

**MOTIVA**  
ENTERPRISES LLC

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July 22, 2009

Mr. Serec Jairam, P.E.  
Broward County Environmental Protection and Growth Management Department  
Pollution Prevention, Remediation and Air Quality Division  
One North University Drive, Suite 203  
Plantation, Florida 33324

Re: Compliance Assurance Monitoring (CAM) Plan  
Motiva Enterprises LLC Port Everglades South Terminal  
FDEP Facility ID No. 0110050

Dear Mr. Jairam:

Per your request, the Motiva Enterprises LLC Port Everglades South Terminal is submitting a Compliance Assurance Monitoring (CAM) Plan application. The Port Everglades South Terminal renewal application was submitted to the Florida Department of Environmental Protection in November 2008.

Thank you for your assistance. Feel free to contact me with any comments or questions at 310/629-8032.

Very truly yours,



T.H. Jackson  
Environmental Representative

Enclosure

**COMPLIANCE ASSURANCE  
MONITORING PLAN APPLICATION**

**MOTIVA ENTERPRISES LLC  
SOUTH TERMINAL  
1200 SE 28TH STREET  
FORT LAUDERDALE, FLORIDA**

**FDEP FACILITY ID NO. 0110050**

**PPM PROJECT NO. 550302**

**JULY 2009**

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## EXECUTIVE SUMMARY – COMPLIANCE ASSURANCE MONITORING PLAN

Motiva Enterprises, LLC (Motiva) owns and operates a petroleum bulk terminal on 1200 SE 28<sup>th</sup> Street, Fort Lauderdale, Florida. This facility is known as the South Terminal. The South Terminal is a major source for Volatile Organic Compounds (VOCs) and was issued a Title V Operating permit by the Broward County Department of Planning and Environmental Protection (DPEP). The pollutant-specific emissions unit (PSEU) of concern at Motiva is classified as an “Other PSEU” per 40 CFR 64.5(b). Facilities with “other PSEUs” are required to submit a Compliance Assurance Monitoring (CAM) plan with the Title V renewal application. Motiva submitted a Title V renewal application to DPEP on October 6, 2008; this document constitutes the CAM plan.

This CAM plan addresses dual-bed vacuum regenerative carbon adsorption vapor recovery unit (VRU) and a back-up VCU. The VRU is used to reduce VOC emissions during the loading of petroleum products into trucks. The VRU is currently permitted as Emissions Unit ID No. 001, in the facility’s Title V permit (Permit No. 0110050-005-AV which was issued on July 26, 2004). VOC vapors from the loading rack go through the VRU to be controlled. Should the VRU shutdown, the VCU will be used to control the emissions on the rack. The loading rack’s vapor collection system (and subsequently the VRU) is subject to an emission limitation standard that restricts emissions to 35 mg of total organic compounds per liter of gasoline loaded, under 40 CFR 60.502(b).

The monitoring approach described in this CAM plan relies on presumptively acceptable monitoring as allowed under 40 CFR 64.4(b). The guidance used for the proposed monitoring is "USEPA CAM Technical Guidance Document, A.24 Carbon Adsorber for VOC Control - Facility EE," dated September 2000. Based on the USEPA guidance document and tests conducted at the facility, three compliance indicators have been selected to monitor the performance of the VRU. All compliance indicators are in place and are currently being monitored.

This document is organized as follows: the section titled “Compliance Assurance Monitoring Rationale and Justification” includes a detailed background, discusses each compliance indicator in detail and the rationales for selecting such indicators, monitoring frequencies, and action and excursion levels triggering various operator responses. **Appendix A** contains the CAM plan approach criteria in a tabular format, and is based on the table in the EPA guidance document. Appendices B through F contain samples of operator logs, inspection forms, and maintenance and malfunction reports that the facility maintains/will maintain. **Appendix G** contains copies of results of tests conducted in November 2008 and March 2003.

According to the convention followed at the facility, and therefore in this CAM plan, a greater vacuum refers to a value closer towards absolute vacuum, whereas less vacuum refers to a value closer towards atmospheric pressure. Thus a vacuum greater than (or above) 25.5 inches of mercury vacuum. Hg vacuum indicates a vacuum closer toward absolute vacuum.

## **Compliance Indicators**

### *Monitoring Vacuum Profile of VRU*

Emission tests performed during normal loading conditions, conducted in October 2003, demonstrated that if the regenerating carbon bed stays at or above 25.5 in. Hg vacuum, the bed is properly regenerated and will have the capacity to meet the permit-specified VOC emission limits under all loading conditions. Hence this plan proposes to monitor the vacuum on the regenerating bed continuously to confirm that it remains at or above 25.5 in. Hg vacuum during each regeneration cycle. Failure to maintain the regenerating bed at or above 25.5 in. Hg vacuum during a regeneration cycle may cause an excursion. If such an event should occur, vapors from the loading rack will be routed to the VCU until the VRU regenerating bed reaches a vacuum of 25.5 in. Hg vacuum – either via operator/maintenance intervention or through continued regeneration. In the event the VRU does not reach its designated vacuum level of 25.5 in. Hg and the VCU shutdowns, an automatic alarm is triggered wherein the loading rack is shut down and no further loading operations can take place until corrective actions are taken. An excursion will trigger an investigation, corrective action, and an external (agency) reporting requirement. However such reporting may not necessarily be indicative of an emission of non-methanogenic organic carbon (NMOC) above permitted levels.

As a backup mechanism that may warn operators of a potential impending excursion level vacuum, Motiva proposes to install a visual alarm that will be triggered when the regenerating bed decreases to 26.5 in. Hg vacuum. The visual alarm can be turned off only via operator intervention and thus may allow internal corrective action to be taken even before a potential excursion can occur.

### *Inspection, Maintenance and, Operator Training*

An inspection, maintenance and operator training program has been and will continue to be implemented and documented by Motiva. The terminal operator on duty currently performs VRU operational checks each day during normal working days. An external reportable incident (although not necessarily indicative of an emission of NMOC above permitted levels) occurs if the periodic inspections or scheduled maintenance are not performed or documented, or if corrective actions are not initiated within 24 hours of detection of problems.

### *Monthly Leak Detection and Repair Program*

A monthly leak detection and repair program of the vapor recovery system has been and will continue to be implemented. The vapor recovery system has been and will continue to

be inspected for leaks using sight, sound, smell and a handheld Lower Explosive Limit (LEL) monitor per 40 CFR 60.502(j). A reportable incident (although not necessarily indicative of an emission of NMOC above permitted levels) is defined as a detection of a leak greater than or equal to 20% of the LEL during normal loading operations. A reportable incident will trigger an investigation, corrective action and an external reporting requirement. Leaks will be repaired within 15 calendar days.

### **Justification for Monitoring Approach, Selection of Indicators and Indicator Range**

Testing conducted on the South Terminal VRU in October 2002 and October 2003, and the USEPA CAM guidance document were the bases for the monitoring approach, selection of the above compliance indicators and their ranges. Testing conducted in November 2008 confirmed that the monitoring and compliance indicators are assuring compliance with the emission standards.

## **EXECUTIVE SUMMARY – TEST RESULTS**

One test was conducted on the South Terminal VRU and one test on the South Terminal VCU during November 2008. Results of these tests are summarized below.

### **Performance Test, November 2008**

Tests showed VOC emissions of 0.71 mg/L of product loaded for the VRU and 5.02 mg/L for the VCU. Comparing the mass of VOC flowing into the VRU with the mass of VOC flowing out, the removal efficiency is calculated as 99.89%. The actual (test) emissions represent 3.8% of the allowable emissions limit of 35 mg/l.

### **Continuous Emission Monitoring (CEM) Test Analysis, March 2003 and November 2008**

The CEM testing performed continuously over a duration of 24 hours in March 2003 showed that at a vacuum of 25.5 in. of Hg, VOC mass removal efficiency was 99.95%. This data demonstrates that the carbon adsorber is operating well below the VOC emission limit and that the current preventative maintenance (PM) and operational program for the VRU is maintaining the VRU in an excellent working condition. This test confirmed that at a vacuum of 25.5 in. of Hg, the regenerating bed regenerates adequately and that VOC emissions are well below the emission limits. Testing done for two hours in November 2008 showed that at a vacuum of 25.5 in of Hg the VOC emissions were 0.52 mg/L of product loaded.

Testing performed in November 2008 confirmed that the instrumentation is performing as designed. When the vacuum fails to reach 25 inches of vacuum within 10 minutes, all vapors are diverted to the VCU.

**Appendix G** contains a copy of the test results.

# 1.0 COMPLIANCE ASSURANCE MONITORING – RATIONALE AND JUSTIFICATION

## 1.1 BACKGROUND

The pollutant-specific emissions unit (PSEU) at the Motiva South Terminal is subject to compliance assurance monitoring (CAM) requirements under 40 CFR Part 64 due to the following reasons:

- it is located at a major source that is required to obtain a Title V permit;
- it is subject to an emission limitation of 35 mg of Total Organic Carbon per liter of gasoline loaded, as specified in 40 CFR 60.502(b);
- it uses a control device to achieve compliance with the above emission limit;
- its potential pre-control emissions of volatile organic compounds (VOCs) from the PSEU are at least 100 tons per year (which is the major source threshold for Broward County); and
- it is not otherwise exempt from 40 CFR Part 64.

The monitoring approach described in this CAM plan relies on presumptively acceptable monitoring identified in guidance from EPA and is therefore consistent with the requirements of 40 CFR 64.4(b). Specifically, 40 CFR 64.4(b)(5) allows the use of presumptively acceptable monitoring identified in guidance from the EPA. The guidance used for the proposed monitoring is "USEPA CAM Technical Guidance Document, A.24 Carbon Adsorber for VOC Control - Facility EE," dated September 2000. Where the facility varies from presumptively acceptable monitoring, the facility proposes to use monitoring recommended by the manufacturer and valid engineering assessments and test data, consistent with 40 CFR 64.4(c)(1).

This CAM plan addresses the South Terminal, which has a dual-bed vacuum regenerative carbon adsorption vapor recovery unit (VRU) and a back-up VCU. The VRU is used to reduce VOC emissions during the loading of petroleum products into trucks. The VRU is currently permitted as Emissions Unit ID No. 001, in the facility's Title V permit (Permit No. 0110050-005-AV). VOC vapors from the loading rack go through the VRU to be controlled. Should the VRU shutdown, the VCU will be used to control the emissions on the rack. The loading rack's vapor collection system (and subsequently the VRU) is subject to an emission limitation standard that restricts emissions to 35 mg of total organic compounds per liter of gasoline loaded, under 40 CFR 60.502(b).

### 1.1.1 Pollutant-Specific Emissions Unit

The PSEU addressed in this CAM plan is a vacuum regenerative carbon absorber and a backup vapor combustion unit used to reduce VOC emissions from the loading of petroleum products into trucks at the Motiva South Terminal. The petroleum products loaded are gasoline, diesel and additives. The PSEU is a McGill<sup>®</sup> carbon vapor recovery unit (VRU). The carbon adsorber has two identical beds, one adsorbing while the other is desorbing, with each bed on a 15-minute cycle. Carbon bed regeneration is accomplished

by a combination of high vacuum and purge air stripping, which removes previously adsorbed petroleum vapor from the carbon and restores the carbon's ability to adsorb vapor during the next cycle. The vacuum pump extracts concentrated petroleum vapor from the carbon bed and discharges into a separator. Non-condensed hydrocarbon vapor and hydrocarbon condensate flow from the separator to an absorber column, which functions as the recovery device for the system. In the absorber, the hydrocarbon vapor flows up through the absorber packing, where it gets liquefied and is subsequently recovered by absorption. Gasoline product from a storage tank is used as the absorbent fluid. The recovered product is returned along with the circulating gasoline back to the product storage tank. A small stream of air and residual vapor exits the top of the absorber column and is recycled to the on-stream carbon bed where the residual petroleum vapor is re-adsorbed.

Four loading bays are equipped to load petroleum products onto trucks. Each bay is equipped with vapor recovery hoses positioned at the truck loading areas for hook-up to the vapor control system. The vapor hoses and associated piping transport vapors to the VRU. The VRU has a backup vapor combustion unit that can control VOC emission should the VRU shutdown. **Appendix A** contains key elements of the CAM plan approach criteria in a tabular format, and is based on the table in the EPA guidance document.

## **1.2 RATIONALE FOR SELECTION OF PERFORMANCE INDICATORS**

The carbon adsorption system was designed and engineered specifically for this facility based on the products loaded and the maximum expected loading rates. The vacuum profile during regeneration is an important variable in the performance of the VRU. If the carbon bed is overloaded, the time to achieve certain vacuum levels will be longer, and the bed will not be fully regenerated during the 15-minute cycle. The VRU has a backup vapor combustion unit that can control emissions should the VRU carbon beds be overloaded. The verification that the VCU is operating is the presence of a flame. The VCU has a 98% control efficiency of VOCs should the VCU shutdown. Also, when the VCU shuts down an alarm triggers an automatic interlock to the loading system and automatically shuts down the loading rack.

Monitoring of the vacuum profile during regeneration, coupled with regular inspection and maintenance activities, operator training and biennial testing of the carbon sample from each bed, serve to verify that the VRU is operating properly. In addition, a monthly leak inspection program is performed to confirm that the vapors released during loading are captured and conveyed to the VRU. A handheld monitor is used to detect leaks in the vapor collection system.

## **1.3 RATIONALE FOR SELECTION OF INDICATOR RANGES**

### **1.3.1 Compliance Indicator No. 1 - Monitoring Vacuum Profile of VRU**

Compliance Indicator No. 1 is monitoring the vacuum cycle of the regeneration bed. A Continuous Emissions Monitoring (CEM) unit was used to monitor emissions for 24 hours; this test confirmed that at a vacuum of 25.5 in. Hg, the regenerating bed regenerates

adequately and that VOC emissions are well below the emission limits. **Appendix G** contains a copy of the test results. Based on the test results, an excursion occurs when the regenerating bed decreases to 25.5 in. Hg vacuum. Vacuum readings will be monitored continuously via a pressure transmitter to verify that the regenerating bed remains at or above 25.5 in. Hg vacuum. This excludes periods when the monitoring system is under repair, maintenance, or QA/QC procedures. These vacuum readings will be relayed to the control panel. Operators will observe and record at least one complete regeneration cycle during each 24-hour period during normal working days. When an excursion occurs, vapors are no longer sent to the VRU and a visual alarm is triggered; vapor flow to the VRU does not resume until the VRU regeneration cycle reaches a vacuum of 25.5 in. Hg – either via operator intervention or through self-adjusting means. However, normal loading operations will continue by routing the emissions to the VCU. An ultraviolet flame detector is used to guarantee the presence of a flame in the VCU, therefore ensuring VOC destruction. Should the VCU shutdown then a high level alarm will automatically shutdown the loading rack. **Appendix B** contains the VRU Daily Operation Log, which contains the pressure profile records.

#### **1.3.1.1 Action Level**

In order to provide a high level of assurance that the excursion level is not reached for Compliance Indicator No. 1, the facility has established an action level set above the excursion level.

The action level is set at 26.5 in. Hg vacuum. If the vacuum decreases to 26.5 in. Hg during a regeneration bed cycle, a visual alarm is triggered on the control panel, which can be turned off only by operator intervention. Following the acknowledgement of the alarm by an on-duty operator, an investigation and subsequent corrective action(s) will be initiated so that the cause of the problem may be corrected before an excursion occurs.

#### **1.3.1.2 Excursion Level/Reportable Incident Level**

As indicated above, an excursion occurs when the regenerating bed decreases to 25.5 in. Hg vacuum. When an excursion occurs, vapors are no longer sent to the VRU and a visual alarm indicating the discontinuation of vapor flow to the VRU is triggered. Under such circumstances, vapors are routed completely to the VCU. Normal loading operations will continue unless the VCU shutdowns. At this point the high-level alarm in the holding tank will activate and automatically shut down the loading rack. A reportable incident (although not necessarily indicative of an emission of NMOC above permitted levels) occurs when the vapor flow to the VRU is shut off. Excursion level incidents will be documented in the Monthly VRU Malfunction Report, in **Appendix D**.

#### **1.3.2 Compliance Indicator No. 2 - Inspection, Maintenance and Operator Training**

Compliance Indicator No. 2 will include a documented inspection, maintenance and operator-training program. VRU operational checks will be performed each day that an operator is on duty during normal working days. Routine maintenance activities are also

conducted. Results of daily inspections and routine maintenance are recorded in the VRU Weekly Inspection Report, included in **Appendix C**. Results of monthly maintenance as well as malfunctions resulting in VRU shut down are recorded in the Monthly VRU Malfunction Report, included in **Appendix D**. Quarterly maintenance is performed by a contracted maintenance company. Results of quarterly maintenance activities are recorded and a file copy is maintained onsite. A copy of the quarterly maintenance activities performed is shown in **Appendix E**. Documentation of operator training is also maintained in **Appendix E**.

#### **1.3.2.1 Reportable Incident Level**

An external reportable incident (although not necessarily indicative of an emission of NMOC above permitted levels) occurs if the periodic inspections and scheduled maintenance are not performed or documented, or if corrective actions are not initiated within 24 hours of detection of problems.

### **1.3.3 Compliance Indicator No. 3 – Monthly Leak Detection and Repair Program**

Compliance indicator No. 3 is a monthly leak detection and repair program. The vapor collection and recovery system are inspected for leaks using sight, sound, smell and a handheld Lower Explosive Limit (LEL) monitor. Tank truckers show verification of fugitive leak checks. Results of the leak inspections are recorded in the Monthly Leak Inspection Form, included in **Appendix F**.

#### **1.3.3.1 Action Level**

In order to verify that corrective actions are taken on leaking piping, hoses, etc., before they lead to reportable incidents, Motiva established an action level as a detection of a leak greater than or equal to 10% and less than 20% of the LEL during normal loading operations. If a detection of leaks triggering an LEL reading in the action level range occurs, a corrective action is initiated, the cause of the problem is identified and repairs are made within 15 calendar days. A first attempt at repair shall be made no later than 5 calendar days after each leak is detected.

#### **1.3.3.2 Reportable Incident Level**

An external reportable incident (although not necessarily indicative of an emission of NMOC above permitted levels) is defined as a detection of a leak greater than or equal to 20% of the LEL during normal loading operations. If a detection of leaks triggering an LEL reading in the reportable level range occurs, a corrective action will be initiated, the cause of the problem will be identified and repairs will be made within 15 calendar days. A first attempt at repair shall be made no later than 5 calendar days after each leak is detected.



## **1.4 RESPONSE TO COMPLIANCE INDICATORS**

The key to demonstrating compliance with permitted emission limits on a long-term basis is the proper operation and maintenance of the PSEU. The above monitoring parameters and indicator ranges were identified to provide verification that the PSEU is operating properly, thereby providing a reasonable assurance of compliance. However, it is equally important that proper action be taken in response to the action and excursion levels of the selected monitoring parameters. These responses are described below.

### **1.4.1 Compliance Indicator No. 1- Monitoring Vacuum Profile of VRU**

#### **1.4.1.1 Action Level**

Exceeding the action level range will trigger an investigation, corrective action and an internal reporting requirement. Upon an action level alarm being acknowledged by an operator, a corrective action is initiated within 24 hours. If onsite personnel cannot conduct the required corrective action, the contracted maintenance group is notified of the incident within the next 24 hours and brought onsite as soon as possible.

#### **1.4.1.2 Excursion Level/Reportable Incident Level**

An excursion triggers an investigation, corrective action, and an external reporting requirement. Upon the discontinuation of the vapor flow to the VRU a visual alarm is triggered and a corrective action is initiated within 24 hours of acknowledgement of the alarm. If onsite personnel cannot conduct the required corrective action, the contracted maintenance group is notified of the incident within 24 hours and brought onsite as soon as possible.

### **1.4.2 Compliance Indicator No. 2- Inspection, Maintenance and Operator Training**

#### **1.4.2.1 Action Level**

Not applicable.

#### **1.4.2.2 Incident Level**

A reportable incident triggers an investigation, corrective action, and an external reporting requirement. Corrective actions will be initiated within 24 hours of the detection of the reportable incident.

### **1.4.3 Compliance Indicator No. 3- Monthly Leak Detection and Repair Program**

#### **1.4.3.1 Action Level**

Exceeding the action level range triggers an investigation, corrective action and an internal reporting requirement. Leaks are repaired within 30 calendar days.

#### **1.4.3.2 Incident Level**

A reportable incident triggers an investigation, corrective action and an external reporting requirement. Leaks are repaired within 15 calendar days.

### **1.5 AIR POLLUTION CONTROL DEVICE BYPASS MONITORING**

Under normal operating conditions, bypass of the VRU cannot occur based on the design of the PSEU. Specifically, all vapors collected at the loading rack flow the VRU. If the vapor flow rate from the loading rack exceeds the processing rate of the VRU, the excess vapors are routed to the VCU. Should the VCU shutdown, an interlock will automatically shut down the loading rack. The VCU is in compliance as long as a flame is present. There are no other lines coming from the loading rack; thus there are no alternate pathways for vapors to bypass the VRU during normal operation.

### **1.6 IMPLEMENTATION PLAN AND SCHEDULE**

As per 40 CFR 64.4(e), Motiva will continue to implement the elements of this CAM Plan.

**APPENDIX A**  
**CAM PLAN APPROACH CRITERIA**

**Emissions Unit 001**  
**Petroleum Liquid Loading Rack with Carbon Adsorption**  
**Vapor Recovery Unit (VRU) and a Backup Vapor Combustion Unit (VCU) for**  
**Controlling VOC Emissions**

**TABLE 1.a: MONITORING APPROACH- VRU Indicator No. 1**

		Indicator 1
I.	Parameter	<u>Regeneration cycle vacuum.</u> Specifically, monitoring the vacuum on the regeneration bed to confirm that it remains at or above 25.5 inches of mercury (inches Hg) vacuum.
	Measurement Approach	Pressure transmitter, relayed to system PLC.
II.	Indicator Range Action Level Range	A corrective action is triggered when the regenerating carbon bed decreases to 26.5 inches Hg vacuum during regeneration. When the action level range is breached, a visual alarm is triggered on the control panel. This alarm must be acknowledged by an operator to turn off.
	Excursion Level/Reportable Incident Range	<p>An excursion occurs if the vacuum level falls below 25.5 inches Hg during the regeneration cycle. At this time, rack activity is shut down, the main valve to the VRU is closed, and vapors are redirected to the VCU. The PLC on the VCU sees the pilot light, it will ignite the VCU. The switch from the VRU to the VCU required 60 seconds. If the pilot light is not recognized at time of switch, the rack will remain shut down, disabling all loading until the problem with the VCU is resolved.</p> <p>Once the regenerating carbon bed returns to 26.5 inches Hg, vapors will be routed back to the VRU. Rack activity is shut down while the computer tells the VCU to shut down and reopens the main valve to the VRU. In the event that the vacuum level does not rise to 26.5 inches Hg, the VCU will continue to burn all vapors.</p>
III.	Response to Indicators Action Level Range	Breach of the action level range will trigger an investigation, corrective action and an internal reporting requirement. The pilot flame on the VCU will also be ignited so that the VCU will be on stand-by to receive the re-routed vapors if the VRU is shut down due to the vacuum level decreasing below 25.5 inches Hg. Upon an action level alarm being acknowledged by the facility, a corrective action will be initiated within 24 hours. If the required corrective action cannot be conducted by onsite personnel, the contracted maintenance group will be notified of the incident within 24 hours and will be brought onsite as soon as possible. The pilot flame on the VCU will remain ignited and ready until the vacuum levels rise above 26.5 inches Hg.

	Excursion Level/Reportable Incident Range	An excursion will trigger an investigation, corrective action, and external reporting requirement. Upon the discontinuation of vapor flow to the VRU, a visual alarm is triggered and a corrective action will be initiated immediately upon acknowledgement of the alarm. If the required action cannot be conducted by onsite personnel, the contracted maintenance group will be notified of the incident within 24 hours and will be brought onsite as soon as possible. Vapors will continue to be routed to the VCU until such time that the problem with the VRU is resolved.
IV.	Performance Criteria Data Representativeness	The pressure cycle is measured in the vacuum pump suction line. The minimum accuracy of the pressure transmitter is +/- 1.0 percent. The pressure transmitter is equipped with a visual alarm that is triggered when the regeneration carbon bed vacuum decreases to the Action Level. The alarm has to be acknowledged by an operator to turn off. The pressure transmitter is also equipped with an additional visual alarm that is triggered when the carbon bed vacuum decreases to the excursion level.
	Verification of Operational Status	NA
	QA/QC Practices and Criteria	Pressure transmitter is calibrated annually.  Alarm light operation is visually checked each day that an operator is on duty during normal working days.  New operators are given 40 hours of hands-on training by a qualified operator, prior to working independently.
	Monitoring Frequency	Pressure profile is monitored and recorded continuously during each regeneration cycle and visual alarms are triggered when the action level/excursion level is breached. Regeneration cycle is monitored visually, once per 24 hour shift when operator is on duty during normal working days. Alarm light is checked daily when operator is on duty.
V.	Data Collection Procedures	The operator records the pressure profile during one regeneration cycle per 24 hour shift, except when operator is not in duty (weekends, holidays, etc.). Alarm light and status are checked and recorded once per day except when operator is not on duty (i.e. weekends, holidays). Alarm lights will not turn off until acknowledged. After the period when an operator is not on duty, the first, shift operator on duty will initiate VRU operation inspection as soon as possible after beginning a shift. Excursion level alarm triggers rerouting of vapor to flow to VCU.
	Average Period	None.

	APCD Bypass Monitoring	Under normal operating conditions, bypass of the APCD (i.e., the VRU) cannot occur based in the design of the PSEU. Specifically, all vapors collected at the loading rack are routed to the VRU. If the VRU shuts down, the excess vapors will be controlled by the VCU. Should the VCU become unoperational then an interlock will automatically shutdown the loading rack.
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**TABLE 1.b: MONITORING APPROACH- VRU Indicator No. 2**

		Indicator 2
I.	Parameter	Documentation of inspection, maintenance and operator training program.
	Measurement Approach	Proper VRU operation is verified by performing periodic inspections and maintenance by properly trained personnel. Daily operator checks include regenerating bed operating temperature profile, cycle time, operating pressures, operating temperatures, and verification of relevant fluid levels. Daily operator checks are performed each day that an operator is on duty during normal working days.  Quarterly maintenance is performed by maintenance contractor. Biennial testing of the carbon in each bed will also be performed.
II.	Indicator Range Action Level Range	NA
	Excursion Level/Reportable Incident Range	A reportable incident occurs if the periodic inspections, scheduled preventative maintenance, or biennial carbon test is not performed or documented, or if corrective action is not initiated within 24 hours of detection to correct any problems identified during the inspection, maintenance of the unit or carbon testing.
III.	Response to Indicators Action Level Range	NA
	Excursion Level/Reportable Incident Range	A reportable incident will trigger an investigation, corrective action and an external reporting requirement. Corrective actions will be initiated immediately upon detection of the reportable incident.
IV.	Performance Criteria Data Representativeness	VRU operation will be verified by trained personnel using documented inspection and maintenance procedures. Carbon samples will be properly taken using representative samples from both beds.
	Verification of Operational Status	NA
	QA/QC Practices and Criteria	New operators are given 40 hours of hands-on training by a qualified operator, prior to working alone. Each operator is given one day of hands-on training annually with the VRU maintenance contractor on proper maintenance, operation and repair of the VRU. Quarterly maintenance is performed by licensed contractor with extensive knowledge of VRU operation and maintenance.

	Monitoring Frequency	<p>Periodic operation and maintenance checks conducted by onsite trained operators.</p> <p>Contract maintenance group performs quarterly scheduled maintenance.</p>
V.	Data Collection Procedures	<p>Results of daily inspections are recorded in the VRU Weekly Inspection Report. Incidents when the VRU is taken out of service for routine maintenance by plant personnel are recorded in a Monthly Maintenance and Malfunction Report. Quarterly maintenance report is prepared by the maintenance service company and a copy is left at the terminal prior to their departure. Documentation of operator training along with the quarterly maintenance report and carbon bed test results is maintained onsite.</p> <p>None.</p>
	Average Period	
	APCD Bypass Monitoring	<p>Under normal operating conditions, bypass of the APCD (i.e., the VRU) cannot occur based on the design of the PSEU. Specifically, all vapors collected at the loading rack are routed to the VRU. If the VRU shuts down, the excess vapors will be controlled by the VCU. Should the VCU become unoperational then an interlock will automatically shutdown the loading rack.</p>



**TABLE 1.c: MONITORING APPROACH- VRU Indicator No. 3**

		Indicator 3
I.	Parameter	Documentation of inspection, maintenance and leak checks of vapor recovery system and bypass sources including the vacuum pressure relief valve on the vapor line from the loading rack to the vapor recovery unit. This relief valve protects the trailers at the loading racks from pressure. The relief valve will open at 18 inches of water column, or approximately 2/3rds psi. This relief valve does not protect the vapor recovery unit in any way. This valve will be checked monthly to ensure that it is operational.
	Measurement Approach	Monthly leak checks of vapor collection system and any bypass sources. Tank truckers will show verification of fugitive leak checks.
II.	Indicator Range	A corrective action is triggered if an LEL reading of 10% -<20% is detected during an inspection.
	Action Level Range	
	Excursion Level Range	An excursion occurs if the LEL exceeds 20%.
III.	Response to Indicators	NA
	Action Level Range	Exceeding the action level range will trigger an investigation, corrective action an internal reporting requirement. Leaks will be repaired within 15 calendar days. At first attempt at repair shall be made no later than 5 calendar days after each leak is detected.
	Excursion Level/Reportable Incident Range	A reportable incident will trigger an investigation, corrective action, and external reporting requirement. Leaks will be repaired within 15 calendar days. At first attempt at repair shall be made no later than 5 calendar days after each leak is detected.
IV.	Performance Criteria	
	A. Data Representativeness	As required by 40 CFR 60.502(j), leaks are inspected using sight, sound, and smell, and handled Lower Explosive Limit monitor.
	B. Verification of Operational Status	NA
	C. QA/QC Practices and Criteria	Procedures are followed according to 40 CFR 60.502(j), NSPS for Bulk Gasoline Terminals.
	D. Monitoring Frequency	Monthly leak check or vapor collection system.

	E. Average Period	NA
V.	Data Collection Procedures	Records of leak checks, leaks found, and corrective actions taken are kept on file at the facility.
	APCD Bypass Monitoring	Under normal operating conditions, bypass of the APCD (i.e. the VRU) cannot occur based on the design of the PSEU. Specifically, all vapors collected at the loading rack are routed to the VRU. If the VRU shuts down, the excess vapors will be controlled by the VCU. Should the VCU become unoperational then an interlock will automatically shutdown the loading rack.

**TABLE 2.a: MONITORING APPROACH- FLARE (VCU) Indicator No. 1**

**EMISSION UNIT 001- LOADING RACK WITH FLARE (VCU)**

	<b>Indicator 1</b>
I. Indicator	Presence of Flame
Monitoring Approach	<p>Flame presence is monitored using an ultraviolet flame detector (UFD).</p> <p>{<u>Operations Note.</u> After a tanker truck is hooked up at the loading rack, a remote signal is sent to the flare programmable logic controller (PLC) to automatically ignite the pilot flame. After the UFD verifies that a flame is present, a green light is on in the operator's office. If the UFD signal is lost during loading, the loading rack automatically shuts down and the green light is off}.</p>
II. Indicator Range	An excursion occurs whenever the UFD signal is lost during loading (i.e. the flame is absent) resulting in automatic shutoff at the loading rack, making loading impossible.
QIP Threshold	Not more than 6 excursions in any semi-annual reporting period.
III. Performance Criteria	NA
A. Data Representativeness	The UFD is wired into the stack to detect the presence of the flame.
B. Verification or Operational Status	A green light in the operator's office is on whenever the UFD detects the presence of a flame.
C. QA/QC Practices and Criteria	Manufacturer's routine maintenance requirements include keeping the flame detection system adjusted for the smoothest, most reliable operation, and ensuring that the flame signal current is above the manufacturer's minimum acceptable level.
D. Monitoring Frequency	The UFD operated continuously, when the flare is operating.
E. Data Collection Procedures	The UFD continuously senses the ultraviolet radiation emitted by the combustion flames and generates a current (microamps) signal to the PLC.
F. Average Period	NA

**APPENDIX B**

**VRU DAILY OPERATION LOG**



**APPENDIX C**

**VRU WEEKLY INSPECTION REPORT**

APPENDIX C  
 MOTIVA ENTERPRISES, LLC  
 PORT EVERGLADES FL - SOUTH TERMINAL  
 FDEP FACILITY ID 0110060  
 VRU Weekly Inspection Report -MCGILL VAPOR RECOVERY UNIT

	DATE	MON	TUE	WED	THU	FRI	MAX
Gasoline Tank Height	HEIGHT						tank safe fill
Gasoline Supply Pressure	P1-4A						25-35 psi
Gasoline Return Pressure	P1-1A						35-50 psi
Temp. Gasoline Supply	T1-1A						90°
Gas. To Absorber Pres.	P1-3B						12-17 psi
Gas. Level in Separator	LG-1						between wire ties
Temp. Seal Fluid into Heat Exchanger	T1-2B						110° within 10° of T1-1C
Glycol Level in Separator	LG-2						wire tie marker
Vacuum Pump Pressure	P1-5A						27 Hg < x < 28.5 Hg
Carbon Bed Temperature (°F) - Bed A (Top)	T1-3A						20°
Carbon Bed Temperature (°F) - Bed (Middle)	T1-3B						20°
Carbon Bed Temperature (°F) - Bed (Bottom)	T1-3C						20°
Carbon Bed Temperature (°F) - Bed B (Top)	T1-3D						20°
Carbon Bed Temperature (°F) - Bed (Middle)	T1-3E						20°
Carbon Bed Temperature (°F) - Bed (Bottom)	T1-3F						20°
Seal Pump Discharge	P1-3A						greater than 20 psi
Glycol Outlet Temperature	T1-1C						110° within 10° of T1-2B
Glycol Seal Flow Rate (pressure below 25 psi clean s	F1/F51-1						30 GPM
Glycol discharge from Vacuum Pump	T1-2						120°
Fluid Leaks (Remarks)*							
Abnormal Noises (Remarks)*							
General System Alarm Check							
Vacuum Transmitter Check for 26.5 in. Hg							
Vacuum (Off/On)							
Vacuum Transmitter Check for 26.5 in. Hg							
Vacuum (Off/On)							
Oil Level/Supply Pump							
Supply Strainer Last Cleaned							
Glycol Last Added:							
INITIAL/SIGN							

**APPENDIX D**  
**MONTHLY VRU MALFUNCTION REPORT**



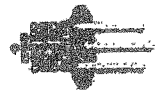
OUT-OF-SERVICE DATE/TIME	RET'D TO SERVICE DATE/TIME	TIME OUT OF SERVICE	SIGNED BY	DESCRIBE MALFUNCTION	GOVERNMENT AGENCY AND PERSON NOTIFIED
DID MALFUNCTION RESULT IN EMISSIONS THAT REQUIRED REPORTING TO A GOVERNMENTAL AGENCY? ( ) NO ( ) YES		ELECTIVE ( ) NON ELECTIVE ( )			
DID MALFUNCTION RESULT IN EMISSIONS THAT REQUIRED REPORTING TO A GOVERNMENTAL AGENCY? ( ) NO ( ) YES		ELECTIVE ( ) NON ELECTIVE ( )			
DID MALFUNCTION RESULT IN EMISSIONS THAT REQUIRED REPORTING TO A GOVERNMENTAL AGENCY? ( ) NO ( ) YES		ELECTIVE ( ) NON ELECTIVE ( )			
DID MALFUNCTION RESULT IN EMISSIONS THAT REQUIRED REPORTING TO A GOVERNMENTAL AGENCY? ( ) NO ( ) YES		ELECTIVE ( ) NON ELECTIVE ( )			

ELECTIVE MEANS YOU CHOSE TO TAKE THE UNIT OUT OF SERVICE, NON ELECTIVE MEANS YOU HAD TO TAKE THE UNIT OUT OF SERVICE  
 \*SYSTEM INCLUDES VAPOR PROCESSING UNIT, VENTS (INCLUDING TANKS IF CONNECTED), VAPOR HOLDER, VAPOR PIPING, T/T BACK LOADING ASSEMBLIES AND VAPOR HOSES. REPORT ALL INCIDENTS RESULTING IN EMISSIONS REQUIRING NOTIFICATION TO AN AGENCY ANY MAJOR EQUIPMENT/COMPONENT FAILURE AND ALL EQUIPMENT FAILURES/PROBLEMS OF A REPETITIVE NATURE

**APPENDIX E**

**QUARTERLY PREVENTATIVE MAINTENANCE CHECKLIST AND  
OPERATOR TRAINING DOCUMENTATION**

**QUARTERLY PREVENTATIVE MAINTENANCE CHECKLIST**



# JORDAN TECHNOLOGIES INC.



2820 South English Station Road  
Louisville, KY 40299  
Ph: 502-267-8344 Fax: 502-267-8379

### 1. BILLING ADDRESS

**MOTIVA**  
Customer Name  
**1200 SOUTHEAST 28TH ST**  
Street Address  
**FORT LAUDERDALE FL**  
City / State / Zip  
Billing Contact and Phone#

### 2. SHIPPING ADDRESS

Customer Name  
**Same**  
Street Address  
City / State / Zip  
Shipping Contact and Phone#

### 3. LABOR AND TRAVEL

Date	Technician	Miles Driven	Std. Labor	Std. Travel	*O.T. Labor	*O.T. Travel	Hol. Labor	Hol. Travel
06-12-2009	RON SELMAN		2					
06-13-2009	RON SELMAN		3					
06-14-2009	RON SELMAN			4				
*OT is charged before 8 am, after 5 pm and on weekends. Totals			5	4				

### 4. LABOR TYPE & EXPENSES

- P.M.I
- Service Call
- Bid Job
- Testing
- Sales Call
- Warranty
- Training
- Other
- Airfare
- Car Rental
- Lodging
- Tolls/Parking
- Equip. Rental
- Meals
- Mileage
- Other

### 5. PARTS & EQUIPMENT

Qty	Item Number	Description	TS	DP	OS
0			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
0			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

### 6. LABOR PERFORMED AND REMARKS

performed pit on megill fan - took all bed readings - took all skirt readings  
performed all shutdowns on unit - checked all actuators - opened and checked all panels - checking on a new actuator for the back pressure line  
mar 30-30 101

*Lester F. Miller* Lester F. Miller 6/17/09  
Customer Signature Customer Printed Name Date Customer P.O.

NET PAYMENT IS DUE 30 DAYS FROM DATE WORK IS PERFORMED

All installed or purchased parts have a 30 day or factory warranty, which ever is longer. No warranty is given for freight or labor on those parts.





## VRU Preventative Maintenance Check List

### 4. Valve Actuators

Remove covers from actuators: check wiring, brakes, micro switches, cam heaters, thermostats, and signs of corrosion. Observe valves for proper seating and switching. Lubricate as necessary.

- |                              |           |
|------------------------------|-----------|
| 4.1 Mov-101 vent valve       | <u>OK</u> |
| 4.2 Mov-102 regen valve      | <u>OK</u> |
| 4.3 Mov-103 inlet valve      | <u>OK</u> |
| 4.4 Mov-201 vent valve       | <u>OK</u> |
| 4.5 Mov-202 regen valve      | <u>OK</u> |
| 4.6 Mov-203 inlet valve      | <u>OK</u> |
| 4.7 Mov-701 gas supply valve | <u>OK</u> |
| 4.8 Mov-601 gas return valve | <u>OK</u> |

Comments: \_\_\_\_\_

### 5. Mechanical Operation

- |  |             |
|--|-------------|
| 5.1 All pumps/motors running smoothly                          | <u>yes</u>  |
| 5.2 Gasoline supply strainer cleaned                           | _____       |
| 5.3 Glycol strainer cleaned                                    | _____       |
| 5.4 Gasoline level in absorber                                 | <u>good</u> |
| 5.5 Glycol level in separator                                  | <u>good</u> |
| 5.6 Pumps lubricated properly(oil in sight glass)              |             |
| 5.7 Lubricate motors as needed per manufacturer recommendation | _____       |
| 5.8 Clean glycol and gasoline sight glasses                    | <u>OK</u>   |





## VRU Preventative Maintenance Check List

### 1. Pressures

- 1.1 Gasoline psi to top of absorber 14.5 PSIG
- 1.2 Gasoline psi to bottom of absorber \_\_\_\_\_ PSIG
- 1.3 Gasoline return pump psi 45 PSIG
- 1.4 Gasoline supply pump psi before strainer 30 PSIG
- 1.5 Gasoline supply pump psi after strainer 30 PSIG
- 1.6 Seal Fluid psi before strainer/sock filter 51 PSIG
- 1.7 Seal Fluid psi after strainer/sock filter 50 47 PSIG

Comments: \_\_\_\_\_

### 2. Temperatures

- 2.1 Temperature V1: Top 75 DEG F Mid 75 DEG F BOT 75 DEG F
- 2.2 Temperature V2: Top 75 DEG F Mid 75 DEG F BOT 75 DEG F
- 2.3 Temperature inlet gas to heat exchanger 80° DEG F
- 2.4 Temperature outlet gas from heat exchanger 84° DEG F
- 2.5 Temperature glycol to vacuum pump(s) 101° DEG F
- 2.6 Temperature difference between 2.4 and 2.5 \_\_\_\_\_ DEG F  
Please consult terminal manager if difference  
Is over 10 DEG F
- 2.7 Temperature glycol on vacuum pump(C1) discharge 108° DEG F
- 2.8 Temperature glycol on vacuum pump(C2) discharge \_\_\_\_\_ DEG F

Comments: \_\_\_\_\_

### VRU Preventative Maintenance(PM) Check List

Date of Preventative Maintenance: 6/2/09 6/3/09

Motiva Terminal: Fert Landdale Smith

Address: \_\_\_\_\_

Fert Landdale PL

Technician: Paul Sabatini

Start Time: 11:00 End Time: \_\_\_\_\_

Quarterly or Bi-Annual PM: \_\_\_\_\_

All Motiva safety procedures and policies will be followed during preventative maintenance activities. Before start of PM, a hot or safe work permit will be issued from Motiva personnel after area has been determined to be ok for LEL, Oxygen and VOC's. Motiva personnel and will convey current condition of VRU to technician.

VRU issues pre-pm inspection:

back pressure actuator not working properly / back l/c on ydragawa not working

\_\_\_\_\_  
\_\_\_\_\_

VRU issues post-pm inspections:

back pressure actuator not working properly / will be new one sent.

\_\_\_\_\_

Terminal Manger \_\_\_\_\_ Date \_\_\_\_\_

**OPERATOR TRAINING DOCUMENTATION**



# HSE Meeting Roster

Form HSE1

Instructions: Use this form to document HSE-related meetings.

## Section 1. General Information

Date	7/30/08
Terminal	Motiva Enterprises, LLC, South Florida Complex 8015
Facilitator/Instructor	ANDY MARCZAK / JORDAN TECH.

## Section 2. Meeting Description

Topic	Title V Air Permit, CAM Plan
Purpose	Meet the requirements of the CAM Plan
Handouts	None.
Agenda/Outline	Tabletop discussion for routine daily checks.

## Section 3. Attendees

Print Name	Signature
SHARON ROBINSON	Sharon Robinson
DAVID T. WATSON	David T. Watson
LARRY ULRICH	Larry Ulrich
BOB REDFERN	Bob Redfern
STEVE TOSI	Steve Tosi
JONATHAN BELLEMAN	Jonathan Belleman
DENAS BROOKS	Denas Brooks
RICK BOWER	Rick Bower

## Section 4. Action Items

Action Item	Responsible Person

## **ANNUAL CARBON BED TESTING**

Device Type D1K100  
 Serial No 12A728148  
 File Message RATA TEST  
 Time Correction None  
 Starting Condition Manual  
 Dividing Condition Manual  
 Meas Ch 2  
 Math Ch 0  
 Data Count 17947  
 Sampling Interval 5.000 sec  
 Start Time 2003/03/12 11:11:35 0.000  
 Stop Time 2003/03/13 12:07:05 0.000  
 Trigger Time 2003/03/13 12:07:05 0.000  
 Trigger No 17946  
 Damage Check Not Damaged

Converted Group 1 - 1

Date	Time	Ch	Tag	sec	CH01	Average	mg/L
2003/10/22	10:48:10			0.000	0.00	0.5	
2003/10/22	10:48:15			0.000	0.01		
2003/10/22	10:48:20			0.000	-0.02		
2003/10/22	10:48:25			0.000	0.04		
2003/10/22	10:48:30			0.000	0.01		
2003/10/22	10:48:35			0.000	-0.01		
2003/10/22	10:48:40			0.000	0.02		
2003/10/22	10:48:45			0.000	-0.02		
2003/10/22	10:48:50			0.000	0.00		
2003/10/22	10:48:55			0.000	-0.01		
2003/10/22	10:49:00			0.000	0.01		
2003/10/22	10:49:05			0.000	0.01		
2003/10/22	10:49:10			0.000	-0.01		
2003/10/22	10:49:15			0.000	0.02		
2003/10/22	10:49:20			0.000	0.02		
2003/10/22	10:49:25			0.000	0.01		
2003/10/22	10:49:30			0.000	-0.01		
2003/10/22	10:49:35			0.000	0.04		
2003/10/22	10:49:40			0.000	0.02		
2003/10/22	10:49:45			0.000	-0.02		
2003/10/22	10:49:50			0.000	0.03		
2003/10/22	10:49:55			0.000	-0.02		
2003/10/22	10:50:00			0.000	0.01		
2003/10/22	10:50:05			0.000	-0.01		
2003/10/22	10:50:10			0.000	0.00		
2003/10/22	10:50:15			0.000	0.01		
2003/10/22	10:50:20			0.000	-0.01		
2003/10/22	10:50:25			0.000	0.02		
2003/10/22	10:50:30			0.000	0.01		
2003/10/22	10:50:35			0.000	0.01		
2003/10/22	10:50:40			0.000	0.00		
2003/10/22	10:50:45			0.000	0.02		
2003/10/22	10:50:50			0.000	0.01		
2003/10/22	10:50:55			0.000	-0.02		
2003/10/22	10:51:00			0.000	0.03		
2003/10/22	10:51:05			0.000	-0.02		
2003/10/22	10:51:10			0.000	0.00		
2003/10/22	10:51:15			0.000	0.00		
2003/10/22	10:51:20			0.000	0.03		
2003/10/22	10:51:25			0.000	0.02		
2003/10/22	10:51:30			0.000	-0.02		
2003/10/22	10:51:35			0.000	0.01		
2003/10/22	10:51:40			0.000	0.01	0.01	0.05 mg/L
2003/10/22	10:51:45			0.000	0.01		
2003/10/22	10:51:50			0.000	0.01		
2003/10/22	10:51:55			0.000	0.03		
2003/10/22	10:52:00			0.000	0.01		
2003/10/22	10:52:05			0.000	-0.02		
2003/10/22	10:52:10			0.000	0.03		
2003/10/22	10:52:15			0.000	-0.02		
2003/10/22	10:52:20			0.000	0.00		
2003/10/22	10:52:25			0.000	0.01		
2003/10/22	10:52:30			0.000	-0.01		
2003/10/22	10:52:35			0.000	0.02		
2003/10/22	10:52:40			0.000	-0.02		
2003/10/22	10:52:45			0.000	0.01		
2003/10/22	10:52:50			0.000	0.00		
2003/10/22	10:52:55			0.000	0.00		
2003/10/22	10:53:00			0.000	0.01		
2003/10/22	10:53:05			0.000	0.03		
2003/10/22	10:53:10			0.000	0.02		
2003/10/22	10:53:15			0.000	-0.02		
2003/10/22	10:53:20			0.000	0.03		
2003/10/22	10:53:25			0.000	-0.01		
2003/10/22	10:53:30			0.000	0.00		
2003/10/22	10:53:35			0.000	0.01		
2003/10/22	10:53:40			0.000	-0.01		
2003/10/22	10:53:45			0.000	0.01		
2003/10/22	10:53:50			0.000	-0.02		
2003/10/22	10:53:55			0.000	0.01		
2003/10/22	10:54:00			0.000	0.01		
2003/10/22	10:54:05			0.000	0.00		
2003/10/22	10:54:10			0.000	0.01		
2003/10/22	10:54:15			0.000	0.03		
2003/10/22	10:54:20			0.000	0.01		
2003/10/22	10:54:25			0.000	-0.02		
2003/10/22	10:54:30			0.000	0.03		
2003/10/22	10:54:35			0.000	0.00		
2003/10/22	10:54:40			0.000	-0.01		
2003/10/22	10:54:45			0.000	0.02		
2003/10/22	10:54:50			0.000	-0.01		
2003/10/22	10:54:55			0.000	0.00		
2003/10/22	10:55:00			0.000	-0.02		
2003/10/22	10:55:05			0.000	0.01		
2003/10/22	10:55:10			0.000	0.01		
2003/10/22	10:55:15			0.000	-0.01		
2003/10/22	10:55:20			0.000	0.03		
2003/10/22	10:55:25			0.000	0.03		
2003/10/22	10:55:30			0.000	0.01		
2003/10/22	10:55:35			0.000	-0.02		
2003/10/22	10:55:40			0.000	0.04		
2003/10/22	10:55:45			0.000	0.01		
2003/10/22	10:55:50			0.000	-0.01		
2003/10/22	10:55:55			0.000	0.02		
2003/10/22	10:56:00			0.000	-0.01		
2003/10/22	10:56:05			0.000	0.01		
2003/10/22	10:56:10			0.000	-0.01		
2003/10/22	10:56:15			0.000	0.01		
2003/10/22	10:56:20			0.000	0.01		
2003/10/22	10:56:25			0.000	-0.01		
2003/10/22	10:56:30			0.000	0.02		
2003/10/22	10:56:35			0.000	0.02	0.01	0.06 mg/L
2003/10/22	10:56:40			0.000	0.01		
2003/10/22	10:56:45			0.000	-0.01		
2003/10/22	10:56:50			0.000	0.04		
2003/10/22	10:56:55			0.000	0.01		
2003/10/22	10:57:00			0.000	-0.01		
2003/10/22	10:57:05			0.000	0.03		

Use One Truck Load as the Basis for all Calculations

Truck Volume = 0.0000 gal  
 HC vol% (in) = 0.00 Vol % 250.0686  
 HC vol% (out) = 0.02 Vol % 378.4300  
 Pump Air Volume Fraction = 0.01  
 Propane Calibration Gas Density = 0.548681  
 Butane Calibration Gas Density = 0.516822

HC Mass In = 0.000 gal x 0.00 % HC x 7.00 mg/gal = 0.0000 gm  
 HC Mass Out = (0.000 gal x (1-0.02) (C)) + (0.000 gal x 0.02) (C) x 7.00 mg/gal = 0.0000 gm

mpg (at 0.01 conversion) = HC mass out x 1000 mg/gal x 1/0.000 gal x 1/1.785 (lb/gal) = 0.301 mpg/lb

Efficiency calculation = HC mass in - HC mass out / HC mass in x 100% = 0.00 %



2003/10/22	11:08:50	0.000	0.01
2003/10/22	11:08:55	0.000	-0.02
2003/10/22	11:09:00	0.000	0.03
2003/10/22	11:09:05	0.000	0.00
2003/10/22	11:09:10	0.000	-0.01
2003/10/22	11:09:15	0.000	0.02
2003/10/22	11:09:20	0.000	-0.01
2003/10/22	11:09:25	0.000	0.01
2003/10/22	11:09:30	0.000	-0.02
2003/10/22	11:09:35	0.000	0.01
2003/10/22	11:09:40	0.000	0.01
2003/10/22	11:09:45	0.000	-0.01
2003/10/22	11:09:50	0.000	0.02
2003/10/22	11:09:55	0.000	0.03
2003/10/22	11:10:00	0.000	0.01
2003/10/22	11:10:05	0.000	-0.02
2003/10/22	11:10:10	0.000	0.04
2003/10/22	11:10:15	0.000	0.00
2003/10/22	11:10:20	0.000	-0.01
2003/10/22	11:10:25	0.000	0.02
2003/10/22	11:10:30	0.000	-0.02
2003/10/22	11:10:35	0.000	0.00
2003/10/22	11:10:40	0.000	-0.01
2003/10/22	11:10:45	0.000	0.01
2003/10/22	11:10:50	0.000	0.01
2003/10/22	11:10:55	0.000	-0.01
2003/10/22	11:11:00	0.000	0.01
2003/10/22	11:11:05	0.000	0.02
2003/10/22	11:11:10	0.000	0.01
2003/10/22	11:11:15	0.000	-0.01
2003/10/22	11:11:20	0.000	0.04
2003/10/22	11:11:25	0.000	0.02
2003/10/22	11:11:30	0.000	-0.02
2003/10/22	11:11:35	0.000	0.03
2003/10/22	11:11:40	0.000	-0.02
2003/10/22	11:11:45	0.000	0.00
2003/10/22	11:11:50	0.000	-0.01
2003/10/22	11:11:55	0.000	0.00
2003/10/22	11:12:00	0.000	0.01
2003/10/22	11:12:05	0.000	-0.01
2003/10/22	11:12:10	0.000	0.02
2003/10/22	11:12:15	0.000	0.01
2003/10/22	11:12:20	0.000	0.01
2003/10/22	11:12:25	0.000	0.00
2003/10/22	11:12:30	0.000	0.04
2003/10/22	11:12:35	0.000	0.02
2003/10/22	11:12:40	0.000	-0.02
2003/10/22	11:12:45	0.000	0.03
2003/10/22	11:12:50	0.000	-0.02
2003/10/22	11:12:55	0.000	0.01
2003/10/22	11:13:00	0.000	0.00
2003/10/22	11:13:05	0.000	0.00
2003/10/22	11:13:10	0.000	0.00
2003/10/22	11:13:15	0.000	-0.02
2003/10/22	11:13:20	0.000	0.02
2003/10/22	11:13:25	0.000	0.00
2003/10/22	11:13:30	0.000	0.01
2003/10/22	11:13:35	0.000	0.01
2003/10/22	11:13:40	0.000	0.03
2003/10/22	11:13:45	0.000	0.01
2003/10/22	11:13:50	0.000	-0.02
2003/10/22	11:13:55	0.000	0.03
2003/10/22	11:14:00	0.000	-0.02
2003/10/22	11:14:05	0.000	0.00
2003/10/22	11:14:10	0.000	0.01
2003/10/22	11:14:15	0.000	-0.01
2003/10/22	11:14:20	0.000	0.02
2003/10/22	11:14:25	0.000	-0.02
2003/10/22	11:14:30	0.000	0.01
2003/10/22	11:14:35	0.000	0.00
2003/10/22	11:14:40	0.000	0.00
2003/10/22	11:14:45	0.000	0.02
2003/10/22	11:14:50	0.000	0.03
2003/10/22	11:14:55	0.000	0.01
2003/10/22	11:15:00	0.000	-0.02
2003/10/22	11:15:05	0.000	0.03
2003/10/22	11:15:10	0.000	-0.01
2003/10/22	11:15:15	0.000	0.00
2003/10/22	11:15:20	0.000	0.01
2003/10/22	11:15:25	0.000	-0.01
2003/10/22	11:15:30	0.000	0.01
2003/10/22	11:15:35	0.000	-0.02
2003/10/22	11:15:40	0.000	0.01
2003/10/22	11:15:45	0.000	0.01
2003/10/22	11:15:50	0.000	0.00
2003/10/22	11:15:55	0.000	0.02
2003/10/22	11:16:00	0.000	0.03
2003/10/22	11:16:05	0.000	0.02
2003/10/22	11:16:10	0.000	-0.02
2003/10/22	11:16:15	0.000	0.03
2003/10/22	11:16:20	0.000	0.00
2003/10/22	11:16:25	0.000	-0.01
2003/10/22	11:16:30	0.000	0.02
2003/10/22	11:16:35	0.000	-0.01
2003/10/22	11:16:40	0.000	0.00
2003/10/22	11:16:45	0.000	-0.01
2003/10/22	11:16:50	0.000	0.01
2003/10/22	11:16:55	0.000	0.01
2003/10/22	11:17:00	0.000	-0.01
2003/10/22	11:17:05	0.000	0.01
2003/10/22	11:17:10	0.000	0.03
2003/10/22	11:17:15	0.000	0.01
2003/10/22	11:17:20	0.000	-0.01
2003/10/22	11:17:25	0.000	0.04
2003/10/22	11:17:30	0.000	0.01
2003/10/22	11:17:35	0.000	-0.01
2003/10/22	11:17:40	0.000	0.03
2003/10/22	11:17:45	0.000	-0.02
2003/10/22	11:17:50	0.000	0.00
2003/10/22	11:17:55	0.000	-0.01
2003/10/22	11:18:00	0.000	0.00
2003/10/22	11:18:05	0.000	0.01
2003/10/22	11:18:10	0.000	-0.01
2003/10/22	11:18:15	0.000	0.02
2003/10/22	11:18:20	0.000	0.01
2003/10/22	11:18:25	0.000	0.01
2003/10/22	11:18:30	0.000	-0.01
2003/10/22	11:18:35	0.000	0.04
2003/10/22	11:18:40	0.000	0.02
2003/10/22	11:18:45	0.000	-0.02
2003/10/22	11:18:50	0.000	0.03
2003/10/22	11:18:55	0.000	-0.02
2003/10/22	11:19:00	0.000	0.01
2003/10/22	11:19:05	0.000	0.00
2003/10/22	11:19:10	0.000	0.00
2003/10/22	11:19:15	0.000	0.00
2003/10/22	11:19:20	0.000	-0.01
2003/10/22	11:19:25	0.000	0.02
2003/10/22	11:19:30	0.000	0.01
2003/10/22	11:19:35	0.000	0.01
2003/10/22	11:19:40	0.000	0.00
2003/10/22	11:19:45	0.000	0.03

0.01

0.05

0.00

0.04





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2003/10/22	11:31:35	0.000	0.02
2003/10/22	11:31:40	0.000	0.01
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2003/10/22	11:31:55	0.000	0.03
2003/10/22	11:32:00	0.000	0.01
2003/10/22	11:32:05	0.000	-0.02
2003/10/22	11:32:10	0.000	0.03
2003/10/22	11:32:15	0.000	-0.02
2003/10/22	11:32:20	0.000	0.00
2003/10/22	11:32:25	0.000	0.00
2003/10/22	11:32:30	0.000	0.00
2003/10/22	11:32:35	0.000	0.02
2003/10/22	11:32:40	0.000	-0.02
2003/10/22	11:32:45	0.000	0.01
2003/10/22	11:32:50	0.000	0.00
2003/10/22	11:32:55	0.000	0.01
2003/10/22	11:33:00	0.000	0.01
2003/10/22	11:33:05	0.000	0.03
2003/10/22	11:33:10	0.000	0.01
2003/10/22	11:33:15	0.000	-0.02
2003/10/22	11:33:20	0.000	0.03
2003/10/22	11:33:25	0.000	-0.01
2003/10/22	11:33:30	0.000	0.00
2003/10/22	11:33:35	0.000	0.01
2003/10/22	11:33:40	0.000	-0.01
2003/10/22	11:33:45	0.000	0.01
2003/10/22	11:33:50	0.000	-0.02
2003/10/22	11:33:55	0.000	0.01
2003/10/22	11:34:00	0.000	0.00
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2003/10/22	11:34:10	0.000	0.01
2003/10/22	11:34:15	0.000	0.03
2003/10/22	11:34:20	0.000	0.02
2003/10/22	11:34:25	0.000	-0.02
2003/10/22	11:34:30	0.000	0.03
2003/10/22	11:34:35	0.000	0.00
2003/10/22	11:34:40	0.000	-0.01
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2003/10/22	11:35:05	0.000	0.01
2003/10/22	11:35:10	0.000	0.01
2003/10/22	11:35:15	0.000	-0.01
2003/10/22	11:35:20	0.000	0.01
2003/10/22	11:35:25	0.000	0.03
2003/10/22	11:35:30	0.000	0.01
2003/10/22	11:35:35	0.000	-0.02
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2003/10/22	11:35:55	0.000	0.02
2003/10/22	11:36:00	0.000	-0.01
2003/10/22	11:36:05	0.000	0.00
2003/10/22	11:36:10	0.000	-0.01
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2003/10/22	11:36:25	0.000	-0.01
2003/10/22	11:36:30	0.000	0.02
2003/10/22	11:36:35	0.000	0.02
2003/10/22	11:36:40	0.000	0.01
2003/10/22	11:36:45	0.000	0.01
2003/10/22	11:36:50	0.000	-0.02
2003/10/22	11:36:55	0.000	0.03
2003/10/22	11:37:00	0.000	-0.02
2003/10/22	11:37:05	0.000	0.03
2003/10/22	11:37:10	0.000	-0.02
2003/10/22	11:37:15	0.000	0.01
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2003/10/22	11:37:25	0.000	0.00
2003/10/22	11:37:30	0.000	0.01
2003/10/22	11:37:35	0.000	-0.01
2003/10/22	11:37:40	0.000	0.02
2003/10/22	11:37:45	0.000	0.01
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2003/10/22	11:38:05	0.000	0.01
2003/10/22	11:38:10	0.000	-0.02
2003/10/22	11:38:15	0.000	0.03
2003/10/22	11:38:20	0.000	-0.02
2003/10/22	11:38:25	0.000	0.00
2003/10/22	11:38:30	0.000	0.00
2003/10/22	11:38:35	0.000	0.00
2003/10/22	11:38:40	0.000	0.02
2003/10/22	11:38:45	0.000	-0.02
2003/10/22	11:38:50	0.000	0.01
2003/10/22	11:38:55	0.000	0.00
2003/10/22	11:39:00	0.000	0.01
2003/10/22	11:39:05	0.000	0.01
2003/10/22	11:39:10	0.000	0.03
2003/10/22	11:39:15	0.000	0.01
2003/10/22	11:39:20	0.000	0.03
2003/10/22	11:39:25	0.000	0.03
2003/10/22	11:39:30	0.000	-0.01
2003/10/22	11:39:35	0.000	0.00
2003/10/22	11:39:40	0.000	0.01
2003/10/22	11:39:45	0.000	-0.01
2003/10/22	11:39:50	0.000	0.01
2003/10/22	11:39:55	0.000	-0.02
2003/10/22	11:40:00	0.000	0.01
2003/10/22	11:40:05	0.000	0.01
2003/10/22	11:40:10	0.000	0.00
2003/10/22	11:40:15	0.000	0.02
2003/10/22	11:40:20	0.000	0.03
2003/10/22	11:40:25	0.000	0.02
2003/10/22	11:40:30	0.000	-0.02
2003/10/22	11:40:35	0.000	0.03
2003/10/22	11:40:40	0.000	0.00
2003/10/22	11:40:45	0.000	-0.01
2003/10/22	11:40:50	0.000	0.02
2003/10/22	11:40:55	0.000	-0.01
2003/10/22	11:41:00	0.000	0.00
2003/10/22	11:41:05	0.000	-0.01
2003/10/22	11:41:10	0.000	0.01
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2003/10/22	11:41:20	0.000	-0.01
2003/10/22	11:41:25	0.000	0.01
2003/10/22	11:41:30	0.000	0.02
2003/10/22	11:41:35	0.000	0.01
2003/10/22	11:41:40	0.000	-0.01
2003/10/22	11:41:45	0.000	0.04
2003/10/22	11:41:50	0.000	0.01
2003/10/22	11:41:55	0.000	-0.01
2003/10/22	11:42:00	0.000	0.02
2003/10/22	11:42:05	0.000	-0.02
2003/10/22	11:42:10	0.000	0.00
2003/10/22	11:42:15	0.000	-0.01
2003/10/22	11:42:20	0.000	0.00
2003/10/22	11:42:25	0.000	0.01

0.01

0.05 1000

0.01

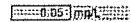
0.05 1000

0.01

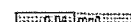
0.05 1000

2003/10/22	11:42:50	0.000	-0.01
2003/10/22	11:42:55	0.000	0.04
2003/10/22	11:43:00	0.000	0.02
2003/10/22	11:43:05	0.000	-0.02
2003/10/22	11:43:10	0.000	0.03
2003/10/22	11:43:15	0.000	-0.02
2003/10/22	11:43:20	0.000	0.01
2003/10/22	11:43:25	0.000	0.00
2003/10/22	11:43:30	0.000	0.00
2003/10/22	11:43:35	0.000	0.01
2003/10/22	11:43:40	0.000	-0.01
2003/10/22	11:43:45	0.000	0.02
2003/10/22	11:43:50	0.000	0.01
2003/10/22	11:43:55	0.000	0.01
2003/10/22	11:44:00	0.000	0.01
2003/10/22	11:44:05	0.000	0.03
2003/10/22	11:44:10	0.000	0.01
2003/10/22	11:44:15	0.000	-0.02
2003/10/22	11:44:20	0.000	0.03
2003/10/22	11:44:25	0.000	-0.02
2003/10/22	11:44:30	0.000	0.00
2003/10/22	11:44:35	0.000	0.01
2003/10/22	11:44:40	0.000	-0.01
2003/10/22	11:44:45	0.000	0.02
2003/10/22	11:44:50	0.000	-0.02
2003/10/22	11:44:55	0.000	0.01
2003/10/22	11:45:00	0.000	0.00
2003/10/22	11:45:05	0.000	0.00
2003/10/22	11:45:10	0.000	0.02
2003/10/22	11:45:15	0.000	0.03
2003/10/22	11:45:20	0.000	0.01
2003/10/22	11:45:25	0.000	-0.02
2003/10/22	11:45:30	0.000	0.03
2003/10/22	11:45:35	0.000	-0.01
2003/10/22	11:45:40	0.000	0.00
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2003/10/22	11:45:50	0.000	-0.01
2003/10/22	11:45:55	0.000	0.01
2003/10/22	11:46:00	0.000	-0.02
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2003/10/22	11:46:20	0.000	0.02
2003/10/22	11:46:25	0.000	0.03
2003/10/22	11:46:30	0.000	0.02
2003/10/22	11:46:35	0.000	-0.02
2003/10/22	11:46:40	0.000	0.03
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2003/10/22	11:46:50	0.000	-0.01
2003/10/22	11:46:55	0.000	0.02
2003/10/22	11:47:00	0.000	-0.01
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2003/10/22	11:47:25	0.000	-0.01
2003/10/22	11:47:30	0.000	0.01
2003/10/22	11:47:35	0.000	0.02
2003/10/22	11:47:40	0.000	0.01
2003/10/22	11:47:45	0.000	-0.01
2003/10/22	11:47:50	0.000	0.04
2003/10/22	11:47:55	0.000	0.02
2003/10/22	11:48:00	0.000	-0.01
2003/10/22	11:48:05	0.000	0.03
2003/10/22	11:48:10	0.000	-0.02
2003/10/22	11:48:15	0.000	0.00
2003/10/22	11:48:20	0.000	-0.01
2003/10/22	11:48:25	0.000	0.00
2003/10/22	11:48:30	0.000	0.01
2003/10/22	11:48:35	0.000	-0.01
2003/10/22	11:48:40	0.000	0.02
2003/10/22	11:48:45	0.000	0.01
2003/10/22	11:48:50	0.000	0.01
2003/10/22	11:48:55	0.000	0.00
2003/10/22	11:49:00	0.000	0.03
2003/10/22	11:49:05	0.000	0.02
2003/10/22	11:49:10	0.000	-0.02
2003/10/22	11:49:15	0.000	0.03
2003/10/22	11:49:20	0.000	-0.02
2003/10/22	11:49:25	0.000	0.01
2003/10/22	11:49:30	0.000	0.00
2003/10/22	11:49:35	0.000	0.00
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2003/10/22	11:49:45	0.000	-0.02
2003/10/22	11:49:50	0.000	0.02
2003/10/22	11:49:55	0.000	0.00
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2003/10/22	11:50:25	0.000	0.03
2003/10/22	11:50:30	0.000	-0.01
2003/10/22	11:50:35	0.000	0.00
2003/10/22	11:50:40	0.000	0.01
2003/10/22	11:50:45	0.000	-0.01
2003/10/22	11:50:50	0.000	0.02
2003/10/22	11:50:55	0.000	-0.02
2003/10/22	11:51:00	0.000	0.01
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2003/10/22	11:51:10	0.000	0.00
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2003/10/22	11:51:20	0.000	0.03
2003/10/22	11:51:25	0.000	0.01
2003/10/22	11:51:30	0.000	-0.02
2003/10/22	11:51:35	0.000	0.03
2003/10/22	11:51:40	0.000	0.00
2003/10/22	11:51:45	0.000	-0.01
2003/10/22	11:51:50	0.000	0.02
2003/10/22	11:51:55	0.000	-0.01
2003/10/22	11:52:00	0.000	0.01
2003/10/22	11:52:05	0.000	-0.02
2003/10/22	11:52:10	0.000	0.01
2003/10/22	11:52:15	0.000	0.01
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2003/10/22	11:52:25	0.000	0.02
2003/10/22	11:52:30	0.000	0.02
2003/10/22	11:52:35	0.000	0.01
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2003/10/22	11:52:45	0.000	0.03
2003/10/22	11:52:50	0.000	0.00
2003/10/22	11:52:55	0.000	-0.01
2003/10/22	11:53:00	0.000	0.02
2003/10/22	11:53:05	0.000	-0.02
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2003/10/22	11:53:15	0.000	-0.01
2003/10/22	11:53:20	0.000	0.01
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2003/10/22	11:53:30	0.000	-0.01
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2003/10/22	11:53:40	0.000	0.02
2003/10/22	11:53:45	0.000	0.01

0.01



0.00



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2003/10/22	11:54:15	0.000	-0.02
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2003/10/22	11:54:30	0.000	0.00
2003/10/22	11:54:35	0.000	0.01
2003/10/22	11:54:40	0.000	-0.01
2003/10/22	11:54:45	0.000	0.02
2003/10/22	11:54:50	0.000	0.01
2003/10/22	11:54:55	0.000	0.01
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2003/10/22	11:55:05	0.000	0.03
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2003/10/22	11:55:15	0.000	-0.02
2003/10/22	11:55:20	0.000	0.03
2003/10/22	11:55:25	0.000	-0.01
2003/10/22	11:55:30	0.000	0.00
2003/10/22	11:55:35	0.000	0.00
2003/10/22	11:55:40	0.000	-0.01
2003/10/22	11:55:45	0.000	0.00
2003/10/22	11:55:50	0.000	-0.02
2003/10/22	11:55:55	0.000	0.01
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2003/10/22	11:56:10	0.000	0.02
2003/10/22	11:56:15	0.000	0.03
2003/10/22	11:56:20	0.000	0.01
2003/10/22	11:56:25	0.000	-0.02
2003/10/22	11:56:30	0.000	0.03
2003/10/22	11:56:35	0.000	-0.01
2003/10/22	11:56:40	0.000	0.00
2003/10/22	11:56:45	0.000	0.01
2003/10/22	11:56:50	0.000	-0.01
2003/10/22	11:56:55	0.000	0.01
2003/10/22	11:57:00	0.000	-0.02
2003/10/22	11:57:05	0.000	0.01
2003/10/22	11:57:10	0.000	0.01
2003/10/22	11:57:15	0.000	0.00
2003/10/22	11:57:20	0.000	0.02
2003/10/22	11:57:25	0.000	0.03
2003/10/22	11:57:30	0.000	0.01
2003/10/22	11:57:35	0.000	-0.02
2003/10/22	11:57:40	0.000	0.03
2003/10/22	11:57:45	0.000	0.00
2003/10/22	11:57:50	0.000	-0.01
2003/10/22	11:57:55	0.000	0.02
2003/10/22	11:58:00	0.000	-0.01
2003/10/22	11:58:05	0.000	0.01
2003/10/22	11:58:10	0.000	-0.01
2003/10/22	11:58:15	0.000	0.01
2003/10/22	11:58:20	0.000	0.01
2003/10/22	11:58:25	0.000	-0.01
2003/10/22	11:58:30	0.000	0.01
2003/10/22	11:58:35	0.000	0.02
2003/10/22	11:58:40	0.000	0.01
2003/10/22	11:58:45	0.000	-0.01
2003/10/22	11:58:50	0.000	0.03
2003/10/22	11:58:55	0.000	0.01
2003/10/22	11:59:00	0.000	-0.01
2003/10/22	11:59:05	0.000	0.03
2003/10/22	11:59:10	0.000	-0.02
2003/10/22	11:59:15	0.000	0.00
2003/10/22	11:59:20	0.000	-0.01
2003/10/22	11:59:25	0.000	0.00
2003/10/22	11:59:30	0.000	0.02
2003/10/22	11:59:35	0.000	-0.01
2003/10/22	11:59:40	0.000	0.01
2003/10/22	11:59:45	0.000	0.01
2003/10/22	11:59:50	0.000	0.01
2003/10/22	11:59:55	0.000	0.00
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2003/10/22	12:00:05	0.000	0.02
2003/10/22	12:00:10	0.000	-0.02
2003/10/22	12:00:15	0.000	0.03
2003/10/22	12:00:20	0.000	-0.02
2003/10/22	12:00:25	0.000	0.00
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2003/10/22	12:00:40	0.000	0.01
2003/10/22	12:00:45	0.000	-0.01
2003/10/22	12:00:50	0.000	0.02
2003/10/22	12:00:55	0.000	0.00
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2003/10/22	12:01:15	0.000	0.02
2003/10/22	12:01:20	0.000	-0.02
2003/10/22	12:01:25	0.000	0.03
2003/10/22	12:01:30	0.000	-0.01
2003/10/22	12:01:35	0.000	0.00
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2003/10/22	12:01:45	0.000	-0.01
2003/10/22	12:01:50	0.000	0.00
2003/10/22	12:01:55	0.000	-0.02
2003/10/22	12:02:00	0.000	0.01
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2003/10/22	12:02:20	0.000	0.02
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2003/10/22	12:02:30	0.000	-0.02
2003/10/22	12:02:35	0.000	0.03
2003/10/22	12:02:40	0.000	0.00
2003/10/22	12:02:45	0.000	-0.01
2003/10/22	12:02:50	0.000	0.02
2003/10/22	12:02:55	0.000	-0.01
2003/10/22	12:03:00	0.000	0.01
2003/10/22	12:03:05	0.000	-0.02
2003/10/22	12:03:10	0.000	0.01
2003/10/22	12:03:15	0.000	0.01
2003/10/22	12:03:20	0.000	-0.01
2003/10/22	12:03:25	0.000	0.02
2003/10/22	12:03:30	0.000	0.02
2003/10/22	12:03:35	0.000	0.01
2003/10/22	12:03:40	0.000	-0.01
2003/10/22	12:03:45	0.000	0.04
2003/10/22	12:03:50	0.000	0.01
2003/10/22	12:03:55	0.000	-0.01
2003/10/22	12:04:00	0.000	0.03
2003/10/22	12:04:05	0.000	-0.02
2003/10/22	12:04:10	0.000	0.01
2003/10/22	12:04:15	0.000	-0.01
2003/10/22	12:04:20	0.000	0.01
2003/10/22	12:04:25	0.000	0.02
2003/10/22	12:04:30	0.000	-0.01
2003/10/22	12:04:35	0.000	0.01
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2003/10/22	12:04:45	0.000	0.01
2003/10/22	12:04:50	0.000	-0.01
2003/10/22	12:04:55	0.000	0.03
2003/10/22	12:05:00	0.000	0.01
2003/10/22	12:05:05	0.000	-0.01

0.01

0.05

0.01

0.05



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2003/10/22	12:17:10	0.000	0.01
2003/10/22	12:17:15	0.000	-0.02
2003/10/22	12:17:20	0.000	0.03
2003/10/22	12:17:25	0.000	-0.01
2003/10/22	12:17:30	0.000	0.00
2003/10/22	12:17:35	0.000	0.02
2003/10/22	12:17:40	0.000	-0.01
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2003/10/22	12:17:50	0.000	-0.02
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2003/10/22	12:18:05	0.000	-0.01
2003/10/22	12:18:10	0.000	0.02
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2003/10/22	12:18:30	0.000	0.04
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2003/10/22	12:18:45	0.000	0.02
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2003/10/22	12:19:35	0.000	-0.01
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2003/10/22	12:19:45	0.000	0.02
2003/10/22	12:19:50	0.000	-0.02
2003/10/22	12:19:55	0.000	0.03
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2003/10/22	12:20:30	0.000	0.02
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2003/10/22	12:22:00	0.000	0.03
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2003/10/22	12:23:10	0.000	0.02
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2003/10/22	12:24:50	0.000	0.03
2003/10/22	12:24:55	0.000	-0.02
2003/10/22	12:25:00	0.000	0.00
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2003/10/22	12:25:15	0.000	0.02
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2003/10/22	12:25:45	0.000	0.03
2003/10/22	12:25:50	0.000	0.02
2003/10/22	12:25:55	0.000	-0.02
2003/10/22	12:26:00	0.000	0.03
2003/10/22	12:26:05	0.000	-0.01
2003/10/22	12:26:10	0.000	0.00
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2003/10/22	12:26:25	0.000	0.01
2003/10/22	12:26:30	0.000	-0.02
2003/10/22	12:26:35	0.000	0.02
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2003/10/22	12:26:50	0.000	0.01
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2003/10/22	12:27:00	0.000	0.02
2003/10/22	12:27:05	0.000	-0.02
2003/10/22	12:27:10	0.000	0.03
2003/10/22	12:27:15	0.000	0.00
2003/10/22	12:27:20	0.000	-0.01
2003/10/22	12:27:25	0.000	0.02
2003/10/22	12:27:30	0.000	-0.01
2003/10/22	12:27:35	0.000	0.00
2003/10/22	12:27:40	0.000	-0.02
2003/10/22	12:27:45	0.000	0.01

0.01

0.05

0.01

0.05

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2003/10/22	12:28:15	0.000	-0.01
2003/10/22	12:28:20	0.000	0.04
2003/10/22	12:28:25	0.000	0.01
2003/10/22	12:28:30	0.000	-0.01
2003/10/22	12:28:35	0.000	0.03
2003/10/22	12:28:40	0.000	-0.01
2003/10/22	12:28:45	0.000	0.01
2003/10/22	12:28:50	0.000	-0.01
2003/10/22	12:28:55	0.000	0.00
2003/10/22	12:29:00	0.000	0.01
2003/10/22	12:29:05	0.000	-0.01
2003/10/22	12:29:10	0.000	0.02
2003/10/22	12:29:15	0.000	0.02
2003/10/22	12:29:20	0.000	0.01
2003/10/22	12:29:25	0.000	0.00
2003/10/22	12:29:30	0.000	0.03
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2003/10/22	12:29:40	0.000	-0.02
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2003/10/22	12:30:10	0.000	0.02
2003/10/22	12:30:15	0.000	-0.02
2003/10/22	12:30:20	0.000	0.01
2003/10/22	12:30:25	0.000	0.00
2003/10/22	12:30:30	0.000	0.01
2003/10/22	12:30:35	0.000	0.01
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2003/10/22	12:30:50	0.000	-0.02
2003/10/22	12:30:55	0.000	0.03
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2003/10/22	12:31:10	0.000	0.01
2003/10/22	12:31:15	0.000	-0.01
2003/10/22	12:31:20	0.000	0.01
2003/10/22	12:31:25	0.000	-0.02
2003/10/22	12:31:30	0.000	0.01
2003/10/22	12:31:35	0.000	0.01
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2003/10/22	12:32:15	0.000	-0.01
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2003/10/22	12:32:25	0.000	-0.01
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2003/10/22	12:32:40	0.000	0.01
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2003/10/22	12:33:15	0.000	0.03
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2003/10/22	12:36:55	0.000	-0.02
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2003/10/22	12:38:40	0.000	0.00
2003/10/22	12:38:45	0.000	0.00
2003/10/22	12:38:50	0.000	0.02
2003/10/22	12:38:55	0.000	-0.01
2003/10/22	12:39:00	0.000	0.01
2003/10/22	12:39:05	0.000	0.01

0.01

0.05 m/s

0.01

0.05 m/s

2003/10/22	12:39:30	0.000	-0.02
2003/10/22	12:39:35	0.000	0.00
2003/10/22	12:39:40	0.000	-0.02
2003/10/22	12:39:45	0.000	0.00
2003/10/22	12:39:50	0.000	0.01
2003/10/22	12:39:55	0.000	-0.01
2003/10/22	12:40:00	0.000	0.01
2003/10/22	12:40:05	0.000	-0.01
2003/10/22	12:40:10	0.000	0.02
2003/10/22	12:40:15	0.000	0.06
2003/10/22	12:40:20	0.000	0.00
2003/10/22	12:40:25	0.000	0.01
2003/10/22	12:40:30	0.000	0.03
2003/10/22	12:40:35	0.000	0.02
2003/10/22	12:40:40	0.000	-0.02
2003/10/22	12:40:45	0.000	0.03
2003/10/22	12:40:50	0.000	0.00
2003/10/22	12:40:55	0.000	0.00
2003/10/22	12:41:00	0.000	0.01
2003/10/22	12:41:05	0.000	-0.01
2003/10/22	12:41:10	0.000	0.00
2003/10/22	12:41:15	0.000	-0.02
2003/10/22	12:41:20	0.000	0.01
2003/10/22	12:41:25	0.000	0.01
2003/10/22	12:41:30	0.000	0.00
2003/10/22	12:41:35	0.000	0.03
2003/10/22	12:41:40	0.000	0.03
2003/10/22	12:41:45	0.000	0.01
2003/10/22	12:41:50	0.000	-0.01
2003/10/22	12:41:55	0.000	0.04
2003/10/22	12:42:00	0.000	0.01
2003/10/22	12:42:05	0.000	-0.01
2003/10/22	12:42:10	0.000	0.02
2003/10/22	12:42:15	0.000	-0.01
2003/10/22	12:42:20	0.000	0.01
2003/10/22	12:42:25	0.000	-0.01
2003/10/22	12:42:30	0.000	0.01
2003/10/22	12:42:35	0.000	0.01
2003/10/22	12:42:40	0.000	-0.01
2003/10/22	12:42:45	0.000	0.02
2003/10/22	12:42:50	0.000	0.02
2003/10/22	12:42:55	0.000	0.01
2003/10/22	12:43:00	0.000	0.00
2003/10/22	12:43:05	0.000	0.03
2003/10/22	12:43:10	0.000	0.01
2003/10/22	12:43:15	0.000	-0.02
2003/10/22	12:43:20	0.000	0.03
2003/10/22	12:43:25	0.000	-0.02
2003/10/22	12:43:30	0.000	0.01
2003/10/22	12:43:35	0.000	0.00
2003/10/22	12:43:40	0.000	0.00
2003/10/22	12:43:45	0.000	0.02
2003/10/22	12:43:50	0.000	-0.01
2003/10/22	12:43:55	0.000	0.01
2003/10/22	12:44:00	0.000	0.01
2003/10/22	12:44:05	0.000	0.01
2003/10/22	12:44:10	0.000	0.01
2003/10/22	12:44:15	0.000	0.03
2003/10/22	12:44:20	0.000	0.01
2003/10/22	12:44:25	0.000	-0.02
2003/10/22	12:44:30	0.000	0.03
2003/10/22	12:44:35	0.000	-0.01
2003/10/22	12:44:40	0.000	0.00
2003/10/22	12:44:45	0.000	0.01
2003/10/22	12:44:50	0.000	-0.01
2003/10/22	12:44:55	0.000	0.01
2003/10/22	12:45:00	0.000	-0.02
2003/10/22	12:45:05	0.000	0.01
2003/10/22	12:45:10	0.000	0.01
2003/10/22	12:45:15	0.000	0.00
2003/10/22	12:45:20	0.000	0.02
2003/10/22	12:45:25	0.000	0.03
2003/10/22	12:45:30	0.000	0.02
2003/10/22	12:45:35	0.000	-0.02
2003/10/22	12:45:40	0.000	0.03
2003/10/22	12:45:45	0.000	0.00
2003/10/22	12:45:50	0.000	-0.01
2003/10/22	12:45:55	0.000	0.02
2003/10/22	12:46:00	0.000	-0.01
2003/10/22	12:46:05	0.000	0.01
2003/10/22	12:46:10	0.000	-0.01
2003/10/22	12:46:15	0.000	0.01
2003/10/22	12:46:20	0.000	0.01
2003/10/22	12:46:25	0.000	-0.01
2003/10/22	12:46:30	0.000	0.01
2003/10/22	12:46:35	0.000	0.02
2003/10/22	12:46:40	0.000	0.01
2003/10/22	12:46:45	0.000	-0.01
2003/10/22	12:46:50	0.000	0.04
2003/10/22	12:46:55	0.000	0.01
2003/10/22	12:47:00	0.000	-0.01
2003/10/22	12:47:05	0.000	0.03
2003/10/22	12:47:10	0.000	-0.02
2003/10/22	12:47:15	0.000	0.00
2003/10/22	12:47:20	0.000	-0.01
2003/10/22	12:47:25	0.000	0.00
2003/10/22	12:47:30	0.000	0.01
2003/10/22	12:47:35	0.000	-0.01
2003/10/22	12:47:40	0.000	0.02
2003/10/22	12:47:45	0.000	0.01
2003/10/22	12:47:50	0.000	0.01
2003/10/22	12:47:55	0.000	0.00
2003/10/22	12:48:00	0.000	0.03
2003/10/22	12:48:05	0.000	0.02
2003/10/22	12:48:10	0.000	-0.02
2003/10/22	12:48:15	0.000	0.03
2003/10/22	12:48:20	0.000	-0.02
2003/10/22	12:48:25	0.000	0.01
2003/10/22	12:48:30	0.000	0.00
2003/10/22	12:48:35	0.000	0.00
2003/10/22	12:48:40	0.000	0.00
2003/10/22	12:48:45	0.000	-0.02
2003/10/22	12:48:50	0.000	0.01
2003/10/22	12:48:55	0.000	0.00
2003/10/22	12:49:00	0.000	0.01
2003/10/22	12:49:05	0.000	0.02
2003/10/22	12:49:10	0.000	0.03
2003/10/22	12:49:15	0.000	0.01
2003/10/22	12:49:20	0.000	-0.02
2003/10/22	12:49:25	0.000	0.03
2003/10/22	12:49:30	0.000	-0.01
2003/10/22	12:49:35	0.000	0.00
2003/10/22	12:49:40	0.000	0.01
2003/10/22	12:49:45	0.000	-0.01
2003/10/22	12:49:50	0.000	0.01
2003/10/22	12:49:55	0.000	-0.02
2003/10/22	12:50:00	0.000	0.01
2003/10/22	12:50:05	0.000	0.01
2003/10/22	12:50:10	0.000	0.00
2003/10/22	12:50:15	0.000	0.02
2003/10/22	12:50:20	0.000	0.03
2003/10/22	12:50:25	0.000	0.01

0.01

0.05

0.01

0.05



2003/10/22	12:50:50	0.000	0.02
2003/10/22	12:50:55	0.000	-0.01
2003/10/22	12:51:00	0.000	0.01
2003/10/22	12:51:05	0.000	-0.01
2003/10/22	12:51:10	0.000	0.01
2003/10/22	12:51:15	0.000	0.01
2003/10/22	12:51:20	0.000	-0.01
2003/10/22	12:51:25	0.000	0.01
2003/10/22	12:51:30	0.000	0.02
2003/10/22	12:51:35	0.000	0.01
2003/10/22	12:51:40	0.000	-0.01
2003/10/22	12:51:45	0.000	0.03
2003/10/22	12:51:50	0.000	0.01
2003/10/22	12:51:55	0.000	-0.01
2003/10/22	12:52:00	0.000	0.03
2003/10/22	12:52:05	0.000	-0.02
2003/10/22	12:52:10	0.000	0.00
2003/10/22	12:52:15	0.000	0.00
2003/10/22	12:52:20	0.000	0.00
2003/10/22	12:52:25	0.000	0.02
2003/10/22	12:52:30	0.000	-0.01
2003/10/22	12:52:35	0.000	0.01
2003/10/22	12:52:40	0.000	0.01
2003/10/22	12:52:45	0.000	0.01
2003/10/22	12:52:50	0.000	0.00
2003/10/22	12:52:55	0.000	0.03
2003/10/22	12:53:00	0.000	0.02
2003/10/22	12:53:05	0.000	-0.02
2003/10/22	12:53:10	0.000	0.03
2003/10/22	12:53:15	0.000	-0.01
2003/10/22	12:53:20	0.000	0.00
2003/10/22	12:53:25	0.000	0.01
2003/10/22	12:53:30	0.000	-0.01
2003/10/22	12:53:35	0.000	0.01
2003/10/22	12:53:40	0.000	-0.02
2003/10/22	12:53:45	0.000	0.01
2003/10/22	12:53:50	0.000	0.00
2003/10/22	12:53:55	0.000	0.00
2003/10/22	12:54:00	0.000	0.01
2003/10/22	12:54:05	0.000	0.03
2003/10/22	12:54:10	0.000	0.02
2003/10/22	12:54:15	0.000	-0.02
2003/10/22	12:54:20	0.000	0.03
2003/10/22	12:54:25	0.000	0.00
2003/10/22	12:54:30	0.000	-0.01
2003/10/22	12:54:35	0.000	0.02
2003/10/22	12:54:40	0.000	-0.01
2003/10/22	12:54:45	0.000	0.00
2003/10/22	12:54:50	0.000	-0.02
2003/10/22	12:54:55	0.000	0.01
2003/10/22	12:55:00	0.000	0.01
2003/10/22	12:55:05	0.000	-0.01
2003/10/22	12:55:10	0.000	0.03
2003/10/22	12:55:15	0.000	0.02
2003/10/22	12:55:20	0.000	0.01
2003/10/22	12:55:25	0.000	-0.01
2003/10/22	12:55:30	0.000	0.04
2003/10/22	12:55:35	0.000	0.01
2003/10/22	12:55:40	0.000	-0.01
2003/10/22	12:55:45	0.000	0.03
2003/10/22	12:55:50	0.000	-0.01
2003/10/22	12:55:55	0.000	0.01
2003/10/22	12:56:00	0.000	-0.01
2003/10/22	12:56:05	0.000	0.00
2003/10/22	12:56:10	0.000	0.01
2003/10/22	12:56:15	0.000	-0.01
2003/10/22	12:56:20	0.000	0.02
2003/10/22	12:56:25	0.000	0.01
2003/10/22	12:56:30	0.000	0.01
2003/10/22	12:56:35	0.000	0.03
2003/10/22	12:56:40	0.000	0.01
2003/10/22	12:56:45	0.000	0.01
2003/10/22	12:56:50	0.000	-0.02
2003/10/22	12:56:55	0.000	0.03
2003/10/22	12:57:00	0.000	-0.02
2003/10/22	12:57:05	0.000	0.01
2003/10/22	12:57:10	0.000	0.00
2003/10/22	12:57:15	0.000	0.00
2003/10/22	12:57:20	0.000	0.02
2003/10/22	12:57:25	0.000	-0.02
2003/10/22	12:57:30	0.000	0.01
2003/10/22	12:57:35	0.000	0.00
2003/10/22	12:57:40	0.000	0.01
2003/10/22	12:57:45	0.000	0.01
2003/10/22	12:57:50	0.000	0.03
2003/10/22	12:57:55	0.000	0.01
2003/10/22	12:58:00	0.000	-0.02
2003/10/22	12:58:05	0.000	0.03
2003/10/22	12:58:10	0.000	-0.01
2003/10/22	12:58:15	0.000	0.00
2003/10/22	12:58:20	0.000	0.01
2003/10/22	12:58:25	0.000	-0.01
2003/10/22	12:58:30	0.000	0.01
2003/10/22	12:58:35	0.000	-0.02
2003/10/22	12:58:40	0.000	0.01
2003/10/22	12:58:45	0.000	0.01
2003/10/22	12:58:50	0.000	0.00
2003/10/22	12:58:55	0.000	0.02
2003/10/22	12:59:00	0.000	0.03
2003/10/22	12:59:05	0.000	0.02
2003/10/22	12:59:10	0.000	-0.02
2003/10/22	12:59:15	0.000	0.03
2003/10/22	12:59:20	0.000	0.00
2003/10/22	12:59:25	0.000	-0.01
2003/10/22	12:59:30	0.000	0.02
2003/10/22	12:59:35	0.000	-0.01
2003/10/22	12:59:40	0.000	0.01
2003/10/22	12:59:45	0.000	-0.01
2003/10/22	12:59:50	0.000	0.01
2003/10/22	12:59:55	0.000	0.01
2003/10/22	13:00:00	0.000	-0.01
2003/10/22	13:00:05	0.000	0.01
2003/10/22	13:00:10	0.000	0.02
2003/10/22	13:00:15	0.000	0.01
2003/10/22	13:00:20	0.000	-0.01
2003/10/22	13:00:25	0.000	0.03
2003/10/22	13:00:30	0.000	0.02
2003/10/22	13:00:35	0.000	-0.01
2003/10/22	13:00:40	0.000	0.03
2003/10/22	13:00:45	0.000	-0.02
2003/10/22	13:00:50	0.000	0.00
2003/10/22	13:00:55	0.000	0.00
2003/10/22	13:01:00	0.000	0.00
2003/10/22	13:01:05	0.000	0.01
2003/10/22	13:01:10	0.000	-0.01
2003/10/22	13:01:15	0.000	0.02
2003/10/22	13:01:20	0.000	0.01
2003/10/22	13:01:25	0.000	0.01
2003/10/22	13:01:30	0.000	0.00
2003/10/22	13:01:35	0.000	0.03
2003/10/22	13:01:40	0.000	0.02
2003/10/22	13:01:45	0.000	-0.02

2003/10/22	13:02:10	0.000	-0.01
2003/10/22	13:02:15	0.000	0.00
2003/10/22	13:02:20	0.000	-0.02
2003/10/22	13:02:25	0.000	0.00
2003/10/22	13:02:30	0.000	0.00
2003/10/22	13:02:35	0.000	0.00
2003/10/22	13:02:40	0.000	0.02
2003/10/22	13:02:45	0.000	0.03
2003/10/22	13:02:50	0.000	0.01
2003/10/22	13:02:55	0.000	-0.02
2003/10/22	13:03:00	0.000	0.03
2003/10/22	13:03:05	0.000	0.00
2003/10/22	13:03:10	0.000	-0.01
2003/10/22	13:03:15	0.000	0.02
2003/10/22	13:03:20	0.000	-0.01
2003/10/22	13:03:25	0.000	0.01
2003/10/22	13:03:30	0.000	-0.02
2003/10/22	13:03:35	0.000	0.01
2003/10/22	13:03:40	0.000	0.01
2003/10/22	13:03:45	0.000	-0.01
2003/10/22	13:03:50	0.000	0.02
2003/10/22	13:03:55	0.000	0.02
2003/10/22	13:04:00	0.000	0.01
2003/10/22	13:04:05	0.000	-0.01
2003/10/22	13:04:10	0.000	0.04
2003/10/22	13:04:15	0.000	0.01
2003/10/22	13:04:20	0.000	-0.01
2003/10/22	13:04:25	0.000	0.03
2003/10/22	13:04:30	0.000	-0.02
2003/10/22	13:04:35	0.000	0.01
2003/10/22	13:04:40	0.000	-0.01
2003/10/22	13:04:45	0.000	0.01
2003/10/22	13:04:50	0.000	0.02
2003/10/22	13:04:55	0.000	-0.01
2003/10/22	13:05:00	0.000	0.01
2003/10/22	13:05:05	0.000	0.01
2003/10/22	13:05:10	0.000	0.01
2003/10/22	13:05:15	0.000	0.00
2003/10/22	13:05:20	0.000	0.03
2003/10/22	13:05:25	0.000	0.01
2003/10/22	13:05:30	0.000	-0.01
2003/10/22	13:05:35	0.000	0.03
2003/10/22	13:05:40	0.000	-0.02
2003/10/22	13:05:45	0.000	0.00
2003/10/22	13:05:50	0.000	0.00
2003/10/22	13:05:55	0.000	0.00
2003/10/22	13:06:00	0.000	0.02
2003/10/22	13:06:05	0.000	-0.02
2003/10/22	13:06:10	0.000	0.01
2003/10/22	13:06:15	0.000	0.00
2003/10/22	13:06:20	0.000	0.01
2003/10/22	13:06:25	0.000	0.01
2003/10/22	13:06:30	0.000	0.03
2003/10/22	13:06:35	0.000	0.02
2003/10/22	13:06:40	0.000	-0.02
2003/10/22	13:06:45	0.000	0.03
2003/10/22	13:06:50	0.000	-0.01
2003/10/22	13:06:55	0.000	0.00
2003/10/22	13:07:00	0.000	0.01
2003/10/22	13:07:05	0.000	-0.01
2003/10/22	13:07:10	0.000	0.01
2003/10/22	13:07:15	0.000	-0.01
2003/10/22	13:07:20	0.000	0.01
2003/10/22	13:07:25	0.000	0.01
2003/10/22	13:07:30	0.000	0.00
2003/10/22	13:07:35	0.000	0.01
2003/10/22	13:07:40	0.000	0.02
2003/10/22	13:07:45	0.000	0.01
2003/10/22	13:07:50	0.000	-0.02
2003/10/22	13:07:55	0.000	0.04
2003/10/22	13:08:00	0.000	0.01
2003/10/22	13:08:05	0.000	-0.01
2003/10/22	13:08:10	0.000	0.02
2003/10/22	13:08:15	0.000	-0.01
2003/10/22	13:08:20	0.000	0.00
2003/10/22	13:08:25	0.000	-0.01
2003/10/22	13:08:30	0.000	0.01
2003/10/22	13:08:35	0.000	0.01
2003/10/22	13:08:40	0.000	-0.01
2003/10/22	13:08:45	0.000	0.02
2003/10/22	13:08:50	0.000	0.01
2003/10/22	13:08:55	0.000	0.01
2003/10/22	13:09:00	0.000	-0.01
2003/10/22	13:09:05	0.000	0.03
2003/10/22	13:09:10	0.000	0.02
2003/10/22	13:09:15	0.000	-0.01
2003/10/22	13:09:20	0.000	0.03
2003/10/22	13:09:25	0.000	-0.02
2003/10/22	13:09:30	0.000	0.01
2003/10/22	13:09:35	0.000	0.00
2003/10/22	13:09:40	0.000	0.00
2003/10/22	13:09:45	0.000	0.00
2003/10/22	13:09:50	0.000	-0.01
2003/10/22	13:09:55	0.000	0.01
2003/10/22	13:10:00	0.000	0.00
2003/10/22	13:10:05	0.000	0.01
2003/10/22	13:10:10	0.000	0.01
2003/10/22	13:10:15	0.000	0.03
2003/10/22	13:10:20	0.000	0.01
2003/10/22	13:10:25	0.000	-0.02
2003/10/22	13:10:30	0.000	0.03
2003/10/22	13:10:35	0.000	-0.01
2003/10/22	13:10:40	0.000	0.00
2003/10/22	13:10:45	0.000	0.01
2003/10/22	13:10:50	0.000	-0.01
2003/10/22	13:10:55	0.000	0.02
2003/10/22	13:11:00	0.000	-0.02
2003/10/22	13:11:05	0.000	0.01
2003/10/22	13:11:10	0.000	0.00
2003/10/22	13:11:15	0.000	0.00
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2003/10/22	13:11:25	0.000	0.02
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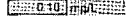
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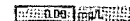
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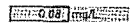
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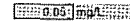
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2003/10/22	13:54:20	0.000	0.02
2003/10/22	13:54:25	0.000	-0.01
2003/10/22	13:54:30	0.000	0.01
2003/10/22	13:54:35	0.000	-0.01
2003/10/22	13:54:40	0.000	0.01
2003/10/22	13:54:45	0.000	0.01
2003/10/22	13:54:50	0.000	-0.01
2003/10/22	13:54:55	0.000	0.02
2003/10/22	13:55:00	0.000	0.01
2003/10/22	13:55:05	0.000	0.01
2003/10/22	13:55:10	0.000	0.00
2003/10/22	13:55:15	0.000	0.03
2003/10/22	13:55:20	0.000	0.01
2003/10/22	13:55:25	0.000	-0.01
2003/10/22	13:55:30	0.000	0.03
2003/10/22	13:55:35	0.000	-0.02
2003/10/22	13:55:40	0.000	0.00
2003/10/22	13:55:45	0.000	0.00
2003/10/22	13:55:50	0.000	0.00
2003/10/22	13:55:55	0.000	0.02
2003/10/22	13:56:00	0.000	-0.01
2003/10/22	13:56:05	0.000	0.01
2003/10/22	13:56:10	0.000	0.00
2003/10/22	13:56:15	0.000	0.01
2003/10/22	13:56:20	0.000	0.01
2003/10/22	13:56:25	0.000	0.03
2003/10/22	13:56:30	0.000	0.01
2003/10/22	13:56:35	0.000	-0.02
2003/10/22	13:56:40	0.000	0.03
2003/10/22	13:56:45	0.000	-0.01
2003/10/22	13:56:50	0.000	0.00
2003/10/22	13:56:55	0.000	0.02
2003/10/22	13:57:00	0.000	-0.01
2003/10/22	13:57:05	0.000	0.01
2003/10/22	13:57:10	0.000	-0.02
2003/10/22	13:57:15	0.000	0.01
2003/10/22	13:57:20	0.000	0.01
2003/10/22	13:57:25	0.000	0.00
2003/10/22	13:57:30	0.000	0.02
2003/10/22	13:57:35	0.000	0.02
2003/10/22	13:57:40	0.000	0.02
2003/10/22	13:57:45	0.000	-0.02
2003/10/22	13:57:50	0.000	0.03
2003/10/22	13:57:55	0.000	0.00
2003/10/22	13:58:00	0.000	-0.01
2003/10/22	13:58:05	0.000	0.02
2003/10/22	13:58:10	0.000	-0.01
2003/10/22	13:58:15	0.000	0.00
2003/10/22	13:58:20	0.000	-0.01
2003/10/22	13:58:25	0.000	0.01

0.01



0.01



2003/10/22	14:44:15	0.000	0.04
2003/10/22	14:44:20	0.000	0.00
2003/10/22	14:44:25	0.000	-0.01
2003/10/22	14:44:30	0.000	0.03
2003/10/22	14:44:35	0.000	-0.01
2003/10/22	14:44:40	0.000	0.01
2003/10/22	14:44:45	0.000	-0.01
2003/10/22	14:44:50	0.000	0.01
2003/10/22	14:44:55	0.000	0.02
2003/10/22	14:45:00	0.000	-0.01
2003/10/22	14:45:05	0.000	0.01
2003/10/22	14:45:10	0.000	0.01
2003/10/22	14:45:15	0.000	0.01
2003/10/22	14:45:20	0.000	0.00
2003/10/22	14:45:25	0.000	0.03
2003/10/22	14:45:30	0.000	0.02
2003/10/22	14:45:35	0.000	-0.02
2003/10/22	14:45:40	0.000	0.03
2003/10/22	14:45:45	0.000	-0.02
2003/10/22	14:45:50	0.000	0.00
2003/10/22	14:45:55	0.000	0.00
2003/10/22	14:46:00	0.000	0.00
2003/10/22	14:46:05	0.000	0.01
2003/10/22	14:46:10	0.000	-0.01
2003/10/22	14:46:15	0.000	0.02
2003/10/22	14:46:20	0.000	0.00
2003/10/22	14:46:25	0.000	0.00
2003/10/22	14:46:30	0.000	0.01
2003/10/22	14:46:35	0.000	0.03
2003/10/22	14:46:40	0.000	0.02
2003/10/22	14:46:45	0.000	-0.02
2003/10/22	14:46:50	0.000	0.03
2003/10/22	14:46:55	0.000	0.00
2003/10/22	14:47:00	0.000	0.00
2003/10/22	14:47:05	0.000	0.02
2003/10/22	14:47:10	0.000	-0.01
2003/10/22	14:47:15	0.000	0.00
2003/10/22	14:47:20	0.000	-0.02
2003/10/22	14:47:25	0.000	0.01
2003/10/22	14:47:30	0.000	0.01
2003/10/22	14:47:35	0.000	-0.01
2003/10/22	14:47:40	0.000	0.03
2003/10/22	14:47:45	0.000	0.02
2003/10/22	14:47:50	0.000	0.01
2003/10/22	14:47:55	0.000	-0.01
2003/10/22	14:48:00	0.000	0.04
2003/10/22	14:48:05	0.000	0.01
2003/10/22	14:48:10	0.000	-0.01
2003/10/22	14:48:15	0.000	0.03
2003/10/22	14:48:20	0.000	-0.01
2003/10/22	14:48:25	0.000	0.01
2003/10/22	14:48:30	0.000	-0.01
2003/10/22	14:48:35	0.000	0.00
2003/10/22	14:48:40	0.000	0.01
2003/10/22	14:48:45	0.000	-0.01
2003/10/22	14:48:50	0.000	0.02
2003/10/22	14:48:55	0.000	0.01
2003/10/22	14:49:00	0.000	0.01
2003/10/22	14:49:05	0.000	0.00
2003/10/22	14:49:10	0.000	0.03
2003/10/22	14:49:15	0.000	0.01
2003/10/22	14:49:20	0.000	-0.01
2003/10/22	14:49:25	0.000	0.03
2003/10/22	14:49:30	0.000	-0.02
2003/10/22	14:49:35	0.000	0.00
2003/10/22	14:49:40	0.000	0.01
2003/10/22	14:49:45	0.000	0.00
2003/10/22	14:49:50	0.000	0.02
2003/10/22	14:49:55	0.000	-0.02
2003/10/22	14:50:00	0.000	0.01
2003/10/22	14:50:05	0.000	0.00
2003/10/22	14:50:10	0.000	0.00
2003/10/22	14:50:15	0.000	0.02
2003/10/22	14:50:20	0.000	0.03
2003/10/22	14:50:25	0.000	0.01
2003/10/22	14:50:30	0.000	-0.02
2003/10/22	14:50:35	0.000	0.03
2003/10/22	14:50:40	0.000	0.00
2003/10/22	14:50:45	0.000	-0.01
2003/10/22	14:50:50	0.000	0.02
2003/10/22	14:50:55	0.000	-0.02
2003/10/22	14:51:00	0.000	0.01
2003/10/22	14:51:05	0.000	-0.01
2003/10/22	14:51:10	0.000	0.01
2003/10/22	14:51:15	0.000	0.01
2003/10/22	14:51:20	0.000	-0.01
2003/10/22	14:51:25	0.000	0.02
2003/10/22	14:51:30	0.000	0.02
2003/10/22	14:51:35	0.000	0.01
2003/10/22	14:51:40	0.000	-0.01
2003/10/22	14:51:45	0.000	0.03
2003/10/22	14:51:50	0.000	0.01
2003/10/22	14:51:55	0.000	-0.01
2003/10/22	14:52:00	0.000	0.03
2003/10/22	14:52:05	0.000	-0.02
2003/10/22	14:52:10	0.000	0.00
2003/10/22	14:52:15	0.000	0.00
2003/10/22	14:52:20	0.000	0.00
2003/10/22	14:52:25	0.000	0.02
2003/10/22	14:52:30	0.000	-0.01
2003/10/22	14:52:35	0.000	0.01
2003/10/22	14:52:40	0.000	0.01
2003/10/22	14:52:45	0.000	0.01
2003/10/22	14:52:50	0.000	0.00
2003/10/22	14:52:55	0.000	0.03
2003/10/22	14:53:00	0.000	0.02
2003/10/22	14:53:05	0.000	-0.02
2003/10/22	14:53:10	0.000	0.03
2003/10/22	14:53:15	0.000	-0.01
2003/10/22	14:53:20	0.000	0.00
2003/10/22	14:53:25	0.000	0.01
2003/10/22	14:53:30	0.000	-0.01
2003/10/22	14:53:35	0.000	0.01
2003/10/22	14:53:40	0.000	-0.01
2003/10/22	14:53:45	0.000	0.02
2003/10/22	14:53:50	0.000	0.00
2003/10/22	14:53:55	0.000	0.00
2003/10/22	14:54:00	0.000	0.01
2003/10/22	14:54:05	0.000	0.03
2003/10/22	14:54:10	0.000	0.02
2003/10/22	14:54:15	0.000	-0.02
2003/10/22	14:54:20	0.000	0.04
2003/10/22	14:54:25	0.000	0.00
2003/10/22	14:54:30	0.000	-0.01
2003/10/22	14:54:35	0.000	0.02
2003/10/22	14:54:40	0.000	-0.01
2003/10/22	14:54:45	0.000	0.00
2003/10/22	14:54:50	0.000	-0.01
2003/10/22	14:54:55	0.000	0.01
2003/10/22	14:55:00	0.000	0.01
2003/10/22	14:55:05	0.000	-0.01

0.01

0.05

0.01

0.00

2003/10/22	14:55:40	0.000	-0.01
2003/10/22	14:55:45	0.000	0.03
2003/10/22	14:55:50	0.000	-0.02
2003/10/22	14:55:55	0.000	0.01
2003/10/22	14:56:00	0.000	0.00
2003/10/22	14:56:05	0.000	0.00
2003/10/22	14:56:10	0.000	0.01
2003/10/22	14:56:15	0.000	-0.01
2003/10/22	14:56:20	0.000	0.02
2003/10/22	14:56:25	0.000	0.00
2003/10/22	14:56:30	0.000	0.01
2003/10/22	14:56:35	0.000	0.01
2003/10/22	14:56:40	0.000	0.03
2003/10/22	14:56:45	0.000	0.01
2003/10/22	14:56:50	0.000	-0.02
2003/10/22	14:56:55	0.000	0.03
2003/10/22	14:57:00	0.000	-0.01
2003/10/22	14:57:05	0.000	0.00
2003/10/22	14:57:10	0.000	0.01
2003/10/22	14:57:15	0.000	-0.01
2003/10/22	14:57:20	0.000	0.01
2003/10/22	14:57:25	0.000	-0.02
2003/10/22	14:57:30	0.000	0.01
2003/10/22	14:57:35	0.000	0.11
2003/10/22	14:57:40	0.000	0.00
2003/10/22	14:57:45	0.000	0.02
2003/10/22	14:57:50	0.000	0.03
2003/10/22	14:57:55	0.000	0.01
2003/10/22	14:58:00	0.000	-0.01
2003/10/22	14:58:05	0.000	0.04
2003/10/22	14:58:10	0.000	0.00
2003/10/22	14:58:15	0.000	-0.01
2003/10/22	14:58:20	0.000	0.03
2003/10/22	14:58:25	0.000	-0.01
2003/10/22	14:58:30	0.000	0.01
2003/10/22	14:58:35	0.000	-0.01
2003/10/22	14:58:40	0.000	0.01
2003/10/22	14:58:45	0.000	0.02
2003/10/22	14:58:50	0.000	-0.01
2003/10/22	14:58:55	0.000	0.01
2003/10/22	14:59:00	0.000	0.01
2003/10/22	14:59:05	0.000	0.01
2003/10/22	14:59:10	0.000	-0.01
2003/10/22	14:59:15	0.000	0.03
2003/10/22	14:59:20	0.000	0.01
2003/10/22	14:59:25	0.000	-0.01
2003/10/22	14:59:30	0.000	0.03
2003/10/22	14:59:35	0.000	-0.02
2003/10/22	14:59:40	0.000	0.00
2003/10/22	14:59:45	0.000	0.00
2003/10/22	14:59:50	0.000	0.00
2003/10/22	14:59:55	0.000	0.02
2003/10/22	15:00:00	0.000	-0.01
2003/10/22	15:00:05	0.000	0.01
2003/10/22	15:00:10	0.000	0.00
2003/10/22	15:00:15	0.000	0.01
2003/10/22	15:00:20	0.000	0.01
2003/10/22	15:00:25	0.000	0.03
2003/10/22	15:00:30	0.000	0.02
2003/10/22	15:00:35	0.000	-0.02
2003/10/22	15:00:40	0.000	0.03
2003/10/22	15:00:45	0.000	-0.01
2003/10/22	15:00:50	0.000	0.00
2003/10/22	15:00:55	0.000	0.01
2003/10/22	15:01:00	0.000	-0.01
2003/10/22	15:01:05	0.000	0.01
2003/10/22	15:01:10	0.000	-0.01
2003/10/22	15:01:15	0.000	0.01
2003/10/22	15:01:20	0.000	0.01
2003/10/22	15:01:25	0.000	0.00
2003/10/22	15:01:30	0.000	0.01
2003/10/22	15:01:35	0.000	0.03
2003/10/22	15:01:40	0.000	0.01
2003/10/22	15:01:45	0.000	-0.01
2003/10/22	15:01:50	0.000	0.04
2003/10/22	15:01:55	0.000	0.01
2003/10/22	15:02:00	0.000	-0.01
2003/10/22	15:02:05	0.000	0.03
2003/10/22	15:02:10	0.000	-0.01
2003/10/22	15:02:15	0.000	0.00
2003/10/22	15:02:20	0.000	-0.01
2003/10/22	15:02:25	0.000	0.01
2003/10/22	15:02:30	0.000	0.01
2003/10/22	15:02:35	0.000	-0.01
2003/10/22	15:02:40	0.000	0.02
2003/10/22	15:02:45	0.000	0.01
2003/10/22	15:02:50	0.000	0.01
2003/10/22	15:02:55	0.000	0.00
2003/10/22	15:03:00	0.000	0.03
2003/10/22	15:03:05	0.000	0.02
2003/10/22	15:03:10	0.000	-0.02
2003/10/22	15:03:15	0.000	0.03
2003/10/22	15:03:20	0.000	-0.01
2003/10/22	15:03:25	0.000	0.01
2003/10/22	15:03:30	0.000	0.00
2003/10/22	15:03:35	0.000	0.00
2003/10/22	15:03:40	0.000	0.00
2003/10/22	15:03:45	0.000	-0.01
2003/10/22	15:03:50	0.000	0.01
2003/10/22	15:03:55	0.000	0.00
2003/10/22	15:04:00	0.000	0.00
2003/10/22	15:04:05	0.000	0.02
2003/10/22	15:04:10	0.000	0.03
2003/10/22	15:04:15	0.000	0.01
2003/10/22	15:04:20	0.000	-0.02
2003/10/22	15:04:25	0.000	0.03
2003/10/22	15:04:30	0.000	-0.01
2003/10/22	15:04:35	0.000	0.00
2003/10/22	15:04:40	0.000	0.02
2003/10/22	15:04:45	0.000	-0.01
2003/10/22	15:04:50	0.000	0.01
2003/10/22	15:04:55	0.000	-0.02
2003/10/22	15:05:00	0.000	0.01
2003/10/22	15:05:05	0.000	0.01
2003/10/22	15:05:10	0.000	-0.01
2003/10/22	15:05:15	0.000	0.02
2003/10/22	15:05:20	0.000	0.02
2003/10/22	15:05:25	0.000	0.01
2003/10/22	15:05:30	0.000	-0.01
2003/10/22	15:05:35	0.000	0.03
2003/10/22	15:05:40	0.000	0.01
2003/10/22	15:05:45	0.000	-0.01
2003/10/22	15:05:50	0.000	0.03
2003/10/22	15:05:55	0.000	-0.02
2003/10/22	15:06:00	0.000	0.01
2003/10/22	15:06:05	0.000	-0.01
2003/10/22	15:06:10	0.000	0.00
2003/10/22	15:06:15	0.000	0.02
2003/10/22	15:06:20	0.000	-0.01
2003/10/22	15:06:25	0.000	0.01

0.01

0.05

0.01

0.05

2003/10/22	15:06:55	0.000	0.01
2003/10/22	15:07:00	0.000	0.00
2003/10/22	15:07:05	0.000	-0.02
2003/10/22	15:07:10	0.000	0.00
2003/10/22	15:07:15	0.000	0.01
2003/10/22	15:07:20	0.000	-0.01
2003/10/22	15:07:25	0.000	0.02
2003/10/22	15:07:30	0.000	-0.02
2003/10/22	15:07:35	0.000	0.01
2003/10/22	15:07:40	0.000	0.00
2003/10/22	15:07:45	0.000	0.00
2003/10/22	15:07:50	0.000	0.01
2003/10/22	15:07:55	0.000	0.03
2003/10/22	15:08:00	0.000	0.02
2003/10/22	15:08:05	0.000	-0.02
2003/10/22	15:08:10	0.000	0.03
2003/10/22	15:08:15	0.000	0.00
2003/10/22	15:08:20	0.000	-0.01
2003/10/22	15:08:25	0.000	0.02
2003/10/22	15:08:30	0.000	-0.01
2003/10/22	15:08:35	0.000	0.01
2003/10/22	15:08:40	0.000	-0.01
2003/10/22	15:08:45	0.000	0.01
2003/10/22	15:08:50	0.000	0.01
2003/10/22	15:08:55	0.000	-0.01
2003/10/22	15:09:00	0.000	0.01
2003/10/22	15:09:05	0.000	0.02
2003/10/22	15:09:10	0.000	0.01
2003/10/22	15:09:15	0.000	-0.01
2003/10/22	15:09:20	0.000	0.03
2003/10/22	15:09:25	0.000	0.02
2003/10/22	15:09:30	0.000	-0.01
2003/10/22	15:09:35	0.000	0.03
2003/10/22	15:09:40	0.000	-0.02
2003/10/22	15:09:45	0.000	0.00
2003/10/22	15:09:50	0.000	0.00
2003/10/22	15:09:55	0.000	0.00
2003/10/22	15:10:00	0.000	0.01
2003/10/22	15:10:05	0.000	-0.01
2003/10/22	15:10:10	0.000	0.02
2003/10/22	15:10:15	0.000	0.00
2003/10/22	15:10:20	0.000	0.01
2003/10/22	15:10:25	0.000	0.01
2003/10/22	15:10:30	0.000	0.03
2003/10/22	15:10:35	0.000	0.02
2003/10/22	15:10:40	0.000	-0.02
2003/10/22	15:10:45	0.000	0.03
2003/10/22	15:10:50	0.000	-0.01
2003/10/22	15:10:55	0.000	0.00
2003/10/22	15:11:00	0.000	0.01
2003/10/22	15:11:05	0.000	-0.01
2003/10/22	15:11:10	0.000	0.00
2003/10/22	15:11:15	0.000	-0.02
2003/10/22	15:11:20	0.000	0.01
2003/10/22	15:11:25	0.000	0.01
2003/10/22	15:11:30	0.000	0.00
2003/10/22	15:11:35	0.000	0.02
2003/10/22	15:11:40	0.000	0.02
2003/10/22	15:11:45	0.000	0.01
2003/10/22	15:11:50	0.000	-0.02
2003/10/22	15:11:55	0.000	0.04
2003/10/22	15:12:00	0.000	0.00
2003/10/22	15:12:05	0.000	-0.01
2003/10/22	15:12:10	0.000	0.02
2003/10/22	15:12:15	0.000	-0.01
2003/10/22	15:12:20	0.000	0.01
2003/10/22	15:12:25	0.000	-0.01
2003/10/22	15:12:30	0.000	0.01
2003/10/22	15:12:35	0.000	0.01
2003/10/22	15:12:40	0.000	-0.01
2003/10/22	15:12:45	0.000	0.02
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2003/10/22	15:17:30	0.000	0.01
2003/10/22	15:17:35	0.000	-0.01
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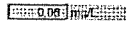
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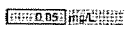


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2003/10/22	15:18:30	0.000	0.02
2003/10/22	15:18:35	0.000	-0.01
2003/10/22	15:18:40	0.000	0.00
2003/10/22	15:18:45	0.000	-0.01
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2003/10/22	15:19:10	0.000	0.02
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2003/10/22	15:19:20	0.000	-0.01
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2003/10/22	15:19:35	0.000	-0.01
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2003/10/22	15:19:45	0.000	-0.02
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2003/10/22	15:22:55	0.000	0.01
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2003/10/22	15:23:10	0.000	0.03
2003/10/22	15:23:15	0.000	0.01
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2003/10/22	15:27:05	0.000	-0.02
2003/10/22	15:27:10	0.000	0.03
2003/10/22	15:27:15	0.000	-0.01
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0.01



0.01



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2003/10/22	15:40:15	0.000	0.02
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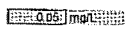
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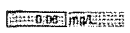
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2003/10/22	15:41:10	0.000	-0.01
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2003/10/22	15:41:55	0.000	0.02
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2003/10/22	15:42:10	0.000	0.03
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2003/10/22	15:42:20	0.000	-0.01
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2003/10/22	15:42:35	0.000	0.00
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2003/10/22	15:45:30	0.000	-0.01
2003/10/22	15:45:35	0.000	0.02
2003/10/22	15:45:40	0.000	0.01
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2003/10/22	15:46:05	0.000	-0.01
2003/10/22	15:46:10	0.000	0.03
2003/10/22	15:46:15	0.000	-0.02
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2003/10/22	15:46:35	0.000	0.02
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2003/10/22	15:47:35	0.000	0.02
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2003/10/22	15:49:15	0.000	-0.01
2003/10/22	15:49:20	0.000	0.01
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2003/10/22	15:49:50	0.000	-0.02
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2003/10/22	15:50:20	0.000	0.01
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2003/10/22	15:50:30	0.000	0.02
2003/10/22	15:50:35	0.000	0.01
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2003/10/22	15:51:20	0.000	0.02
2003/10/22	15:51:25	0.000	-0.01
2003/10/22	15:51:30	0.000	0.00
2003/10/22	15:51:35	0.000	-0.01
2003/10/22	15:51:40	0.000	0.01
2003/10/22	15:51:45	0.000	0.01

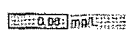
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0.01



0.01



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2003/10/22	15:53:35	0.000	-0.02
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2003/10/22	15:55:05	0.000	0.03
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2003/10/22	16:00:05	0.000	0.00
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2003/10/22	16:00:15	0.000	0.02
2003/10/22	16:00:20	0.000	-0.01
2003/10/22	16:00:25	0.000	0.00
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2003/10/22	16:00:35	0.000	0.01
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2003/10/22	16:00:50	0.000	0.02
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2003/10/22	16:01:05	0.000	-0.01
2003/10/22	16:01:10	0.000	0.04
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0.01

0.05

0.01

0.05

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2003/10/22	18:11:30	0.000	0.03
2003/10/22	18:11:35	0.000	-0.02
2003/10/22	18:11:40	0.000	0.01
2003/10/22	18:11:45	0.000	0.00
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2003/10/22	18:12:25	0.000	0.03
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2003/10/22	18:12:45	0.000	-0.01
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2003/10/22	18:13:25	0.000	-0.01
2003/10/22	18:13:30	0.000	0.02
2003/10/22	18:13:35	0.000	0.02
2003/10/22	18:13:40	0.000	0.01
2003/10/22	18:13:45	0.000	-0.01
2003/10/22	18:13:50	0.000	0.00
2003/10/22	18:13:55	0.000	0.01
2003/10/22	18:14:00	0.000	-0.01
2003/10/22	18:14:05	0.000	0.03
2003/10/22	18:14:10	0.000	-0.02
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0.01

0.00 mph

0.01

0.00 mph

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2003/10/22	18:15:10	0.000	-0.02
2003/10/22	18:15:15	0.000	0.03
2003/10/22	18:15:20	0.000	-0.01
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2003/10/22	18:15:35	0.000	-0.01
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2003/10/22	18:16:10	0.000	0.03
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2003/10/22	18:16:55	0.000	-0.01
2003/10/22	18:17:00	0.000	0.01
2003/10/22	18:17:05	0.000	0.01
2003/10/22	18:17:10	0.000	-0.01
2003/10/22	18:17:15	0.000	0.02
2003/10/22	18:17:20	0.000	0.01
2003/10/22	18:17:25	0.000	0.01
2003/10/22	18:17:30	0.000	0.00
2003/10/22	18:17:35	0.000	0.03
2003/10/22	18:17:40	0.000	0.02
2003/10/22	18:17:45	0.000	-0.02
2003/10/22	18:17:50	0.000	0.03
2003/10/22	18:17:55	0.000	-0.02
2003/10/22	18:18:00	0.000	0.01
2003/10/22	18:18:05	0.000	0.00
2003/10/22	18:18:10	0.000	0.00
2003/10/22	18:18:15	0.000	0.01
2003/10/22	18:18:20	0.000	-0.01
2003/10/22	18:18:25	0.000	0.01
2003/10/22	18:18:30	0.000	0.00
2003/10/22	18:18:35	0.000	0.00
2003/10/22	18:18:40	0.000	0.02
2003/10/22	18:18:45	0.000	0.03
2003/10/22	18:18:50	0.000	0.01
2003/10/22	18:18:55	0.000	-0.02
2003/10/22	18:19:00	0.000	0.03
2003/10/22	18:19:05	0.000	0.00
2003/10/22	18:19:10	0.000	-0.01
2003/10/22	18:19:15	0.000	0.02
2003/10/22	18:19:20	0.000	-0.01
2003/10/22	18:19:25	0.000	0.01
2003/10/22	18:19:30	0.000	-0.01
2003/10/22	18:19:35	0.000	0.01
2003/10/22	18:19:40	0.000	0.01
2003/10/22	18:19:45	0.000	-0.01
2003/10/22	18:19:50	0.000	0.02
2003/10/22	18:19:55	0.000	0.02
2003/10/22	18:20:00	0.000	0.01
2003/10/22	18:20:05	0.000	-0.01
2003/10/22	18:20:10	0.000	0.03
2003/10/22	18:20:15	0.000	0.01
2003/10/22	18:20:20	0.000	-0.01
2003/10/22	18:20:25	0.000	0.03
2003/10/22	18:20:30	0.000	-0.02
2003/10/22	18:20:35	0.000	0.01
2003/10/22	18:20:40	0.000	0.00
2003/10/22	18:20:45	0.000	0.00
2003/10/22	18:20:50	0.000	0.02
2003/10/22	18:20:55	0.000	-0.01
2003/10/22	18:21:00	0.000	0.01
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2003/10/22	18:21:10	0.000	0.01
2003/10/22	18:21:15	0.000	0.01
2003/10/22	18:21:20	0.000	0.03
2003/10/22	18:21:25	0.000	0.01
2003/10/22	18:21:30	0.000	-0.02
2003/10/22	18:21:35	0.000	0.03
2003/10/22	18:21:40	0.000	-0.01
2003/10/22	18:21:45	0.000	0.00
2003/10/22	18:21:50	0.000	0.01
2003/10/22	18:21:55	0.000	-0.01
2003/10/22	18:22:00	0.000	0.01
2003/10/22	18:22:05	0.000	-0.02
2003/10/22	18:22:10	0.000	0.01
2003/10/22	18:22:15	0.000	0.01
2003/10/22	18:22:20	0.000	0.00
2003/10/22	18:22:25	0.000	0.02
2003/10/22	18:22:30	0.000	0.03
2003/10/22	18:22:35	0.000	0.01
2003/10/22	18:22:40	0.000	-0.01
2003/10/22	18:22:45	0.000	0.03
2003/10/22	18:22:50	0.000	0.00
2003/10/22	18:22:55	0.000	-0.01
2003/10/22	18:23:00	0.000	0.02
2003/10/22	18:23:05	0.000	-0.01
2003/10/22	18:23:10	0.000	0.00
2003/10/22	18:23:15	0.000	-0.01
2003/10/22	18:23:20	0.000	0.01
2003/10/22	18:23:25	0.000	0.02
2003/10/22	18:23:30	0.000	-0.01
2003/10/22	18:23:35	0.000	0.01
2003/10/22	18:23:40	0.000	0.01
2003/10/22	18:23:45	0.000	0.01
2003/10/22	18:23:50	0.000	0.00
2003/10/22	18:23:55	0.000	0.03
2003/10/22	18:24:00	0.000	0.02
2003/10/22	18:24:05	0.000	-0.02
2003/10/22	18:24:10	0.000	0.03
2003/10/22	18:24:15	0.000	-0.02
2003/10/22	18:24:20	0.000	0.00
2003/10/22	18:24:25	0.000	0.01
2003/10/22	18:24:30	0.000	0.00
2003/10/22	18:24:35	0.000	0.02
2003/10/22	18:24:40	0.000	-0.01
2003/10/22	18:24:45	0.000	0.02
2003/10/22	18:24:50	0.000	0.01
2003/10/22	18:24:55	0.000	0.00
2003/10/22	18:25:00	0.000	0.01
2003/10/22	18:25:05	0.000	0.03
2003/10/22	18:25:10	0.000	0.02
2003/10/22	18:25:15	0.000	-0.02
2003/10/22	18:25:20	0.000	0.03
2003/10/22	18:25:25	0.000	0.00
2003/10/22	18:25:30	0.000	-0.01
2003/10/22	18:25:35	0.000	0.02
2003/10/22	18:25:40	0.000	-0.01
2003/10/22	18:25:45	0.000	0.00

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2003/10/22	18:28:20	0.000	0.01
2003/10/22	18:28:25	0.000	-0.01
2003/10/22	18:28:30	0.000	0.03
2003/10/22	18:28:35	0.000	0.02
2003/10/22	18:28:40	0.000	-0.01
2003/10/22	18:28:45	0.000	0.03
2003/10/22	18:28:50	0.000	-0.02
2003/10/22	18:28:55	0.000	0.01
2003/10/22	18:27:00	0.000	0.06
2003/10/22	18:27:05	0.000	0.00
2003/10/22	18:27:10	0.000	0.01
2003/10/22	18:27:15	0.000	-0.01
2003/10/22	18:27:20	0.000	0.01
2003/10/22	18:27:25	0.000	0.00
2003/10/22	18:27:30	0.000	0.01
2003/10/22	18:27:35	0.000	0.01
2003/10/22	18:27:40	0.000	0.03
2003/10/22	18:27:45	0.000	0.03
2003/10/22	18:27:50	0.000	0.01
2003/10/22	18:27:55	0.000	-0.02
2003/10/22	18:28:00	0.000	0.03
2003/10/22	18:28:05	0.000	-0.01
2003/10/22	18:28:10	0.000	0.00
2003/10/22	18:28:15	0.000	0.01
2003/10/22	18:28:20	0.000	-0.01
2003/10/22	18:28:25	0.000	0.01
2003/10/22	18:28:30	0.000	-0.02
2003/10/22	18:28:35	0.000	0.01
2003/10/22	18:28:40	0.000	0.00
2003/10/22	18:28:45	0.000	0.02
2003/10/22	18:28:50	0.000	0.03
2003/10/22	18:28:55	0.000	0.01
2003/10/22	18:29:00	0.000	-0.01
2003/10/22	18:29:05	0.000	0.03
2003/10/22	18:29:10	0.000	0.01
2003/10/22	18:29:15	0.000	-0.01
2003/10/22	18:29:20	0.000	0.03
2003/10/22	18:29:25	0.000	-0.02
2003/10/22	18:29:30	0.000	0.01
2003/10/22	18:29:35	0.000	-0.01
2003/10/22	18:29:40	0.000	0.00
2003/10/22	18:29:45	0.000	0.02
2003/10/22	18:29:50	0.000	-0.01
2003/10/22	18:29:55	0.000	0.01
2003/10/22	18:30:00	0.000	0.01
2003/10/22	18:30:05	0.000	0.01
2003/10/22	18:30:10	0.000	0.00
2003/10/22	18:30:15	0.000	0.03
2003/10/22	18:30:20	0.000	0.01
2003/10/22	18:30:25	0.000	-0.01
2003/10/22	18:30:30	0.000	0.03
2003/10/22	18:30:35	0.000	-0.01
2003/10/22	18:30:40	0.000	0.00
2003/10/22	18:30:45	0.000	0.01
2003/10/22	18:30:50	0.000	-0.01
2003/10/22	18:30:55	0.000	0.02
2003/10/22	18:31:00	0.000	-0.02
2003/10/22	18:31:05	0.000	0.01
2003/10/22	18:31:10	0.000	0.01
2003/10/22	18:31:15	0.000	0.00
2003/10/22	18:31:20	0.000	0.02
2003/10/22	18:31:25	0.000	0.02
2003/10/22	18:31:30	0.000	-0.02
2003/10/22	18:31:35	0.000	0.03
2003/10/22	18:31:40	0.000	0.00
2003/10/22	18:31:45	0.000	0.00
2003/10/22	18:31:50	0.000	-0.01
2003/10/22	18:31:55	0.000	0.02
2003/10/22	18:32:00	0.000	-0.01
2003/10/22	18:32:05	0.000	0.01
2003/10/22	18:32:10	0.000	-0.01
2003/10/22	18:32:15	0.000	0.01
2003/10/22	18:32:20	0.000	0.01
2003/10/22	18:32:25	0.000	-0.01
2003/10/22	18:32:30	0.000	0.01
2003/10/22	18:32:35	0.000	0.02
2003/10/22	18:32:40	0.000	0.01
2003/10/22	18:32:45	0.000	-0.01
2003/10/22	18:32:50	0.000	0.03
2003/10/22	18:32:55	0.000	0.02
2003/10/22	18:33:00	0.000	-0.02
2003/10/22	18:33:05	0.000	0.03
2003/10/22	18:33:10	0.000	-0.02
2003/10/22	18:33:15	0.000	0.00
2003/10/22	18:33:20	0.000	0.00
2003/10/22	18:33:25	0.000	0.00
2003/10/22	18:33:30	0.000	0.01
2003/10/22	18:33:35	0.000	-0.01
2003/10/22	18:33:40	0.000	0.02
2003/10/22	18:33:45	0.000	0.00
2003/10/22	18:33:50	0.000	0.00
2003/10/22	18:33:55	0.000	0.01
2003/10/22	18:34:00	0.000	0.03
2003/10/22	18:34:05	0.000	0.02
2003/10/22	18:34:10	0.000	-0.02
2003/10/22	18:34:15	0.000	0.03
2003/10/22	18:34:20	0.000	0.00
2003/10/22	18:34:25	0.000	0.00
2003/10/22	18:34:30	0.000	0.02
2003/10/22	18:34:35	0.000	-0.01
2003/10/22	18:34:40	0.000	0.00
2003/10/22	18:34:45	0.000	-0.01
2003/10/22	18:34:50	0.000	0.01
2003/10/22	18:34:55	0.000	0.01
2003/10/22	18:35:00	0.000	-0.01
2003/10/22	18:35:05	0.000	0.02
2003/10/22	18:35:10	0.000	0.02
2003/10/22	18:35:15	0.000	0.01
2003/10/22	18:35:20	0.000	-0.01
2003/10/22	18:35:25	0.000	0.04
2003/10/22	18:35:30	0.000	0.01
2003/10/22	18:35:35	0.000	-0.01
2003/10/22	18:35:40	0.000	0.03
2003/10/22	18:35:45	0.000	-0.01
2003/10/22	18:35:50	0.000	0.01
2003/10/22	18:35:55	0.000	-0.01
2003/10/22	18:36:00	0.000	0.00
2003/10/22	18:36:05	0.000	0.01
2003/10/22	18:36:10	0.000	-0.01
2003/10/22	18:36:15	0.000	0.02
2003/10/22	18:36:20	0.000	0.01
2003/10/22	18:36:25	0.000	0.01
2003/10/22	18:36:30	0.000	0.01
2003/10/22	18:36:35	0.000	0.03
2003/10/22	18:36:40	0.000	0.01
2003/10/22	18:36:45	0.000	-0.02
2003/10/22	18:36:50	0.000	0.03
2003/10/22	18:36:55	0.000	-0.01
2003/10/22	18:37:00	0.000	0.00
2003/10/22	18:37:05	0.000	0.01

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0.000 0.000 0.000 0.000

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2003/10/22	16:37:40	0.000	0.02
2003/10/22	16:37:45	0.000	0.03
2003/10/22	16:37:50	0.000	0.01
2003/10/22	16:37:55	0.000	-0.01
2003/10/22	16:38:00	0.000	0.03
2003/10/22	16:38:05	0.000	0.00
2003/10/22	16:38:10	0.000	-0.01
2003/10/22	16:38:15	0.000	0.02
2003/10/22	16:38:20	0.000	-0.01
2003/10/22	16:38:25	0.000	0.01
2003/10/22	16:38:30	0.000	-0.01
2003/10/22	16:38:35	0.000	0.01
2003/10/22	16:38:40	0.000	0.02
2003/10/22	16:38:45	0.000	-0.01
2003/10/22	16:38:50	0.000	0.01
2003/10/22	16:38:55	0.000	0.01
2003/10/22	16:39:00	0.000	0.01
2003/10/22	16:39:05	0.000	0.00
2003/10/22	16:39:10	0.000	0.03
2003/10/22	16:39:15	0.000	0.01
2003/10/22	16:39:20	0.000	-0.01
2003/10/22	16:39:25	0.000	0.03
2003/10/22	16:39:30	0.000	-0.02
2003/10/22	16:39:35	0.000	0.00
2003/10/22	16:39:40	0.000	0.00
2003/10/22	16:39:45	0.000	0.00
2003/10/22	16:39:50	0.000	0.02
2003/10/22	16:39:55	0.000	-0.01
2003/10/22	16:40:00	0.000	0.01
2003/10/22	16:40:05	0.000	0.00
2003/10/22	16:40:10	0.000	0.00
2003/10/22	16:40:15	0.000	0.01
2003/10/22	16:40:20	0.000	0.03
2003/10/22	16:40:25	0.000	0.02
2003/10/22	16:40:30	0.000	-0.02
2003/10/22	16:40:35	0.000	0.03
2003/10/22	16:40:40	0.000	0.00
2003/10/22	16:40:45	0.000	0.00
2003/10/22	16:40:50	0.000	0.02
2003/10/22	16:40:55	0.000	-0.01
2003/10/22	16:41:00	0.000	0.01
2003/10/22	16:41:05	0.000	-0.01
2003/10/22	16:41:10	0.000	0.01
2003/10/22	16:41:15	0.000	0.01
2003/10/22	16:41:20	0.000	-0.01
2003/10/22	16:41:25	0.000	0.01
2003/10/22	16:41:30	0.000	0.02
2003/10/22	16:41:35	0.000	0.01
2003/10/22	16:41:40	0.000	-0.01
2003/10/22	16:41:45	0.000	0.03
2003/10/22	16:41:50	0.000	0.02
2003/10/22	16:41:55	0.000	-0.01
2003/10/22	16:42:00	0.000	0.03
2003/10/22	16:42:05	0.000	-0.02
2003/10/22	16:42:10	0.000	0.00
2003/10/22	16:42:15	0.000	0.00
2003/10/22	16:42:20	0.000	0.00
2003/10/22	16:42:25	0.000	0.01
2003/10/22	16:42:30	0.000	-0.01
2003/10/22	16:42:35	0.000	0.02
2003/10/22	16:42:40	0.000	0.01
2003/10/22	16:42:45	0.000	0.01
2003/10/22	16:42:50	0.000	0.01
2003/10/22	16:42:55	0.000	0.03
2003/10/22	16:43:00	0.000	0.02
2003/10/22	16:43:05	0.000	-0.02
2003/10/22	16:43:10	0.000	0.03
2003/10/22	16:43:15	0.000	-0.01
2003/10/22	16:43:20	0.000	0.00
2003/10/22	16:43:25	0.000	0.01
2003/10/22	16:43:30	0.000	-0.01
2003/10/22	16:43:35	0.000	0.00
2003/10/22	16:43:40	0.000	-0.02
2003/10/22	16:43:45	0.000	0.01
2003/10/22	16:43:50	0.000	0.01
2003/10/22	16:43:55	0.000	0.00
2003/10/22	16:44:00	0.000	0.02
2003/10/22	16:44:05	0.000	0.03
2003/10/22	16:44:10	0.000	0.01
2003/10/22	16:44:15	0.000	-0.01
2003/10/22	16:44:20	0.000	0.04
2003/10/22	16:44:25	0.000	0.01
2003/10/22	16:44:30	0.000	-0.01
2003/10/22	16:44:35	0.000	0.02
2003/10/22	16:44:40	0.000	-0.01
2003/10/22	16:44:45	0.000	0.01
2003/10/22	16:44:50	0.000	0.01
2003/10/22	16:44:55	0.000	-0.01
2003/10/22	16:45:00	0.000	0.01
2003/10/22	16:45:05	0.000	0.01
2003/10/22	16:45:10	0.000	-0.01
2003/10/22	16:45:15	0.000	0.02
2003/10/22	16:45:20	0.000	0.01
2003/10/22	16:45:25	0.000	0.00
2003/10/22	16:45:30	0.000	0.03
2003/10/22	16:45:35	0.000	0.01
2003/10/22	16:45:40	0.000	-0.02
2003/10/22	16:45:45	0.000	0.03
2003/10/22	16:45:50	0.000	-0.02
2003/10/22	16:45:55	0.000	0.00
2003/10/22	16:46:00	0.000	0.01
2003/10/22	16:46:05	0.000	0.00
2003/10/22	16:46:10	0.000	0.02
2003/10/22	16:46:15	0.000	-0.02
2003/10/22	16:46:20	0.000	0.01
2003/10/22	16:46:25	0.000	0.00
2003/10/22	16:46:30	0.000	0.00
2003/10/22	16:46:35	0.000	0.02
2003/10/22	16:46:40	0.000	0.03
2003/10/22	16:46:45	0.000	0.01
2003/10/22	16:46:50	0.000	-0.02
2003/10/22	16:46:55	0.000	0.03
2003/10/22	16:47:00	0.000	0.00
2003/10/22	16:47:05	0.000	-0.01
2003/10/22	16:47:10	0.000	0.02
2003/10/22	16:47:15	0.000	-0.01
2003/10/22	16:47:20	0.000	0.01
2003/10/22	16:47:25	0.000	-0.01
2003/10/22	16:47:30	0.000	0.01
2003/10/22	16:47:35	0.000	0.01
2003/10/22	16:47:40	0.000	-0.01
2003/10/22	16:47:45	0.000	0.01
2003/10/22	16:47:50	0.000	0.02
2003/10/22	16:47:55	0.000	0.01
2003/10/22	16:48:00	0.000	-0.01
2003/10/22	16:48:05	0.000	0.03
2003/10/22	16:48:10	0.000	0.01
2003/10/22	16:48:15	0.000	-0.01
2003/10/22	16:48:20	0.000	0.03
2003/10/22	16:48:25	0.000	-0.02

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2003/10/22 17:00:15 0.000 0.01  
 2003/10/22 17:00:20 0.000 -0.01  
 2003/10/22 17:00:25 0.000 0.02  
 2003/10/22 17:00:30 0.000 0.01  
 2003/10/22 17:00:35 0.000 0.01  
 2003/10/22 17:00:40 0.000 0.00  
 2003/10/22 17:00:45 0.000 0.03  
 2003/10/22 17:00:50 0.000 0.02  
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2003/10/22	17:23:15	0.000	0.02
2003/10/22	17:23:20	0.000	-0.01
2003/10/22	17:23:25	0.000	0.01
2003/10/22	17:23:30	0.000	0.01
2003/10/22	17:23:35	0.000	0.01
2003/10/22	17:23:40	0.000	0.01
2003/10/22	17:23:45	0.000	0.03
2003/10/22	17:23:50	0.000	0.01
2003/10/22	17:23:55	0.000	-0.02
2003/10/22	17:24:00	0.000	0.03
2003/10/22	17:24:05	0.000	-0.01
2003/10/22	17:24:10	0.000	0.00
2003/10/22	17:24:15	0.000	0.01
2003/10/22	17:24:20	0.000	-0.01
2003/10/22	17:24:25	0.000	0.01
2003/10/22	17:24:30	0.000	-0.02
2003/10/22	17:24:35	0.000	0.01
2003/10/22	17:24:40	0.000	0.01
2003/10/22	17:24:45	0.000	0.00
2003/10/22	17:24:50	0.000	0.02
2003/10/22	17:24:55	0.000	0.03
2003/10/22	17:25:00	0.000	0.01
2003/10/22	17:25:05	0.000	-0.01
2003/10/22	17:25:10	0.000	0.03
2003/10/22	17:25:15	0.000	0.01
2003/10/22	17:25:20	0.000	-0.01
2003/10/22	17:25:25	0.000	0.02
2003/10/22	17:25:30	0.000	-0.02
2003/10/22	17:25:35	0.000	0.00
2003/10/22	17:25:40	0.000	-0.01
2003/10/22	17:25:45	0.000	0.01
2003/10/22	17:25:50	0.000	0.02
2003/10/22	17:25:55	0.000	-0.01
2003/10/22	17:26:00	0.000	0.01
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2003/10/22	17:26:15	0.000	0.00
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2003/10/22	17:26:30	0.000	-0.02
2003/10/22	17:26:35	0.000	0.03
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2003/10/22	17:27:05	0.000	-0.01
2003/10/22	17:27:10	0.000	0.02
2003/10/22	17:27:15	0.000	0.01
2003/10/22	17:27:20	0.000	0.00
2003/10/22	17:27:25	0.000	0.01
2003/10/22	17:27:30	0.000	0.03
2003/10/22	17:27:35	0.000	0.01
2003/10/22	17:27:40	0.000	-0.01
2003/10/22	17:27:45	0.000	0.03
2003/10/22	17:27:50	0.000	0.01
2003/10/22	17:27:55	0.000	-0.01
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2003/10/22	17:28:15	0.000	-0.01
2003/10/22	17:28:20	0.000	0.01
2003/10/22	17:28:25	0.000	0.01
2003/10/22	17:28:30	0.000	-0.01
2003/10/22	17:28:35	0.000	0.02
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2003/10/22	17:28:50	0.000	0.00
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2003/10/22	17:29:05	0.000	-0.02
2003/10/22	17:29:10	0.000	0.03
2003/10/22	17:29:15	0.000	-0.01
2003/10/22	17:29:20	0.000	0.00
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2003/10/22	17:29:30	0.000	-0.01
2003/10/22	17:29:35	0.000	0.02
2003/10/22	17:29:40	0.000	0.01
2003/10/22	17:29:45	0.000	0.01
2003/10/22	17:29:50	0.000	0.01
2003/10/22	17:29:55	0.000	0.00
2003/10/22	17:30:00	0.000	0.02
2003/10/22	17:30:05	0.000	0.03
2003/10/22	17:30:10	0.000	0.01
2003/10/22	17:30:15	0.000	-0.01
2003/10/22	17:30:20	0.000	0.03
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2003/10/22	17:30:35	0.000	0.02
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2003/10/22	17:31:10	0.000	0.02
2003/10/22	17:31:15	0.000	0.01
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2003/10/22	17:31:25	0.000	0.00
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2003/10/22	17:31:35	0.000	0.01
2003/10/22	17:31:40	0.000	-0.02
2003/10/22	17:31:45	0.000	0.03
2003/10/22	17:31:50	0.000	-0.01
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2003/10/22	17:32:05	0.000	-0.01
2003/10/22	17:32:10	0.000	0.02
2003/10/22	17:32:15	0.000	-0.02
2003/10/22	17:32:20	0.000	0.01
2003/10/22	17:32:25	0.000	0.01
2003/10/22	17:32:30	0.000	0.00
2003/10/22	17:32:35	0.000	0.02
2003/10/22	17:32:40	0.000	0.03
2003/10/22	17:32:45	0.000	0.01
2003/10/22	17:32:50	0.000	-0.01
2003/10/22	17:32:55	0.000	0.03
2003/10/22	17:33:00	0.000	0.00
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2003/10/22	17:33:10	0.000	0.03
2003/10/22	17:33:15	0.000	-0.01
2003/10/22	17:33:20	0.000	0.01
2003/10/22	17:33:25	0.000	-0.01
2003/10/22	17:33:30	0.000	0.01
2003/10/22	17:33:35	0.000	0.02
2003/10/22	17:33:40	0.000	-0.01
2003/10/22	17:33:45	0.000	0.01

0.01

0.05

0.01

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2003/10/22	17:45:50	0.000	0.03
2003/10/22	17:45:55	0.000	0.00
2003/10/22	17:46:00	0.000	-0.01
2003/10/22	17:46:05	0.000	0.02
2003/10/22	17:46:10	0.000	-0.01
2003/10/22	17:46:15	0.000	0.01
2003/10/22	17:46:20	0.000	-0.01
2003/10/22	17:46:25	0.000	0.01
2003/10/22	17:46:30	0.006	0.02
2003/10/22	17:46:35	0.000	-0.01
2003/10/22	17:46:40	0.000	0.01
2003/10/22	17:46:45	0.000	0.01
2003/10/22	17:46:50	0.000	0.01
2003/10/22	17:46:55	0.000	0.00
2003/10/22	17:47:00	0.000	0.03
2003/10/22	17:47:05	0.000	0.02
2003/10/22	17:47:10	0.000	-0.02
2003/10/22	17:47:15	0.000	0.03
2003/10/22	17:47:20	0.006	-0.01
2003/10/22	17:47:25	0.000	0.00
2003/10/22	17:47:30	0.000	0.01
2003/10/22	17:47:35	0.000	-0.01
2003/10/22	17:47:40	0.000	0.01
2003/10/22	17:47:45	0.000	-0.01
2003/10/22	17:47:50	0.000	0.01
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2003/10/22	17:48:10	0.000	0.03
2003/10/22	17:48:15	0.000	0.01
2003/10/22	17:48:20	0.000	-0.01
2003/10/22	17:48:25	0.000	0.03
2003/10/22	17:48:30	0.000	0.01
2003/10/22	17:48:35	0.000	-0.01
2003/10/22	17:48:40	0.000	0.02
2003/10/22	17:48:45	0.000	-0.01
2003/10/22	17:48:50	0.000	0.00
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2003/10/22	17:49:10	0.000	-0.01
2003/10/22	17:49:15	0.000	0.02
2003/10/22	17:49:20	0.000	0.01
2003/10/22	17:49:25	0.000	0.01
2003/10/22	17:49:30	0.000	0.00
2003/10/22	17:49:35	0.000	0.03
2003/10/22	17:49:40	0.000	0.02
2003/10/22	17:49:45	0.000	-0.02
2003/10/22	17:49:50	0.000	0.03
2003/10/22	17:49:55	0.000	-0.01
2003/10/22	17:50:00	0.000	0.00
2003/10/22	17:50:05	0.000	0.01
2003/10/22	17:50:10	0.000	-0.01
2003/10/22	17:50:15	0.000	0.00
2003/10/22	17:50:20	0.000	-0.02
2003/10/22	17:50:25	0.000	0.01
2003/10/22	17:50:30	0.000	0.00
2003/10/22	17:50:35	0.000	0.00
2003/10/22	17:50:40	0.000	0.02
2003/10/22	17:50:45	0.000	0.02
2003/10/22	17:50:50	0.000	0.01
2003/10/22	17:50:55	0.000	-0.01
2003/10/22	17:51:00	0.000	0.03
2003/10/22	17:51:05	0.000	0.00
2003/10/22	17:51:10	0.000	-0.01
2003/10/22	17:51:15	0.000	0.02
2003/10/22	17:51:20	0.000	-0.01
2003/10/22	17:51:25	0.000	0.01
2003/10/22	17:51:30	0.000	-0.01
2003/10/22	17:51:35	0.000	0.01
2003/10/22	17:51:40	0.000	0.01
2003/10/22	17:51:45	0.000	-0.01
2003/10/22	17:51:50	0.000	0.02
2003/10/22	17:51:55	0.000	0.01
2003/10/22	17:52:00	0.000	0.01
2003/10/22	17:52:05	0.000	0.00
2003/10/22	17:52:10	0.000	0.03
2003/10/22	17:52:15	0.000	0.01
2003/10/22	17:52:20	0.000	-0.02
2003/10/22	17:52:25	0.000	0.03
2003/10/22	17:52:30	0.000	-0.01
2003/10/22	17:52:35	0.000	0.00
2003/10/22	17:52:40	0.000	0.01
2003/10/22	17:52:45	0.000	0.00
2003/10/22	17:52:50	0.000	0.02
2003/10/22	17:52:55	0.000	-0.02
2003/10/22	17:53:00	0.000	0.01
2003/10/22	17:53:05	0.000	0.01
2003/10/22	17:53:10	0.000	0.00
2003/10/22	17:53:15	0.000	0.02
2003/10/22	17:53:20	0.000	0.02
2003/10/22	17:53:25	0.000	0.01
2003/10/22	17:53:30	0.000	-0.01
2003/10/22	17:53:35	0.000	0.03
2003/10/22	17:53:40	0.000	0.00
2003/10/22	17:53:45	0.000	-0.01
2003/10/22	17:53:50	0.000	0.02
2003/10/22	17:53:55	0.000	-0.01
2003/10/22	17:54:00	0.000	0.01
2003/10/22	17:54:05	0.000	-0.01
2003/10/22	17:54:10	0.000	0.01
2003/10/22	17:54:15	0.000	0.02
2003/10/22	17:54:20	0.000	-0.01
2003/10/22	17:54:25	0.000	0.01
2003/10/22	17:54:30	0.000	0.01
2003/10/22	17:54:35	0.000	0.01
2003/10/22	17:54:40	0.000	0.00
2003/10/22	17:54:45	0.000	0.03
2003/10/22	17:54:50	0.000	0.01
2003/10/22	17:54:55	0.000	-0.01
2003/10/22	17:55:00	0.000	0.03
2003/10/22	17:55:05	0.000	-0.02
2003/10/22	17:55:10	0.000	0.00
2003/10/22	17:55:15	0.000	0.01
2003/10/22	17:55:20	0.000	0.00
2003/10/22	17:55:25	0.000	0.02
2003/10/22	17:55:30	0.000	-0.02
2003/10/22	17:55:35	0.000	0.01
2003/10/22	17:55:40	0.000	0.01
2003/10/22	17:55:45	0.000	0.00
2003/10/22	17:55:50	0.000	0.02
2003/10/22	17:55:55	0.000	0.02
2003/10/22	17:56:00	0.000	0.02
2003/10/22	17:56:05	0.000	-0.02
2003/10/22	17:56:10	0.000	0.03
2003/10/22	17:56:15	0.000	0.00
2003/10/22	17:56:20	0.000	-0.01
2003/10/22	17:56:25	0.000	0.02

0.01

0.003 mmpa

0.01

0.053 mmpa

2003/10/22	17:58:55	0.000	-0.01
2003/10/22	17:57:00	0.000	0.01
2003/10/22	17:57:05	0.000	0.02
2003/10/22	17:57:10	0.000	0.01
2003/10/22	17:57:15	0.000	0.00
2003/10/22	17:57:20	0.000	0.03
2003/10/22	17:57:25	0.000	0.02
2003/10/22	17:57:30	0.000	-0.01
2003/10/22	17:57:35	0.000	0.03
2003/10/22	17:57:40	0.000	-0.02
2003/10/22	17:57:45	0.000	0.00
2003/10/22	17:57:50	0.000	0.01
2003/10/22	17:57:55	0.000	-0.01
2003/10/22	17:58:00	0.000	0.01
2003/10/22	17:58:05	0.000	-0.01
2003/10/22	17:58:10	0.000	0.02
2003/10/22	17:58:15	0.000	0.00
2003/10/22	17:58:20	0.000	0.00
2003/10/22	17:58:25	0.000	0.01
2003/10/22	17:58:30	0.000	0.03
2003/10/22	17:58:35	0.000	0.01
2003/10/22	17:58:40	0.000	-0.02
2003/10/22	17:58:45	0.000	0.03
2003/10/22	17:58:50	0.000	0.01
2003/10/22	17:58:55	0.000	-0.01
2003/10/22	17:59:00	0.000	0.02
2003/10/22	17:59:05	0.000	-0.01
2003/10/22	17:59:10	0.000	0.00
2003/10/22	17:59:15	0.000	-0.01
2003/10/22	17:59:20	0.000	0.01
2003/10/22	17:59:25	0.000	0.01
2003/10/22	17:59:30	0.000	-0.01
2003/10/22	17:59:35	0.000	0.02
2003/10/22	17:59:40	0.000	0.01
2003/10/22	17:59:45	0.000	0.01
2003/10/22	17:59:50	0.000	0.00
2003/10/22	17:59:55	0.000	0.03
2003/10/22	18:00:00	0.000	0.02
2003/10/22	18:00:05	0.000	-0.02
2003/10/22	18:00:10	0.000	0.03
2003/10/22	18:00:15	0.000	-0.02
2003/10/22	18:00:20	0.000	0.01
2003/10/22	18:00:25	0.000	0.01
2003/10/22	18:00:30	0.000	0.00
2003/10/22	18:00:35	0.000	0.00
2003/10/22	18:00:40	0.000	-0.02
2003/10/22	18:00:45	0.000	0.01
2003/10/22	18:00:50	0.000	0.00
2003/10/22	18:00:55	0.000	0.00
2003/10/22	18:01:00	0.000	0.02
2003/10/22	18:01:05	0.000	0.03
2003/10/22	18:01:10	0.000	0.01
2003/10/22	18:01:15	0.000	-0.02
2003/10/22	18:01:20	0.000	0.03
2003/10/22	18:01:25	0.000	0.00
2003/10/22	18:01:30	0.000	-0.01
2003/10/22	18:01:35	0.000	0.02
2003/10/22	18:01:40	0.000	-0.01
2003/10/22	18:01:45	0.000	0.01
2003/10/22	18:01:50	0.000	-0.01
2003/10/22	18:01:55	0.000	0.01
2003/10/22	18:02:00	0.000	0.01
2003/10/22	18:02:05	0.000	-0.01
2003/10/22	18:02:10	0.000	0.02
2003/10/22	18:02:15	0.000	0.01
2003/10/22	18:02:20	0.000	0.01
2003/10/22	18:02:25	0.000	0.00
2003/10/22	18:02:30	0.000	0.03
2003/10/22	18:02:35	0.000	0.01
2003/10/22	18:02:40	0.000	-0.01
2003/10/22	18:02:45	0.000	0.03
2003/10/22	18:02:50	0.000	-0.02
2003/10/22	18:02:55	0.000	0.01
2003/10/22	18:03:00	0.000	0.01
2003/10/22	18:03:05	0.000	0.00
2003/10/22	18:03:10	0.000	0.02
2003/10/22	18:03:15	0.000	-0.02
2003/10/22	18:03:20	0.000	0.01
2003/10/22	18:03:25	0.000	0.00
2003/10/22	18:03:30	0.000	0.00
2003/10/22	18:03:35	0.000	0.02
2003/10/22	18:03:40	0.000	0.03
2003/10/22	18:03:45	0.000	0.01
2003/10/22	18:03:50	0.000	-0.02
2003/10/22	18:03:55	0.000	0.03
2003/10/22	18:04:00	0.000	0.00
2003/10/22	18:04:05	0.000	-0.01
2003/10/22	18:04:10	0.000	0.02
2003/10/22	18:04:15	0.000	-0.01
2003/10/22	18:04:20	0.000	0.01
2003/10/22	18:04:25	0.000	-0.01
2003/10/22	18:04:30	0.000	0.01
2003/10/22	18:04:35	0.000	0.01
2003/10/22	18:04:40	0.000	-0.01
2003/10/22	18:04:45	0.000	0.01
2003/10/22	18:04:50	0.000	0.01
2003/10/22	18:04:55	0.000	0.01
2003/10/22	18:05:00	0.000	-0.01
2003/10/22	18:05:05	0.000	0.03
2003/10/22	18:05:10	0.000	0.01
2003/10/22	18:05:15	0.000	-0.01
2003/10/22	18:05:20	0.000	0.03
2003/10/22	18:05:25	0.000	-0.02
2003/10/22	18:05:30	0.000	0.00
2003/10/22	18:05:35	0.000	0.00
2003/10/22	18:05:40	0.000	0.00
2003/10/22	18:05:45	0.000	0.02
2003/10/22	18:05:50	0.000	-0.01
2003/10/22	18:05:55	0.000	0.01
2003/10/22	18:06:00	0.000	0.00
2003/10/22	18:06:05	0.000	0.00
2003/10/22	18:06:10	0.000	0.01
2003/10/22	18:06:15	0.000	0.03
2003/10/22	18:06:20	0.000	0.02
2003/10/22	18:06:25	0.000	-0.02
2003/10/22	18:06:30	0.000	0.03
2003/10/22	18:06:35	0.000	0.00
2003/10/22	18:06:40	0.000	-0.01
2003/10/22	18:06:45	0.000	0.02
2003/10/22	18:06:50	0.000	-0.01
2003/10/22	18:06:55	0.000	0.01
2003/10/22	18:07:00	0.000	-0.01
2003/10/22	18:07:05	0.000	0.01
2003/10/22	18:07:10	0.000	0.01
2003/10/22	18:07:15	0.000	-0.01
2003/10/22	18:07:20	0.000	0.01
2003/10/22	18:07:25	0.000	0.02
2003/10/22	18:07:30	0.000	0.01
2003/10/22	18:07:35	0.000	-0.01
2003/10/22	18:07:40	0.000	0.03
2003/10/22	18:07:45	0.000	0.02

0.01

0.05

0.01

0.05





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2003/10/22	18:19:50	0.000	0.01
2003/10/22	18:19:55	0.000	-0.01
2003/10/22	18:20:00	0.000	0.01
2003/10/22	18:20:05	0.000	0.00
2003/10/22	18:20:10	0.000	0.00
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2003/10/22	18:20:20	0.000	0.03
2003/10/22	18:20:25	0.000	0.01
2003/10/22	18:20:30	0.006	-0.02
2003/10/22	18:20:35	0.000	0.03
2003/10/22	18:20:40	0.006	0.00
2003/10/22	18:20:45	0.000	-0.01
2003/10/22	18:20:50	0.000	0.02
2003/10/22	18:20:55	0.000	-0.01
2003/10/22	18:21:00	0.000	0.01
2003/10/22	18:21:05	0.000	-0.01
2003/10/22	18:21:10	0.000	0.01
2003/10/22	18:21:15	0.000	0.01
2003/10/22	18:21:20	0.000	-0.01
2003/10/22	18:21:25	0.000	0.02
2003/10/22	18:21:30	0.000	0.02
2003/10/22	18:21:35	0.000	0.01
2003/10/22	18:21:40	0.000	-0.01
2003/10/22	18:21:45	0.000	0.03
2003/10/22	18:21:50	0.006	0.01
2003/10/22	18:21:55	0.000	-0.01
2003/10/22	18:22:00	0.000	0.03
2003/10/22	18:22:05	0.000	-0.02
2003/10/22	18:22:10	0.000	0.01
2003/10/22	18:22:15	0.000	0.00
2003/10/22	18:22:20	0.000	0.00
2003/10/22	18:22:25	0.000	0.02
2003/10/22	18:22:30	0.000	-0.01
2003/10/22	18:22:35	0.000	0.01
2003/10/22	18:22:40	0.000	0.01
2003/10/22	18:22:45	0.000	0.01
2003/10/22	18:22:50	0.000	0.01
2003/10/22	18:22:55	0.000	0.03
2003/10/22	18:23:00	0.000	0.01
2003/10/22	18:23:05	0.000	-0.01
2003/10/22	18:23:10	0.000	0.03
2003/10/22	18:23:15	0.000	-0.01
2003/10/22	18:23:20	0.000	0.00
2003/10/22	18:23:25	0.000	0.01
2003/10/22	18:23:30	0.006	-0.01
2003/10/22	18:23:35	0.006	0.01
2003/10/22	18:23:40	0.000	-0.02
2003/10/22	18:23:45	0.006	0.01
2003/10/22	18:23:50	0.000	0.01
2003/10/22	18:23:55	0.000	0.00
2003/10/22	18:24:00	0.000	0.02
2003/10/22	18:24:05	0.000	0.03
2003/10/22	18:24:10	0.000	0.01
2003/10/22	18:24:15	0.000	-0.01
2003/10/22	18:24:20	0.000	0.03
2003/10/22	18:24:25	0.000	0.01
2003/10/22	18:24:30	0.000	-0.01
2003/10/22	18:24:35	0.000	0.03
2003/10/22	18:24:40	0.000	-0.02
2003/10/22	18:24:45	0.000	0.00
2003/10/22	18:24:50	0.000	0.00
2003/10/22	18:24:55	0.000	0.00
2003/10/22	18:25:00	0.000	0.02
2003/10/22	18:25:05	0.000	-0.01
2003/10/22	18:25:10	0.000	0.01
2003/10/22	18:25:15	0.000	0.01
2003/10/22	18:25:20	0.000	0.01
2003/10/22	18:25:25	0.000	0.00
2003/10/22	18:25:30	0.000	0.03
2003/10/22	18:25:35	0.000	0.02
2003/10/22	18:25:40	0.000	-0.02
2003/10/22	18:25:45	0.000	0.03
2003/10/22	18:25:50	0.000	-0.01
2003/10/22	18:25:55	0.000	0.00
2003/10/22	18:26:00	0.000	0.01
2003/10/22	18:26:05	0.000	-0.01
2003/10/22	18:26:10	0.000	0.01
2003/10/22	18:26:15	0.000	-0.01
2003/10/22	18:26:20	0.000	0.01
2003/10/22	18:26:25	0.000	0.01
2003/10/22	18:26:30	0.000	0.00
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2003/10/22	18:26:40	0.000	0.00
2003/10/22	18:26:45	0.000	0.00
2003/10/22	18:26:50	0.000	-0.02
2003/10/22	18:26:55	0.000	0.01
2003/10/22	18:27:00	0.000	0.00
2003/10/22	18:27:05	0.000	0.00
2003/10/22	18:27:10	0.000	0.02
2003/10/22	18:27:15	0.000	-0.01
2003/10/22	18:27:20	0.000	0.00
2003/10/22	18:27:25	0.000	-0.01
2003/10/22	18:27:30	0.000	0.01
2003/10/22	18:27:35	0.006	0.01
2003/10/22	18:27:40	0.000	-0.01
2003/10/22	18:27:45	0.000	0.02
2003/10/22	18:27:50	0.000	0.01
2003/10/22	18:27:55	0.000	0.01
2003/10/22	18:28:00	0.000	0.00
2003/10/22	18:28:05	0.000	0.03
2003/10/22	18:28:10	0.000	0.02
2003/10/22	18:28:15	0.000	-0.02
2003/10/22	18:28:20	0.000	0.03
2003/10/22	18:28:25	0.000	-0.02
2003/10/22	18:28:30	0.000	0.01
2003/10/22	18:28:35	0.000	0.00
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2003/10/22	18:28:45	0.000	0.00
2003/10/22	18:28:50	0.000	-0.02
2003/10/22	18:28:55	0.000	0.01
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2003/10/22	18:29:05	0.000	0.00
2003/10/22	18:29:10	0.000	0.02
2003/10/22	18:29:15	0.000	0.03
2003/10/22	18:29:20	0.000	0.01
2003/10/22	18:29:25	0.000	-0.02
2003/10/22	18:29:30	0.000	0.03
2003/10/22	18:29:35	0.000	0.00
2003/10/22	18:29:40	0.000	-0.01
2003/10/22	18:29:45	0.000	0.02
2003/10/22	18:29:50	0.000	-0.01
2003/10/22	18:29:55	0.000	0.01
2003/10/22	18:30:00	0.000	-0.01
2003/10/22	18:30:05	0.000	0.01
2003/10/22	18:30:10	0.000	0.01
2003/10/22	18:30:15	0.000	-0.01
2003/10/22	18:30:20	0.000	0.02
2003/10/22	18:30:25	0.000	0.02

0.01

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0.01

0.053 mpa

0.01

0.001 mpa

0.01

0.053 mpa

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2003/10/22	18:42:25	0.000	0.02
2003/10/22	18:42:30	0.000	-0.01
2003/10/22	18:42:35	0.000	0.00
2003/10/22	18:42:40	0.000	-0.01
2003/10/22	18:42:45	0.000	0.01
2003/10/22	18:42:50	0.000	0.01
2003/10/22	18:42:55	0.000	-0.01
2003/10/22	18:43:00	0.000	0.01
2003/10/22	18:43:05	0.000	0.02
2003/10/22	18:43:10	0.000	0.01
2003/10/22	18:43:15	0.000	-0.01
2003/10/22	18:43:20	0.000	0.03
2003/10/22	18:43:25	0.000	0.02
2003/10/22	18:43:30	0.000	-0.01
2003/10/22	18:43:35	0.000	0.03
2003/10/22	18:43:40	0.000	-0.02
2003/10/22	18:43:45	0.000	0.00
2003/10/22	18:43:50	0.000	0.00
2003/10/22	18:43:55	0.000	0.00
2003/10/22	18:44:00	0.000	0.01
2003/10/22	18:44:05	0.000	-0.01
2003/10/22	18:44:10	0.000	-0.02
2003/10/22	18:44:15	0.000	0.00
2003/10/22	18:44:20	0.000	0.01
2003/10/22	18:44:25	0.000	0.01
2003/10/22	18:44:30	0.000	0.03
2003/10/22	18:44:35	0.000	0.02
2003/10/22	18:44:40	0.000	-0.02
2003/10/22	18:44:45	0.000	0.03
2003/10/22	18:44:50	0.000	0.00
2003/10/22	18:44:55	0.000	0.00
2003/10/22	18:45:00	0.000	0.01
2003/10/22	18:45:05	0.000	-0.01
2003/10/22	18:45:10	0.000	0.00
2003/10/22	18:45:15	0.000	-0.02
2003/10/22	18:45:20	0.000	0.01
2003/10/22	18:45:25	0.000	0.01
2003/10/22	18:45:30	0.000	0.00
2003/10/22	18:45:35	0.000	0.02
2003/10/22	18:45:40	0.000	0.03
2003/10/22	18:45:45	0.000	0.01
2003/10/22	18:45:50	0.000	-0.01
2003/10/22	18:45:55	0.000	0.04
2003/10/22	18:46:00	0.000	0.01
2003/10/22	18:46:05	0.000	-0.01
2003/10/22	18:46:10	0.000	0.03
2003/10/22	18:46:15	0.000	-0.01
2003/10/22	18:46:20	0.000	0.01
2003/10/22	18:46:25	0.000	-0.01
2003/10/22	18:46:30	0.000	0.00
2003/10/22	18:46:35	0.000	0.01
2003/10/22	18:46:40	0.000	-0.03
2003/10/22	18:46:45	0.000	0.02
2003/10/22	18:46:50	0.000	0.01
2003/10/22	18:46:55	0.000	0.01
2003/10/22	18:47:00	0.000	0.00
2003/10/22	18:47:05	0.000	0.02
2003/10/22	18:47:10	0.000	0.01
2003/10/22	18:47:15	0.000	-0.02
2003/10/22	18:47:20	0.000	0.03
2003/10/22	18:47:25	0.000	-0.02
2003/10/22	18:47:30	0.000	0.00
2003/10/22	18:47:35	0.000	0.01
2003/10/22	18:47:40	0.000	0.00
2003/10/22	18:47:45	0.000	0.02
2003/10/22	18:47:50	0.000	-0.02
2003/10/22	18:47:55	0.000	0.01
2003/10/22	18:48:00	0.000	0.00
2003/10/22	18:48:05	0.000	0.00
2003/10/22	18:48:10	0.000	0.02
2003/10/22	18:48:15	0.000	0.03
2003/10/22	18:48:20	0.000	0.01
2003/10/22	18:48:25	0.000	-0.02
2003/10/22	18:48:30	0.000	0.03
2003/10/22	18:48:35	0.000	0.00
2003/10/22	18:48:40	0.000	-0.01
2003/10/22	18:48:45	0.000	0.02
2003/10/22	18:48:50	0.000	-0.01
2003/10/22	18:48:55	0.000	0.01
2003/10/22	18:49:00	0.000	-0.01
2003/10/22	18:49:05	0.000	0.01
2003/10/22	18:49:10	0.000	0.01
2003/10/22	18:49:15	0.000	-0.01
2003/10/22	18:49:20	0.000	0.01
2003/10/22	18:49:25	0.000	0.02
2003/10/22	18:49:30	0.000	0.01
2003/10/22	18:49:35	0.000	-0.01
2003/10/22	18:49:40	0.000	0.03
2003/10/22	18:49:45	0.000	0.01
2003/10/22	18:49:50	0.000	-0.01
2003/10/22	18:49:55	0.000	0.03
2003/10/22	18:50:00	0.000	-0.02
2003/10/22	18:50:05	0.000	0.01
2003/10/22	18:50:10	0.000	0.00
2003/10/22	18:50:15	0.000	0.00
2003/10/22	18:50:20	0.000	0.02
2003/10/22	18:50:25	0.000	-0.01
2003/10/22	18:50:30	0.000	0.01
2003/10/22	18:50:35	0.000	0.01
2003/10/22	18:50:40	0.000	0.01
2003/10/22	18:50:45	0.000	0.01
2003/10/22	18:50:50	0.000	0.03
2003/10/22	18:50:55	0.000	0.02
2003/10/22	18:51:00	0.000	-0.02
2003/10/22	18:51:05	0.000	0.03
2003/10/22	18:51:10	0.000	-0.01
2003/10/22	18:51:15	0.000	0.00
2003/10/22	18:51:20	0.000	0.01
2003/10/22	18:51:25	0.000	0.00
2003/10/22	18:51:30	0.000	0.01
2003/10/22	18:51:35	0.000	0.00
2003/10/22	18:51:40	0.000	0.03
2003/10/22	18:51:45	0.000	0.02
2003/10/22	18:51:50	0.000	0.01
2003/10/22	18:51:55	0.000	0.01
2003/10/22	18:52:00	0.000	0.03
2003/10/22	18:52:05	0.000	0.01
2003/10/22	18:52:10	0.000	-0.02
2003/10/22	18:52:15	0.000	0.03
2003/10/22	18:52:20	0.000	0.01
2003/10/22	18:52:25	0.000	-0.01
2003/10/22	18:52:30	0.000	0.03
2003/10/22	18:52:35	0.000	-0.01
2003/10/22	18:52:40	0.000	0.01
2003/10/22	18:52:45	0.000	0.00
2003/10/22	18:52:50	0.000	0.02
2003/10/22	18:52:55	0.000	0.02
2003/10/22	18:53:00	0.000	0.00
2003/10/22	18:53:05	0.000	0.02

0.01



0.01



2003/10/22	18:53:35	0.000	-0.02
2003/10/22	18:53:40	0.000	0.00
2003/10/22	18:53:45	0.000	-0.01
2003/10/22	18:53:50	0.000	0.01
2003/10/22	18:53:55	0.000	0.00
2003/10/22	18:54:00	0.000	0.00
2003/10/22	18:54:05	0.000	0.00
2003/10/22	18:54:10	0.000	-0.01
2003/10/22	18:54:15	0.000	0.01
2003/10/22	18:54:20	0.000	0.00
2003/10/22	18:54:25	0.000	0.00
2003/10/22	18:54:30	0.000	0.02
2003/10/22	18:54:35	0.000	0.00
2003/10/22	18:54:40	0.000	0.01
2003/10/22	18:54:45	0.000	-0.02
2003/10/22	18:54:50	0.000	0.00
2003/10/22	18:54:55	0.000	-0.01
2003/10/22	18:55:00	0.000	0.00
2003/10/22	18:55:05	0.000	0.02
2003/10/22	18:55:10	0.000	-0.01
2003/10/22	18:55:15	0.000	0.01
2003/10/22	18:55:20	0.000	-0.02
2003/10/22	18:55:25	0.000	0.01
2003/10/22	18:55:30	0.000	0.01
2003/10/22	18:55:35	0.000	-0.01
2003/10/22	18:55:40	0.000	0.02
2003/10/22	18:55:45	0.000	0.02
2003/10/22	18:55:50	0.000	0.01
2003/10/22	18:55:55	0.000	-0.01
2003/10/22	18:56:00	0.000	0.00
2003/10/22	18:56:05	0.000	0.01
2003/10/22	18:56:10	0.000	-0.01
2003/10/22	18:56:15	0.000	0.00
2003/10/22	18:56:20	0.000	-0.02
2003/10/22	18:56:25	0.000	0.01
2003/10/22	18:56:30	0.000	-0.01
2003/10/22	18:56:35	0.000	0.00
2003/10/22	18:56:40	0.000	0.02
2003/10/22	18:56:45	0.000	-0.01
2003/10/22	18:56:50	0.000	0.01
2003/10/22	18:56:55	0.000	0.01
2003/10/22	18:57:00	0.000	0.01
2003/10/22	18:57:05	0.000	0.00
2003/10/22	18:57:10	0.000	0.00
2003/10/22	18:57:15	0.000	0.01
2003/10/22	18:57:20	0.000	-0.01
2003/10/22	18:57:25	0.000	0.00
2003/10/22	18:57:30	0.000	-0.01
2003/10/22	18:57:35	0.000	0.00
2003/10/22	18:57:40	0.000	0.01
2003/10/22	18:57:45	0.000	-0.01
2003/10/22	18:57:50	0.000	0.02
2003/10/22	18:57:55	0.000	-0.02
2003/10/22	18:58:00	0.000	0.01
2003/10/22	18:58:05	0.000	0.00
2003/10/22	18:58:10	0.000	0.00
2003/10/22	18:58:15	0.000	0.02
2003/10/22	18:58:20	0.000	0.00
2003/10/22	18:58:25	0.000	0.02
2003/10/22	18:58:30	0.000	-0.02
2003/10/22	18:58:35	0.000	0.04
2003/10/22	18:58:40	0.000	0.00
2003/10/22	18:58:45	0.000	-0.01
2003/10/22	18:58:50	0.000	0.02
2003/10/22	18:58:55	0.000	-0.01
2003/10/22	18:59:00	0.000	0.01
2003/10/22	18:59:05	0.000	-0.01
2003/10/22	18:59:10	0.000	0.01
2003/10/22	18:59:15	0.000	0.01
2003/10/22	18:59:20	0.000	-0.01
2003/10/22	18:59:25	0.000	0.01
2003/10/22	18:59:30	0.000	0.02
2003/10/22	18:59:35	0.000	0.01
2003/10/22	18:59:40	0.000	-0.01
2003/10/22	18:59:45	0.000	0.00
2003/10/22	18:59:50	0.000	0.02
2003/10/22	18:59:55	0.000	-0.01
2003/10/22	19:00:00	0.000	0.00
2003/10/22	19:00:05	0.000	-0.02
2003/10/22	19:00:10	0.000	0.00
2003/10/22	19:00:15	0.000	0.00
2003/10/22	19:00:20	0.000	0.00
2003/10/22	19:00:25	0.000	0.01
2003/10/22	19:00:30	0.000	-0.01
2003/10/22	19:00:35	0.000	0.02
2003/10/22	19:00:40	0.000	0.00
2003/10/22	19:00:45	0.000	0.01
2003/10/22	19:00:50	0.000	0.01
2003/10/22	19:00:55	0.000	0.00
2003/10/22	19:01:00	0.000	0.02
2003/10/22	19:01:05	0.000	-0.02
2003/10/22	19:01:10	0.000	0.00
2003/10/22	19:01:15	0.000	-0.01
2003/10/22	19:01:20	0.000	0.00
2003/10/22	19:01:25	0.000	0.01
2003/10/22	19:01:30	0.000	-0.01
2003/10/22	19:01:35	0.000	0.00
2003/10/22	19:01:40	0.000	-0.02
2003/10/22	19:01:45	0.000	0.01
2003/10/22	19:01:50	0.000	0.01
2003/10/22	19:01:55	0.000	0.00
2003/10/22	19:02:00	0.000	0.02
2003/10/22	19:02:05	0.000	0.00
2003/10/22	19:02:10	0.000	0.01
2003/10/22	19:02:15	0.000	-0.01
2003/10/22	19:02:20	0.000	0.04
2003/10/22	19:02:25	0.000	0.01
2003/10/22	19:02:30	0.000	-0.01
2003/10/22	19:02:35	0.000	0.00
2003/10/22	19:02:40	0.000	-0.01
2003/10/22	19:02:45	0.000	0.01
2003/10/22	19:02:50	0.000	-0.01
2003/10/22	19:02:55	0.000	0.01
2003/10/22	19:03:00	0.000	0.01
2003/10/22	19:03:05	0.000	-0.01
2003/10/22	19:03:10	0.000	0.02
2003/10/22	19:03:15	0.000	0.01
2003/10/22	19:03:20	0.000	0.01
2003/10/22	19:03:25	0.000	0.00
2003/10/22	19:03:30	0.000	0.00
2003/10/22	19:03:35	0.000	0.01
2003/10/22	19:03:40	0.000	-0.01
2003/10/22	19:03:45	0.000	0.00
2003/10/22	19:03:50	0.000	-0.02
2003/10/22	19:03:55	0.000	0.01
2003/10/22	19:04:00	0.000	0.00
2003/10/22	19:04:05	0.000	0.00
2003/10/22	19:04:10	0.000	0.02
2003/10/22	19:04:15	0.000	-0.01
2003/10/22	19:04:20	0.000	0.01
2003/10/22	19:04:25	0.000	0.00

0.01

0.073 mpa

0.01

0.000 mpa

2003/10/22	19:04:55	0.000	0.00
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2003/10/22	19:05:05	0.000	0.00
2003/10/22	19:05:10	0.000	0.02
2003/10/22	19:05:15	0.000	-0.01
2003/10/22	19:05:20	0.000	0.01
2003/10/22	19:05:25	0.000	-0.02
2003/10/22	19:05:30	0.000	0.01
2003/10/22	19:05:35	0.000	0.04
2003/10/22	19:05:40	0.000	-0.01
2003/10/22	19:05:45	0.000	0.02
2003/10/22	19:05:50	0.000	0.02
2003/10/22	19:05:55	0.000	0.01
2003/10/22	19:06:00	0.000	-0.01
2003/10/22	19:06:05	0.000	0.03
2003/10/22	19:06:10	0.000	0.01
2003/10/22	19:06:15	0.000	-0.01
2003/10/22	19:06:20	0.000	0.03
2003/10/22	19:06:25	0.000	-0.02
2003/10/22	19:06:30	0.000	0.01
2003/10/22	19:06:35	0.000	-0.01
2003/10/22	19:06:40	0.000	0.01
2003/10/22	19:06:45	0.000	0.02
2003/10/22	19:06:50	0.000	-0.01
2003/10/22	19:06:55	0.000	0.01
2003/10/22	19:07:00	0.000	0.01
2003/10/22	19:07:05	0.000	0.01
2003/10/22	19:07:10	0.000	0.00
2003/10/22	19:07:15	0.000	0.03
2003/10/22	19:07:20	0.000	0.02
2003/10/22	19:07:25	0.000	-0.02
2003/10/22	19:07:30	0.000	0.03
2003/10/22	19:07:35	0.000	-0.02
2003/10/22	19:07:40	0.000	0.00
2003/10/22	19:07:45	0.000	0.01
2003/10/22	19:07:50	0.000	-0.01
2003/10/22	19:07:55	0.000	0.01
2003/10/22	19:08:00	0.000	-0.01
2003/10/22	19:08:05	0.000	0.02
2003/10/22	19:08:10	0.000	0.00
2003/10/22	19:08:15	0.000	0.00
2003/10/22	19:08:20	0.000	0.01
2003/10/22	19:08:25	0.000	0.03
2003/10/22	19:08:30	0.000	0.02
2003/10/22	19:08:35	0.000	-0.02
2003/10/22	19:08:40	0.000	0.03
2003/10/22	19:08:45	0.000	0.00
2003/10/22	19:08:50	0.000	-0.01
2003/10/22	19:08:55	0.000	0.02
2003/10/22	19:09:00	0.000	-0.01
2003/10/22	19:09:05	0.000	0.00
2003/10/22	19:09:10	0.000	-0.01
2003/10/22	19:09:15	0.000	0.01
2003/10/22	19:09:20	0.000	0.01
2003/10/22	19:09:25	0.000	-0.01
2003/10/22	19:09:30	0.000	0.02
2003/10/22	19:09:35	0.000	0.02
2003/10/22	19:09:40	0.000	0.01
2003/10/22	19:09:45	0.000	-0.01
2003/10/22	19:09:50	0.000	0.04
2003/10/22	19:09:55	0.000	0.01
2003/10/22	19:10:00	0.000	-0.01
2003/10/22	19:10:05	0.000	0.03
2003/10/22	19:10:10	0.000	-0.01
2003/10/22	19:10:15	0.000	0.01
2003/10/22	19:10:20	0.000	-0.01
2003/10/22	19:10:25	0.000	0.00
2003/10/22	19:10:30	0.000	0.01
2003/10/22	19:10:35	0.000	-0.01
2003/10/22	19:10:40	0.000	0.02
2003/10/22	19:10:45	0.000	0.00
2003/10/22	19:10:50	0.000	0.01
2003/10/22	19:10:55	0.000	0.01
2003/10/22	19:11:00	0.000	0.03
2003/10/22	19:11:05	0.000	0.01
2003/10/22	19:11:10	0.000	-0.02
2003/10/22	19:11:15	0.000	0.03
2003/10/22	19:11:20	0.000	-0.01
2003/10/22	19:11:25	0.000	0.00
2003/10/22	19:11:30	0.000	0.01
2003/10/22	19:11:35	0.000	-0.01
2003/10/22	19:11:40	0.000	0.02
2003/10/22	19:11:45	0.000	-0.02
2003/10/22	19:11:50	0.000	0.01
2003/10/22	19:11:55	0.000	0.00
2003/10/22	19:12:00	0.000	0.00
2003/10/22	19:12:05	0.000	0.02
2003/10/22	19:12:10	0.000	0.02
2003/10/22	19:12:15	0.000	0.01
2003/10/22	19:12:20	0.000	-0.01
2003/10/22	19:12:25	0.000	0.03
2003/10/22	19:12:30	0.000	0.00
2003/10/22	19:12:35	0.000	-0.01
2003/10/22	19:12:40	0.000	-0.02
2003/10/22	19:12:45	0.000	-0.01
2003/10/22	19:12:50	0.000	0.01
2003/10/22	19:12:55	0.000	-0.01
2003/10/22	19:13:00	0.000	0.01
2003/10/22	19:13:05	0.000	0.01
2003/10/22	19:13:10	0.000	-0.01
2003/10/22	19:13:15	0.000	0.01
2003/10/22	19:13:20	0.000	0.01
2003/10/22	19:13:25	0.000	-0.01
2003/10/22	19:13:30	0.000	-0.01
2003/10/22	19:13:35	0.000	0.03
2003/10/22	19:13:40	0.000	0.01
2003/10/22	19:13:45	0.000	-0.01
2003/10/22	19:13:50	0.000	0.03
2003/10/22	19:13:55	0.000	-0.02
2003/10/22	19:14:00	0.000	0.01
2003/10/22	19:14:05	0.000	0.00
2003/10/22	19:14:10	0.000	0.00
2003/10/22	19:14:15	0.000	0.02
2003/10/22	19:14:20	0.000	-0.01
2003/10/22	19:14:25	0.000	0.01
2003/10/22	19:14:30	0.000	0.00
2003/10/22	19:14:35	0.000	0.01
2003/10/22	19:14:40	0.000	0.01
2003/10/22	19:14:45	0.000	0.03
2003/10/22	19:14:50	0.000	0.02
2003/10/22	19:14:55	0.000	-0.02
2003/10/22	19:15:00	0.000	0.03
2003/10/22	19:15:05	0.000	-0.01
2003/10/22	19:15:10	0.000	0.00
2003/10/22	19:15:15	0.000	0.01
2003/10/22	19:15:20	0.000	-0.01
2003/10/22	19:15:25	0.000	0.01
2003/10/22	19:15:30	0.000	-0.01
2003/10/22	19:15:35	0.000	0.01
2003/10/22	19:15:40	0.000	0.01
2003/10/22	19:15:45	0.000	0.00

0.01

0.00 m/c

0.01

0.00 m/c

**APPENDIX F**  
**MONTHLY LEAK INSPECTION FORM**

Motiva Enterprises, LLC South Florida Complex

Fort Lauderdale, Florida 33316

The South Florida Complex consists of two terminals.

The South Terminal and the East Terminal.

Use this form to check and document the "monthly" and "annual"  
Tests for vapor leaks.

Monthly test will include: the vapor lines from the loading racks to  
The vapor recovery unit, including the flame arrestors. This also includes  
The vapor combustor unit.

Annual tests: Internal Floating Roof tanks use EPA 450/2-77-036 p. 6-2

Tank Number:

Terminal:

Date:

Vapor Lines Checked:

Terminal

Date:

Comments:

Date:

Signed: \_\_\_\_\_

**APPENDIX G**

**ENGINEERING EMISSION ANALYSIS TEST RESULTS**



**CAM PLAN TEST**

**MOTIVA ENTERPRISES LLC**

**PORT EVERGLADES, FL TRANSPORT LOADING TERMINAL  
SOUTH**

**ON THE**

**McGILL CARBON VAPOR RECOVERY UNIT**

**ON**

**NOVEMBER 21, 2008**

REPORTED BY: BLUE HEAVEN TECHNOLOGIES  
2820 SOUTH ENGLISH STATION ROAD  
LOUISVILLE, KENTUCKY 40299

TEST PERSONNEL: TONY FENTON



In reference to the Motiva Enterprises LLC CAM Plan Test conducted at the Port Everglades, Florida Transport Loading Facility on November 21, 2008 and described in the following report;

I certify under penalty of law that the information provided in this document is true, accurate and complete. I am aware that there are significant civil and criminal penalties, including fines or imprisonment or both, for submitting false, inaccurate or incomplete information.


by:   
Tony Fenton  
Technical Service Group  
Blue Heaven Technologies

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CHARTS

EXECUTIVE SUMMARY

The Motiva Enterprises LLC terminal in Port Everglades, Florida is a bulk transport loading facility for Gasoline Products.

The products are bottom loaded into transport tankers and the displaced hydrocarbon vapors are balanced to a MCGILL CARBON ADSORPTION / ABSORPTION VAPOR RECOVERY UNIT (VRU).

At This facility we conducted a test on the CAM Plan that is in operation on this McGill Vapor Recovery Unit. The set points on this VRU are as follows: If the vacuum on this unit fails to reach 26 inches of vacuum within 10 minutes a warning light will come on.

If the vacuum on this unit fails to reach 25 inches of vacuum within 10 minutes, a low vacuum warning light will come on. A valve will close and divert all vapors from the loading rack to a John Zink Vapor Combustor located at this terminal. This valve remains closed until the vacuum on the VRU reaches 25 inches of vacuum in less then 10 minutes.

The vacuum on the McGill Vapor Recovery unit was set at 25.30 inches of vacuum in order to test the 26 inch set point. At 10 minutes and 33 seconds the low vacuum warning light came on.

The vacuum on the McGill Vapor Recovery unit was set at 23.40 inches of vacuum in order to test the 25 inch set point. At 10 minutes and 35 seconds the low vacuum warning light and the switch to VCU light came on. At 10 minutes and 4 seconds the valve closed and diverted all vapors to the VCU. This proved all set points are working.

The McGill Vapor Recovery unit vacuum was set at 25.5 inches of vacuum on both carbon beds. The unit was tested for two hours under normal loading conditions with the vacuum set at 25.5 inches. The data is with this report. After loading 108,925 of accountable gallons, the unit ran at 0.52 mg/liter. Well under the allowable of 35mg/liter.

Both Vapor units located at this terminal had Compliance Test prior to this CAM Test.

Results: McGill VRU	0.71mg/liter
John Zink VCU	5.02mg/liter

**APPENDIX A**  
**TRUCK MONITORING DATA SHEETS**

CAM  
TEST

Seq. No. <u>1</u>	Tanker Name <u>PEDD TANK</u>	Load Start Time <u>9.25</u>		
Bay No. <u>1</u>	Trailer Number <u>194158</u>	Load Stop Time <u>9.35</u>		
Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
<u>GAS</u>	<u>DIESEL</u>		<u>8500</u>	
Max. Back Pressure: Reading 1 _____ Reading 2 _____ Reading 3 _____ Reading 4 _____ Highest _____				
Seq. No. <u>2</u>	Tanker Name <u>ORBITA</u>	Load Start Time <u>9.26</u>		
Bay No. <u>4</u>	Trailer Number <u>1782</u>	Load Stop Time <u>9.37</u>		
Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
<u>GAS</u>	<u>GAS</u>		<u>8500</u>	
Max. Back Pressure: Reading 1 _____ Reading 2 _____ Reading 3 _____ Reading 4 _____ Highest _____				
Seq. No. <u>3</u>	Tanker Name <u>EAGLE</u>	Load Start Time <u>9.28</u>		
Bay No. <u>2</u>	Trailer Number <u>2482</u>	Load Stop Time <u>9.36</u>		
Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
<u>GAS</u>	<u>GAS</u>		<u>6825</u>	
Max. Back Pressure: Reading 1 _____ Reading 2 _____ Reading 3 _____ Reading 4 _____ Highest _____				
Seq. No. <u>4</u>	Tanker Name <u>ORBITA OL</u>	Load Start Time <u>9.32</u>		
Bay No. <u>4</u>	Trailer Number <u>8902</u>	Load Stop Time <u>10.06</u>		
Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
<u>GAS</u>	<u>GAS</u>		<u>8500</u>	
Max. Back Pressure: Reading 1 _____ Reading 2 _____ Reading 3 _____ Reading 4 _____ Highest _____				
Seq. No. <u>5</u>	Tanker Name <u>PIPELINE</u>	Load Start Time <u>9.44</u>		
Bay No. <u>1</u>	Trailer Number <u>93</u>	Load Stop Time <u>9.55</u>		
Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
<u>GAS</u>	<u>GAS</u>		<u>8700</u>	
Max. Back Pressure: Reading 1 _____ Reading 2 _____ Reading 3 _____ Reading 4 _____ Highest _____				
Seq. No. <u>6</u>	Tanker Name <u>DIB Tanking</u>	Load Start Time <u>9.50</u>		
Bay No. <u>2P</u>	Trailer Number <u>2415</u>	Load Stop Time <u>10.02</u>		
Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
<u>GAS</u>	<u>GAS</u>		<u>9000</u>	
Max. Back Pressure: Reading 1 _____ Reading 2 _____ Reading 3 _____ Reading 4 _____ Highest _____				

Accountable Gallons Load 1	<u>8500</u>	Total Gallons Load 1	<u>8500</u>
Accountable Gallons Load 2	<u>8500</u>	Total Gallons Load 2	<u>8500</u>
Accountable Gallons Load 3	<u>6825</u>	Total Gallons Load 3	<u>6825</u>
Accountable Gallons Load 4	<u>8500</u>	Total Gallons Load 4	<u>8500</u>
Accountable Gallons Load 5	<u>8700</u>	Total Gallons Load 5	<u>8700</u>
Accountable Gallons Load 6	<u>9000</u>	Total Gallons Load 6	<u>9000</u>

Total Accountable Gallons This Page 50025 Total Gallons This Page 50025  
 Acct. Total From Previous Page + \_\_\_\_\_ Total Gallons Prev Page + \_\_\_\_\_  
 Accountable Gallons Total = \_\_\_\_\_ Total Gallons = \_\_\_\_\_

Seq. No.	Tanker Name	Load Start Time	Bay No.	Trailer Number	Load Stop Time	Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
7	EAGEL	10:00	2	2328	10:17	GAS DIESEL	GAS		5700	2000
Max. Back Pressure: Reading 1 _____ Reading 2 _____ Reading 3 _____ Reading 4 _____ Highest _____										
8	EAGEL			2311		ETHANOL	NO LOAD			
Max. Back Pressure: Reading 1 _____ Reading 2 _____ Reading 3 _____ Reading 4 _____ Highest _____										
9	LANN SEA	10:10	2	35	10:16	GAS	GAS		3500	
Max. Back Pressure: Reading 1 _____ Reading 2 _____ Reading 3 _____ Reading 4 _____ Highest _____										
10	D+B TRUCKING	10:21		2404	10:26	GAS	GAS		7500	
Max. Back Pressure: Reading 1 _____ Reading 2 _____ Reading 3 _____ Reading 4 _____ Highest _____										
11	ALION	10:15	4	T-41	10:22	GAS	GAS		8800	
Max. Back Pressure: Reading 1 _____ Reading 2 _____ Reading 3 _____ Reading 4 _____ Highest _____										
12	D+B TRUCKING	10:18	2	2403	10:30	GAS	GAS		8800	
Max. Back Pressure: Reading 1 _____ Reading 2 _____ Reading 3 _____ Reading 4 _____ Highest _____										

DID NOT LOAD

Accountable Gallons Load 1	<u>5700</u>	Total Gallons Load 1	<u>7700</u>
Accountable Gallons Load 2	<u>0</u>	Total Gallons Load 2	<u>0</u>
Accountable Gallons Load 3	<u>3500</u>	Total Gallons Load 3	<u>3500</u>
Accountable Gallons Load 4	<u>7500</u>	Total Gallons Load 4	<u>7500</u>
Accountable Gallons Load 5	<u>8800</u>	Total Gallons Load 5	<u>8800</u>
Accountable Gallons Load 6	<u>8800</u>	Total Gallons Load 6	<u>8800</u>
Total Accountable Gallons This Page	<u>34300</u>	Total Gallons This Page	<u>34300</u>
Acct. Total From Previous Page	+ <u>50,025</u>	Total Gallons Prev. Page	+ <u>50,025</u>
Accountable Gallons Total	= <u>84,325</u>	Total Gallons	= <u>84,325</u>

Seq. No.	Tanker Name	Load Start Time	Bay No.	Trailer Number	Load Stop Time	Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
13	ATLANTIC	10:00	4	103	10:13	GAS	DIESEL		1000	
Max. Back Pressure: Reading 1 _____ Reading 2 _____ Reading 3 _____ Reading 4 _____ Highest _____										
<del>14</del>	<del>OAS TRUCK</del>	<del>10:24</del>	<del>4</del>	<del>2403</del>	<del>10:13</del>	<del>GAS</del>	<del>DIESEL</del>		7400	1275
Max. Back Pressure: Reading 1 _____ Reading 2 _____ Reading 3 _____ Reading 4 _____ Highest _____										
15	PENNY TRUCK	10:25	1	1941326	10:42	GAS	GAS		7100	
Max. Back Pressure: Reading 1 _____ Reading 2 _____ Reading 3 _____ Reading 4 _____ Highest _____										
16	EAGLE	10:53	1	2305	11:08	GAS	GAS		9000	
Max. Back Pressure: Reading 1 _____ Reading 2 _____ Reading 3 _____ Reading 4 _____ Highest _____										
17	OAS TRUCKING	10:54	1	2424	11:06	GAS DIESEL	GAS DIESEL		7500	1275
Max. Back Pressure: Reading 1 _____ Reading 2 _____ Reading 3 _____ Reading 4 _____ Highest _____										
18										
Max. Back Pressure: Reading 1 _____ Reading 2 _____ Reading 3 _____ Reading 4 _____ Highest _____										

DID NOT LOAD

Accountable Gallons Load 1	<u>1000</u>	Total Gallons Load 1	<u>1000</u>
Accountable Gallons Load 2	<u>0</u>	Total Gallons Load 2	<u>0</u>
Accountable Gallons Load 3	<u>7100</u>	Total Gallons Load 3	<u>7100</u>
Accountable Gallons Load 4	<u>9000</u>	Total Gallons Load 4	<u>9000</u>
Accountable Gallons Load 5	<u>7500</u>	Total Gallons Load 5	<u>8775</u>
Accountable Gallons Load 6		Total Gallons Load 6	
Total Accountable Gallons This Page	<u>24600</u>	Total Gallons This Page	<u>25875</u>
Acct. Total From Previous Page	+ <u>84325</u>	Total Gallons Prev Page	+ <u>86325</u>
Accountable Gallons Total	= <u>108,925</u>	Total Gallons	= <u>112,200</u>

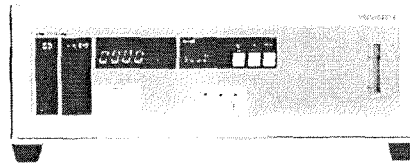


**APPENDIX B  
INSTRUMENT AND CALIBRATION  
INFORMATION**

## VIA-510 Gas Analyzer

**Features**

- Selectable response time
- Selectable outputs: 0–1 VDC or 4–20 mA
- Digital outputs indicate malfunctions or calibration failure)
- Measures CO, CO<sub>2</sub>, NO<sub>x</sub>, SO<sub>2</sub>, CH<sub>4</sub>, C<sub>2</sub>H<sub>4</sub>, and NO<sub>2</sub>; others upon request

**Overview**

The VIA-510 series of general-purpose gas analyzers provide continuous monitoring of concentrations of the specific sample gas. The analyzers can be operated from controls on the front panel or by commands from a remote computer. Measurement results are displayed on the front panel and are available to remote data logging systems through an industry-standard interface.

The VIA-510 series can be used for a wide variety of analyses and tests, such as industrial process control and composition analysis, environment-related atmospheric and fixed-source emissions monitoring, and automobile emission analysis.

These analyzers use the infrared absorption method which offers superior sensitivity, selectivity, and stability.

*They are compact and compatible with a variety of OEM analysis equipment.*

A high level of sensitivity is achieved through the use of a dual-beam NDIR analysis method. Horiba's patented chopper motor assures continuous long-term stable monitoring. The analysis mechanism and the amplifier are combined in a single unit. The highly accurate performance makes the analyzers suitable for process monitoring and control.

**Specifications****Standard Ranges**

Gas	Minimum	Maximum
Carbon monoxide	0-50 ppm	0-100%

(CO)		
Carbon dioxide (CO <sub>2</sub> )	0-50 ppm	0-100%
Nitrogen monoxide (NO)	0-100 ppm	0-100%
Sulfur dioxide (SO <sub>2</sub> )	0-100 ppm	0-100%
Methane (CH <sub>4</sub> )	0-100 ppm	0-100%
Ethene (C <sub>2</sub> H <sub>4</sub> )	0-100 ppm	0-100%
Nitrous Oxide (N <sub>2</sub> O)	0-100 ppm	0-100%

#### Performance

Lowest detection limit:	1.0 ppm
Repeatability:	± 1% of full-scale
Response time:	Selectable
Zero drift:	< 1% (full scale) per day
Span drift:	< 2% (full scale) per week

**HORIBA**

Copyright 2003 Horiba Inc.

Certificate of Analysis  
**- EPA PROTOCOL GAS -**

Customer: Welders Supply Company (Louisville, KY)  
Date: March 21, 2007  
Delivery Receipt: DR-18921  
Product: 4.50% Propane/Nitrogen - EPA PROTOCOL  
Final Analysis Date: March 13, 2007  
Expiration Date: March 13, 2010 DO NOT USE BELOW 150 PSIG

Cylinder Data

Cylinder Serial Number: FF-34546      Cylinder Outlet: CGA 350  
Cylinder Volume: 30 Cubic Feet      Cylinder Pressure: 2000 psig, 70°F  
Expiration Date: March 13, 2010

Analytical Data

EPA PROTOCOL, Section No. 2.2, Procedure G-1

Replicate Concentrations

Propane: 4.53% +/- 0.045%

Nitrogen: Balance

Reference Standard(s):

<u>SRM/GMIS:</u>	GMIS	GMIS
<u>Cylinder Number:</u>	CC-185413	CC-233186
<u>Concentration:</u>	3.02% Propane/Nitrogen	4.95% Propane/Nitrogen
<u>Expiration Date:</u>	March 30, 2008	March 07, 2010

Certification Instrumentation

Component: Propane  
Make/Model: HP5890-II  
Serial Number: 3336A59393  
Principal of Measurement: GC-FID  
Last Calibration: March 02, 2007

Analytical uncertainty and NIST Traceability are in compliance with EPA-600/R-97/121.

Certified by:



Date:

March 21, 2007

*Unmatched Excellence*

# Liquid Technology Corporation

Industry Leader in Specialty Gases, Equipment and Service

## Certificate of Analysis - EPA PROTOCOL GAS -

Customer: Welders Supply Company (Louisville, KY)  
Date: February 22, 2008  
Delivery Receipt: DR-21050  
Product: 2.50% Propane/Nitrogen - EPA PROTOCOL  
Final Analysis Date: February 22, 2008  
Expiration Date: February 22, 2011 **DO NOT USE BELOW 150 PSIG**

Cylinder Data  
Cylinder Serial Number: FF-31325 Cylinder Outlet: CGA 350  
Cylinder Volume: 30 Cubic Feet Cylinder Pressure: 2000 psig, 70°F  
Expiration Date: February 22, 2011

Analytical Data  
EPA PROTOCOL, Section No. 2.2, Procedure G-1

**Replicate Concentrations**  
**Propane: 2.50% +/- 0.025%**  
**Nitrogen: Balance**

Reference Standard(s):  

SRM/GMIS:	GMIS	GMIS
Cylinder Number:	CC- 88820	CC-185413
Concentration:	1.005% Propane/Nitrogen	3.02% Propane/Nitrogen
Expiration Date:	April 07, 2010	March 30, 2008

Certification Instrumentation  

Component:	Propane
Make/Model:	HP5890-II
Serial Number:	3336A59393
Principal of Measurement:	GC-FID
Last Calibration:	February 11, 2008

Analytical uncertainty and NIST Traceability are in compliance with EPA-600/R-97/121.

Certified by:   
Date: February 22, 2008

*Unmatched Excellence*

2564 Pemberton Drive ~ Apopka, Florida 32703 ~ Phone (407)-292-2990 ~ Fax (407)-292-3313  
~ www.liquidtechcorp.com ~

# Liquid Technology Corporation

Industry Leader in Specialty Gases, Equipment and Service

## Certificate of Analysis - EPA PROTOCOL GAS -

Customer: Welders Supply Company (Louisville, KY)  
Date: March 21, 2007  
Delivery Receipt: DR-18921  
Product: 1.50% Propane/Nitrogen - EPA PROTOCOL  
Final Analysis Date: March 13, 2007  
Expiration Date: March 13, 2010 DO NOT USE BELOW 150 PSIG

### Cylinder Data

Cylinder Serial Number: FF-20064      Cylinder Outlet: CGA 350  
Cylinder Volume: 30 Cubic Feet      Cylinder Pressure: 2000 psig, 70°F  
Expiration Date: March 13, 2010

### Analytical Data

EPA PROTOCOL, Section No. 2.2, Procedure G-1

### Replicate Concentrations

Propane: 1.48% +/- 0.014%

Nitrogen: Balance

### Reference Standard(s):

<u>SRM/GMIS:</u>	GMIS	GMIS
<u>Cylinder Number:</u>	CC- 88820	CC-185413
<u>Concentration:</u>	1.005% Propane/Nitrogen	3.02% Propane/Nitrogen
<u>Expiration Date:</u>	April 07, 2010	March 30, 2008

### Certification Instrumentation

Component: Propane  
Make/Model: HP5890-II  
Serial Number: 3336A59393  
Principal of Measurement: GC-FID  
Last Calibration: March 02, 2007

Analytical uncertainty and NIST Traceability are in compliance with EPA-600/R-97/121.

Certified by:



Date:

March 21, 2007

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2564 Pemberton Drive ~ Apopka, Florida 32703 ~ Phone (407)-292-2990 ~ Fax (407)-292-3313  
~ www.liquidtechcorp.com ~

**APPENDIX C  
COMPUTER PRINTOUT, VOC ANALYZER  
STRIP CHART**



2820 SOUTH ENGLISH STATION RD  
LOUISVILLE, KY 40299  
502 267 8344

### **Vapor Recovery Performance Test**

**Test Id:** 000694123-00447  
**Test for:** Motiva Enterprise LLC South  
Port Everglades, FL  
**Unit Tested:** McGill VRU CAM TEST  
**Test Date:** 11/21/2008  
**Test Personnel:** Tony Fenton  
**Strip Chart Recorder Speed:** 150

All data fields are rounded 2 places following the decimal for display purposes. Internal to the program all data fields are 8 digits following the decimal.



### Outlet Calibration Information

Allowable range is +/- 5% of actual span gas Concentration

Low range span gas concentration	1.48 %, Cylinder # FF-20064
Mid range span gas concentration	2.50 %, Cylinder # FF-31325
High range span gas concentration	4.53 %, Cylinder # FF-34546+
Zero span analyzer reading	0.00 %
Zero range analyzer error	0.00 %
Low range analyzer reading	1.47 %
Low range analyzer error	-0.68 %
Mid range analyzer reading	2.48 %
Mid range analyzer error	-0.80 %
High range analyzer reading	4.52 %
High range analyzer error	-0.22 %

Time	Baro (mm Hg)	Flow P (mm Hg)	Atm T (Deg C)	Exh. T (Deg C)	HCin (Vol %)	HCout (Vol %)	VE (m <sup>3</sup> )	VES (m <sup>3</sup> )	ME (mg)
09:29	765.5484	0.007045	18.24344	18.77872		0.011762	16.02986	16.22	3490.34
09:34	765.5539654	0.009801	18.34535	21.0324		0.027268	45.89831	46.07	22990.88
09:39	765.5746221	0.007007	18.89297	22.06389		0.011159	16.54164	16.55	3379.19
09:44	765.6206009	0.007057	19.00355	21.04519		0.011426	0.046888	0.05	9.84
09:49	765.622131	0.007017	19.36902	22.1315		0.010976	6.551032	6.55	1316.08
09:54	765.6225661	0.006995	19.17712	22.8629		0.00112	26.67216	26.61	545.41
09:59	765.6039795	0.006989	19.38314	22.86748		0.046471	19.1878	19.14	16279.26
10:04	765.5914985	0.00698	19.59649	22.99529		0.052294	8.09338	8.07	7723.59
10:09	765.597514	0.007057	19.94182	23.92786		0.016595	28.06631	27.90	8473.09
10:14	765.621591	0.006912	20.13357	24.15518		0.018716	11.59223	11.52	3943.94
10:19	765.6087949	0.006945	20.05656	24.10736		0.054694	10.36923	10.30	10311.12
10:24	765.6290916	0.006882	19.93237	24.18981		0.065448	23.671	23.51	28159.33
10:29	765.6301867	0.006976	20.3953	24.61092		0.074699	24.88404	24.68	33739.02
10:34	765.6066197	0.0069	20.11994	24.06591		0.118209	1.090954	1.08	2344.96
10:39	765.5481149	0.007026	20.33911	24.26448		0.127789	14.37417	14.27	33375.68
10:44	765.5074016	0.00688	20.3926	24.75906		0.005884	13.36718	13.25	1426.64
10:49	765.4565024	0.006983	20.9739	24.24224		0.001112	0.123556	0.12	2.50
10:54	765.4093386	0.006952	21.04781	24.1397		0.028627	3.192064	3.17	1660.78
10:59	765.3555292	0.007	20.77845	25.02442		0.027941	32.47947	32.16	16443.02
11:04	765.3064451	0.006978	21.41236	25.16566		0.068987	15.79358	15.63	19731.19
11:09	765.2702172	0.006961	21.17827	24.55844		0.079781	0.447241	0.44	647.45
11:14	765.2405747	0.006931	20.8883	24.22281		0.00101	3.984747	3.96	73.11
11:19	765.2354143	0.006999	21.50004	24.40711		0.0011	2.600643	2.58	51.93
11:24	765.2214	0.006931	21.55458	24.558		0	0	0.00	0.00

**POST CALIBRATIONS:**

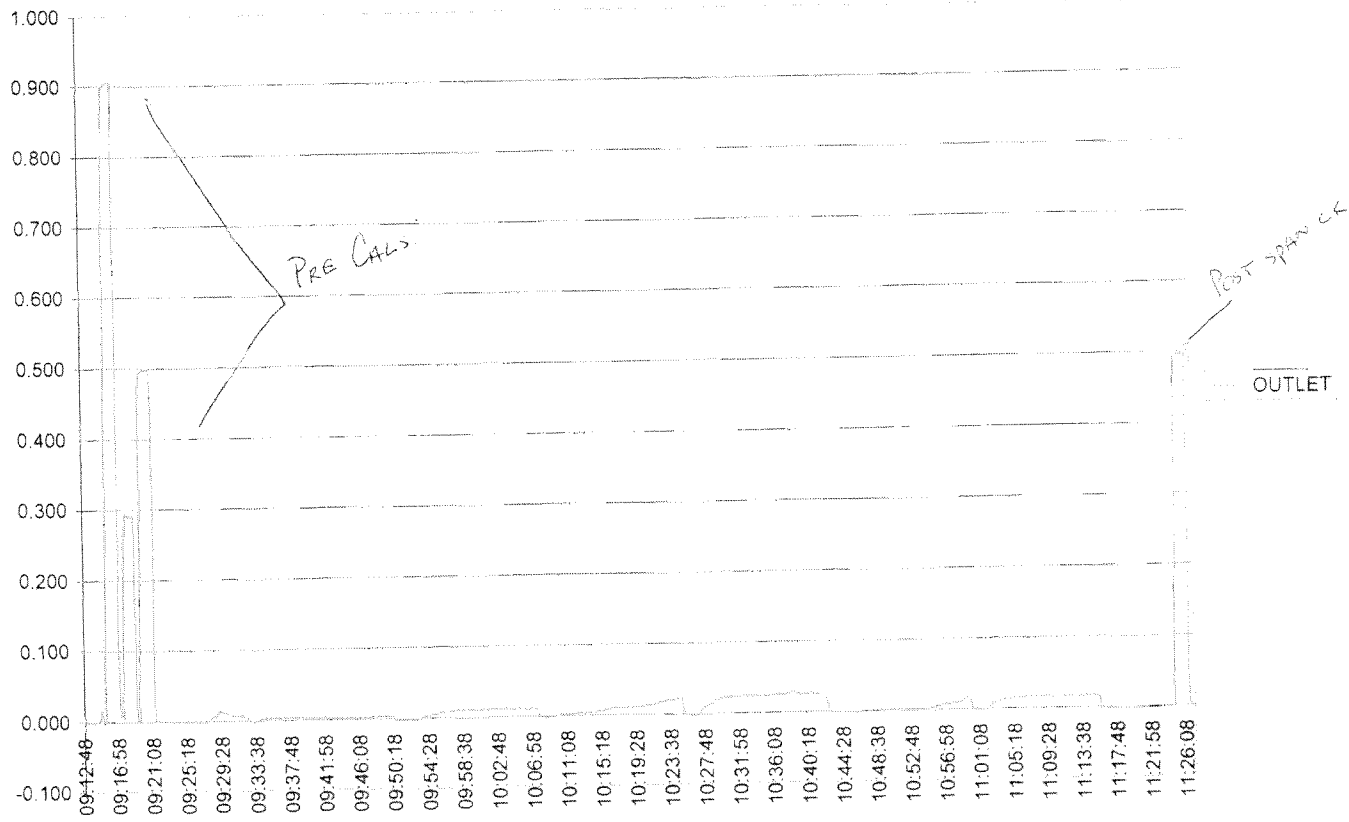
Outlet Span Check completed at 11:25 the reading is 2.48 %

Outlet Zero Check completed at 11:26 the reading is 0.00 %

## PRELIMINARY TEST RESULTS

Average Barometric Pressure was	765.50 mm Hg
Average Flow Pressure was	0.01 mm Hg
Average Ambient Temperature was	20.11 Deg C
Average Inlet Concentration was	0.00 Vol. %
Average Outlet Concentration was	0.038 Vol. %
Total volume emitted was	325.06 cubic meters
Total Volume Emitted standardized w	323.83 cubic meters
Total milligrams emitted was	216118.35 mg
Accountable gallons loaded was	108,925 gallons
Total gallons loaded was	112,200 gallons
Accountable liters loaded was	412,281.13 liters
Total Liters loaded was	424,677.00 liters
Accountable milligrams emitted per liter loaded	0.52 mg/L
Total milligrams emitted per liter loaded was	0.51 mg/L

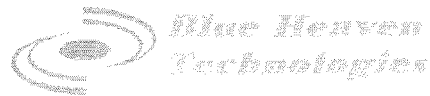
MOTIVA SOUTH - CAM TEST - PORT EVERGLADES, FL - 11/21/08 - PAGE 1



**VOLATILE ORGANIC COMPOUND EMISSION TEST REPORT**  
**OF THE**  
**MOTIVA ENTERPRISES LLC**  
**PORT EVERGLADES, FL TRANSPORT LOADING TERMINAL**  
**SOUTH**  
**ON THE**  
**MCGILL CARBON VAPOR RECOVERY UNIT**  
**ON**  
**NOVEMBER 20, 2008**

REPORTED BY: BLUE HEAVEN TECHNOLOGIES  
2820 SOUTH ENGLISH STATION ROAD  
LOUISVILLE, KENTUCKY 40299

TEST PERSONNEL: TONY FENTON



In reference to the Motiva Enterprises LLC Air Emission Source Test conducted at the Port Everglades, Florida Transport Loading Facility on November 20, 2008 and described in the following report;

I certify under penalty of law that the information provided in this document is true, accurate and complete. I am aware that there are *significant civil and criminal* penalties, including fines or imprisonment or both, for submitting false, inaccurate or *incomplete information*.

by:   
Tony Fenton  
Technical Service Group  
Blue Heaven Technologies

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EXECUTIVE SUMMARY

The Motiva Enterprises LLC terminal in Port Everglades, Florida is a bulk transport loading facility for Gasoline Products.

The products are bottom loaded into transport tankers and the displaced hydrocarbon vapors are balanced to a McGILL CARBON ADSORPTION / ABSORPTION VAPOR RECOVERY UNIT (VRU).

This facility was source tested for air emissions on November 20, 2008. The purpose of this test was to confirm proper operation of the VRU and verify compliance with applicable VOC (Volatile Organic Compound) air emission requirements.

The Gasoline Terminal Air Emission Source Test was conducted in accordance with procedures established, and the test methods referenced, in the Code of Federal Regulations; CFR 40, Part 60, Subpart XX. Specific procedures used include:

<u>EPA TEST METHOD</u>	<u>MEASUREMENT</u>
Method 2A	Exhaust Vapor Volume
Method 25B	Inlet and Outlet VOC Concentrations
Method 21	Potential Leak Sources
40 CFR 60 Subsection 60.503 (d)	Transport Loading Maximum Backpressure

*The results of this air emission test demonstrate that this source is in compliance with all applicable Federal and Local requirements. A summary of the data is presented below:*

<u>TEST PARAMETER</u>	<u>MEASURED VALUE</u>	<u>REQUIRED VALUE</u>
VOC Emissions	0.71 mg/liter	35 mg/liter

Method 21 Leak Testing was performed on the day prior to testing. A portable LEL Meter was calibrated using a 500 PPM Methane calibration gas and used to check for Leaks around all fittings, flanges, valves and any other exposed potential leak source. No Leaks above 500 PPM were found.



**TERMINAL OPERATION AND DESCRIPTION**

Light petroleum products are bottom loaded at four loading racks at the Motiva Enterprises LLC, Port Everglades, Florida South terminal.

The terminal is equipped to load Regular, Mid-grade, Premium Unleaded Gasoline, and Diesel fuel products onto transports.

Each rack is equipped with vapor recovery hoses positioned at the transport loading positions for hook up to the Vapor Control System. The vapor hoses and associated piping transports the vapors to the VRU. The system also employs a liquid knock-out tank and pressure / vacuum relief vent upstream from the VRU.

A general overview of the loading rack layout is shown on page 9.

McGILL VAPOR RECOVERY UNIT

The terminal is equipped with a McGill Adsorption / Absorption Gasoline Vapor Recovery Unit. Hydrocarbon vapors enter the McGill VRU into one of two Carbon Adsorbers. The Hydrocarbon - air mixture flows up through the absorber where the bulk of the hydrocarbons are absorbed. The air continues through the Carbon Adsorber and is vented to the atmosphere. The saturated carbon is then desorbed by employing vacuum regeneration at 27.5" Hg Vacuum, while the second Carbon Adsorber is receiving the hydrocarbon - air mixture generated in transport loading activity. The purpose of regeneration is to restore the carbon to a level where it will effectively adsorb hydrocarbons again. The two carbon adsorbers alternate between adsorption and regeneration at 15 minute intervals.

When a Carbon Adsorber is in the regeneration mode, a liquid ring vacuum pump pulls the hydrocarbon from the carbon. The rich hydrocarbon vapors from the Carbon Adsorber are mixed with the vacuum pump seal fluid and are discharged to an Absorber / Separator.

The liquid hydrocarbons are condensed and separated from the seal fluid in the separator compartment and are discharged back to a holding tank. Any remaining hydrocarbons pass up through the packed Absorber tower and are contacted by a fresh stream of gasoline which absorbs most of the remaining hydrocarbons. The small amount of hydrocarbons that is left then leaves the top of the absorber and is directed back to the Carbon Adsorber where the whole process is repeated.

The McGill Vapor Recovery Unit is illustrated schematically on page 10.

## MEASUREMENT AND DATA ANALYSIS

The NonDispersive InfraRed (NDIR) analyzer, turbine flow meter, exhaust vapor thermistor and exhaust pressure transducer are connected to the VRU exhaust stack in order to acquire their respective data. A quad check valve assembly is employed to provide for proper VRU regeneration air flow and allow one turbine meter to satisfy both carbon vessel measurement requirements.

The barometric pressure transducer and ambient thermistor are located in close proximity to the VRU in order to acquire ambient atmospheric conditions for use in subsequent standardization equations. A test schematic depicting general test equipment configuration is included as Figure 3.

Each transducer data channel is scaled and connected to the computer input board. Using an operations code program each input channel is read 25 times in a 5 second interval and mass, flow, concentration, temperature, and pressure values are averaged and stored in an array for subsequent use.

After sixty 5 second intervals (5 minutes) the hard disk array is polled and average values are determined for concentration, pressure, and temperature. These values along with the flow for the 5 minute period are used to compute the mass emitted for that 5 minute period. These averaged and summed values are then printed out as the 5 minute interval data and are again stored on hard disk until the six hour test period is completed.

Upon completion of the test, the 5 minute interval data is polled to determine test averages for Inlet and Outlet VOC concentration, pressure and temperature data for all test intervals during which VRU exhaust flow was greater than zero and volume and milligram emission data is summed for all 5 minute periods to arrive at a final test period total.

This data acquisition methodology essentially represents a series of very short (5 second) intervals during which VRU operation is measured, averaged and standardized. This effectively removes all judgmental decisions from data reduction processes and provides a technically unbiased analysis of VRU operation.

Additionally, pretest and post test vapor analyzer calibrations are conducted, along with an hourly analyzer calibration drift check verification. Following the conclusion of the six hour test the loading rack volumes are calculated and final mass emission values are determined.

Copies of the transport loading rack sheets, hydrocarbon analyzer strip charts and computer print outs are attached as Appendices to this test report.

TEST EQUIPMENT

Quantity	Item
2	Thermistor Temperature Probes
1	IBM Compatible Computer with 16 Channel, 12 bit A/D Input Card
1	Gastech Land Surveyor Combustible Gas Indicator
1	Setra Model #261 (or #264) Variable Differential Pressure Transducer
1	Setraceram Model #361 (or #304) Digital Barometer
1	American Meter Co. 8" Turbine Flow Meter
1 (or 2)	Strip Chart Recorder, either: Yokogawa VR 200 View recorder Yokogawa VR 1800 six pin recorder
2	NonDispersive InfraRed Analyzers (NDIR), either: Horiba PIR-2000 Horiba VIA-510 OFC / Summit Analyzer Model 702D Enviromax 2010 NDIR analyzer

All equipment specifications are shown in Appendix B along with available calibration and accuracy information.

EXAMPLE CALCULATIONS

A. Terminology:

- $T_a$  = Ambient Temperature ( $^{\circ}$  Celsius).
- $P_b$  = Barometric Pressure (mm Hg).
- $L_t$  = Total volume of liquid dispensed from all controlled racks during the test period (Liters).
- $V_e$  = Volume of air-hydrocarbon mixture exhausted from the processing unit (cubic meters).
- $V_{es}$  = Normalized volume of air-hydrocarbon mixture exhausted (Cubic meters at  $20^{\circ}$  Celsius, 760 mm Hg).
- $C_e$  = Volume fraction of hydrocarbons in exhausted mixture (Volume % as  $C_3H_8/100$ , corrected for methane content, if required).
- $T_e$  = Temperature at process unit exhaust ( $^{\circ}$  Celsius).
- $P_e$  = Pressure at processing unit exhaust (mm Hg, absolute).
- $M_e$  = Mass of VOC emitted (milligrams).
- $(M/L)_e$  = Mass of hydrocarbons exhausted from the processing unit per volume of liquid loaded (mg/liter).
- $(M/T)_e$  = Mass of hydrocarbons exhausted from the processing unit per unit time (lb/hour).

Constants:

- $0.3858 = (273.2^{\circ} C + 20^{\circ} C) / (760 \text{ mm Hg})$  Normalization Factor.
- $1.83 \times 10^6 \text{ mg/m}^3 = \text{Standard Density of Propane (C}^3\text{H}^8\text{)}$ .
- $454,000 = \text{Conversion Factor mg/lb}$ .
- $3.785 = \text{Conversion Factor Liter/Gallon}$ .
- $264.2 = \text{Conversion Factor gallons / meter}^3$

B. Calculate the Following Results for Each Period of the Vapor Control System Operation:

- (1.) Volume of air-hydrocarbon mixture exhausted from the vapor control system:

$$V_e = (V_{ef} - V_{ei}) \quad (\text{meters}^3)$$

(where subscript  $f$  refers to final and subscript  $i$  refers to initial)

$V_e$  = Totalized volume from flow rate and time records.

- (2.) Normalized volume of exhausted mixture:

$$V_{es} = \frac{(0.3858^{\circ} \text{ Kelvin/mm Hg}) \times V_e \times P_e}{(T_e + 273.2)} \quad (\text{meter}^3)$$

- (3.) Mass of hydrocarbons exhausted from the vapor control system:

$$M_e = \frac{(1.83 \times 10^6 \text{ mg C}^3\text{H}^8)}{\text{meter}^3} \times (V_{es}) \times (C_e) \quad (\text{mg}) \quad (\text{equation B})$$

C. Calculate the Average Mass of Hydrocarbons Emitted Per Volume of Gasoline Loaded:

$$(M/L)_e = M_e/L_e \quad (\text{mg/liter})$$

D. Calculate the Average Mass of Hydrocarbons Emitted Per Unit Time:

$$(M/T)_e = (M/L)_e \times \frac{1 \text{ lb} \times 3.785 \text{ liter} \times \text{Acct. Gal}}{454,000 \text{ mg} \quad 1 \text{ gal} \quad \text{Test Time}} \quad (\text{lb/hr})$$

E. Calculation for Efficiency (if used):

$$\text{Unit Efficiency} = [1 - (\text{outlet mg} / \text{inlet mg})] \times 100\%$$

Where inlet milligrams is derived using inlet concentration and volume of liquid loaded onto transports, assuming a vapor growth ratio of 1:1 and no gross leaks.

F. Example ME Calculation For a Typical Five Minute Interval:

This is an example calculation only, and not an interval from this test. This is intended to clarify the computer method for arriving at the VOC mass emitted data for each test interval.

Barometric Pressure (Baro-P) = 768.4 mm Hg	Volume Emitted (VE) = 42.9 m <sup>3</sup>
Exhaust Pressure (Exhaust-P) = 1.0 mm Hg	Milligrams Emitted (ME) = 436931.5 mg
Ambient Temperature (Ambient-T) = 16.8° C	Outlet VOC Concentration = 0.55 %
Exhaust Temperature (Exhaust-T) = 18.3° C	Inlet VOC Concentration = 34.0 %
Volume Emitted Standardized (VES) = 43.6 m <sup>3</sup>	

*Please Note: All data fields are rounded to two places following the decimal point for display purposes only.*

1.) Therefore, for this calculation:

	0.545 % lowest possible value before rounding for display
<b>HCout =</b>	<b>0.55 % value displayed (after rounding)</b>
	0.554 % highest possible value before rounding for display
	43.55 m <sup>3</sup> lowest possible value before rounding for display
<b>VES =</b>	<b>43.6 m<sup>3</sup> value displayed (after rounding)</b>
	43.64 m <sup>3</sup> highest possible value before rounding for display

2.) Using the above values in the previous equation B we have:

(1.83 x 106) x (0.00545) x (43.55)	= 434,345.9 mg
	436,931.5 mg
<b>(1.83 x 106) x (0.0055) x (43.6)</b>	<b>= 438,834.0 mg</b>
(1.83 x 106) x (0.00554) x (43.64)	= 442,431.0 mg

**Note:** The value for ME printed by the computer for this interval is **436,931.5 mg**. While this is not the result produced from entering the printed values for HCout and VES into Equation B, it is the result produced by the calculation carried out on the stored computer data, prior to rounding for display.

DATA SUMMARY

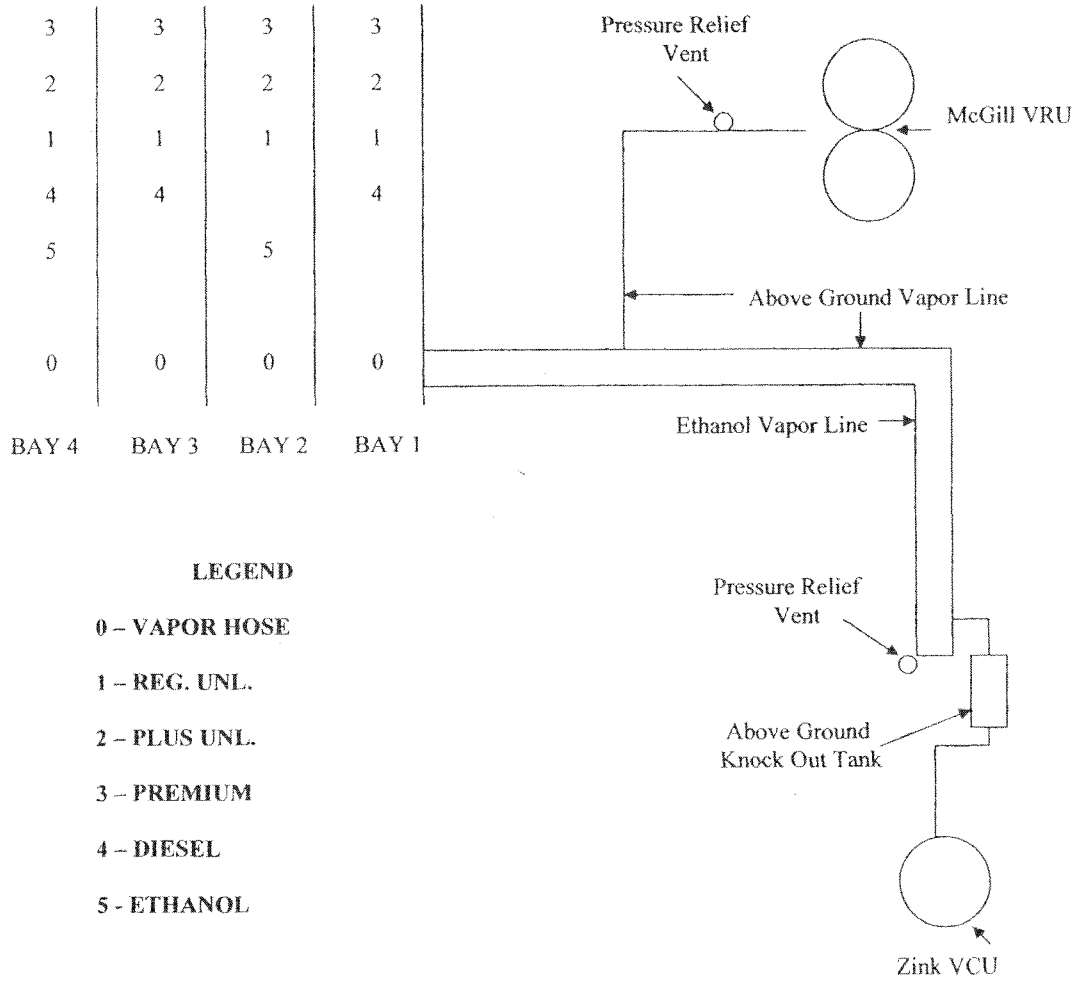
TERMINAL DESCRIPTION	Motiva Enterprises LLC Port Everglades, FL
VAPOR CONTROL UNIT TYPE	McGill VRU
TEST DATE	November 20, 2008
TEST PERIOD	07:15 – 13:15 six hrs.
AVERAGE AMBIENT TEMPERATURE	67.1° F
AVERAGE OUTLET CONCENTRATION (as Propane)	0.046 % by Volume
AVERAGE INLET CONCENTRATION (as Propane)	48.91 % by Volume
TOTAL PETROLEUM LOADED	381,835 gallons
ACCOUNTABLE PETROLEUM LOADED	316,935 gallons
AVERAGE HYDROCARBON EMISSIONS (Calculated with Total Loaded Product)	0.59 mg/liter 0.31 lb/hr
AVERAGE HYDROCARBON EMISSIONS (Calculated with Accountable Product Loaded)	0.71 mg/liter 0.31 lb/hr
NUMBER OF TRUCKS LOADED	49
NUMBER OF LEAKING TRUCKS	0
VOLUME OF LEAKING TRUCKS	0 gallons
MAXIMUM PRESSURE AT TRUCK VAPOR HOSE	9.0" H <sub>2</sub> O
STRIP CHART RECORDER SPEED	150 mm/hour
UNIT EFFICIENCY	99.92 %

**COMPUTER PRINTOUT LEGEND**

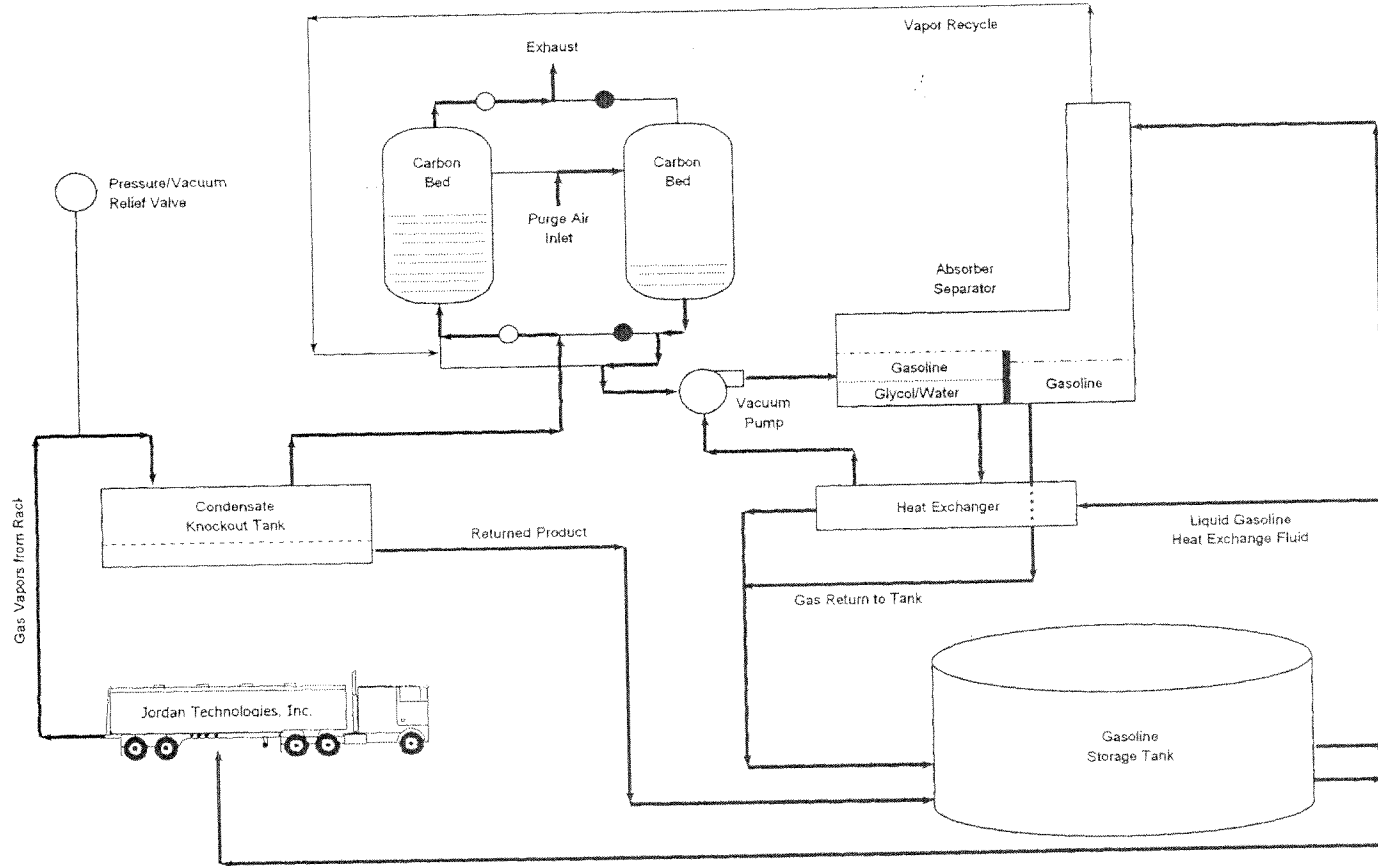
AMBIENT-T.....Ambient Temperature.....° Celsius  
EXHAUST-T..... Exhaust Temperature..... ° Celsius  
EXHAUST-P.....Exhaust Pressure.....mm Hg  
BARO-P.....Barometric Pressure.....mm Hg  
HCin.....Inlet VOC Concentration (when used).....% by volume  
HCout.....Exhaust VOC Concentration..... Vol. Fraction  
VES.....Flow Through Turbine Meter.....m<sup>3</sup> std.  
ME.....Total Milligrams Emitted.....mg of VOC  
VE.....Flow Through Turbine Meter.....m<sup>3</sup>



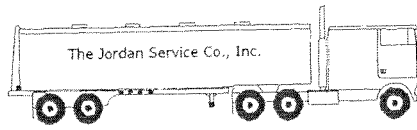
**Motiva Enterprises LLC  
Port Everglades, Florida  
Terminal  
(NOT DRAWN TO SCALE)**



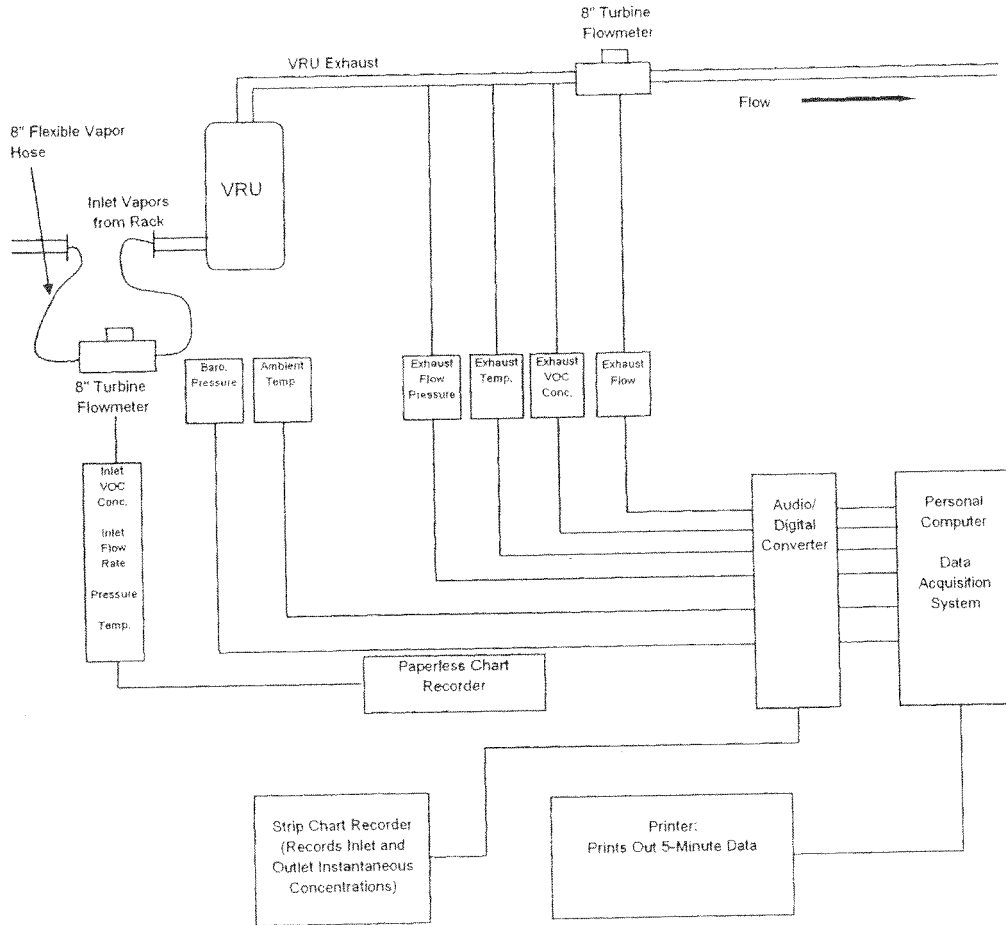
### ACTIVATED CARBON VAPOR RECOVERY UNIT SCHEMATIC



# VAPOR RECOVERY UNIT TEST SCHEMATIC



Test Equipment Diagram  
Note: Not to Scale



**APPENDIX A**  
**TRUCK MONITORING DATA SHEETS**

Seq. No.	Tanker Name	Load Start Time	Bay No.	Trailer Number	Load Stop Time	Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
1	ALION	7:16	1	T-200	7:28	GAS	GAS	/	8800	
Max. Back Pressure: Reading 1 _____ Reading 2 _____ Reading 3 _____ Reading 4 _____ Highest _____										
2	B+B FUEL	7:28	4	5377	7:46	DIESEL	DIESEL	/	7500	250
Max. Back Pressure: Reading 1 _____ Reading 2 _____ Reading 3 _____ Reading 4 _____ Highest _____										
3	FERRY TANKS	7:31	2	1941338	7:41	GAS	GAS	/	4500	
Max. Back Pressure: Reading 1 <u>4</u> Reading 2 <u>3</u> Reading 3 <u>4</u> Reading 4 <u>4</u> Highest <u>4</u>										
4	ALION	7:47		T-41	7:47	GAS	GAS		8800	
Max. Back Pressure: Reading 1 <u>3</u> Reading 2 <u>4</u> Reading 3 <u>3</u> Reading 4 <u>4</u> Highest <u>4</u>										
5	FERRY TANK	7:49	2	1941158	8:09	GAS	GAS		8500	
Max. Back Pressure: Reading 1 <u>4</u> Reading 2 <u>3</u> Reading 3 <u>4</u> Reading 4 <u>4</u> Highest <u>4</u>										
6	LASS SEA PET	7:58	4	79	8:23	GAS	GAS		3800	
Max. Back Pressure: Reading 1 <u>4</u> Reading 2 <u>3</u> Reading 3 <u>5</u> Reading 4 <u>4</u> Highest <u>5</u>										

Accountable Gallons Load 1	<u>8800</u>	Total Gallons Load 1	<u>8800</u>
Accountable Gallons Load 2	<u>0</u>	Total Gallons Load 2	<u>7500</u>
Accountable Gallons Load 3	<u>4500</u>	Total Gallons Load 3	<u>4500</u>
Accountable Gallons Load 4	<u>8800</u>	Total Gallons Load 4	<u>8800</u>
Accountable Gallons Load 5	<u>8500</u>	Total Gallons Load 5	<u>8500</u>
Accountable Gallons Load 6	<u>3800</u>	Total Gallons Load 6	<u>3800</u>

Total Accountable Gallons This Page 34,400 Total Gallons This Page 41,900  
 Acct. Total From Previous Page + \_\_\_\_\_ Total Gallons Prev. Page + \_\_\_\_\_  
 Accountable Gallons Total = \_\_\_\_\_ Total Gallons = \_\_\_\_\_

Seq. No. <u>7</u>	Tanker Name <u>KENAW</u>	Load Start Time <u>7:55</u>		
Bay No. <u>1</u>	Trailer Number <u>5800</u>	Load Stop Time <u>8:15</u>		
Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
<u>DIESEL</u>	<u>DIESEL</u>	<input checked="" type="checkbox"/>	<u>7600</u>	<u>0</u>
Max. Back Pressure: Reading 1 <u>5</u> Reading 2 <u>5</u> Reading 3 <u>6</u> Reading 4 <u>5</u> Highest <u>6</u>				
Seq. No. <u>8</u>	Tanker Name <u>DB TRUCKS</u>	Load Start Time <u>8:08</u>		
Bay No. <u>4</u>	Trailer Number <u>2924</u>	Load Stop Time <u>8:18</u>		
Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
<u>GAS</u>	<u>GAS</u>	<input checked="" type="checkbox"/>	<u>7500</u>	<u>0</u>
Max. Back Pressure: Reading 1 <u>6</u> Reading 2 <u>5</u> Reading 3 <u>7</u> Reading 4 <u>6</u> Highest <u>7</u>				
Seq. No. <u>1</u>	Tanker Name <u>EAGLE</u>	Load Start Time <u>8:07</u>		
Bay No. <u>2</u>	Trailer Number <u>2439</u>	Load Stop Time <u>8:19</u>		
Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
<u>GAS</u>	<u>GAS</u>	<input checked="" type="checkbox"/>	<u>9000</u>	<u>0</u>
Max. Back Pressure: Reading 1 <u>6</u> Reading 2 <u>7</u> Reading 3 <u>6</u> Reading 4 <u>7</u> Highest <u>7</u>				
Seq. No. <u>10</u>	Tanker Name <u>PENNY TRUCKS</u>	Load Start Time <u>8:22</u>		
Bay No. <u>4</u>	Trailer Number <u>070</u>	Load Stop Time <u>8:34</u>		
Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
<u>GAS</u>	<u>GAS</u>	<input type="checkbox"/>	<u>8500</u>	<u>0</u>
Max. Back Pressure: Reading 1 <u>7</u> Reading 2 <u>6</u> Reading 3 <u>7</u> Reading 4 <u>6</u> Highest <u>7</u>				
Seq. No. <u>11</u>	Tanker Name <u>EAGLE</u>	Load Start Time <u>8:23</u>		
Bay No. <u>2</u>	Trailer Number <u>281</u>	Load Stop Time <u>8:33</u>		
Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
<u>GAS</u>	<u>GAS</u>	<input type="checkbox"/>	<u>9000</u>	<u>0</u>
Max. Back Pressure: Reading 1 _____ Reading 2 _____ Reading 3 _____ Reading 4 _____ Highest _____				
Seq. No. <u>12</u>	Tanker Name <u>PENNY TRUCKS</u>	Load Start Time <u>8:20</u>		
Bay No. <u>1</u>	Trailer Number <u>199202</u>	Load Stop Time <u>8:32</u>		
Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
<u>GAS</u> <u>DIESEL</u>	<u>GAS</u> <u>DIESEL</u>	<input type="checkbox"/>	<u>6000</u>	<u>2000</u>
Max. Back Pressure: Reading 1 _____ Reading 2 _____ Reading 3 _____ Reading 4 _____ Highest _____				

Accountable Gallons Load 1	<u>0</u>	Total Gallons Load 1	<u>7600</u>
Accountable Gallons Load 2	<u>7500</u>	Total Gallons Load 2	<u>7500</u>
Accountable Gallons Load 3	<u>9000</u>	Total Gallons Load 3	<u>9000</u>
Accountable Gallons Load 4	<u>8500</u>	Total Gallons Load 4	<u>8500</u>
Accountable Gallons Load 5	<u>9000</u>	Total Gallons Load 5	<u>9000</u>
Accountable Gallons Load 6	<u>6000</u>	Total Gallons Load 6	<u>8000</u>
Total Accountable Gallons This Page	<u>40000</u>	Total Gallons This Page	<u>49600</u>
Acct. Total From Previous Page	<u>+ 34400</u>	Total Gallons Prev. Page	<u>+ 41900</u>
Accountable Gallons Total	<u>= 74400</u>	Total Gallons	<u>= 91500</u>

Seq. No. <u>13</u>	Tanker Name <u>DB TRUCKING</u>	Load Start Time <u>8:38</u>		
Bay No. <u>1</u>	Trailer Number <u>2410</u>	Load Stop Time <u>9:49</u>		
Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
<u>GAS</u>	<u>GAS</u>		<u>7500</u> <u>1000</u>	<u>1275</u>
Max. Back Pressure: Reading 1 <u>6</u> Reading 2 <u>5</u> Reading 3 <u>6</u> Reading 4 <u>6</u> Highest <u>6</u>				

Seq. No. <u>14</u>	Tanker Name <u>SOUTH GALE</u>	Load Start Time <u>8:37</u>		
Bay No. <u>2</u>	Trailer Number <u>338</u>	Load Stop Time <u>9:48</u>		
Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
<u>GAS</u>	<u>GAS</u>	<u>✓</u>	<u>8500</u>	
Max. Back Pressure: Reading 1 <u>9</u> Reading 2 <u>7</u> Reading 3 <u>8</u> Reading 4 <u>7</u> Highest <u>9</u>				

Seq. No. <u>15</u>	Tanker Name <u>KENAW</u>	Load Start Time <u>8:</u>		
Bay No. <u>4</u>	Trailer Number <u>3211</u>	Load Stop Time		
Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
	<u>N/A</u>			
Max. Back Pressure: Reading 1 <u>5</u> Reading 2 <u>6</u> Reading 3 <u>5</u> Reading 4 <u>6</u> Highest <u>6</u>				

NO  
LOAD

Seq. No. <u>16</u>	Tanker Name <u>PIPELINE</u>	Load Start Time <u>8:44</u>		
Bay No. <u>4</u>	Trailer Number <u>06</u>	Load Stop Time <u>9:01</u>		
Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
<u>DIESEL</u>	<u>DIESEL</u>	<u>✓</u>		<u>7500</u> <u>LSD</u>
Max. Back Pressure: Reading 1 Reading 2 Reading 3 Reading 4 Highest				

Seq. No. <u>17</u>	Tanker Name <u>LAWD + SEA</u>	Load Start Time <u>8:49</u>		
Bay No. <u>2</u>	Trailer Number	Load Stop Time <u>9:00</u>		
Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
<u>GAS</u>	<u>GAS</u>	<u>✓</u>	<u>2800</u>	
Max. Back Pressure: Reading 1 <u>5</u> Reading 2 <u>4</u> Reading 3 <u>3</u> Reading 4 <u>4</u> Highest <u>4</u>				

Seq. No. <u>18</u>	Tanker Name <u>KENAW</u>	Load Start Time <u>9:00</u>		
Bay No. <u>1</u>	Trailer Number <u>3133</u>	Load Stop Time <u>9:11</u>		
Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
<u>DIESEL</u>	<u>DIESEL</u>			<u>5600</u> <u>LSD</u>
Max. Back Pressure: Reading 1 Reading 2 Reading 3 Reading 4 Highest				

Accountable Gallons Load 1	<u>9000</u>	Total Gallons Load 1	<u>9000</u>
Accountable Gallons Load 2	<u>8500</u>	Total Gallons Load 2	<u>8500</u>
Accountable Gallons Load 3	<u>0</u>	Total Gallons Load 3	<u>0</u>
Accountable Gallons Load 4	<u>0</u>	Total Gallons Load 4	<u>7500</u>
Accountable Gallons Load 5	<u>2800</u>	Total Gallons Load 5	<u>2800</u>
Accountable Gallons Load 6	<u>0</u>	Total Gallons Load 6	<u>5600</u>

Total Accountable Gallons This Page	<u>20,300</u>	Total Gallons This Page	<u>33,400</u>
Acct. Total From Previous Page	<u>+ 74,400</u>	Total Gallons Prev. Page	<u>+ 91,500</u>
Accountable Gallons Total	<u>= 94,700</u>	Total Gallons	<u>= 124,900</u>

Seq. No. <u>19</u>	Tanker Name <u>DB TRAWL</u>	Load Start Time <u>9.07</u>		
Bay No. <u>4</u>	Trailer Number <u>2402</u>	Load Stop Time <u>9.20</u>		
Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
GAS	GAS	✓	<del>8600</del> 7400	1200
Max. Back Pressure: Reading 1 _____ Reading 2 _____ Reading 3 _____ Reading 4 _____ Highest _____				
Seq. No. <u>20</u>	Tanker Name <u>ALTON</u>	Load Start Time <u>9.15</u>		
Bay No. <u>2</u>	Trailer Number <u>T-41</u>	Load Stop Time <u>9.23</u>		
Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
GAS	GAS	✓	8200	
Max. Back Pressure: Reading 1 <u>5</u> Reading 2 <u>6</u> Reading 3 <u>7</u> Reading 4 <u>5</u> Highest <u>7</u>				
Seq. No. <u>21</u>	Tanker Name <u>ALTON</u>	Load Start Time <u>9.24</u>		
Bay No. <u>1</u>	Trailer Number <u>T-200</u>	Load Stop Time <u>9.33</u>		
Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
GAS	GAS	✓	6875	
Max. Back Pressure: Reading 1 _____ Reading 2 _____ Reading 3 _____ Reading 4 _____ Highest _____				
Seq. No. <u>22</u>	Tanker Name <u>PEEP TANK</u>	Load Start Time <u>9.25</u>		
Bay No. <u>4</u>	Trailer Number <u>144130</u>	Load Stop Time <u>9.32</u>		
Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
GAS	GAS	✓	8500	
Max. Back Pressure: Reading 1 _____ Reading 2 _____ Reading 3 _____ Reading 4 _____ Highest _____				
Seq. No. <u>23</u>	Tanker Name <u>KEWAN</u>	Load Start Time <u>9</u>		
Bay No. <u>2</u>	Trailer Number <u>2311</u>	Load Stop Time _____		
Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
<del>DIESEL</del> GAS	<del>DIESEL</del> GAS	✓	N/A	<del>250</del> 700
Max. Back Pressure: Reading 1 _____ Reading 2 _____ Reading 3 _____ Reading 4 _____ Highest _____				
Seq. No. <u>24</u>	Tanker Name <u>PIPELINE</u>	Load Start Time <u>9.34</u>		
Bay No. _____	Trailer Number <u>38</u>	Load Stop Time <u>9.42</u>		
Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
DIESEL	DIESEL			650 7600
Max. Back Pressure: Reading 1 <u>4</u> Reading 2 <u>5</u> Reading 3 <u>2</u> Reading 4 <u>6</u> Highest <u>2</u>				

NO  
LOAD

Accountable Gallons Load 1	<u>7400</u>	Total Gallons Load 1	<u>8600</u>
Accountable Gallons Load 2	<u>8800</u>	Total Gallons Load 2	<u>8800</u>
Accountable Gallons Load 3	<u>6875</u>	Total Gallons Load 3	<u>6875</u>
Accountable Gallons Load 4	<u>8500</u>	Total Gallons Load 4	<u>8500</u>
Accountable Gallons Load 5	<u>0</u>	Total Gallons Load 5	<u>0</u>
Accountable Gallons Load 6	<u>0</u>	Total Gallons Load 6	<u>7400</u>
Total Accountable Gallons This Page	<u>31575</u>	Total Gallons This Page	<u>40375</u>
Acct. Total From Previous Page	<u>+ 94700</u>	Total Gallons Prev. Page	<u>+ 124900</u>
Accountable Gallons Total	<u>= 126275</u>	Total Gallons	<u>= 165275</u>



Seq. No. <u>25</u>	Tanker Name <u>BLA BLAK</u>	Load Start Time <u>9.40</u>		
Bay No. <u>4</u>	Trailer Number <u>50</u>	Load Stop Time <u>9.49</u>		
Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
<u>GAS</u>	<u>GAS</u>		<u>3800</u>	<u>2200</u>
Max. Back Pressure: Reading 1 <u>5</u> Reading 2 <u>6</u> Reading 3 <u>5</u> Reading 4 <u>6</u> Highest <u>6</u>				
Seq. No. <u>26</u>	Tanker Name <u>EAGLE</u>	Load Start Time <u>9.45</u>		
Bay No. <u>2</u>	Trailer Number <u>2303</u>	Load Stop Time <u>10.18</u>		
Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
<u>GAS</u>	<u>GAS</u>	<u>✓</u>	<u>8500</u>	
Max. Back Pressure: Reading 1 <u>5</u> Reading 2 <u>3</u> Reading 3 <u>4</u> Reading 4 <u>5</u> Highest <u>5</u>				
Seq. No. <u>27</u>	Tanker Name <u>EAGLE</u>	Load Start Time <u>9.56</u>		
Bay No. <u>1</u>	Trailer Number <u>2401</u>	Load Stop Time <u>10.45</u>		
Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
<u>GAS</u>	<u>GAS</u>	<u>✓</u>	<u>8500</u>	
Max. Back Pressure: Reading 1 <u>4</u> Reading 2 <u>5</u> Reading 3 <u>4</u> Reading 4 <u>5</u> Highest <u>5</u>				
Seq. No. <u>28</u>	Tanker Name <u>OP TRUCKING</u>	Load Start Time <u>10.01</u>		
Bay No. <u>1</u>	Trailer Number <u>2408</u>	Load Stop Time <u>10.15</u>		
Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
<u>GAS</u>	<u>GAS</u>		<u>9000</u>	
Max. Back Pressure: Reading 1 _____ Reading 2 _____ Reading 3 _____ Reading 4 _____ Highest _____				
Seq. No. <u>29</u>	Tanker Name <u>EAGLE</u>	Load Start Time <u>10.25</u>		
Bay No. <u>2</u>	Trailer Number <u>2401</u>	Load Stop Time <u>10.46</u>		
Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
<u>GAS</u>	<u>GAS</u>		<u>8500</u>	
Max. Back Pressure: Reading 1 <u>5</u> Reading 2 <u>3</u> Reading 3 <u>4</u> Reading 4 <u>3</u> Highest <u>5</u>				
Seq. No. <u>30</u>	Tanker Name <u>KEMAN</u>	Load Start Time <u>9.59</u>		
Bay No. <u>4</u>	Trailer Number <u>700</u>	Load Stop Time <u>10.08</u>		
Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
<u>GAS</u>	<u>GAS</u>		<u>5100</u>	
Max. Back Pressure: Reading 1 <u>5</u> Reading 2 <u>6</u> Reading 3 <u>7</u> Reading 4 <u>7</u> Highest <u>7</u>				

Accountable Gallons Load 1	<u>3800</u>	Total Gallons Load 1	<u>6000</u>
Accountable Gallons Load 2	<u>8500</u>	Total Gallons Load 2	<u>8500</u>
Accountable Gallons Load 3	<u>8500</u>	Total Gallons Load 3	<u>8500</u>
Accountable Gallons Load 4	<u>9000</u>	Total Gallons Load 4	<u>9000</u>
Accountable Gallons Load 5	<u>8500</u>	Total Gallons Load 5	<u>8500</u>
Accountable Gallons Load 6	<u>5100</u>	Total Gallons Load 6	<u>5100</u>
Total Accountable Gallons This Page	<u>43,400</u>	Total Gallons This Page	<u>45600</u>
Acct. Total From Previous Page	+ <u>126,275</u>	Total Gallons Prev. Page	+ <u>165,275</u>
Accountable Gallons Total	= <u>169,675</u>	Total Gallons	= <u>210,875</u>

Seq. No. <u>31</u>	Tanker Name <u>O+B Trucking</u>	Load Start Time <u>10:22</u>		
Bay No. <u>1</u>	Trailer Number <u>2404</u>	Load Stop Time <u>10:31</u>		
Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
<u>GAS</u>	<u>GAS</u>	<u>✓</u>	<u>9000</u>	
Max. Back Pressure: Reading 1 <u>5</u> Reading 2 <u>4</u> Reading 3 <u>5</u> Reading 4 <u>4</u> Highest <u>5</u>				
Seq. No. <u>32</u>	Tanker Name <u>O+B</u>	Load Start Time <u>10</u>		
Bay No. <u>4</u>	Trailer Number <u>2431</u>	Load Stop Time		
Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
<del><u>GAS</u></del>	<u>GAS</u>	<u>N/A</u>	<u>9000</u>	
Max. Back Pressure: Reading 1 Reading 2 Reading 3 Reading 4 Highest				
Seq. No. <u>33</u>	Tanker Name <u>O+B</u>	Load Start Time <u>10:30</u>		
Bay No. <u>2</u>	Trailer Number <u>2403</u>	Load Stop Time <u>10:53</u>		
Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
<u>GAS</u>	<u>GAS</u>	<u>✓</u>	<u>8960</u>	
Max. Back Pressure: Reading 1 Reading 2 Reading 3 Reading 4 Highest				
Seq. No. <u>34</u>	Tanker Name <u>O+B Trucking</u>	Load Start Time <u>10:59</u>		
Bay No. <u>4</u>	Trailer Number <u>2431</u>	Load Stop Time <u>10:55</u>		
Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
<u>GAS</u>	<u>GAS</u>	<u>✓</u>	<u>9000</u>	
Max. Back Pressure: Reading 1 Reading 2 Reading 3 Reading 4 Highest				
Seq. No. <u>35</u>	Tanker Name <u>SOUTH BAY</u>	Load Start Time <u>10:50</u>		
Bay No. <u>1</u>	Trailer Number <u>338</u>	Load Stop Time <u>10:55</u>		
Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
<u>GAS</u>	<u>GAS</u>	<u>✓</u>	<u>8800</u>	
Max. Back Pressure: Reading 1 <u>5</u> Reading 2 <u>5</u> Reading 3 <u>6</u> Reading 4 <u>5</u> Highest <u>6</u>				
Seq. No. <u>36</u>	Tanker Name <u>EAGLE</u>	Load Start Time <u>10:50</u>		
Bay No. <u>1</u>	Trailer Number <u>2301</u>	Load Stop Time <u>11:07</u>		
Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
<u>GAS</u> <u>DIESEL</u>	<u>GAS</u>		<u>4000</u> <del>8500</del>	<u>4500</u>
Max. Back Pressure: Reading 1 Reading 2 Reading 3 Reading 4 Highest				

NO  
LEAD

Accountable Gallons Load 1	<u>9000</u>	Total Gallons Load 1	<u>9000</u>
Accountable Gallons Load 2	<u>0</u>	Total Gallons Load 2	<u>0</u>
Accountable Gallons Load 3	<u>8960</u>	Total Gallons Load 3	<u>8960</u>
Accountable Gallons Load 4	<u>9000</u>	Total Gallons Load 4	<u>9000</u>
Accountable Gallons Load 5	<u>8800</u>	Total Gallons Load 5	<u>8800</u>
Accountable Gallons Load 6	<u>4000</u>	Total Gallons Load 6	<u>8500</u>
Total Accountable Gallons This Page	<u>39760</u>	Total Gallons This Page	<u>44260</u>
Acct. Total From Previous Page	<u>+ 169,675</u>	Total Gallons Prev. Page	<u>+ 210,875</u>
Accountable Gallons Total	<u>= 209,435</u>	Total Gallons	<u>= 255,135</u>

Seq. No. <u>32</u>	Tanker Name <u>KEPAU</u>	Load Start Time <u>11:09</u>		
Bay No. <u>4</u>	Trailer Number <u>5145</u>	Load Stop Time <u>11:15</u>		
Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
<u>LAS</u>	<u>LAS</u>	<input checked="" type="checkbox"/>	<u>8600</u>	
Max. Back Pressure: Reading 1 _____ Reading 2 _____ Reading 3 _____ Reading 4 _____ Highest _____				
Seq. No. <u>33</u>	Tanker Name <u>KEPAU</u>	Load Start Time <u>11:00</u>		
Bay No. <u>2</u>	Trailer Number <u>5098</u>	Load Stop Time <u>11:14</u>		
Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
<u>LAS</u>	<u>LAS</u>	<input checked="" type="checkbox"/>	<u>9600</u>	
Max. Back Pressure: Reading 1 _____ Reading 2 _____ Reading 3 _____ Reading 4 _____ Highest _____				
Seq. No. <u>39</u>	Tanker Name <u>DEM TRUCKING</u>	Load Start Time <u>11:07</u>		
Bay No. <u>1</u>	Trailer Number <u>8411</u>	Load Stop Time <u>11:17</u>		
Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
<u>LAS</u>	<u>LAS</u>	<input checked="" type="checkbox"/>	<u>9000</u>	
Max. Back Pressure: Reading 1 _____ Reading 2 _____ Reading 3 _____ Reading 4 _____ Highest _____				
Seq. No. <u>39</u>	Tanker Name <u>FAOZL</u>	Load Start Time <u>11:28</u>		
Bay No. <u>4</u>	Trailer Number <u>2378</u>	Load Stop Time <u>11:29</u>		
Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
<u>DIESEL</u>	<u>LAS</u>			<u>6000 LSD</u>
Max. Back Pressure: Reading 1 _____ Reading 2 _____ Reading 3 _____ Reading 4 _____ Highest _____				
Seq. No. <u>39</u>	Tanker Name <u>PEHU TRUCK</u>	Load Start Time <u>11:20</u>		
Bay No. <u>2</u>	Trailer Number <u>19478</u>	Load Stop Time <u>11:27</u>		
Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
<u>LAS</u>	<u>LAS</u>		<u>8500</u>	
Max. Back Pressure: Reading 1 _____ Reading 2 _____ Reading 3 _____ Reading 4 _____ Highest _____				
Seq. No. <u>42</u>	Tanker Name <u>FAZOL</u>	Load Start Time <u>12:00</u>		
Bay No. <u>2</u>	Trailer Number <u>2408</u>	Load Stop Time <u>12:18</u>		
Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
<u>ETHANOL</u>	<u>ETHANOL</u>			<u>7700</u>
Max. Back Pressure: Reading 1 _____ Reading 2 _____ Reading 3 _____ Reading 4 _____ Highest _____				

Accountable Gallons Load 1	<u>8400</u>	Total Gallons Load 1	<u>8600</u>
Accountable Gallons Load 2	<u>8600</u>	Total Gallons Load 2	<u>8600</u>
Accountable Gallons Load 3	<u>9000</u>	Total Gallons Load 3	<u>9000</u>
Accountable Gallons Load 4	<u>0</u>	Total Gallons Load 4	<u>6000</u>
Accountable Gallons Load 5	<u>8500</u>	Total Gallons Load 5	<u>8500</u>
Accountable Gallons Load 6	<u>0</u>	Total Gallons Load 6	<u>7700</u>
Total Accountable Gallons This Page	<u>34700</u>	Total Gallons This Page	<u>48400</u>
Acct. Total From Previous Page	+ <u>209435</u>	Total Gallons Prev. Page	+ <u>255135</u>
Accountable Gallons Total	= <u>244135</u>	Total Gallons	= <u>303535</u>

Seq. No. <u>3243</u>	Tanker Name <u>S + B FUEL</u>	Load Start Time <u>11:31</u>		
Bay No. <u>1</u>	Trailer Number <u>5373</u>	Load Stop Time <u>11:40</u>		
Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
<u>DIESEL</u>	<u>DIESEL</u>	<u>✓</u>		<u>5500</u>
Max. Back Pressure: Reading 1 _____ Reading 2 _____ Reading 3 _____ Reading 4 _____ Highest _____				
Seq. No. <u>3244</u>	Tanker Name <u>KEMAR</u>	Load Start Time <u>11:51</u>		
Bay No. <u>2</u>	Trailer Number <u>2225</u>	Load Stop Time <u>11:59</u>		
Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
<u>GAS</u>	<u>GAS</u>		<u>8000</u>	
Max. Back Pressure: Reading 1 _____ Reading 2 _____ Reading 3 _____ Reading 4 _____ Highest _____				
Seq. No. <u>3245</u>	Tanker Name <u>SAGE</u>	Load Start Time _____		
Bay No. <u>4</u>	Trailer Number _____	Load Stop Time _____		
Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
		<u>✓</u>		
Max. Back Pressure: Reading 1 _____ Reading 2 _____ Reading 3 _____ Reading 4 _____ Highest _____				
Seq. No. <u>46</u>	Tanker Name <u>OHIO TRUCKS</u>	Load Start Time <u>12:25</u>		
Bay No. <u>2</u>	Trailer Number <u>2400</u>	Load Stop Time <u>12:34</u>		
Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
		<u>✓</u>	<u>9000</u>	
Max. Back Pressure: Reading 1 <u>7</u> Reading 2 <u>6</u> Reading 3 <u>7</u> Reading 4 <u>8</u> Highest <u>8</u>				
Seq. No. <u>3247</u>	Tanker Name <u>KENAW</u>	Load Start Time <u>12:26/21</u>		
Bay No. <u>2</u>	Trailer Number <u>5726</u>	Load Stop Time <u>12:27</u>		
Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
			<u>6000</u>	
Max. Back Pressure: Reading 1 _____ Reading 2 _____ Reading 3 _____ Reading 4 _____ Highest _____				
Seq. No. <u>48</u>	Tanker Name <u>KENAW</u>	Load Start Time <u>12</u>		
Bay No. <u>1</u>	Trailer Number <u>5372</u>	Load Stop Time _____		
Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
<u>GAS</u>	<u>GAS</u>	<u>✓</u>	<u>8000</u>	
Max. Back Pressure: Reading 1 _____ Reading 2 _____ Reading 3 _____ Reading 4 _____ Highest _____				

NO LEAK

Accountable Gallons Load 1	<u>0</u>	Total Gallons Load 1	<u>5500</u>
Accountable Gallons Load 2	<u>8000</u>	Total Gallons Load 2	<u>8000</u>
Accountable Gallons Load 3	<u>0</u>	Total Gallons Load 3	<u>0</u>
Accountable Gallons Load 4	<u>9000</u>	Total Gallons Load 4	<u>9000</u>
Accountable Gallons Load 5	<u>6000</u>	Total Gallons Load 5	<u>6000</u>
Accountable Gallons Load 6	<u>8000</u>	Total Gallons Load 6	<u>8000</u>
Total Accountable Gallons This Page	<u>31000</u>	Total Gallons This Page	<u>36500</u>
Acct. Total From Previous Page	<u>+ 244135</u>	Total Gallons Prev. Page	<u>+ 303535</u>
Accountable Gallons Total	<u>= 275135</u>	Total Gallons	<u>= 340035</u>

Seq. No.	Tanker Name	Load Start Time	Bay No.	Trailer Number	Load Stop Time	Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
49	AL TOM	12:31	4	T-41	12:48	GAS	GAS		6900	
Max. Back Pressure: Reading 1 <u>7</u> Reading 2 <u>8</u> Reading 3 <u>6</u> Reading 4 <u>7</u> Highest <u>8</u>										
50	T & L	12:51	2	T-84	12:48	GAS	DIESEL		8500	
Max. Back Pressure: Reading 1 <u>6</u> Reading 2 <u>5</u> Reading 3 <u>4</u> Reading 4 <u>3</u> Highest <u>6</u>										
51	D & D TRUCKING	12:44	4	2404	12:54	GAS	GAS		9000	
Max. Back Pressure: Reading 1 <u>6</u> Reading 2 <u>7</u> Reading 3 <u>8</u> Reading 4 <u>7</u> Highest <u>8</u>										
52	KEVAN	12:49	1	5469	1	GAS	GAS		8600	
Max. Back Pressure: Reading 1 <u>5</u> Reading 2 <u>6</u> Reading 3 <u>7</u> Reading 4 <u>6</u> Highest <u>7</u>										
53	AL TOM	12:50		T-200	12:00	GAS	GAS		8800	
Max. Back Pressure: Reading 1 <u>5</u> Reading 2 <u>6</u> Reading 3 <u>5</u> Reading 4 <u>6</u> Highest <u>6</u>										
54	<del>PROXY TANK</del>	<del>VA</del>		<del>40133</del>	<del>VA</del>	<del>GAS</del>	<del>GAS</del>		<del>0</del>	
Max. Back Pressure: Reading 1 _____ Reading 2 _____ Reading 3 _____ Reading 4 _____ Highest _____										

NO LOAD

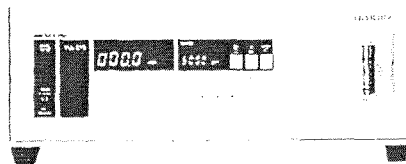
Accountable Gallons Load 1	<u>6900</u>	Total Gallons Load 1	<u>6900</u>
Accountable Gallons Load 2	<u>8500</u>	Total Gallons Load 2	<u>8500</u>
Accountable Gallons Load 3	<u>9000</u>	Total Gallons Load 3	<u>9000</u>
Accountable Gallons Load 4	<u>8600</u>	Total Gallons Load 4	<u>8600</u>
Accountable Gallons Load 5	<u>8800</u>	Total Gallons Load 5	<u>8800</u>
Accountable Gallons Load 6	<u>0</u>	Total Gallons Load 6	<u>0</u>
Total Accountable Gallons This Page	<u>41800</u>	Total Gallons This Page	<u>41800</u>
Acct. Total From Previous Page	+ <u>275135</u>	Total Gallons Prev. Page	+ <u>275135</u>
Accountable Gallons Total	= <u>316935</u>	Total Gallons	= <u>316935</u>

**APPENDIX B**  
**INSTRUMENT AND CALIBRATION**  
**INFORMATION**

## VIA-510 Gas Analyzer

### Features

- Selectable response time
- Selectable outputs: 0-1 VDC or 4-20 mA
- Digital outputs indicate malfunctions or calibration failure)
- Measures CO, CO<sub>2</sub>, NO<sub>x</sub>, SO<sub>2</sub>, CH<sub>4</sub>, C<sub>2</sub>H<sub>4</sub>, and NO<sub>2</sub>; others upon request



### Overview

The VIA-510 series of general-purpose gas analyzers provide continuous monitoring of concentrations of the specific sample gas. The analyzers can be operated from controls on the front panel or by commands from a remote computer. Measurement results are displayed on the front panel and are available to remote data logging systems through an industry-standard interface.

The VIA-510 series can be used for a wide variety of analyses and tests, such as industrial process control and composition analysis, environment-related atmospheric and fixed-source emissions monitoring, and automobile emission analysis.

These analyzers use the infrared absorption method which offers superior sensitivity, selectivity, and stability. They are compact and compatible with a variety of OEM analysis equipment.

A high level of sensitivity is achieved through the use of a dual-beam NDIR analysis method. Horiba's patented chopper motor assures continuous long-term stable monitoring. The analysis mechanism and the amplifier are combined in a single unit. The highly accurate performance makes the analyzers suitable for process monitoring and control.

### Specifications

#### Standard Ranges

Gas	Minimum	Maximum
Carbon monoxide	0-50 ppm	0-100%

(CO)		
Carbon dioxide (CO <sub>2</sub> )	0-50 ppm	0-100%
Nitrogen monoxide (NO)	0-100 ppm	0-100%
Sulfur dioxide (SO <sub>2</sub> )	0-100 ppm	0-100%
Methane (CH <sub>4</sub> )	0-100 ppm	0-100%
Ethene (C <sub>2</sub> H <sub>4</sub> )	0-100 ppm	0-100%
Nitrous Oxide (N <sub>2</sub> O)	0-100 ppm	0-100%

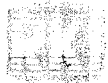
### **Performance**

Lowest detection limit:	1.0 ppm
Repeatability:	± 1% of full-scale
Response time:	Selectable
Zero drift:	< 1% (full scale) per day
Span drift:	< 2% (full scale) per week

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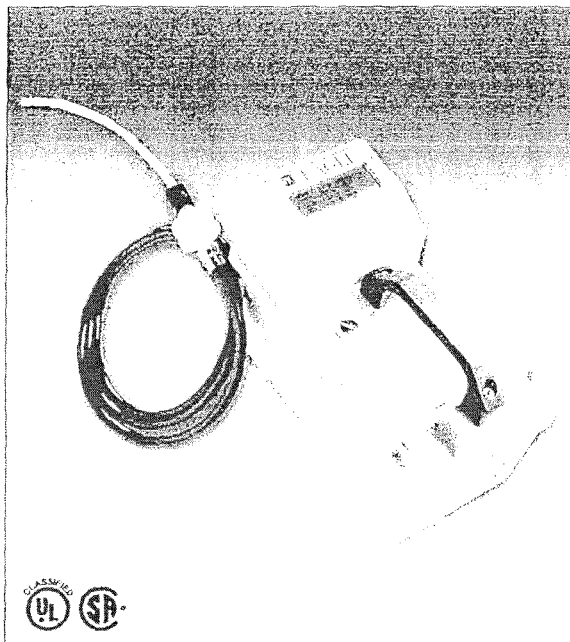




# ONE TO SIX GAS PORTABLE MONITOR

Gas Detection For Life

**EAGLE™ Model**



## Features

- Simultaneous detection of up to 6 different gases
- Over 250 gas monitoring configurations
- Wide range of toxic gases
- PPM / LEL hydrocarbon detection
- Powerful long-life pump up to 125' range with filters
- Low flow pump shut off and alarm
- Methane elimination switch for environmental use
- Security "Adjustment Lockout Switch"
- Up to 30 hours of continuous operation
- Alkaline or Ni-Cad capability
- IR Sensors available for 50% CO<sub>2</sub>, 100% LEL CH<sub>4</sub>, and 100% volume CH<sub>4</sub>
- Transformer testing version available
- Datalogging option
- Autocalibration
- Dual hydrophobic filters (most versions)
- Ergonomic RF / EMI / chemical / weather resistant enclosure
- Intrinsically safe design, CSA (C / US) & UL Classified (most versions)

RKI is proud to offer the most versatile portable gas detector on the market. Equipped with features that are not available on most competitive units, the EAGLE is a powerful instrument that does more than offer standard confined space protection. Detection combinations never before offered in a portable gas monitor are now available featuring the industry's widest selection of high quality, long life and field proven sensors.

The EAGLE features include PPM or LEL hydrocarbon detection at the push of a button, infrared sensors for CO<sub>2</sub> and combustible monitoring including 100% volume methane, a methane elimination switch for environmental applications, a long list of super toxic gases and measurable ranges, and dual hydrophobic filters to increase its water resistant performance. For quick response and recovery from distant sampling locations, the EAGLE has a strong internal pump with a low flow auto shut off and alarm, which can draw samples up to 125 feet even with the dual hydrophobic filters in place. The EAGLE will continuously operate for over 30 hours on alkaline batteries or 18 hours on Ni-Cads. A variety of accessories are also available to help satisfy almost any application such as long sample hoses, special float probes for tank testing, datalogging, continuous operation adapters, remote alarms and strobes, and dilution fittings just to name a few.

With its ergonomic design and large glove friendly buttons, the EAGLE offers easy access to controls such as autocalibration, alarm silence, demand zero, peak hold and a wide variety of other features. Each channel has two alarm levels plus TWA and STEL alarms for toxic channels. The two alarm levels are user adjustable and can be latching or self resetting. Rugged, reliable, easy to operate and maintain, the EAGLE is the solution for just about any portable gas monitoring situation.

RKI Instruments, Inc • 33248 Central Ave. Union City, CA • Phone (800) 754-5165 • (510) 441-5656 • Fax (510) 441-5650

World Leader In Gas Detection & Sensor Technology  
[www.rkiinstruments.com](http://www.rkiinstruments.com)

<b>Enclosure</b>	Weather resistant, chemical resistant, RFI / EMI coated high impact polycarbonate-polyester blend. Can operate in rain or set into 2.5" of water without damage. Ergonomically balanced with rugged top mounted handle.
<b>Dimensions</b>	10.5" L x 5.9" W x 7" H
<b>Weight</b>	5 lbs
<b>Detection Principle</b>	Catalytic combustion, electrochemical cell, galvanic cell, and infrared
<b>Sensor Life</b>	2 years under normal conditions.
<b>Sampling Method</b>	Powerful, long-life pump (over 6,000 hours) can draw samples over 125 feet. Flow rate approximately 2.0 SCFH.
<b>Display</b>	4 x 20 LCD readout. Viewed through window in case top. Displays readings & status of all channels simultaneously. Backlight, automatic for alarms and by demand with adjustable time.
<b>Alarms</b>	2 alarms per channel plus TWA and STEL alarms for toxics. The two alarms are fully adjustable for levels, latching or self reset and silenceable.
<b>Alarm Method</b>	Buzzer 85 dB at 30 cm, dual high intensity LEDs, and flashing display.
<b>Controls</b>	6 external glove friendly push buttons for operation, demand zero, and auto calibration. Buttons also access LEL / ppm, alarm silence, peak hold, TWA / STEL values, battery status and many other features.
<b>Continuous Operation</b>	30 hours minimum using alkaline batteries, or 18 hours using Ni-Cads.
<b>Power Source</b>	4 alkaline or Ni-Cad, size D batteries. Charger has alkaline recognition to prevent battery damage if charging is attempted with alkalines.
<b>Operating Temp. &amp; Humidity</b>	-10°C to 40°C (14°F to 104°F), 0 to 95% RH, non-condensing.
<b>Indication Accuracy</b>	Maximum variance +/- 5% of full scale.
<b>Response Time</b>	30 seconds to 90% (for most gases) using standard 5 ft hose.
<b>Safety Rating</b>	Intrinsically Safe, Class I, Division 1, Groups A, B, C and D. CSA (C / US) & UL Classified (most versions).
<b>Standard Accessories</b>	Shoulder strap, alkaline batteries, hydrophobic probe and 5 foot hose. Internal hydrophobic filter (most versions) (certain toxic versions equipped with special probe, inlet fitting and 3' teflon hose. For HF and O3 versions, 3' teflon hose used without probe)
<b>Optional Accessories</b>	<ul style="list-style-type: none"> <li>Datalogging of up to 4 gases (No datalogging possible on 5 or 6 gas versions or versions with more than 2 toxic sensors)</li> <li>Remote alarms</li> <li>Dilution fitting (50/50)</li> <li>Ni-Cad batteries</li> <li>Battery charger, 115 VAC, 220 VAC, or 12 VDC</li> <li>Continuous operation adapter, 115 VAC or 12 VDC</li> <li>Extra loud buzzer</li> <li>Extension probes</li> <li>Large internal hydrophobic filter</li> </ul>
<b>Warranty</b>	One year material and workmanship

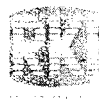
Specifications subject to change without notice.

Gases & Detectable Ranges	
<b>Standard Confined Space Gases</b>	
Hydrocarbons (CH <sub>4</sub> , std)	0 - 100% LEL 0 - 50,000 ppm
Oxygen (O <sub>2</sub> )	0 - 40% Vol.
Carbon Monoxide (CO)	0 - 500 ppm
Hydrogen Sulfide (H <sub>2</sub> S)	0 - 100 ppm
<b>Super Toxics and Other Gases</b>	
Ammonia (NH <sub>3</sub> )	0 - 75 ppm
Arsine (AsH <sub>3</sub> )	0 - 1 ppm 0 - 200 ppb
Carbon Dioxide (CO <sub>2</sub> ) (IR Sensor)	0 - 5,000 ppm 0 - 10,000 ppm 0 - 5% Vol. 0 - 20% Vol. 0 - 60% Vol.
Chlorine (Cl <sub>2</sub> )	0 - 3 ppm
Chlorine Dioxide (ClO <sub>2</sub> )	0 - 1 ppm
Fluorine (F <sub>2</sub> )	0 - 5 ppm
Hydrogen Fluoride (HF)	0 - 9 ppm
Hydrogen Chloride (HCl)	0 - 15 ppm
Hydrogen Cyanide (HCN)	0 - 30 ppm
Hydrogen Sulfide (H <sub>2</sub> S)	0 - 1 ppm 0 - 30 ppm
Methane (CH <sub>4</sub> ) (IR Sensor)	0 - 100% LEL 0 - 100% Vol.
Isobutane (C <sub>4</sub> H <sub>10</sub> ) (IR Sensor)	0 - 100% LEL 0 - 30% Vol.
Nitrogen Dioxide (NO <sub>2</sub> )	0 - 15 ppm
Nitric Oxide (NO)	0 - 100 ppm
Ozone (O <sub>3</sub> )	0 - 1 ppm
Phosphine (PH <sub>3</sub> )	0 - 1 ppm
Silane (SiH <sub>4</sub> )	0 - 15 ppm
Sulfur Dioxide (SO <sub>2</sub> )	0 - 10 ppm 0 - 15 ppm

The EAGLE can be configured with up to 6 gas sensors including a maximum of 2 super toxics from the above list

### Special Features

- Low flow alarm shuts pump off to avoid damage to instrument.
- Hydrophobic filter disc in probe.
- Internal hydrophobic filter (most versions)
- Single gas calibration capability.
- Methane elimination switch for environmental applications.
- Security "Adjustment Lockout Switch"
- Confirmation beep (silenceable).
- Meets EPA Method 21 protocol for fugitive emissions testing (most applications).



A9812



ISO 9001:2000

Authorized Distributor:

33248 Central Ave. Union City, CA 94587

Toll Free: (800) 754-5165 • Phone: (510) 441-5656 • Fax: (510) 441-5650  
mail4rki@rklinstruments.com • www.rklinstruments.com



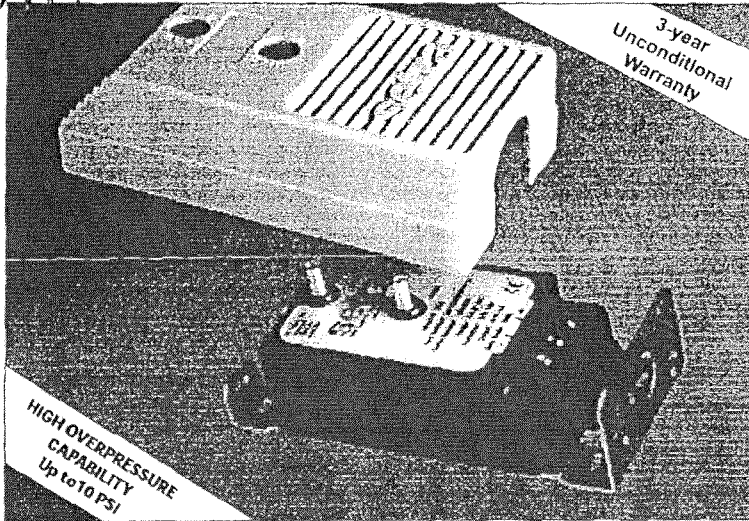
### Model 264

#### Very Low Differential Pressure Transducer

Unidirectional Ranges: 0 - 0.1 to 0 - 100 in. W.C.

Bidirectional Ranges: 0 - ±0.5 to 0 - ±50 in. W.C.

Air or Non-Conducting Gas



3-year  
Unconditional  
Warranty

HIGH OVERPRESSURE  
CAPABILITY  
Up to 10 PSI

Setra Systems 264 pressure transducers sense differential or gauge (static) pressure and convert this pressure difference to a proportional electrical output for either unidirectional or bidirectional pressure ranges. The 264 Series is offered with a high level analog 0 to 5 VDC or 4 to 20 mA output.

Used in Building Energy Management Systems, these transducers are capable of measuring pressures and flows with the accuracy necessary for proper building pressurization and air flow control.

The 264 Series transducers are available for air pressure ranges as low as 0.1 in. W.C. full scale to 100 in. W.C. full scale. Static standard accuracy is ±1.0% full scale in normal ambient temperature environments, but higher accuracies are available. The units are temperature compensated to 0.033% FS/°F thermal error over the temperature range of 0°F to +150°F.

The Model 264 utilizes an improved all stainless steel micro-tig welded sensor. The tensioned stainless steel diaphragm and insulated stainless steel electrode, positioned close to the diaphragm, form a variable capacitor. Positive pressure moves the diaphragm toward the electrode, increasing the capacitance. A decrease in pressure moves the diaphragm away from the electrode, decreasing the capacitance. The change in capacitance is detected and converted to a linear DC electrical signal by Setra's unique electronic circuit.

The tensioned sensor allows up to 10 PSI overpressure (in either direction) with no damage to the unit. In addition, the parts that make up the sensor have thermally matched coefficients, which promote improved temperature performance and excellent long term stability.

NOTE: Setra quality standards are based on ANSI Z540-1. The calibration of this product is NIST traceable.  
U.S. Patent nos. 4,081,915; 4,318,814; 4,434,203; 6,019,002; 6,014,800  
Other Patents Pending

159 Swanson Rd., Boxborough, MA 01719/Telephone: 978-263-1400/Fax: 978-264-0292

### Applications

- Heating, Ventilation and Air Conditioning (HVAC)
- Energy Management Systems
- Variable Air Volume and Fan Control (VAV)
- Environmental Pollution Control
- Lab and Fume Hood Control
- Oven Pressurization and Furnace Draft Controls

### Features

- Up to 10 PSI Overpressure on All Ranges
- Installation Time Minimized with Snap-Track Mounting and Easy-To-Access Pressure Ports and Electrical Connections
- 0 to 5 VDC or 2-wire 4 to 20 mA Analog Outputs Are Compatible with Energy Management Systems
- Reverse Wiring Protection
- Internal Regulation Permits Use with Unregulated DC Power Supplies
- Meets or Exceeds Industry Standards

When it comes to a product you can choose to depend on, you can't choose Setra.



Visit our Website at <http://www.setra.com>

**setra**  
800-257-3872

# Model 264 Specifications

## Performance Data

	Standard	Optional
Accuracy: RSS (at constant temp)	±1.0% FS	±0.4% FS ±0.25% FS
Non-Linearity: BFSL	±0.90% FS	±0.38% FS ±0.22% FS
Hysteresis	0.10% FS	0.10% FS 0.10% FS
Non-Repeatability	0.05% FS	0.05% FS 0.05% FS

### Thermal Effects\*\*

Compensated Range °F (°C)	0 to +150 (-18 to +55)
Zero/Span Shift %FS/°F (°C)	0.033 (0.06)
Maximum Line Pressure	10 psi
Overpressure	Up to 10 psi in Positive or Negative Direction
Long Term Stability	0.5% FS/1 YR

### Position Effect

(Unit is factory calibrated at 0g effect in the vertical position.)

Range	Zero Offset (Gal/5g)
to 0.5 in. WC	0.67
to 1.0 in. WC	0.50
to 2.5 in. WC	0.22
to 5 in. WC	0.14

\* RSS of Non-Linearity, Hysteresis, and Non-Repeatability

\*\* Units calibrated at nominal 30°F. Maximum absolute error determined from this datum.

## Environmental Data

Temperature	
Operating °F (°C)	0 to +175 (-18 to +79)
Storage °F (°C)	-65 to +250 (-54 to +121)

\* Operating temperature limits of the electronics only. Pressure media temperatures may be considerably higher.

## Physical Description

Case	Fire-Retardant Glass Filled Polyester
Mounting	Four screw holes on removable zinc plated steel base (designed for 2.75" snap track)
Electrical Connection	Screw Terminal Strip
Pressure Fittings	3/16" O.D. barbed brass pressure fitting for 1/4" push-on tubing
Zero and Span Adjustments	Accessible on top of case
Weight (approx.)	10 ounces

## Pressure Media

Typically air or similar non-conducting gases

Specifications subject to change without notice.

## Electrical Data (Voltage)

Circuit	3-Wire (Com, Exc, Out)
Excitation	9 to 30 VDC
Output	0 to 5 VDC**
Bidirectional output at zero pressure	2.5 VDC**
Output Impedance	100 ohms

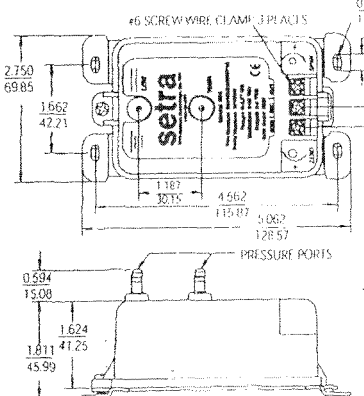
## Electrical Data (Current)

Circuit	2-Wire
Output	4 to 20 mA**
Bidirectional output at zero pressure	12 mA**
External Load	0 to 800 ohms
Minimum supply voltage (VEX) = 9 + 0.02 x (Resistance of receiver plus line)	
Maximum supply voltage (VDC) = 30 + 0.004 x (Resistance of receiver plus line)	

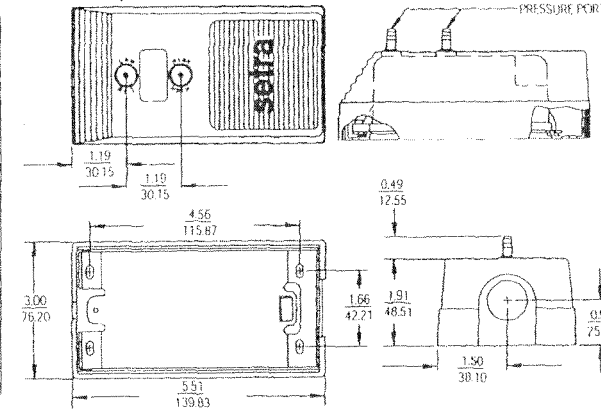
\* Calibrated at factory with a 24 VDC loop supply voltage and a 250 ohm load.  
 \*\* Zero output factory set to within ±0.16 mA (±0.06 mA for optional accuracies).  
 \*\*\* Span (Full Scale) output factory set to within ±0.16 mA (±0.06 mA for optional accuracies).

## Outline Drawings

### Code T1 Electrical Termination Dimensions



### Optional 1/2" Conduit Electrical Enclosure Dimensions



## ORDERING INFORMATION

Code all blocks in table.

Example: Part No. 26412R5WD1171C for a 264 Transducer 0 to 2.5 in. WC Range, 4 to 20 mA Output, Terminal Strip Electrical Connection, and ±1% Accuracy.

Model	Differential	Bidirectional	Output	Elec. Termination	Accuracy
2641 = 264	OR1WD = 0 to 0.1 in. WC R25WD = 0 to 0.25 in. WC OR5WD = 0 to 0.5 in. WC O01WD = 0 to 1 in. WC 2R5WD = 0 to 2.5 in. WC O03WD = 0 to 3 in. WC O05WD = 0 to 5 in. WC O10WD = 0 to 10 in. WC O15WD = 0 to 15 in. WC O25WD = 0 to 25 in. WC O50WD = 0 to 50 in. WC O100WD = 0 to 100 in. WC	R05WB = ±0.05 in. WC OR1WB = ±0.1 in. WC R25WB = ±0.25 in. WC OR5WB = ±0.5 in. WC O01WB = ±1 in. WC 1R5WB = ±1.5 in. WC 2R5WB = ±2.5 in. WC O05WB = ±5 in. WC 7R5WB = ±7.5 in. WC O10WB = ±10 in. WC O25WB = ±25 in. WC O50WB = ±50 in. WC	11 = 4-20 mA 2D = 0 to 5 VDC	Standard T1 = Terminal Strip Optional A1 = 1/2" Conduit Enclosure	Standard C = ±1% FS Optional (w/Cal. Cert.) E = ±0.4% FS F = ±0.25% FS G = ±1% FS

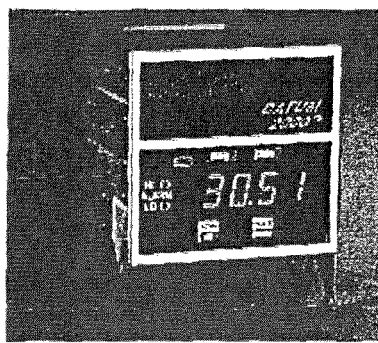
Please contact factory for versions not shown.

While we provide application assistance on all Setra products, both personally and through literature, it is the customer's responsibility to determine the suitability of the product in the application.

159 Swanson Road, Buxborough, MA 01719/Tel: 978-263-1400  
 Toll Free: 800-257-3872; Fax: 978-264-0292; email: sales@setra.com



55P264 Rev-D 04/19/01



## DATUM 2000™ Manometer w/Transducer Installed

The DATUM 2000™ Manometer is a complete system with built-in pressure or vacuum transducer. A wide selection of standard pressure ranges is available for gauge, absolute, differential and vacuum measurements from  $\pm 0.25$  inches WC to 1000 psia.

The transducer installed in the Manometer operates on channel one of the two channel meter. Channel two is available for any other voltage or current input from another remote instrument.

Setra pressure transducer Models 204, 204D, 239 and 270 are available for installation in the 1/4 DIN Datum Manometer.

### DATUM 2000™ Manometer Transducer Specifications

Type of Pressure Measurement	w/Models 204/204D	w/Model 239	w/Model 270
	Gauge Absolute Vacuum Differential	Differential Gauge	Gauge Absolute Barometric
Standard Ranges	0 to 25, 50, 100, 250, 500, 1000 psig 0 to 25, 50, 100, 250, 500, 1000 psia 0 to 25, 50, 100 psid 0 to 14.7 psiv 0 to $\pm 10$ , $\pm 25$ , $\pm 50$ , $\pm 100$ psid	0 to 0.5, 1.0, 2.5, 5, 15, 30 inch WC 0 to $\pm 0.25$ , $\pm 5$ , $\pm 1.0$ , $\pm 2.5$ , $\pm 7.5$ , $\pm 15$ inch WC 0 to 5, 10 psid 0 to $\pm 2.5$ , $\pm 5$ psid	0 to 5, 10, 20, 50, 100 psig 0 to 10, 20, 50, 100 psia 600-1100 millibar 600-1100 millibar
System Accuracy (RSS)	$\pm 0.11\%$ FS $\pm 2$ digits $\pm 0.22\%$ FS $\pm 2$ digits* * for $\pm 100$ , $\pm 250$ , $\pm 500$ PSID Ranges	$\pm 0.14\%$ FS $\pm 2$ digits	$\pm 0.05\%$ FS $\pm 2$ digits
Thermal Effects			
%FS +60° to +95°F			
Thermal Zero Shift	0.14 max $\pm 4$ digits	0.35 max $\pm 4$ digits	0.07 max $\pm 4$ digits
Thermal Span Shift	0.11 max $\pm 4$ digits	0.35 max $\pm 4$ digits	0.04 max $\pm 4$ digits
Pressure Fittings			
Positive	1/4" 18 NPT internal	1/8" 27 NPT internal	1/8" 27 NPT internal
Reference	1/8" 27 NPT internal	1/8" 27 NPT internal	N/A
Pressure Media			
Positive	Gas compatible with 17-4 PH stainless steel** **Note: Hydrogen not recommended for use with 17-4 PH stainless steel	Gases compatible with stainless steel, hard anodized 6061 aluminum, Buna N O-ring.	Non-condensing air or gas compatible with aluminum, alumina, ceramics, gold, fluorocarbon elastomer sealant and Buna-N O-Ring
Reference	Clean dry air or other gases (Non-corrosive, non-condensable.)	Clean dry air or other gases (Non-corrosive, non-condensable.)	N/A
Analog Output	Normally 0 to 5 VDC for unidirectional pressure or vacuum ranges 0 to $\pm 2.5$ VDC for bidirectional ranges	Normally 0 to 5 VDC for unidirectional pressure. 0 to $\pm 2.5$ VDC for bidirectional ranges	0 to 5 VDC for gauge and absolute ranges

## Ordering Instructions

### DATUM 2000™ Meter only

Order as DATUM 2000-1 meter for 115 VAC converter or DATUM 2000-2 for 220 VAC converter with European 2-prong turrel.

### DATUM 2001 Meter with One Transducer or Transmitter Set-up

To order factory set-up with one transducer or transmitter and 10ft. cable/connector assembly, specify option 2001-1 for 115 VAC converter or 2001-2 for 220 VAC European converter. Transducer or transmitter ordered and priced separately.

### DATUM 2002 Meter with Two Transducers or Transmitters Set-up

For two factory setups and cable assemblies with two transducers or transmitters, specify option 2002-1 for 115 VAC or 2002-2 for 220 VAC European converter. Transducers or transmitters ordered and priced separately.

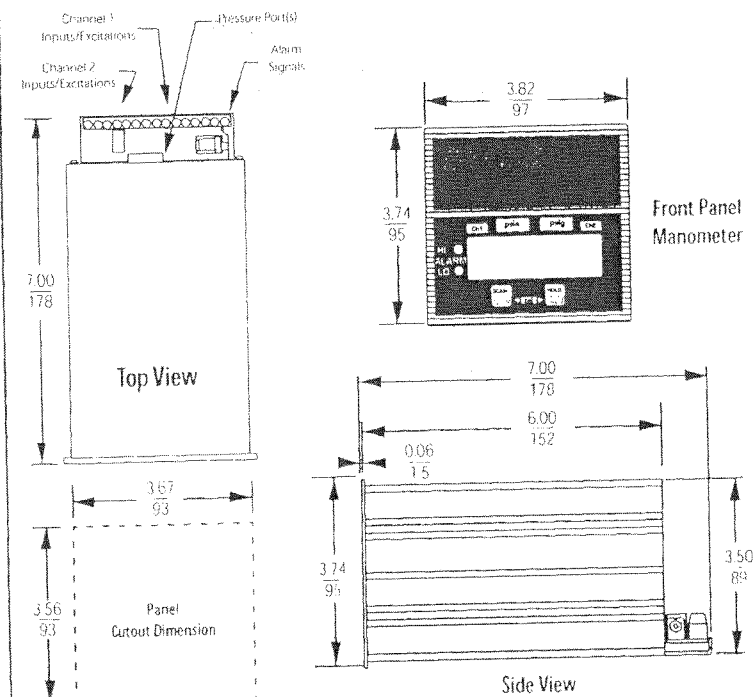
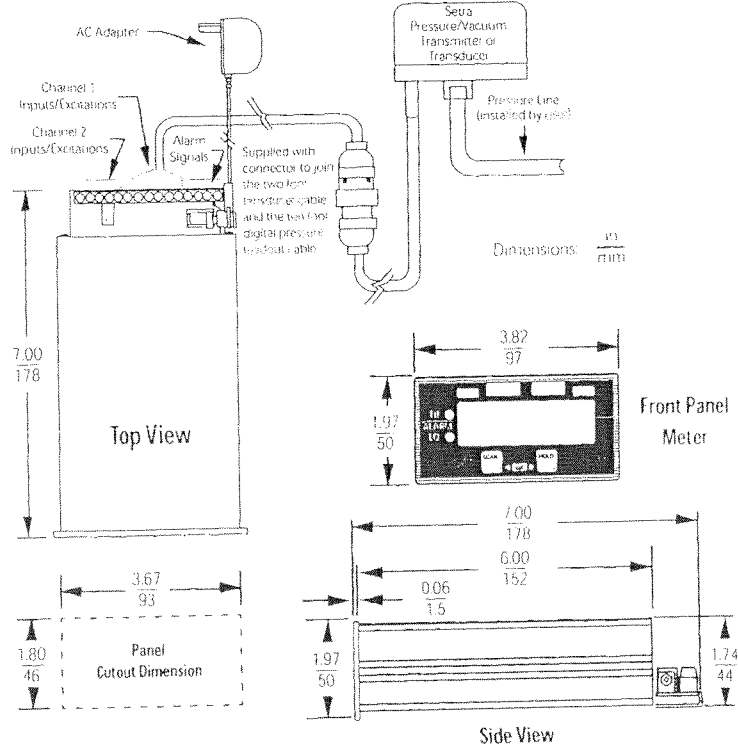
### DATUM Manometer with Transducer Installed

To order a manometer with a Model 204 pressure transducer, order part #2204; with a Model 239, order part #2239; with a Model 270, order part #2270. Specify pressure range.

### Options:

- 602: 1.5 VDC Output (2204, 2239 only)
  - 603: 1.6 VDC Output (2204, 2239 only)
  - 607: 0.5 VDC Output (2239 bidirectional only)
  - 653: 220 VAC converter (Manometer only)
  - 654: RS-232 Output
  - 811-825: 11-25 ft. of cable\*
- \*Consult factory for lengths above 25 ft. of cable.

*Specifications subject to change without notice.*



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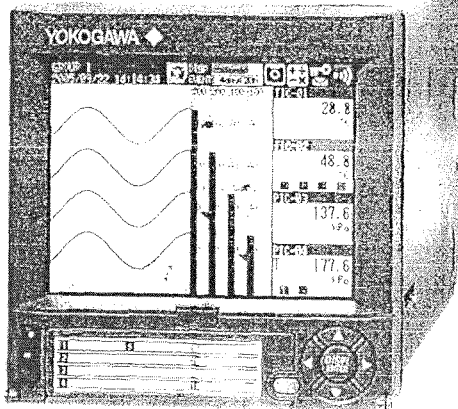
**800-257-3872**



# DXAdvanced

## DXAdvanced DX1000N Removable Chassis Model

A removable chassis model has been added to the Yokogawa's latest DXAdvanced Video Graphic Recorder featuring easy maintenance.



The new DXAdvanced DX1000N features an inner chassis that can be removed from the case via the front panel of the instrument. This provides access to all of the internal components of the DX1000N from the control panel without having to access the rear of the unit or disturb any of the field and power supply wiring.

Functionality, appearance, and panel cutout dimensions are the same as those of the standard DX1000.

### Advanced Performance

#### - High-speed measurement

- \* High-speed measurement of up to 25 ms (DX1002N or DX1004N using fast sampling mode)

### Advanced Memory

#### - High Capacity Internal Memory and Removable Media

- \* Supports up to 200 MB of non-volatile, internal flash memory for reliable, long-term data storage
- \* All models include a CompactFlash drive. Rugged and readily available CompactFlash cards (CF cards) serve as the removable media, and are available as optional accessories.
- \* Supports USB Flash drive with optional USB interface.

### Advanced Display and User Interface Functions

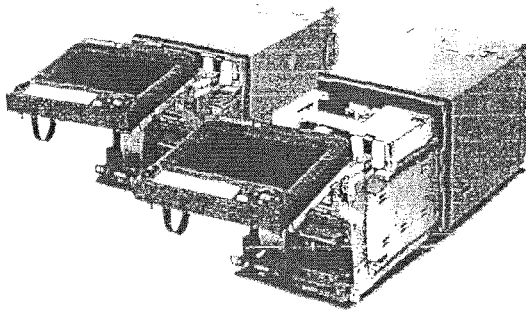
#### - Easy configuration and menu navigation

- \* USB keyboard & remote control options for text entry
- \* Versatile, standard display modes
- \* Jump to your favorite screen with the Favorite key

### Advanced Connectivity

#### - Powerful Ethernet connectivity and convenience functions

- \* Standard Ethernet interface
- \* Includes Web server and E-mail messaging functions, time synchronization (SNTP), automatic network setup (DHCP), file transfer (FTP) and more.



### Advanced Reliability and Security

#### - Rugged construction and data security

- \* Water and dust-proof front panel (complies with IEC529-IP65 and NEMA No.250 TYPE4\*) \*Except for external king test.
- \* A mechanical lock with removable key is provided to securely latch the front panel door. This forbids access to the power switch and removable media.
- \* Reliable, non-volatile flash memory is used for internal data storage operations with ECC\* function. \* ECC: Error Check and Correct

**vigilantplant.**

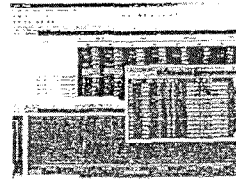
The clear path to operational excellence

**YOKOGAWA** ◆



### Application Software (DAQSTANDARD for DXAdvanced)

Every DXAdvanced unit includes a DAQSTANDARD software, which is used for all data file display and reporting functions, including printing and conversion to common file formats. In addition, it includes a configuration tool that is used to fully configure the unit in both on-line (via Ethernet communications) and off-line (saving and loading files from the media) modes. Configuration files can also be archived on the PC.



### Models and Suffix Codes

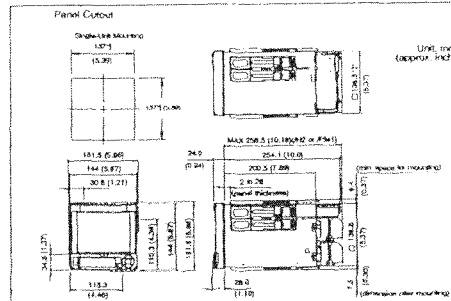
Model code	Suffix code	Options code	Specification
DX1002N			2 ch, 125 ms (Fast sampling mode: 25 ms)
DX1004N			4 ch, 125 ms (Fast sampling mode: 25 ms)
DX1006N			6 ch, 1 s (Fast sampling mode: 125 ms)
DX1012N			12 ch, 1 s (Fast sampling mode: 125 ms)
Interval memory	-1		Standard memory (80 MB)
External media	-4		Large memory (200 MB)
Display language		-2	CF card (with media)
			English/German/French/dogF, DST (summer/winter time)
Options	IA1		Alarm output 2 points *1
	IA2		Alarm output 4 points *1
	IA3		Alarm output 6 points *1 *2
	IC2		RS-232 interface *3
	IC3		RS-422A/485 interface *3
	IF1		FAIL/Status output *2
	IQ2		Clamped input terminal (detachable)
	MA1		Mathematical functions
	NI1		Cu10, Cu25 RTD Input/4 isolated RTD
	NI2		3 leg isolated RTD *4
	NR		Extended input type (PPI40-20, P150, etc.)
	PI1		24 VDC power supply
	PI1		Remote control
	/TPS2		24VDC transmitter power supply (2 loops) *5
	/TPS4		24VDC transmitter power supply (4 loops) *5
	KB1		Easy text entry (with input terminal) *7 *8
	KB2		Easy text entry (without input terminal) *7
	USB1		USB interface
	/PM1		Fuse input (including remote control and mathematical functions) *9
	KCC1		Calibration correction function

\*1 IA1, IA2 and IA3 cannot be specified together. \*2 IC3 and IF1 cannot be specified together.  
 \*3 IC2 and IC3 cannot be specified together. \*4 NI2 can be specified for only DX1006N and DX1012N.  
 \*5 In case that /TPS2 is specified, /TPS4, IA1, IA2 or IF1 cannot be specified together.  
 \*6 In case that /TPS4 is specified, /TPS2, IA1, IA2 or IF1 cannot be specified together.  
 \*7 KB1 and KB2 cannot be specified together. \*8 In case that KB1 is specified, remote input terminal (436227) is included.  
 \*9 In case that /PM1 is specified, IA1, IA2, IA3, /TPS2 or /TPS4 cannot be specified. And combination of /AZ1 cannot be specified together.

### Accessories

Product	Model code (part number)	Specification
Shunt resistor	415820	250Ω±0.1%
(for screw-in type terminal)	415821	100Ω±0.1%
	415822	10Ω±0.1%
Shunt resistor (for clamped input terminal)	436920	250Ω±0.1%
	436921	100Ω±0.1%
	436922	10Ω±0.1%
CF card adapter	772080	-
	772081	128 MB
	772082	256 MB
CF card	772083	512 MB
	772084	1 GB
Mounting bracket	B8600EX	-
Door lock key	B8706FX	-
Remote control terminal	436227	For IA31, IA32 option

### Dimensions



For more details on all functions, see the DX1000/10000 Series (Bulletin DA41001-01G).  
 For more details on all specifications, see the DX1000 Series Specifications (GS DA43001-01G).

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### Application Software

Model code	Description	O/S
DXA120	DAQSTANDARD for DXAdvanced	Windows 2000/XP

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**vigilance**<sup>®</sup>

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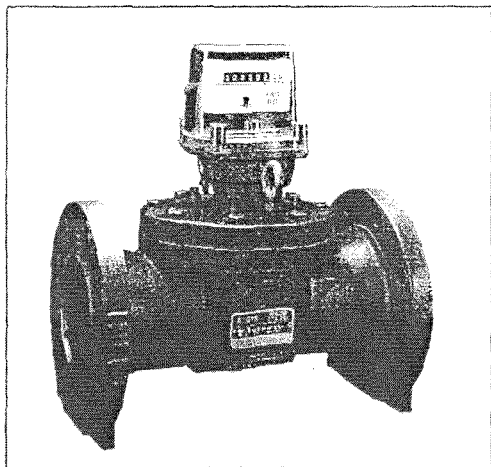
**YOKOGAWA** ◆



# AMERICAN METER

## GTX Gas Turbine Meters

### Data Sheet



American Meter's gas turbine meters bring together refinements in design learned from years of application experience. GTX turbine meters are based on the standard GTS turbine meter design with the removal of certain features, making them an extremely cost-effective option for industrial applications while maintaining meter accuracy and the quality expected from American Meter products.

GTX meters are available in 4", 6", and 8" sizes with maximum allowable operating pressures up to 175 psig. As shown in the features and benefits listed, many of the optional accessories for GTS turbine meters remain available on the GTX Series, such as medium- and low-frequency pulsers.

#### Related Bulletins:

Instruction Manual ..... JM 4720  
 Repair Parts List ..... RPL 4810  
 Medium Frequency Pulser ..... JMP 6778  
 Electronic Temp. Comp. .... JM 4730

#### Features – Benefits – Optional Accessories

- *Mechanical Drive Output*
- *Mechanical and Electronic Pulse Outputs*
- *Temperature Compensation*
- *Mechanical Drive Models* for use with P&T Correctors or *Electronic Pulse Output Models* to interface directly with popular flow computers.
- *Electronic Temperature Compensation* with Fixed Factor Pressure and six-month data storage.
- *One Output Gear Train* for all meter sizes; reduces spare parts inventory.
- *High-Efficiency Inlet Flo-Guide®* flow conditioners to minimize the effects of flow disturbances in short-coupled installations.
- *Interchangeable Pre-Calibrated Measurement Cartridges* for easy maintenance.  
 NOTE: GTX cartridges fit only into GTX bodies.
- *Three-Point Accuracy Curve* supplied as standard.
- *Five-Point Accuracy Curve* (optional).
- *Medium- and High-Pressure Accuracy Curves* available.
- *Cartridge Recertification and Repair Services.*
- *Mercury or Equimeter Corrector Adapter Plates.*
- *Output Drive: 100 ft (4" and 6")*  
*Output Drive: 1,000 ft (8")*

#### Comparison Chart

Feature	GTS	GTX
Pressure Ratings	175, 720, 1,440	175
Bearings/ Lubrication	Standard SST Bearings/Oiler	Self-Lubricating Bearings/No Oiler System
Outlet Diffuser	Standard	None
Compatibility	GTS/AccuTest/GT	GTX Only
Rotors	.45° or 30° Metal or Plastic	.45° Only Plastic Only
Pulsers	High-, Medium-, or Low-Frequency	Medium- or Low-Frequency

### Capacity Table

Size	45° Rotor Angle				
	Qmax MSCFH	Qmin MSCFH	Range Qmax/Qmin	Minimum Actual Flow Rate MACFH	Pressure Drop Inches W.C.
4"	18	1.2	15	1.20	2.4
6"	36	1.9	18	1.94	3.3
8"	60	3	20	3.00	1.6

### GTX Basic Specifications (Figure 1)

Size	Material AL=aluminum		Dimensions (Inches)		Flange		Bolts		ANSI	Weight (lbs.)	Cartridge Bolt Torque (lb-ft.)
					(Inches)		No.	Dia. (in.)			
	Body	Top	A	B	O.D.	*B.D.					
4"	AL	AL	5.85	14.0	8.00	7.50	8	5/8	150 FF	32	20
6"	AL	AL	6.42	16.0	11.00	8.50	8	3/4	150 FF	54	26
8"	AL	AL	7.42	21.0	13.50	11.75	8	3/4	150 RF	90	70

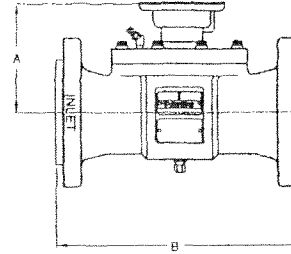


Figure 1  
GTX Specifications

Note: GTX MAOP = 175 psig

\*B.D. = Bolt Circle Diameter

B = Standard

Operating Temperature Range:

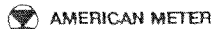
-40°F to +140°F

-40°C to +60°C

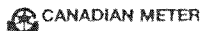
Manufacturing Standards  
ANSI/ASME MFC - 4M - 1986  
AGA Report #7

### GTX Ordering Information

- Size:
  - 4" - 100 mm
  - 6" - 150 mm
  - 8" - 200 mm
- Maximum Allowable Working Pressure:
  - 175 psi/12 bar
  - 175 psi/12 bar
  - 175 psi/12 bar
- Index: Clock Type, Odometer Type, None
- Model:
  - Mechanical Instrument Drive Output only
  - Mechanical Instrument Drive Output and Medium-Frequency Pulse Output
  - Mechanical Instrument Drive and Low-Frequency Pulse Output
  - Mercury or Equimeter Corrector Adapter Plate



300 Welsh Road  
Building One  
Horsham, PA 19044-2234 U.S.A.  
Phone: 215/830-1800  
Fax: 215/830-1890  
Website: americanmeter.com



275 Industrial Road  
Cambridge, Ontario, N3H 4R7 Canada  
Phone: 877/461-2626 (toll free)  
Phone: 519/650-1900  
Fax: 519/650-1917  
Website: canadianmeter.com

AMC Quality System  
DMT is Accredited by:



6/21/2008

**Six Month Meter Calibration**  
40 CFR 60 METHOD 2A

Serial No: 21429

**PITOT TUBE VELOCITY AND FLOW RATE CALIBRATION FOR 8" TURBINE**

## DEFINITIONS:

$M_a$ = Mol. wt. of Air (lb/lb-mole)	$T_s$ = Absolute avg. stack gas temperature ( $^{\circ}$ K)
$v_s$ = Duct gas velocity (ft/sec)	$T_{std}$ = Standard temperature (20 $^{\circ}$ C or 68 $^{\circ}$ F)
$Q_{sd}$ = Std. dry volumetric duct flow rate (dscf/	$P_s$ = Absolute duct pressure (in Hg.)
$K_p$ = Pitot tube constant	$P_{std}$ = Standard pressure (in Hg.)
$C_p$ = Pitot tube coefficient (dimensionless)	$P_{bar}$ = Barometric pressure (mm Hg.)
$\Delta p$ = Velocity head of stack gas (in H <sub>2</sub> O)	$A$ = Cross sectional area of duct ( $\pi$ )

## DATA INPUT: please enter the following data using correct units;

	<u>30 % Flow</u>	<u>60 % Flow</u>	<u>90 % Flow</u>	
$\Delta p$ =	0.05	0.17	0.41	in. H <sub>2</sub> O (from pitot tube)
$T_s$ =	5.1	5.2	5.2	$^{\circ}$ C (from thermister/thermometer)
$P_g$ =	0.9	3.2	6.5	in H <sub>2</sub> O (from pitot tube)
..... $P_g$ =	1.681488	5.978624	12.14408	mm Hg (calculated)
$P_{bar}$ =	761.3	761.3	761.3	mm Hg (from barometer)
Dia =	7.875	7.875	7.875	in I.D.
..... $A$ =	0.3382425	0.3382425	0.3382425	ft <sup>2</sup> (calculated from above)

## CORRECTED DATA/CONSTANTS USED IN FORMULAS:

	<u>30 % Flow</u>	<u>60 % Flow</u>	<u>90 % Flow</u>	
$T_{std}$ =	528	528	528	$^{\circ}$ K
$T_s$ =	501.18	501.36	501.36	$^{\circ}$ K
$P_{std}$ =	29.92	29.92	29.92	in. Hg
$P_{bar}$ =	29.972441	29.972441	29.972441	in. Hg
$P_s$ =	30.038641	30.20782	30.450554	in. Hg
$M_a$ =	28.9644	28.9644	28.9644	lb/lb-mole (from Mark's M.E. Handbook)
$C_p$ =	0.99	0.99	0.99	Dimensionless
$K_p$ =	85.49	85.49	85.49	$\frac{ft^2}{(in. H_2O)^2} \frac{sec}{(in. H_2O)}$

## CALCULATE: Average duct gas velocity

$$v_s = K_p \cdot C_p \cdot \left[ \frac{\Delta p}{\rho} \right]^{0.5} \cdot \left[ \frac{T_s}{P_s \cdot M_a} \right]^{0.5} \quad \text{Eq. 2.9}$$

	<u>30 % Flow</u>	<u>60 % Flow</u>	<u>90 % Flow</u>	
$v_s$ =	14.36349	26.41544	40.85897	(ft/sec)
=	861.80939	1584.9264	2451.5382	(ft/min)
=	262.74676	483.20927	747.42018	(m/min)

## CALCULATE: Average duct gas volumetric flow rate

$$Q_{sd} = 3600 \cdot v_s \cdot A \cdot \left[ \frac{T_{std} \cdot P_s}{T_s \cdot P_{std}} \right] \quad \text{Eq. 2.10}$$

	<u>30 % Flow</u>	<u>60 % Flow</u>	<u>90 % Flow</u>	
$Q_{sd}$ =	18499.053	34200.349	53325.62	(scf/hr)
=	308.31755	570.00581	888.76033	(scf/min)

= 2306.3756 4263.9399 6648.3895 (gal/min)  
 = 8.7315532 16.142565 25.169693 (meters<sup>3</sup>/min)  
 = 43.657766 80.712823 125.84846 (meter<sup>3</sup>/5 min.)

INPUT: Average Ves Values from 5-minute Test Data Printouts.

Qsd = 43.22 80.32 122.6 (cubic meters)

CALCULATE: The Test Meter Calibration Coefficient.

$$Y_m = \frac{(V_{rf} - V_{ri}) \times (T_r + 273)}{(V_{mf} - V_{mi}) \times (T_m + 273)} \times \frac{(P_b)}{(P_b + P_g)} \quad \text{Eq. 2A-1}$$

Ym = 1.0079026 0.9970606 1.0103791 All meter coefficients must be between 0.95 and 1.05.

DETERMINE: The Minimum and Maximum Coefficients.

Maximum Value: 1.0103791  
 Minimum Value: 0.9970606

Difference: 0.0133185 Must not exceed 0.030

CALCULATE: The Average Test Meter Calibration Coefficient Value:

Avg Y<sub>m</sub> = Sum of three Y<sub>m</sub> Values / 3

Avg Y<sub>m</sub> = 1.0051141 This value gets entered into computer program for test trailer constants.

CALIBRATE: The Test Trailer Temperature Thermistors

Reference Thermometer:  
 Fisher: 885-250  
 ID 15041D

	Actual Reading (Deg. C)	Reference Reading (Deg. C)	Percent Difference	Allowable
Flow Temperature Thermistor	5.2	5.5	-5.7692308	+/- 2.0 %
Ambiant Temperature Thermistor	5.6	5.5	1.7857143	+/- 2.0 %

CALIBRATE: The Test Trailer Barometer

Trailer Barometer: Setra: Model 361  
 Reference Barometer: Princo - NOVA

	Actual Reading (mm Hg)	Reference Reading (mm Hg)	Difference	Allowable
Barometric Reading	761.3	762	-0.7	+/- 2.5 mm Hg

CALIBRATE: Flow Pressure Transducer

Trailer Flow Transducer: Setra Model: 264  
 Reference: Water Slack Tube Monometer

	Actual Reading (mm Hg)	Reference Reading (mm Hg)	Difference	Allowable
Flow Pressure Reading	0	0	0	+/- 2.5 mm Hg
	1.2	1.2	0	+/- 2.5 mm Hg
	8.4	8.3	0.1	+/- 2.5 mm Hg

# Specialty Gases

Division

Welders Supply Co. P. O. Box 21007 Louisville, Ky. 40221-0007 (502) 635-7531

## Certification of Cylinder Content

Thursday, January 31, 2008

Mix Type: Primary Standard  
Analytic Accuracy:  $\pm 2\%$   
Serial Number: LL-41085  
Cylinder CGA: 350  
Approx. PSI: 160  
Test Date: 080131  
Expiration Date: 31-Jan-11

Analytic Method(s): Gravimetric  
Gas Chromatography

### Cylinder Contents:

Requested Gas	Actual
85 % Propane	84.89 %
bal Nitrogen	Balance

Frank Fogarty  
Specialty Gas Lab Manger

# Specialty Gases

Division

Welders Supply Co. P. O. Box 21007 Louisville, Ky. 40221-0007 (502) 635-7531

## Certification of Cylinder Content

Monday, October 20, 2008

Mix Type: Primary Standard  
Analytic Accuracy:  $\pm 2\%$   
Serial Number: LL-21916  
Cylinder CGA: 350  
Approx. PSI: 2000  
Test Date: 081020  
Expiration Date: 20-Oct-11

Analytic Method(s): Gravimetric  
Gas Chromatography

### Cylinder Contents:

Requested Gas	Actual
50 % Propane	50.92 %
bal Nitrogen	Balance

Frank Fogarty  
Specialty Gas Lab Manger

# Specialty Gases

Division

Welders Supply Co. P. O. Box 21007 Louisville, Ky. 40221-0007 (502) 635-7531

## Certification of Cylinder Content

Thursday, January 31, 2008

Mix Type: Primary Standard  
Analytic Accuracy:  $\pm 2\%$   
Serial Number: LL-20930  
Cylinder CGA: 350  
Approx. PSI: 160  
Test Date: 080131  
Expiration Date: 31-Jan-11

Analytic Method(s): Gravimetric  
Gas Chromatography

### Cylinder Contents:

Requested Gas	Actual
25 % Propane	24.955 %
bal Nitrogen	Balance

Frank Fogarty  
Specialty Gas Lab Manger

# Liquid Technology Corporation

Industry Leader in Specialty Gases, Equipment and Service

## Certificate of Analysis - EPA PROTOCOL GAS -

Customer: Welders Supply Company (Louisville, KY)  
Date: March 21, 2007  
Delivery Receipt: DR-18921  
Product: 4.50% Propane/Nitrogen - EPA PROTOCOL  
Final Analysis Date: March 13, 2007  
Expiration Date: March 13, 2010 DO NOT USE BELOW 150 PSIG

### Cylinder Data

Cylinder Serial Number: FF-34546      Cylinder Outlet: CGA 350  
Cylinder Volume: 30 Cubic Feet      Cylinder Pressure: 2000 psig, 70°F  
Expiration Date: March 13, 2010

### Analytical Data

EPA PROTOCOL, Section No. 2.2, Procedure G-1

### Replicate Concentrations

Propane: 4.53% +/- 0.045%

Nitrogen: Balance

### Reference Standard(s):

<u>SRM/GMIS:</u>	<u>GMIS</u>	<u>GMIS</u>
<u>Cylinder Number:</u>	<u>CC-185413</u>	<u>CC-233186</u>
<u>Concentration:</u>	<u>3.02% Propane/Nitrogen</u>	<u>4.95% Propane/Nitrogen</u>
<u>Expiration Date:</u>	<u>March 30, 2008</u>	<u>March 07, 2010</u>

### Certification Instrumentation

Component: Propane  
Make/Model: HP5890-II  
Serial Number: 3336A59393  
Principal of Measurement: GC-FID  
Last Calibration: March 02, 2007

Analytical uncertainty and NIST Traceability are in compliance with EPA-600/R-97/121.

Certified by:



Date:

March 21, 2007

*Unmatched Excellence*



# Liquid Technology Corporation

Industry Leader in Specialty Gases, Equipment and Service

## Certificate of Analysis - EPA PROTOCOL GAS -

Customer: Welders Supply Company (Louisville, KY)  
Date: February 22, 2008  
Delivery Receipt: DR-21050  
Product: 2.50% Propane/Nitrogen - EPA PROTOCOL  
Final Analysis Date: February 22, 2008  
Expiration Date: February 22, 2011 **DO NOT USE BELOW 150 PSIG**

### Cylinder Data

Cylinder Serial Number: FF-31325      Cylinder Outlet: CGA 350  
Cylinder Volume: 30 Cubic Feet      Cylinder Pressure: 2000 psig, 70°F  
Expiration Date: February 22, 2011

### Analytical Data

EPA PROTOCOL, Section No. 2.2, Procedure G-1

### Replicate Concentrations

**Propane: 2.50% +/- 0.025%**

**Nitrogen: Balance**

### Reference Standard(s):

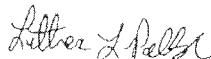
<u>SRM/GMIS:</u>	GMIS	GMIS
<u>Cylinder Number:</u>	CC- 88820	CC-185413
<u>Concentration:</u>	1.005% Propane/Nitrogen	3.02% Propane/Nitrogen
<u>Expiration Date:</u>	April 07, 2010	March 30, 2008

### Certification Instrumentation

Component: Propane  
Make/Model: HP5890-II  
Serial Number: 3336A59393  
Principal of Measurement: GC-FID  
Last Calibration: February 11, 2008

Analytical uncertainty and NIST Traceability are in compliance with EPA-600/R-97/121.

Certified by:



Date:

February 22, 2008

*Unmatched Excellence*

2564 Pemberton Drive - Apopka, Florida 32703 - Phone (407)-292-2990 - Fax (407)-292-3313  
~ www.liquidtechcorp.com ~

# Liquid Technology Corporation

Industry Leader in Specialty Gases, Equipment and Service

## Certificate of Analysis

### - EPA PROTOCOL GAS -

Customer: Welders Supply Company (Louisville, KY)  
Date: March 21, 2007  
Delivery Receipt: DR-18921  
Product: 1.50% Propane/Nitrogen - EPA PROTOCOL  
Final Analysis Date: March 13, 2007  
Expiration Date: March 13, 2010 DO NOT USE BELOW 150 PSIG

#### Cylinder Data

Cylinder Serial Number: FF-20064      Cylinder Outlet: CGA 350  
Cylinder Volume: 30 Cubic Feet      Cylinder Pressure: 2000 psig, 70°F  
Expiration Date: March 13, 2010

#### Analytical Data

EPA PROTOCOL, Section No. 2.2, Procedure G-1

#### Replicate Concentrations

Propane: 1.48% +/- 0.014%

Nitrogen: Balance

#### Reference Standard(s):

<u>SRM/GMIS:</u>	GMIS	GMIS
<u>Cylinder Number:</u>	CC-88820	CC-185413
<u>Concentration:</u>	1.005% Propane/Nitrogen	3.02% Propane/Nitrogen
<u>Expiration Date:</u>	April 07, 2010	March 30, 2008

#### Certification Instrumentation

Component: Propane  
Make/Model: HP5890-II  
Serial Number: 3336A59393  
Principal of Measurement: GC-FID  
Last Calibration: March 02, 2007

Analytical uncertainty and NIST Traceability are in compliance with EPA-600/R-97/121.

Certified by:



Date:

March 21, 2007

*Unmatched Excellence*

2564 Pemberton Drive ~ Apopka, Florida 32703 ~ Phone (407)-292-2990 ~ Fax (407)-292-3313  
~ www.liquidtechcorp.com ~

**APPENDIX C**  
**COMPUTER PRINTOUT & VOC ANALYZER**  
**STRIP CHARTS**



2820 SOUTH ENGLISH STATION RD  
LOUISVILLE, KY 40299  
502 267 8344

### *Vapor Recovery Performance Test*

**Test Id:** 000000001-00446

**Test for:** Motiva Enterprise LLC South  
Port Everglades, FL

**Unit Tested:** McGill VRU

**Test Date:** 11/20/2008

**Test Personnel:** Tony Fenton

**Strip Chart Recorder Speed:** 150

All data fields are rounded 2 places following the decimal for display purposes. Internal to the program all data fields are 8 digits following the decimal.

### Outlet Calibration Information

Allowable range is +/- 5% of actual span gas Concentration

Low range span gas concentration	1.48 %, Cylinder # FF-20064
Mid range span gas concentration	2.50 %, Cylinder # FF-31325
High range span gas concentration	4.53 %, Cylinder # FF-34546+
Zero span analyzer reading	0.00 %
Zero range analyzer error	0.00 %
Low range analyzer reading	1.47 %
Low range analyzer error	-0.68 %
Mid range analyzer reading	2.49 %
Mid range analyzer error	-0.40 %
High range analyzer reading	4.54 %
High range analyzer error	0.22 %

### Inlet Calibration Information

Allowable range is +/- 5% of actual span gas Concentration

Low range span gas concentration	24.955 %, Cylinder # LL-20930
Mid range span gas concentration	50.92 %, Cylinder # LL-21916
High range span gas concentration	84.89 %, Cylinder # LL-41085
Zero span analyzer reading	0.01 %
Zero range analyzer error	0.00 %
Low range analyzer reading	25.16 %
Low range analyzer error	0.82 %
Mid range analyzer reading	50.65 %
Mid range analyzer error	-0.53 %
High range analyzer reading	85.11 %
High range analyzer error	0.26 %

Time	Baro (mm Hg)	Flow P (mm Hg)	Atm T (Deg C)	Exh. T (Deg C)	HCin (Vol %)	HCout (Vol %)	VE (m <sup>3</sup> )	VES (m <sup>3</sup> )	ME (mg)
7:20	764.2201761	0.006822	11.82689	12.66443	48.48479	0.027346	10.02183	10.34	5172.63
7:25	764.2286067	0.006333	12.01944	13.79865	60.42596	0.023264	10.76453	11.06	4707.97
7:30	764.3115335	0.00688	12.09448	13.77807	60.29064	0.07162	3.629677	3.73	4888.09
7:35	764.2201761	0.006817	12.82689	13.66644	48.48479	0.027346	10.02183	10.30	5154.56
7:40	764.2286067	0.006843	12.87939	13.79865	33.5957	0.032637	10.40019	10.68	6381.31
7:45	764.3153355	0.00688	12.65435	14.33381	24.06404	0.053158	3.770458	3.87	3761.49
7:50	764.2860675	0.006433	12.88439	14.6463	35.5957	0.062637	10.14002	10.39	11906.41
7:55	764.4771171	0.006847	13.1109	15.5861	58.99064	0.047422	18.67921	19.08	16555.52
8:00	764.5063245	0.006768	13.31252	16.71766	50.12478	0.131072	15.54522	15.82	37934.18
8:05	764.4763245	0.006333	13.41252	16.81766	50.10796	0.1135	14.52175	14.77	30674.13
8:10	764.5647993	0.006741	13.70809	16.87373	53.70505	0.115072	6.035807	6.14	12924.88
8:15	764.610283	0.006791	13.971	17.16079	53.14223	0.031725	35.52332	36.09	20952.66

Outlet Span Check completed at 08:15 the reading is 2.50 %

Outlet Zero Check completed at 08:17 the reading is 0.00 %

> A1 SPAN CK

8:20	764.6526615	0.006846	14.21041	16.75056	55.75696	0.042049	4.321977	4.40	3383.74
8:25	764.7028256	0.006758	14.31491	16.7016	45.50414	0.068608	13.99957	14.25	17887.48
8:30	764.719177	0.006717	14.58356	18.21664	32.4378	0.029719	48.2789	48.88	26582.96
8:35	764.7307729	0.006733	14.95243	19.41542	28.32899	0.015628	19.2695	19.43	5556.36
8:40	764.7498695	0.006701	15.18074	19.10521	52.34223	0.013986	9.006551	9.09	2326.84
8:45	764.8131447	0.006711	15.35409	19.94136	56.44677	0.039657	18.96103	19.09	13850.87
8:50	764.8039489	0.00673	15.64927	19.28218	45.0627	0.051962	27.30468	27.55	26193.34
8:55	764.811258	0.006711	15.66155	19.1549	0	0	0	0.00	0.00
9:00	764.8449023	0.006806	15.92703	19.16987	23.50611	0.092892	11.428	11.53	19606.81
9:05	764.8979316	0.006738	15.99354	19.62297	40.98677	0.028917	16.77412	16.90	8945.46
9:10	764.9357347	0.006808	16.28443	20.55494	45.62813	0.005821	4.92227	4.95	526.75
9:15	764.9627969	0.006683	16.31895	20.92699	45.04292	0.025583	11.24903	11.29	5284.38

Outlet Span Check completed at 09:17 the reading is 2.48 %

Outlet Zero Check completed at 09:18 the reading is 0.00 %

Inlet Span Check completed at 09:19 the reading is 50.42 %

> A2 SPAN CK

Time	Baro (mm Hg)	Flow P (mm Hg)	Atm T (Deg C)	Exh. T (Deg C)	HCin (Vol %)	HCout (Vol %)	VE (m <sup>3</sup> )	VES (m <sup>3</sup> )	ME (mg)
Inlet Zero Check completed at 09:19 the reading is 0.40 % } # 2 span ck									
9:20	764.9424703	0.006723	16.6532	21.64716	42.01835	0.04508	9.928972	9.94	8198.49
9:25	764.9732978	0.006723	16.766	21.23471	59.06185	0.01399	19.66482	19.71	5046.46
9:30	764.999505	0.006798	17.08446	21.16988	59.68563	0.081924	17.5151	17.56	26327.57
9:35	765.0345028	0.006722	17.18383	21.13496	58.2718	0.097344	8.511667	8.54	15204.79
9:40	765.0618351	0.006661	17.20597	21.37715	60.49867	0	13.58786	13.61	0.00
9:45	765.0287424	0.006611	17.59766	22.74404	20.56389	0.05225	18.81364	18.76	17940.77
9:50	764.9947046	0.006715	17.85495	23.07506	19.83288	0.042746	14.5757	14.52	11358.09
9:55	764.9706576	0.006642	18.2862	23.31058	22.39663	0.025087	16.17985	16.10	7393.40
10:00	764.9255039	0.006767	18.19416	23.03772	49.22238	0.009307	16.13772	16.08	2738.16
10:05	764.8807852	0.006679	18.51226	22.90686	58.8578	0.036414	8.525707	8.50	5661.91
10:10	764.8504377	0.006669	18.77716	23.33723	59.03902	0.061005	11.79765	11.74	13106.19
10:15	764.8404319	0.006728	19.30677	24.68839	65.07529	0	15.35795	15.21	0.00

Outlet Span Check completed at 10:16 the reading is 2.49 %

Outlet Zero Check completed at 10:17 the reading is 0.00 %

10:20	764.8477525	0.006698	19.44434	24.18823	60.56792	0.047049	2.660037	2.64	2272.53
10:25	764.8235855	0.006655	19.19671	24.86169	53.92516	0.10496	17.43888	17.26	33159.86
10:30	764.8187251	0.006609	19.73246	25.16502	36.63699	0.037649	33.17831	32.81	22606.63
10:35	764.8009187	0.006652	19.57818	24.50708	40.45825	0.042985	26.95504	26.72	21015.31
10:40	764.8306361	0.006801	19.81297	24.50024	55.06062	0.050931	8.767061	8.69	8099.15
10:45	764.817315	0.006841	19.76405	24.59295	50.18453	0.024953	21.43625	21.24	9698.97
10:50	764.7734214	0.006736	19.86794	25.6319	44.77498	0.053486	24.07737	23.77	23268.62
10:55	764.7217122	0.006744	20.37128	25.81627	45.20386	0.064334	9.511487	9.38	11048.83
11:00	764.6370302	0.006694	20.29596	26.01604	31.80478	0.088247	15.22028	15.01	24233.23
11:05	764.5620691	0.006743	20.25596	25.62207	33.48966	0.005133	42.66381	42.11	3955.67
11:10	764.4673063	0.006872	20.3173	25.15379	46.81582	0.0291	17.99538	17.79	9473.40
11:15	764.3864047	0.00678	20.83308	25.37543	50.039	0.042014	2.229197	2.20	1692.83

Outlet Span Check completed at 11:16 the reading is 2.48 %

Outlet Zero Check completed at 11:17 the reading is 0.00 %

Time	Baro (mm Hg)	Flow P (mm Hg)	Atm T (Deg C)	Exh. T (Deg C)	HCin (Vol %)	HCout (Vol %)	VE (m <sup>3</sup> )	VES (m <sup>3</sup> )	ME (mg)
Inlet Span Check completed at 11:17 the reading is 50.90 %									
Inlet Zero Check completed at 11:18 the reading is 0.42 %									
11:20	764.3557422	0.006768	20.41286	26.07802	50.46346	0.023959	28.01022	27.60	12101.15
11:25	764.3276749	0.006773	20.78288	26.35749	38.70068	0.056954	13.25545	13.05	13599.85
11:30	764.2877116	0.006678	21.39468	26.55376	28.83943	0.082465	13.17007	12.96	19550.93
11:35	764.2571091	0.006639	23.71348	26.88388	38.96724	0.068181	21.83106	21.45	26764.06
11:40	764.2332421	0.00669	24.18875	26.58858	53.72499	0.003841	11.66479	11.47	806.31
11:45	764.1401145	0.006743	25.00198	25.80171	53.58019	0.016494	1.349911	1.33	401.75
11:50	764.1455455	0.006644	25.00159	25.77955	0	0	0	0.00	0.00
11:55	764.232589	0.006645	25.15488	25.64589	0	0	0	0.00	0.00
12:00	764.0376711	0.006751	25.05286	25.15028	64.62183	0	8.240179	8.14	0.00
12:05	763.9458036	0.006754	25.66689	26.7024	69.99378	0.001052	5.149301	5.06	97.39
12:10	763.8555112	0.00678	25.29197	26.21046	69.35022	0.028216	0.107439	0.11	54.60
12:15	763.7775798	0.006722	26.01202	25.83423	0	0	0	0.00	0.00
Outlet Span Check completed at 12:15 the reading is 2.48 %									
Outlet Zero Check completed at 12:16 the reading is 0.00 %									
12:20	763.6846471	0.006738	26.46552	26.45099	70.51251	0	13.27468	13.05	0.00
12:25	763.5859841	0.006838	26.75268	26.56262	59.48508	0.017546	9.515711	9.35	3002.67
12:30	763.5448507	0.006745	27.30341	26.4738	62.31516	0.074016	10.35715	10.18	13790.20
12:35	763.5227389	0.006692	28.54391	27.15202	62.95978	0.027855	24.30697	23.84	12151.92
12:40	763.439182	0.006843	27.72258	27.05081	61.34675	0.091636	16.55039	16.24	27225.94
12:45	763.3615506	0.006813	27.60953	26.93364	29.84152	0.087347	34.23122	33.59	53691.21
12:50	763.3238226	0.006801	28.03155	26.94228	57.33486	0.056999	21.39619	20.99	21897.93
12:55	763.2667579	0.006853	28.07037	26.67909	63.16171	0.044328	22.01781	21.62	17538.62
13:00	763.2012475	0.006799	28.43069	26.50286	61.06449	0.100953	9.893128	9.72	17956.37
13:05	763.1191008	0.006723	28.10428	26.4095	53.32764	0.101215	20.00488	19.66	36411.13
13:10	763.0396693	0.004724	24.65826	27.35073	55.65147	0.007329	19.52683	19.13	2565.19
13:15	762.9505469	0.003418	22.75127	27.06656	0	0	0	0.00	0.00

> X 4 SPAN CK

> # 5 SPAN CK



Time	Baro (mm Hg)	Flow P (mm Hg)	Atm T (Deg C)	Exh. T (Deg C)	HCin (Vol %)	HCout (Vol %)	VE (m <sup>3</sup> )	VES (m <sup>3</sup> )	ME (mg)
	72.0						67.00		
SUMS	55035.70	0.48	1404.14	1614.94	3276.78	3.10	1031.15	1028.03	854266.94
AVRGS	764.4	0.0	19.5	22.4	48.9	0.05			

**POST CALIBRATIONS:**

Outlet Span Check completed at 13:16 the reading is 2.47 %

Outlet Zero Check completed at 13:16 the reading is 0.00 %

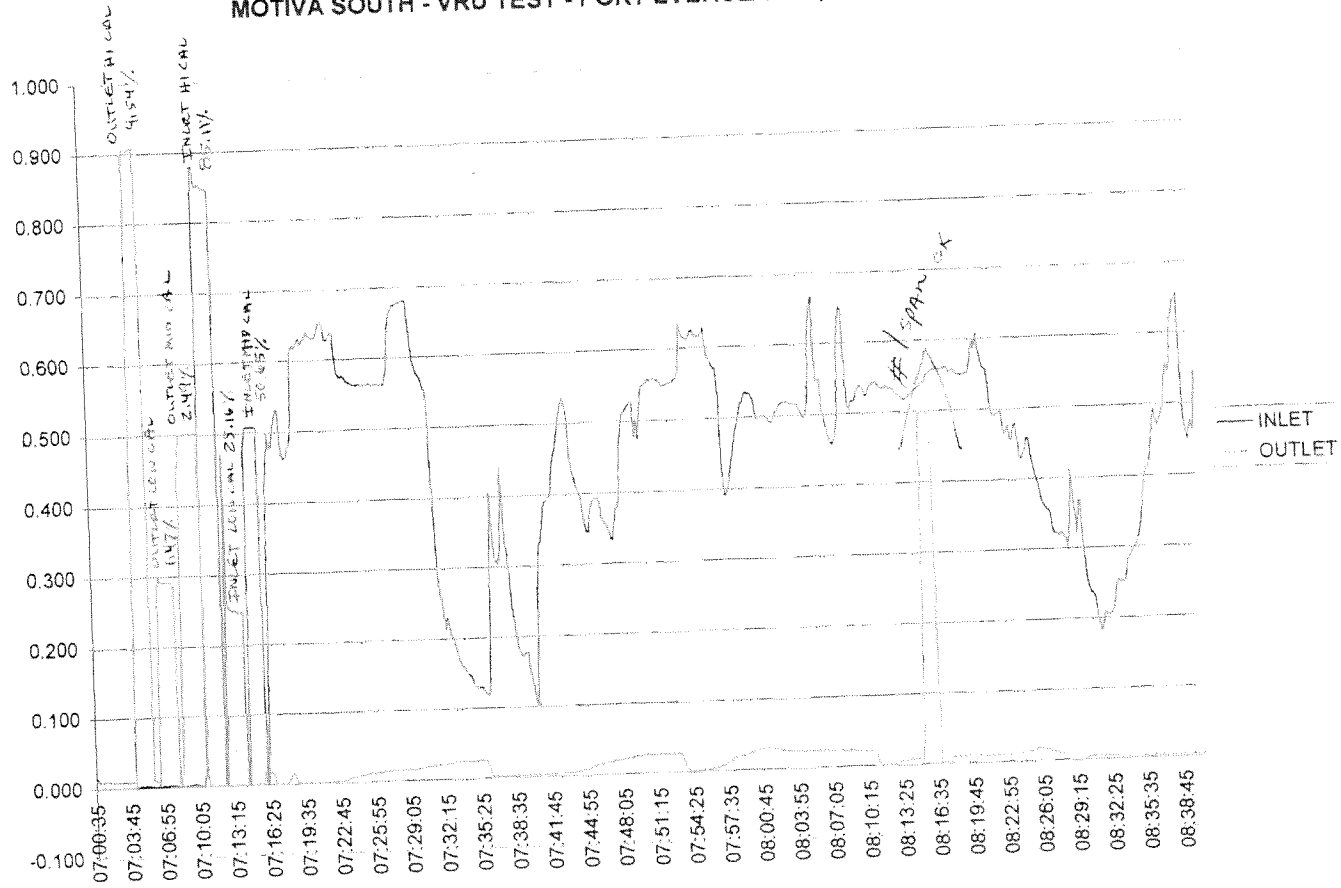
Inlet Span Check completed at 13:17 the reading is 50.74 %

Inlet Zero Check completed at 13:18 the reading is 0.27 %

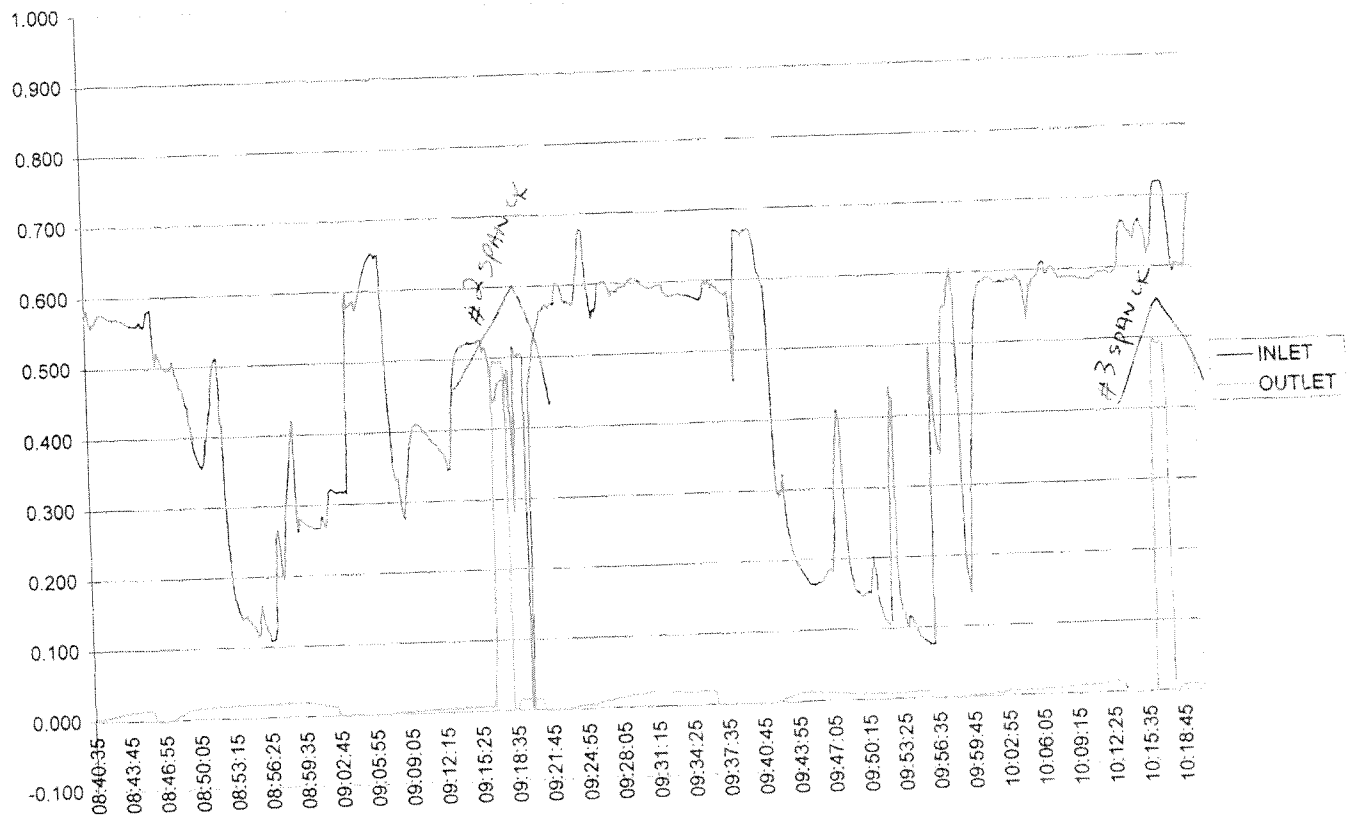
## PRELIMINARY TEST RESULTS

Average Barometric Pressure was	764.38 mm Hg
Average Flow Pressure was	0.01 mm Hg
Average Ambient Temperature was	19.50 Deg C
Average Inlet Concentration was	48.91 Vol. %
Average Outlet Concentration was	0.046 Vol. %
Total volume emitted was	1031.15 cubic meters
Total Volume Emitted standardized w	1028.03 cubic meters
Total milligrams emitted was	854266.94 mg
Accountable gallons loaded was	316,935 gallons
Total gallons loaded was	381,835 gallons
Accountable liters loaded was	1,199,598.98 liters
Total Liters loaded was	1,445,245.48 liters
Accountable milligrams emitted per liter loaded	0.71 mg/L
Total milligrams emitted per liter loaded was	0.59 mg/L
Unit Efficiency accountable was	99.92 %
Unit Efficiency total was	99.93 %

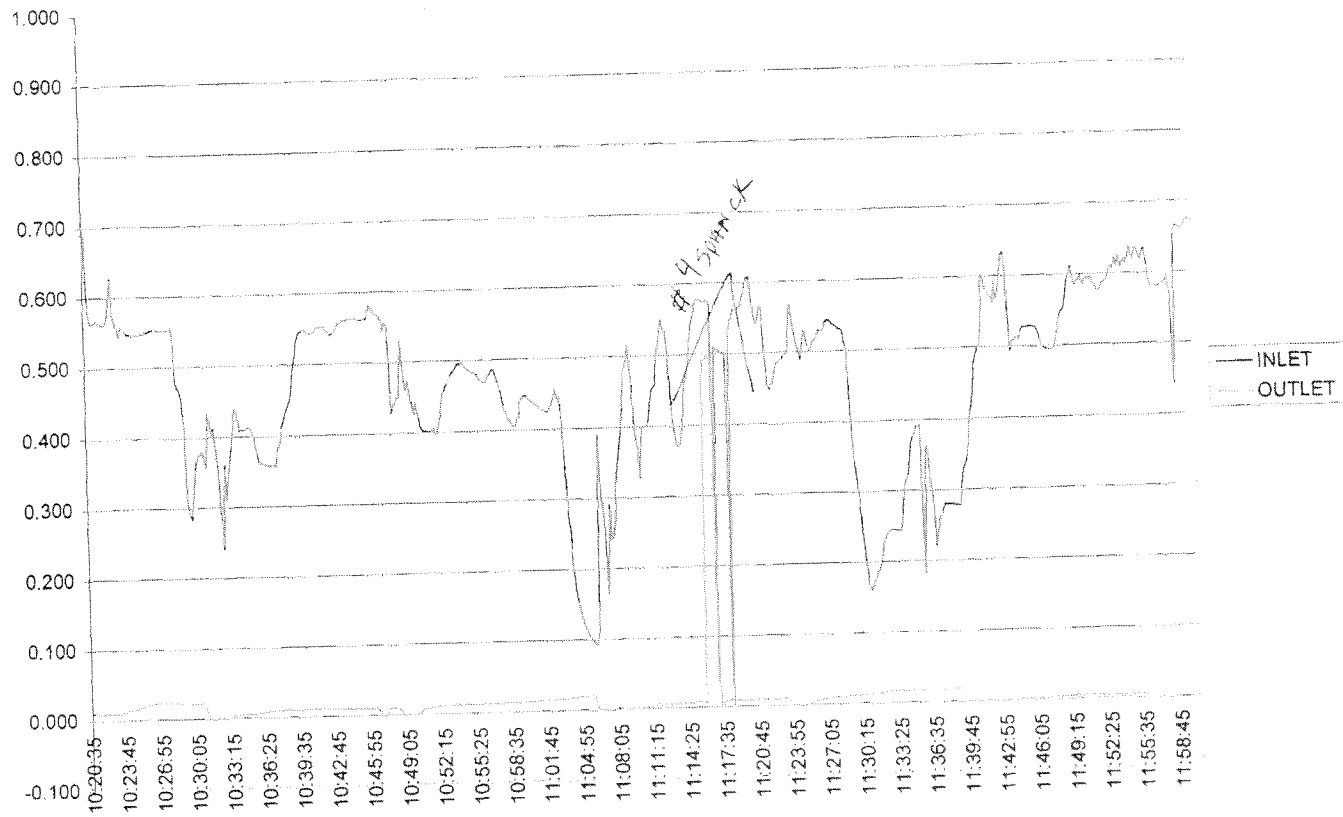
MOTIVA SOUTH - VRU TEST - PORT EVERGLADES, FL - 11/20/08 - PAGE 1



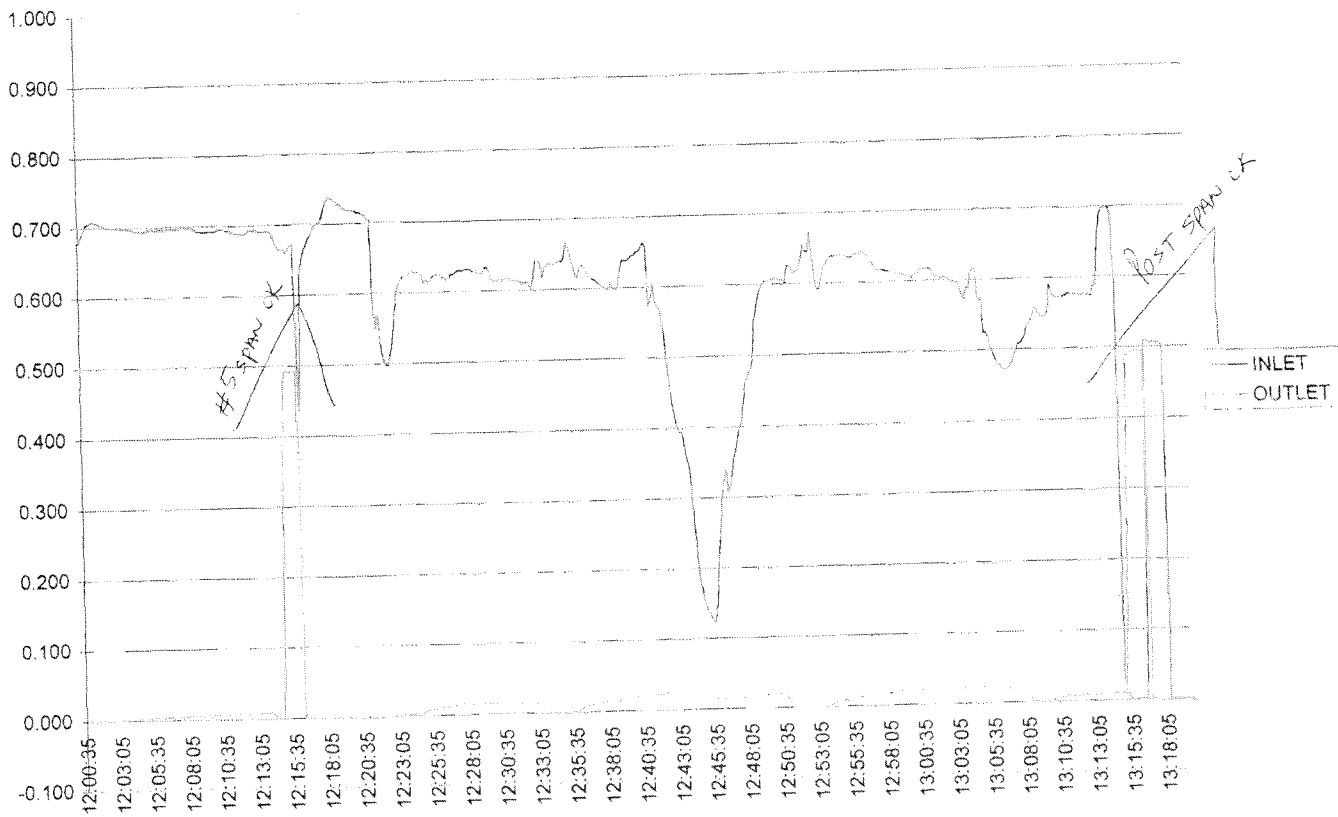
MOTIVA SOUTH - VRU TEST - PORT EVERGLADES, FL - 11/20/08 - PAGE 2



MOTIVA SOUTH - VRU TEST - PORT EVERGLADES, FL - 11/20/08 - PAGE 3



MOTIVA SOUTH - VRU TEST - PORT EVERGLADES, FL - 11/20/08 - PAGE 4



# Product Return Report

Send product returns to 7883 Airway Park, Mobile, AL 36608 U.S.A.  
Attn: Product Evaluations

Distributor MVF Process Control Product Hylok Fitting w/o Ring face seal  
Salesperson Melissa Hipenstael Part number H-ZCOMC-8BN Quantity 4  
Customer Jordan Technologies Inc. Product I.D. number (from original packaging) \_\_\_\_\_

### Describe the application and system. Attach drawings and photos.

System fluid \_\_\_\_\_ Pressure \_\_\_\_\_ psig/bar Temperature \_\_\_\_\_ °F/°C  Inspection gage used  
Flow rate \_\_\_\_\_ Range \_\_\_\_\_ Range \_\_\_\_\_ OD wall \_\_\_\_\_  
Time in service \_\_\_\_\_ Pressure drop \_\_\_\_\_ Vibration \_\_\_\_\_ Hardness \_\_\_\_\_  
Cycles \_\_\_\_\_ Back pressure \_\_\_\_\_  Seamless  Welded  
Actuator pressure \_\_\_\_\_ Make/break times? \_\_\_\_\_

What does the system do and what is the product's function in the system? Can you provide a sketch or photo? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

### Describe the customer's reason for returning the product.

Describe the problem. We were trying to use a Hylok to substitute for a Parker fitting that was unavailable. The threads did not match.

Is this a first time occurrence? yes

Did your customer try to solve the problem? yes

Did the customer test the product? If yes, how was the product tested? What were the results? \_\_\_\_\_  
\_\_\_\_\_

### Response desired – check (☑) one only.

Phone  Fax  Evaluation Report  Letter

Products may be cutaway or damaged during evaluation. Does the customer want the product returned?  Yes  No

Reported by Tony Underwood Signature Tony Underwood Date 12-5-08

Distributor \_\_\_\_\_ Signature \_\_\_\_\_ Date \_\_\_\_\_

How many sheets are attached? \_\_\_\_\_ Describe attachments \_\_\_\_\_

**VOLATILE ORGANIC COMPOUND EMISSION TEST REPORT**

**OF THE**

**MOTIVA ENTERPRISES LLC.**

**PORT EVERGLADES, FLORIDA TRANSPORT LOADING  
TERMINAL SOUTH**

**ON THE**

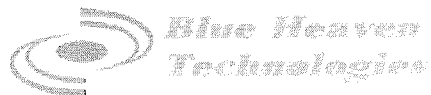
**JOHN ZINK VAPOR DESTRUCTION UNIT**

**ON**

**NOVEMBER 19, 2008**

REPORTED BY: BLUE HEAVEN TECHNOLOGIES  
2820 SOUTH ENGLISH STATION ROAD  
LOUISVILLE, KENTUCKY 40299

TEST PERSONNEL: TONY FENTON





In reference to the Motiva Enterprises LLC Air Emission Source Test conducted at the Port Everglades, Florida south Transport Loading Facility on November 19, 2008 and described in the following report;

I certify under penalty of law that the information provided in this document is true, accurate and complete. I am aware that there are significant civil and criminal penalties, including fines or imprisonment or both, for submitting false, inaccurate or incomplete information.

by: Tony Fenton

Tony Fenton  
Technical Service Group  
Blue Heaven Technologies

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APPENDIX B.....	INSTRUMENT AND CALIBRATION INFORMATION
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EXECUTIVE SUMMARY

The Motiva Enterprises LLC south terminal in Port Everglades, Florida is a bulk transport loading facility for Gasoline and Fuel Oil Products.

The products are bottom loaded into transport tankers and the displaced hydrocarbon vapors are balanced to a JOHN ZINK VAPOR DESTRUCTION UNIT (VDU).

This facility was source tested for air emissions on November 19, 2008. The purpose of this test was to confirm proper operation of the VRU and verify compliance with applicable VOC (Volatile Organic Compound) air emission requirements.

The Gasoline Terminal Air Emission Source Test was conducted in accordance with procedures established, and the test methods referenced, in the Code of Federal Regulations; CFR 40, Part 60, Subpart XX. Specific procedures used include:

<u>EPA TEST METHOD</u>	<u>MEASUREMENT</u>
Method 2A	Inlet Vapor Volume
Method 2B	Exhaust Vapor Volume
Method 25A	Outlet VOC Concentration
Method 25B	Inlet VOC Concentrations
Method 21	Potential Leak Sources
40 CFR 60 Subsection 60.503 (d)	Transport Loading Maximum Backpressure

*The results of this air emission test demonstrate that this source is in compliance with all applicable Federal and Local requirements. A summary of the data is presented below:*

<u>TEST PARAMETER</u>	<u>MEASURED VALUE</u>	<u>REQUIRED VALUE</u>
VOC Emissions	5.02 mg/liter	35 mg/liter

Method 21 Leak Testing was performed on the day prior to testing. A portable LEL Meter was calibrated using a 500 PPM Methane calibration gas and used to check for Leaks around all fittings, flanges, valves and any other exposed potential leak source. No Leaks above 500 PPM were found.

**TERMINAL OPERATION AND DESCRIPTION**

Light petroleum products are bottom loaded at four loading racks at the Motiva Enterprises Port Everglades, Florida south terminal.

*Regular, Midgrade, and Premium Unleaded Gasoline* as well as Ethanol and Diesel Fuel are available for loading onto transports.

The loading rack is equipped with a vapor recovery hose positioned at the transport loading position for hook up to the Vapor Control System. The vapor hose and associated piping transports the vapors to the VDU. The system also employs a liquid knock-out tank and pressure relief vent upstream from the VDU.

A general overview of the loading rack layout is shown on page 12.

**JOHN ZINK VAPOR DESTRUCTION UNIT**

The terminal is equipped with a John Zink Vapor Destruction Unit (VDU). The hydrocarbon vapors from the loading rack are transported by vapor piping to the liquid seal drum.

Until loading occurs at the transport loading rack, the vapor combustion system is in a standby mode with *no pilot flame and the air-assist blower is off*. Automatic start-up of the vapor combustion system is initiated by an electrical signal from the loading rack indicating that product loading will occur shortly.

The start-up sequence consists of a short air purge using the air-assist blower to purge the stack of any combustibles prior to pilot ignition. This brief air purge is followed by automatic electronic ignition of the pilot. After pilot ignition, product loading begins at the loading rack and an air-vapor mixture begins to flow from the transports being loaded to the vapor combustion system.

Flow through the vapor combustion system first consists of the air-vapor mixture from the loading rack bubbling through a liquid seal (typically water or water / antifreeze). Here, the combustible vapors are ignited by the pilot and burned. The air-assist blower provides partial combustion air and mixing energy to the burner tips to assure smokeless combustion.

As the loading operation at the loading rack is completed, vapor flow to the combustion system ceases. The pilot and air-assist blower remain on for a brief time period after loading is complete. If no further loading occurs, the combustion unit will shut down in the standby mode to await automatic re-start as described.

The John Zink Vapor Destruction Unit is illustrated schematically on page 13.

## MEASUREMENT AND DATA ANALYSIS

A NonDispersive InfraRed (NDIR) analyzer, turbine flow meter, exhaust vapor thermistor and exhaust pressure transducer are connected to the VDU inlet pipe in order to acquire their respective data. A hydrocarbon NDIR, CO and CO<sub>2</sub> monitor are connected to the combustor exhaust stack to acquire their data.

The barometric pressure transducer and ambient thermistor are located in close proximity to the VDU in order to acquire ambient atmospheric conditions for use in subsequent standardization equations. A test schematic depicting general test equipment configuration is included as Figure 3.

Each transducer data channel is scaled and connected to the computer input board. Using an operations code program each input channel is read 25 times in a 5 second interval and mass, flow, concentration, temperature, and pressure values are averaged and stored in an array for subsequent use.

After sixty 5 second intervals (5 minutes) the hard disk array is polled and average values are determined for concentration, pressure, and temperature. These values along with the flow for the 5 minute period are used to compute the mass emitted for that 5 minute period. These averaged and summed values are then printed out as the 5 minute interval data and are again stored on hard disk until the six hour test period is completed.

Upon completion of the test, the 5 minute interval data is polled to determine test averages for Inlet and Outlet VOC concentration, pressure and temperature data for all test intervals during which VDU inlet flow was greater than zero and volume and milligram emission data is summed for all 5 minute periods to arrive at a final test period total.

This data acquisition methodology essentially represents a series of very short (5 second) intervals during which VDU operation is measured, averaged and standardized. This effectively removes all judgmental decisions from data reduction processes and provides a technically unbiased analysis of VDU operation.

Additionally, pretest and post test vapor analyzer calibrations are conducted, along with an hourly analyzer calibration drift check verification. Following the conclusion of the six hour test the loading rack volumes are calculated and final mass emission values are determined.

Copies of the transport loading rack sheets, hydrocarbon analyzer strip charts and computer print outs are attached as Appendices to this test report.

TEST EQUIPMENT

Quantity	Item
2	Thermistor Temperature Probes
1	IBM Compatible Computer with 16 Channel, 12 bit A/D Input Card
1	Gastech Model #1214 Combustible Gas Indicator
1	Setra Model #261 (or #264) Variable Differential Pressure Transducer
1	Setraceram Model #361 (or #304) Digital Barometer
1	American Meter Co. 8" Turbine Flow Meter
1 (or 2)	Strip Chart Recorder, either: Yokogawa $\mu$ R 1800 Six Channel Dot Matrix Chart Recorder Yokogawa vr 200 Paperless recorder
2	NonDispersive InfraRed Analyzers (NDIR), either:
* Inlet	Horiba VIA-510 Enviromax Model 2010 NDIR
* Outlet	Enviromax Model 3000 NDIR Analyzer. Range: 0-1000 PPM
1	CO and CO2 Stack Sampling System, either: Horiba ENDA-1000 Horiba ES-510 / VIA-510

All equipment specifications are shown in Appendix B along with available calibration and accuracy information.

EXAMPLE CALCULATIONS

A. Terminology:

- $T_a$  = Ambient Temperature ( $^{\circ}$  Celsius).
- $P_b$  = Barometric Pressure (mm Hg).
- $L$  = Total accountable volume of liquid dispensed from all controlled racks during the test period (Liters).
- $CO_e$  = Carbon Monoxide Concentration in Exhaust Stack (ppm volume).
- $CO_{2e}$  = Carbon Dioxide Concentration in Exhaust Stack (ppm volume).
- $HC_e$  = VOC Concentration in Exhaust Stack (ppm volume).
- $HC_i$  = VOC Concentration in Combustor Inlet (Volume %).
- $V_i$  = Inlet Volume of air-hydrocarbon mixture to the combustor ( $m^3$ ).
- $V_e$  = Exhaust volume from the combustor ( $m^3$ ).
- $V_{es}$  = Standardized exhaust volume from the combustor ( $m^3$ ,  $20^{\circ}$  C, 760mmHg).
- $T_i$  = Temperature at process unit inlet metering position ( $^{\circ}$  Celsius).
- $P_i$  = Pressure at processing unit inlet metering position (mm Hg.).
- $M_i$  = Mass of VOC input to combustor during test period (milligrams).
- $M_e$  = Mass of organic carbon exhausted during test period (milligrams).
- $K1$  = Calibration Gas Factor (3 for  $C^3H^8$ ).
- $K2$  =  $1.83 \times 10^6$  mg/ $m^3$  = Standard Density of Propane ( $C^3H^8$ ).
- $H$  = Total Test Time (Hour).
- 454,000 = Conversion Factor mg/lb.
- 3.785 = Conversion Factor Liter/Gallon.
- 264.2 = Conversion Factor Gallon / cubic meter



B. Standardize Flow Volume:

$$V_{is} = V_i \times \frac{(0.3858^\circ \text{ K/mm Hg}) \times (P_i + P_b)}{(T_i + 273.2^\circ \text{ K})} \quad (\text{meter}^3)$$

where  $0.3858 = (273.2 + 20)^\circ \text{ K}/760 \text{ mm Hg}$

C. Calculate Mass of Inlet Hydrocarbon:

$$M_i = (K2) \times (V_{is}) \times (HC_i) \times (10^{-2}) \quad (\text{mg})$$

where  $10^{-2}$  = the required conversion from vol % to vol fraction

D. Calculate Combustor Exhaust Flow Volume: (Carbon Balance Equation)

$$V_{es} = \frac{V_{is} \times (K1) \times (HC_i) \times (10^4)}{[(K1) \times (HC_e)] + \text{CO}_{2e} + \text{CO}_{e-300}} \quad (\text{m}^3)$$

where  $10^4$  = conversion factor from vol % to ppm volume

E. Calculate Mass of Exhaust Hydrocarbon:

$$M_e = (10^{-6}) \times (K2) \times (V_{es}) \times (HC_e) \quad (\text{mg})$$

where  $10^{-6}$  = the conversion factor from ppm-volume to vol fraction

F. Calculate Hydrocarbon Emission Rate:

$$M_e/L = \frac{\text{Sum of all 5 second } M_e \text{ calculations}}{\text{Liters of Accountable Gasoline Loaded}} \quad (\text{mg/liter})$$

$$M_e/H = \frac{(M_e/L) \text{ mg}}{\text{liter}} \times \frac{1 \text{ lb}}{454,000 \text{ mg}} \times \frac{3.785 \text{ liter}}{1 \text{ gal}} \times \frac{\text{Accountable gals (lb/hr)}}{\text{Total Test Time}}$$

G. Efficiency Calculation:

$$\text{Efficiency} = [(1 - \text{outlet mg}) / (\text{inlet mg})] \times 100\% \quad (\%)$$



The computer calculates the results for Combustor Exhaust Volume (VO<sub>UT</sub>) and (MO<sub>UT</sub>) with the same data reduction method seen above with (VIN) and (MIN).

3.) Using Formula D Above:

$$\begin{aligned}\text{Combustor Exhaust Volume} &= (18) \times \frac{(3) \times (13.9) \times (10,000)}{[(3) \times (19.9)] + (2,828) + (8.2)} \\ &= 2,592 \text{ m}^3\end{aligned}$$

4.) Using Formula E Above:

$$\begin{aligned}\text{HC Mass Emitted} &= (0.000001) \times (1.83 \times 10^6) \times (2,630.7) \times (19.9) \\ &= 95,802.2 \text{ mg}\end{aligned}$$

I.) Example Test Summary Calculations:

This data was obtained during a previous test and is used here for an example only.

Average barometric pressure was 759.61 mm Hg  
 Average flow pressure was 6.68 mm Hg  
 Average ambient temperature was 13.23° Celsius  
 Average inlet temperature was 12.49° Celsius  
 Average inlet concentration was 12.90 %  
 Average outlet concentration was 24.4 ppm  
 Average CO out concentration was 14.3 ppm  
 Average CO<sub>2</sub> out concentration was 2205.3 ppm  
 Total volume in was 448.76 meters<sup>3</sup>  
 Total volume emitted was 196706.88 meters<sup>3</sup>  
 Total milligrams in was 1.13182E+08 mg  
 Total milligrams emitted was 9170099 mg  
 Accountable gallons loaded was 92950 gallons  
 Total gallons loaded was 104702 gallons  
 Accountable liters loaded was 351853.8 liters  
 Total liters loaded was 396340 liters  
 Accountable milligrams emitted per liter loaded was 26.06 mg/liter  
 Total milligrams emitted per liter loaded was 23.14 mg/liter  
 Unit Efficiency was 91.90 %

1.) Using Formula F Above:

$$\begin{aligned}
 \text{Mass emission rate} &= \frac{9,170,099}{351,853.8} \\
 &= 26.06 \text{ mg/liter}
 \end{aligned}$$

$$\begin{aligned}
 \frac{26.06 \text{ mg}}{\text{liters}} &= \frac{26.06 \text{ mg}}{\text{liters}} \times \frac{1 \text{ lb}}{454,000 \text{ mg}} \times \frac{3.785 \text{ liters}}{1 \text{ gallon}} \times \frac{92,950 \text{ gallons}}{6 \text{ hours}} \\
 &= 3.37 \text{ lb/hr}
 \end{aligned}$$

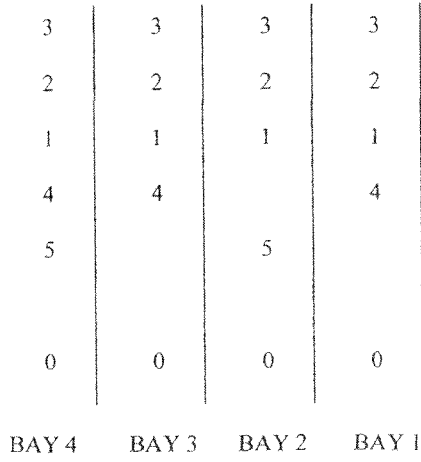
2.) Using Formula G Above:

$$\begin{aligned}
 \text{Unit Efficiency} &= \left(1 - \frac{9,170,099}{1.13182 \times 10^8}\right) \times 100 \% \\
 &= 91.90 \%
 \end{aligned}$$

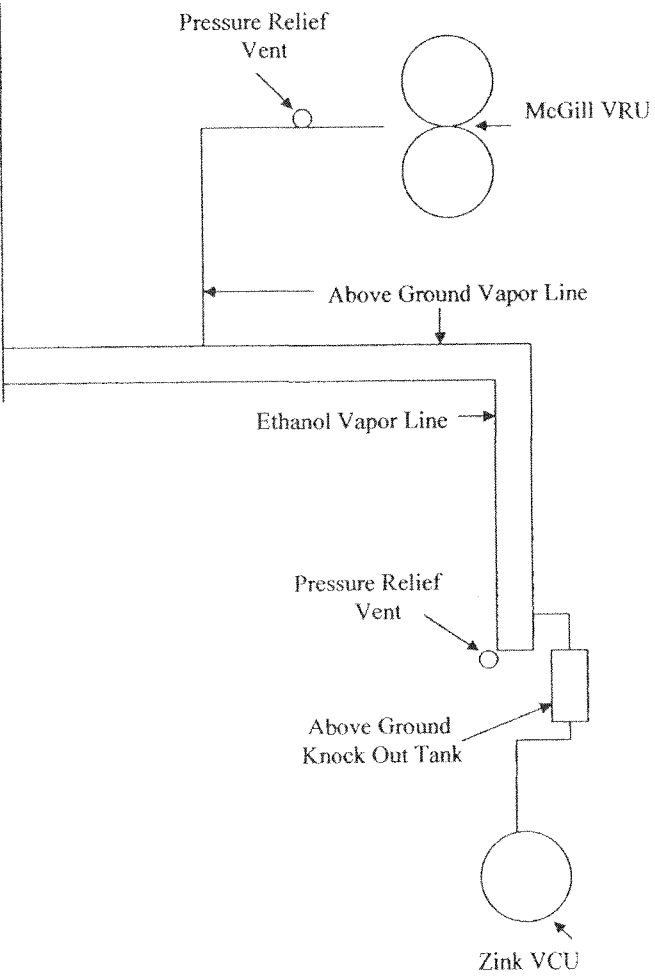
DATA SUMMARY

TERMINAL DESCRIPTION	Motiva Enterprises South Port Everglades, Florida
VAPOR CONTROL UNIT TYPE	John Zink VDU
TEST DATE	November 19, 2008
TEST PERIOD	07:40-13:40 six hrs.
AVERAGE AMBIENT TEMPERATURE	74.4° F
AVERAGE OUTLET CONCENTRATIONS:	VOC 56.1 ppm volume CO 422.95 ppm volume CO <sub>2</sub> 2.84 % by volume
AVERAGE INLET CONCENTRATION (as Propane)	43.50 % by volume
TOTAL PETROLEUM LOADED	335,700 gallons
ACCOUNTABLE PETROLEUM LOADED	238,545 gallons
AVERAGE HYDROCARBON EMISSIONS (Calculated with Total Loaded Product)	3.12 mg/liter 1.45 lb/hr
AVERAGE HYDROCARBON EMISSIONS (Calculated with Accountable Product Loaded)	4.39 mg/liter 1.45 lb/hr
NUMBER OF TRUCKS LOADED	41
NUMBER OF LEAKING TRUCKS	0
VOLUME OF LEAKING TRUCKS	0 gallons
MAXIMUM PRESSURE AT TRUCK VAPOR HOSE	10.0" water column
UNIT EFFICIENCY	99.58 %

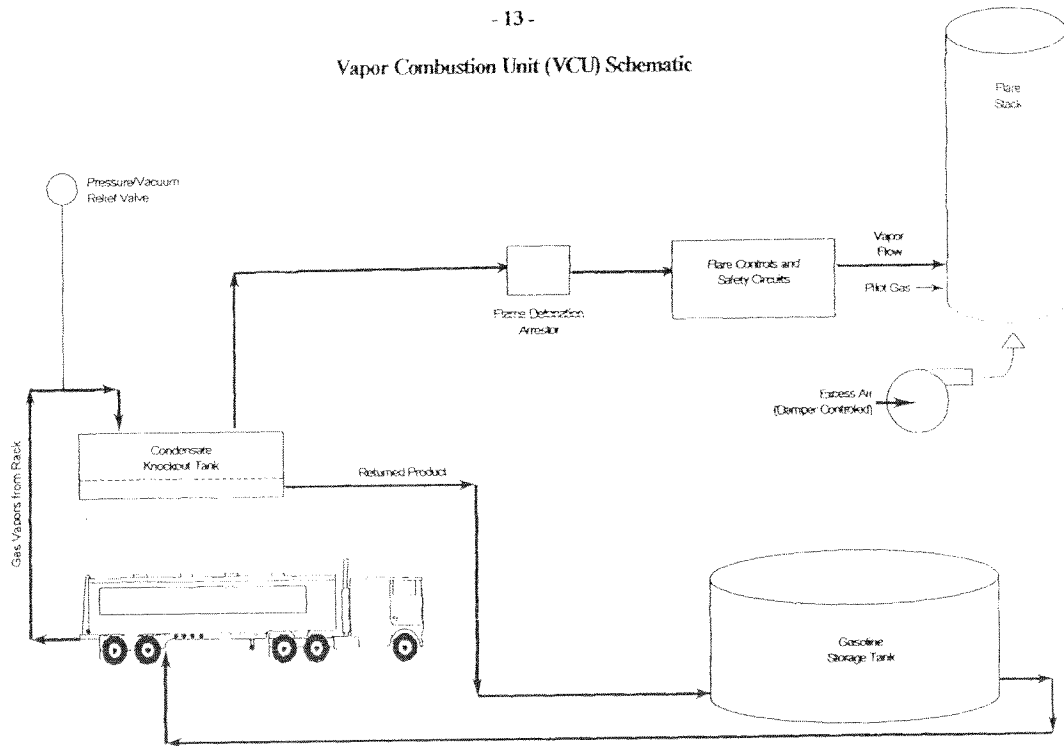
**Motiva Enterprises LLC  
Port Everglades, Florida  
Terminal  
(NOT DRAWN TO SCALE)**



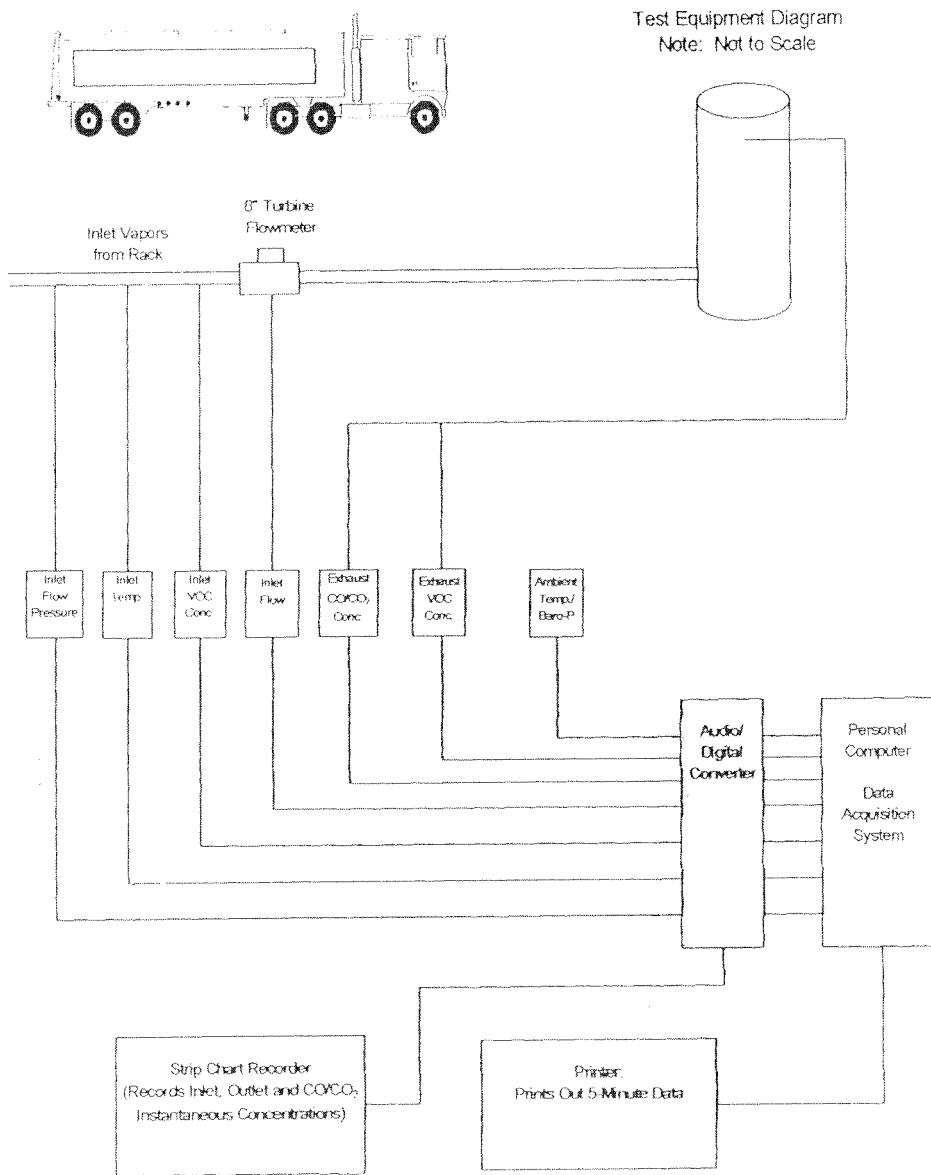
- LEGEND**
- 0 - VAPOR HOSE
  - 1 - REG. UNL.
  - 2 - PLUS UNL.
  - 3 - PREMIUM
  - 4 - DIESEL
  - 5 - ETHANOL



### Vapor Combustion Unit (VCU) Schematic



### VAPOR COMBUSTION UNIT TEST SCHEMATIC





**APPENDIX A**  
**TRUCK MONITORING DATA SHEETS**

Seq. No. <u>1</u>	Tanker Name <u>DB Trucking</u>	Load Start Time <u>7:41</u>		
Bay No. <u>1</u>	Trailer Number <u>402</u>	Load Stop Time <u>7:51</u>		
Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
<u>GAS</u>	<u>DIESEL</u>	<input checked="" type="checkbox"/>	<u>2600</u>	
Max. Back Pressure: Reading 1 _____ Reading 2 _____ Reading 3 _____ Reading 4 _____ Highest _____				
Seq. No. <u>2</u>	Tanker Name <u>DB Trucking</u>	Load Start Time <u>8:37</u>		
Bay No. <u>2</u>	Trailer Number <u>402</u>	Load Stop Time _____		
Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
<u>GAS</u> <u>DIESEL</u>	<u>GAS</u>	<input checked="" type="checkbox"/>	<u>5000</u>	<u>3000</u>
Max. Back Pressure: Reading 1 _____ Reading 2 _____ Reading 3 _____ Reading 4 _____ Highest _____				
Seq. No. <u>3</u>	Tanker Name <u>DB Trucking</u>	Load Start Time <u>7:51</u>		
Bay No. _____	Trailer Number <u>402</u>	Load Stop Time <u>8:07</u>		
Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
<u>GAS</u> <u>DIESEL</u>	<u>GAS</u>	<input checked="" type="checkbox"/>	<u>5000</u>	<u>5000</u>
Max. Back Pressure: Reading 1 _____ Reading 2 _____ Reading 3 _____ Reading 4 _____ Highest _____				
Seq. No. <u>4</u>	Tanker Name <u>DB Trucking</u>	Load Start Time _____		
Bay No. <u>3</u>	Trailer Number <u>402</u>	Load Stop Time _____		
Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
<u>GAS</u> <u>DIESEL</u>	<u>GAS</u> <u>DIESEL</u>	<input checked="" type="checkbox"/>	<u>4500</u> <u>1500</u>	<u>2500</u>
Max. Back Pressure: Reading 1 _____ Reading 2 _____ Reading 3 _____ Reading 4 _____ Highest _____				
Seq. No. <u>5</u>	Tanker Name <u>DB Trucking</u>	Load Start Time <u>8:16</u>		
Bay No. <u>2</u>	Trailer Number <u>402</u>	Load Stop Time <u>8:27</u>		
Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
<u>GAS</u>	<u>GAS</u>	<input checked="" type="checkbox"/>	<u>9000</u>	
Max. Back Pressure: Reading 1 _____ Reading 2 _____ Reading 3 _____ Reading 4 _____ Highest _____				
Seq. No. <u>6</u>	Tanker Name <u>ALTA</u>	Load Start Time <u>8:29</u>		
Bay No. <u>2</u>	Trailer Number <u>7-44</u>	Load Stop Time <u>8:39</u>		
Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
<u>GAS</u>	<u>GAS</u>	<input checked="" type="checkbox"/>	<u>4800</u>	
Max. Back Pressure: Reading 1 _____ Reading 2 _____ Reading 3 _____ Reading 4 _____ Highest _____				

Accountable Gallons Load 1	<u>2600</u>	Total Gallons Load 1	<u>2600</u>
Accountable Gallons Load 2	<u>5000</u>	Total Gallons Load 2	<u>8000</u>
Accountable Gallons Load 3	<u>5000</u>	Total Gallons Load 3	<u>8000</u>
Accountable Gallons Load 4	<u>6000</u>	Total Gallons Load 4	<u>8500</u>
Accountable Gallons Load 5	<u>9000</u>	Total Gallons Load 5	<u>9000</u>
Accountable Gallons Load 6	<u>8800</u>	Total Gallons Load 6	<u>8800</u>

Total Accountable Gallons This Page 42,600 Total Gallons This Page 51,100  
 Acct. Total From Previous Page + \_\_\_\_\_ Total Gallons Prev. Page + \_\_\_\_\_  
 Accountable Gallons Total = \_\_\_\_\_ Total Gallons = \_\_\_\_\_

Terminal Location: LOT 10, EVERETT, WA Date: 11/17/00 Page number: 2

Seq. No.	Tanker Name	Trailer Number	Leak	Accountable Gallons	Non-Acc. Gallons	Max. Back Pressure	Reading 1	Reading 2	Reading 3	Reading 4	Highest
7	MTIC	1-300	/	8800							
8	SHARON	5195	/	7500							
9	DB KING	800	/	9000							
10	DRAGON	8103	/	7000							
11	ERIE	8294	/	8800							
12	PEPPER	912	/	8500							

Accountable Gallons Load 1	Accountable Gallons Load 2	Accountable Gallons Load 3	Accountable Gallons Load 4	Accountable Gallons Load 5	Accountable Gallons Load 6	Total Gallons This Page	Total Gallons Prev. Page	Total Gallons
8800	0	9000	7900	8800	8500	42500	42,000	84,500
8800	7500	9000	8735	8800	8500	51,335	51,000	102,335

Seq. No. <u>13</u>	Tanker Name <u>ERGEL</u>	Load Start Time <u>9:29</u>		
Bay No. <u>2</u>	Trailer Number <u>2302</u>	Load Stop Time <u>9:41</u>		
Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
<u>GA</u>	<u>GAS</u>	<u>✓</u>	<u>8000</u>	
Max. Back Pressure: Reading 1 <u>5</u> Reading 2 <u>7</u> Reading 3 <u>6</u> Reading 4 <u>6</u> Highest <u>7</u>				
Seq. No. <u>14</u>	Tanker Name <u>PEE TANK</u>	Load Start Time <u>9:53</u>		
Bay No. <u>1</u>	Trailer Number <u>1947-92</u>	Load Stop Time <u>9:53</u>		
Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
<u>GAS DIESEL</u>	<u>GAS</u>	<u>✓</u>	<u>5500</u>	<u>2500</u>
Max. Back Pressure: Reading 1 <u>4</u> Reading 2 <u>5</u> Reading 3 <u>6</u> Reading 4 <u>6</u> Highest <u>6</u>				
Seq. No. <u>15</u>	Tanker Name <u>AL TOM</u>	Load Start Time <u>9:46</u>		
Bay No. <u>2</u>	Trailer Number <u>7-41</u>	Load Stop Time <u>9:57</u>		
Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
<u>GAS</u>	<u>LAC</u>	<u>✓</u>	<u>8525</u>	
Max. Back Pressure: Reading 1 _____ Reading 2 _____ Reading 3 _____ Reading 4 _____ Highest _____				
Seq. No. <u>16</u>	Tanker Name <u>PIPELINE</u>	Load Start Time _____		
Bay No. <u>1</u>	Trailer Number <u>36</u>	Load Stop Time _____		
Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
<u>DIESEL</u>	<u>DIESEL</u>			<u>7600</u>
Max. Back Pressure: Reading 1 _____ Reading 2 _____ Reading 3 _____ Reading 4 _____ Highest _____				
Seq. No. <u>17</u>	Tanker Name <u>ERGEL</u>	Load Start Time _____		
Bay No. <u>2</u>	Trailer Number <u>2429</u>	Load Stop Time _____		
Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
<u>ETH ETHANOL</u>	<u>ETHANOL</u>			<u>7700</u>
Max. Back Pressure: Reading 1 _____ Reading 2 _____ Reading 3 _____ Reading 4 _____ Highest _____				
Seq. No. <u>18</u>	Tanker Name <u>SAPIEX</u>	Load Start Time <u>10:00</u>		
Bay No. <u>3</u>	Trailer Number <u>5190</u>	Load Stop Time _____		
Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
<u>DEAL</u>	<u>DIESEL</u>	<u>✓</u>		<u>7500</u>
Max. Back Pressure: Reading 1 _____ Reading 2 _____ Reading 3 _____ Reading 4 _____ Highest _____				

Accountable Gallons Load 1	<u>8000</u>	Total Gallons Load 1	<u>8000</u>
Accountable Gallons Load 2	<u>5500</u>	Total Gallons Load 2	<u>8000</u>
Accountable Gallons Load 3	<u>8525</u>	Total Gallons Load 3	<u>8525</u>
Accountable Gallons Load 4	<u>0</u>	Total Gallons Load 4	<u>7600</u>
Accountable Gallons Load 5	<u>0</u>	Total Gallons Load 5	<u>7700</u>
Accountable Gallons Load 6	<u>0</u>	Total Gallons Load 6	<u>7500</u>

Total Accountable Gallons This Page 22025 Total Gallons This Page 47325  
 Acct. Total From Previous Page + 85,160 Total Gallons Prev. Page + 102,435  
 Accountable Gallons Total = 107,185 Total Gallons = 149760

Seq No. <u>19</u>	Tanker Name <u>SANTER</u>	Load Start Time <u>10:20</u>		
Bay No. <u>1</u>	Trailer Number <u>5190</u>	Load Stop Time <u>10:44</u>		
Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
<u>DIESEL</u>	<u>DIESEL</u>	<u>✓</u>		<u>7500</u>
Max. Back Pressure: Reading 1 <u>5</u> Reading 2 <u>4</u> Reading 3 <u>6</u> Reading 4 <u>7</u> Highest <u>7</u>				
Seq No. <u>20</u>	Tanker Name <u>McKEE</u>	Load Start Time <u>10:23</u>		
Bay No. <u>4</u>	Trailer Number <u>AUG 3657</u>	Load Stop Time <u>10:35</u>		
Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
<u>GAS</u>	<u>GAS</u>	<u>✓</u>	<u>8000</u>	
Max. Back Pressure: Reading 1 <u>7</u> Reading 2 <u>6</u> Reading 3 <u>5</u> Reading 4 <u>6</u> Highest <u>7</u>				
Seq No. <u>21</u>	Tanker Name <u>SANTER</u>	Load Start Time <u>10:30</u>		
Bay No. <u>1</u>	Trailer Number <u>VR-3205</u>	Load Stop Time <u>10:35</u>		
Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
<u>DIESEL</u>	<u>DIESEL</u>	<u>✓</u>		<u>1480</u>
Max. Back Pressure: Reading 1 _____ Reading 2 _____ Reading 3 _____ Reading 4 _____ Highest _____				
Seq No. <u>22</u>	Tanker Name <u>DB TRUCKING</u>	Load Start Time <u>10:42</u>		
Bay No. <u>4</u>	Trailer Number <u>2402</u>	Load Stop Time <u>10:54</u>		
Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
<u>GAS</u>	<u>GAS</u>	<u>✓</u>	<u>7400</u>	<u>1200</u>
Max. Back Pressure: Reading 1 _____ Reading 2 _____ Reading 3 _____ Reading 4 _____ Highest _____				
Seq No. <u>23</u>	Tanker Name <u>ALTON</u>	Load Start Time <u>10:45</u>		
Bay No. <u>2</u>	Trailer Number <u>T-200</u>	Load Stop Time <u>10:57</u>		
Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
<u>GAS</u>	<u>GAS</u>	<u>✓</u>	<u>8000</u>	<del>1200</del>
Max. Back Pressure: Reading 1 _____ Reading 2 _____ Reading 3 _____ Reading 4 _____ Highest _____				
Seq No. <u>24</u>	Tanker Name <u>UKRNETA O.C.</u>	Load Start Time <u>10:40</u>		
Bay No. <u>1</u>	Trailer Number <u>8402</u>	Load Stop Time <u>10:57</u>		
Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
<u>GAS</u> <u>DIESEL</u>	<u>GAS</u>	<u>✓</u>	<u>4000</u>	<u>4000</u>
Max. Back Pressure: Reading 1 _____ Reading 2 _____ Reading 3 _____ Reading 4 _____ Highest _____				

Accountable Gallons Load 1	<u>0</u>	Total Gallons Load 1	<u>7500</u>
Accountable Gallons Load 2	<u>8000</u>	Total Gallons Load 2	<u>8000</u>
Accountable Gallons Load 3	<u>0</u>	Total Gallons Load 3	<u>1480</u>
Accountable Gallons Load 4	<u>7400</u>	Total Gallons Load 4	<u>8600</u>
Accountable Gallons Load 5	<u>8000</u>	Total Gallons Load 5	<u>8000</u>
Accountable Gallons Load 6	<u>4000</u>	Total Gallons Load 6	<u>8000</u>
Total Accountable Gallons This Page	<u>29000</u>	Total Gallons This Page	<u>43180</u>
Acct. Total From Previous Page	<u>+ 107185</u>	Total Gallons Prev. Page	<u>+ 149760</u>
Accountable Gallons Total	<u>= 136185</u>	Total Gallons	<u>= 192940</u>

Seq. No. <u>25</u>	Tanker Name <u>PIPELINE MIST</u>	Load Start Time <u>11.05</u>		
Bay No. <u>1</u>	Trailer Number <u># I</u>	Load Stop Time <u>11.19</u>		
Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
<u>GAS DIESEL</u>	<u>GAS</u>	<u>✓</u>	<u>7800</u>	<u>1200</u>
Max. Back Pressure: Reading 1 <u>6</u> Reading 2 <u>7</u> Reading 3 <u>6</u> Reading 4 <u>7</u> Highest <u>7</u>				
Seq. No. <u>26</u>	Tanker Name <u>ERGOEL</u>	Load Start Time <u>11.05</u>		
Bay No. <u>4</u>	Trailer Number <u>2782</u>	Load Stop Time <u>11.18</u>		
Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
<u>GAS</u>	<u>GAS</u>	<u>✓</u>	<u>9000</u>	
Max. Back Pressure: Reading 1 <u>5</u> Reading 2 <u>5</u> Reading 3 <u>6</u> Reading 4 <u>7</u> Highest <u>7</u>				
Seq. No. <u>27</u>	Tanker Name <u>SAMPEX</u>	Load Start Time <u>11.22</u>		
Bay No. <u>1</u>	Trailer Number <u>5195</u>	Load Stop Time <u>11.34</u>		
Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
<u>DIESEL</u>	<u>DIESEL</u>	<u>✓</u>		<u>7500</u>
Max. Back Pressure: Reading 1 _____ Reading 2 _____ Reading 3 _____ Reading 4 _____ Highest _____				
Seq. No. <u>28</u>	Tanker Name <u>DEUN TANK</u>	Load Start Time <u>11.33</u>		
Bay No. <u>4</u>	Trailer Number <u>1941342</u>	Load Stop Time <u>11.38</u>		
Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
<u>DIESEL</u>	<u>GAS DIESEL</u>	<u>✓</u>		<u>7500</u>
Max. Back Pressure: Reading 1 _____ Reading 2 _____ Reading 3 _____ Reading 4 _____ Highest _____				
Seq. No. <u>29</u>	Tanker Name <u>TR LYONS</u>	Load Start Time <u>11.42</u>		
Bay No. <u>4</u>	Trailer Number <u>1-84</u>	Load Stop Time <u>11.53</u>		
Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
<u>DIESEL</u>	<u>GAS DIESEL</u>	<u>✓</u>		<u>7500</u>
Max. Back Pressure: Reading 1 _____ Reading 2 _____ Reading 3 _____ Reading 4 _____ Highest _____				
Seq. No. <u>30</u>	Tanker Name <u>PIPELINE</u>	Load Start Time <u>11.45</u>		
Bay No. <u>1</u>	Trailer Number <u>83</u>	Load Stop Time <u>11.56</u>		
Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
<u>GAS</u>	<u>GAS</u>	<u>✓</u>	<u>8900</u>	
Max. Back Pressure: Reading 1 <u>8</u> Reading 2 <u>10</u> Reading 3 <u>10</u> Reading 4 <u>10</u> Highest <u>10</u>				

Accountable Gallons Load 1	<u>7800</u>	Total Gallons Load 1	<u>9000</u>
Accountable Gallons Load 2	<u>9000</u>	Total Gallons Load 2	<u>9000</u>
Accountable Gallons Load 3	<u>0</u>	Total Gallons Load 3	<u>7500</u>
Accountable Gallons Load 4	<u>0</u>	Total Gallons Load 4	<u>7500</u>
Accountable Gallons Load 5	<u>0</u>	Total Gallons Load 5	<u>7500</u>
Accountable Gallons Load 6	<u>8900</u>	Total Gallons Load 6	<u>8900</u>
Total Accountable Gallons This Page	<u>25600</u>	Total Gallons This Page	<u>49300</u>
Acct. Total From Previous Page	<u>+ 136185</u>	Total Gallons Prev. Page	<u>+ 192940</u>
Accountable Gallons Total	<u>= 161785</u>	Total Gallons	<u>= 242240</u>

Seq. No. 31 Tanker Name BAYLOR Load Start Time 12.02  
 Bay No. 4 Trailer Number 2312 Load Stop Time 12.13  
 Products Loading Previous Product Leak Accountable Gallons Non-Acct. Gallons  
GAS GAS  9000   
 Max. Back Pressure: Reading 1 7 Reading 2 6 Reading 3 7 Reading 4 7 Highest 7

Seq. No. 32 Tanker Name OTB Trucking Load Start Time 12.09  
 Bay No. 1 Trailer Number 2409 Load Stop Time 12.11  
 Products Loading Previous Product Leak Accountable Gallons Non-Acct. Gallons  
GAS GAS  2960   
 Max. Back Pressure: Reading 1 0 Reading 2 7 Reading 3 6 Reading 4 5 Highest 8

Seq. No. 33 Tanker Name OTB Trucking Load Start Time 12.07  
 Bay No. 4 Trailer Number 2400 Load Stop Time 12.07  
 Products Loading Previous Product Leak Accountable Gallons Non-Acct. Gallons  
GAS GAS  9000   
 Max. Back Pressure: Reading 1 Reading 2 Reading 3 Reading 4 Highest

Seq. No. 34 Tanker Name OTB Trucking Load Start Time 12.10  
 Bay No. 4 Trailer Number 2404 Load Stop Time 12  
 Products Loading Previous Product Leak Accountable Gallons Non-Acct. Gallons  
GAS GAS  9000   
 Max. Back Pressure: Reading 1 Reading 2 Reading 3 Reading 4 Highest

Seq. No. 35 Tanker Name KEWAN Load Start Time 12.36  
 Bay No. 1 Trailer Number 5076 Load Stop Time 12  
 Products Loading Previous Product Leak Accountable Gallons Non-Acct. Gallons  
DIESEL GAS   6300 LSO  
 Max. Back Pressure: Reading 1 Reading 2 Reading 3 Reading 4 Highest

Seq. No. 36 Tanker Name KEWAN Load Start Time 12.43  
 Bay No. 4 Trailer Number 5046 Load Stop Time 12.51  
 Products Loading Previous Product Leak Accountable Gallons Non-Acct. Gallons  
DIESEL DIESEL   7400 LSO  
 Max. Back Pressure: Reading 1 Reading 2 Reading 3 Reading 4 Highest

Accountable Gallons Load 1	<u>9000</u>	Total Gallons Load 1	<u>9000</u>
Accountable Gallons Load 2	<u>2960</u>	Total Gallons Load 2	<u>2960</u>
Accountable Gallons Load 3	<u>9000</u>	Total Gallons Load 3	<u>9000</u>
Accountable Gallons Load 4	<u>9000</u>	Total Gallons Load 4	<u>9000</u>
Accountable Gallons Load 5	<u>0</u>	Total Gallons Load 5	<u>6300</u>
Accountable Gallons Load 6	<u>0</u>	Total Gallons Load 6	<u>7400</u>
Total Accountable Gallons This Page	<u>35960</u>	Total Gallons This Page	<u>49660</u>
Acct. Total From Previous Page	<u>+ 161785</u>	Total Gallons Prev. Page	<u>+ 242240</u>
Accountable Gallons Total	<u>= 197745</u>	Total Gallons	<u>= 291900</u>

Seq. No. <u>37</u>	Tanker Name <u>EAGLE</u>	Load Start Time <u>12:58</u>		
Bay No. <u>1</u>	Trailer Number <u>2294</u>	Load Stop Time <u>1:04</u>		
Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
<u>GAS</u>	<u>GAS</u>	<u>✓</u>	<u>9000</u>	
Max. Back Pressure: Reading 1 <u>1</u> Reading 2 <u>2</u> Reading 3 <u>7</u> Reading 4 <u>9</u> Highest <u>9</u>				

Seq. No. <u>38</u>	Tanker Name <u>ALOM</u>	Load Start Time <u>1:57</u>		
Bay No. <u>2</u>	Trailer Number <u>T-200</u>	Load Stop Time <u>1:08</u>		
Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
<u>GAS</u>	<u>GAS</u>	<u>✓</u>	<u>8800</u>	
Max. Back Pressure: Reading 1 <u>7</u> Reading 2 <u>6</u> Reading 3 <u>6</u> Reading 4 <u>8</u> Highest <u>8</u>				

Seq. No. <u>39</u>	Tanker Name <u>MEDIA PET</u>	Load Start Time <u>1:13</u>		
Bay No. <u>1</u>	Trailer Number <u>2301</u>	Load Stop Time <u>1:23</u>		
Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
<u>GAS</u>	<u>DIESEL</u>		<u>8500</u>	
Max. Back Pressure: Reading 1 <u>7</u> Reading 2 <u>4</u> Reading 3 <u>4</u> Reading 4 <u>7</u> Highest <u>9</u>				

Seq. No. <u>40</u>	Tanker Name <u>EAGLE</u>	Load Start Time <u>1:15</u>		
Bay No. <u>1</u>	Trailer Number <u>3298</u>	Load Stop Time <u>1:24</u>		
Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
<u>GAS</u> <u>DIESEL</u>	<u>GAS</u>	<u>✓</u>	<u>8000</u>	<u>1000</u>
Max. Back Pressure: Reading 1 _____ Reading 2 _____ Reading 3 _____ Reading 4 _____ Highest _____				

Seq. No. <u>41</u>	Tanker Name <u>TG LYNDS</u>	Load Start Time <u>1:26</u>		
Bay No. <u>1</u>	Trailer Number <u>49</u>	Load Stop Time <u>1:36</u>		
Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
<u>GAS</u> <u>DIESEL</u>	<u>GAS</u>	<u>✓</u>	<u>6500</u>	<u>2000</u>
Max. Back Pressure: Reading 1 _____ Reading 2 _____ Reading 3 _____ Reading 4 _____ Highest _____				

Seq. No. <u>37</u>	Tanker Name _____	Load Start Time _____		
Bay No. _____	Trailer Number _____	Load Stop Time _____		
Products Loading	Previous Product	Leak	Accountable Gallons	Non-Acct. Gallons
Max. Back Pressure: Reading 1 _____ Reading 2 _____ Reading 3 _____ Reading 4 _____ Highest _____				

Accountable Gallons Load 1	<u>9000</u>	Total Gallons Load 1	<u>9000</u>
Accountable Gallons Load 2	<u>8800</u>	Total Gallons Load 2	<u>8800</u>
Accountable Gallons Load 3	<u>8500</u>	Total Gallons Load 3	<u>8500</u>
Accountable Gallons Load 4	<u>8000</u>	Total Gallons Load 4	<u>9000</u>
Accountable Gallons Load 5	<u>6500</u>	Total Gallons Load 5	<u>8500</u>
Accountable Gallons Load 6		Total Gallons Load 6	

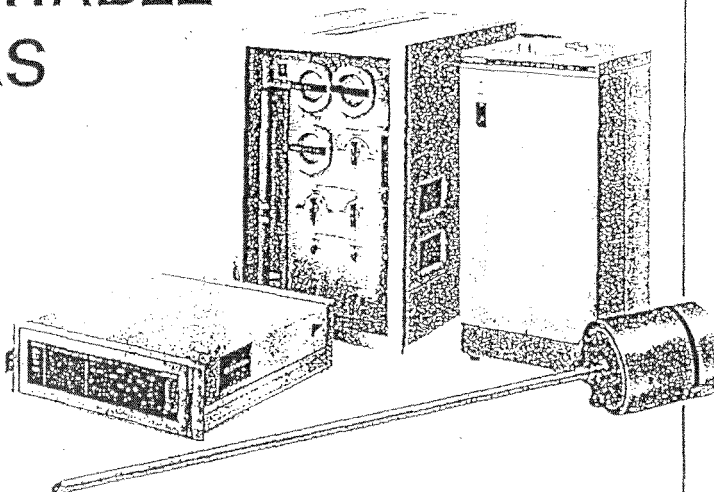
Total Accountable Gallons This Page	<u>40800</u>	Total Gallons This Page	<u>43900</u>
Acct. Total From Previous Page	<u>+ 197745</u>	Total Gallons Prev. Page	<u>+ 291900</u>
Accountable Gallons Total	<u>= 238545</u>	Total Gallons	<u>= 335700</u>



**APPENDIX B**  
**INSTRUMENT AND CALIBRATION**  
**INFORMATION**

# TRANSPORTABLE STACK GAS ANALYZER SYSTEM

ENDA-1000 SERIES



## *Transportable and Affordable NO<sub>x</sub>, SO<sub>2</sub>, CO<sub>2</sub>, CO and O<sub>2</sub> measurements*

HORIBA has now developed transportable NO<sub>x</sub>, SO<sub>2</sub>, CO<sub>2</sub>, CO and O<sub>2</sub> analyzers employing several new techniques based on extensive experience in the field of stationary stack gas analyzers and process analyzers. These new 1000 Series analyzers are designed for installation in an automobile so that they can be transported easily from one place to another for field measurement at a number of different points.

Each system consists of a sample probe/primary filter assembly, a pre-conditioner, a sampling unit and an analyzer unit. The sample probe/primary filter assembly can be mounted directly on the smoke stack. A single analyzer unit can measure up to three different components simultaneously,

so two units provide measurement of all five components. The sampling unit is available in a 3-component version

and a 5-component version. Both the analyzer unit and sampling unit fit neatly into a standard 19-inch rack.

### SPECIFICATIONS

#### Measuring range (Standard)

NO<sub>x</sub>, SO<sub>2</sub>, CO: 0 - 200/500 ppm

CO<sub>2</sub>: 0 - 20/40 vol%

O<sub>2</sub>: 0 - 10/25 vol%

Response time: Within 1 min for 90% response at system inlet, within 4 min for SO<sub>2</sub> measurement

Sample flow rate: Approx. 3 liters/min

Sample probe/primary filter:

Flange: JIS 10 K 40 A FF

Length: 1000 mm (39.4 in)

Material: 304 stainless steel

Element: Bellows type, 304 stainless steel cylinder filled with quartz wool, with a filtering accuracy of 2 μ

Sample gas conditions:

Temperature: Lower than 250°C

Pressure: Less than atmospheric pressure ±100 mm H<sub>2</sub>O

Dust: Less than 0.1 g/Nm<sup>3</sup>

SO<sub>2</sub>: Lower than 2000 ppm

SO<sub>3</sub>: Lower than 1/10 of SO<sub>2</sub>

NO: Lower than 1000 ppm

NO<sub>2</sub>: Lower than 1/10 of NO

CO<sub>2</sub>: 5 - 15%

CO: Lower than 1000 ppm

O<sub>2</sub>: 0.5 - 15% H<sub>2</sub>O: 4 - 20%

Weight & Dimensions (w x d x h):

Preconditioner: approx. 32 kg, 70.5 lb

300 x 300 x 600 mm, 11.8 x 11.8 x 23.6 in

Sampling unit: approx. 58 kg, 127.8 lb

430 x 550 x 621 mm, 16.9 x 21.7 x 24.4 in

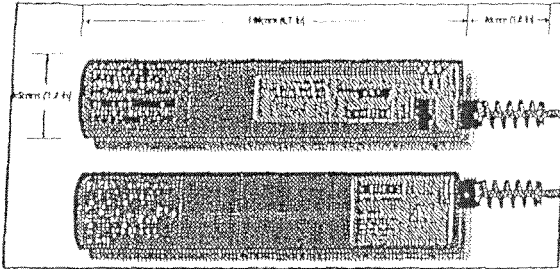
Analyzer unit: approx. 15 kg, 33.1 lb

482 x 500 x 132 mm, 19.0 x 19.7 x 5.2 in



# SmartLink Instruments

Compact Miniaturized Instruments



Our compact SmartLink instruments make lab-grade measurements possible in the field or on the factory floor. These instruments connect directly to complex signals and sensors; collect, process, and store sensor input data; and link directly to your computer or network.

SmartLink Instruments Selector Guide					
Model (single or multi-ch)	Sensors Measured/ Signals Accommodated	Applications	Key Attributes	Accuracy & Resolution	Analog & Digital I/O
<b>ENM-DCY11, 12</b> High-speed DCY & ohm measurement system	<ul style="list-style-type: none"> <li>• DCY, DCL, 1-20mA</li> <li>• RTDs, thermistors, ohms</li> <li>• Pressure, flow, &amp; weight transducers</li> <li>• Humidity, RPM</li> <li>• Counter/Timer</li> </ul>	<ul style="list-style-type: none"> <li>• Process monitoring</li> <li>• Production test</li> <li>• Research analysis</li> <li>• Frequency, event, pulse width, vibration analysis</li> </ul>	<ul style="list-style-type: none"> <li>• 31k readings/s burst</li> <li>• External trigger</li> </ul>	<ul style="list-style-type: none"> <li>• 0.1%</li> <li>• 16 bits</li> </ul>	<ul style="list-style-type: none"> <li>• AI: 1/4</li> <li>• DI: 2/4</li> <li>• Recorder output</li> </ul>
<b>ENM-DCY11/12</b> High-speed DCY & ohm measurement system	<ul style="list-style-type: none"> <li>• DCY, DCL, 1-20mA</li> <li>• RTDs, thermistors, ohms</li> <li>• Pressure, flow, &amp; weight transducers</li> <li>• Humidity, RPM</li> <li>• Counter/Timer</li> </ul>	<ul style="list-style-type: none"> <li>• Process monitoring</li> <li>• Production test</li> <li>• Research analysis</li> <li>• Frequency, event, pulse width, vibration analysis</li> </ul>	<ul style="list-style-type: none"> <li>• 31k readings/s burst</li> <li>• External trigger</li> </ul>	<ul style="list-style-type: none"> <li>• 0.1%</li> <li>• 16 bits</li> </ul>	<ul style="list-style-type: none"> <li>• AI: 1/4</li> <li>• DI: 2/4</li> <li>• Recorder output</li> </ul>
<b>ENM-DCY11/12</b> Precision isolated (1500V) DCY & ohm measurement system	<ul style="list-style-type: none"> <li>• DCY, DCL, 1-20mA</li> <li>• RTDs, thermistors, ohms</li> <li>• Pressure, flow, and weight transducers</li> </ul>	<ul style="list-style-type: none"> <li>• Process reliability testing</li> <li>• High accuracy data acquisition</li> <li>• Production test in hostile environments</li> </ul>	<ul style="list-style-type: none"> <li>• 11 readings/s</li> <li>• 1500V isolation to com</li> <li>• 400V inputs</li> </ul>	<ul style="list-style-type: none"> <li>• 0.05%</li> <li>• 20 bits</li> </ul>	<ul style="list-style-type: none"> <li>• AI: 1/6</li> <li>• DI: 1/1</li> </ul>
<b>ENM-TC11/12</b> Isolated thermocouple interface	<ul style="list-style-type: none"> <li>• Thermocouples</li> <li>• RTDs</li> </ul>	<ul style="list-style-type: none"> <li>• High accuracy, high temperature monitoring</li> </ul>	<ul style="list-style-type: none"> <li>• 11 readings/s</li> <li>• 1500V isolation to com</li> <li>• 400V inputs</li> </ul>	<ul style="list-style-type: none"> <li>• 0.1%</li> <li>• 16 bits</li> </ul>	<ul style="list-style-type: none"> <li>• AI: 1/4</li> <li>• DI: 1/1</li> </ul>
<b>ENM-TH11, 12</b> Precision thermistor	<ul style="list-style-type: none"> <li>• Thermistors</li> <li>• Ohms</li> </ul>	<ul style="list-style-type: none"> <li>• High accuracy temperature monitoring</li> </ul>	<ul style="list-style-type: none"> <li>• 1 readings/s</li> <li>• High accuracy</li> </ul>	<ul style="list-style-type: none"> <li>• 0.1%</li> <li>• 16 bits</li> </ul>	<ul style="list-style-type: none"> <li>• AI: 1/4</li> <li>• DI: 2/2</li> </ul>

**ENVIROMAX™ 3000**

**OPERATORS MANUAL**

**Software level 115**

**INSTRUMENT SERIAL #119**

THIS COPY IS SUBJECT TO REVISION CONTROLS AND REVISIONS WILL BE AUTOMATICALLY ISSUED.

I.1. Configuration certificate

I.1.A. INSTRUMENT: ENVIROMAX 3000 GAS ANALYZER

I.1.A.1. SERIAL NUMBER: 119

I.1.A.2. DATE OF THIS TEST: 6/16/94

I.1.A.3. Non-settable

ITEM	AS SHIPPED
Gas measured	<u>C<sub>3</sub>H<sub>8</sub></u>
Range measured	<u>0 - 2000</u>
Units measured	<u>PPM</u>
Smallest unit	<u>1 PPM</u>
Software version	<u>115</u>

I.1.A.4. User settable

ITEM	AS SHIPPED
Calibration Gas concentration	<u>2000/C<sub>3</sub>H<sub>8</sub></u>
Calibration Track/Hold	<u>TRACK</u>
Chart range 1	<u>200</u>
Chart range 2	<u>500</u>
Chart range 3	<u>1000</u>
Chart range 4	<u>2000</u>
Range selected	<u>4</u>
Low alarm	<u>OFF</u>
High alarm	<u>OFF</u>
Audible alarm	<u>OFF</u>
Filter	<u>10</u>
Linearization	<u>LINEAR</u>
Brightness	<u>1</u>

I.1.A.5. Configuration check by VB

Date 6-16-94 Signature: [Handwritten Signature]

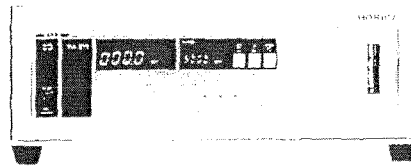
## I.2. SPECIFICATIONS

Measuring method:	NDIR single beam.
Gas Measured:	2000 PPM Propane.
Resolution:	1. Part Per Million (PPM).
Repeatability $\pm$	Greater of 6PPM or 0.5% of reading.
Response Time:	User selectable at 1, 10, 100.
Display:	Vacuum fluorescent, 2 lines of 16 characters.
Alarms:	High and Low limit, user settable.
Analog output:	Selectable 0 to 1, 5, or 10 Volts full scale. Optional 4-20 mA isolated current loop.
Analog ranges:	4, each with settable full scale. Selectable auto range.
A.C. Output:	Isolated triac control for zero and span gas valves. Rated maximum load: .6 Amp, 240 Volts AC. Not available on portable.
Power Source:	Charger requires 110 VAC., 50/60 Hz
Materials in sample flow path:	Glass, Gold, Buna-N, Lexan, Epoxy, Sapphire, Teflon, 304 Stainless Steel.
Sample flow:	0.2 to 2.0 liter/minute.
Warm up time:	1 Hour.
Ambient conditions:	Operating: -10°C to 50°C. Storage: -10°C to 80°C.
Dimensions:	Length: 20.0 inches. (50.8 cm) Width: 8.0 inches. (21.6 cm) Depth: 5.25 inches. (13.3 cm)
Weight:	Approximately 19 pounds. (8.6 Kg)

## VIA-510 Gas Analyzer

**Features**

- Selectable response time
- Selectable outputs: 0–1 VDC or 4–20 mA
- Digital outputs indicate malfunctions or calibration failure)
- Measures CO, CO<sub>2</sub>, NO<sub>x</sub>, SO<sub>2</sub>, CH<sub>4</sub>, C<sub>2</sub>H<sub>4</sub>, and NO<sub>2</sub>; others upon request

**Overview**

The VIA-510 series of general-purpose gas analyzers provide continuous monitoring of concentrations of the specific sample gas. The analyzers can be operated from controls on the front panel or by commands from a remote computer. Measurement results are displayed on the front panel and are available to remote data logging systems through an industry-standard interface.

The VIA-510 series can be used for a wide variety of analyses and tests, such as industrial process control and composition analysis, environment-related atmospheric and fixed-source emissions monitoring, and automobile emission analysis.

These analyzers use the infrared absorption method which offers superior sensitivity, selectivity, and stability. They are compact and compatible with a variety of OEM analysis equipment.

A high level of sensitivity is achieved through the use of a dual-beam NDIR analysis method. Horiba's patented chopper motor assures continuous long-term stable monitoring. The analysis mechanism and the amplifier are combined in a single unit. The highly accurate performance makes the analyzers suitable for process monitoring and control.

**Specifications****Standard Ranges**

Gas	Minimum	Maximum
Carbon monoxide	0-50 ppm	0-100%



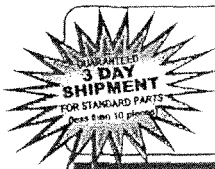
(CO)		
Carbon dioxide (CO <sub>2</sub> )	0-50 ppm	0-100%
Nitrogen monoxide (NO)	0-100 ppm	0-100%
Sulfur dioxide (SO <sub>2</sub> )	0-100 ppm	0-100%
Methane (CH <sub>4</sub> )	0-100 ppm	0-100%
Ethene (C <sub>2</sub> H <sub>4</sub> )	0-100 ppm	0-100%
Nitrous Oxide (N <sub>2</sub> O)	0-100 ppm	0-100%

#### Performance

Lowest detection limit:	1.0 ppm
Repeatability:	± 1% of full-scale
Response time:	Selectable
Zero drift:	< 1% (full scale) per day
Span drift:	< 2% (full scale) per week

**HORIBA**

Copyright 2003 Horiba Inc.



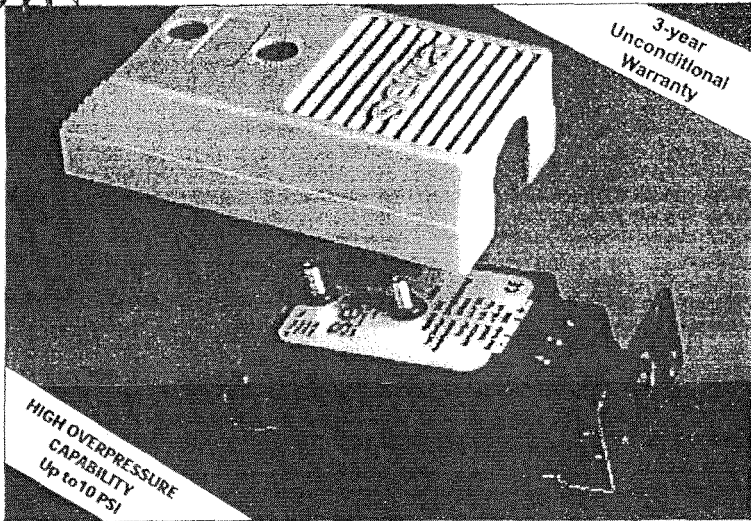
## Model 264

### Very Low Differential Pressure Transducer

Unidirectional Ranges: 0 - 0.1 to 0 - 100 in. W.C.

Bidirectional Ranges: 0 -  $\pm 0.5$  to 0 -  $\pm 50$  in. W.C.

Air or Non-Conducting Gas



Setra Systems 264 pressure transducers sense differential or gauge (static) pressure and convert this pressure difference to a proportional electrical output for either unidirectional or bidirectional pressure ranges. The 264 Series is offered with a high level analog 0 to 5 VDC or 4 to 20 mA output.

Used in Building Energy Management Systems, these transducers are capable of measuring pressures and flows with the accuracy necessary for proper building pressurization and air flow control.

The 264 Series transducers are available for air pressure ranges as low as 0.1 in. W.C. full scale to 100 in. W.C. full scale. Static standard accuracy is  $\pm 1.0\%$  full scale in normal ambient temperature environments, but higher accuracies are available. The units are temperature compensated to 0.033% FS/°F thermal error over the temperature range of 0°F to +150°F.

The Model 264 utilizes an improved all stainless steel micro tig welded sensor. The tensioned stainless steel diaphragm and insulated stainless steel electrode, positioned close to the diaphragm, form a variable capacitor. Positive pressure moves the diaphragm toward the electrode, increasing the capacitance. A decrease in pressure moves the diaphragm away from the electrode, decreasing the capacitance. The change in capacitance is detected and converted to a linear DC electrical signal by Setra's unique electronic circuit.

The tensioned sensor allows up to 10 PSI overpressure (in either direction) with no damage to the unit. In addition, the parts that make up the sensor have thermally matched coefficients, which promote improved temperature performance and excellent long term stability.

NOTE: Setra quality standards are based on ANSI Z540.1. The calibration of this product is NIST traceable.

U.S. Patent nos. 4293915; 4338614; 4434203; 6010002; 6014800  
Other Patents Pending

159 Swanson Rd., Boxborough, MA 01719/Telephone: 978-263 1400/Fax: 978-264-0292

## Applications

- Heating, Ventilating and Air Conditioning (HVAC)
- Energy Management Systems
- Variable Air Volume and Fan Control (VAV)
- Environmental Pollution Control
- Lab and Fume Hood Control
- Oven Pressurization and Furnace Draft Controls

## Features

- Up to 10 PSI Overpressure on All Ranges
- Installation Time Minimized with Snap Track Mounting and Easy-To-Access Pressure Ports and Electrical Connections
- 0 to 5 VDC or 2-wire 4 to 20 mA Analog Outputs Are Compatible with Energy Management Systems
- Reverse Wiring Protection
- Internal Regulation Permits Use with Unregulated DC Power Supplies
- Meets CE Conformance Standards

*When it comes to a product to rely on - choose the Model 264. When it comes to a company to trust - choose Setra.*



Visit Setra Online:  
<http://www.setra.com>

**setra**  
**800-257-3872**

# Model 264 Specifications

## Performance Data

	Standard	Optional
Accuracy* RSS (at constant temp)	±1.0% FS	±0.4% FS ±0.25% FS
Non-Linearity, BF SL	±0.96% FS	±0.38% FS ±0.22% FS
Hysteresis	0.16% FS	0.10% FS 0.10% FS
Non-Repeatability	0.05% FS	0.05% FS 0.05% FS

### Thermal Effects\*\*

Compensated Range °F (°C)	0 to +150 (-18 to +65)
Zero/Span Shift %FS/°F (°C)	0.033 (0.06)
Maximum Line Pressure	10 psi
Overpressure	Up to 10 psi in Positive or Negative Direction.
Long Term Stability	0.5% FS/1 YR

### Position Effect

(Unit is factory calibrated at 0g effect in the vertical position.)

Range	Zero Offset (%FS/G)
To 0.5 in. WC	0.60
To 1.0 in. WC	0.50
To 2.5 in. WC	0.22
To 5 in. WC	0.14

\* RSS of Non-Linearity, Hysteresis, and Non-Repeatability.

\*\* Units calibrated at nominal 10° F. Maximum thermal error computed from this datum.

## Environmental Data

Temperature	Operating °F (°C)	0 to +175 (-18 to +79)
	Storage °F (°C)	-65 to +250 (-54 to +121)

\* Operating temperature limits of the electronics only. Pressure media temperatures may be considerably higher.

## Physical Description

Case	Fire-Retardant Glass Filled Polyester
Mounting	Four screw holes on removable zinc plated steel base (designed for 2.75" snap track)
Electrical Connection	Screw Terminal Strip
Pressure Fittings	3/16" O.D. barbed brass pressure fitting for 1/4" push-on tubing
Zero and Span Adjustments	Accessible on top of case
Weight (approx.)	10 ounces

## Pressure Media

Typically air or similar non-conducting gases.

Specifications subject to change without notice.

## Electrical Data (Voltage)

Circuit	3-Wire (Com, Exc, Out)
Excitation	9 to 30 VDC
Output	0 to 5 VDC**

Bidirectional output at zero

pressure: 2.5 VDC\*\*

Output Impedance: 100 ohms

\*\* Calibrated into a 500 ohm load, operable into a 5000 ohm load or greater.

\*\* Zero output factory set to within ±50mV (±25 mV for optional accuracies).

\*\* Span (Full Scale) output factory set to within ±50mV (±25 mV for optional accuracies).

## Electrical Data (Current)

Circuit	2-Wire
Output	4 to 20mA**

Bidirectional output at zero

pressure: 12mA\*\*

External Load 0 to 800 ohms

Minimum supply voltage (VDC) = 9 + 0.02 x

(Resistance of receiver plus line).

Maximum supply voltage (VDC) = 30 + 0.004 x

(Resistance of receiver plus line).

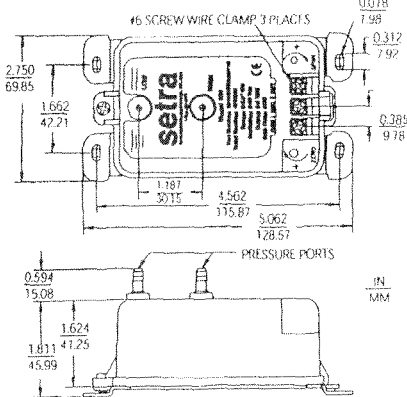
\* Calibrated at factory with a 24 VDC loop supply voltage, and a 250 ohm load.

\*\* Zero output factory set to within ±0.16mA (±0.08 mA for optional accuracies).

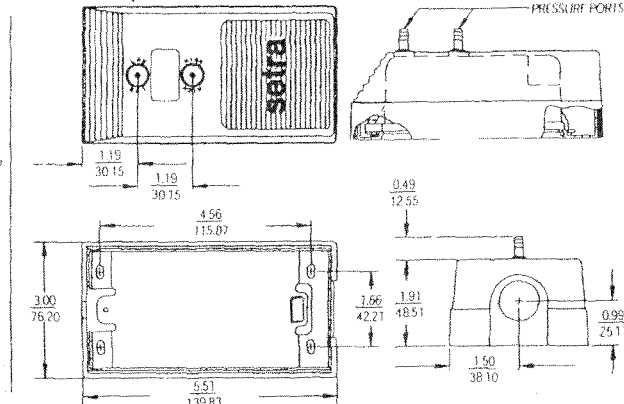
\*\* Span (Full Scale) output factory set to within ±0.16mA (±0.08 mA for optional accuracies).

## Outline Drawings

### Code T1 Electrical Termination Dimensions



### Optional 1/2" Conduit Electrical Enclosure Dimensions



## ORDERING INFORMATION

### Code all blocks in table.

Example: Part No 26412R5WD11T1C for a 264 Transducer 0 to 2.5 in WC Range, 4 to 20 mA Output, Terminal Strip Electrical Connection, and ±1% Accuracy.

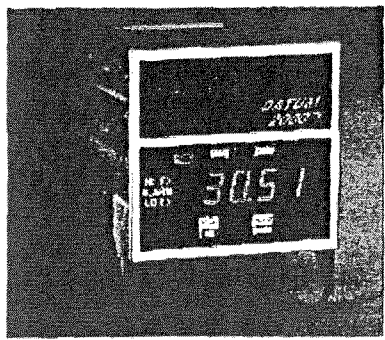
Model	Differential	Bidirectional	Output	Elec. Termination	Accuracy
2641 = 264	0R1WD = 0 to 0.1 in. WC	0R05WB = ±0.05 in. WC	11 = 4-20 mA	T1 = Terminal Strip	C = ±1% FS
	0R25WD = 0 to 0.25 in. WC	0R1WB = ±0.1 in. WC	2D = 0 to 5 VDC	A1 = 1/2" Conduit Enclosure	E = ±0.4% FS
	0R5WD = 0 to 0.5 in. WC	0R25WB = ±0.25 in. WC			F = ±0.25% FS
	001WD = 0 to 1 in. WC	0R5WB = ±0.5 in. WC			G = ±1% FS
	0025WD = 0 to 2.5 in. WC	001WB = ±1 in. WC			
	003WD = 0 to 3 in. WC	1R5WB = ±1.5 in. WC			
	005WD = 0 to 5 in. WC	2R5WB = ±2.5 in. WC			
	010WD = 0 to 10 in. WC	005WB = ±5 in. WC			
	015WD = 0 to 15 in. WC	7R5WB = ±7.5 in. WC			
	025WD = 0 to 25 in. WC	010WB = ±10 in. WC			
	050WD = 0 to 50 in. WC	025WB = ±25 in. WC			
	100WD = 0 to 100 in. WC	050WB = ±50 in. WC			

Please contact factory for versions not shown.

While we provide application assistance on all Setra products, both presently and through our literature, it is the customer's responsibility to determine the suitability of the product in the application.

159 Swanson Road, Boxborough, MA 01719/Tel: 978-263-1400  
Toll Free: 800-257-3872; Fax: 978-264-0292; email: sales@setra.com

SSP264 Rev-D 04/19/01



## DATUM 2000™ Manometer w/Transducer Installed

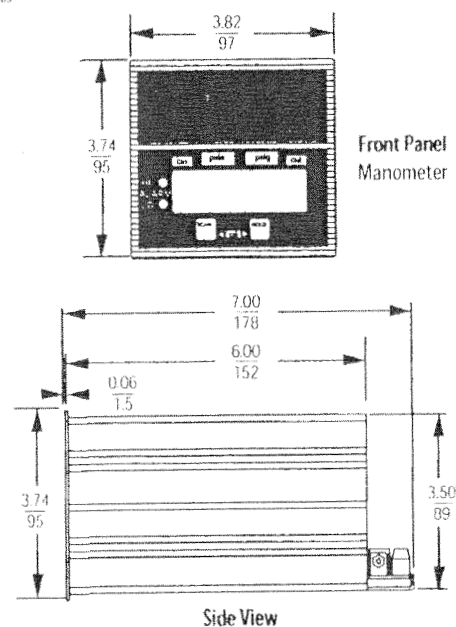
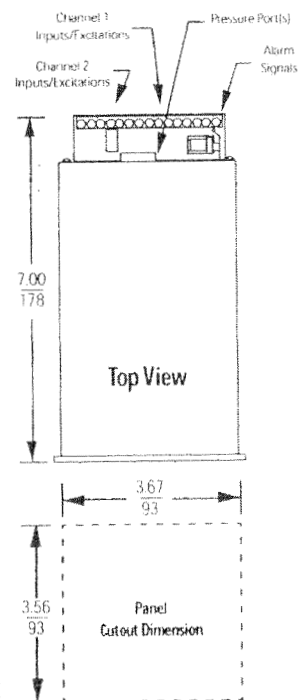
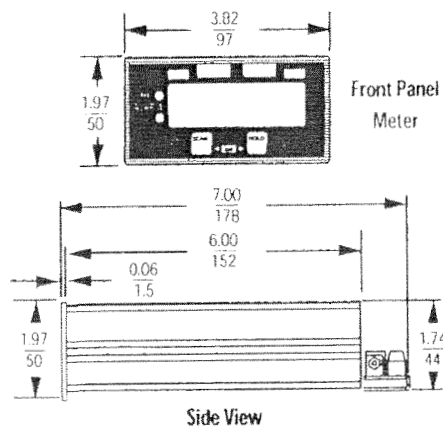
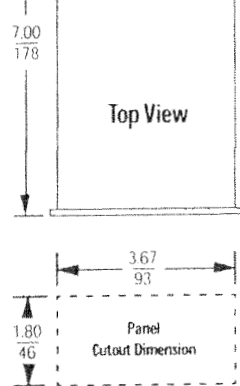
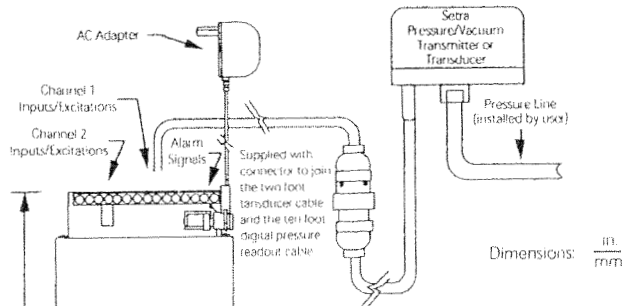
The DATUM 2000™ Manometer is a complete system with built-in pressure or vacuum transducer. A wide selection of standard pressure ranges is available for gauge, absolute, differential and vacuum measurements from  $\pm 0.25$  inches WC to 1000 psi.

The transducer installed in the Manometer operates on channel one of the two channel meter. Channel two is available for any other voltage or current input from another remote instrument.

Setra pressure transducer Models 204, 204D, 239 and 270 are available for installation in the 1/4 DIN Datum Manometer.

### DATUM 2000™ Manometer Transducer Specifications

Type of Pressure Measurement	w/Models 204/204D	w/Model 239	w/Model 270
<b>Standard Ranges</b>	Gauge Absolute Vacuum Differential  0 to 25, 50, 100, 250, 500, 1000 psig 0 to 25, 50, 100, 250, 500, 1000 psia 0 to 25, 50, 100 psid 0 to 14.7 psiv 0 to $\pm 10$ , $\pm 25$ , $\pm 50$ , $\pm 100$ psid	Differential Gauge  0 to 0.5, 1.0, 2.5, 5, 15, 30 inch WC 0 to $\pm 0.25$ , $\pm 5$ , $\pm 1.0$ , $\pm 2.5$ , $\pm 7.5$ , $\pm 15$ inch WC 0 to 5, 10 psid 0 to $\pm 2.5$ , $\pm 5$ psid	Gauge Absolute Barometric  0 to 5, 10, 20, 50, 100 psig 0 to 10, 20, 50, 100 psia 600-1100 millibar 800-1100 millibar
<b>System Accuracy (RSS)</b>	$\pm 0.11\%$ FS $\pm 2$ digits $\pm 0.22\%$ FS $\pm 2$ digits* * For $\pm 100$ , $\pm 250$ , $\pm 500$ PSID Ranges	$\pm 0.14\%$ FS $\pm 2$ digits	$\pm 0.05\%$ FS $\pm 2$ digits
<b>Thermal Effects</b> %FS -60°F to +95°F			
Thermal Zero Shift	0.14 max. $\pm 4$ digits	0.35 max. $\pm 4$ digits	0.07 max. $\pm 4$ digits
Thermal Span Shift	0.11 max. $\pm 4$ digits	0.35 max. $\pm 4$ digits	0.04 max. $\pm 4$ digits
<b>Pressure Fittings</b>			
Positive	1/4" 18 NPT internal	1/8" 27 NPT internal	1/8" 27 NPT internal
Reference	1/8" 27 NPT internal	1/8" 27 NPT internal	N/A
<b>Pressure Media</b>			
Positive	Gas compatible with 17-4 PH stainless steel.** **Note: Hydrogen not recommended for use with 17-4 PH stainless steel.	Gases compatible with stainless steel, hard anodized 6061 aluminum, Buna N O-ring.	Non-condensing air or gas compatible with aluminum, alumina, ceramics, gold, fluorocarbon elastomer sealant and Buna-N O-Ring.
Reference	Clean dry air or other gases. (Non corrosive, non condensable.)	Clean dry air or other gases. (Non corrosive, non condensable.)	N/A
<b>Analog Output</b>	Normally 0 to 5 VDC for unidirectional pressure or vacuum ranges. 0 to $\pm 2.5$ VDC for bidirectional ranges.	Normally 0 to 5 VDC for unidirectional pressure 0 to $\pm 2.5$ VDC for bidirectional ranges.	0 to 5 VDC for gauge and absolute ranges



## Ordering Instructions

### DATUM 2000™ Meter only

Order as DATUM 2000-1 meter for 115 VAC converter or DATUM 2000-2 for 220 VAC converter with European 2-prong turret.

### DATUM 2001 Meter with One Transducer or Transmitter Set-up

To order factory set-up with one transducer or transmitter and 10ft. cable/connector assembly, specify option 2001-1 for 115 VAC converter or 2001-2 for 220 VAC European converter. Transducer or transmitter ordered and priced separately.

### DATUM 2002 Meter with Two Transducers or Transmitters Set-up

For two factory setups and cable assemblies with two transducers or transmitters, specify option 2002-1 for 115 VAC or 2002-2 for 220 VAC European converter. Transducers or transmitters ordered and priced separately.

### DATUM Manometer with Transducer Installed

To order a manometer with a Model 204 pressure transducer, order part #2204; with a Model 239, order part #2239; with a Model 270, order part #2270. Specify pressure range.

### Options:

- 602: 1-5 VDC Output (2204, 2239 only)
- 603: 1-6 VDC Output (2204, 2239 only)
- 607: 0-5 VDC Output (2239 bidirectional only)
- 653: 220 VAC converter (Manometer only)
- 654: RS-232 Output
- 811-825: 11-25 ft. of cable\*

\*Consult factory for lengths above 25 ft. of cable.

Specifications subject to change without notice.



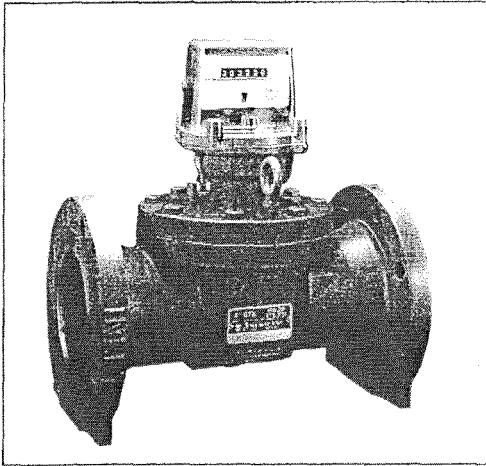
159 Swanson Road  
Boxborough, Massachusetts 01719  
Telephone: 978-263-1400 • Fax: 978-264-0292

**800-257-3872**

# AMERICAN METER

## GTX Gas Turbine Meters

### Data Sheet



American Meter's gas turbine meters bring together refinements in design learned from years of application experience. GTX turbine meters are based on the standard GTS turbine meter design with the removal of certain features, making them an extremely cost-effective option for industrial applications while maintaining meter accuracy and the quality expected from American Meter products.

GTX meters are available in 4", 6", and 8" sizes with maximum allowable operating pressures up to 175 psig. As shown in the features and benefits listed, many of the optional accessories for GTS turbine meters remain available on the GTX Series, such as medium- and low-frequency pulsers.

#### Related Bulletins:

Instruction Manual ..... JM 4720  
 Repair Parts List ..... RPL 4810  
 Medium Frequency Pulser ..... JMP 6778  
 Electronic Temp. Comp. .... IM 4730

#### Features – Benefits – Optional Accessories

- *Mechanical Drive Output*
- *Mechanical and Electronic Pulse Outputs*
- *Temperature Compensation*
- *Mechanical Drive Models* for use with P&T Correctors or *Electronic Pulse Output Models* to interface directly with popular flow computers.
- *Electronic Temperature Compensation* with Fixed Factor Pressure and six-month data storage.
- *One Output Gear Train* for all meter sizes; reduces spare parts inventory.
- *High-Efficiency Inlet Flo-Guide®* flow conditioners to minimize the effects of flow disturbances in short-coupled installations.
- *Interchangeable Pre-Calibrated Measurement Cartridges* for easy maintenance.  
 NOTE: GTX cartridges fit only into GTX bodies.
- *Three-Point Accuracy Curve* supplied as standard.
- *Five-Point Accuracy Curve* (optional).
- *Medium- and High-Pressure Accuracy Curves* available.
- *Cartridge Recertification and Repair Services.*
- *Mercury or Equimeter Corrector Adapter Plates.*
- *Output Drive: 100 ft (4" and 6")*  
*Output Drive: 1,000 ft (8")*

#### Comparison Chart

Feature	GTS	GTX
Pressure Ratings	175, 720, 1,440	175
Bearings/ Lubrication	Standard SST Bearings/Oiler	Self-Lubricating Bearings/No Oiler System
Outlet Diffuser	Standard	None
Compatibility	GTS/AccuTest/GT	GTX Only
Rotors	.45" or .30" Metal or Plastic	.45" Only Plastic Only
Pulsers	High-, Medium-, or Low-Frequency	Medium- or Low-Frequency

### Capacity Table

Size	45° Rotor Angle				
	Qmax MSCFH	Qmin MSCFH	Range Qmax/Qmin	Minimum Actual Flow Rate MACFH	Pressure Drop Inches W.C.
4"	18	1.2	15	1.20	2.4
6"	36	1.9	18	1.94	3.3
8"	60	3	20	3.00	1.6

### GTX Basic Specifications (Figure 1)

Size	Material AL=aluminum		Dimensions (inches)		Flange				ANSI	Weight (lbs.)	Cartridge Bolt Torque (lb-ft.)
					(Inches)		Bolts				
	Body	Top	A	B	O.D.	*B.D.	No.	Dia. (in.)			
4"	AL	AL	5.85	14.0	8.00	7.50	8	5/8	150 FF	32	20
6"	AL	AL	6.42	16.0	11.00	9.50	8	3/4	150 FF	64	35
8"	AL	AL	7.42	21.0	13.50	11.75	8	3/4	150 RF	90	70

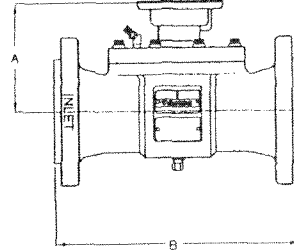


Figure 1  
GTX Specifications

Note: GTX MAOP = 175 psig

\*B.D. = Bolt Circle Diameter

B = Standard

Operating Temperature Range:

-40°F to +140°F

-40°C to +60°C

Manufacturing Standards

ANSI/ASME MFC - 4M - 1986

AGA Report #7

### GTX Ordering Information

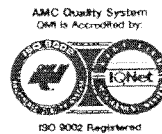
- **Size:**
  - 4" - 100 mm
  - 6" - 150 mm
  - 8" - 200 mm
- **Maximum Allowable Working Pressure:**
  - 175 psi/12 bar
  - 175 psi/12 bar
  - 175 psi/12 bar
- **Index:** Clock Type, Odometer Type, None
- **Model:**
  - Mechanical Instrument Drive Output only
  - Mechanical Instrument Drive Output and Medium-Frequency Pulse Output
  - Mechanical Instrument Drive and Low-Frequency Pulse Output
  - Mercury or Equimeter Corrector Adapter Plate



300 Welsh Road  
Building One  
Horsham, PA 19044-2234 U.S.A.  
Phone: 215/830-1800  
Fax: 215/830-1890  
Website: americanmeter.com



275 Industrial Road  
Cambridge, Ontario, N3H 4R7 Canada  
Phone: 877/461-2626 (toll free)  
Phone: 519/650-1900  
Fax: 519/650-1917  
Website: canadianmeter.com



ISO 9002 Registered



Dutch Council for Accreditation

6/21/2008

**Six Month Meter Calibration**  
40 CFR 60 METHOD 2A

Serial No: 21429

**PITOT TUBE VELOCITY AND FLOW RATE CALIBRATION FOR 8" TURBINE**

**DEFINITIONS:**

$M_a$ = Mol. wt. of Air (lb/lb-mole)	$T_s$ = Absolute avg. stack gas temperature (°K)
$v_s$ = Duct gas velocity (ft/sec)	$T_{std}$ = Standard temperature (20°C or 68°F)
$Q_{sd}$ = Std. dry volumetric duct flow rate (dscf/	$P_s$ = Absolute duct pressure (in Hg.)
$K_p$ = Pitot tube constant	$P_{std}$ = Standard pressure (in Hg.)
$C_p$ = Pitot tube coefficient (dimensionless)	$P_{bar}$ = Barometric pressure (mm Hg.)
$\Delta p$ = Velocity head of stack gas (in H <sub>2</sub> O)	$A$ = Cross sectional area of duct ( $\pi r^2$ )

**DATA INPUT: please enter the following data using correct units;**

	<u>30 % Flow</u>	<u>60 % Flow</u>	<u>90 % Flow</u>	
$\Delta p$ =	0.05	0.17	0.41	in. H <sub>2</sub> O (from pitot tube)
$T_s$ =	5.1	5.2	5.2	°C (from thermister/thermometer)
$P_g$ =	0.9	3.2	6.5	in H <sub>2</sub> O (from pitot tube)
***** $P_g$ =	1.681488	5.978624	12.14408	mm Hg (calculated)
$P_{bar}$ =	761.3	761.3	761.3	mm Hg (from barometer)
$Dia$ =	7.875	7.875	7.875	in I.D.
***** $A$ =	0.3382425	0.3382425	0.3382425	ft <sup>2</sup> (calculated from above)

**CORRECTED DATA/CONSTANTS USED IN FORMULAS:**

	<u>30 % Flow</u>	<u>60 % Flow</u>	<u>90 % Flow</u>	
$T_{std}$ =	528	528	528	°K
$T_s$ =	501.18	501.36	501.36	°K
$P_{std}$ =	29.92	29.92	29.92	in. Hg
$P_{bar}$ =	29.972441	29.972441	29.972441	in. Hg
$P_s$ =	30.038641	30.20782	30.450554	in. Hg
$M_a$ =	28.9644	28.9644	28.9644	lb/lb-mole (from Mark's M.E. Handbook)
$C_p$ =	0.99	0.99	0.99	Dimensionless
$K_p$ =	85.49	85.49	85.49	$\frac{ft^2}{sec^2} \left[ \frac{lb}{lb-mole} \left( \frac{in. Hg}{in. Hg} \right)^{-1} \right]$

**CALCULATE: Average duct gas velocity**

$$v_s = K_p \cdot C_p \cdot [(\Delta p)^{-1}] \cdot [(T_s / (P_s \cdot M_a))^{-1}] \quad \text{Eq. 2.9}$$

	<u>30 % Flow</u>	<u>60 % Flow</u>	<u>90 % Flow</u>	
$v_s$ =	14.36349	26.41544	40.85897	(ft/sec)
=	861.80939	1584.9264	2451.5382	(ft/min)
=	262.74676	483.20927	747.42018	(m/min)

**CALCULATE: Average duct gas volumetric flow rate**

$$Q_{sd} = 3600 \cdot v_s \cdot A \cdot [(T_{std} \cdot P_s) / (T_s \cdot P_{std})] \quad \text{Eq. 2.10}$$

	<u>30 % Flow</u>	<u>60 % Flow</u>	<u>90 % Flow</u>	
$Q_{sd}$ =	18499.053	34200.349	53325.62	(scf/hr)
=	308.31755	570.00581	888.76033	(scf/min)



= 2306.3756 4263.9399 6648.3895 (gal/min)  
 = 8.7315532 16.142565 25.169693 (meters3/min)  
 = 43.657766 80.712823 125.84846 (meter3/5 min.)

**INPUT: Average Ves Values from 5-minute Test Data Printouts.**

Qsd = 43.22 80.32 122.6 (cubic meters)

**CALCULATE: The Test Meter Calibration Coefficient.**

$$Y_m = \frac{(V_{rf} - V_{ri}) \times (T_r + 273)}{(V_{mf} - V_{mi}) \times (T_m + 273)} \times \left( \frac{P_b}{P_b + P_g} \right) \quad \text{Eq. 2A-1}$$

Y<sub>m</sub> = 1.0079026 0.9970606 1.0103791 All meter coefficients must be between 0.95 and 1.05.

**DETERMINE: The Minimum and Maximum Coefficients.**

Maximum Value: 1.0103791  
 Minimum Value: 0.9970606

Difference: 0.0133185 Must not exceed 0.030

**CALCULATE: The Average Test Meter Calibration Coefficient Value:**

Avg Y<sub>m</sub> = Sum of three Y<sub>m</sub> Values / 3

Avg Y<sub>m</sub> = 1.0051141 This value gets entered into computer program for test trailer constants.

**CALIBRATE: The Test Trailer Temperature Thermistors**

Reference Thermometer:  
 Fisher: 885-250  
 ID 15041D

	Actual Reading (Deg. C)	Reference Reading (Deg. C)	Percent Difference	Allowable
Flow Temperature Thermistor	5.2	5.5	-5.7892308	+/- 2.0 %
Ambiant Temperature Thermistor	5.6	5.5	1.7857143	+/- 2.0 %

**CALIBRATE: The Test Trailer Barometer**

Trailer Barometer: Setra: Model 361  
 Reference Barometer: Princo - NOVA

	Actual Reading (mm Hg)	Reference Reading (mm Hg)	Difference	Allowable
Barometric Reading	761.3	762	-0.7	+/- 2.5 mm Hg

**CALIBRATE: Flow Pressure Transducer**

Trailer Flow Transducer: Setra Model: 264  
 Reference: Water Slack Tube Monometer

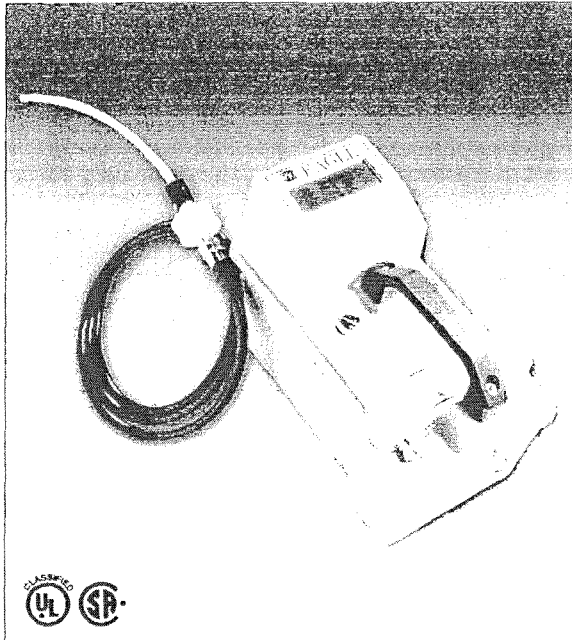
	Actual Reading (mm Hg)	Reference Reading (mm Hg)	Difference	Allowable
Flow Pressure Reading	0	0	0	+/- 2.5 mm Hg
	1.2	1.2	0	+/- 2.5 mm Hg
	8.4	8.3	0.1	+/- 2.5 mm Hg



# ONE TO SIX GAS PORTABLE MONITOR

Gas Detection For Life

**EAGLE™ Model**



## Features

- Simultaneous detection of up to 6 different gases
- Over 250 gas monitoring configurations
- Wide range of toxic gases
- PPM / LEL hydrocarbon detection
- Powerful long-life pump up to 125' range with filters
- Low flow pump shut off and alarm
- Methane elimination switch for environmental use
- Security "Adjustment Lockout Switch"
- Up to 30 hours of continuous operation
- Alkaline or Ni-Cad capability
- IR Sensors available for 50% CO<sub>2</sub>, 100% LEL CH<sub>4</sub>, and 100% volume CH<sub>4</sub>
- Transformer testing version available
- Datalogging option
- Autocalibration
- Dual hydrophobic filters (most versions)
- Ergonomic RFI / EMI / chemical / weather resistant enclosure
- Intrinsically safe design, CSA (C / US) & UL Classified (most versions)

RKI is proud to offer the most versatile portable gas detector on the market. Equipped with features that are not available on most competitive units, the EAGLE is a powerful instrument that does more than offer standard confined space protection. Detection combinations never before offered in a portable gas monitor are now available featuring the industry's widest selection of high quality, long life and field proven sensors.

The EAGLE features include PPM or LEL hydrocarbon detection at the push of a button, infrared sensors for CO<sub>2</sub> and combustible monitoring including 100% volume methane, a methane elimination switch for environmental applications, a long list of super toxic gases and measurable ranges, and dual hydrophobic filters to increase its water resistant performance. For quick response and recovery from distant sampling locations, the EAGLE has a *strong internal pump* with a low flow auto shut off and alarm, which can draw samples up to 125 feet even with the dual hydrophobic filters in place. The EAGLE will continuously operate for over 30 hours on alkaline batteries or 18 hours on Ni-Cads. A variety of accessories are also available to help satisfy almost any application such as long sample hoses, special float probes for tank testing, datalogging, continuous operation adapters, remote alarms and strobes, and dilution fittings just to name a few.

With its ergonomic design and large glove friendly buttons, the EAGLE offers easy access to controls such as autocalibration, alarm silence, demand zero, peak hold and a wide variety of other features. Each channel has two alarm levels plus TWA and STEL alarms for toxic channels. The two alarm levels are user adjustable and can be latching or self resetting. Rugged, reliable, easy to operate and maintain, the EAGLE is the solution for just about any portable gas monitoring situation.

RKI Instruments, Inc • 33248 Central Ave. Union City, CA • Phone (800) 754-5165 • (510) 441-5656 • Fax (510) 441-5650

World Leader In Gas Detection & Sensor Technology

[www.rkiinstruments.com](http://www.rkiinstruments.com)

# EAGLE™ Model

<b>Enclosure</b>	Weather resistant, chemical resistant, RFI / EMI coated high impact polycarbonate-polyester blend. Can operate in rain or set into 2.5" of water without damage. Ergonomically balanced with rugged top mounted handle.
<b>Dimensions</b>	10.5" L x 5.9" W x 7" H
<b>Weight</b>	5 lbs
<b>Detection Principle</b>	Catalytic combustion, electrochemical cell, galvanic cell, and infrared.
<b>Sensor Life</b>	2 years under normal conditions
<b>Sampling Method</b>	Powerful, long-life pump (over 6,000 hours) can draw samples over 125 feet. Flow rate approximately 2.0 SCFH.
<b>Display</b>	4 x 20 LCD readout. Viewed through window in case top. Displays readings & status of all channels simultaneously. Backlight, automatic for alarms and by demand with adjustable time.
<b>Alarms</b>	2 alarms per channel plus TWA and STEL alarms for toxics. The two alarms are fully adjustable for levels, latching or self reset and silenceable.
<b>Alarm Method</b>	Buzzer 85 dB at 30 cm, dual high intensity LEDs, and flashing display.
<b>Controls</b>	6 external glove friendly push buttons for operation, demand zero, and autocalibration. Buttons also access LEL / ppm, alarm silence, peak hold, TWA / STEL values, battery status and many other features.
<b>Continuous Operation</b>	30 hours minimum using alkaline batteries, or 18 hours using Ni-Cads
<b>Power Source</b>	4 alkaline or Ni-Cad, size D batteries. Charger has alkaline recognition to prevent battery damage if charging is attempted with alkalines.
<b>Operating Temp. &amp; Humidity</b>	-10°C to 40°C (14°F to 104°F), 0 to 95% RH, non-condensing.
<b>Indication Accuracy</b>	Maximum variance +/- 5% of full scale
<b>Response Time</b>	30 seconds to 90% (for most gases) using standard 5 ft hose.
<b>Safety Rating</b>	Intrinsically Safe, Class I, Division 1, Groups A, B, C and D. CSA (C / US) & UL Classified (most versions).
<b>Standard Accessories</b>	Shoulder strap, alkaline batteries, hydrophobic probe and 5 foot hose, Internal hydrophobic filter (most versions) (certain toxic versions equipped with special probe, inlet fitting and 3' teflon hose. For HF and O3 versions, 3' teflon hose used without probe).
<b>Optional Accessories</b>	<ul style="list-style-type: none"> <li>Datalogging of up to 4 gases (No datalogging possible on 5 or 6 gas versions or versions with more than 2 toxic sensors)</li> <li>Remote alarms</li> <li>Dilution fitting (50/50)</li> <li>Ni-Cad batteries</li> <li>Battery charger, 115 VAC, 220 VAC, or 12 VDC</li> <li>Continuous operation adapter, 115 VAC or 12 VDC</li> <li>Extra loud buzzer</li> <li>Extension probes</li> <li>Large internal hydrophobic filter</li> </ul>
<b>Warranty</b>	One year material and workmanship

Specifications subject to change without notice.

Gases & Detectable Ranges	
<b>Standard Confined Space Gases</b>	
Hydrocarbons (CH <sub>4</sub> , std)	0 - 100% LEL 0 - 50,000 ppm
Oxygen (O <sub>2</sub> )	0 - 40% Vol.
Carbon Monoxide (CO)	0 - 500 ppm
Hydrogen Sulfide (H <sub>2</sub> S)	0 - 100 ppm
<b>Super Toxics and Other Gases</b>	
Ammonia (NH <sub>3</sub> )	0 - 75 ppm
Arsine (AsH <sub>3</sub> )	0 - 1 ppm 0 - 200 ppb
Carbon Dioxide (CO <sub>2</sub> ) (I R Sensor)	0 - 5,000 ppm 0 - 10,000 ppm 0 - 5% Vol. 0 - 20% Vol. 0 - 60% Vol.
Chlorine (Cl <sub>2</sub> )	0 - 3 ppm
Chlorine Dioxide (ClO <sub>2</sub> )	0 - 1 ppm
Fluorine (F <sub>2</sub> )	0 - 5 ppm
Hydrogen Fluoride (HF)	0 - 9 ppm
Hydrogen Chloride (HCl)	0 - 15 ppm
Hydrogen Cyanide (HCN)	0 - 30 ppm
Hydrogen Sulfide (H <sub>2</sub> S)	0 - 1 ppm 0 - 30 ppm
Methane (CH <sub>4</sub> ) (I R Sensor)	0 - 100% LEL 0 - 100% Vol.
Isobutane (C <sub>4</sub> H <sub>10</sub> ) (I R Sensor)	0 - 100% LEL 0 - 30% Vol.
Nitrogen Dioxide (NO <sub>2</sub> )	0 - 15 ppm
Nitric Oxide (NO)	0 - 100 ppm
Ozone (O <sub>3</sub> )	0 - 1 ppm
Phosphine (PH <sub>3</sub> )	0 - 1 ppm
Silane (SiH <sub>4</sub> )	0 - 15 ppm
Sulfur Dioxide (SO <sub>2</sub> )	0 - 10 ppm 0 - 15 ppm

The EAGLE can be configured with up to 6 gas sensors including a maximum of 2 super toxics from the above list.

### Special Features

- Low flow alarm shuts pump off to avoid damage to instrument.
- Hydrophobic filter disc in probe.
- Internal hydrophobic filter (most versions).
- Single gas calibration capability.
- Methane elimination switch for environmental applications.
- Security "Adjustment Lockout Switch"
- Confirmation beep (silenceable).
- Meets EPA Method 21 protocol for fugitive emissions testing (most applications).



A9812



ISO 9001 2000

33248 Central Ave. Union City, CA 94587  
Toll Free: (800) 754-5185 • Phone: (510) 441-5656 • Fax: (510) 441-5650  
mail4rki@rkiinstruments.com • www.rkiinstruments.com

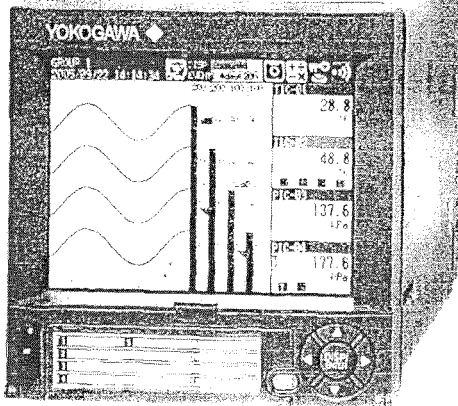
Authorized Distributor:



# DXAdvanced

## DXAdvanced DX1000N Removable Chassis Model

*A removable chassis model has been added to the Yokogawa's latest DXAdvanced Video Graphic Recorder featuring easy maintenance.*



The new DXAdvanced DX1000N features an inner chassis that can be removed from the case via the front panel of the instrument. This provides access to all of the internal components of the DX1000N from the control panel without having to access the rear of the unit or disturb any of the field and power supply wiring. Functionality, appearance, and panel cutout dimensions are the same as those of the standard DX1000.

### Advanced Performance

#### - High-speed measurement

- \* High-speed measurement of up to 25 ms (DX1002N or DX1004N using fast sampling mode)

### Advanced Memory

#### - High Capacity Internal Memory and Removable Media

- \* Supports up to 200 MB of non-volatile, internal flash memory for reliable, long-term data storage
- \* All models include a CompactFlash drive. Rugged and readily available CompactFlash cards (CF cards) serve as the removable media, and are available as optional accessories.
- \* Supports USB Flash drive with optional USB interface.

### Advanced Display and User Interface Functions

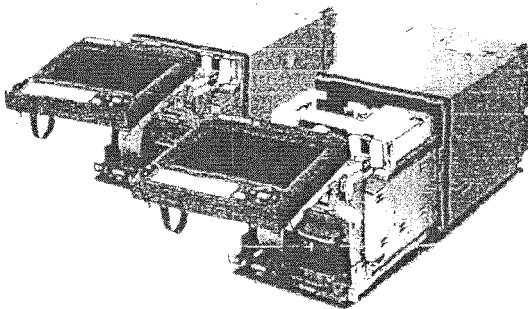
#### - Easy configuration and menu navigation

- \* USB keyboard & remote control options for text entry
- \* Versatile, standard display modes
- \* Jump to your favorite screen with the Favorite key

### Advanced Connectivity

#### - Powerful Ethernet connectivity and convenience functions

- \* Standard Ethernet interface
- \* Includes Web server and E-mail messaging functions, time synchronization (SNTP), automatic network setup (DHCP), file transfer (FTP) and more.



### Advanced Reliability and Security

#### - Rugged construction and data security

- \* Water and dust-proof front panel (complies with IEC529-IP65 and NEMA No.250 TYPE4\*) \*except for external Icing test.
- \* A mechanical lock with removable key is provided to securely latch the front panel door. This forbids access to the power switch and removable media.
- \* Reliable, non-volatile flash memory is used for internal data storage operations with ECC\* function \* ECC: Error Check and Correct

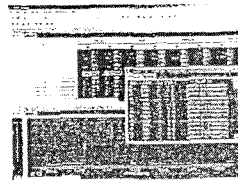
**vigilantplant.**  
The clear path to operational excellence

**YOKOGAWA** ◆



### Application Software (DAQSTANDARD for DXAdvanced)

Every DXAdvanced unit includes a DAQSTANDARD software, which is used for all data file display and reporting functions, including printing and conversion to common file formats. In addition, it includes a configuration tool that is used to fully configure the unit in both on-line (via Ethernet communications) and off-line (saving and loading files from the media) modes. Configuration files can also be archived on the PC.



### Models and Suffix Codes

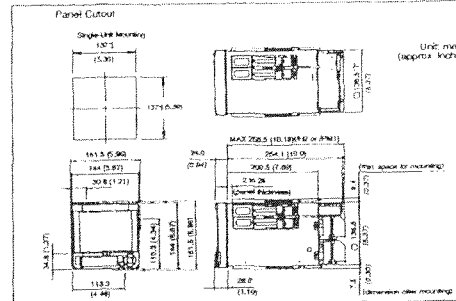
Model code	Suffix code	Options code	Description
DX1002N			2 ch, 125 ms (Fast sampling mode: 25 ms)
DX1004N			4 ch, 125 ms (Fast sampling mode: 25 ms)
DX1006N			6 ch, 1 s (Fast sampling mode: 125 ms)
DX1012N			12 ch, 1 s (Fast sampling mode: 125ms)
Internal memory	-1		Standard memory (80 MB)
External media	-2		Large memory (200 MB)
Display language	-4		CF card (with media)
Options		A1	Alarm output 2 points *1
		A2	Alarm output 4 points *1
		A3	Alarm output 8 points *1 *2
		IC2	RS-232C interface *3
		IC3	RS-422A/485 interface *3
		R1	FAIL/Status output *2
		RI2	Clamped input terminal (detachable)
		M1	Mathematical functions
		RT1	Cu10, Cu25 RTD input/3 leg isolated RTD
		RT2	3 leg isolated RTD *4
		RT3	Extended input type (PFA0-20, P150, etc.)
		PS1	24 VDC/AC power supply
		RM1	Remote control
		/TPS2	24VDC transmitter power supply (2 loops) *5
		/TPS4	24VDC transmitter power supply (4 loops) *6
		KB1	Easy text entry (with input terminal) *7 *8
		KB2	Easy text entry (without input terminal) *7
		USB1	USB Interface
		MP1	Pulse input (including remote control and mathematical functions) *9
		ACC1	Calibration correction function

\*1 A1, A2 and A3 cannot be specified together. \*2 A3 and R1 cannot be specified together.  
 \*3 IC2 and IC3 cannot be specified together. \*4 NO pin is specified for only DX1006N and DX1012N.  
 \*5 In case that /TPS2 is specified, /TPS4, A2, A3 or R1 cannot be specified together.  
 \*6 In case that /TPS4 is specified, /TPS2, A1, A2, A3 or R1 cannot be specified together.  
 \*7 KB1 and KB2 cannot be specified together. \*8 In case that MB1 is specified, remote input terminal (436227) is included.  
 \*9 In case that MP1 is specified, A3, RT1, R1, /TPS2 or /TPS4 cannot be specified. And combination of /ACC1 cannot be specified together.

### Accessories

Product	Model code (part number)	Specification
Shunt resistor (for screw input terminal)	415920	250 Ω ±0.1%
	415921	100 Ω ±0.1%
	415922	10 Ω ±0.1%
Shunt resistor (for clamped input terminal)	438920	250 Ω ±0.1%
	438921	100 Ω ±0.1%
	438922	10 Ω ±0.1%
CF card adapter	772090	
	772091	128 MB
	772092	256 MB
CF card	772093	512 MB
	772094	1 GB
Mounting bracket	B9900EX	-
Door lock key	B0706FX	-
Remote control terminal	436227	For KB1, /KB2 option

### Dimensions



For more details on all functions, see the DX1000/DC1000 catalog (Number DA-11001-01E).  
 For more details on all specifications, see the DX1000N General Specifications (DS-04L-0801-01E).

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 Ethernet is a registered trademark of Xerox Corporation.  
 Other company names and product names appearing in this document are registered trademarks or trademarks of their respective holders.

### Application Software

Model code	Description	OS
DXA120	DAQSTANDARD for DXAdvanced	Windows 2000/XP

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**YOKOGAWA** ◆

# Liquid Technology Corporation

Industry Leader in Specialty Gases, Equipment and Service

## Certificate of Analysis

### - EPA PROTOCOL GAS -

Customer Welders Supply Co (Louisville, KY)  
Date February 21, 2006  
Delivery Receipt DR-16713  
Gas Standard 900 ppm Propane/Nitrogen - EPA PROTOCOL  
Final Analysis Date February 21, 2006  
Expiration Date February 21, 2009

Component Propane  
Balance Gas Nitrogen

Analytical Data: **DO NOT USE BELOW 150 psi**  
EPA Protocol, Section No. 2.2, Procedure G-1

#### Reported Concentrations

**Propane: 896.4 ppm +/- 8.9 ppm**

**Nitrogen: Balance**

#### Reference Standards:

SRM/GMIS:	GMIS	GMIS
Cylinder Number:	CC-166431	CC-166377
Concentration:	494.8 ppm Propane/Nitrogen	995.8 ppm Propane/Nitrogen
Expiration Date:	May 02, 2008	May 02, 2008

#### Certification Instrumentation

Component: Propane  
Make/Model: HP5890-II  
Serial Number: 3336A59393  
Principal of Measurement: GC-FID  
Last Calibration: February 01, 2006

#### Cylinder Data

<u>Cylinder Serial Number:</u>	LL-21903	<u>Cylinder Outlet:</u>	CGA 350
<u>Cylinder Volume:</u>	80 Cubic Feet	<u>Cylinder Pressure:</u>	2000 psig, 70 F
<u>Expiration Date:</u>	February 21, 2009		

Analytical Uncertainty and NIST Traceability are in compliance with EPA-600/R-97/121.

Certified by:   
Date: February 21, 2006

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Fax (407)-292-3313

# Liquid Technology Corporation

Industry Leader in Specialty Gases, Equipment and Service

## Certificate of Analysis - EPA PROTOCOL GAS -

Customer: Welders Supply Company (Louisville, KY)  
Date: July 06, 2007  
Delivery Receipt: DR-19624  
Product: 500.0 ppm Propane/Nitrogen - EPA PROTOCOL  
Final Analysis Date: June 20, 2007  
Expiration Date: June 20, 2010 DO NOT USE BELOW 150 PSIG

Cylinder Data  
Cylinder Serial Number: LL-42355 Cylinder Outlet: CGA 350  
Cylinder Volume: 80 Cubic Feet Cylinder Pressure: 2000 psig, 70°F  
Expiration Date: June 20, 2010

Analytical Data  
EPA PROTOCOL, Section No. 2.2, Procedure G-1

Replicate Concentrations  
Propane: 507.5 ppm +/- 5.0 ppm  
Nitrogen: Balance

Reference Standard(s):  
SRM/GMIS: GMIS  
Cylinder Number: CC-166431  
Concentration: 494.8 ppm Propane/Nitrogen  
Expiration Date: May 02, 2008

Certification Instrumentation  
Component: Propane  
Make/Model: HP5890-II  
Serial Number: 3336A59393  
Principal of Measurement: GC-FID  
Last Calibration: June 01, 2007

Analytical uncertainty and NIST Traceability are in compliance with EPA-600/R-97/121.

Certified by:   
Date: July 06, 2007

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- www.liquidtechcorp.com -

# Liquid Technology Corporation

Industry Leader in Specialty Gases, Equipment and Service

## Certificate of Analysis

### - EPA PROTOCOL GAS -

Customer Welders Supply Co (Louisville, KY)  
Date February 21, 2006  
Delivery Receipt DR-9833  
Gas Standard 250 ppm Propane/Nitrogen - EPA PROTOCOL  
Final Analysis Date February 21, 2006  
Expiration Date February 21, 2009

Component Propane  
Balance Gas Air

Analytical Data: DO NOT USE BELOW 150 psi  
EPA Protocol, Section No. 2.2, Procedure G-1

#### Reported Concentrations

**Propane: 251.6 ppm +/- 2.5 ppm**

**Nitrogen: Balance**

#### Reference Standards:

SRM/GMIS:	GMIS	GMIS
Cylinder Number:	CC-166582	CC-166431
Concentration:	103.2 ppm Propane/Nitrogen	494.8 ppm Propane/Nitrogen
Expiration Date:	May 02, 2008	May 02, 2008

#### Certification Instrumentation

Component: Propane  
Make/Model: HP5890-II  
Serial Number: 3336A59393  
Principal of Measurement: GC-FID  
Last Calibration: February 01, 2006

#### Cylinder Data

<u>Cylinder Serial Number:</u>	LL-4724	<u>Cylinder Outlet:</u>	CGA 350
<u>Cylinder Volume:</u>	80 Cubic Feet	<u>Cylinder Pressure:</u>	2000 psig, 70 F
<u>Expiration Date:</u>	February 21, 2009		

Analytical Uncertainty and NIST Traceability are in compliance with EPA-600/R-97/121.

Certified by:



Date:

February 21, 2006

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# Liquid Technology Corporation

Industry Leader in Specialty Gases, Equipment and Service

Certificate of Analysis

- EPA PROTOCOL GAS -

Customer Welders Supply Co. (Louisville, Kentucky)  
Date March 02, 2006  
Delivery Receipt DR-16713  
Gas Standard 900 ppm CO, 4.50% Carbon Dioxide/Nitrogen - EPA PROTOCOL  
Final Analysis Date March 02, 2006  
Expiration Date March 02, 2009

Component Carbon Monoxide/Carbon Dioxide  
Balance Gas Nitrogen

Analytical Data: DO NOT USE BELOW 150 psig  
EPA Protocol, Section No. 2.2, Procedure G-1

## Reported Concentrations

**Carbon Monoxide: 932.7 ppm +/- 9.3 ppm**

**Carbon Dioxide: 4.55% +/- 0.045%**

**Nitrogen: Balance**

### Reference Standards:

SRM/GMIS:	GMIS/GMIS	GMIS/GMIS
Cylinder Number:	CC-115896/CC-159055	CC-55961/CC-115946
Concentration:	755.8 ppm CO/999.5 ppm CO	1.00% CO2/6.01% CO2/Nitrogen
Expiration Date:	08/11/09 - 08/18/09	03/29/08 - 07/23/06

### Certification Instrumentation

Component:	Carbon Monoxide	Carbon Dioxide
Make/Model:	Nicolet - NEXUS 470	HP5890II
Serial Number:	AEP99000154	3336A59393
Principal of Measurement:	FTIR	TCD
Last Calibration:	March 02, 2006	March 02, 2006

### Cylinder Data

Cylinder Serial Number:	LL-18741	Cylinder Outlet:	CGA 350
Cylinder Volume:	80 Cubic Feet	Cylinder Pressure:	1900 psig, 70F

Analytical Uncertainty and NIST Traceability are in compliance with EPA-600/R-97/121.

Certified by:



Date:

March 02, 2006

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# Liquid Technology Corporation

Industry Leader in Specialty Gases, Equipment and Service

## Certificate of Analysis **- EPA PROTOCOL GAS -**

Customer Welders Supply Co. (Louisville, Kentucky)  
Date July 06, 2007  
Delivery Receipt DR-19624  
Gas Standard 600.0 ppm CO, 3.00% Carbon Dioxide/Nitrogen - EPA PROTOCOL  
Final Analysis Date June 27, 2007  
Expiration Date June 27, 2010

Component Carbon Monoxide, Carbon Dioxide  
Balance Gas Nitrogen

Analytical Data: **DO NOT USE BELOW 150 psig**  
EPA Protocol, Section No. 2.2, Procedure G-1

**Reported Concentrations**  
**Carbon Monoxide: 611.4 ppm +/- 6.1 ppm**  
**Carbon Dioxide: 3.13% +/- 0.03%**  
**Nitrogen: Balance**

### Reference Standards:

SRM/GMIS:	GMIS/GMIS	GMIS/GMIS
Cylinder Number:	CC-166528/CC-115896	CC-55961/CC-115946
Concentration:	496.3 ppm CO/755.8ppm CO	1.00% CO2/6.01% CO2
Expiration Date:	04/06/09 - 08/11/09	03/29/08 - 07/23/10

### Certification Instrumentation

Component:	Carbon Monoxide	Carbon Dioxide
Make/Model:	Nicolet - NEXUS 470	HP5890II
Serial Number:	AEP99000154	3336A59393
Principal of Measurement:	FTIR	TCD
Last Calibration:	June 01, 2007	June 12, 2007

### Cylinder Data

Cylinder Serial Number:	LJ-20938	Cylinder Outlet:	CGA 350
Cylinder Volume:	80 Cubic Feet	Cylinder Pressure:	2000 psig, 70F

Analytical Uncertainty and NIST Traceability are in compliance with EPA-600/R-97/121.

Certified by:  
Date:

  
July 06, 2007

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# Liquid Technology Corporation

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## Certificate of Analysis

### - EPA PROTOCOL GAS -

Customer Welders Supply Co. (Louisville, Kentucky)  
Date March 02, 2006  
Delivery Receipt DR-16713  
Gas Standard 300 ppm CO, 1.50% Carbon Dioxide/Nitrogen - EPA PROTOCOL  
Final Analysis Date March 02, 2006  
Expiration Date March 02, 2009

Component Carbon Monoxide/Carbon Dioxide  
Balance Gas Nitrogen

Analytical Data: DO NOT USE BELOW 150 psig  
EPA Protocol, Section No. 2.2, Procedure G-I

### Reported Concentrations

Carbon Monoxide: 312.9 ppm +/- 3.1 ppm

Carbon Dioxide: 1.48% +/- 0.014%

Nitrogen: Balance

### Reference Standards:

SRM/GMIS:	GMIS/GMIS	GMIS/GMIS
Cylinder Number:	CC-115900/CC-166528	CC-55961/CC-115946
Concentration:	258.8 ppm CO/496.3 ppm CO	1.00% CO2/6.01% CO2/Nitrogen
Expiration Date:	08/11/09 - 04/0609	03/29/08 - 07/23/06

### Certification Instrumentation

Component:	Carbon Monoxide	Carbon Dioxide
Make/Model:	Nicolet - NEXUS 470	HP5890II
Serial Number:	AEP99000154	3336A59393
Principal of Measurement:	FTIR	TCD
Last Calibration:	March 02, 2006	March 02, 2006

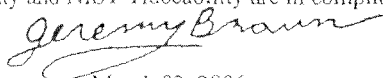
### Cylinder Data

Cylinder Serial Number:	LL-42299	Cylinder Outlet:	CGA 350
Cylinder Volume:	80 Cubic Feet	Cylinder Pressure:	1900 psig, 70F

Analytical Uncertainty and NIST Traceability are in compliance with EPA-600/R-97/121.

Certified by:

Date:

  
March 02, 2006

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# Specialty Gases

Division

Welders Supply Co. P. O. Box 21007 Louisville, Ky. 40221-0007 (502) 635-7531

## Certification of Cylinder Content

Thursday, January 31, 2008

Mix Type: Primary Standard  
Analytic Accuracy:  $\pm 2\%$   
Serial Number: LL-41085  
Cylinder CGA: 350  
Approx. PSI: 160  
Test Date: 080131  
Expiration Date: 31-Jan-11

Analytic Method(s): Gravimetric  
Gas Chromatography

### Cylinder Contents:

Requested Gas	Actual
85 % Propane	84.89 %
bal Nitrogen	Balance

Frank Fogarty  
Specialty Gas Lab Manger

# Specialty Gases

Division

Welders Supply Co. P. O. Box 21007 Louisville, Ky. 40221-0007 (502) 635-7531

## Certification of Cylinder Content

Monday, October 20, 2008

Mix Type	Primary Standard
Analytic Accuracy	± 2%
Serial Number	LL-21916
Cylinder CGA	350
Approx. PSI	2000
Test Date	081020
Expiration Date	20-Oct-11
Analytic Method(s)	Gravimetric Gas Chromatography

### Cylinder Contents:

Requested Gas	Actual
50 % Propane	50.92 %
bal Nitrogen	Balance

Frank Fogarty  
Specialty Gas Lab Manger

# Specialty Gases

Division

Welders Supply Co. P. O. Box 21007 Louisville, Ky. 40221-0007 (502) 635-7531

## Certification of Cylinder Content

Thursday, January 31, 2008

Mix Type: Primary Standard  
Analytic Accuracy:  $\pm 2\%$   
Serial Number: LL-20930  
Cylinder CGA: 350  
Approx. PSI: 160  
Test Date: 080131  
Expiration Date: 31-Jan-11

Analytic Method(s): Gravimetric  
Gas Chromatography

### Cylinder Contents:

Requested Gas	Actual
25 % Propane	24.955 %
bal Nitrogen	Balance

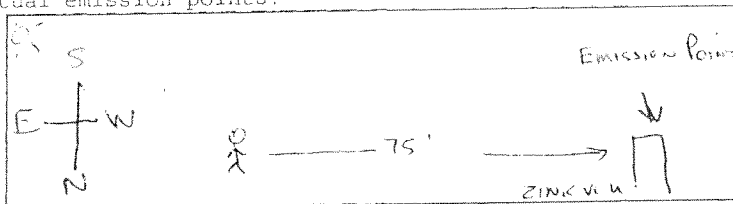
Frank Fogarty  
Specialty Gas Lab Manger

**APPENDIX C**

**VISIBLE EMISSION METHOD 22  
DATA SHEET**

FUGITIVE OR SMOKE EMISSION INSPECTION OUTDOOR LOCATION	
Company <u>MOTIVA ENTERPRISES</u> Location <u>PORT EVERGLADES, FL</u> Company Rep.	Observer <u>Tony Fenton</u> Affiliation <u>Blue Heaven</u> Date <u>11/19/08</u>
Sky Conditions <u>CLEAR</u> Precipitation <u>NONE</u>	Wind Direction <u>From West</u> Wind Speed <u>5-15 MPH</u>
Industry	Process Unit <u>ZINC VU</u>

Sketch process unit: indicate observer position relative to source; indicate potential emission points and/or actual emission points.



OBSERVATIONS	Clock Time	Observation period duration, min:sec	Accumulated emission time, min:sec
Begin Observation	<u>7:45 - 8:00</u>	<u>15</u>	<u>0</u>
	<u>8:05 - 8:20</u>	<u>15</u>	<u>0</u>
	<u>8:30 - 8:40</u>	<u>10</u>	<u>0</u>
	<u>8:45 - 9:00</u>	<u>15</u>	<u>0</u>
	<u>9:05 - 9:20</u>	<u>15</u>	<u>0</u>
	<u>9:25 - 9:40</u>	<u>15</u>	<u>0</u>
	<u>9:45 - 10:00</u>	<u>15</u>	<u>0</u>
	<u>10:05 - 10:20</u>	<u>15</u>	<u>0</u>
	<u>10:30 - 10:45</u>	<u>15</u>	<u>0</u>
End <u>10:45am</u> Observation	_____	_____	_____
<u>2 hrs Observation</u>			

Figure 22-1



**APPENDIX D**

**COMPUTER PRINTOUT  
VOC ANALYER STRIP CHARTS**



John Jordan Service Company  
Technical Services Group  
502 267-8344

### ***Vapor Combustion Performance Test***

**Test Id:** 000694123-00445  
**Test for:** Motiva Enterprise LLC South  
Port Everglades, FL  
**Unit Tested:** Zink VCU  
**Test Date:** 11/19/2008  
**Test Personnel:** Tony Fenton  
**Strip Chart Recorder Speed:** 150

All data fields are rounded 2 places following the decimal for display purposes. Internal to the program all data fields are 8 digits following the decimal.

### **Outlet Calibration Information**

Allowable range is +/- 5% of actual span gas Concentration

Low range span gas concentration	251.60 PPM, Cylinder # LL-4724
Mid range span gas concentration	507.50 PPM, Cylinder # LL-42355
High range span gas concentration	896.40 PPM, Cylinder # LL-21903
Zero span analyzer reading	0.09 PPM
Zero range analyzer error	0.00 PPM
Low range analyzer reading	252.42 PPM
Low range analyzer error	0.33 PPM
Mid range analyzer reading	505.53 PPM
Mid range analyzer error	-0.39 PPM
High range analyzer reading	899.41 PPM
High range analyzer error	0.34 PPM

### **Inlet Calibration Information**

Allowable range is +/- 5% of actual span gas Concentration

Low range span gas concentration	24.955 %, Cylinder # LL-20930
Mid range span gas concentration	50.92 %, Cylinder # LL-21916
High range span gas concentration	84.89 %, Cylinder # LL-41085
Zero span analyzer reading	0.00 %
Zero range analyzer error	0.00 %
Low range analyzer reading	25.09 %
Low range analyzer error	0.54 %
Mid range analyzer reading	50.73 %
Mid range analyzer error	-0.37 %
High range analyzer reading	85.06 %
High range analyzer error	0.20 %

### **CO Calibration Information**

Allowable range is +/- 5% of actual span gas Concentration

<b>Low range span gas concentration</b>	312.90 PPM, Cylinder # 42299
<b>Mid range span gas concentration</b>	611.40 PPM, Cylinder # 20938
<b>High range span gas concentration</b>	932.70 PPM, Cylinder # 18741
<b>Zero span analyzer reading</b>	0.42 PPM
<b>Zero range analyzer error</b>	0.00 PPM
<b>Low range analyzer reading</b>	312.35 PPM
<b>Low range analyzer error</b>	-0.18 PPM
<b>Mid range analyzer reading</b>	612.54 PPM
<b>Mid range analyzer error</b>	0.19 PPM
<b>High range analyzer reading</b>	937.74 PPM
<b>High range analyzer error</b>	0.54 PPM

### **CO2 Calibration Information**

Allowable range is +/- 5% of actual span gas Concentration

<b>Low range span gas concentration</b>	1.48 %, Cylinder # 42299
<b>Mid range span gas concentration</b>	3.13 %, Cylinder # 20938
<b>High range span gas concentration</b>	4.55 %, Cylinder # 18741
<b>Zero span analyzer reading</b>	0.00 %
<b>Zero range analyzer error</b>	0.00 %
<b>Low range analyzer reading</b>	1.46 %
<b>Low range analyzer error</b>	-1.35 %
<b>Mid range analyzer reading</b>	3.15 %
<b>Mid range analyzer error</b>	0.64 %
<b>High range analyzer reading</b>	4.55 %
<b>High range analyzer error</b>	0.00 %

Time	Baro P (mm Hg)	Flow P (mm Hg)	Atn T (Deg C)	In T (Deg C)	HC In (Vol %)	HC out (Vol ppm)	Vin (m <sup>3</sup> )	VinStd (m <sup>3</sup> )	Min (mg)	Vout (m <sup>3</sup> )	Mout (mg)	CO (Vol ppm)	CO <sub>2</sub> (Vol %)
07:45	765.0013651	2.242906	13.85813148	11.25598704	17.82156	0	5.841565646	6.08	1982471	182.0	0	175.21896	1.7985122
07:50	765.0795365	1.131073	14.3997537	10.43036852	18.08779	39.904157	12.827668	13.37	4425361	616.9	45052	253.88186	1.1685659
07:55	765.1422567	0.04604	15.0593469	11.18075185	15.81247	88.485126	3.245464627	3.37	974895.3	193.1	24198	180.02106	0.8192039
08:00	765.1194548	0.236578	15.33698519	11.57498333	18.78129	254.79713	0.863711028	0.90	307800.1	135.5	63168	60.324413	0.3198923
08:05	765.1527425	2.071858	15.70941481	11.81428889	34.1611	71.379315	18.26056714	18.96	11855377	561.2	73302	444.8311	3.4274097
08:10	765.2063889	0.011707	16.49092778	12.15467983	41.23743	131.91382	4.866081378	5.03	3799117	302.4	72994	565.93203	1.9835445
08:15	765.2247184	0.029068	16.8865963	12.60100550	39.50279	248.46371	0.887025232	0.92	662398.4	59.4	27009	468.49697	1.7368836
08:20	765.2225682	1.526528	17.35704259	12.89069444	47.12562	75.093366	16.39934798	16.96	14623030	693.7	95335	482.0053	3.4187482
08:25	765.2821881	0.486533	18.96432963	12.64637407	52.81323	63.219856	9.801399715	9.91	9580731	525.3	60774	591.32845	2.9417956
08:30	765.2830166	0.011512	17.42141296	13.38302778	0	0	0	0.00	0	0.0	0	0	0
08:35	765.2751978	3.415371	17.76221667	13.56086296	53.84644	54.062056	21.8942379	22.75	22413562	974.8	96438	307.29914	3.7524897
08:40	765.2689271	4.251856	18.06937593	13.51628889	47.31627	42.100839	26.88902945	27.64	23929003	1041.7	80255	422.01862	3.7410137
08:45	765.2825032	2.347042	17.98406296	14.10994815	36.34844	64.456629	8.6903497	8.96	5958505	332.9	39271	1291.8405	2.815434

Outlet span check completed at 08:45 the reading is: 507.27 PPM

Outlet zero check completed at 08:46 the reading is : 7.20 PPM

CO2 span check completed at 08:46 the reading is: 3.14%

CO span check completed at 08:46 the reading is: 613.06 PPM

CO2 zero check completed at 08:46 the reading is: 0.06%

CO zero check completed at 08:48 the reading is: 1.58 PPM

Inlet span check completed at 08:48 the reading is: 50.52 %

Inlet zero check completed at 08:48 the reading is: 0.34%

#1 span ck

08:50	765.3516688	2.064938	18.28452407	14.22033704	56.94799	40.766852	13.1381911	13.53	14104508	779.4	58149	779.21267	2.9063288
08:55	765.3429581	0.106778	18.75986667	15.18736481	53.21574	53.809198	7.32313779	7.50	7302829	462.6	45548	614.51076	2.5406188
09:00	765.2789271	4.185583	18.89375926	14.51628889	47.27235	40.100839	27.90294528	28.79	24905470	1481.9	108748	321.18615	2.7410137
09:05	765.3326073	1.049622	19.10144444	16.18477037	21.4577	165.96564	8.231896202	8.41	3302906	699.7	212499	163.38579	0.7377614
09:10	765.4078234	4.080849	19.79941481	15.02791111	40.30837	56.589876	28.07653292	26.86	19814109	836.8	86661	345.27881	3.8800694
09:15	765.438711	0.121238	19.95662593	15.87032407	37.81394	131.41984	7.521497303	7.68	5289835	512.4	123233	557.78874	1.6271862
09:20	765.4844681	4.959655	20.21155185	18.07363889	49.70778	50.994918	24.23454875	24.90	22651327	921.9	86032	318.23135	4.0108274
09:25	765.4892027	4.415135	21.1979965	15.46511852	53.51765	35.236139	24.1991291	24.90	24385721	1353.8	87298	270.83497	2.9452219
09:30	765.5147222	2.29531	21.44441111	16.40430826	54.17423	32.221157	20.39945858	20.87	20685851	877.1	51717	347.44791	3.8519413
09:35	765.5451747	3.99957	21.0439037	16.51427778	55.47441	50.484846	24.49596044	25.10	25483817	1223.8	113060	304.58592	3.3981927
09:40	765.5479789	2.589368	21.69906852	16.62669444	53.40925	60.882197	20.54498158	21.01	20532226	1133.6	126297	381.51768	2.9448803
09:45	765.5822577	0.107398	22.30697593	17.89179815	51.73589	54.895158	3.585290368	3.64	3444708	245.5	24658	790.34893	2.2351388

Outlet span check completed at 09:45 the reading is: 499.27 PPM

Outlet zero check completed at 09:46 the reading is : 4.98 PPM

CO2 span check completed at 09:46 the reading is: 3.16%

CO span check completed at 09:46 the reading is: 614.99 PPM

CO2 zero check completed at 09:49 the reading is: 0.06%

CO zero check completed at 09:49 the reading is: 0.57 PPM

Inlet span check completed at 09:49 the reading is: 50.20 %

Inlet zero check completed at 09:50 the reading is: 0.10%

#2 span ck

09:50	765.5436446	1.328007	22.33850558	17.88257963	48.00058	46.553888	7.823928839	7.95	8994039	321.0	28522	348.75336	3.5524212
09:55	765.5275783	1.561178	22.92773889	17.81117222	53.75963	31.578654	16.6030641	16.88	16611016	679.7	33495	741.15084	4.6441839
10:00	765.5557506	1.903841	22.57714074	18.2179963	58.16069	29.938179	17.19158257	17.47	18592730	728.2	39897	515.83802	4.1549788
10:05	765.5699968	1.434026	23.58202407	18.17119074	51.05734	64.950817	15.20746829	15.44	14429308	657.9	78192	798.72741	3.5263659
10:10	765.4832046	0.107946	23.26103889	19.7702	22.3519	59.638958	7.249301811	7.31	2989491	399.2	43565	286.74743	1.2111869

Time	Baro P (mm Hg)	Flow P (mm Hg)	Alm T (Deg C)	In T (Deg C)	HC In (Vol %)	HC out (Vol ppm)	Vin (m <sup>3</sup> )	VinStd (m <sup>3</sup> )	Min (mg)	Vout (m <sup>3</sup> )	Mout (mg)	CO (Vol ppm)	CO <sub>2</sub> (Vol %)
10:15	765.4710986	0.100745	23.01207037	20.23198519	10.48048	112.57865	5.749311031	5.79	1109913	399.7	82344	117.08218	0.4397455
10:20	765.4910986	0.101745	23.21207037	20.18851852	12.04833	42.578649	7.749311031	7.80	1720058	382.0	29761	157.08218	0.7397455
10:25	765.4430613	0.590977	24.50785	20.36552963	13.78413	174.39765	8.042456495	8.10	2042323	407.9	130175	184.48852	0.7800747
10:30	765.4674983	3.272886	23.82665	19.50405	42.16453	38.763322	23.70766862	24.02	18535332	598.8	42474	437.81034	5.0493952
10:35	765.426895	1.803727	24.41226687	19.43918704	41.34601	71.368382	15.39103225	15.57	11778993	533.1	69623	544.96025	3.5783816
10:40	765.390752	0.01437	24.41489444	20.69459074	35.19758	112.38006	5.003232904	5.03	3237996	266.6	54823	623.09855	1.9252241
10:45	765.3125956	0.708973	24.43313333	21.53947037	23.18848	76.174772	10.03667045	10.06	4270489	447.5	62386	305.55266	1.5409141
10:50	765.268447	4.679333	24.68410185	20.32893333	50.13196	19.859697	27.17548929	27.50	25229911	860.9	31289	412.61063	4.7870497
10:55	765.1890905	8.49048	25.85509615	19.9078	53.32824	1.7131084	38.97443511	39.69	38733292	1473.2	4618	250.61988	4.314722
11:00	765.1625233	0.521458	26.03745	20.73327963	50.68525	0	16.692787	16.78	15560517	685.5	0	671.64887	3.6838216

Outlet span check completed at 10:59 the reading is: 504.35 PPM  
 Outlet zero check completed at 11:01 the reading is: 6.36 PPM  
 CO2 span check completed at 11:01 the reading is: 3.15%  
 CO span check completed at 11:01 the reading is: 614.13 PPM  
 CO2 zero check completed at 11:03 the reading is: 0.06%  
 CO zero check completed at 11:03 the reading is: 1.26 PPM  
 Inlet span check completed at 11:04 the reading is: 50.63 %  
 Inlet zero check completed at 11:04 the reading is: 0.11%

#3 span ck

11:05	765.1087139	0.010428	26.47089074	21.93810185	0	0	0	0.00	0	0.0	0	0	0
11:10	765.0944927	2.792209	26.56076481	22.17551687	48.23277	72.719171	15.89058503	15.94	14067520	815.9	108571	254.34568	2.8094128
11:15	765.0703108	7.271554	27.67537407	20.91145741	43.53333	18.784692	35.93770905	35.50	28279290	1266.2	43526	292.10833	3.6564973
11:20	765.0844701	4.93325	27.68410185	20.89333333	44.13196	19.859697	26.17548928	26.44	21353884	850.5	30910	212.81083	4.1188705
11:25	765.0428585	0.846637	26.32176481	21.89053519	35.7734	12.232706	12.3690837	12.39	8108151	479.7	10738	564.1935	2.7410861
11:30	765.0474639	1.423456	27.11235826	21.93118704	28.54195	26.927031	14.65654044	14.89	7670240	460.9	22709	904.93457	2.6598981
11:35	765.0080557	0.972223	26.58526481	22.28876296	26.59205	87.388326	14.24258533	14.24	6931559	539.8	86318	586.38335	2.0503873
11:40	764.9641321	0.743258	27.84708852	22.59678519	24.65367	57.954283	10.53306477	10.52	4745905	456.9	48459	491.01581	1.6882861
11:45	764.9097526	0.240483	27.84400556	23.29396111	22.35817	81.253005	8.4690329	8.43	3449962	493.7	73404	263.55061	1.1249224

Outlet span check completed at 11:46 the reading is: 507.29 PPM  
 Outlet zero check completed at 11:47 the reading is: 3.08 PPM  
 CO2 span check completed at 11:47 the reading is: 3.13%  
 CO span check completed at 11:47 the reading is: 610.04 PPM  
 CO2 zero check completed at 11:48 the reading is: 0.06%  
 CO zero check completed at 11:48 the reading is: 1.52 PPM  
 Inlet span check completed at 11:49 the reading is: 51.04 %  
 Inlet zero check completed at 11:49 the reading is: 0.09%

#4 span ck

11:50	764.8490126	3.359728	28.48780741	22.56484074	44.12167	7.5540533	15.460348	15.49	12508846	805.6	11136	283.52611	2.5449483
11:55	764.8152449	1.755211	28.54094815	22.74856296	53.49407	40.357497	17.70197014	17.69	17317148	742.2	54815	414.53319	3.8013868
12:00	764.7235123	0.06568	28.32245556	23.45743148	53.43715	90.51681	3.302829839	3.28	3212398	381.7	63229	484.49082	1.3340195
12:05	764.6838524	6.118502	27.88167593	23.31797778	54.77447	3.7745574	30.81366139	30.90	30975300	1165.8	8051	224.63714	4.3630067
12:10	764.6240492	3.201371	28.12897963	23.14134074	58.25067	8.4638413	28.35727	28.35	30735602	1378.0	21344	282.40618	3.6555679
12:15	764.5687797	0.073232	27.81488704	23.72917407	57.81144	28.87803	22.27806	22.13	23416838	1582.6	86534	746.28795	2.9719931
12:20	764.4969786	1.70005	27.77185828	23.64741481	62.99091	17.720403	16.80449127	16.73	19290541	819.1	26561	405.31931	3.8451659
12:25	764.4551553	0.608748	27.31342593	23.16183148	64.65301	18.473823	11.46893657	11.42	13514496	749.7	25346	382.61213	2.9412188
12:30	764.4074664	0.443029	27.78914815	23.67544258	63.93474	44.113617	2.482821145	2.47	2887340	213.4	17224	121.98417	2.2230163
12:35	764.3460664	0.037422	27.27109444	24.16173889	63.4324	42.18559	1.36929	1.36	1576326	2595.7	200386	20.660252	0.1148335

Outlet span check completed at 12:35 the reading is: 504.43 PPM

Time	Baro P (mm Hg)	Flow P (mm Hg)	Atm T (Deg C)	In T (Deg C)	HC In (Vol %)	HC out (Vol ppm)	Vin (m <sup>3</sup> )	VinStd (m <sup>3</sup> )	Min (mg)	Vout (m <sup>3</sup> )	Mout (mg)	CO (Vol ppm)	CO <sub>2</sub> (Vol %)
Outlet zero check completed at 12:36 the reading is : 6.68 PPM													
CO2 span check completed at 12:37 the reading is: 3.15%													
CO span check completed at 12:37 the reading is: 613.77 PPM													
CO2 zero check completed at 12:39 the reading is: 0.06%													
CO zero check completed at 12:39 the reading is: 0.48 PPM													
Inlet span check completed at 12:39 the reading is: 50.50 %													
Inlet zero check completed at 12:39 the reading is: 0.57%													
12:40	764.2797159	0.012074	27.78955185	23.83364074	47.32306	51.413743	12.236987	12.14	10516421	1018.2	95803	649.66023	1.8427301
12:45	764.6977972	0.173232	27.61488704	23.82917407	47.14391	27.803042	13.325828	13.24	11421475	842.5	42868	446.26795	2.1993072
12:50	764.2081301	6.378466	27.72661296	23.3245463	64.70611	7.7329711	34.0574508	34.15	34183938	1219.2	17254	235.76808	4.6003737
12:55	764.1593161	2.021332	27.83265	23.21560741	58.26828	32.081623	18.13820898	18.09	19285115	1019.7	59868	489.43917	3.071718
13:00	764.1208979	2.740171	28.58781481	23.85784074	58.21547	33.861499	16.12840295	16.06	17112708	818.8	50739	654.62499	3.3805414
13:05	764.0714839	5.092347	28.57045556	23.74878148	61.5817	7.1376682	28.87841149	28.86	32519625	1226.3	16018	218.55863	4.3533153
13:10	764.0290904	2.449711	27.3198463	23.78498148	61.42870	40.08549	18.4872199	18.41	20692283	1106.5	81168	252.01853	3.05848
13:15	763.9652902	0.505543	27.24884074	23.87942222	51.9786	3.0287539	22.268906	22.11	21029316	1022.2	5662	823.83831	3.3193045
13:20	763.9280721	7.058922	27.51801852	23.42264074	38.26683	6.3296976	35.54925289	35.65	24063705	992.3	11494	375.94885	4.1145692
13:25	763.8407949	3.850064	27.15107037	23.23547222	30.89795	7.9474049	19.97151623	19.95	11282629	705.4	10260	225.13132	2.6270812
13:30	763.8224484	1.629378	26.66285	23.84022778	28.57394	51.890687	19.3693676	19.26	10069351	465.2	44009	381.35513	3.5264208
13:35	763.8189232	2.6038	26.06827593	23.17346296	47.7881	39.483453	18.65150481	18.61	16272635	735.6	53166	298.84351	3.6145206
13:40	763.7650537	0.009994	26.50608889	24.00755	0	0	0	0.00	0	0.0	0	0	0

#5 span ck

55078.0	145.6	1696.5	1384.96	3001.32	3760.47	1104.89	1117.91	9.54E+08	51857.4	3960433	28760.86	193.19
72.0	72.0			69.00	67.00	69.00		68	68	72	68.00	68.00
765.0	2.0	23.6	19.24	43.50	56.13						422.95	2.84

POST CALIBRATIONS:

Outlet span check completed at 13:40 the reading is: 509.44 PPM

Outlet zero check completed at 13:42 the reading is : 6.17 PPM

CO2 span check completed at 13:42 the reading is: 3.14%

CO span check completed at 13:42 the reading is: 611.27 PPM

CO2 zero check completed at 13:44 the reading is: 0.06%

CO zero check completed at 13:44 the reading is: 0.18 PPM

Inlet span check completed at 13:44 the reading is: 50.52 %

Inlet zero check completed at 13:45 the reading is: 0.31%

PRELIMINARY TEST RESULTS

The test data Id is 000694123-00445

Average Barometric Pressure was	764.97 mm Hg
Average Flow Pressure was	2.02 mm Hg
Average Ambient Temperature was	23.56 Deg C
Average Inlet Temperature was	19.24 Deg C
Average Inlet Concentration was	43.50 Vol. %
Average Outlet Concentration was	56.1 Vol. PPM
Average CO out concentration was	422.95 Vol. PPM
Average CO2 out concentration was	2.84 Vol. %
Total volume in standardized was	1117.9 cubic meters
Total volume emitted was	51,857.4 cubic meters
Total milligrams in was	953,641,512.5 mg
Total milligrams emitted was	3,960,432.9 mg
Accountable gallons loaded was	238,545.0 gallons
Total gallons loaded was	335,700.0 gallons
Accountable liters loaded was	902,892.8 liters
Total Liters loaded was	1,270,624.5 liters
Accountable milligrams emitted per liter loaded was	4.39 mg/L
Total milligrams emitted per liter loaded was	3.12 mg/L
Unit Efficiency was	99.58 %