



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Washington, DC 20460

OFFICE OF
AIR AND RADIATION

APR - 8 2019

Mr. Steve Hoke
Clean Diesel Group LLC
10505 Plaza Drive BLDG C
Whitmore Lake, MI 48189

Dear Mr. Hoke:

The U.S. Environmental Protection Agency (EPA) has reviewed your request for verification of the Clean Diesel Group LLC's (CDG) Semi-Active Electric Diesel Particulate Filter (SEF) System for on-road application. The SEF System is a diesel oxidation catalyst (DOC) and a non-catalyzed diesel particulate filter (DPF) with an electric element to initiate filter regeneration for broad applicability on vehicles with low temperature exhaust profiles. The SEF system also includes a back pressure monitoring and warning system, and Regeneration Control Station Assembly. Based on the information provided, EPA hereby verifies that this technology reduces emissions of certain criteria pollutants by the percentages described in the table below.

This verification approval is based on the technical information and test data provided along with the in-use compliance test report approved by the California Air Resource Board (CARB). CARB's in-use approval is accepted by EPA through the reciprocity policy.

Technology	Engine Model/Application	Fuel, Max Sulfur (ppm)	Reductions (%)			
			PM	NO _x	HC	CO
Semi-Active Electric Diesel Particulate Filter (SEF) System	On-road, 4-stroke diesel engines, turbocharged or naturally aspirated for engines rated ≤ 400 hp, originally manufactured from model year 1991-2006, and engine family name listed in the Attachment A	15	90	N/A	65	60

The following criteria must be met for appropriately retrofitted engines to achieve the aforementioned emission reductions:

1. The engine must meet at a certified PM emission level of at most 0.25 grams per brake horsepower-hour.
2. The engine must have rated exhaust flow not to exceed 2,700 cubic feet per minute.

3. The engine must be used by an on-road motor vehicle with a manufacturer's Gross Vehicle Weight Rating of over 14,000 pounds.
4. The engine must be rated to no more than 400 horsepower and it must have a displacement of no more than 13 liters.
5. The engine may be certified as having exhaust gas recirculation.
6. The engine may be mechanically or electronically controlled.
7. The engine must be well maintained and not consume lubricating oil at a rate greater than that specified by the engine manufacturer.
8. The vehicle may not be equipped with an oil burning system and lube oil or other oils may not be mixed with the fuel.
9. The engine must not have been originally certified or equipped with a diesel particulate filter.
10. The engine must remain in its original certified configuration, except that if an OEM oxidation catalyst is present, it may be removed if the SEF System is installed. Should the SEF System be removed, the OEM oxidation catalyst must be re-installed, returning the engine to its original certified configuration.
11. The system must be installed with a backpressure monitor to notify the operator when the backpressure limit is reached. The notification must occur and be clearly visible to the operator while the vehicle or equipment is in use.
12. Use of the SEF system requires a Regeneration Control Station Assembly for periodic regeneration of the filter.

Prior to the sale and/or installation of an SEF Muffler System, CDG must provide each prospective owner/purchaser of the SEF Muffler System with a written estimate of regeneration frequency required for each SEF installation for each in various weather conditions. The required regeneration frequency may range from every 1 to 30 days. Also, prior to sale and/or installation of an SEF Muffler System, CDG must provide each prospective owner/purchaser of the SEF Muffler System with a written estimate of the number and cost of Regeneration Control Station Assemblies required to support their systems. CDG must also ensure that the installation of the SEF Muffler System conforms to all applicable industrial safety requirements.

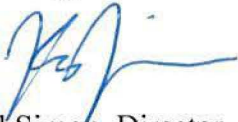
CDG estimates that this device will incur no discernible fuel economy penalty when used in a compatible application. No changes are permitted to the SEF device without the written approval of EPA. This verification does not automatically confer to modified devices or devices that are similar to this original verification. Changes to the verified device without EPA written approval shall invalidate this verification. EPA reserves the right to conduct testing of technologies

submitted for verification. Verification approval and web listing may be revoked if the technology is modified from the device tested and described in the application or if it fails to meet requirements in EPA testing.

Information on CDG's SEF System, percent reduction, and applicable engines will be posted on the EPA's Verified Technology List website at: <https://www.epa.gov/verified-diesel-tech/verified-technologies-list-clean-diesel>. EPA reserves the right to review and/or revoke this verification if these operating criteria are not met or if information becomes available regarding the safety, design and/or operation of the technology.

Thank you for participating in EPA's Technology Assessment Center Verification Program. If you have any questions or comments, please contact Britney J. McCoy, of my staff, at 202-343-9218.

Sincerely,



Karl Simon, Director
Transportation and Climate Division
Office of Transportation and Air Quality

EPA/CARB-Approved Engine Families for Semi-Active Electric Filter (SEF) Muffler System Attachment A

Notes:

- Engines have maximum power of more than 400 horsepower (hp) . Not all engines in this family are approved for the SEF Muffler System. The SEF MufflerSystem is only verified for engines rated to no more than 400 hp.

Model Year	Manufacturer	Engine Family	Displacement (Liter)		Note
			1.0	2	
1991	Caterpillar	MCT0403FZC1	6.6		
1991	Caterpillar	MCT0403FZD2	6.6		
1991	Caterpillar	MCT0403FZE3	6.6		
1991	Caterpillar	MCT0629FZD4	10.3		
1991	Cummins	MCE03.4FAA2	3.4		
1991	Cummins	MCE0359FAA9	5.9		
1991	Cummins	MCE0359FABX	5.9		
1991	Cummins	MCE0505FAA2	8.3		
1991	Cummins	MCE0611FZA2	10.0		
1991	Cummins	MCE0611FZB3	10.0		
1991	Detroit Diesel Corporation	MDD11.1FZA2	11.1		
1991	Ford	MFM07.8FPK8	7.8	6.6	
1991	General Motors	MGM06.2DAB2	6.2		
1991	Hino	MHM03.8FAA0	3.8		
1991	Hino	MHM06.5FAA6	6.5		
1991	International	MNV0360EPC7	5.9		
1991	International	MNV0360FPCX	5.9		
1991	International	MNV0466EPC4	7.6		
1991	International	MNV0466FPC7	7.6		
1991	International	MNV07.3DAA1	7.3		
1991	Mercedes-Benz	MMB5.96FAA3	6.0		
1991	Perkins	MPE0365FAA1	6.0		
1991	Renault	MRE0335FAA4	6.2		
1991	Volvo	MVT06.7FAA1	6.7		
1992	Caterpillar	NCT0403FZC0	6.6		
1992	Caterpillar	NCT0403FZD1	6.6		
1992	Caterpillar	NCT0403FZE2	6.6		
1992	Caterpillar	NCT0629FZD3	10.3		
1992	Caterpillar	NCT0638FPCX	10.5		
1992	Cummins	NCE0359FAA8	5.9		
1992	Cummins	NCE0359FAB9	5.9		
1992	Cummins	NCE0505FAA1	8.3		
1992	Cummins	NCE0611FZA1	10.0		
1992	Cummins	NCE0611FZB2	10.0		
1992	General Motors	NGM06.2DAB1	6.2		

**EPA/CARB-Approved Engine Families for Semi-Active Electric Filter (SEF) Muffler System
Attachment A**

Model Year	Manufacturer	Engine Family	Displacement (Liter)		Note
			1.0	2	
1992	General Motors	NGM06.5EAB5	6.5		
1992	International	NNV0360EPC6	5.9		
1992	International	NNV0360FPC9	5.9		
1992	International	NNV0466EPA1	7.6		
1992	International	NNV0466FPC6	7.6		
1992	International	NNV07.3DAA0	7.3		
1992	Mitsubishi	NMM0238FAA0	3.9		
1992	Mitsubishi	NMM0302FAA0	4.9		
1992	Mitsubishi	NMM0460FAA6	7.5		
1992	Nissan	NND0254EAB1	4.2		
1992	Nissan	NND0423FAC9	6.9		
1992	Nissan	NND0452FAC9	7.4		
1993	Caterpillar	PCT0403FZC9	6.6		
1993	Caterpillar	PCT0403FZDX	6.6		
1993	Caterpillar	PCT0403FZE0	6.6		
1993	Caterpillar	PCT0403FZF1	6.6		
1993	Caterpillar	PCT0629FZD1	10.3		1
1993	Caterpillar	PCT0629FZE2	10.3		
1993	Caterpillar	PCT0638FPC8	10.5		
1993	Cummins	PCE0359FAA6	5.9		
1993	Cummins	PCE0359FAB7	5.9		
1993	Cummins	PCE0359FAC8	5.9		
1993	Cummins	PCE0359FAD9	5.9		
1993	Cummins	PCE0359FDA1	5.9		
1993	Cummins	PCE0505FAAX	8.3		
1993	Cummins	PCE0505FAB0	8.3		
1993	Cummins	PCE0505FDA5	8.3		
1993	Cummins	PCE0505FDD8	8.3		
1993	Cummins	PCE0611FZAX	10.0		
1993	Cummins	PCE0611FZB0	10.0		
1993	Cummins	PCE0661FZA2	10.8		
1993	Cummins	PCE0661FZB3	10.8		
1993	Detroit Diesel Corporation	PDD08.5FZB7	8.5		
1993	Detroit Diesel Corporation	PDD08.5FZK7	8.5		
1993	Detroit Diesel Corporation	PDD11.1FZAX	11.1		
1993	Detroit Diesel Corporation	PDD11.1FZD2	11.1		
1993	General Motors	PGM06.2DABX	6.2		
1993	General Motors	PGM06.5EAB3	6.5		
1993	Hino	PHM03.8FAA8	3.8		
1993	Hino	PHM06.5FAA3	6.5		

**EPA/CARB-Approved Engine Families for Semi-Active Electric Filter (SEF) Muffler System
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Model Year	Manufacturer	Engine Family	Displacement (Liter)		Note
			1.0	2	
1993	International	PNV0360FPC7	5.9		
1993	International	PNV0408FPA2	6.7		
1993	International	PNV0408FPB3	6.7		
1993	International	PNV0466EPAX	7.6		
1993	International	PNV0466FPC4	7.6		
1993	International	PNV0466FPD5	7.6		
1993	International	PNV0466FPE6	7.6		
1993	International	PNV0466FPF7	7.6		
1993	International	PNV0530FPA2	8.7		
1993	International	PNV07.3DAA9	7.3		
1993	International	PNV07.3EPA2	7.3		
1993	Isuzu	PSZ0235FAA8	3.9		
1993	Isuzu	PSZ0396FAB5	6.5		
1993	Mercedes-Benz	PMB5.96FAA1	6.0		
1993	Mitsubishi	PMM0238FAA9	3.9		
1993	Mitsubishi	PMM0302FAA9	5.0		
1993	Mitsubishi	PMM0460FAA4	7.5		
1993	Nissan	PND0254EABX	4.2		
1993	Nissan	PND0423FAC7	6.9		
1993	Nissan	PND0452FAC7	7.4		
1993	Perkins	PPE0365FAA9	6.0		
1993	Renault	PRE0335FAA0	6.2		
1993	Renault	PRE0377FAB8	6.2		
1993	Renault	PRE0377FAC9	6.2		
1993	Volvo	PVT06.7FAA9	6.7		
1994	Caterpillar	RCP403DZDAAA	6.6		
1994	Caterpillar	RCP403DZDABA	6.6		
1994	Caterpillar	RCP629EZDARA	10.3		
1994	Caterpillar	RCP638EZDARA	10.5		
1994	Cummins	RCE359D6DAAB	5.9		
1994	Cummins	RCE359D6DAAW	5.9		
1994	Cummins	RCE359D6DABW	5.9		
1994	Cummins	RCE505D6DAAA	8.3		
1994	Cummins	RCE505D6DAAB	8.3		
1994	Cummins	RCE505D6DAAC	8.3		
1994	Cummins	RCE505F6DAAW	8.3		
1994	Cummins	RCE611EGDARW	10.0		
1994	Cummins	RCE661EJDARA	10.8		
1994	Cummins	RCE661EJDARW	10.8		
1994	Cummins	RCE661FJDAAA	10.8		

**EPA/CARB-Approved Engine Families for Semi-Active Electric Filter (SEF) Muffler System
Attachment A**

Model Year	Manufacturer	Engine Family	Displacement (Liter)		Note
			1.0	2	
1994	Detroit Diesel Corporation	RDD11.EJDARA	11.1		
1994	Detroit Diesel Corporation	RDD8.5EJDARA	8.5		
1994	Detroit Diesel Corporation	RDD8.5EJDARW	8.5		
1994	Detroit Diesel Corporation	RDD8.5FJDABA	8.5		
1994	General Motors	RGM6.5C6DAAA	6.5		
1994	General Motors	RGM6.5C6DAAB	6.5		
1994	General Motors	RGM6.5C6DAAC	6.5		
1994	General Motors	RGM6.5C6DARW	6.5		
1994	Hino	RHM3.8C7DARW	3.8		
1994	Hino	RHM6.5D7DARW	6.5		
1994	International	RNV408D6DAAW	6.7		
1994	International	RNV444C8DABA	7.3		
1994	International	RNV466D6DOTW	7.6		
1994	International	RNV466D6DAAA	7.6		
1994	International	RNV466D6DABA	7.6		
1994	International	RNV466D6DARW	7.6		
1994	International	RNV466D6DASW	7.6		
1994	International	RNV530D6DAAA	8.7		
1994	International	RNV7.3C8DAAA	7.3		
1994	Isuzu	RSZ3.9C6DARW	3.9		
1994	Mercedes-Benz	RMB6.0D6DAAA	6.0		
1994	Mercedes-Benz	RMB6.0D6DARA	6.0		
1994	Mitsubishi	RMT238B7DAAA	3.9		
1994	Nissan	RND254C6DAAA	4.2		
1994	Nissan	RND423D6DAAA	6.9		
1994	Perkins	RPK243C6DAAA	4.0		
1994	Perkins	RPK365D6DAAA	6.0		
1994	Volvo	RVT6.7D6DBRA	6.7		
1995	Caterpillar	SCP403DZDAAA	6.6		
1995	Caterpillar	SCP403DZDABA	6.6		
1995	Caterpillar	SCP403DZDARK	6.6		
1995	Caterpillar	SCP442DZDARK	7.2		
1995	Caterpillar	SCP629EZDARK	10.3		
1995	Caterpillar	SCP629EZDARM	10.3		
1995	Caterpillar	SCP638EZDARA	10.5		
1995	Cummins	SCE239D6DAAA	3.9		
1995	Cummins	SCE359D6DAAA	5.9		
1995	Cummins	SCE359D6DAAW	5.9		
1995	Cummins	SCE359D6DABW	5.9		
1995	Cummins	SCE505D6DAAA	8.3		

**EPA/CARB-Approved Engine Families for Semi-Active Electric Filter (SEF) Muffler System
Attachment A**

Model Year	Manufacturer	Engine Family	Displacement (Liter)		Note
			1.0	2	
1995	Cummins	SCE505D6DAAW	8.3		
1995	Cummins	SCE505D6DABW	8.3		
1995	Cummins	SCE505F6DAAW	8.3		
1995	Cummins	SCE611EGDARW	10.0		
1995	Cummins	SCE661EJDARA	10.8		
1995	Cummins	SCE661EJDARW	10.8		
1995	Cummins	SCE661EJDASW	10.8		
1995	Cummins	SCE661EJDATW	10.8		
1995	Cummins	SCE661FJDAAA	10.8		
1995	Detroit Diesel Corporation	SDD11.EJDARA	11.1		
1995	Detroit Diesel Corporation	SDD8.5EJDARA	8.5		
1995	Detroit Diesel Corporation	SDD8.5EJDARW	8.5		
1995	Detroit Diesel Corporation	SDD8.5FJDABA	8.5		
1995	Hino	SHM3.8C7DARW	3.8		
1995	Hino	SHM6.5D7DARW	6.5		
1995	International	SNV444C8D0AA	7.3		
1995	International	SNV444C8D0RA	7.3		
1995	International	SNV444C8D0SA	7.3		
1995	International	SNV466D6DARA	7.6		
1995	International	SNV466D6DASA	7.6		
1995	International	SNV466D6DATA	7.6		
1995	International	SNV466D8DARB	7.6		
1995	International	SNV466D8DASB	7.6		
1995	International	SNV466D8DATB	7.6		
1995	International	SNV530D6DARA	8.7		
1995	International	SNV530E6DASA	8.7		
1995	International	SNV530F6DATA	8.7		
1995	Isuzu	SSZ3.9C6DARW	3.9		
1995	Isuzu	SSZ7.1D6DAAA	7.1		
1995	Mercedes-Benz	SMB6.0D6DAAA	6.0		
1995	Mercedes-Benz	SMB6.0D6DARA	6.0		
1995	Mitsubishi	SMT460D7DAAA	7.5		
1995	Nissan	SND254C6DAAA	4.2		
1995	Nissan	SND423D6DAAA	6.9		
1995	Perkins	SPK243C6DAAA	4.0		
1995	Perkins	SPK365D6DAAA	6.0		
1995	Renault	SR3377D8DAAW	6.2		
1995	Renault	SR3377D8DABW	6.2		
1995	Volvo	SVT6.7D6DBRA	6.7		
1996	Caterpillar	TCP403D2DAAA	6.6		

**EPA/CARB-Approved Engine Families for Semi-Active Electric Filter (SEF) Muffler
System
Attachment A**

Model Year	Manufacturer	Engine Family	Displacement (Liter)		Note
			1.0	2	
1996	Caterpillar	TCP403DZDABA	6.6		
1996	Caterpillar	TCP403DZDARK	6.6		
1996	Caterpillar	TCP442DZDAAK	7.2		
1996	Caterpillar	TCP442DZDARK	7.2		
1996	Caterpillar	TCP629EZDARK	10.3		
1996	Caterpillar	TCP629EZDARM	10.3		
1996	Caterpillar	TCP638EZDARA	10.5		
1996	Cummins	TCE239D6DAAA	3.9		
1996	Cummins	TCE359D6DAAA	5.9		
1996	Cummins	TCE359D6DABW	5.9		
1996	Cummins	TCE505D6DAAA	8.3		
1996	Cummins	TCE505D6DAAW	8.3		
1996	Cummins	TCE505D6DABW	8.3		
1996	Cummins	TCE661EJDARB	10.8		
1996	Cummins	TCE661EJDARW	10.8		
1996	Cummins	TCE661EJDATW	10.8		
1996	Cummins	TCE661FJDABA	10.8		
1996	Detroit Diesel Corporation	TDD11.EJDARA	11.1		
1996	Detroit Diesel Corporation	TDD8.5EJDARA	8.5		
1996	Detroit Diesel Corporation	TDD8.5EJDARW	8.5		
1996	Detroit Diesel Corporation	TDD8.5FJDABA	8.5		
1996	General Motors	TGM6.5C6DAAA	6.5		
1996	General Motors	TGM6.5C6DABA	6.5		
1996	Hino	THM3.8C7DARW	3.8		
1996	Hino	THM6.5D7DARW	6.5		
1996	International	TNV444C8D0RA	7.3		
1996	international	TNV444C8D0SA	7.3		
1996	International	TNV466D6DARB	7.6		
1996	International	TNV466D6DATB	7.6		
1996	International	TNV466D8DATB	7.6		
1996	international	TNV530D6DARA	8.7		
1996	International	TNV530D8DARA	8.7		
1996	International	TNV530E6DASA	8.7		
1996	International	TNV530E8DASA	8.7		
1996	International	TNV7.3C8DAAA	7.3		
1996	Isuzu	TSZ3.9C6DARW	3.9		
1996	Isuzu	TSZ7.1D6DAAA	7.1		
1996	Mitsubishi	TMT238C7DBAA	3.9		
1996	Mitsubishi	TMT358D7DBAA	5.9		
1996	Mitsubishi	TMT460D7DBAA	7.5		

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Attachment A**

Model Year	Manufacturer	Engine Family	Displacement (Liter)		Note
			1.0	2	
1996	Nissan	TND254C6DAAA	4.2		
1996	Nissan	TND423D6DAAA	6.9		
1996	Perkins	TPK243C6DAAA	4.0		
1996	Perkins	TPK365D6DAAA	6.0		
1996	Renault	TR3377D8DAAW	6.2		
1996	Renault	TR3377D8DABW	6.2		
1996	Volvo	TVT6.7D6DBRA	6.7		
1997	Caterpillar	VCP403DZDAAA	6.6		
1997	Caterpillar	VCP403DZDABA	6.6		
1997	Caterpillar	VCP403DZDARK	6.6		
1997	Caterpillar	VCP442DZDAAK	7.2		
1997	Caterpillar	VCP442DZDARK	7.2		
1997	Caterpillar	VCP629EZDARK	10.3		
1997	Caterpillar	VCP629EZDARX	10.3		
1997	Caterpillar	VCP638EZDARA	10.5		
1997	Cummins	VCE239D6DAAA	3.9		
1997	Cummins	VCE359D6DAAA	5.9		
1997	Cummins	VCE359D6DABW	5.9		
1997	Cummins	VCE359DJDARA	5.9		
1997	Cummins	VCE505D6DAAA	8.3		
1997	Cummins	VCE505D6DAAW	8.3		
1997	Cummins	VCE505D6DABW	8.3		
1997	Cummins	VCE661EJDARB	10.8		
1997	Cummins	VCE661EJDASA	10.8		
1997	Cummins	VCE661EJDATW	10.8		
1997	Cummins	VCE661FJDABA	10.8		
1997	Detroit Diesel Corporation	VDD11.EJDARA	11.1		
1997	Detroit Diesel Corporation	VDD3.8C8DABA	3.8		
1997	Detroit Diesel Corporation	VDD8.5EJDARA	8.5		
1997	Detroit Diesel Corporation	VDD8.5FJDABA	8.5		
1997	General Motors	VGM6.5C6DAAA	6.5		
1997	General Motors	VGM6.5C6DABA	6.5		
1997	General Motors	VGM6.5C6DARW	6.5		
1997	Hino	VHM8.0DHDARA	8.0	5.3	
1997	International	VNV444C8DARW	7.3		
1997	International	VNV444C8DASW	7.3		
1997	International	VNV466D6DARA	7.6		
1997	International	VNV466D8DARW	7.6		
1997	International	VNV466D8DASA	7.6		
1997	International	VNV530D6DARA	8.7		

**EPA/CARB-Approved Engine Families for Semi-Active Electric Filter (SEF) Muffler
System
Attachment A**

Model Year	Manufacturer	Engine Family	Displacement (Liter)		Note
			1.0	2	
1997	International	VNV530D8DARA	8.7		
1997	International	VNV530E6DASA	8.7		
1997	International	VNV530E8DASA	8.7		
1997	International	VNV7.3C8DAAA	7.3		
1997	International	VNV7.3C8DAAW	7.3		
1997	Isuzu	VSZ3.9C6DARA	3.9		
1997	Isuzu	VSZ7.1D6DAAA	7.1		
1997	Isuzu	VSZ7.1D6DAAW	7.1		
1997	Mitsubishi	VMT238C7DBAA	3.9		
1997	Mitsubishi	VMT358D7DBAA	5.9		
1997	Mitsubishi	VMT460D7DBAA	7.5		
1997	Nissan	VND254C6DAAA	4.2		
1997	Nissan	VND423D6DAAA	6.9		
1997	Renault	VR3377D8DAAW	6.2		
1997	Renault	VR3377D8DABW	6.2		
1997	Volvo	VVT6.7D6DBRA	6.7		
1998	Caterpillar	WCPXH0442HRK	7.2		
1998	Caterpillar	WCPXH0442HSK	7.2		
1998	Caterpillar	WCPXH0629ERK	10.3		
1998	Cummins	WCEXH0359BAD	5.9		
1998	Cummins	WCEXH0359BAE	5.9		
1998	Cummins	WCEXH0505CAC	8.3		
1998	Cummins	WCEXH0505CAD	8.3		
1998	Cummins	WCEXH0505CAE	8.3		
1998	Cummins	WCEXH0505CAF	8.3		
1998	Cummins	WCEXH0661MAA	10.8		1
1998	Cummins	WCEXH0661MAB	10.8		
1998	Cummins	WCEXH0661MAC	10.8		
1998	Cummins	WCEXH0661MAD	10.8		1
1998	Cummins	WCEXH0661MAE	10.8		
1998	Detroit Diesel Corporation	WDDXH03.8C1C	3.8		
1998	Detroit Diesel Corporation	WDDXH08.5EJD	8.5		
1998	Detroit Diesel Corporation	WDDXH08.5FJC	8.5		
1998	Detroit Diesel Corporation	WDDXH11.1EHD	11.1		
1998	General Motors	WGMXH06.5522	6.5		
1998	General Motors	WGMXH06.5523	6.5		
1998	General Motors	WGMXH06.5526	6.5		
1998	Hino	WHMXH08.0JTR	8.0	5.3	
1998	International	WNVXH0444CCB	7.3		
1998	International	WNVXH0444CCD	7.3		

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Model Year	Manufacturer	Engine Family	Displacement (Liter)		Note
			1.0	2	
1998	International	WNVXH0466CCB	7.6		
1998	International	WNVXH0466CCD	7.6		
1998	International	WNVXH0530CCB	8.7		
1998	International	WNVXH0530CCD	8.7		
1998	Isuzu	WSZXH07.84RA	7.8		
1998	Mercedes-Benz	WMBXH4.25DJA	4.2		
1998	Nissan	WNDXH04.2TAB	4.2		
1998	Nissan	WNDXH06.9FAB	6.9		
1998	Volvo	WVTXH07.350S	7.3		
1999	Caterpillar	XCPXH0442HRK	7.2		
1999	Caterpillar	XCPXH0442HSK	7.2		
1999	Caterpillar	XCPXH0629ERK	10.3		
1999	Cummins	XCEXH0359BAI	5.9		
1999	Cummins	XCEXH0359BAJ	5.9		
1999	Cummins	XCEXH0359BAK	5.9		
1999	Cummins	XCEXH0505CAC	8.3		
1999	Cummins	XCEXH0505CAD	8.3		
1999	Cummins	XCEXH0505CAE	8.3		
1999	Cummins	XCEXH0505CAF	8.3		
1999	Cummins	XCEXH0661MAC	10.8		
1999	Cummins	XCEXH0661MAG	10.8		
1999	Cummins	XCEXH0661MAH	10.8		1
1999	Cummins	XCEXH0661MAI	10.8		
1999	Detroit Diesel Corporation	XDDXH03.8C1N	3.8		
1999	Detroit Diesel Corporation	XDDXH08.5EJL	8.5		
1999	Detroit Diesel Corporation	XDDXH08.5FJN	8.5		
1999	Detroit Diesel Corporation	XDDXH11.1EHL	11.1		
1999	General Motors	XGMXH06.5523	6.5		
1999	General Motors	XGMXH06.5526	6.5		
1999	Hino	XHMXH08.0JTR	8.0	5.3	
1999	International	XNVXH0444ANA	7.3		
1999	International	XNVXH0444ANB	7.3		
1999	International	XNVXH0466ANA	7.6		
1999	International	XNVXH0466ANB	7.6		
1999	International	XNVXH0530ACT	8.7		
1999	International	XNVXH0530ANA	8.7		
1999	International	XNVXH0530ANB	8.7		
1999	International	XNVXH07.3ACA	7.3		
1999	International	XNVXH07.3ANE	7.3		
1999	Isuzu	XSZXH04.83AA	4.8		

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Model Year	Manufacturer	Engine Family	Displacement (Liter)		Note
			1.0	2	
1999	Isuzu	XSZXH07.84RA	7.8		
1999	Mercedes-Benz	XMBXH4.25DJA	4.2		
1999	Mercedes-Benz	XMBXH6.37DJA	6.4		
1999	Mitsubishi	XMTXH03.9D4A	3.9		
1999	Mitsubishi	XMTXH05.8D6A	5.9		
1999	Mitsubishi	XMTXH07.5D6A	7.5		
1999	Nissan	XNDXH04.6FAB	4.6		
1999	Nissan	XNDXH06.9FAB	6.9		
1999	Renault	XR3XH0377KWC	6.2		
1999	Renault	XR3XH0377LWC	6.2		
1999	Volvo	XVTXH07.350S	7.3		
1999	Volvo	XVTXH07.399B	7.3		
2000	Caterpillar	YCPXH0442HRK	7.2		
2000	Caterpillar	YCPXH0629ERK	10.3		
2000	Cummins	YCEXH0359BAI	5.9		
2000	Cummins	YCEXH0359BAO	5.9		
2000	Cummins	YCEXH0359BAP	5.9		
2000	Cummins	YCEXH0505CAF	8.3		
2000	Cummins	YCEXH0505CAG	8.3		
2000	Cummins	YCEXH0505CAH	8.3		
2000	Cummins	YCEXH0505CAI	8.3		
2000	Cummins	YCEXH0540LAA	8.8		
2000	Cummins	YCEXH0661MAG	10.8		
2000	Cummins	YCEXH0661MAH	10.8		1
2000	Cummins	YCEXH0661MAI	10.8		
2000	DaimlerChrysler	YMBXH4.25DJA	4.3		
2000	DaimlerChrysler	YMBXH6.37DJA	6.4		
2000	Detroit Diesel Corporation	YDDXH03.8C1N	3.8		
2000	Detroit Diesel Corporation	YDDXH08.5EJB	8.5		
2000	Detroit Diesel Corporation	YDDXH08.5EJL	8.5		
2000	Detroit Diesel Corporation	YDDXH08.5FJN	8.5		
2000	General Motors	YGMXH06.5526	6.5		
2000	Hino	YHMXH05.3JTD	5.3		
2000	Hino	YHMXH08.0JTP	8.0		
2000	Hino	YHMXH08.0JTR	8.0		
2000	International	YNVXH0444ACT	7.3		
2000	International	YNVXH0444ANA	7.3		
2000	International	YNVXH0444ANB	7.3		
2000	International	YNVXH0444ANC	7.3		
2000	International	YNVXH0466ANA	7.6		

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Model Year	Manufacturer	Engine Family	Displacement (Liter)		Note
			1.0	2	
2000	International	YNVXH0466ANB	7.6		
2000	International	YNVXH0530ACT	8.7		
2000	International	YNVXH0530ANA	8.7		
2000	International	YNVXH0530ANB	8.7		
2000	International	YNVXH07.3ANA	7.3		
2000	Isuzu	YSZXH04.83AA	4.8		
2000	Isuzu	YSZXH07.84RA	7.8		
2000	Mitsubishi	YMTXH03.9D4A	3.9		
2000	Mitsubishi	YMTXH05.8D6A	5.9		
2000	Mitsubishi	YMTXH07.5D6A	7.5		
2000	Nissan	YNDXH04.6FAB	4.6		
2000	Nissan	YNDXH06.9FAB	6.9		
2000	Renault	YR3XH0377KWC	6.2		
2000	Volvo	YVTXH07.350S	7.3		
2001	Caterpillar	1CPXH0442HAK	7.2		
2001	Caterpillar	1CPXH0442HBK	7.2		
2001	Caterpillar	1CPXH0442HRK	7.2		
2001	Caterpillar	1CPXH0629ERK	10.3		
2001	Cummins	1CEXH0239BAD	3.9		
2001	Cummins	1CEXH0239BAE	3.9		
2001	Cummins	1CEXH0359BAO	5.9		
2001	Cummins	1CEXH0359BAU	5.9		
2001	Cummins	1CEXH0359BAV	5.9		
2001	Cummins	1CEXH0505CAM	8.3		
2001	Cummins	1CEXH0505CAN	8.3		
2001	Cummins	1CEXH0505CAO	8.3		
2001	Cummins	1CEXH0505CAP	8.3		
2001	Cummins	1CEXH0540LAA	8.8		
2001	Cummins	1CEXH0540LAB	8.8		
2001	Cummins	1CEXH0661MAP	10.8		
2001	Cummins	1CEXH0661MAQ	10.8		1
2001	Cummins	1CEXH0661MAR	10.8		
2001	Detroit Diesel Corporation	1DDXH08.5EJB	8.5		
2001	Detroit Diesel Corporation	1DDXH08.5EJL	8.5		
2001	General Motors	1GMXH06.5526	6.5		
2001	Hino	1HMXH05.3JTD	5.3		
2001	Hino	1HMXH08.0JTP	8.0		
2001	Hino	1HMXH08.0JTR	8.0		
2001	International	1NVXH0444ANA	7.3		
2001	International	1NVXH0444ANB	7.3		

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Model Year	Manufacturer	Engine Family	Displacement (Liter)		Note
			1.0	2	
2001	International	1NVXH0444ANC	7.3		
2001	International	1NVXH0466ANA	7.6		
2001	International	1NVXH0466ANB	7.6		
2001	International	1NVXH0530ACT	8.7		
2001	International	1NVXH0530ANA	8.7		
2001	International	1NVXH0530ANB	8.7		
2001	International	1NVXH07.3ACE	7.3		
2001	International	1NVXH07.3ANA	7.3		
2001	Mercedes-Benz	1MBXH4.25DJA	4.2		
2001	Mercedes-Benz	1MBXH6.37DJA	6.4		
2001	Mercedes-Benz	1MBXH6.37DJC	6.4		
2001	Mitsubishi	1MTXH03.9D4A	3.9		
2001	Mitsubishi	1MTXH04.8M5A	4.9		
2001	Mitsubishi	1MTXH05.8D6A	5.9		
2001	Mitsubishi	1MTXH07.5D6A	7.5		
2001	Nissan	1NDXH04.6FAB	4.6		
2001	Nissan	1NDXH06.9FAB	6.9		
2001	Volvo	1VTXH07.350S	7.3		
2002	Caterpillar	2CPXH0442HAK	7.2		
2002	Caterpillar	2CPXH0442HBV	7.2		
2002	Caterpillar	2CPXH0442HBX	7.2		
2002	Caterpillar	2CPXH0442HRK	7.2		
2002	Caterpillar	2CPXH0629EBX	10.3		
2002	Caterpillar	2CPXH0629ERK	10.3		
2002	Caterpillar	2CPXH0729EBX	11.9		1
2002	Caterpillar	2CPXH0729ERK	11.9		1
2002	Cummins	2CEXH0239BAD	3.9		
2002	Cummins	2CEXH0239BAE	3.9		
2002	Cummins	2CEXH0359BAB	5.9		
2002	Cummins	2CEXH0359BAO	5.9		
2002	Cummins	2CEXH0505CAM	8.3		
2002	Cummins	2CEXH0505CAN	8.3		
2002	Cummins	2CEXH0505CAQ	8.3		
2002	Cummins	2CEXH0540LAB	8.8		
2002	Cummins	2CEXH0540LAC	8.8		
2002	Cummins	2CEXH0661MAP	10.8		
2002	Cummins	2CEXH0661MAS	10.8		
2002	DaimlerChrysler	2MBXH12.0DJA	12.0		
2002	DaimlerChrysler	2MBXH12.8DJA	12.8		1
2002	DaimlerChrysler	2MBXH4.25DJA	4.3		

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Model Year	Manufacturer	Engine Family	Displacement (Liter)		Note
			1.0	2	
2002	DaimlerChrysler	2MBXH6.37DJA	6.4		
2002	DaimlerChrysler	2MBXH6.37DJC	6.4		
2002	Detroit Diesel Corporation	2DDXH08.5EJL	8.5		
2002	Detroit Diesel Corporation	2DDXH08.5FJY	8.5		
2002	Detroit Diesel Corporation	2DDXH12.7EGL	12.7		1
2002	Detroit Diesel Corporation	2DDXH12.7FGN	12.7		
2002	General Engine Products	2GEPH06.5521	6.5		
2002	General Engine Products	2GEPH06.5CFF	6.5		
2002	General Motors	2GMXH06.5521	6.5		
2002	Hino	2HMXH05.3JTD	5.3		
2002	Hino	2HMXH08.0JTP	8.0		
2002	Hino	2HMXH08.0JTR	8.0		
2002	International	2NVXH0365AEA	6.0		
2002	International	2NVXH0444ANA	7.3		
2002	International	2NVXH0444ANB	7.3		
2002	International	2NVXH0444ANC	7.3		
2002	International	2NVXH0466ANA	7.6		
2002	International	2NVXH0466ANB	7.6		
2002	International	2NVXH0530ACT	8.7		
2002	International	2NVXH0530ANA	8.7		
2002	International	2NVXH0530ANB	8.7		
2002	International	2NVXH0530ANC	8.7		
2002	International	2NVXH07.3ACE	7.3		
2002	International	2NVXH07.3ANA	7.3		
2002	Isuzu	2SZXH04.83AA	4.8		
2002	Isuzu	2SZXH06.64RA	6.6		
2002	Isuzu	2SZXH07.84RA	7.8	7.2	
2002	Mack	2MKXH11.9H59	11.9		
2002	Mack	2MKXH11.9V60	11.9		
2002	Mack	2MKXH11.9V61	11.9		
2002	Mack	2MKXH11.9V65	11.9		
2002	Mack	2MKXH11.9V66	11.9		
2002	Mitsubishi	2MTXH03.9D4A	3.9		
2002	Mitsubishi	2MTXH04.8M5A	4.9		
2002	Mitsubishi	2MTXH05.8D6A	5.9		
2002	Mitsubishi	2MTXH07.5D6A	7.5		
2002	Nissan	2NDXH04.6FAB	4.6		
2002	Nissan	2NDXH06.9FAB	6.9		
2002	Renault	2R3XH0377BNA	6.2		
2002	Renault	2R3XH0377CNA	6.2		

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Model Year	Manufacturer	Engine Family	Displacement (Liter)		Note
			1.0	2	
2002	Volvo	2VTXH07.350S	7.3		
2002	Volvo	2VTXH12.150S	12.1		1
2003	Caterpillar	3CPXH0442HBV	7.2		
2003	Caterpillar	3CPXH0442HBX	7.2		
2003	Caterpillar	3CPXH0629EBV	10.3		
2003	Caterpillar	3CPXH0629EBX	10.3		
2003	Caterpillar	3CPXH0729EBV	11.9		1
2003	Caterpillar	3CPXH0729EBX	11.9		1
2003	Cummins	3CEXH0239BAD	3.9		
2003	Cummins	3CEXH0359BAG	5.9		
2003	Cummins	3CEXH0359BAH	5.9		
2003	Cummins	3CEXH0505CAN	8.3		
2003	Cummins	3CEXH0505CAQ	8.3		
2003	Cummins	3CEXH0540LAC	8.8		
2003	Cummins	3CEXH0661MAT	10.8		1
2003	Cummins	3CEXH0661MAU	10.8		
2003	DaimlerChrysler	3MBXH12.0DJA	12.0		
2003	DaimlerChrysler	3MBXH12.8DJA	12.8		1
2003	DaimlerChrysler	3MBXH4.25DJA	4.3		
2003	DaimlerChrysler	3MBXH4.25DJC	4.3		
2003	DaimlerChrysler	3MBXH6.37DJA	6.4		
2003	DaimlerChrysler	3MBXH6.37DJC	6.4		
2003	Detroit Diesel Corporation	3DDXH12.7EGY	12.7		1
2003	General Engine Products	3GEPH06.5521	6.5		
2003	General Engine Products	3GEPH06.5527	6.5		
2003	General Engine Products	3GEPH06.5CFF	6.5		
2003	Hino	3HMXH05.3JTD	5.3		
2003	Hino	3HMXH08.0JTP	8.0		
2003	Hino	3HMXH08.0JTR	8.0		
2003	International	3NVXH0365AEA	6.0		
2003	International	3NVXH0444ANB	7.3		
2003	International	3NVXH0444ANC	7.3		
2003	International	3NVXH0466ANA	7.6		
2003	International	3NVXH0466ANB	7.6		
2003	International	3NVXH0530ANA	8.7		
2003	International	3NVXH0530ANB	8.7		
2003	International	3NVXH0530ANC	8.7		
2003	International	3NVXH06.0AEA	6.0		
2003	Isuzu	3SZXH04.83AA	4.8		
2003	Isuzu	3SZXH06.64RA	6.6		

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Model Year	Manufacturer	Engine Family	Displacement (Liter)		Note
			1.0	2	
2003	Isuzu	3SZXH07.84AA	7.8		
2003	Isuzu	3SZXH07.84RA	7.8		
2003	Mack	3MKXH11.9H64	11.9		1
2003	Mack	3MKXH11.9H70	11.9		1
2003	Mack	3MKXH11.9V65	11.9		
2003	Mack	3MKXH11.9V67	11.9		1
2003	Mack	3MKXH11.9V68	11.9		
2003	Mitsubishi	3MTXH03.9D4A	3.9		
2003	Mitsubishi	3MTXH04.8M5A	4.9		
2003	Mitsubishi	3MTXH05.8D6A	5.9		
2003	Mitsubishi	3MTXH07.5D6A	7.5		
2003	Nissan	3NDXH04.6FAB	4.6		
2003	Nissan	3NDXH06.9FAB	6.9		
2003	Volvo	3VTXH12.150S	12.1		1
2004	Caterpillar	4CPXH0442HBK	7.2		
2004	Caterpillar	4CPXH0537HBK	8.8		
2004	Caterpillar	4CPXH0537HBX	8.8		
2004	Caterpillar	4CPXH0680EBK	11.1		
2004	Cummins	4CEXH0359BAG	5.9		
2004	Cummins	4CEXH0359BAH	5.9		
2004	Cummins	4CEXH0505CAR	8.3		
2004	Cummins	4CEXH0505CAS	8.3		
2004	Cummins	4CEXH0540LAE	8.8		
2004	Cummins	4CEXH0661MAT	10.8		1
2004	Cummins	4CEXH0661MAU	10.8		
2004	DaimlerChrysler	4MBXH12.8DJA	12.8		1
2004	DaimlerChrysler	4MBXH4.25DJA	4.3		
2004	DaimlerChrysler	4MBXH6.37DJA	6.4		
2004	Detroit Diesel Corporation	4DDXH12.7EGY	12.7		1
2004	General Engine Products	4GEPH06.5527	6.5		
2004	Hino	4HMXH04.7JTA	4.7		
2004	Hino	4HMXH07.7JTA	7.7		
2004	Hino	4HMXH07.7JTB	7.7		
2004	International	4NVXH0365AEB	6.0		
2004	International	4NVXH0466AEA	7.6		
2004	International	4NVXH0466ANA	7.6		
2004	International	4NVXH0466ANB	7.6		
2004	International	4NVXH0530ANA	8.7		
2004	International	4NVXH0530ANB	8.7		
2004	International	4NVXH0530ANC	8.7		

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Model Year	Manufacturer	Engine Family	Displacement (Liter)		Note
			1.0	2	
2004	International	4NVXH0570AEA	9.3		
2004	International	4NVXH06.0AEB	6.0		
2004	Isuzu	4SZXH05.23AA	5.2		
2004	Isuzu	4SZXH06.64AA	6.6		
2004	Isuzu	4SZXH06.64AW	6.6		
2004	Isuzu	4SZXH07.84RA	7.8		
2004	Isuzu	4SZXH07.84RW	7.8		
2004	Mack	4MKXH11.9H64	11.9		1
2004	Mack	4MKXH11.9H70	11.9		1
2004	Mack	4MKXH11.9V65	11.9		
2004	Mack	4MKXH11.9V71	11.9		1
2004	Volvo	4VTXH12.150S	12.1		1
2005	Caterpillar	5CPXH0442HBK	7.2		
2005	Caterpillar	5CPXH0537HBK	8.8		
2005	Caterpillar	5CPXH0680EBK	11.1		
2005	Caterpillar	5CPXH0763EBK	12.5		1
2005	Cummins	5CEXH0359BAB	5.9		
2005	Cummins	5CEXH0359BAF	5.9		
2005	Cummins	5CEXH0359BAG	5.9		
2005	Cummins	5CEXH0359BAH	5.9		
2005	Cummins	5CEXH0505CAR	8.3		
2005	Cummins	5CEXH0505CAX	8.3		
2005	Cummins	5CEXH0505CAY	8.3		
2005	Cummins	5CEXH0540LAE	8.8		
2005	Cummins	5CEXH0540LAH	8.8		
2005	Cummins	5CEXH0540LAI	8.8		
2005	Cummins	5CEXH0661MAT	10.8		1
2005	Cummins	5CEXH0661MAU	10.8		
2005	Cummins	5CEXH0661MAX	10.8		1
2005	DaimlerChrysler	5MBXH12.8DJA	12.8		1
2005	DaimlerChrysler	5MBXH4.25DJA	4.3		
2005	DaimlerChrysler	5MBXH6.37DJA	6.4		
2005	DaimlerChrysler	5MBXH7.20DJA	7.2	4.8	
2005	Detroit Diesel Corporation	5DDXH12.7EGY	12.7		1
2005	General Motors	5GMXH06.6592	6.6		
2005	General Motors	5GMXH06.6593	6.6		
2005	Hino	5HMXH04.7JTA	4.7		
2005	Hino	5HMXH07.7JTA	7.7		
2005	Hino	5HMXH07.7JTB	7.7		
2005	International	5NVXH0275AEA	4.5		

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Model Year	Manufacturer	Engine Family	Displacement (Liter)		Note
			1.0	2	
2005	International	5NVXH0365AEC	6.0		
2005	International	5NVXH0466AEA	7.6		
2005	International	5NVXH0570AEA	9.3		
2005	International	5NVXH06.0AEC	6.0		
2005	Isuzu	5SZXH05.23AB	5.2		
2005	Isuzu	5SZXH07.84RA	7.8		
2005	Isuzu	5SZXH07.84RB	7.8		
2005	Isuzu	5SZXH07.84RW	7.8		
2005	Mack	5MKXH11.9H70	11.9		1
2005	Mack	5MKXH11.9V65	11.9		
2005	Mack	5MKXH11.9V67	11.9		1
2005	Mack	5MKXH11.9V71	11.9		1
2005	Mack	5MKXH11.9V74	11.9		1
2005	Mitsubishi Fuso	5MFTH04.9M5A	4.9		
2005	Mitsubishi Fuso	5MFTH07.5M6A	7.5		
2005	Volvo	5VTXH12.150S	12.1		1
2006	Caterpillar	6CPXH0442HBK	7.2		
2006	Caterpillar	6CPXH0537HBK	8.8		
2006	Caterpillar	6CPXH0680EBK	11.1		
2006	Caterpillar	6CPXH0763EBK	12.5		1
2006	Cummins	6CEXH0359BAB	5.9		
2006	Cummins	6CEXH0359BAF	5.9		
2006	Cummins	6CEXH0359BAG	5.9		
2006	Cummins	6CEXH0359BAH	5.9		
2006	Cummins	6CEXH0359BAI	5.9		
2006	Cummins	6CEXH0505CAX	8.3		
2006	Cummins	6CEXH0505CAY	8.3		
2006	Cummins	6CEXH0540LAI	8.8		
2006	Cummins	6CEXH0540LAJ	8.8		
2006	Cummins	6CEXH0661MAT	10.8		1
2006	Cummins	6CEXH0661MAU	10.8		
2006	Cummins	6CEXH0661MAX	10.8		1
2006	DaimlerChrysler	6MBXH12.8DJA	12.8		1
2006	DaimlerChrysler	6MBXH4.25DJA	4.3		
2006	DaimlerChrysler	6MBXH6.37DJA	6.4		
2006	DaimlerChrysler	6MBXH7.20DJA	7.2	4.8	
2006	Detroit Diesel Corporation	6DDXH12.7EGY	12.7		1
2006	General Motors	6GMXH06.6590	6.6		
2006	General Motors	6GMXH06.6591	6.6		
2006	Hino	6HMXH04.7JTA	4.7		
2006	Hino	6HMXH07.7JTA	7.7		

**EPA/CARB-Approved Engine Families for Semi-Active Electric Filter (SEF) Muffler
System
Attachment A**

Model Year	Manufacturer	Engine Family	Displacement (Liter)		Note
			1.0	2	
2006	Hino	6HMXH07.7JT8	7.7		
2006	International	6NVXH0275AEA	4.5		
2006	International	6NVXH0365AEC	6.0		
2006	International	6NVXH0466AEA	7.6		
2006	International	6NVXH0570AEA	9.3		
2006	International	6NVXH06.0AEC	6.0		
2006	Isuzu	6SZXH05.23AB	5.2		
2006	Isuzu	6SZXH07.84RA	7.8		
2006	Isuzu	6SZXH07.84RW	7.8		
2006	Mack	6MKXH10.8C02	10.8		1
2006	Mack	6MKXH11.9H70	11.9		1
2006	Mack	6MKXH11.9V65	11.9		
2006	Mack	6MKXH11.9V67	11.9		1
2006	Mack	6MKXH11.9V71	11.9		1
2006	Mack	6MKXH11.9V74	11.9		1
2006	Mitsubishi Fuso	6MFTH04.9M5A	4.9		
2006	Mitsubishi Fuso	6MFTH07.5M6A	7.5		
2006	Volvo	6VTXH12.150S	12.1		1