RSV

WELD MATERIAL DOCUMENTATION

OF THE ELEVEN

REACTOR PRESSURE VESSELS

FABRICATED BY RDM

FOR WESTINGHOUSE

**RSV** zware **A**pparatenbouw b.v.
Rotterdam Heavy Equipment

RSV-A

# WELD MATERIAL DOCUMENTATION
# OF THE ELEVEN
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Westinghouse Weld Material Documentation.

Table of contents.

RSV Zware Apparatenbouw b.v.
Rotterdam Heavy Equipment

# C E R T I F I E D  S T A T E M E N T

THIS IS TO CERTIFY THAT ALL WELD MATERIAL USED IN THE PRIMARY PRESSURE BOUNDARY FERRITIC WELDS OF THE ELEVEN REACTOR PRESSURE VESSELS FABRICATED BY RDM - ROTTERDAM - HOLLAND FOR WESTINGHOUSE MEET THE APPLICABLE ACCEPTANCE CRITERIA.

1979-10-01
M. Lodder
Manager QA RSV-A

# REACTOR PRESSURE VESSELS FABRICATED BY RDM FOR WESTINGHOUSE

| RDM ORDER NO. | ASME CODE | OWNER | SITE |
|---|---|---|---|
| 30678 | III,W-68 | Virginia Electric Power Co. | Surry 1 |
| 30679 | III,W-68 | Virginia Electric Power Co. | Surry 2 |
| 30616 | III,1968 | Tennessee Valley Authority | Sequoyah 1 |
| 30624 | III,1968 | Tennessee Valley Authority | Sequoyah 2 |
| 30661 | III,W-68 | Virginia Electric Power Co. | North Anna 1 |
| 30662 | III,W-68 | Virginia Electric Power Co. | North Anna 2 |
| 30663 | III,W-68 | Stabens Vattenfallswerk | Ringhals 2 |
| 30664 | III,W-71 | Duke Power Co. | McGuire 2 |
| 30743 | III,W-71 | Duke Power Co. | Catawba 1 |
| 30749 | III,W-71 | Tennessee Valley Authority | Watts Bar 1 |
| 30750 | III,W-71 | Tennessee Valley Authority | Watts Bar 2 |

ARCHIVE MATERIAL which might be used for verification purposes

There is only one piece of restmaterial available
(a UT-calibration block cut from the weld procedure qualification test, length of weld approx. 150 mm)
welded with wire S3Mo, 4 mm ∅, manufacturer Böhler, Heat No. 0227 and flux LW320, manufacturer Linde, Lot No. 14.
See Attachment B31.1/2.

JMMARY OF WELD MATERIALS AND TEST



| WELDING MATERIALS | | | | | | NUMBER AND DATES OF TESTS | | | | | SURVEILLANCE PLATE | REFER ATTACHED NON-CONFORM. REPORT | SEE ATTACHM. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WIRE/ELECTRODE | | | FLUX | | | WIRE/FLUX OR ELECTRODE WELD DEPOSIT TEST PLATES | | | IN-PROCESS TESTS | | | | |
| VENDOR | TYPE | HEAT/LOT NO | VENDOR | TYPE | LOT NO. | NO.OF TEST | DATES | ACCEPT. CRITER. | NO. OF TEST | DATE(S) | | | |
| Soudo-metal | KG66ELH E9018-G | 5835.3423 | | | | 1 | 032169 | A | | | | | B01.1/2 |
| | | 5835.3900 | | | | 1 | 031169 | A | | | | | B02.1/2 |
| | | 6236.4063 | | | | 1 | 050169 | A | | | | | B03.1/2 |
| | | 6236.4450 | | | | 1 | 081569 | A,B | 1 | 120370 | | E05.1/2 | B04.1/2 C01.1 |
| | | 6497.4647 | | | | 1 | 072469 | B | | | | | B05.1/2 |
| | | 6497.4675 | | | | 1 | 073169 | A | | | | | B06.1/2 |
| | | 6507.4705 | | | | 1 | 062769 | A,B | 1 | 120370 | | E 01.1 | B07.1/2 C02.1 |
| | | 6747.5458 | | | | 1 | 022370 | A,B | | | | | B08.1/2 |
| | | 7011.6032 | | | | 1 | 051570 | A,B,C | 1 | 120370 | | E 01.1 | B09.1/2 C01.1/C02.1 |
| | | 7011.6143 | | | | 2 | 051570 093074 | A,B,C | | | | | B10.1//4 |
| | | 7359.6708 | | | | 1 | 102970 | A,B,C | | | | | B11.1/2 |
| | | 7565.7158 | | | | 2 | 012771 082874 | C | | | | | B12.1//4 |
| | | 7703.7265 | | | | 2 | 031271 082874 | B,C | | | | | B13.1//4 |
| | | | | | | | | | | | | | |
| Sécher. | Molyth. E8018-G | 8640 | | | | 1 | 011570 | B | | | | | B14.1/2 |
| | | 8825 | | | | 1 | 011570 | B | | | | | B15.1/2 |
| | | 8928 | | | | 1 | 011570 | B | | | | | B16.1/2 |
| | | 9004 | | | | 1 | 011570 | B | | | | | B17.1/2 |
| | | 9092 | | | | 1 | 011570 | B | | | | | B18.1/2 |

Acceptance Criteria : A E-Spec 676413 rev. 1 ; ASME III 1968.
B E-Spec 676413 rev. 1 ; ASME III 1968 including Winter 1968.
C E-Spec 676413 rev. 2 ; ASME III 1971 including Winter 1971.

SUMMARY OF WELD MATERIALS AND TEST



| WELDING MATERIALS | | | | | | NUMBER AND DATES OF TESTS | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WIRE/ELECTRODE | | | FLUX | | | WIRE/FLUX OR ELECTRODE WELD DEPOSIT TEST PLATES | | | IN-PROCESS TESTS | | SURVEILLANCE PLATE | REFER ATTACHED NON-CONFORM. REPORT | SEE ATTACHM. |
| VENDOR | TYPE | HEAT/LOT NO | VENDOR | TYPE | LOT NO. | NO.OF TEST | DATES | ACCEPT. CRITER. | NO. OF TEST | DATE(S) | | | |
| Arco Chem. | S4Mo MnMo | 801 | Air Liquide | SAF89 | 01180 | 1 | 082569 | B | | | | | B19.1/3 |
| | | 801 | | | 01211 | 1 | 062772 | B | | | | | B19.2/3 |
| Westf.U | | 1725 | | | 01211 | 1 | 052670 | A,B | | | | | B20.1/3 |
| | | 1725 | | | 02275 | 2 | 102970 * | A,B,C | 7 | ** | 2 | | B20.2/3 C03.1//8 1) |
| Arco Chem. | | 4275 | | | 02275 | 1 | 052770 | A,B | 1 | 102870 | | | B21.1/2 C04.1/2 |
| | | 4278 | | | 01211 | 2 | 121069 020172 | A,B | | | 1 | | B22.1/2 D02.1 |
| | | 4292 | | | 01211 | 1 | 052670 | A | | | | | B23.1/3 |
| Smit-weld | Smit 40 MnMo | 25006 | | | 01135 | | | A | | | | E06.1/2 | B24.1/3 |
| | | 25006 | | | 01985 | | | A | | | | E06.1/2 | B24.2/3 |
| | | 25017 | | | 01135 | | | A | | | | E06.1/2 | B25.1/4 |
| | | 25017 | | | 01170 | | | B | | | | E06.1/2 | B25.2/4 |
| | | 25017 | | | 01197 | 1 | 072469 | A,B | | | | | B25.3/4 |
| | | 25295 | | | 01103 | 2 | 032669 010472 | A | | | 1 | E02.1/2/3 | B26.1/6 D03.1 |
| | | 25295 | | | 01135 | 1 | 051969 | A | | | | | B26.2/6 |
| | | 25295 | | | 01170 | 1 | 120169 | A,B | | | | | B26.3/6 |
| | | 25295 | | | 01197 | | | A | | | | E06.1/2 | B26.4/6 |
| | | 25295 | | | 02275 | 1 | 052671 | A | | | | | B26.5/6 |
| | | 25531 | | | 01211 | 2 | 101669 082572 | A,B | 1 | 102870 | 1 | | B27.1/2 C06.1 2) |
| Arco Chem. | S4Mo MnMo | 4292 | | | 02275 | 1 | 102970 | A,B | 3 | 022571 031771 | | | B23.2/3 C05.1/2/3 |

Acceptance Criteria : A E-Spec 676413 rev. 1 ; ASME III 1968.
B E-Spec 676413 rev. 1 ; ASME III 1968 including Winter 1968.
C E-Spec 676413 rev. 2 ; ASME III 1971 including Winter 1971.

* 042771 082572

** 112570 022571 042171 011772 012172

1) D01.1//4
2) D04.1

SUMMARY OF WELD MATERIALS AND TEST



| WELDING MATERIALS | | | | | | NUMBER AND DATES OF TESTS | | | | | SURVEILLANCE PLATE | REFER ATTACHED NON-CONFORM. REPORT | SEE ATTACHM. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WIRE/ELECTRODE | | | FLUX | | | WIRE/FLUX OR ELECTRODE WELD DEPOSIT TEST PLATES | | | IN-PROCESS TESTS | | | | |
| VENDOR | TYPE | HEAT/LOT NO | VENDOR | TYPE | LOT NO. | NO. OF TEST | DATES | ACCEPT. CRITER. | NO. OF TEST | DATE(S) | | | |
| Arco Chem. | S4Mo MnMo | 721858 | Air Liquide | SAF89 | 01135 | | | A | | | | E06.1/2 | B28.1/3 |
| | | 721858 | | | 01197 | 1 | 082569 | A,B | | | | | B28.2/3 |
| Hoesch | S3NiMo MnMoNi | 895075 | Gries-heim | LW320 | P 46 | 5 | 091872 * 07xx72 | C | | | 4 | | B29.1/2 D05.1//4 |
| | | 892680 | | | P 21 | 5 | * | C | | | 4 | | B30.1/2 D05.1//4 |
| Böhler | S3Mo MnMo | 0227 | Linde | LW320 | 14 | 2 | 011871 | B | | | 1 | | B31.1/2 2) |
| Phönix U | | 8816 | | | 28 | 1 | 111771 | B | | | | | B32.1/2 |
| Böhler | | 20459 | | | 26 | 1 | 091571 | B | | | | | B33.1/2 |
| | | 27622 | | | 26 | 1 | 091571 | B | | | | | B34.1/2 |
| | | 27622 | | | 28 | 1 | 111771 | B | | | | | B35.1/2 |
| Phönix U | | 716126 | | | 26 | 2 | 030471 082472 | B | 1 | 081271 | 1 | | B36.1/2 C07.1 1) |
| | | 716126 | | | 28 | 1 | 111771 | B | | | | | B37.1/2 |

Acceptance Criteria : A E-Spec 676413 rev. 1 ; ASME III 1968.
B E-Spec 676413 rev. 1 ; ASME III 1968 including Winter 1968.
C E-Spec 676413 rev. 2 ; ASME III 1971 including Winter 1971.

* 071073
09xx73

1) D06.1/2
2) D07.1//4

SUMMARY OF WELD MATERIALS AND TEST



| WELDING MATERIALS | | | | | | NUMBER AND DATES OF TESTS | | | | | SURVEILLANCE PLATE | REFER ATTACHED NON-CONFORM. REPORT | SEE ATTACHM. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WIRE/ELECTRODE | | | FLUX | | | WIRE/FLUX OR ELECTRODE WELD DEPOSIT TEST PLATES | | | IN-PROCESS TESTS | | | | |
| VENDOR | TYPE | HEAT/LOT NO. | VENDOR | TYPE | LOT NO. | NO. OF TEST | DATES | ACCEPT. CRITER. | NO. OF TEST | DATE(S) | | | |
| B&W | E8015-G | 818-021736 | | | | 2 | 050167<br>120572 | B | | | | | B 38.1/2 |
| | | 818-022108 | | | | 1 | 103167 | B | | | | | B 39.1 |
| | | 818-022778 | | | | 1 | 103067 | B | | | | E03.1//5 | B 40.1 |
| | | 818-023006 | | | | 1 | 092367 | B | | | | E03.1//5 | B 41.1 |
| | | 818-024509 | | | | 1 | 051068 | B | | | | E03.1//5 | B 42.1 |
| | | 818-024510 | | | | 1 | 051068 | B | | | | E03.1//5 | B 43.1 |
| | | 818-024790 | | | | 1 | 080168 | B | | | | E03.1//5 | B 44.1 |
| | | 818-024965 | | | | 1 | 080268 | B | | | | E03.1//5 | B 45.1 |
| | | 818-025134 | | | | 1 | 091168 | B | | | | E03.1//5 | B 46.1 |
| | | 818-025185 | | | | 1 | 100768 | B | | | | E03.1//5 | B 47.1 |
| | | 818-025186 | | | | 1 | 102468 | B | | | | E03.1//5 | B 48.1 |
| | | 818-025371 | | | | 1 | 101568 | B | | | | E03.1//5 | B 49.1 |
| | | 818-025391 | | | | 1 | 120568 | B | | | | E03.1//5 | B 50.1 |
| | | 818-025392 | | | | 1 | 111168 | B | | | | E03.1//5 | B 51.1 |
| | | 818-025561 | | | | 1 | 010969 | B | | | | E03.1//5 | B 52.1 |
| | | 818-025562 | | | | 1 | 111268 | B | | | | E03.1//5 | B 53.1 |
| | | 818-025611 | | | | 1 | 012369 | B | | | | E03.1//5 | B 54.1 |
| | | 818-025612 | | | | 5 | 021269 * | B | | | | | B 55.1//5 |
| | | 818-025655 | | | | 1 | 032169 | B | | | | E03.1//5 | B 56.1 |

Acceptance Criteria : A E-Spec. 676413 rev. 1 ; ASME III 1968.
B E-Spec. 676413 rev. 1 ; ASME III 1968 including Winter 1968.
C E-Spec. 676413 rev. 2 ; ASME III 1971 including Winter 1971.

* 040671,020573,071873,101673

SUMMARY OF WELD MATERIALS AND TEST



| WELDING MATERIALS | | | | | | NUMBER AND DATES OF TESTS | | | | | SURVEILLANCE PLATE | REFER ATTACHED NON-CONFORM. REPORT | SEE ATTACHM. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WIRE/ELECTRODE | | | FLUX | | | WIRE/FLUX OR ELECTRODE WELD DEPOSIT TEST PLATES | | | IN-PROCESS TESTS | | | | |
| VENDOR | TYPE | HEAT/LOT NO. | VENDOR | TYPE | LOT NO. | NO.OF TEST | DATES | ACCEPT. CRITER. | NO. OF TEST | DATE(S) | | | |
| | | | | | | 1 | 031969 | B | | | | E04.1 | B 57.1 |
| B & W | E7015 | 818-025962 | | | | 1 | 051468 | B | | | | | B 58.1//3 |
| RACO | E8018-C1 | 401W9661 | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | B 59.1//3 |
| Page Stl | MnMoNi | 72445 | Linde | 80 | 8504 | 1 | 021668 | B | | | | | B 59.1/4//6 |
| | | 72445 | | | 8578 | 2 | 100968<br>012269 | B | | | | | B 59.1/7 |
| | | 72445 | | | 8597 | 1 | 021369 | B | | | | | B59.1/8//11 |
| | | 72445 | | | 8632 | 3 | 042369<br>060969 | B | | | | | B 60.1//4 |
| US Stl | MnMoNi | 8T1554 | Linde | 80 | 8579 | 1 | 110468 | B | | | | | B 61.1//4 |
| | | 8T1762 | | | 8578 | 1 | 110468 | B | | | | | B 61.1/2/5 /6 |
| | | 8T1762 | | | 8596 | 1 | 021069 | B | | | | | B 61.1/2/7 |
| | | 8T1762 | | | 8597 | 1 | 041569 | B | | | | | B 61.1/2/8 |
| | | 8T1762 | | | 8632 | 1 | 042369 | B | | | | | B 62.1/2 D 08.1//4 |
| Linde | MnMoNi | 299L44 | Linde | 80 | 8596 | 2 | 121768 | B | | | 1 | | |

Acceptance Criteria : A E-Spec. 676413 rev. 1 ; ASME III 1968.
B E-Spec. 676413 rev. 1 ; ASME III 1968 including Winter 1968.
C E-Spec. 676413 rev. 2 ; ASME III 1971 including Winter 1971.

ACCEPTANCE CRITERIA "A" E-Spec. 676413 rev. 1 ; ASME III, 1968
"B" E-Spec. 676413 rev. 1 ; ASME III, W-68

General

Welding materials, for use in Class A vessels shall be tested.
Tests shall be conducted for each Lot of covered electrodes, and for each combination of Heat of bare electrodes and Batch of flux mix to be used for vessel welding.

Preheat, interpass and PWHT temperatures shall conform to the applicable WPS.
The PWHT holding time shall be at least 80% of the maximum time to be applied to the weld metal in the vessel.

One all-weld-metal tensile test shall be made.
The tests shall meet the minimum specified tensile strength of the vessel material to be welded.

V-notch Charpy impact tests shall be made from the weld materials test.
The minimum requirement for weld impact test shall be the energy value assigned the base material.

SMA Electrodes - chemical : see below
- mechanical:see below

Wire / Flux - chemical : none
- mechanical:see below

Chemical :

| | SA - 316 | | |
|---|---|---|---|
| | E 8018- C 3 | E 8015- G | E 9018 - G |
| C | .12 max. | ... | ... |
| Mn | .40 to 1.10 | 1.00 min* | 1.00 min* |
| P | .030 max | ... | ... |
| S | .030 max | ... | ... |
| Si | .80 max | .80 min* | .80 min* |
| Ni | .30 to 1.10 | .50 min* | .50 min* |
| Cr | .15 max | .30 min* | .30 min* |
| Mo | .35 max | .20 min* | .20 min* |
| V | .05 max | .10 min* | .10 min* |

* Need have the minimum of only one of the * marked elements.

ACCEPTANCE CRITERIA "A" and "B" continued

Mechanical :-Tensile

Min. Tensile Strength 80 KSI (56.2 kg/mm$^2$)

-Impacts

Min. 30 ft-lb (5.2 kgm/cm$^2$) Avg 3 spec.

Min. 25 ft-lb (4.3 kgm/cm$^2$) 1 indiv. spec.

Core Region Weld Metal

Fully Charpy V-Notch curves (upper and lower plateaus included) shall be furnished.

The Supplier shall establish the Charpy V-Notch Transition Temperature based on the Charpy V-notch curves and the General requirements above.

The Supplier shall "aim for" a Charpy V-Notch Transition Temperature of less than 10$^\circ$F(- 12.2$^\circ$C).

Drop Weight test data shall be furnished.

The Supplier shall establish the Nil Ductility Transition Temperature based on the drop weight data.

The Supplier shall "aim for" obtaining a Nil Ductility Transition Temperature of less than 10$^\circ$F (-12.2$^\circ$C).

ACCEPTANCE CRITERIA "C" E-Spec. 676413 rev. 2 ; ASME III, W- 71

General

Welding materials, for use in Class A vessels shall be tested.
Tests shall be conducted for each Lot of covered electrodes, and for each combination of Heat of bare electrodes and Batch of flux mix to be used for vessel welding.

Preheat, interpass and PWHT temperatures shall conform to the applicable WPS.
The PWHT holding time shall be at least 80% of the maximum time to be applied to the weld metal in the vessel.

One all-weld-metal tensile test shall be made.
The tests shall meet the minimum specified tensile strength of the vessel material to be welded.

V-Notch Charpy impact tests shall be made from the weld materials test.
The minimum requirement for weld impact test shall be the energy value assigned the base material.

SMA Electrodes - chemical : see below
- mechanical: see below

Wire/Flux - chemical : none
- mechanical: see below

Chemical :

| | SA - 316 |
|---|---|
| | E 9018-G |
| C | ... |
| Mn | 1.00 min* |
| P | ... |
| S | ... |
| Si | .90 min* |
| Ni | .50 min* |
| Cr | .30 min* |
| Mo | .20 min* |
| V | .10 min* |

* need have the minimum of only one of the * marked elements.

ACCEPTANCE CRITERIA "C" Continued

Mechanical : - Tensile
Min. Tensile Strength 80 KSI (56.2 $kg/mm^2$)

- Impacts
Min. 30 ft-lb ( 5.2 $kgm/cm^2$) Avg 3 spec.
Min. 25 ft-lb ( 4.3 $kgm/cm^2$) 1 indiv. spec.
The lateral expension in inches and the percent ductile-fracture area for each specimen shall be reported for information.

Core Region Weld Metal

Fully Charpy V-Notch curves (upper and lower plateaus included) shall be furnished.
The Supplier shall establish the Charpy V-Notch Transition Temperature based on the Charpy V-Notch curves and the General requirements above.
The Supplier shall "aim for" obtaining a Charpy V-Notch Transition Temperature of less than $10^{\circ}F$ ($-12.2^{\circ}C$) with a quarantee of $40^{\circ}F$ ($4.4^{\circ}C$) or less.

Drop Weight test data shall be furnished.
The Supplier shall establish the Nil Ductility Transition Temperature based on the drop weight data.
The Supplier shall "aim for" obtaining a Nil Ductility Transition Temperature of less than $10^{\circ}F$($-12.2^{\circ}C$) with a quarantee of $40^{\circ}F$ ($4.4^{\circ}C$) or less.

# DE ROTTERDAMSCHE DROOGDOK MIJ. N.V.

LABORATORIUM | MEETPROTOCOL | ORDER No. 30.6.

Lab. merk: H.
Materiaalsoort: L. Staal.

Besteller: Loopkat Hr. Visser
2 ingangscontrole
Werkstuk: Nr. H 725-4 Klarge 5835-3423 (A)
~~H 725-325 dikm 5835-3445~~ (B)

Tekening:
Legerde:
Keur: Klark
L.P. Schiebaan

## TREKPROEF

| Merk / Ets | | Meetlengte mm | Doorsnede mm² | 0,2 Rekgrens kg | 0,2 Rekgrens kg/mm² | Treksterkte kg | Treksterkte kg/mm² | Rek(l= 5 d) mm | Rek(l= 5 d) % | Insnoering mm | Insnoering % | Opmerkingen |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 5d | 12.83 | | | | | | | | | |
| 725 | A | 5d | 12,83 | 7690 | 59,5 | 8450 | 65,4 | 14,6 | 23,2 | 7,0 | 5,2 | |
| | ~~B~~ | ~~6d~~ | ~~12,83~~ | ~~7600~~ | ~~60,4~~ | ~~8680~~ | ~~67,2~~ | ~~12,7~~ | ~~25,4~~ | ~~7,2~~ | ~~6,5~~ | |

## BUIGPROEF

Klamp V — KERFSLAG...FF

| Merk / Ets | | Doorsnede mm x mm | Rol/stempel mm/mm | Opleg afstand mm | Buighoek graden | Doorbuiging mm | Buigsterkte kg/mm² | Doorsnede mm x mm | Kerfcoëfficiënt kgm/cm² | Gem. kgm/ |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | 10x8 | | |
| 725 | A | | | | | | | 10x8 | 17,5 - 17,0 - 16,4 | 17,0 |
| | ~~B~~ | | | | | | | ~~10x8~~ | ~~12,3 - 13,5 - 15,3~~ | ~~13,7~~ |

LABORATORIUM KDM.

Smeed. eigenschappen volgens doc. nr. LP 254-68.
30 h/615°C

21-3-19.69.

801

Bol.2

SOUDOMETAL S. A.
24, Bd Maurice Herbette
BRUXELLES 7

Annexe au bl. facteur 6.463 du 6/11-1968
VA 026948

Bruxelles, le 6 novembre 1968.

INGEKOMEN 7 NOV. 1968

## CERTIFICAT DE QUALITE

Concerne : Cde : .....
Firme : .....

| Repère | TYPE | Ø - L | N° fabrication |
|---|---|---|---|
| 1 | COMETE JAUNE 66 ELH | ~~3,25 - 350~~ | ~~5835.3113~~ |
| 2 | " " " | 4 - 450 | 5835.3423 |
| 3 | | | |
| 4 | | | |
| 5 | | | |

Analyse du métal déposé :

| Elément dosé / Repère | C o/o | Mn o/o | Si o/o | Cr o/o | Ni o/o | Mo o/o | o/o |
|---|---|---|---|---|---|---|---|
| ~~1~~ | ~~0,050~~ | ~~1,28~~ | ~~0,32~~ | ~~0,20~~ | ~~1,20~~ | ~~0,31~~ | |
| 2 | 0,045 | 1,35 | 0,28 | 0,17 | 1,15 | 0,26 | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

Essais mécaniques :

| Essai de : | Traction | | | Résilience | |
|---|---|---|---|---|---|
| Repère | Charge Rupt. kg/mm² | Lim élast. kg/mm² | Allongemt 5d o/o | t° C | Type : Charpy V kgm/cm² |
| 1 & 2 | 60 - 70 | 52 - 62 | 20 - 25 | -50 | ≥ 4 |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

SERVICE TECHNIQUE,

Le Chef du Laboratoire,
J. DELVAUX

Le Directeur,
H. DESGUIN

~~Dhr Leer~~ ~~ert~~
1x Dhr. Visser
1x Lab. arch.

# DE ROTTERDAMSCHE DROOGDOK MIJ. N.V.

vdW.

| LABORATORIUM | MEETPROTOCOL | ORDER No. 30.643 |
|---|---|---|
| Lab. merk H/D<br>Materiaalsoort<br>C Staal | Besteller Ingangs-controle Lasmaterialen<br>Werkstuk 1 Lasproefplaat (Ingangscontrole) | Tekening -<br>Legende -<br>Keur R.D.M. |

## TREKPROEF

| Merk | Ets | Meetlengte mm | Doorsnede mm Ø | Rekgrens kg | Rekgrens kg/mm² | Treksterkte kg | Treksterkte kg/mm² | Rek(l 5 d) mm | Rek(l 5 d) % | Insnoering mm | Insnoering % | Opmerkingen |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 50 | 10,0 | | | | | | | | | |
| 711/ | 4 | 50 | 10,0 | 4400 | 56,1 | 4960 | 63,2 | 12,1 | 24,2 | 5,3 | 71,9 | proefstaven uit het volle lasmateriaal |
| | ~~5~~ | ~~50~~ | ~~10,0~~ | ~~4380~~ | ~~55,8~~ | ~~4940~~ | ~~62,9~~ | ~~12,9~~ | ~~25,8~~ | ~~5,4~~ | ~~70,8~~ | |

## BUIGPROEF

| Merk | Ets | Doorsnede mm x mm | Rol/stempel mm/mm | Opleg afstand mm | Buighoek graden | Doorbuiging mm | Buigsterkte kg/mm² |
|---|---|---|---|---|---|---|---|
| 711 / | 4 (58 35.3900) | | | | | | |
| | ~~5 (58 37.3474)~~ | | | | | | |

## Charpy V KERFSLAGPROEF bij -12°C.

| Doorsnede mm x mm | Kerftaaiheid kgm/cm² | Gemiddeld kgm/cm² |
|---|---|---|
| 10x8 | | |
| 10x8 | 13,9-11,4-15,4-12,0-15,4-~~14,8~~ | 13,8 |
| ~~10x8~~ | ~~18,6-13,3-15,6-17,5-17,3-17,0~~ | ~~16,9~~ |

Beproevingen volgens Doc. MB L.P. 754-68

LABORATORIUM RDM.

11 maart 1969.

Warmtebehandeling:
30 h / 615°C.

Model 56 DPL 70

SOUDOMETAL S. A.
24, Bd Maurice Herbette
BRUXELLES 7

Bruxelles, le 10 décembre 1968.

# CERTIFICAT DE QUALITE

Concerne : Cde : .....
Firme : .....

| Repère | TYPE | Ø . L | N° fabrication |
|---|---|---|---|
| 1 | COMETE JAUNE 66 ELH | ~~3,25/350~~ | ~~5835,3445~~ |
| 2 | " " " | ~~3,25/350~~ | ~~5835,3852~~ |
| 3 | " " " | 4/450 | 5835,3900 |
| 4 | " " " | ~~5/450~~ | ~~5837,3474~~ |
| 5 | | | |

Analyse du métal déposé :

| Elément dosé / Repère | C o/o | Mn o/o | Si o/o | Cr o/o | Ni o/o | Mo o/o | o/o |
|---|---|---|---|---|---|---|---|
| ~~1~~ | ~~0,040~~ | ~~1,32~~ | ~~0,27~~ | ~~0,16~~ | ~~1,15~~ | ~~0,25~~ | |
| ~~2~~ | ~~0,040~~ | ~~1,24~~ | ~~0,29~~ | ~~0,18~~ | ~~1,35~~ | ~~0,31~~ | |
| 3 | 0,050 | 1,31 | 0,24 | 0,16 | 1,25 | 0,31 | |
| ~~4~~ | ~~0,055~~ | ~~1,45~~ | ~~0,35~~ | ~~0,12~~ | ~~1,12~~ | ~~0,20~~ | |
| | | | | | | | |

Essais mécaniques :

| Essai de : Traction | | | | Résilience | |
|---|---|---|---|---|---|
| Repère | Charge Rupt kg/mm² | Lim élast. kg/mm² | Allongemt 5d o/o | t° C | Type : Charpy V kgm/cm² |
| 1-2-3-4 | 60 - 70 | 52 - 62 | 20 - 25 | -50 | > 4 |
| | | | | | |
| | | | | | |
| | | | | | |

SERVICE TECHNIQUE,

Le Chef du Laboratoire,
J. DELVAUX

Le Directeur,
H. DESGUIN

DE ROTTERDAMSCHE DROOGDOK MAATSCHAPPIJ N.V. B03.1

Quality and Metallurgical Department — Order n° : 30643

# TEST REPORT OF WELDING MATERIALS (required by ASME CODE Section III, par. N-511)

## Description of test material

Type : KOBELCO 60 SAL 66 ELH
Supplier : SOUDOMETAAL
Dimension : Ø 3.25 mm
Lot/heat/batch n°: 6236 - 4068

Type :
Supplier :
Dimension :
Lot/heat/batch n°:

Lab. n° : H737
Stamp n° : 5513
Ordered by: VISSER
Witnessed by: Lloyds
MR v. B2-2074

Date test results required:

## Chemical composition

| | C | Mn | Si | P | S | Cr | Ni | Mo | |
|---|---|---|---|---|---|---|---|---|---|
| Required: | | | | | | | | | |
| | | | | | | | | | |
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## Mechanical tests (acc. to doc. n° LP 754-93 rev. 1)

### Tensile test

| | Diameter | Yield strength | Tensile strength | Elongation | Reduct. of Area | Temp. | Remarks |
|---|---|---|---|---|---|---|---|
| | mm | kg/mm² | kg/mm² | l: 4 d | % | °C | |
| Required: | x | 35.2 | 56.2 | 18 | 38 | 20 | |
| H737 | 13.33 | 65.5 | 72,6 | 22.0 | 65.8 | 20 | |

### Impact test

| n° | Energy | Absorbe energy | Shear fracture | Lateral exp. | Temp. | Remarks |
|---|---|---|---|---|---|---|
| | kgm/cm² | kgm/cm² | % | " | °C | |
| Required: | x | x | | | -12°C | |
| | 23,4 | 20,8 | | | | |
| | 22,0 | | | | | |
| | 17,0 | | | | | |

POOR ORIGINAL

Heat treatment of test specimens :
30 h at 615°C

Laboratory R.D.M., 1-3-94

**SOUDOMETAL** S. A.
24, Bd Maurice Herbette
BRUXELLES 7

Retrait: cpte ... du 10-3-1969

L.3686 Q.Vrd

Bruxelles, le 13 mars 1969.

## CERTIFICAT DE QUALITE

11/3-'69 VA 029622 - 3.000 el.
20/3-'69 VA 029830 - 3.840 el.

Concerne : Cde :

Firme : R.D.M.

Rotterdam

| Repère | TYPE | Ø . L | N° fabrication |
|---|---|---|---|
| 1 | COMETE JAUNE 66 EL.H | 3,25-350 | 6236.4063 |
| 2 | | | |
| 3 | | | |
| 4 | | | |
| 5 | | | |

Analyse du métal déposé :

| Elément dosé / Repère | C o/o | Mn o/o | Si o o | Cr o/o | Ni o/o | Mo o/o | o/o |
|---|---|---|---|---|---|---|---|
| 1 | 0,045 | 1,32 | 0,36 | 0,17 | 1,24 | 0,29 | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

Ess mécaniques :

| Essai de : | Traction | | | Résilience | |
|---|---|---|---|---|---|
| Repère | Charge Rupt kg/mm² | Lim élast. kg/mm² | Allongemt 5d o/o | t° C | Type : Charpy V kgm/cm² |
| 1 | 60 - 70 | 52 - 62 | 20 - 25 | -50 | > 4 |
| | | | | | |
| | | | | | |
| | | | | | |

SERVICE TECHNIQUE,

Le Chef du Laboratoire,
J. DELVAUX

Le Directeur,
H. DESGUIN

DE ROTTERDAMSCHE DROOGDOK MAATSCHAPPIJ N.V. B04.1

Quality and Metallurgical Department — Order n° : 30 643

## TEST REPORT OF WELDING MATERIALS (required by ASME CODE Section III, par. N-511)

**Description of test material**

Type : Komeet Cool 66 MH
Supplier : Soudometal
Dimension : Ø 4
Lot/heat/batch n°: 6236-4450

Type :
Supplier :
Dimension :
Lot/heat/batch n°:

Lab. n° : J 74[illegible]
Stamp n° : 5542
Ordered by : WI[illegible]
Witnessed by : [illegible]
Mr. Wegenhouser.

Date test results required:

**Chemical composition**

| | C | Mn | Si | P | S | Cr | Ni | Mo | |
|---|---|---|---|---|---|---|---|---|---|
| Required: | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | Vo[illegible]elite | | 0,25% | | | | | |
| | | | | | | | | | |
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**Mechanical tests (acc. to doc. n° LP 754-68 rev. 1)**

Tensile test

| | Dimensions | Yield strength | Tensile strength | Elongation | Reduct. of area | Temp. | Remarks |
|---|---|---|---|---|---|---|---|
| | mm | kg/mm² | kg/mm² | l: 4 d | % | °C | |
| Required: | x | 35,2 | 56,2 | 18 | 38 | ±20 | |
| 1 | 2,83 | 56,2 | 63,5 | 26,8 | 71,1 | | |
| | | | | | | | |

Impact test

| n° | Energy | Average energy | Shear fracture | Lateral exp. | Temp. | Remarks |
|---|---|---|---|---|---|---|
| | kgm/cm² | kgm/cm² | % | " | °C | |
| Required: | | 5,2 | | | -12 | |
| 1 | 17,5 | 18,0 | | | | 1 x Mr. Heemskerk<br>1 x Mr. Lathouwers<br>2 x Mr. Visser<br>1 x Lab. archief. |
| 2 | 18,6 | | | | | |

Heat treatment of test specimens :
24 - 30 hrs. 610°

Laboratory R.D.M., August 15th, 1969.

J.K.

Betr. ...

...

OUDOMETAL S. A.
... Bd Maurice Herbette
BRUXELLES 7

LR/DD/728

Bruxelles, le 20 juin 1989

## CERTIFICAT DE QUALITE

Concerne : Cde :
Firme :

| Repère | TYPE | Ø - L | N° fabrication |
|---|---|---|---|
| 1 | COMETE JAUNE ... ELH | 4-450 | 6236.4450 |
| 2 | | | |
| 3 | | | |
| 4 | | | |
| 5 | | | |

Analyse du métal déposé :

| Elément dosé / Repère | C o/o | Mn o/o | Si o/o | Cr o/o | Ni o/o | Mo o/o | o/o |
|---|---|---|---|---|---|---|---|
| 1 | 0,045 | 1,51 | 0,28 | 0,18 | 1,13 | 0,25 | |
| | | | | | | | |
| | | | | | | | |
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Essais mécaniques :

| Essai de | Traction | | | Résilience | |
|---|---|---|---|---|---|
| Repère | Charge Rupt kg/mm² | ...m élast. ...g mm² | Allongemt 5d o/o | t° C | Type : Charpy V kgm/cm² |
| 1 | 60 - 70 | ... - 54 | 20 - 25 | -50 | > 4 |
| | | | | | |
| | | | | | |
| | | | | | |

SERVICE TECHNIQUE,

Le Chef du Laboratoire,
J. DELVAUX

Le Directeur,
H. DESGUIN

# DE ROTTERDAMSCHE DROOGDOK MAATSCHAPPIJ N.V.

Quality and Metallurgical Department — Order n° : 30143

## TEST REPORT OF WELDING MATERIALS (required by ASME CODE Section III, par. N-511)

**Description of test material**

Type : KOMEET GEEL 66 ELH
Supplier : SOUDOMETAAL
Dimension : ϕ 5 mm
Lot/heat/batch n°: 6497 – 4647

Type :
Supplier :
Dimension :
Lot/heat/batch n°:

Lab. n° : 8729
Stamp n° : 3541
Ordered by : VIS
Witnessed by : Lloyds

Date test results required:

**Chemical composition**

| | C | Mn | Si | P | S | Cr | Ni | Mo | |
|---|---|---|---|---|---|---|---|---|---|
| Required: | | | | | | | | | |
| | | | | | | | | | |
| | VOCHTBEPALING | | | | C. 14% | vocht. | | | |
| | | | | | | | | | |
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**Mechanical tests (acc. to doc. n° LP 754-68 rev. 1)**

Tensile test

| | Dimensions | Yield strength | Tensile strength | Elongation | Reduct. of area | Temp. | Remarks |
|---|---|---|---|---|---|---|---|
| | mm | kg/mm² | kg/mm² | l: 5.5d | % | °C | |
| Required: | | | 50,2 | | | | |
| 8729 | 12,85 | 56,9 | 62,2 | 23,8 | 68,5 | | |
| | | | | | | | |

Impact test

| n° | Energy | Average energy | Shear fracture | Lateral exp. | Temp. | Remarks |
|---|---|---|---|---|---|---|
| | kgm/cm² | kgm/cm² | % | " | °C | |
| Required: | | | | | -12° | |
| 1 | 15,9 | 12,6 | | | | |
| 2 | 13,1 | | | | | |
| 3 | 8,9 | | | | | |

Heat treatment of test specimens :
30' at 610°C.

Laboratory R.D.M.,
24-3-1969 DS

2 x Lloyds
1 x Hmsts
1 x Archief
1 x Lithoman

KOMEET GEEL 66 ELH ELECTRODE
Heat/Lot No. 6497.4647

Mill certificate not available.
This electrode was made from the same heat as electrode 6497.4675 (see Att. B06.1/2).

Chemical analysis:

| | |
|---|---|
| C | .050% |
| Mn | 1.45 % |
| Si | .31 % |
| Cr | .14 % |
| Ni | 1.04 % |
| Mo | .29 % |

# DE ROTTERDAMSCHE DROOGDOK MAATSCHAPPIJ N.V.

Doc. 1

Quality and Metallurgical Department — Order n° : 3064 3

## TEST REPORT OF WELDING MATERIALS (required by ASME CODE Section III, par. N-511)

**Description of test material**

Type : KOM STEEL CC 6 LM
Supplier : SOUDOMETAAL
Dimension : ⌀ 5 mm
Lot/heat/batch n°: 6447 - 4675

Type :
Supplier :
Dimension :
Lot/heat/batch n°:

Lab. n° : 8 737 B
Stamp n° : 554
Ordered by : V/J
Witnessed by : L. / d.

Date test results required:

**Chemical composition**

| | C | Mn | Si | P | S | Cr | Ni | Mo | |
|---|---|---|---|---|---|---|---|---|---|
| Required: | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | VOCHTBEPALING. | | | 0,16 % | vocht. | | | | |
| | | | | | | | | | |
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**Mechanical tests (acc. to doc. n° LP 751-63 rev. 1)**

Tensile test

| | Dimensions | Yield strength | Tensile strength | Elongation | Reduct. of area | Temp. | Remarks |
|---|---|---|---|---|---|---|---|
| | mm | kg/mm² | kg/mm² | l: 4 d | % | °C | |
| Required: | | | | | | | |
| 1 | 12,83 | 54,2 | 61,8 | 30,6 | 72,5 | | |
| | | | | | | | |

Impact test

| n° | Energy | Average energy | Shear fracture | Lateral exp. | Temp. | Remarks |
|---|---|---|---|---|---|---|
| | kgm/cm² | kgm/cm² | % | " | °C | |
| Required: | | | | | -196 | |
| 1 | 14,1 | 14,4 | | | | |
| 2 | 15,2 | | | | | |
| 3 | 14,1 | | | | | |

2 x VIJ
1 x Ilmil.
1 x Leith
1 x Architect

Heat treatment of test specimens :

Laboratory R.D.M., 31-7-64.

Betr.: opdracht d.d. 25.4.'69 D.-463 O.Vrd.

SOUDOMETAL S. A.
24, Bd Maurice Herbette
B R U X E L L E S 7

Bruxelles, le 1er Juillet 1969.

GDP/DD/756

# CERTIFICAT DE QUALITE

Concerne : Cde : .....
Firme : .....

| Repère | TYPE | Ø - L | N° fabrication |
|---|---|---|---|
| 1 | COMETE JAUNE 66 ELII | 5 - 450 | 6497.4675 |
| 2 | | | |
| 3 | | | |
| 4 | | | |
| 5 | | | |

Analyse du métal déposé :

| Elément dosé / Repère | C o/o | Mn o/o | Si o/o | Cr o o | Ni o/o | Mo o o | o/o |
|---|---|---|---|---|---|---|---|
| 1 | 0,050 | 1,45 | 0,31 | 0,14 | 1,04 | 0,29 | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

Essais mécaniques :

| Essai de Traction | | | | Résilience | |
|---|---|---|---|---|---|
| Repère | Charge Rupt kg/mm² | Lim élast. kg/mm² | Allongemt % | t° C | Type : Charpy V kgm/cm² |
| 1 | 60 - 70 | 50 - 60 | 20 - 25 | +20 | > 4 |
| | | | | | |
| | | | | | |
| | | | | | |

SERVICE TECHNIQUE,

Le Chef du Laboratoire,
J. DELVAUX

Le Directeur,
H. DESGUIN

3378 IC 34

# DE ROTTERDAMSCHE DROOGDOK MAATSCHAPPIJ N.V.

Quality and Metallurgical Department — Order n° : 30643

## TEST REPORT OF WELDING MATERIALS (required by ASME CODE Section III, par. N-511)

**Description of test material**

Type : KOMEET GEEL 66 ELM.
Supplier : SOUDOMETAAL-
Dimension : ϕ 3,25 x 350 mm
Lot/heat/batch n°: 6507 · 41705

Type :
Supplier :
Dimension :
Lot/heat/batch n°:

Lab. n° : 41632
Stamp n° : 3533
Ordered by: HE
Witnessed by: Lloyds

H.K. WITTEMAN

Date test results required:

**Chemical composition**

| | C | Mn | Si | P | S | Cr | Ni | Mo | |
|---|---|---|---|---|---|---|---|---|---|
| Required: | | | | | | | | | |
| | | | | | | | | | |
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| | | | | | | | | | |

**Mechanical tests (acc. to doc. n° LP 751-03 rev. 1)**

Tensile test

| | Dimensions | Yield strength | Tensile strength | Elongation | Reduct. of area | Temp. | Remarks |
|---|---|---|---|---|---|---|---|
| | mm | kg/mm² | kg/mm² | l: 4 d | % | °C | |
| Required: | - | 35,2 | 56,2 | 19 | - | | |
| 1 | 12,83 | 61,1 | 66,9 | 24,4 | 70,2 | | |

Impact test

| n° | Energy | Average energy | Shear fracture | Lateral exp. | Temp | Remarks |
|---|---|---|---|---|---|---|
| | kgm/cm² | kgm/cm² | % | " | °C | |
| Required: | - | 5,2 | | | -12°C | |
| 1 | 11,5 | 13,2 | | | | |
| 2 | 13,3 | | | | | |
| 3 | 14,8 | | | | | |



Heat treatment of test specimens:
30 hr at 610 °C

Laboratory R.D.M., 27-6-1966

B07.2

Betreft: opdracht dd [illegible] D.7462 O.Vrd.

Geleverd met VA [illegible] dd [illegible]-1969 - 6.000 el.

**SOUDOMETAL** S. A.
24, Bd Maurice Herbette
BRUXELLES 7

LR/DD/680

Bruxelles, le 6 juin 1969.

## CERTIFICAT DE QUALITE

Concerne : Cde : .....

Firme : .....

| Repère | TYPE | Ø · L | N° fabrication |
|---|---|---|---|
| 1 | COMETE JAUNE 66 ELH | 3,25-350 | 6507.4705 |
| 2 | | | |
| 3 | | | |
| 4 | | | |
| 5 | | | |

Analyse du métal déposé :

| Elément dosé / Repère | C o/o | Mn o/o | Si o/o | Cr o/o | Ni o/o | Mo o/o | o/o |
|---|---|---|---|---|---|---|---|
| 1 | 0,050 | 1,20 | 0,22 | 0,19 | 1,36 | 0,24 | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

Essais mécaniques :

| Essai de : | Traction | | | Résilience | |
|---|---|---|---|---|---|
| Repère | Charge Rupt kg/mm² | Lim élast. kg/mm² | Allongemt 5d o/o | t° C | Type : Charpy V kgm/cm² |
| 1 | 60 - 70 | 52 - 62 | 20 - 25 | -50 | ≥4 |
| | | | | | |
| | | | | | |
| | | | | | |

SERVICE TECHNIQUE,

Le Chef du Laboratoire,
J. DELVAUX

Le Directeur,
H. DESGUIN

B08.1

# DE ROTTERDAMSCHE DROOGDOK MAATSCHAPPIJ N.V.

Quality and Metallurgical Department — Order nº : [illegible]

## TEST REPORT OF WELDING MATERIALS (required by ASME CODE Section III, Div. 1, N-511)

| Description of test material | | Lab. nº : K 723 |
|---|---|---|
| Type | : Koneet geel 66 [illegible] | Stamp nº : 5583 |
| Supplier | : Soudo metaal | Ordered by : Vii |
| Dimension | : Ø 5 mm | Witnessed by : [illegible] |
| Lot/heat/batch nº: | 6747-5458 | |
| Type | : | |
| Supplier | : | Date test results required: |
| Dimension | : | |
| Lot/heat/batch nº: | | |

### Chemical composition

| | C | Mn | Si | P | S | Cr | Ni | Mo | |
|---|---|---|---|---|---|---|---|---|---|
| Required: | | | | | | | | | |
| | | | | | | | | | |
| Vochtgehalte | 0,11 % | | | | | | | | |

### Mechanical tests (acc. to doc. nº LP 751-83 rev. 3)

Tensile test

| | Dimension | Yield strength | Tensile strength | Elongation | Reduct. of Area | Temp. | Remarks |
|---|---|---|---|---|---|---|---|
| | mm | kg/mm² | kg/mm² | l: 4 d | % | °C | |
| Required: | 12,83 | | | | | | |
| 1 | 12,83 | 57,4 | 63,6 | 26,4 | 71,9 | | |
| | | | | | | | |

Impact test

| nº | Energy | Average energy | Shear fracture | Lateral exp. | Temp | Remarks |
|---|---|---|---|---|---|---|
| | kgm/cm² | gm/cm² | % | mm | °C | |
| Required: | | | | | -12°C | |
| 1 | 17,5 | | | | | |
| 2 | 15,8 | 16,6 | | | | |
| 3 | 16,5 | | | | | |

Heat treatment of test specimens: [illegible]

POOR ORIGINAL

Laboratory R.D.M., [signature]

SOUDOMETAL S. A.
24, Bd Maurice Herbette
B R U X E L L E S 7

Bruxelles, le 13 octobre 1970

# CERTIFICAT DE QUALITE

Concerne : Cde :
Firme : SOUDOMETAL
Vlaardingen
HOLLAND

| Repère | TYPE | Ø - L | N° fabrication |
|---|---|---|---|
| ~~1~~ | ~~COMETE JAUNE 66 ELH~~ | ~~3.25/350~~ | ~~7359.6708~~ |
| ~~2~~ | ~~COMETE JAUNE 66 ELH~~ | ~~4/450~~ | ~~7011.6143~~ |
| 3 | COMETE JAUNE 66 ELH | 5/450 | 6747.5458 |
| 4 | | | |
| 5 | | | |

Analyse du metal déposé :

| Element dosé / Repère | C o/o | Mn o/o | Si o/o | Cr o/o | Ni o/o | Mo o/o | o/o |
|---|---|---|---|---|---|---|---|
| ~~1~~ | ~~0.050~~ | ~~1.33~~ | ~~0.23~~ | ~~0.14~~ | ~~0.83~~ | ~~0.27~~ | |
| ~~2~~ | ~~0.045~~ | ~~1.45~~ | ~~0.28~~ | ~~0.14~~ | ~~0.90~~ | ~~0.27~~ | |
| 3 | 0.060 | 1.46 | 0.37 | 0.14 | 0.90 | 0.33 | |
| | | | | | | | |
| | | | | | | | |

Essais mecaniques :

| Essai de : | Traction | | | Résilience | |
|---|---|---|---|---|---|
| Repère | Charge Rupt kg/mm² | Lim elast. kg/mm² | Allongemt o/o | t° C | Type : CHARPY V kgm/cm² |
| 1-2-3 | 60 - 70 | 52 - 62 | 20 - 25 | -50° | > 4 |
| | | | | | |
| | | | | | |
| | | | | | |

SERVICE TECHNIQUE,

Le Chef du Laboratoire,
J. DELVAUX

Le Directeur,
H. DESGUIN

# DE ROTTERDAMSCHE DROOGDOK MAATSCHAPPIJ N.V.

Quality and Metallurgical Department — Order n° : 30643

## TEST REPORT OF WELDING MATERIALS (required by ASME CODE Section III, par. N-511)

**Description of test material**

Type : Komeet Geel 66 ELH
Supplier : Soudo metaal
Dimension : Ø 3¼ mm
Lot/heat/batch n°: 7011-6032

Type :
Supplier :
Dimension :
Lot/heat/batch n°:

Lab. n° : L746
Stamp n° : 5632
Ordered by: Vis 15-5-70
Witnessed by: Lloyd's Mr. Stuy

Date test results required:

**Chemical composition**

| | C | Mn | Si | P | S | Cr | Ni | Mo | |
|---|---|---|---|---|---|---|---|---|---|
| Required: | | | | | | | | | |
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**Mechanical tests (acc. to doc. n° LP 751-68 rev. 3)**

**Tensile test**

| | Dimensions | Yield strength | Tensile strength | Elongation | Reduct. of area | Temp | Remarks |
|---|---|---|---|---|---|---|---|
| | mm | kg/mm² | kg/mm² | l: 4 d | % | °C | |
| Required: | Ø12,83 | 35.2 | 56.2 | 18.0 | 38.0 | | |
| 1 | Ø12,83 | 59,8 | 66,2 | 26,8 | 63,0 | | |

**Impact test**

| n° | Energy | Average energy | Shear fracture | Lateral exp. | Temp | Remarks |
|---|---|---|---|---|---|---|
| | kgm/cm² | kgm/cm² | % | " | °C | |
| Required: | | 5.2 | | | -12 | |
| 1 | 15,0 | 14,2 | 68 | 0,075 | -12 | |
| 2 | 13,8 | | 61 | 0,071 | | |
| 3 | 13,8 | | 61 | 0,067 | | |

Heat treatment of test specimens :

Laboratory R.D.M.,

Bog.2

Retrait opportun du 24-3-1970 D.5307 C.Vrd.

**SOUDOMETAL** S. A.
24, Bd Maurice Herbette
B R U X E L L E S 7

Bruxelles, le 27 avril 1970.

AS/DD/394

## CERTIFICAT DE QUALITE

Concerne : Cde : .....
Firme : .....

| Repère | T Y P E | Ø - L | N° fabrication |
|---|---|---|---|
| 1 | COMETE JAUNE 66 ELH | 3,25-350 | 7011.6032 |
| 2 | " " | ~~4-450~~ | ~~7011.6143~~ |
| 3 | | | |
| 4 | | | |
| 5 | | | |

Analyse du métal déposé :

| Element dosé / Repère | C o/o | Mn o/o | Si o/o | Cr o/o | Ni o/o | Mo o/o | o/o |
|---|---|---|---|---|---|---|---|
| 1 | 0,045 | 1,25 | 0,25 | 0,15 | 0,93 | 0,26 | |
| ~~2~~ | ~~0,045~~ | ~~1,32~~ | ~~0,25~~ | ~~0,15~~ | ~~0,91~~ | ~~0,27~~ | |
| | | | | | | | |
| | | | | | | | |

Essais mécaniques :

| Essai de Traction | | | | Résilience | |
|---|---|---|---|---|---|
| Repère | Charge Rupt kg/mm² | Lim élast. kg/mm² | Allongemt 5d o/o | t° C | Type : Charpy V kgm/cm² |
| 1-2 | 60 - 70 | 52 - 62 | 20 - 25 | -50 | > 4 |
| | | | | | |
| | | | | | |
| | | | | | |

SERVICE TECHNIQUE,

Le Chef du Laboratoire,
J. DELVAUX

Le ~~Directeur~~,
H. DESGUIN

B 10.1

# DE ROTTERDAMSCHE DROOGDOK MAATSCHAPPIJ N.V.

Quality and Metallurgical Department — Order n° : 30643

## TEST REPORT OF WELDING MATERIALS (required by ASME CODE Section III, par. N-511)

**Description of test material**

Type : Komeet geel 66 ELH
Supplier : Soudo metaal
Dimension : Ø 4 mm
Lot/heat/batch n°: 7011-6143

Type :
Supplier :
Dimension :
Lot/heat/batch n°:

Lab. n° : L 747
Stamp n° : 5633
Ordered by : Vis 15-5-70
Witnessed by : Lloyd's Hr. Stuy

Date test results required:

**Chemical composition**

| | C | Mn | Si | P | S | Cr | Ni | Mo | |
|---|---|---|---|---|---|---|---|---|---|
| Required: | | | | | | | | | |
| | 0.045 | 1.32 | 0.25 | | | 0.15 | 0.91 | 0.37 | |

**Mechanical tests (acc. to doc. n° LP 754-68 rev. 3)**

Tensile test

| | Dimensions | Yield strength | Tensile strength | Elongation | Reduct of area | Temp. | Remarks |
|---|---|---|---|---|---|---|---|
| | mm | kg/mm² | kg/mm² | l: d | % | °C | |
| Required: | Ø12,83 | 35.2 | 56.2 | 18.0 | 3.80 | | |
| 1 | Ø12,83 | 59,6 | 66,2 | 27,6 | 70,2 | 20° C | |

Impact test

| n° | Energy | Average energy | Shear fracture | Lateral exp. | Temp | Remarks |
|---|---|---|---|---|---|---|
| | kgm/cm² | kgm/cm² | % | " | °C | |
| Required: | | 5.2 | | | -12 | |
| 1 | 16,0 | 16,1 | 72 | 0.079 | -12 | |
| 2 | 15,8 | | 72 | 0.079 | | |
| 3 | 16,5 | | 75 | 0.083 | | |

Heat treatment of test specimens :

Laboratory R.D.M.,

Bulletin opérateur dd 24-3-1970 D.5307 C.Vrd.

**SOUDOMETAL** S. A.
24, Bd Maurice Herbette
B R U X E L L E S 7

Bruxelles, le 27 avril 1970.

AS/DD/394

## CERTIFICAT DE QUALITE

Concerne : Cde : .....
Firme : .....

| Repère | T Y P E | Ø - L | N° fabrication |
|---|---|---|---|
| 1 | COMETE JAUNE 66 ELH | ~~3125 350~~ | ~~7011,6032~~ |
| 2 | " " | 4 - 450 | 7011,6143 |
| 3 | | | |
| 4 | | | |
| 5 | | | |

Analyse du métal déposé :

| Elément dosé / Repère | C o/o | Mn o/o | Si o/o | Cr o/o | Ni o/o | Mo o/o | o/o |
|---|---|---|---|---|---|---|---|
| ~~1~~ | ~~0,045~~ | ~~1,25~~ | ~~0,25~~ | ~~0,15~~ | ~~0,93~~ | ~~0,26~~ | |
| 2 | 0,045 | 1,32 | 0,25 | 0,15 | 0,91 | 0,37 | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

Essais mécaniques :

| Essai de Traction | | | | Résilience | |
|---|---|---|---|---|---|
| Repère | Charge Rupt kg/mm² | Lim élast. kg/mm² | Allongemt 5d o/o | t° C | Type : Charpy V kgm/cm² |
| 1-2 | 60 - 70 | 52 - 62 | 20 - 25 | -50 | > 4 |
| | | | | | |
| | | | | | |
| | | | | | |

SERVICE TECHNIQUE,

Le Chef du Laboratoire,
J. DELVAUX

Le ~~Directeur~~,
H. DESGUIN

# DE ROTTERDAMSCHE DROOGDOK MAATSCHAPPIJ B.V.

LABORATORY



**MECHANICAL AND CHEMICAL TEST RESULTS** — Report Nr. R.N. U 727

Customer: Rotterdam Nuclear B.V.
Customer Ref: Receiving Inspection
Manufact. Order: 30795
Sub Order: 93300
Sequence Nr.:
Drawing:
Item:

Item Description: Receiving inspection of Welding materials
Material:
Date of test: 1974-09-27
Lab. report Nr.: P 674
Sim. H.T. of Specimens: 30hrs at 615°C±20°C
Inspection by: Stoomwezen .

**Chemical composition**

| | C | Mn | Si | P | S | Cr | Ni | Mo | |
|---|---|---|---|---|---|---|---|---|---|
| Required | | | | | | | | | |
| | | | | | | | | | |

**Tensile test (Amsler tensile testing machine)** acc to ASME SA370 and ASTM E21-70

| No | Dimensions mm | Yield strength kg/mm² | Tensile strength kg/mm² | Elongation % 4 d | Reduct. of area % | Temp. °C | Remarks Location |
|---|---|---|---|---|---|---|---|
| Required | Ø12.5 | 35.2 | 56.2 | 18.0 | 38.0 | 20 | All weld metal |
| U727T1 | Ø12.5 | 51.3 | 61.2 | 22.0 | 64.0 | 20 | All weld metal |
| Required | Ø12.5 | 29.8 | 50.7 | - | - | 302 | |
| U727WT1 | Ø12.5 | 59.1 | 64.5 | 27.6 | 72.1 | 302 | |

**Impact test acc. to ASTM E 23** — Type of bar: Charpy-V — Satec machine

| No | Energy kgm/cm² | Average energy kgm/cm² | Shear fracture % | Lateral exp. | Temp. °C |
|---|---|---|---|---|---|
| Required | | | | | |
| | | | | | |

Particulars of welding material;
Trade name : Comète Jaune 66 ELH
Supplier : Soudometal S.A.
diameter : Ø 4mm
heatnr. : 7011.6143

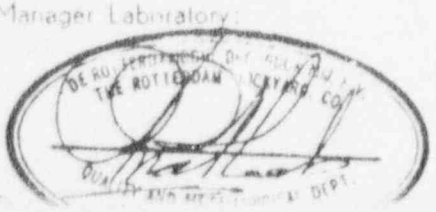
Note : for determinatin of RTndt
see page 2

Results: ACCEPTABLE / NOT ACCEPTABLE

Var. required: — See Var. Report:
Dev. required: — See Dev. Request:

Sign. Operator: vTw/.
Date: 1974-09-30

Manager Laboratory:



Approved by (Customer):

Approved by Inspector: (ltw)

MECHANICAL AND CHEMICAL TEST RESULTS | Report Nr. R.N. U727

Customer : Rotterdam Nuclear B.V.
Customer Ref : Receiving Inspection
Manufact. Order : 30795
Sub Order : 93300
Sequence Nr :
Drawing :
Item :

Item Description : Receiving inspection of welding materials.
Material : see page 1
Date of test : 1974-09-30
Lab. report Nr : P 674
Sim. H.T. of Specimens : 30hrs. at 615°C ± 20°C
Inspection by : Stoomwezen.

Impact test acc. to ASTM E 23 — Type of bar: Charpy - V

| No | Energy kgm/cm² | Average energy kgm/cm² | Shear fracture % | Lateral exp. | Temp °C | No | Energy kgm/cm² | Average energy kgm/cm² | Shear fracture % | Lateral exp. | Temp °C |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Required | 8.6 | | | 0.035 | | Required | | | | | |
| U727K1 | 16.6 | | 80 | 0.075 | -12 | | | | | | |
| K2 | 18.3 | 17.8 | 76 | 0.083 | -12 | | | | | | |
| K3 | 18.6 | | 74 | 0.079 | -12 | | | | | | |

Dropweight test acc to ASTM E208-69
Type of specimen : P3
Location of specimen : All weld metal

| Number | Temp. | Result |
|---|---|---|
| U727P1 | -40°C | No break |
| P2 | -50°C | No break |
| P3 | -60°C | No break |
| P4 | -75°C | Break |
| P5 | -70°C | Break |
| P6 | -65°C | Break |
| P7 | -60°C | Break |
| P8 | -55°C | Break |
| P9 | -50°C | Break |
| P10 | -40°C | No break |

Tndt -45°C

Results: ACCEPTABLE / NOT ACCEPTABLE

Var. required | See Var. Report:
Dev. required | See Dev. Request:

Sign. Operator: vTw/.
Date: 1974-09-30

Manager Laboratory: DE ROTTERDAMSCHE DROOGDOK MAATSCHAPPIJ N.V. THE ROTTERDAM DRYDOCK CO.
Date: 1974-09-30

Approved by Customer:
Date: 1974-09-30

Approved by Inspection:
Date: 1974-09-30

# DE ROTTERDAMSCHE DROOGDOK MAATSCHAPPIJ N.V.

Quality and Metallurgical Department — Order nº : 30643

## TEST REPORT OF WELDING MATERIALS (required by ASME Code Section III, par. N-510)

**Description of test material**

Type : Komeet Geel 66 ELH
Supplier : Goudometal
Dimension : 3¼ mm
Lot/heat/batch nº: 7359-6708
Type :
Supplier :
Dimension :
Lot/heat/batch nº:

Lab. nº : N 750
Stamp nº : 42
Ordered by : LT - AB
Witnessed by : Lloyd's
Mr. v. Bezuye

Date test results required:

**Chemical composition**

| | C | Mn | Si | P | S | Cr | Ni | Mo | |
|---|---|---|---|---|---|---|---|---|---|
| Required: | | | | | | | | | |
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Weld metal tests (acc. to Cl. nº QW-451.1)

Guide bend tests

| | Ult. tens. str. | Yield strength | Elongation in 4 d | Reduction of area | Temp. | Remarks |
|---|---|---|---|---|---|---|
| | ton | kg/mm² | % | % | °C | |
| Required: | 12.83 | 35.2 | 36.2 | 18.0 | 38.0 | 20 |
| N750T1 | 12.83 | 65.0 | 71.2 | 23.0 | 71.1 | 20 |

POOR ORIGINAL

Impact tests

| nº | | Energy absorption | Lateral expansion | Shear fracture | Temp. | Remarks |
|---|---|---|---|---|---|---|
| | | kgm/cm² | % | % | °C | |
| Required: | | 5.2 | | | -12 | |
| N750 | K1 | 9.4 | 48 | 0.043 | | |
| | K2 | 9.6 | 10.0 | 48 | 0.043 | -12 |
| | K3 | 10.0 | | 52 | 0.047 | |

Heat treatment of test specimens:
30 hrs at 610°C

SURVEYOR TO LLOYD'S REGISTER

Laboratory, R'dam, October 29, 1970

SOUDOMETAL S. A
24, Bd Maurice Herbette
BRUXELLES 7

Bruxelles, le 13 octobre 1970

# CERTIFICAT DE QUALITE

Concerne : Cde :
Firme : SOUDOMETAL
Vlaardingen
HOLLAND

| Repère | TYPE | Ø - L | N° fabrication |
|---|---|---|---|
| 1 | COMETE JAUNE 66 ELH | 3.25/350 | 7359.6708 |
| ~~2~~ | ~~COMETE JAUNE 66 ELH~~ | ~~4/450~~ | ~~7011.6143~~ |
| ~~3~~ | ~~COMETE JAUNE 66 ELH~~ | ~~5/450~~ | ~~6747.5458~~ |
| 4 | | | |
| 5 | | | |

Analyse du metal depose :

| Element dose / Repère | C o/o | Mn o/o | Si o/o | Cr o o | Ni o/o | Mo o/o | o/o |
|---|---|---|---|---|---|---|---|
| 1 | 0.050 | 1.33 | 0.23 | 0.14 | 0.83 | 0.27 | |
| ~~2~~ | ~~0.045~~ | ~~1.45~~ | ~~0.28~~ | ~~0.14~~ | ~~0.90~~ | ~~0.27~~ | |
| ~~3~~ | ~~0.060~~ | ~~1.46~~ | ~~0.37~~ | ~~0.14~~ | ~~0.90~~ | ~~0.33~~ | |
| | | | | | | | |
| | | | | | | | |

Essais mécaniques :

| Essai de : | Traction | | | Résilience | |
|---|---|---|---|---|---|
| Repère | Charge Rupt kg/mm² | Lim élast. kg/mm² | Allongemt o/o | t° C | Type : CHARPY V kgm/cm² |
| 1-2-3 | 60 - 70 | 52 - 62 | 20 - 25 | -50° | > 4 |
| | | | | | |
| | | | | | |
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SERVICE TECHNIQUE,

Le Chef du Laboratoire,
J. DELVAUX

Le Directeur,
H. DESGUIN

B12.1

# DE ROTTERDAMSCHE DROOGDOK MAATSCHAPPIJ N.V.

Quality and Metallurgical Department — Order nº : [illegible]

## TEST REPORT OF WELDING MATERIALS (required by ASME CODE Section III, par. N-511)

**Description of test material**

Type : Komeet Coel [illegible]
Supplier : Soudometal
Dimension : Ø4
Lot/heat/batch nº: 7565-7158

Type :
Supplier :
Dimension :
Lot/heat/batch nº:

Lab. nº : 0.726
Stamp nº : 68
Ordered by: I.T. AB.
Witnessed by:
Lloyd's Mr. Wittoman

Date test results required:

**Chemical composition**

| | C | Mn | Si | P | S | Cr | Ni | Mo | |
|---|---|---|---|---|---|---|---|---|---|
| Required: | | | | | | | | | |
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**Mechanical tests (acc. to spec. nº [illegible])**

Tensile test

| | Diameter | Area | Tensile strength | Elongation | | Temp. | Remarks |
|---|---|---|---|---|---|---|---|
| | mm | kg/mm² | kg/mm² | % | | °C | |
| Required: | 3.2 | 35.2 | 56.2 | 18.0 | 38.0 | [illegible] | POOR ORIGINAL |
| 27[illegible]81 | 3.2 | 63.9 | 69.1 | [illegible] | [illegible] | [illegible] | |

Impact test

| nº | Energy | Energy | Shear fracture | Lateral exp. | Remarks |
|---|---|---|---|---|---|
| | kgm/cm² | kgm/cm² | % | mm | |
| Required: | | 5.2 | | | |
| [illegible]eoK1 | 17.3 | | 81 | 0.091 | |
| K2 | 18.5 | 18.3 | 84 | 0.087 | |
| K3 | 19.2 | | 84 | 0.094 | |

Heat treatment of test specimens:
[illegible]

Lab. [illegible] R'dam, 7-1-1971

[illegible] B

S.C.F. [illegible] S.A.
24, Boulevard [illegible]
BRUXELLES 7

Bruxelles, le 5 janvier 1972



# CERTIFICAT DE QUALITE

Concerne : Cde :
Firme : SOUDOKAL S.A.
Vilvoorde

| Repère | TYPE | Ø - L | N° fabrication |
|---|---|---|---|
| 1 | [illegible] | 4 x 350 | [illegible] |
| 2 | | | |
| 3 | | | |
| 4 | | | |
| 5 | | | |

Analyse du métal déposé :

| Electrode N° / Repère | C o/o | Mn o/o | Si o/o | Cr o/o | Ni o/o | Mo o/o | o/o |
|---|---|---|---|---|---|---|---|
| 1 | 0,030 | 1,4 | 0,31 | 0,16 | 1,4 | 0,32 | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

Essais mécaniques :

| Essai de Traction | | | | Résilience | |
|---|---|---|---|---|---|
| Repère | Charge R kg/mm² | Limite élast. kg/mm² | Allongt % o/o | t° C | Type : Charpy V kgm/cm² |
| 1 | 60 à 70 | 52 à 62 | 20 à 25 | -50 | > 4 |
| | | | | | |
| | | | | | |
| | | | | | |

SERVICE TECHNIQUE,

Le Chef du Laboratoire,
J. DELVAUX

Le Directeur,
H. DESGUIN

MECHANICAL AND CHEMICAL TEST RESULTS

Report Nr. R.N. U 720

Customer: R.N. for General Electric
Customer Ref: Leibstadt
Manufact. Order: 30795
Sub Order: 93300
Sequence Nr:
Drawing:
Item:

Item Description: Additional tests for receiving inspection of welding materials
Material: Comète Jaune 66 ELH
Date of test: 1974-08-28
Lab. report Nr: F 666
Summ. HT of Specimens: 30 hrs at 615°C±20°C
Inspection by: G.E.Stw.Q.A.R.N.

Chemical composition

| | C | Mn | Si | P | S | Cr | Ni | Mo | |
|---|---|---|---|---|---|---|---|---|---|
| Required | | | | | | | | | |
| | | | | | | | | | |

Tensile test (Amsler tensile testing machine)

| No | Dimensions mm | Yield stress kg/mm² | Tensile strength kg/mm² | Elongation % 4 d | Reduct. of area % | Temp. °C | Remarks / Location |
|---|---|---|---|---|---|---|---|
| Required | Ø12.5 | 29.8 | 50.7 | - | - | 302°C | all weld metal |
| U720WT1 | Ø12.5 | 48.5 | 57.9 | 22.4 | 66.8 | 302°C | all weld metal |

Supplier :Soudometal S.A.
Dimension:Ø4 mm
Heatnr. : 7565-7158

Impact test acc. to ASTM E 23 Type of bar: Charpy-V Satec machine

| No | Energy kgm/cm² | Average energy kgm/cm² | Shear fracture % | Lateral exp. | Temp. °C |
|---|---|---|---|---|---|
| Required | 8.6 | | | 0.035 | |
| U720K1 | 13.3 | 14.3 | 62 | 0.063 | -27°C |
| U720K2 | 13.0 | | 72 | 0.067 | -27°C |
| U720K3 | 16.6 | | 74 | 0.075 | -27°C |

Dropweight test acc.to ASTM E 208-6
Type of specimen : P3
Required : Tndt ≤ - 29°C

| Number | temp. | Result |
|---|---|---|
| U720 P1 | -50°C | No break |
| U720 P2 | -70°C | Break |
| U720 P3 | -60°C | No break |
| U720 P4 | -65°C | Break |
| U720 P5 | -60°C | Break |
| U720 P6 | -55°C | No break |
| U720 P7 | -55°C | No break |

Results: ACCEPTABLE XXXXXXXXXXXXXX

Tndt = RTndt = -60°C

see page 2 for transition Curve

Var. required: See Var. Report:
Dev. required: See Dev. Report:

Sign Operator:
Date: 1974-08-28

Manager Laboratory: THE ROTTERDAM DOCKYARD CO. LABORATORY
Date: 1974-08-28

Approved by Customer:
Date:

Approved by Inspection:
Date:

# DE ROTTERDAMSCHE DROOGDOK MAATSCHAPPIJ B.V.

LABORATORY



MECHANICAL AND CHEMICAL TEST RESULTS

Report Nr. R.N. U 720

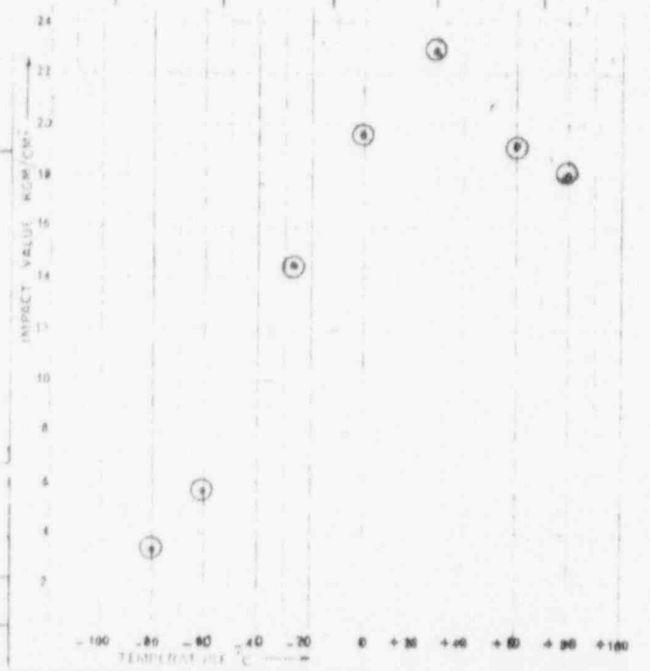
Customer: R.N. for General Electric
Customer Ref: Leibstadt
Manufact. Order: 30795
Sub Order: 93300
Sequence Nr:
Drawing:
Item:

Item Description: Additional tests for-receiving inspection of welding materials.
Material: Comète Jaune 66 ELH
Date of test: 1974-08-29
Lab. report Nr: P 666
Sum. HT of Specimens: 30 hrs.at 615°C±20°C
Inspection by: G.E. Stw. Q.A.R.N.

Impact test acc. to ASTM E 23 — Type of bar: Charpy - V

| No | Energy kgm/cm² | Average energy kgm/cm² | Shear fracture % | Lateral exp. | Temp °C |
|---|---|---|---|---|---|
| Required | | | | | |
| U720K4 | 4.6 | | 16 | 0.020 | -80°C |
| U720K5 | 2.5 | 3.3 | 21 | 0.016 | -80°C |
| U720K6 | 2.9 | | 21 | 0.012 | -80°C |
| U720K7 | 8.1 | | 33 | 0.039 | Tndt |
| U720K8 | 3.8 | 5.6 | 36 | 0.024 | Tndt |
| U720K9 | 5.1 | | 36 | 0.024 | Tndt |
| U720K1 | 13.3 | | 62 | 0.063 | -27°C |
| U720K2 | 13.0 | 14.3 | 72 | 0.067 | -27°C |
| U720K3 | 16.6 | | 74 | 0.075 | -27°C |
| U720K10 | 22.3 | | 85 | 0.099 | 0°C |
| U720K11 | 17.6 | 19.8 | 90 | 0.083 | 0°C |
| U720K12 | 19.6 | | 94 | 0.083 | 0°C |

| No | Energy kgm/cm² | Average energy kgm/cm² | Shear fracture % | Lateral exp. | Temp °C |
|---|---|---|---|---|---|
| Required | | | | | |
| U720K13 | 24.4 | | 100 | 0.094 | +30°C |
| U720K14 | 21.3 | 22.9 | 100 | 0.094 | +30°C |
| U720K15 | 22.9 | | 100 | 0.094 | +30°C |
| U720K16 | 21.5 | | 100 | 0.094 | +60°C |
| U720K17 | 18.4 | 19.1 | 100 | 0.083 | +60°C |
| U720K18 | 17.4 | | 100 | 0.083 | +60°C |
| U720K19 | 20.9 | | 100 | 0.087 | +80°C |
| U720K20 | 18.5 | 18.0 | 100 | 0.091 | +80°C |
| U720K21 | 14.5 | | 100 | 0.075 | +80°C |




Results: ACCEPTABLE / NOT ACCEPTABLE

Var. required: See Var. Reports:
Dev. required: See Dev. Requests:

Manager Laboratory: THE ROTTERDAM DRYDOCK CO. LABORATORY
Date: 1974-08-29

Approved by Customer:

Approved by Inspection:

B13.1

# DE ROTTERDAMSCHE DROOGDOK MAATSCHAPPIJ N.V.

Quality and Metallurgical Department — Order nº : 30643

## TEST REPORT OF WELDING MATERIALS (required by ASME CODE Section III par. N-331)

**Description of test material**

Type : Komeet geel 66
Supplier : Soudometal
Dimension : Ø 5 mm
Lot (or) batch nº: ~~7265~~ 7703.7265
Type :
Supplier :
Dimension :
Lot (or) batch nº:

Lab. nº 0.737
Stamp nº : 79
Ordered by: LT - AB
Witnessed by: Lloyd's Mr.v.Bezuije

Date test results required:

Classification

| | C | Mn | Si | P | S | Cr | Ni | Mo | |
|---|---|---|---|---|---|---|---|---|---|
| Required | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
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| | | | | | | | | | |

Radiographic test (acc. to doc. nº UP 7.2.02)

Tensile test

| | Diameter specimen | Ultimate tensile strength | Yield point stress at 0.2 % | Elongation in 4 d | Reduction of area | Temp. | Remarks |
|---|---|---|---|---|---|---|---|
| | mm | kg/mm² | kg/mm² | % | % | °C | |
| Required | Ø12.83 | 35.0 | 56.2 | 18.0 | 38.0 | 20 | |
| 737I1 | Ø12.83 | 58.0 | 64.5 | 29.4 | 66.7 | 20 | |

Impact test

| nº | Energy kgm/cm² | Average energy kgm/cm² | Shear fracture % | Lateral exp. a | Temp °C | Remarks |
|---|---|---|---|---|---|---|
| Required | | 5.2 | | | -12 | * see B13.3 |
| 737K1 | 19,4) | | * | * | -12 | |
| K2 | 18.8 | )18.6 | | | -12 | |
| K3 | 17.5) | | | | -12 | |

Heat treatment of test specimens :
30 hr. 610°C

Laboratory R.D.M., March 12th, 1971

SOUDOMETAL S.A
24, Bd Maurice Herbette
B R U X E L L E S 7

Bruxelles, le 4 mars 1971.

CDP/DD/214

# CERTIFICAT DE QUALITE

(Electrodes)

Concerne : Cde : D.14409 O.VRD.DD. du 13.1.71
Firme : NV. ROTTERDAMSCHE DROOGDOK MAATSCHAPPIJ
P.O.Box 913
ROTTERDAM

| Repère | TYPE | Ø . L | N° fabrication |
|---|---|---|---|
| 1 | COMETE JAUNE 66 ELH | 5 x 450 | 7703.7265 |
| 2 | | | |
| 3 | | | |
| 4 | | | |
| 5 | | | |

Analyse du métal deposé :

| Element dosé / Repère | C o/o | Mn o/o | Si o/o | Cr o/o | Ni o/o | Mo o/o | o/o |
|---|---|---|---|---|---|---|---|
| 1 | 0,055 | 1,47 | 0,36 | 0,12 | 0,94 | 0,30 | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

Essais mécaniques :

| Essai de | Traction | | | Résilience | |
|---|---|---|---|---|---|
| Repère | Charge Rupt kg/mm² | Lim elast. kg/mm² | Allongemt 5d o/o | t° C | Type : Charpy V kgm/cm² |
| 1 | 60 x 70 | 52 x 62 | 20 x 25 | -50 | > 6 |
| | | | | | |
| | | | | | |
| | | | | | |

SERVICE TECHNIQUE,

Le Chef du Laboratoire,

Le Directeur,

# DE ROTTERDAMSCHE DROOGDOK MAATSCHAPPIJ B.V.

LABORATORY



MECHANICAL AND CHEMICAL TEST RESULTS

Report Nr R.N. U 719

Customer : R.N. for General Electric
Customer Ref : Leibstadt
Manufact. Order : 30795
Sub Order : 93300
Sequence Nr :
Drawing :
Item :

Item Description : Additional tests for receiving inspection of welding materials.
Material : Comète Jaune 66 ELH
Date of test : 1974-08-28
Lab. report Nr : P 666
Spec. HT + Specimens : 30 hrs at 615°C±20°C
Inspection by : G.E. Stw. Q.A.R.N.

Chemical composition

| | C | Mn | Si | P | S | Cr | Ni | Mo | |
|---|---|---|---|---|---|---|---|---|---|
| Required | | | | | | | | | |
| | | | | | | | | | |

Tensile test (Amsler tensile testing machine)

| No | Dimensions mm | Yield strength kg/mm² | Tensile strength kg/mm² | Elongation on 4 d % | Reduction of area % | Temp. °C | Remarks / Location |
|---|---|---|---|---|---|---|---|
| Required | Ø12.5 | 29.8 | 50.7 | - | - | 302°C | all weld metal |
| U719WT1 | Ø12.5 | 49.7 | 58.8 | 20.8 | 64.0 | 302°C | all weld metal |

Supplier : Soudometal S.A.
Dimension: Ø 5 mm
Heatnr. : 7703-7265

Impact test acc. to ASTM E 23 — Type of bar: Charpy V — Satec machine

| No | Energy kgm/cm² | Average energy kgm/cm² | Shear fracture % | Lateral exp. | Temp. °C |
|---|---|---|---|---|---|
| Required | 8.6 | | | 0.035 | |
| U719K1 | 18.9 | 8.1 | 72 | 0.087 | -17°C |
| U719K2 | 5.5 | | 45 | 0.032 | -17°C |
| U719K3 | 17.4 | 18.8 | 67 | 0.079 | -12°C |
| U719K4 | 19.6 | | 76 | 0.083 | -12°C |
| U719K5 | 19.3 | | 74 | 0.083 | -12°C |

Results : ACCEPTABLE
XXXXXXXXXXXXX

Dropweight test acc.to ASTM E 208-69
Type of specimen : P3
Required : Tndt - 29°C

| Number | temp. | Result |
|---|---|---|
| U719 P1 | -50°C | Break |
| U719 P2 | -45°C | No break |
| U719 P3 | -45°C | No break |

Tndt = - 50°C RTndt = - 45°C

see page 2 for transition Curve

Var. required : See Var. Report
Doc. required : See Doc. Report

Sign. Operator :
Date : 1974-08-28

Signature Laboratory : DE ROTTERDAMSCHE DROOGDOK MAATSCHAPPIJ N.V. LABORATORY 1974-09-30

Published by : M. Broeken R.N.

Approved by Inspection :

# DE ROTTERDAMSCHE DROOGDOK MAATSCHAPPIJ B.V.

LABORATORY



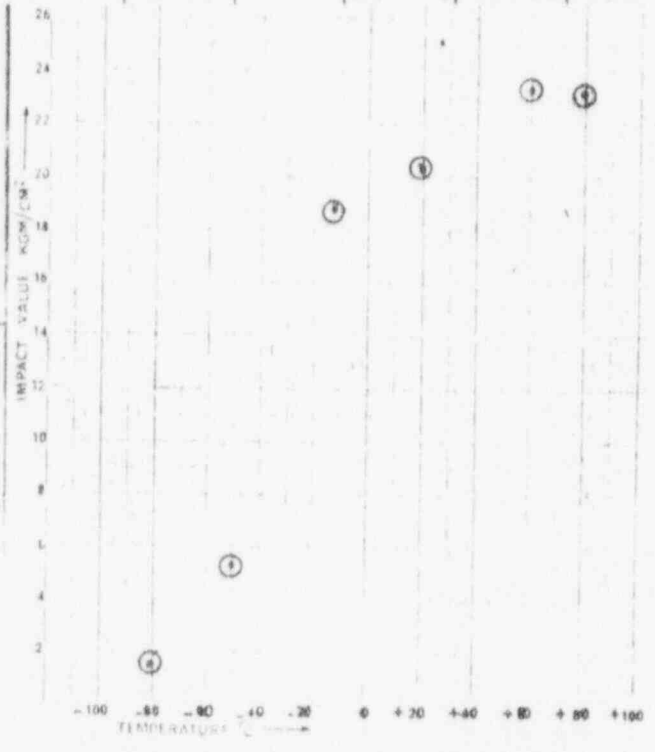
MECHANICAL AND CHEMICAL TEST RESULTS | Report Nr. R.N. U 719

Customer: R.N. for General Electric
Customer Ref: Leibstadt
Manufact. Order: 30795
Sub Order: 93300
Sequence Nr:
Drawing:
Item:

Item Description: Additional tests for receiving inspection of welding materials
Material: Comète Jaune 66 ELH
Date of test: 1974-08-29
Lab. report Nr: P 666
Sum. HT of Specimens: 30 hrs. at 615°C ± 20°C
Inspection by: G.E. Stw. Q.A.R.N.

Impact test acc. to ASTM E 23 — Type of bar: Charpy - V

| No | Energy kgm/cm² | Average energy kgm/cm² | Shear fracture % | Lateral exp | Temp °C | No | Energy kgm/cm² | Average energy kgm/cm² | Shear fracture % | Lateral exp | Temp °C |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Required | | | | | | Required | | | | | |
| U719K6 | 2.0 | | 21 | 0.012 | -80°C | U719K15 | 23.1 | | 100 | 0.099 | +60°C |
| U719K7 | 1.5 | 1.5 | 16 | 0.008 | -80°C | U719K16 | 22.6 | 23.3 | 100 | 0.087 | +60°C |
| U719K8 | 1.1 | | 16 | 0.012 | -80°C | U719K17 | 24.3 | | 100 | 0.099 | +60°C |
| U719K9 | 3.5 | | 26 | 0.020 | Tndt | U719K18 | 23.5 | | 100 | 0.071 | +80°C |
| U719K10 | 4.6 | 5.4 | 21 | 0.024 | Tndt | U719K19 | 22.9 | 23.0 | 100 | 0.094 | +80°C |
| U719K11 | 8.0 | | 27 | 0.035 | Tndt | U719K20 | 22.6 | | 100 | 0.099 | +80°C |
| U719K3 | 17.4 | | 67 | 0.079 | -12°C | | | | | | |
| U719K4 | 19.6 | 18.8 | 76 | 0.083 | -12°C | | | | | | |
| U719K5 | 19.3 | | 74 | 0.083 | -12°C | | | | | | |
| U719K12 | 20.5 | | 86 | 0.087 | +20°C | | | | | | |
| U719K13 | 20.9 | 20.3 | 88 | 0.099 | +20°C | | | | | | |
| U719K14 | 19.5 | | 80 | 0.083 | +20°C | | | | | | |




Results: ACCEPTABLE / NOT ACCEPTABLE

Var. required: | See Var. Report:
Dev. required: | See Dev. Request:
Com. Operator:
Date: 1974-08-29

Manager Laboratory: | Approved by Engineer: | Approved by Inspection:

QUALITY CONTROL

# PROTOKOLL DER SCHWEISSMATERIAL PRUEFUNG
# RECORD OF WELD MATERIAL QUALIFICATION

No. R - 3005
Blatt 1 von 1
Sheet 1 of 1

B 14.1

| | | | |
|---|---|---|---|
| Handelsmarke / Trade - Name | Molytherme | Hersteller / Manufacturer | Sécheron, Geneva |
| Klassifikation / Classification | | A- und F - Nummer / A- and F - Number | A-1, F-4 |
| Durchmesser / Diameter | 5.0 mm | Chargen - Nr. / Heat - No. | 8640 |
| Grundwerkstoff / Base Material | H-I (= SA-285 Gr.B) | Form, Dimension / Form, Dimension | Plate 210x260x20 mm |
| Schweissverfahren / Welding Procedure | Manual electric arc | Schweiss - Spez. / Weld - Spec. | S-3301 |
| Stromart, Polarität / Current, Polarity | D.C. reverse | Stromstärke / Amperage | 240 - 300 |

| | | |
|---|---|---|
| Vorwärmen / Preheating | None | |
| Zwischenlagentemperatur / Interpass temperature | max. 230 °C | |
| Nachbehandlung / Post weld heat treatment | None | |
| Spannungsarm glühen / Stress relief treatment | 610 ± 15 °C/ 20 h. | |

| | | | |
|---|---|---|---|
| Prüfart / Examination - Method | X-Ray | | |
| Spezifikation / Applied Specification | ASME-Code III | | |
| Prüfer und Datum / Operator and Date | Bellucci 6.1.70 | | |
| Prüf - Resultat / Test - Result | Satisfactory | | |



Zug-Proben / Tensile Test

| Proben - Nr. / Sample - No. | Durchm. / Diameter mm | Fläche / Area mm² | | Belastung / Load kp | Festigkeit / Strength kp/mm² | Festigkeit / Strength psi | Dehnung / Elongation mm | Dehnung / Elongation % |
|---|---|---|---|---|---|---|---|---|
| E 431 | 10 | | Bruch / Rupture | 57.1 | 59.7 | 84900 | | 25.5 |
| | | | Streckgrenze / Yield | | 54.3 | 77200 | | |

Kerbschlag-Proben / Impact Tests

Proben gemäss / Specimens acc. to

| Proben - Nr. / Sample - No. | Lage / Location | Prüf-Temp / Test - Temp | Fläche / Area mm² | Schlagarbeit / Absorbed energy mkp | mkp/cm² | ft. lbs | Aufweitung / Lateral Expansion mm | % | Duktilität in % / Ductile area in % |
|---|---|---|---|---|---|---|---|---|---|
| E 431 | weld-mat. | -12 °C | | | 19.3 | 111.8 | | 17 | 75 |
| " | " | " | | | 14.5 | 84 | | | |
| " | " | " | | | 19.4 | 112.5 | | | |

| | | | |
|---|---|---|---|
| Schweisser / Welder | Vasella | Schweisser Stempel-No. | 131 |
| Durchgeführt bei / Conducted by | Sulzer, 8307 | Schweiss - Datum / Weld - Date | 19.12.69 |
| Mat. Prüf. Prüfung / Mat. Test. Testing | 3/1-431 | Prüf - Datum / Test - Date | 14.1.70 |
| Abnahmebehörde / Inspection Agency | Lloyd's | Inspektor / Inspector | Mr.Milne |

Bestätigung / Certification

Wir bestätigen, dass die Angaben in diesem Protokoll korrekt sind.
We certify that the statements in this record are correct.

Ort und Datum / Place and Date: Winterthur 15.1.1970

Unterschrift / Signed by: Sulzer Brothers Limited
Inspection Dept. for Nuclear Equipment

rsv-a rotterdam nl 28280 18.6.1979

attn. mr. van de poll

westinghouse weld material documentation
your tx/ds/88t/vdp of june 15, 1979
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1. analysis for r-3002, r-3003 and r-3005 for surry 1
all: electrode molytherme

| | | c | si | mn | mo |
|---|---|---|---|---|---|
| ~~r-3002, dia. 3,25,~~ | ~~heat 9092~~ | ~~0,060~~ | ~~0,40~~ | ~~1,06~~ | ~~0,45~~ |
| ~~r-3003, dia. 4,~~ | ~~heat 9004~~ | ~~0,053~~ | ~~0,31~~ | ~~1,03~~ | ~~0,47~~ |
| r-3005, dia. 5, | heat 8640 | 0,044 | 0,25 | 0,96 | 0,52 |

2. analysis for r-3001 and r-3004 for surry 11
all: electrode molytherme

| | | c | si | mn | mo |
|---|---|---|---|---|---|
| ~~r-3001, dia. 3,25,~~ | ~~heat 8825~~ | ~~0,054~~ | ~~0,38~~ | ~~1,09~~ | ~~0,50~~ |
| ~~r-3004, dia. 5,~~ | ~~heat 8928~~ | ~~0,053~~ | ~~0,35~~ | ~~1,05~~ | ~~0,49~~ |

regards sulzer winterthur

0342-2/35/21056/ammann/mz

18.6.79 17.23 kb

28280 rsv a nl
76165e sulz ch

QUALITY CONTROL

# PROTOKOLL DER SCHWEISSMATERIAL PRUEFUNG / RECORD OF WELD MATERIAL QUALIFICATION

No. R - 3001
Blatt / Sheet 1 von / of 1

**Zusatzwerkstoff / Filler Material**

| | | | |
|---|---|---|---|
| Handelsmarke / Trade - Name | Polytherme | Hersteller / Manufacturer | Bisi Sécheron, Geneva |
| Klassifikation / Classification | | A- und F - Nummer / A- and F - Number | A-1, F-4 |
| Durchmesser / Diameter | 3.25 mm | Chargen - Nr. / Heat - No. | 8825 |

**Schweissen / Welding**

| | | | |
|---|---|---|---|
| Grundwerkstoff / Base Material | H-I (= SA-285 Gr.B) | Form, Dimension / Form, Dimension | Plate 210x260x20 mm |
| Schweiss-verfahren / Weld - Procedure | Manual electric arc | Schweiss - Spez. / Weld - Spec. | 3-3301 |
| Strom-art, Polarität / Current, Polarity | D.C. reverse | Stromstärke / Amperage | 130 - 180 |

**Nachweis-behandlung / Heat Treatment**

| | | |
|---|---|---|
| Vorwärmen / Preheating | None | |
| Zwischenlagentemperatur / Interpass temperature | max. 250 °C | |
| Nachschweissglühung / Post weld heat treatment | None | |
| Spannungsarm glühen / Stress relief treatment | 610 ± 15 °C/ 20 h. | |

**Zerstörende Prüfung / NDT - Examination**

| | | | |
|---|---|---|---|
| Prüfart / Examination - Method | X-Ray | | |
| Spezifikation / Applied Specification | ASME-Code III | | |
| Prüfer und Datum / Operator and Date | Bellucci 6.1.70 | | |
| Prüf - Resultat / Test - Result | Satisfactory | | |



**Zug - Probe / Tensile - Test**

| Probe - Nr. / Sample - No. | Durchm. / Diameter mm | Fläche / Area mm² | | Belastung / Load kp | Festigkeit / Strength kp/mm² | Festigkeit / Strength psi | Dehnung / Elongation mm | Dehnung / Elongation % |
|---|---|---|---|---|---|---|---|---|
| A 431 | 8 | | Bruch / Rupture | | 64.1 | 91200 | | |
| | | | Streckgrenze / Yield | | 57.5 | 81700 | | |

**Kerbschlag - Probe / Impact - Test**

Proben gemäss / Specimens acc. to.

| Probe - Nr. / Sample - No. | Lage / Location | Prüf - Temp. / Test - Temp | Fläche / Area mm² | Schlagarbeit / Absorbed energy mkp | mkp/cm² | ft. lbs | Aufweitung / Lateral Expansion mm | Aufweitung / Lateral Expansion % | Duktilität in % / Ductile area in % |
|---|---|---|---|---|---|---|---|---|---|
| A 431 | weld mat. | -12 °C | | | 13.1 | 75.9 | | 14 | 70 |
| " | " | " | | | 15.1 | 87.5 | | | |
| " | " | " | | | 15.8 | 91.5 | | | |

**Durchführung der Prüfungen / Performance of Tests**

| | | | |
|---|---|---|---|
| Schweisser / Welder | Burnardj | Schweisser Stempel-Nr. / Welder Stamp - No. | 108 |
| Durchgeführt bei / Conducted by | Sulzer, 8307 | Schweiss - Datum / Weld - Date | 20.12.1969 |
| Prüf. Mat. Prüfung / Test. Mat. Testing | 3/1-431 | Prüf-Datum / Test - Date | 14.1.70 |
| Abnahmebehörde / Inspection Agency | Lloyd's | Inspektor / Inspector | Mr.Milne |

**Bestätigung / Certification**

Wir bestätigen, dass die Angaben in diesem Protokoll korrekt sind.

We certify that the statements in this record are correct.

Ort und Datum / Place and Date: Winterthur, 15.1.1970

Unterschrift / Signed by

Sulzer Brothers Limited
Inspection Dept. for Nuclear Equipment

rsv-a rotterdam nl 28280 18.6.1979

attn. mr. van de poll

westinghouse weld material documentation
your tx/ds/881/vdp of june 15, 1979
---

1. analysis for r-3002, r-3003 and r-3005 for surry 1
all: electrode molytherme

| | c | si | mn | mo |
|---|---|---|---|---|
| ~~r-3002, dia. 3,25, heat 9092~~ | ~~0,060~~ | ~~0,40~~ | ~~1,06~~ | ~~0,45~~ |
| ~~r-3003, dia. 4, heat 9004~~ | ~~0,053~~ | ~~0,31~~ | ~~1,03~~ | ~~0,47~~ |
| ~~r-3005, dia. 5, heat 8640~~ | ~~0,044~~ | ~~0,25~~ | ~~0,96~~ | ~~0,52~~ |

2. analysis for r-3001 and r-3004 for surry 11
all: electrode molytherme

| | c | si | mn | mo |
|---|---|---|---|---|
| r-3001, dia. 3,25, heat 8825 | 0,054 | 0,38 | 1,09 | 0,50 |
| ~~r-3004, dia. 5, heat 8928~~ | ~~0,053~~ | ~~0,35~~ | ~~1,05~~ | ~~0,49~~ |

regards sulzer winterthur

0342-2/35/21056/ammann/mz

18.6.79 17.33 kb

28280 rsv a nl
75165e sulz ch

QUALITY CONTROL

# PROTOKOLL DER SCHWEISSMATERIAL PRÜFUNG
# RECORD OF WELD MATERIAL QUALIFICATION

No. R - 3004
Blatt / Sheet 1 von / of 1

B16.1

**Zusatzwerkstoff / Filler Material**

| | | | |
|---|---|---|---|
| Handelsmarke / Trade - Name | Polytherme | Hersteller / Manufacturer | Sécheron, Geneva |
| Klassifikation / Classification | | A- und F - Nummer / A- and F - Number | A-1, F-4 |
| Durchmesser / Diameter | 5.0 mm | Chargen - Nr. / Heat - No. | 8928 |

**Schweissen / Welding**

| | | | |
|---|---|---|---|
| Grundwerkstoff / Base - Material | H-I (= SA-285 Gr.B) | Form, Dimension / Form, Dimension | Plate 210x260x20 mm |
| Schweissverfahren / Weld - Procedure | Manual electric arc | Schweiss - Spez. / Weld - Spec. | 3-3301 |
| Stromart, Polarität / Current, Polarity | D.C. reverse | Stromstärke / Amperage | 240 - 300 |

**Wärmebehandlung / Heat Treatment**

| | | |
|---|---|---|
| Vorwärmen / Preheating | None | |
| Zwischenlagentemperatur / Interpass temperature | max. 250 °C | |
| Nachbehandlung / Post weld heat treatment | None | |
| Spannungsarm glühen / Stress relief treatment | 610 ± 15 °C/ 20 h. | |

**Zerstörende Prüfung / ND-Examination**

| | | | |
|---|---|---|---|
| Prüfart / Examination - Method | X-Ray | | |
| Spezifikation / Applied Specification | ASME-Code III | | |
| Prüfer und Datum / Operator and Date | Bellucci 6.1.70 | | |
| Prüf - Resultat / Test - Result | Satisfactory | | |



**Zug - Probe / Tensile - Test**

| Probe - Nr. / Sample - No. | Durchm. / Diameter mm | Fläche / Area mm² | | Belastung / Load kp | Festigkeit / Strength kp/mm² | Festigkeit / Strength psi | Dehnung / Elongation min | Dehnung / Elongation % |
|---|---|---|---|---|---|---|---|---|
| D 431 | 10 | | Bruch / Rupture | | 57.1 | 81200 | | 28.3 |
| | | | Streckgrenze / Yield | | 49.2 | 70000 | | |

**Kerbschlag - Proben / Impact - Tests**

Proben gemäss / Specimens acc. to.

| Probe - Nr. / Sample - No. | Lage / Location | Prüf - Temp / Test - Temp | Fläche / Area mm² | Schlagarbeit / Absorbed energy mkp | mkp/cm² | ft. lbs | Aufweitung / Lateral Expansion min | Aufweitung / Lateral Expansion % | Duktilität in % / Ductile area in % |
|---|---|---|---|---|---|---|---|---|---|
| D 431 | Weld-mat. | -12 °C | | | 16.6 | 96.2 | | 16 | 75 |
| " | " | " | | | 18.8 | 109 | | | |
| " | " | " | | | 14.4 | 83.4 | | | |

**Durchführung / Performance**

| | | | |
|---|---|---|---|
| Schweisser / Welder | Vasella | Schweisser Stemp - No. | 131 |
| Durchgeführt bei / Conducted by | Sulzer, 8307 | Schweiss - Datum / Weld - Date | 19.12.69 |
| Prüf. Mat. Prüfung / Test. Mat. Testing | 3/1-431 | Prüf - Datum / Test - Date | 14.1.70 |
| Abnahmebehörde / Inspection Agency | Lloyd's | Inspektor / Inspector | Mr. Milne |

**Bestätigung / Certification**

Wir bestätigen, dass die Angaben in diesem Protokoll korrekt sind.
We certify that the statements in this record are correct.

Ort und Datum / Place and Date: Winterthur, 15.1.1970

Unterschrift: [illegible]

Sulzer Brothers Limited
Inspection Dept. for Nuclear Equipment

rsv-a rotterdam nl 28280 18.6.1979

attn. mr. van de poll

westinghouse weld material documentation
your tx/ds/88t/vdp of june 15, 1979
---

1. analysis for r-3002, r-3003 and r-3005 for surry 1
all: electrode molytherme

| | | c | si | mn | mo |
|---|---|---|---|---|---|
| ~~r-3002, dia. 3,25,~~ | ~~heat 9092~~ | ~~0,060~~ | ~~0,40~~ | ~~1,06~~ | ~~0,45~~ |
| ~~r-3003, dia. 4,~~ | ~~heat 9004~~ | ~~0,053~~ | ~~0,31~~ | ~~1,03~~ | ~~0,47~~ |
| ~~r-3005, dia. 5,~~ | ~~heat 8640~~ | ~~0,044~~ | ~~0,25~~ | ~~0,96~~ | ~~0,52~~ |

2. analysis for r-3001 and r-3004 for surry 11
all: electrode molytherme

| | | c | si | mn | mo |
|---|---|---|---|---|---|
| ~~r-3001, dia. 3,25,~~ | ~~heat 8825~~ | ~~0,054~~ | ~~0,38~~ | ~~1,09~~ | ~~0,50~~ |
| r-3004, dia. 5, | heat 8928 | 0,053 | 0,35 | 1,05 | 0,49 |

regards sulzer winterthur

0342-2/35/21056/ammann/mz

18.6.79 17.33 kb

28280 rsv a nl
76165e sulz ch

QUALITY CONTROL

# PROTOKOLL DER SCHWEISSMATERIAL PRUEFUNG
# RECORD OF WELD MATERIAL QUALIFICATION

No. 23 - 3009

Blatt / Sheet 1 von / of 1

B171

| | | | | |
|---|---|---|---|---|
| Zusatz-Material / Filler-Material | Handelsmarke / Trade-Name | Polytherme | Hersteller / Manufacturer | Sécheron, Geneva |
| | Klassifikation / Classification | | A- und F-Nummer / A- and F-Number | A-1, F-4 |
| | Durchmesser / Diameter | 4.0 mm | Chargen-Nr. / Heat-No. | 9004 |
| Schweissanlage | Grundwerkstoff / Base-Material | H-I (= SA-285 Gr.B) | Form, Dimension / Form, Dimension | Plate 210x260x20 mm |
| | Schweissverfahren / Weld-Procedure | Manual electric arc | Schweiss-Spez. / Weld-Spec. | 3-3301 |
| | Stromart, Polarität / Current, Polarity | D.C. reverse | Stromstärke / Amperage | 180 - 200 |

| | | | |
|---|---|---|---|
| Vorwärmen / Preheating | None | | |
| Zwischenlagentemperatur / Interpass temperature | max. 250 °C | | |
| Nachbehandlung / Post weld heat treatment | None | | |
| Spannungsarmglühen / Stress relief treatment | 610 ± 15 °C/ 20 h. | | |

Zerstörungsfreie Prüfung / NDT-Examination

| | | | |
|---|---|---|---|
| Prüfart / Examination-Method | X-Ray | | |
| Spezifikation / Applied Specification | ASME-Code III | | |
| Prüfer und Datum / Operator and Date | Bellucci 6.1.70 | | |
| Prüf-Resultat / Test-Result | Satisfactory | | |

Zug-Probe / Tensile-Test

| Probe-Nr. / Sample-No. | Durchm. / Diameter mm | Fläche / Area mm² | | Belastung / Load kp | Festigkeit / Strength kp/mm² | Festigkeit / Strength psi | Dehnung / Elongation mm | Dehnung / Elongation % |
|---|---|---|---|---|---|---|---|---|
| C 431 | 10 | | Bruch / Rupture | | 56.8 | 80800 | | 30.0 |
| | | | Streckgrenze / Yield | | 52.8 | 75000 | | |

Kerbschlag-Proben / Impact-Tests

Proben gemäss / Specimens acc. to:

| Probe-Nr. / Sample-No. | Lage / Location | Prüf-Temp. / Test-Temp. | Fläche / Area mm² | Schlagarbeit / Absorbed energy mkp | Schlagarbeit / Absorbed energy mkp/cm² | Schlagarbeit / Absorbed energy ft. lbs | Aufweitung / Lateral mm | Aufweitung / Expansion % | Duktilität in % / Ductile area in % |
|---|---|---|---|---|---|---|---|---|---|
| C 431 | weld-met. | -12 °C | | | 19.4 | 112.5 | | 17 | 85 |
| " | " | " | | | 18.3 | 106 | | | |
| " | " | " | | | 20.1 | 116.5 | | | |

Durchführung / Referenzen

| | | | |
|---|---|---|---|
| Schweisser / Welder | Vasella | Schweisser Stempel-Nr. / Welder Stamp-No. | 131 |
| Durchgeführt bei / Conducted by | Sulzer, 8307 | Schweiss-Datum / Weld-Date | 20.12.69 |
| Prot. Mat. Prüfung / Prot. Mat. Testing | 3/1-431 | Prüf-Datum / Test-Date | 14.1.70 |
| Abnahmebehörde / Inspection-Agency | Lloyd's | Inspektor / Inspector | Mr.Milne |

Bestätigung / Certification

Wir bestätigen, dass die Angaben in diesem Protokoll korrekt sind.

We certify that the statements in this record are correct.

Ort und Datum / Place and Date: Winterthur, 15.1.1970

Unterschrift / Signed by:

Sulzer Brothers Limited
Inspection Dept. for Nuclear Equipment

rsv-a rotterdam nl 28280 18.6.1979

attn. mr. van de poll

westinghouse weld material documentation
your tx/ds/88t/vdp of june 15, 1979
---

1. analysis for r-3002, r-3003 and r-3005 for slurry 1
all: electrode molytherme

| | | c | si | mn | mo |
|---|---|---|---|---|---|
| ~~r-3002, dia. 3,25,~~ | ~~heat 9092~~ | ~~0,060~~ | ~~0,40~~ | ~~1,06~~ | ~~0,45~~ |
| r-3003, dia. 4, | heat 9004 | 0,053 | 0,31 | 1,03 | 0,47 |
| ~~r-3005, dia. 5,~~ | ~~heat 9640~~ | ~~0,044~~ | ~~0,25~~ | ~~0,96~~ | ~~0,52~~ |

2. analysis for r-3001 and r-3004 for slurry 11
all: electrode molytherme

| | | c | si | mn | mo |
|---|---|---|---|---|---|
| ~~r-3001, dia. 3,25,~~ | ~~heat 8825~~ | ~~0,054~~ | ~~0,38~~ | ~~1,09~~ | ~~0,50~~ |
| ~~r-3004, dia. 5,~~ | ~~heat 8928~~ | ~~0,053~~ | ~~0,35~~ | ~~1,05~~ | ~~0,49~~ |

regards sulzer winterthur

0342-2/35/21056/ammann/mz

18.6.79 17.23 kb

28280 rsv a nl
76165e sulz ch

QUALITY CONTROL

# PROTOKOLL DER SCHWEISSMATERIAL PRUEFUNG
# RECORD OF WELD MATERIAL QUALIFICATION

No. PR - 3002

Blatt / Sheet 1 von / of 1

B18.1

**Zusatz-Material / Filler - Material**

| | | | |
|---|---|---|---|
| Handelsmarke / Trade - Name | Polytherme | Hersteller / Manufacturer | Sécheron, Geneva |
| Klassifikation / Classification | | A- und F - Nummer / A- and F - Number | A-1, F-4 |
| Durchmesser / Diameter | 3.25 mm | Chargen - Nr. / Heat - No. | 9092 |

**Schweissen / Welding**

| | | | |
|---|---|---|---|
| Grundwerkstoff / Base - Material | H-I (= SA-285 Gr.B) | Form, Dimension / Form, Dimension | Plate 210x260x20 mm |
| Schweissverfahren / Weld - Procedure | Manual electric arc | Schweiss - Spez. / Weld - Spec. | 3-3301 |
| Stromart, Polarität / Current, Polarity | D.C. reverse | Stromstärke / Amperage | 130 - 180 |

**Wärmebehandlung / Heat Treatment**

| | | |
|---|---|---|
| Vorwärmen / Preheating | None | |
| Zwischenlagentemperatur / Interpass temperature | max. 250 °C | |
| Nachbehandlung / Post weld heat treatment | None | |
| Spannungsfrei glühen / Stress relief treatment | 610 ± 15 °C/ 20 h. | |

**Zerstörungsfreie Prüfung / N.D. - Examination**

| | | | |
|---|---|---|---|
| Prüfart / Examination - Method | X-Ray | | |
| Spezifikation / Applied Specification | ASME-Code III | | |
| Prüfer und Datum / Operator and Date | Bellucci 6.1.70 | | |
| Prüf - Resultat / Test - Result | Satisfactory | | |

**Zug-Probe / Tensile - Test**

| Probe - Nr. / Sample - No. | Durchm. / Diameter mm | Fläche / Area mm² | | Belastung / Load kp | Festigkeit / Strength kp/mm² | Festigkeit / Strength psi | Dehnung / Elongation mm | Dehnung / Elongation % |
|---|---|---|---|---|---|---|---|---|
| B 431 | 8 | | Bruch / Rupture | | 62.1 | 88300 | | 26.0 |
| | | | Streckgrenze / Yield | | 53.0 | 75400 | | |

**Kerbschlag-Proben / Impact - Tests**

Proben gemäss / Specimens acc. to.

| Probe - Nr. / Sample - No. | Lage / Location | Prüf - Temp. / Test - Temp. | Fläche / Area mm² | Schlagarbeit / Absorbed energy mkp | Schlagarbeit / Absorbed energy mkp/cm² | Schlagarbeit / Absorbed energy ft. lbs | Aufweitung / Lateral Expansion mm | Aufweitung / Lateral Expansion % | Duktilität in % / Ductile area in % |
|---|---|---|---|---|---|---|---|---|---|
| B 431 | weld mat. | -12 °C | | | 12.6 | 73.0 | | 12 | 65 |
| " | " | " | | | 12.9 | 74.7 | | | |
| " | " | " | | | 11.7 | 67.8 | | | |

**Durchführung / Performance**

| | | | |
|---|---|---|---|
| Schweisser / Welder | Burnardj | Schweisser Stemp - No. | 108 |
| Durchgeführt bei / Conducted by | Sulzer, 8307 | Schweiss - Datum / Weld - Date | 21.12.1969 |
| Prot. Mat. Prüfung / Prot. Mat. Testing | 3/1-431 | Prüf - Datum / Test - Date | 14.1.70 |
| Abnahmebehörde / Inspection - Agency | Lloyd's | Inspektor / Inspector | Mr. Milne |

**Bestätigung / Certification**

Wir bestätigen, dass die Angaben in diesem Protokoll korrekt sind.

We certify that the statements in this record are correct.

Ort und Datum / Place and Date: Winterthur, 15.1.1970

Unterschrift / Signed by

Sulzer Brothers Limited
Inspection Dept. for Nuclear Equipment

rsv-a rotterdam nl 28280 18.6.1979

attn. mr. van de poll

westinghouse weld material documentation
your tx/ds/88t/vdp of june 15, 1979
---

1. analysis for r-3002, r-3003 and r-3005 for surry 1
all: electrode molytherme

| | c | si | mn | mo |
|---|---|---|---|---|
| r-3002, dia. 3,25, heat 9092 | 0,060 | 0,40 | 1,06 | 0,45 |
| ~~r-3003, dia. 4, heat 9004~~ | ~~0,053~~ | ~~0,31~~ | ~~1,03~~ | ~~0,47~~ |
| ~~r-3005, dia. 5, heat 9640~~ | ~~0,044~~ | ~~0,25~~ | ~~0,96~~ | ~~0,52~~ |

2. analysis for r-3001 and r-3004 for surry 11
all: electrode molytherme

| | c | si | mn | mo |
|---|---|---|---|---|
| ~~r-3001, dia. 3,25, heat 8825~~ | ~~0,054~~ | ~~0,38~~ | ~~1,09~~ | ~~0,50~~ |
| ~~r-3004, dia. 5, heat 8928~~ | ~~0,053~~ | ~~0,35~~ | ~~1,05~~ | ~~0,49~~ |

regards sulzer winterthur

0342-2/35/21056/ammann/mz

18.6.79 17.23 kb

28280 rsv a nl
76165e sulz ch

# DE ROTTERDAMSCHE DROOGDOK MAATSCHAPPIJ N.V.

Quality and Metallurgical Department — Order n°: 3.613

## TEST REPORT OF WELDING MATERIALS (required by ASME CODE Section III, par. N-511)

**Description of test material**

Type : drawn 43 (NC 54 Ti)
Supplier : arco-chemie
Dimension : ø 4
Lot/heat/batch n°: 8-21

Type : Linde 93 (SMT)
Supplier : Smit (SMT)
Dimension :
Lot/heat/batch n°: 01180

Lab. n° : 11693
Stamp n° : 5348
Ordered by: CB
Witnessed by: Bruyls

Ir. V. Brouwer. X

Date test results required:

Chemical composition of weldmetal

| | C | Mn | Si | P | S | Cr | Ni | Mo | Cu |
|---|---|---|---|---|---|---|---|---|---|
| Required: | x | x | x | | | | | x | x |
| | 0,11 | 1,53 | 0,46 | | | | | 0,44 | 0,16 |

Mechanical tests (acc. to doc. nº LP 751-03 rev. 1)

Tensile test

| | Dimens. | Yield stress | Tensile strength | Elongation | Reduct. of area | Temp. | Remarks |
|---|---|---|---|---|---|---|---|
| | mm | kg/mm² | kg/mm² | in 4 d | % | °C | POOR ORIGINAL |
| Required: | | x | x | x | x | + 5 | |
| 4698 | 12,83 | 40,4 | 59,2 | 25,8 | 67,6 | | |

Impact test

| nº | Energy | Average energy | Shear fracture | Lateral exp | Temp. | Remarks |
|---|---|---|---|---|---|---|
| | kgm/cm² | kgm/cm² | % | mm | °C | 2 sub / burst |
| Required: | x | x | | | - 12 | |
| 4698 1 | 12,5 | | | | | |
| 2 | 12,8 | 13,2 | | | - 12° | |
| 3 | 14,5 | | | | | |

Heat treatment of test specimens:

Laboratory R.D.M.,

# DE ROTTERDAMSCHE DROOGDOK MAATSCHAPPIJ N.V.

Quality and Metallurgical Department — Order n° : 30643

## TEST REPORT OF WELDING MATERIALS

**Description of test material**

Type : S4Mo
Supplier : D.E.W.
Dimension : Ø 4
Lot/heat/batch n°: 801

Type : Flux 89
Supplier : Smit (S.A.F.)
Dimension :
Lot/heat/batch n°: 1211

Lab. n° : R 732
Stamp n° : 177
Ordered by : LT
Witnessed by :
Lloyd's: Mr. v Bezuijje

K Bezuijje

Date test results required:

**Chemical composition**

| | C | Mn | Si | P | S | Cr | Ni | Mo | Cu |
|---|---|---|---|---|---|---|---|---|---|
| Required: | | | | | | | | | |
| 32 A | 0,086 | 1,58 | 0,43 | 0,012 | 0,012 | | | 0,51 | 0,18 |

**Non destructive testing**

**Mechanical tests (acc. to doc. n° LP 754-68)**

Tensile test

| | Dimensions | Yield strength | Tensile strength | Elongation | Reduct. of area | Temp. | Remarks |
|---|---|---|---|---|---|---|---|
| | mm | kg/mm² | kg/mm² | l= 4 d | % | °C | |
| Required: | Ø12,83 | 35,2 | 56,2 | 18,0 | 38,0 | 20 | |
| 32 T1 | 12,83 | 48,4 | 60,2 | 28,6 | 65,8 | 20 | all weld metal |

Impact test type Charpy-V

| n° | Energy | Average energy | Shear fracture | Lateral exp. | Temp | Remarks |
|---|---|---|---|---|---|---|
| | kgm/cm² | kgm/cm² | % | " | °C | |
| Required: | | 5,2 | | | -12 | |
| 32 K1 | 11,3 | | 41 | 0,063 | -12 | |
| K2 | 8,8 | 10,1 | 35 | 0,051 | -12 | |
| K3 | 10,3 | | 41 | 0,059 | -12 | |

Heat treatment of test specimens:
20 hrs at 610°C

Laboratory R.D.M., June 27, 1972

Vos/vdB

RDB

B

Dig. 5

ARCO-CHEMIE
WILHELM SCHIEFELBEIN GMBH
SCHWEISS-TECHNIK

Firma
De Rotterdamsche Droogdok
Maatschappij N.V.
Scheeps- en Werktuigbouw

Rotterdam
Postbus 913

IHR ZEICHEN | IHRE ZUSCHRIFT | UNSER ZEICHEN: Ed/Kö | UNSERE ZUSCHRIFT | 28 BREMEN 1, den 24. Juli 1969
POSTFACH 1417

Betr. Auftrag Nr. D 9725 - O. Vrd.

## ANALYSEN-ZERTIFIKAT

Nr. 113 33231

Automaten-Schweißdraht 54/Mo

4,0 mm - Chargen-Nr. 801

| C | Si | Mn | Mo | P | S |
|---|---|---|---|---|---|
| 0,14 | 0,16 | 2,10 | 0,53 | 0,013 | 0,015 |

~~5,0 mm - Chargen-Nr. 721858~~

| C | Si | Mn | Mo | P | S |
|---|---|---|---|---|---|
| ~~0,15~~ | ~~0,18~~ | ~~2,04~~ | ~~0,51~~ | ~~0,019~~ | ~~0,010~~ |

ARCO - CHEMIE
Wilhelm Schiefelbein GmbH

# DE ROTTERDAMSCHE DROOGDOK MAATSCHAPPIJ N.V.

Quality and Metallurgical Department — Order n° : 30643

## TEST REPORT OF WELDING MATERIALS (required by ASME CODE Section IIB, par. N-511)

**Description of test material**

Type : S4Mo
Supplier : W.U.
Dimension : Ø 4 mm
Lot/heat/batch n°: 1725

Type : Poeder 89
Supplier : Smit
Dimension : 12 x 150
Lot/heat/batch n°: 1211

Lab. n° : L 718
Stamp n° : 5609
Ordered by: V1a 26-3-70
Witnessed by: Lloyd's

Date test results required:

**Chemical composition**

| | C | Mn | Si | P | S | Cr | Ni | Mo | |
|---|---|---|---|---|---|---|---|---|---|
| Required: | | | | | | | | | |
| deposit | 0,09 | 1,32 | 0,30 | | | | | 0,32 | |

**Mechanical tests (acc. to doc. n° LP 754-68 rev. 3)**

Tensile test

| | Dimensions mm | Yield strength kg/mm² | Tensile strength kg/mm² | Elongation l: 4 d | Reduct. of area % | Temp. °C | Remarks |
|---|---|---|---|---|---|---|---|
| Required: | | | | | | | |
| 1 | Ø12,83 | 47,2 | 56,6 | 32,0 | 67,7 | | |

Impact test

| n° | Energy kgm/cm² | Average energy kgm/cm² | Shear fracture % | Lateral exp. " | Temp. °C | Remarks |
|---|---|---|---|---|---|---|
| Required: | | | | | -12 | |
| 1 | 11.5 | 11.6 | | | -12 | |
| 2 | 11.3 | | | | -12 | |
| 3 | 12.1 | | | | -12 | |

Heat treatment of test specimens :
14 hrs at 610° C

Laboratory R.D.M., May 26 , 1970.

# DE ROTTERDAMSCHE DROOGDOK MAATSCHAPPIJ N.V.

Quality and Metallurgical Department — Order nº : 30643

## TEST REPORT OF WELDING MATERIALS (required by ASME CODE Section III, par. N-511)

**Description of test material**

Type : S4Mo
Supplier : Arco Chemie
Dimension : Ø 4 mm
Lot/heat/batch nº: 1725

Type : Flux 89
Supplier : SAF
Dimension : 12 x 150
Lot/heat/batch nº: 2275

Lab. nº : 0.701
Stamp nº : 43
Ordered by : LI AB
Witnessed by : Lloyd's
Mr v. Bezuye.

Date test results required:

**Chemical composition**

| | C | Mn | Si | P | S | Cr | Ni | Mo | Cu |
|---|---|---|---|---|---|---|---|---|---|
| Required: | | | | | | | | | |
| Deposit | 0,058 | 1,66 | 0,38 | | | | | 0,51 | 0,11 |

**Mechanical tests (acc. to doc. nº LP 754-68)**

Tensile test

| | Diameter | Yield strength | Tensile strength | Elongation | Reduct. of area | Temp. | Remarks |
|---|---|---|---|---|---|---|---|
| | mm | kg/mm² | kg/mm² | l: 4 d | % | °C | |
| Required: | 12.83 | 35.2 | 56.2 | 18.0 | 38.0 | 20 | |
| 0701 T1 | 12.83 | 44.9 | 56.6 | 31.2 | 67.6 | 20 | |



Impact test

| nº | Energy | Average energy | Shear fracture | Lateral exp. | Temp. | Remarks |
|---|---|---|---|---|---|---|
| | kgm/cm² ; gm/cm² | | % | mm | °C | |
| Required: | | 5.2 | | | -12C | |
| 0701 K1 | 10.1 | | 47 | 0.063 | | |
| K2 | 12.3 | 10.8 | 54 | 0.071 | -12 | |
| K3 | 10.0 | | 47 | 0.059 | | |

Heat treatment of test specimens:
30 hrs 610°C

SURVEYOR TO LLOYD'S REGISTER OF SHIPPING

Laboratory R.D.M., October 29 th, 1970

**WESTFÄLISCHE UNION AKTIENGESELLSCHAFT**

Welca N.V.
Lastechnik

Rotterdam/NIEDERLAND
Postbus 1551

| Ihre Zeichen | Ihre Nachricht vom | Unser Hausruf | Unsere Abt. u. Zeichen | 47 Hamm |
|---|---|---|---|---|
| | | ☎ 271 8603 Durchwahlverkehr | TSK/Sch | 23.2.1970 |

# Werkszeugnis

Bestell-Nr PS vom 6.1.1970

Unsere Auftrags-Nr 123.30555

Prüfgegenstand Schweißdraht Abmessung 4,00 mm Ø

| lfd Nr | Qualität | Chargen-Nr. | lfd Nr | Qualität | Chargen-Nr. |
|---|---|---|---|---|---|
| 1 | Union S 4 Mo | 1725 | 5 | | |
| 2 | | | 6 | | |
| 3 | | | 7 | | |
| 4 | | | 8 | | |

Chemische Zusammensetzung des Schweiß-gutes / drahtes

| lfd Nr | C | Si | Mn | Cr | Mo | Ni | P | S | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0,14 | 0,13 | 2,14 | | 0,52 | | 0,014 | 0,009 | | | |
| 2 | | | | | | | | | | | |
| 3 | | | | | | | | | | | |
| 4 | | | | | | | | | | | |
| 5 | | | | | | | | | | | |
| 6 | | | | | | | | | | | |
| 7 | | | | | | | | | | | |
| 8 | | | | | | | | | | | |

Bemerkungen

Westfälische Union AG
für Eisen- und Drahtindustrie
Schweißtechnische Versuchsanstalt

# DE ROTTERDAMSCHE DROOGDOK MAATSCHAPPIJ N.V.

Quality and Metallurgical Department — INTERN — Order n° : 18004

## TEST REPORT OF WELDING MATERIALS (required by ASME CODE Section III, par. N-510)

**Description of test material**

Type : 54Mo
Supplier : Arco Chemie
Dimension : Ø 4 mm
Lot/heat/batch n°: 4275

Type : 89
Supplier : Smit
Dimension : 12 x 150
Lot/heat/batch n°: 04275

Lab. n° : L 737
Stamp n° : 9627
Ordered by: VIS 24-4-70
Witnessed by : [illegible]
27-5-70

Date test results required:

**Chemical composition**

| | C | Mn | Si | P | S | Cr | Ni | Mo | |
|---|---|---|---|---|---|---|---|---|---|
| Required: | | | | | | | | | |
| deposit | 0,084 | 1,74 | 0,35 | | | | | 0,38 | hoog in las |

**Mechanical tests (acc. to ecs. n° LP 754-03 rev. 3)**

Tensile test

| | Dimensions Ø mm | Yield Strength kg/mm² | Tensile strength kg/mm² | Elongation l: 4 d | Reduct. of area % | Temp. °C | Remarks |
|---|---|---|---|---|---|---|---|
| Required: | 12,83 | | | | | | |
| 1 | 12,83 | 46,9 | 58,1 | 29,0 | 67,6 | | |

Impact test

| n° | Energy kgm/cm² | Average energy kgm/cm² | Shear fracture % | Lateral exp. n | Temp. °C | Remarks |
|---|---|---|---|---|---|---|
| Required: | | | | | -12 | |
| 1 | 13,0 | 11,7 | | | | |
| 2 | 10,8 | | | | | |
| 3 | 11,4 | | | | | |

Heat treatment of test specimens : [illegible]



Laboratory R.D.M., 27-5-70.

[illegible]

S4Mo WIRE
Lot No. 4275

Mill certificate not available.
Chemical analysis (not required for wire/flux combinations) of deposit is available: Art. B21.1.

# DE ROTTERDAMSCHE DROOGDOK MAATSCHAPPIJ N.V.

Quality and Metallurgical Department — Order n° : 5064

## TEST REPORT OF WELDING MATERIALS (required by ASME CODE Section III, par. N-511)

**Description of test material**

Type : S4Mo
Supplier : Arco Chemie
Dimension : Ø 4 mm
Lot/heat/batch n°: 4278

Type : Poeder 83
Supplier : Smit
Dimension :
Lot/heat/batch n°: 1211

Lab. n° : K 724
Stamp n° : 5585
Ordered by : VIS
Witnessed by Lloyd's Mr. v. Bezuye

Date test results required :

**Chemical composition**

| | C | Mn | Si | P | S | Cr | Ni | Mo | Cu |
|---|---|---|---|---|---|---|---|---|---|
| Required: | X | X | X | | | | | X | X |
| wire | 0,12 | 2,05 | 0,08 | | | | | 0,44 | 0,08 |
| deposit | 0,09 | 1,49 | 0,33 | | | | | 0,37 | 0,11 |

**Mechanical tests (acc. to doc. n° LP 754-63 rev. 3)**

**Tensile test**

| | Dimensions | Yield strength | Tensile strength | Elongation | Reduct. of area | Temp. | Remarks |
|---|---|---|---|---|---|---|---|
| | mm | kg/mm² | kg/mm² | l: d | % | °C | |
| Required: | | | | | | | |
| 1 | X | X | X | X | X | 20 | |
| | 12,83 | 48,0 | 58,4 | 27,4 | 68,5 | 20 | |

**Impact test**

| n° | Energy | Average energy | Shear fracture | Lateral exp. | Temp. | Remarks |
|---|---|---|---|---|---|---|
| | kgm/cm² | kgm/cm² | % | " | °C | |
| Required: | | | | | -12 | |
| 1 | 10,5 | 11,3 | | | -12 | |
| 2 | 13,0 | | | | | |
| 3 | 10,5 | | | | | |

Heat treatment of test specimen
20 hr / 610°C

Laboratory R.D.M. 10-12-1969.

B 22.6

ARCO-CHEMIE
WILHELM SCHIEFELBEIN GMBH
SCHWEISS-TECHNIK

Firma
De Rotterdamsche Droogdok
Maatschappij N.V.
Scheeps- en Werktuigbouw

Rotterdam
Postbus 913

| IHR ZEICHEN | IHRE ZUSCHRIFT | UNSERE ZEICHEN | UNSERE ZUSCHRIFT | 28 BREMEN 1, den 27. Nov. 1969 |
|---|---|---|---|---|
| | | Kd/ja | 2-fach | POSTFACH 1417 |

BETR. Auftrag Nr. D.22417 - O.Vrd - Toestel: 168

ANALYSEN-ZERTIFIKAT
Nr. 113.20747

Automaten-Schweißdraht Si/Mo

4,0 mm - Chargen-Nr. 1278

| C | Si | Mn | Mo | P | S |
|---|---|---|---|---|---|
| 0,13 | 0,10 | 2,03 | 0,53 | 0,014 | 0,010 |

ARCO - CHEMIE
Wilhelm Schiefelbein GmbH

B23.1

# DE ROTTERDAMSCHE DROOGDOK MAATSCHAPPIJ N.V.

Quality and Metallurgical Department — Order n° : 40643

## TEST REPORT OF WELDING MATERIALS (required by ASME CODE Section III, par. N-511)

**Description of test material**

Type :
Supplier :
Dimension :
Lot/heat/batch n°:

Type :
Supplier :
Dimension :
Lot/heat/batch n°:

Lab. n° : L 748
Stamp n° : 1625
Ordered by: V[illegible]-4-70
Witnessed by: Lloyd's

Date test results required:

**Chemical composition**

| | C | Mn | Si | P | S | Cr | Ni | Mo | |
|---|---|---|---|---|---|---|---|---|---|
| Required: | | | | | | | | | |
| [illegible] | 0,07 | 1,51 | 0,37 | | | | | 0,43 | hoog in Lab |
| | | | | | | | | | |
| | | | | | | | | | |
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| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

**Mechanical tests (acc. to doc. n° LP 754-68 rev. 3)**

Tensile test

| | Dimensions | Yield strength | Tensile strength | Elongation | Reduct. of area | Temp. | Remarks |
|---|---|---|---|---|---|---|---|
| | mm | kg/mm² | kg/mm² | l₅ d | % | °C | |
| Required | 12,83 | | | | | | |
| 1 | 12,83 | 48,9 | 56,1 | 24,5 | 62,1 | | |
| | | | | | | | |

Impact test

| n° | Energy | Average energy | Shear fracture | Lateral exp | Temp | Remarks |
|---|---|---|---|---|---|---|
| | kgm/cm² | kgm/cm² | % | " | °C | |
| Required: | | | | | -18 | |
| 1 | 7,1 | | | | | |
| 2 | 8,8 | 8,- | | | | |
| 3 | 8,- | | | | | |

Laboratory R.D.M., 26-5-70.

Heat treatment of test specimens :

# DE ROTTERDAMSCHE DROOGDOK MAATSCHAPPIJ N.V.

Quality and Metallurgical Department — Order n° : 30643

## TEST REPORT OF WELDING MATERIALS (required by ASME CODE Section III, par. N-511)

### Description of test material

Type : AC 54 Mo
Supplier : Arco Chemie
Dimension : Ø 4 mm
Lot/heat/batch n°: 4292

Type : Flux 89
Supplier : SAF
Dimension : 12 x 150
Lot/heat/batch n°: 2275

Lab. n° : N748
Stamp n° : 40
Ordered by : LT-AB
Witnessed by : Lloyd's
Mr v. Bezuye

Date test results required:

### Chemical composition

| | C | Mn | Si | P | S | Cr | Ni | Mo | Cu |
|---|---|---|---|---|---|---|---|---|---|
| Required: | | | | | | | | | |
| Deposit | 0,052 | 1,59 | 0,36 | | | | | 0,51 | 0,12 |

### Mechanical tests (acc. to doc. n° LP 754-08)

Tensile test

| | Diameter | Yield strength | Tensile strength | Elongation | Reduct. of area | Temp. | Remarks |
|---|---|---|---|---|---|---|---|
| | mm | kg/mm² | kg/mm² | l= 4 d | % | °C | |
| Required: | 12.83 | 35.2 | 56.2 | 18.0 | 38.0 | 20 | |
| N748T1 | Ø12,83 | 43,0 | 56,3 | 30,8 | 67,6 | 20 | |

Impact test

| n° | Energy | Average energy | Shear fracture | Lateral exp. | Temp. | Remarks |
|---|---|---|---|---|---|---|
| | kgm/cm² | kgm/cm² | % | " | °C | |
| Required: | | 5.2 | | | -12°C | |
| N748 K1 | 5,4 | | 33 | 0,032 | | |
| K2 | 13,0 | 9,7 | 64 | 0,067 | -12 | |
| K3 | 10,8 | | 47 | 0,059 | | |

Heat treatment of test specimens:
30 hrs at 610°C.

SURVEYOR TO LLOYD'S REGISTER OF SHIPPING

Laboratory R.D.M., October 29, 1970

S/Mo WIRE

Lot No. 4292

Mill certificate not available.

Chemical analysis (not required for wire/flux combinations) of deposit is available: Att. B23.1 and B23.2.

TEST REPORT OF WELDING MATERIALS

Not available.

See Attachment E06.1/2.

TEST REPORT OF WELDING MATERIALS

Not available.
See Attachment E06.1/2.

**SMIT NIJMEGEN**

Keuringscertificaat/Prüfungsattest
Certificat d'essai/Test-certificate

| | | |
|---|---|---|
| Elektrodesoort<br>Elektrodentyp | Electrode type<br>Type d'électrode | Draad 40 – 5/32" ~~en 3/16"~~ |
| Toevoegmetaal<br>Metal d'apport | Zusatzwerkstoff<br>Filler metal | |
| Fabricagenummer<br>Numéro du charge | Fertigungsnummer<br>Serial number | ~~D 23400, D 24123, D 23787, D 25047 en~~ D 25006 |
| Client<br>Client | Kunde<br>Customer | R.D.M. t.a.v. Hr. W. Heemskerk |
| Uw bestelling<br>Votre commande | Ihr Auftrag<br>Your order | |
| Onze factuur<br>Notre facture | Unsere Rechnung<br>Our invoice | |
| Opmerking<br>Remarque | Bemerkung<br>Note | |

| Type/Typ Ø mm | Chemische samenstelling / Analyse chimique / Chemische Zusammensetzung / Chemical composition | | | | | | | | | | Stroomsterkte / Amperage | Amperezahl / Amperage | | % Ferriet / % de ferrite / % ferrit / % ferrite |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | % C x $10^2$ | % Mn x $10^2$ | % Si x $10^2$ | % P x $10^3$ | % S x $10^3$ | % Cr | % Ni | % Mo | % Nb | % W | % Cu | | A | |
| ~~D 23900~~ | ~~13~~ | ~~194~~ | ~~< 3~~ | ~~16~~ | ~~16~~ | | | ~~0,47~~ | | ~~en~~ | ~~0,16~~ | | | |
| ~~D 24123~~ | ~~13~~ | ~~190~~ | ~~< 5~~ | ~~40~~ | ~~20~~ | | | ~~0,49~~ | | ~~en~~ | ~~0,15~~ | | | |
| ~~D 23787~~ | ~~13~~ | ~~200~~ | ~~5~~ | ~~40~~ | ~~14~~ | | | ~~0,48~~ | | ~~en~~ | ~~0,16~~ | | | |
| ~~D 25047~~ | ~~13~~ | ~~190~~ | ~~6~~ | ~~13~~ | ~~13~~ | | | ~~0,48~~ | | ~~en~~ | ~~0,15~~ | | | |
| D 25006 | 13 | 190 | 6 | 13 | 13 | | | 0,48 | | ca | 0,17 | | | |

Mechanische eigenschappen / Caractéristiques mécaniques / Mechanical properties / Mechanische Eigenschaften

| | $\sigma_v$ kg/mm² | $\sigma_B$ kg/mm² | δ % | Ψ % | Buighoek / Biegewinkel / Angle de pliage / Bending angle | Hardheid / Dureté / Hardness | Kerfslagwaarde / Résilience / Kerbschlagzähigkeit / Impact value DVM/ISO/V-notch kgm/cm² |
|---|---|---|---|---|---|---|---|
| | | | | | | | |

Opmerkingen/Bemerkungen
Remarques/Notes

| Datum/Datum | Par | Handtekening / Signature / Unterschrift |
|---|---|---|
| 1 – 2 – 1983 | WP | |

TEST REPORT OF WELDING MATERIALS

Not available.

See Attachment E06.1/2.

TEST REPORT OF WELDING MATERIALS

Not available.

See Attachment E06.1/2.

DE ROTTERDAMSCHE DROOGDOCK MAATSCHAPPIJ N.V.

Quality and Metallurgical Department — Order n° : 30643

# TEST REPORT OF WELDING MATERIALS (required by ASME CODE Section III, par. N-511)

## Description of test material

Type : WIRE 40
Supplier : SMIT
Dimension : ⌀ 5 mm
Lot/heat/batch n°: 25017

Type : FLUX 39
Supplier : SAF (AIR LIQUIDE)
Dimension : 12 x 150
Lot/heat/batch n°: 1197

Lab. n° : 8726
Stamp n° : 5538
Ordered by: VISSER
Witnessed by: Lloyds
B. v. Berge

Date test results required:

## Chemical composition

| | C | Mn | Si | P | S | Cr | Ni | Mo | Cu |
|---|---|---|---|---|---|---|---|---|---|
| Required: | * | * | * | | | | | * | * |
| DEPOSIT | 0,08 | 1,6 | 0,8 | | | | | 0,44 | 0,08 |

## Mechanical tests (acc. to doc. n° LP 751-65 rev. 1)

### Tensile test

| | Dimensions | Yield strength | Tensile strength | Elongation | Reduct. of area | Temp. | Remarks |
|---|---|---|---|---|---|---|---|
| | mm | kg/mm² | kg/mm² | l: 4 d | % | °C | |
| Required: | * | * | 56/72 | * | * | | |
| 7726 | 12,3 | 47,4 | 58,2 | 31,0 | 69,4 | | |

### Impact test

| n° | Energy | Average energy | Shear fracture | Lateral exp. | Temp. |
|---|---|---|---|---|---|
| | kgm/cm² | kgm/cm² | % | " | °C |
| Required: | * | * | | | -12°C |
| 1 | 11,1 | 11,1 | | | |
| 2 | 13,4 | | | | |
| 3 | 9,8 | | | | |

Heat treatment of test specimens :
30 hr at 610°C.

Remarks



Laboratory R.D.M., 24-7-79 Sg/KO.

**SMIT NIJMEGEN**

Keuringscertificaat/Prufungsattest
Certificat d'essai/Test certificate

| | | |
|---|---|---|
| Elektrodesoort<br>Elektrodentyp | Electrode type<br>Type d'électrode | Draad 40 - ~~5/32" en~~ 3/16" |
| Toevoegmetaal<br>Métal d'apport | Zusatzwerkstoff<br>Filler metal | |
| Fabricagenummer<br>Numéro du charge | Fertigungsnummer<br>Serial number | ~~D 23900, D 24123, D 23787,~~ D 25017 ~~en D 5066~~ |
| Client<br>Client | Kunde<br>Customer | R.D.M. t.a.v. Hr. Heemskerk |
| Uw bestelling<br>Votre commande | Ihr Auftrag<br>Your order | |
| Onze factuur<br>Notre facture | Unsere Rechnung<br>Our invoice | |
| Opmerking<br>Remarque | Bemerkung<br>Note | |

| Type/Typ Ø mm | Chemische samenstelling / Analyse chimique / Chemische Zusammensetzung / Chemical composition | | | | | | | | | | Stroomsterkte / Ampérage | | Ampérezahl / Amperage | | % Ferriet<br>% de Ferrite<br>% Ferrit<br>% Ferrite |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | % C x $10^2$ | % Mn x $10^2$ | % Si x $10^2$ | % P x $10^3$ | % S x $10^3$ | % Cr | % Ni | % Mo | % Nb | % V | % Cu | | | A | |
| ~~5/32"~~ D 23900 | ~~13~~ | ~~194~~ | ~~< 3~~ | ~~16~~ | ~~16~~ | | | ~~0,47~~ | | ~~ca~~ | ~~0,46~~ | | | | |
| ~~5/32"~~ D 24123 | ~~13~~ | ~~190~~ | ~~< 5~~ | ~~10~~ | ~~20~~ | | | ~~0,49~~ | | ~~ca~~ | ~~0,15~~ | | | | |
| ~~5/32"~~ D 23787 | ~~13~~ | ~~200~~ | ~~5~~ | ~~10~~ | ~~11~~ | | | ~~0,48~~ | | ~~ca~~ | ~~0,18~~ | | | | |
| 3/16" D 25017 | 13 | 190 | 6 | 13 | 13 | | | 0,48 | | ca | 0,15 | | | | |
| ~~5/32"~~ D 25006 | ~~13~~ | ~~190~~ | ~~6~~ | ~~13~~ | ~~13~~ | | | ~~0,48~~ | | ~~ca~~ | ~~0,17~~ | | | | |

| | Mechanische eigenschappen / Caractéristiques mécaniques / Mechanische Eigenschaften / Mechanical properties | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | $\sigma_v$ kg/mm² | $\sigma_\beta$ kg/mm² | $\delta$ % | $\psi$ % | Buighoek / Biegewinkel / Angle de pliage / Bending angle | Hardheid / Dureté / Harte / Hardness | Kerfslagwaarde / Résilience / Kerbschlagzähigkeit / Impact value DVM/ISO/V-notch kgm/cm² | |
| | | | | | | | | |

Opmerkingen/Bemerkungen
Remarques/Notes

| Datum/Date: | Par: | Handtekening / Signature / Unterschrift |
|---|---|---|
| 4 - 2 - 1969 | WP | |

# DE ROTTERDAMSCHE DROOGDOK MIJ. N.V.

LABORATORIUM | MEETPROTOCOL | ORDER No. 30.643

merk H.

erkaalsoort C - staal

Besteller Hr. Hamskerk (Kaapstad)

Werkstuk Ingangscentrale
Charge 25295 - 1103.

Tekening

Legende

Keur LL 1105

Dik plaat 4 mm.

## TREKPROEF

| | Meetlengte | Doorsnede | Rekgrens σ x | | Treksterkte | | Rek (l = 4 d) | | Insnoering | | Opmerkingen |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | mm | mm Ø | kg | kg/mm² | kg | kg/mm² | mm | % | mm | % | |
| Eis | 50.0 | 12,83 | | | | | | | | | |
| 600 | 50 c | 12,83 | 5900 | ~~54,0~~ 45,7 | 7360 | 57,0 | 14,4 | 28,8 | 7,2 | 69,4. | |

## BUIGPROEF

| | Doorsnede | Kolfstempel | Opleg afstand | Buighoek | Doorbuiging | Buigsterkte |
|---|---|---|---|---|---|---|
| | mm x mm | mm/mm | mm | graden | mm | kg/mm² |
| Eis | | | | | | |
| 1 | | | | | | |
| 2 | | | | | | |
| 3 | | | | | | |

Charpy V

## KERFSLAGPROEF – 12° d.

| | Doorsnede | Kerftaaiheid | Gemiddeld |
|---|---|---|---|
| | mm x mm | kgm/cm² | kgm/cm² |
| Eis | 10 x 8. | | |
| 1 | 10 x 8. | 5,0 – 5,3 – 9,3 | 6,5. |
| 2 | | | |
| 3 | | | |

LABORATORIUM RDM. 26-3-'69 04

Ingetoud op 1 600 d gedurende 2½ uur.

56 DPL 70

B20.2

# DE ROTTERDAMSCHE DROOGDOK MAATSCHAPPIJ N.V.

Quality and Metallurgical Department — Order n° : 77106

## TEST REPORT OF WELDING MATERIALS (required by ASME CODE Section III, par. N-511)

**Description of test material**

Type : WIRE 40
Supplier : SMIT
Dimension : ϕ 4 mm
Lot/heat/batch n°: 25295

Type : FLUX 89
Supplier : SMIT
Dimension :
Lot/heat/batch n°: 1135

Lab. n° : J 703
Stamp n° : 5519
Ordered by: VISSER
Witnessed by: [illegible]

Date test results required: 8-5-'69

**Chemical composition**

| | C | Mn | Si | P | S | Cr | Ni | Mo | Cu |
|---|---|---|---|---|---|---|---|---|---|
| Required: | | | | | | | | | |
| WIRE | x | x | x | | | | | x | x |
| | 0,15 | 2,13 | 0,06 | | | | | 0,50 | 0,26 |
| DEPOSIT | x | x | x | | | | | x | x |
| | 0,093 | 1,46 | 0,35 | | | | | 0,41 | 0,25 |

**Mechanical tests (acc. to doc. n° LP 754-03 rev. 1)**

Tensile test

| | Dimensions | Yield strength | Tensile strength | Elongation | Reduct. of area | Temp. | Remarks |
|---|---|---|---|---|---|---|---|
| | mm | kg/mm² | kg/mm² | l: 4 d | % | °C | |
| Required: | x | x | x | x | x | | |
| J703 | 12,52 | 44,5 | 56,5 | 29,0 | [illegible] | [illegible] | |

Impact test

| n° | Energy | Average energy | Shear fracture | Lateral exp. | Temp. | Remarks |
|---|---|---|---|---|---|---|
| | kgm/cm² | kgm/cm² | % | " | °C | |
| Required: | x | x | | | -12°C | |
| J703 | 9,5<br>8,6<br>5,1 | 7,7 | | | | |

Heat treatment of test specimens :

Laboratory R.D.M., May 9th '69

B20.3

# DE ROTTERDAMSCHE DROOGDOK MAATSCHAPPIJ N.V.

Quality and Metallurgical Department — Order n° : 30643

## TEST REPORT OF WELDING MATERIALS (required by ASME CODE Section III, par. N-511)

**Description of test material**

Type : Wire 40
Supplier : Smit"
Dimension : Ø 4 mm
Lot/heat/batch n°: 25295

Type : flux 89
Supplier : Smit
Dimension :
Lot/heat/batch n°: 1170

Lab. n° : K730
Stamp n° : 5581
Ordered by: VIS
Witnessed by: Lloyd's
Mr.v.Bezuye

Date test results required:

**Chemical composition**

| | C | Mn | Si | P | S | Cr | Ni | Mo | Cu | |
|---|---|---|---|---|---|---|---|---|---|---|
| Required: | X | X | X | | | | | X | X | |
| deposit | 0,10 | 1,50 | 0,36 | | | | | 0,37 | 0,30 | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
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| | | | | | | | | | | |

**Mechanical tests (acc. to doc. n° LP 754-63 rev. 3)**

**Tensile test**

| | Dimensions | Yield strength | Tensile strength | Elongation | Reduct. of area | Temp. | Remarks |
|---|---|---|---|---|---|---|---|
| | mm | kg/mm² | kg/mm² | l: d | % | °C | |
| Required: | X | X | X | X | X | | |
| 1 | 12,83 | 50,3 | 61,1 | 27,2 | 64,9 | 20 | |
| | | | | | | | |

**Impact test**

| n° | Energy | Average energy | Shear fracture | Lateral exp. | Temp. | Remarks |
|---|---|---|---|---|---|---|
| | kgm/cm² | kgm/cm² | % | " | °C | |
| Required: | | | | | -12°C | |
| 1 | 10,3 | | | | | |
| 2. | 8,6 | 10,4 | | | -12 | |
| 3 | 12,5 | | | | | |

Laboratory R.D.M., 1-12-1969.

Heat treatment of test specimens :

TEST REPORT OF WELDING MATERIALS

Not available.

See Attachment E06.1/2.

DE ROTTERDAMSCHE DROOGDOK MAATSCHAPPIJ N.V.

Quality and Metallurgical Department — Order n° : 30643

# TEST REPORT OF WELDING MATERIALS (required by ASME CODE Section III, par. N-511)

## Description of test material

Type : Wire 40
Supplier : Smit
Dimension : ø 4 mm.
Lot/heat/batch n°: 25295

Type : Flux 89
Supplier : SAF
Dimension : 12 x 150
Lot/heat/batch n°: 2275

Lab. n° : 0.748
Stamp n° : 90
Ordered by : LT. A.B.
Witnessed by : Lloyd's

Date test results required:

## Chemical composition

| | C | Mn | Si | P | S | Cr | Ni | Mo |
|---|---|---|---|---|---|---|---|---|
| Required: | | | | | | | | |
| deposit | x | x | x | | | | | x |
| 0748A | 0.081 | 1.52 | 0.35 | | | | | 0,44 |

## Mechanical tests (acc. to doc n° LP 754-68)

### Tensile test

| | Dimensions | Yield strength | Tensile strength | Elongation | Reduction of area | Temp. | Remarks |
|---|---|---|---|---|---|---|---|
| | mm | kg/mm² | kg/mm² | l = 4 d | % | °C | |
| Required: | 12,83 | 35.2 | 56.2 | 18.0 | 38.0 | 20 | |
| 0,748 | 12.83 | 48.0 | 59.1 | 30.0 | 64.9 | 20 | |

### Impact test

| n° | Energy | Average energy | Shear fracture | Lateral exp. | Temp | Remarks |
|---|---|---|---|---|---|---|
| | kgm/cm² | kgm/cm² | % | in | °C | |
| Required: | | | | | -12 | |
| 1 | 10,5 | | 44 | 0,055 | -12 | |
| 2 | 10,8 | 10,8 | 41 | 0,063 | -12 | |
| 3 | 11,1 | | 41 | 0,063 | -12 | |



Heat treatment of test specimens :
30 hrs. 610°C

Laboratory R.D.M., 1971-05-26

**SMIT NIJMEGEN**

Keuringscertificaat/Prüfungsattest
Certificat d'essai/Test-certificate

| | | |
|---|---|---|
| Elektrodesoort / Elektrodentyp | Electrode type / Type d'électrode | Draad 40 – 5/32" |
| Toevoegmetaal / Métal d'apport | Zusatzwerkstoff / Filler metal | |
| Fabricagenummer / Numéro du charge | Fertigungsnummer / Serial number | D 25295 |
| Client / Client | Kunde / Customer | R.D.M. t.a.v. Heer ~~W~~ Heemskerk |
| Uw bestelling / Votre commande | Ihr Auftrag / Your order | |
| Onze factuur / Notre facture | Unsere Rechnung / Our invoice | |
| Opmerking / Remarque | Bemerkung / Note | |

| Type/Typ Ø mm | Chemische samenstelling / Analyse chimique / Chemische Zusammensetzung / Chemical composition | | | | | | | | | | Stroomsterkte / Amperage | | Amperezahl / Amperage | | % Ferriet / % de ferrite / % Ferrit / % Ferrite |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | % C x $10^2$ | % Mn x $10^2$ | % Si x $10^2$ | % P x $10^3$ | % S x $10^3$ | % Cr | % Ni | % Mo | % Nb Cu | % W | | | | A | |
| 5/32" | 14 | 203 | | 16 | 11 | | | 0.48 | 0.31 | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |

| | Mechanische eigenschappen / Caractéristiques mécaniques / Mechanische Eigenschaften / Mechanical properties | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | $\sigma_v$ kg/mm² | $\sigma_B$ kg/mm² | $\delta$ % | $\psi$ % | Buighoek / Biegewinkel / Angle de pliage / Bending angle | Hardheid / Härte / Dureté / Hardness | Kerfslagwaarde / Kerbschlagzähigkeit / Resilience / Impact value DVM/ISO/V-notch | kgm/cm² |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Opmerkingen/Bemerkungen
Remarques/Notes

| Datum/Date | Par. | Handtekening / Signature / Unterschrift |
|---|---|---|
| 25-1-1969 | W. Peters | |

B27.1

# DE ROTTERDAMSCHE DROOGDOK MAATSCHAPPIJ N.V.

Quality and Metallurgical Department — Order n° : 30643

## TEST REPORT OF WELDING MATERIALS (required by ASME CODE Section III, par. N-511)

**Description of test material**

Type : Smit 40
Supplier : Smit
Dimension : 4 mm.
Lot/heat/batch n°: 25531

Type : 89
Supplier : Smit
Dimension :
Lot/heat/batch n°: 1211

Lab. n° : j 675
Stamp n° : 5559
Ordered by: Vis
Witnessed by: Lloyds

V. Bezuye

Date test results required:

**Chemical composition**

| | C | Mn | Si | P | S | Cr | Ni | Mo | |
|---|---|---|---|---|---|---|---|---|---|
| Required: | x | x | x | | | | | x | |
| Deposit | 0,085 | 1,54 | 0,26 | | | | | 0,46 | |

**Mechanical tests (acc. to doc. n° LP 754-68 rev. 1)**

Tensile test

| | Dimensions | Yield strength | Tensile strength | Elongation | Reduct. of area | Temp. | Remarks |
|---|---|---|---|---|---|---|---|
| | mm | kg/mm² | kg/mm² | l: 4d | % | °C | |
| Required: | | | | | | | |
| 1 | 12,83 | 48,0 | 58,4 | 26,6 | 68,5 | | |

Impact test

| n° | Energy | Average energy | Shear fracture | Lateral exp. | Temp. |
|---|---|---|---|---|---|
| | kgm/cm² | kgm/cm² | % | " | °C |
| Required: | | | | | |
| 1 | 12,1 | 11,8 | | | |
| 2 | 12,3 | | | | |
| 3 | 11,0 | | | | |

Heat treatment of test specimens :

Remarks

1 x Hmsk.
2 x Vis.
1 x Arch.

Laboratory R.D.M.,
16-10-1969

**SMIT NIJMEGEN**

Keuringscertificaat/Prüfungsattest
Certificat d'essai/Test certificate

| | |
|---|---|
| Elektrodesoort / Elektrodentyp | Electrode type / Type d'électrode |
| Toevoegmetaal / Métal d'apport | Zusatzwerkstoff / Filler metal: OH 40 - Ø 4 mm |
| Fabricagenummer / Numéro du charge | Fertigungsnummer / Serial number: B 25591 |
| Client / Client | Kunde / Customer: Rotterdamse Droogdok Maatschappij, t.a.v. de Heer Vlaar (Lab.) |
| Uw bestelling / Votre commande | Ihr Auftrag / Your order |
| Onze factuur / Notre facture | Unsere Rechnung / Our invoice |
| Opmerking / Remarque | Bemerkung / Note |



| Type/Typ Ø mm | Chemische samenstelling / Analyse chimique / Chemische Zusammensetzung / Chemical composition | | | | | | | | | | Stroomsterkte / Amperage | | Amperezahl / Amperage | | % Ferriet / % de Ferrite / % Ferrit / % Ferrite |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | % C x $10^2$ | % Mn x $10^2$ | % Si x $10^2$ | % P x $10^3$ | % S x $10^3$ | % Cr | % Ni | % Mo | % Nb | % ∩ | % Cu | | | A | |
| | 13 | 290 | 9 | 18 | 27 | | | 0,99 | | | 0,06 | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |

| | Mechanische eigenschappen / Caractéristiques mécaniques | | | | | Mechanische Eigenschaften / Mechanical properties | | |
|---|---|---|---|---|---|---|---|---|
| | $\sigma_v$ kg/mm² | $\sigma_B$ kg/mm² | $\delta$ % | $\psi$ % | Buighoek / Biegewinkel / Angle de pliage / Bending angle | Hardheid / Dureté / Hardness | Kerfslagwaarde / Resilience / DVM/ISO/V-notch | Kerbschlagzähigkeit / Impact value kgm/cm² |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Opmerkingen/Bemerkungen
Remarques/Notes

Datum/Date: 13 oktober 1969

Par:

Handtekening / Signature / Unterschrift:

TEST REPORT OF WELDING MATERIALS

Not available.

See Attachment E06.1/2.

# DE ROTTERDAMSCHE DROOGDOK MAATSCHAPPIJ N.V.

B28.2

Quality and Metallurgical Department

Order n° : 36643

## TEST REPORT OF WELDING MATERIALS (required by ASME CODE Section III, par. N-511)

**Description of test material**

Type : drawn 45 (AC 54 M.)
Supplier : Arcos-Chemie
Dimension : 45
Lot/heat/batch n°: 721858

Type : Feder 89 (SAF)
Supplier : Smit
Dimension :
Lot/heat/batch n°: 01197

Lab. n° : J 650
Stamp n° : J 5547
Ordered by: Hark
Witnessed by: Langus
HR. v BEZUYE

Date test results required:

**Chemical composition of weld metal**

| | C | Mn | Si | P | S | Cr | Ni | Mo | Cu |
|---|---|---|---|---|---|---|---|---|---|
| Required: | x | x | x | | | | | x | x |
| | 0,11 | 1,52 | 0,39 | | | | | 0,49 | 0,08 |

**Mechanical tests (acc. to doc. n° LP 754-69 rev. 1)**

**Tensile test**

| | Dimensions mm | Yield strength kg/mm² | Tensile strength kg/mm² | Elongation l: 4 d % | Reduct. of area % | Temp. °C | Remarks |
|---|---|---|---|---|---|---|---|
| Required: | | x | x | x | x | +20 | |
| J 650 | 12,83 | 44,1 | 57,7 | 30,4 | 61,7 | | |

POOR ORIGINAL

**Impact test**

| n° | Energy kgm/cm² | Average energy kgm/cm² | Shear fracture % | Lateral exp. " | Temp °C | Remarks |
|---|---|---|---|---|---|---|
| Required: | x | x | | | -12 | |
| J650 1 | 12,3 | | | | | 24h/415°C |
| 2 | 11,3 | 11,8 | | | -19° | 2 x V-notch |
| 3 | 11,8 | | | | | 1 x R. Charpy |
| | | | | | | 1 x Lateral exp. |
| | | | | | | 1 x Hardness |

Heat treatment of test specimens : 1 hr 595° C

Laboratory R.D.M.,

25.8.69

D28-3

ARCO-CHEMIE
WILHELM SCHIEFELBEIN GMBH
SCHWEISS-TECHNIK

Firma
De Rotterdamsche Droogdok
Maatschappij N.V.
Scheeps- en Werktuigbouw

Rotterdam
Postbus 913

| IHR ZEICHEN | IHRE ZUSCHRIFT | UNSER ZEICHEN | UNSERE ZUSCHRIFT | 28 BREMEN 1, den 24. Juli 1969 |
|---|---|---|---|---|
| | | Kd/Kö | | POSTFACH 1417 |

betr. Auftrag Nr. D 9785 - O. Vrd.

## ANALYSEN-ZERTIFIKAT

Nr. 113 33231



Automaten-Schweißdraht 54/Mo

~~4,0 mm - Chargen-Nr. 804~~

| C | Si | Mn | Mo | P | S |
|---|---|---|---|---|---|
| ~~0,14~~ | ~~0,15~~ | ~~2,10~~ | ~~0,53~~ | ~~0,013~~ | ~~0,015~~ |

5,0 mm - Chargen-Nr. 721858

| C | Si | Mn | Mo | P | S |
|---|---|---|---|---|---|
| 0,15 | 0,18 | 2,04 | 0,51 | 0,019 | 0,010 |

ARCO - CHEMIE
Wilhelm Schiefelbein GmbH

TEST REPORT OF WELDING [illegible]

Description of test material

| | | |
|---|---|---|
| Type | : | NiMo |
| Supplier | : | Boehler |
| Dimension | : | ϕ4 mm |
| Lot/heat/batch n°: | | 895075 |
| Type | : | Grau LD (IW 320) |
| Supplier | : | Messer Griesheim |
| Dimension | : | 12 x 150 |
| Lot/heat/batch n°: | | P56 |

Cab. n° : R.747
Sample n° : 231
Coating type : AF AB0
Witnessed by : Lloyd's
[illegible]
Date test report issued:

Chemical composition

| | C | Mn | Si | P | S | Cr | Ni | Mo | |
|---|---|---|---|---|---|---|---|---|---|
| Required: | | | | | | | | | |
| deposit | 0.069 | 1.97 | 0.22 | 0.010 | | 0.05 | 0.70 | 0.56 | |
| wire | 0.12 | 1.27 | 0.22 | 0.009 | | 0.03 | 0.73 | 0.56 | |

Non destructive testing

Mechanical tests (acc. to doc. n° LF [illegible])

Tensile test

| | Dimensions | Yield [illegible] | Tensile strength | Elongation L=5d | [illegible] | Temp. | Remarks |
|---|---|---|---|---|---|---|---|
| | mm | kg/mm² | kg/mm² | in 4d | % | °C | |
| Required: | ϕ12.83 | 35.2 | 56.2 | 18.0 | 68.0 | 20° | |
| R747 | ϕ12.83 | 58.4 | 63.4 | 29.4 | [illegible] | 20° | |

Impact test

| n° | Energy | [illegible] | Shear fracture | Lateral exp. | [illegible] | Remarks |
|---|---|---|---|---|---|---|
| | kgm/cm² | kg/cm² | % | mm | °C | |
| Required: | | 5.2 | | | -15° | |
| R747 1 | 7.1 | | 43 | 0.035 | | |
| 2 | 10.7 | 9.2 | 78 | 0.050 | -20° | |
| 3 | 9.9 | | 67 | 0.055 | | |



[illegible], September 10th, 19[illegible]

[illegible]

**HOESCH HUTTENWERKE AG**
Qualitätssicherung und -kontrolle · Abt. Qualitätsstelle

Dortmund, 8.5.1973 W1.

**Werkszeugnis (nach DIN 50049/2)** Nr. D 6845
Work's Certificate

Chemische Zusammensetzung / Chemical Composition

| Pos. Nr. | Schmelze / Heat | % C | % Si | % Mn | % P | % S | % Cu | % Ni | % Mo |
|---|---|---|---|---|---|---|---|---|---|
| | Vorschrift Specification | | | | | | | | |
| 1 | 895 075 | 0,13 | 0,25 | 1,22 | 0,010 | 0,008 | 0,05 | 0,75 | 0,58 |
| 2 | | | | | | | | | |
| 3 | | | | | | | | | |
| 4 | | | | | | | | | |
| 6 | | | | | | | | | |
| 7 | | | | | | | | | |
| 8 | | | | | | | | | |

Prüfungsergebnisse / Test Results

| Pos. Nr. | Schmelze Heat | | Streckgrenze Yield point σ s kp/mm² | Zugfestigkeit Tensile strength σ B kp/mm² | Dehnung Elongation d 10 % | Dehnung Elongation d 5 % | Einschnürung Reduction of area ψ % | Härte Hardness | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Vorschrift Specification | | | | | | | | | | |
| 1 | | | | | | | | | | | |
| 2 | | | | | | | | | | | |
| 3 | | | | | | | | | | | |
| 4 | | | | | | | | | | | |
| 5 | | | | | | | | | | | |
| 6 | | | | | | | | | | | |
| 7 | | | | | | | | | | | |
| 8 | | | | | | | | | | | |

Bemerkungen
Remarks

**HOESCH HUTTENWERKE**
**Aktiengesellschaft**
Qualitätssicherung und -kontrolle
Abt. Qualitätsstelle

1 /

# DE ROTTERDAMSCHE DROOGDOK MAATSCHAPPIJ N.V.

Quality and Metallurgical Department — Order n° : 30643

## TEST REPORT OF WELDING MATERIALS

**Description of test material**

Type : NIMO kwal. Hoesch
Supplier : Morelisse N.V.
Dimension : ø 4 mm
Lot/heat/batch n°: 899680

Type : GRAU L.O. (LW 320)
Supplier : Morelisse N.V.
Dimension :
Lot/heat/batch n°: P. 23

Lab. n° : P 710
Stamp n° :
Ordered by: Mr. Boogaerts
Witnessed by: A.F.

Date test results required:

**Chemical composition**

| | C | Mn | Si | P | S | Cr | Ni | Mo | Cu | Al |
|---|---|---|---|---|---|---|---|---|---|---|
| Required: | | | | | | | | | | |
| | 0.052 | 1.97 | 0.25 | 0.009 | 0.015 | 0.04 | 0.75 | 0.46 | 0,03 | 0.014 |
| | | | | | | | | | | |
| | V | | | | | | | | | |
| | 0.01 | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

**Non destructive testing**

**Mechanical tests (acc. to doc. n° LP 754-68)**

**Tensile test**

| | Dimensions mm | Yield strength kg/mm² | Tensile strength kg/mm² | Elongation l: d | Reduct. of area % | Temp. °C | Remarks |
|---|---|---|---|---|---|---|---|
| Required: | | | 56,2 | | | 20° | Results obtained from P.V. P 710 |
| | 25,2/34,7 | | 58,8 | | | 20° | |
| | | | | | | | |

**Impact test**

| n° | Energy kgm/cm² | Average energy kgm/cm² | Shear fracture % | Lateral exp. " | Temp. °C | Remarks |
|---|---|---|---|---|---|---|
| Required: | | 5,2 | | | -12° | |
| | 10.0<br>7,5<br>6,8 | 8.1 | 47<br>47<br>55 | 0,043<br>0,039<br>0,055 | | |

Heat treatment of test specimens :
30 hr at 610°C

Laboratory R.D.M., July 1972

**HOESCH HUTTENWERKE AG**
Qualitätssicherung und -kontrolle · Abt. Qualitätsstelle

B30.2

Dortmund, 6.1.1972 Wi.

**Werkszeugnis (nach DIN 50049/2)** Nr. D 5386
Work's Certificate

Chemische Zusammensetzung / Chemical Composition

| Pos. Nr. | Schmelze / Heat | % C | % Si | % Mn | % P | % S | % Al | % Mo | % |
|---|---|---|---|---|---|---|---|---|---|
| | Vorschrift / Specification | | | | | | | | |
| 1 | | | | | | | | | |
| 2 | | | | | | | | | |
| 3 | | | | | | | | | |
| 4 | | | | | | | | | |
| 5 | | | | | | | | | |
| 6 | | | | | | | | | |
| 7 | 899 680 | 0,12 | 0,24 | 1,23 | 0,011 | 0,015 | 0,76 | 0,50 | |
| 8 | | | | | | | | | |

Prüfungsergebnisse / Test Results

| Pos. Nr. | Schmelze / Heat | | Streckgrenze / Yield point σ s kp/mm² | Zugfestigkeit / Tensile strength σ B kp/mm² | Dehnung / Elongation d 10 % | Dehnung / Elongation d 5 % | Einschnürung / Reduction of area ϕ % | Härte / Hardness | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Vorschrift / Specification | | | | | | | | | | |
| 1 | | | | | | | | | | | |
| 2 | | | | | | | | | | | |
| 3 | | | | | | | | | | | |
| 4 | | | | | | | | | | | |
| 5 | | | | | | | | | | | |
| 6 | | | | | | | | | | | |
| 7 | | | | | | | | | | | |
| 8 | | | | | | | | | | | |

Bemerkungen / Remarks: Es wurde irrtümlich die Sehmelze 890 680 angegeben. Wir bitten, diesen Irrtum zu entschuldigen.

HOESCH HUTTENWERKE
Aktiengesellschaft
Qualitätssicherung und -kontrolle
i. A. Abt. Qualitätsstelle

SULZER
QUALITY CONTROL

# PROTOKOLL DER SCHWEISSMATERIAL PRUEFUNG
# RECORD OF WELD MATERIAL QUALIFICATION

No. R - 3008
Blatt / Sheet 1 von / of 1

**Zusatz-Material / Filler-Material**

| | | | |
|---|---|---|---|
| Handelsmarke / Trade-Name | Wire : S 3 Mo<br>Flux : Grau Lo | Hersteller / Manufacturer | Sulzer, Germany<br>Linde, Germany |
| Klassifikation / Classification | approx. EM-12K | A- und F-Nummer / A- and F-Number | A-2, F-6 |
| Durchmesser / Diameter | 4.0 mm | Chargen-Nr. / Heat-No. | 0227 + 14 |

**Schweissen / Welding**

| | | | |
|---|---|---|---|
| Grundwerkstoff / Base-Material | SA-533 Gr.B Cl.1 | Form, Dimension / Form, Dimension | Plate 230 mm |
| Schweissverfahren / Weld-Procedure | subm. submerged arc | Schweiss-Spez. / Weld-Spec. | S-3303 equivalent to EM4-502 |
| Stromart, Polarität / Current, Polarity | D.C. | Stromstärke / Amperage | 450 - 620 Amp. |

**Wärmebehandlung / Heat Treatment**

| | |
|---|---|
| Vorwärmen / Preheating | min. 125 °C |
| Zwischenlagentemperatur / Interpass temperature | max. 250 °C |
| Nachbehandlung / Post weld heat treatment | None |
| Spannungsarm glühen / Stress relief treatment | 610 °C / 25 hr. |

**Zerstörungsfreie Prüfung / NDT-Examination**

| | |
|---|---|
| Prüfart / Examination-Method | X-Ray |
| Spezifikation / Applied Specification | ASME-Code III |
| Prüfer und Datum / Operator and Date | Koncik 7.11.69 |
| Prüf-Resultat / Test-Result | Satisfactory |



**Zug-Probe / Tensile-Test**

| Probe-Nr. / Sample-No. | Durchm. / Diameter mm | Fläche / Area mm² | | Belastung / Load kp | Festigkeit / Strength kp/mm² | Festigkeit / Strength psi | Dehnung / Elongation mm | Dehnung / Elongation % |
|---|---|---|---|---|---|---|---|---|
| 656.11 | 10 | | Bruch / Rupture | | 63,2 | 89900 | | 26,0 |
| | | | Streckgrenze / Yield | | 55,6 | 79000 | | |

**Kerbschlag-Proben / Impact-Tests**

Proben gemäss / Specimens acc. to: Charpy-V-notch

| Probe-Nr. / Sample-No. | Lage / Location | Prüf-Temp. / Test-Temp. °C | Fläche / Area mm² | Schlagarbeit / Absorbed energy mkp | mkp/cm² | ft. lbs | Aufweitung / Lateral Expansion mm | Aufweitung / Lateral Expansion inch | Duktilität in % / Ductile area in % |
|---|---|---|---|---|---|---|---|---|---|
| 3)3.3-1 | Weld-met. | -12 | 80 | | 11.4 | | | | |
| -2 | " | -12 | 80 | | 8.8 | | | | |
| -3 | " | -12 | 80 | | 8.0 | | | | |

**Durchführung / Performance**

| | | | |
|---|---|---|---|
| Schweisser / Welder | Fischer/Bergner/Baldauf | Schweisser Stempel-No. / Welder Stamp-No. | 99/143/112 |
| Durchgeführt bei / Conducted by | Sulzer | Schweiss-Datum / Weld-Date | 28/29.10.1969 |
| Prüf-Mat. Prüfung / Test-Mat. Testing | 671-424<br>671-656.11 | Prüf-Datum / Test-Date | 28.11.1969<br>14.1.1971 |
| Abnahmebehörde / Inspection Agency | SVSB | Inspektor / Inspector | [illegible] SVSB [illegible] |

**Bestätigung / Certification**

Wir bestätigen, dass die Angaben in diesem Protokoll korrekt sind.
We certify that the statements in this record are correct.

Ort und Datum / Place and Date: Winterthur 18.1.1971

Unterschrift / Signed by

Sulzer Brothers Limited

12.50
28280 rsv a nl
76165z sulz ch

rsv-a rotterdam nl 28280 14.6.1979
attn. mr. van de poll

u r g e n t

westinghouse weld material documentation
rsv-a fs tx/ds/68 t/vdp of 16.5.1979
our telex of 11.6.1979, point 3.
---

record no. analysis

| | c | p | s | si | mn | mo |
|---|---|---|---|---|---|---|
| r-3008 | 0.07 | 0.015 | 0.015 | 0.24 | 1.69 | 0.48 |
| ~~r-3012~~ | ~~0.08~~ | ~~0.017~~ | ~~0.014~~ | ~~0.20~~ | ~~1.74~~ | ~~0.43~~ |
| ~~r-3046~~ | ~~0.09~~ | ~~0.006~~ | ~~0.009~~ | ~~0.21~~ | ~~1.85~~ | ~~0.51~~ |
| ~~r-3035~~ | ~~0.06~~ | ~~0.014~~ | ~~0.008~~ | ~~0.05~~ | ~~1.93~~ | ~~0.46~~ |
| ~~r-3036~~ | ~~0.04~~ | ~~0.009~~ | ~~0.008~~ | ~~0.02~~ | ~~2.03~~ | ~~0.47~~ |
| ~~r-3045~~ | ~~0.06~~ | ~~0.009~~ | ~~0.006~~ | ~~0.25~~ | ~~2.1~~ | ~~0.53~~ |
| ~~r-3044~~ | ~~0.06~~ | ~~0.007~~ | ~~0.007~~ | ~~0.19~~ | ~~2.0~~ | ~~0.54~~ |

regards sulzer winterthur

0342-2/35/21056/ammann/mz
14.6.79 11.55h an

28280 rsv a nl
76165z sulz ch

| QUALITY CONTROL | PROTOKOLL DER SCHWEISSMATERIAL-PRUEFUNG<br>RECORD OF WELD MATERIAL QUALIFICATION | No. R - 3044<br>Blatt / Sheet 1 von / of 1 |
|---|---|---|

**Zusatz-Material / Filler-Material**

| | | | |
|---|---|---|---|
| Handelsmarke / Trade-Name | S3Mo + LW 320 | Hersteller / Manufacturer | Union + Linde |
| Klassifikation / Classification | EM-12K mod. (SA-558) | A- und F-Nummer / A- and F-Number | A-2, F-6 |
| Durchmesser / Diameter | 3.0 mm | Chargen-Nr. / Heat-No. | 8816 + 28 |

**Schweissen / Welding**

| | | | |
|---|---|---|---|
| Grundwerkstoff / Base-Material | SA-508 Cl.2 | Form, Dimension / Form, Dimension | Plate 100 mm thick |
| Schweissverfahren / Weld-Procedure | autom. submerged arc | Schweiss-Spez. / Weld-Spec. | 3AB/3303 |
| Stromart, Polarität / Current, Polarity | D.C. wire positive | Stromstärke / Amperage | 400 Amp. |

**Wärmebehandlung / Heat Treatment**

| | | |
|---|---|---|
| Vorwärmen / Preheating | min. 130 °C | |
| Zwischenlagentemperatur / Interpass temperature | max. 250 °C | |
| Nachbehandlung / Post weld heat treatment | None | |
| Spannungsfrei glühen / Stress relief treatment | 610 °C / 31 hours | |

**Zerst.freie Prüfung / NO-Examination**

| | | | |
|---|---|---|---|
| Prüfart / Examination-Method | | | |
| Spezifikation / Applied Specification | | | |
| Prüfer und Datum / Operator and Date | | | |
| Prüf-Resultat / Test-Result | | | |

**Zug-Probe / Tensile-Test**

| Probe-Nr. / Sample-No. | Durchm. / Diameter | Fläche / Area | | Belastung / Load | Festigkeit / Strength | | Dehnung / Elongation | |
|---|---|---|---|---|---|---|---|---|
| 407-3.0 | mm | $mm^2$ | | kp | $kp/mm^2$ | psi | mm | % |
| | 12,7 | | Bruch / Rupture | | 61,3 | | | 29,2 |
| | | | Streckgrenze / Yield | | 55,7 | | | |

**Kerbschlag-Proben / Impact-Tests**

Proben gemäss / Specimens acc. to: Charpy V-notch acc. SA-370

| Probe-Nr. / Sample-No. | Lage / Location | Prüf-Temp. / Test-Temp. °C | Fläche / Area $mm^2$ | Schlagarbeit / Absorbed energy mkp | mkp/$cm^2$ | ft. lbs | Aufweitung / Lateral Expansion mm | inch | Duktilität in % / Ductile area in % |
|---|---|---|---|---|---|---|---|---|---|
| 407-3.0M | Weld-matr. | - 12 | 80 | | 11,6 | | | | |
| -"- | " | - 12 | 80 | | 10,6 | | | | |
| -"- | " | - 12 | 80 | | 11,9 | | | | |

**Durchführung / Performance**

| | | | |
|---|---|---|---|
| Schweisser / Welder | Fischer | Schweisser Stamp-No. | 99 |
| Durchgeführt bei / Conducted by | Sulzer, Mstr. Meierhofer | Schweiss-Datum / Weld-Date | 5.11.1971 |
| Prot. Mat. Prüfung / Prot. Mat. Testing | 3/4-407 | Prüf-Datum / Test-Date | 17.11.1971 |
| Abnahmebehörde / Inspection-Agency | SVDB | Inspektor / Inspector | Lloyd's |

**Bestätigung / Certification**

Wir bestätigen, dass die Angaben in diesem Protokoll korrekt sind.

We certify that the statements in this record are correct.

Ort und Datum / Place and Date: Winterthur, 17.11.1971

Unterschrift / Signed by

Sulzer Brothers Limited
Inspection Dept. for Nuclear Equipment

B32.2

12.50
28280 rsv a nl
76165z sulz ch

rsv-a rotterdam nl 28280 14.6.1979
attn. mr. van de poll

u r g e n t

westinghouse weld material documentation
rsv-a fs tx/ds/68 t/vdp of 16.5.1979
our telex of 11.6.1979, point 3.

record no. analysis

| | c | p | s | si | mn | mo |
|---|---|---|---|---|---|---|
| ~~r-3008~~ | ~~0.07~~ | ~~0.015~~ | ~~0.015~~ | ~~0.24~~ | ~~1.63~~ | ~~0.48~~ |
| ~~r-3012~~ | ~~0.08~~ | ~~0.017~~ | ~~0.014~~ | ~~0.20~~ | ~~1.74~~ | ~~0.43~~ |
| ~~r-3046~~ | ~~0.09~~ | ~~0.006~~ | ~~0.009~~ | ~~0.21~~ | ~~1.85~~ | ~~0.51~~ |
| ~~r-3035~~ | ~~0.06~~ | ~~0.014~~ | ~~0.008~~ | ~~0.05~~ | ~~1.93~~ | ~~0.46~~ |
| ~~r-3036~~ | ~~0.04~~ | ~~0.009~~ | ~~0.008~~ | ~~0.02~~ | ~~2.03~~ | ~~0.47~~ |
| ~~r-3045~~ | ~~0.06~~ | ~~0.009~~ | ~~0.006~~ | ~~0.25~~ | ~~2.1~~ | ~~0.53~~ |
| r-3044 | 0.06 | 0.007 | 0.007 | 0.19 | 2.0 | 0.54 |

regards sulzer winterthur

0342-2/35/21056/ammann/mz
14.6.79 11.55h an

28280 rsv a nl
76165z sulz ch

SULZER
QUALITY CONTROL

# PROTOKOLL DER SCHWEISSMATERIAL-PRUEFUNG
# RECORD OF WELD MATERIAL QUALIFICATION

No. K-3039
Blatt / Sheet 1 von / of 1

**Zusatz-Material / Filler-Material**

| | | | |
|---|---|---|---|
| Handelsmarke / Trade-Name | Wire : S 3 Mo<br>Flux : LW 320 | Hersteller / Manufacturer | Böhler<br>Linde |
| Klassifikation / Classification | EM-12 K | A- und F-Nummer / A- and F-Number | A-2, F-6 |
| Durchmesser / Diameter | ø 3,25 | Chargen-Nr. / Heat-No. | 20459 + 26 |

**Schweissen / Welding**

| | | | |
|---|---|---|---|
| Grundwerkstoff / Base-Material | SA-508 Cl.2 | Form, Dimension / Form, Dimension | Plate 100 mm thickn. |
| Schweissverfahren / Weld-Procedure | autom. submerged arc | Schweiss-Spez. / Weld-Spec. | 3AB/3304, rev.1 |
| Stromart, Polarität / Current, Polarity | D.C. wire positive | Stromstärke / Amperage | 380-340 Amp. |

**Wärmebehandlung / Heat Treatment**

| | | |
|---|---|---|
| Vorwärmen / Preheating | 130-180° C | |
| Zwischenlagentemperatur / Interpass temperature | max. 250°C | |
| Nachbehandlung / Post weld heat treatment | 610°C/30 hrs | |
| Spannungsfrei glühen / Stress relief treatment | | |

**Zerstörungsfreie Prüfung / NDT-Examination**

| | | | |
|---|---|---|---|
| Prüfart / Examination-Method | | | |
| Spezifikation / Applied Specification | | | |
| Prüfer und Datum / Operator and Date | | | |
| Prüf-Resultat / Test-Result | | | |

**Zug-Probe / Tensile-Test**

| Probe-Nr. / Sample-No. | Durchm. / Diameter mm | Fläche / Area mm² | | Belastung / Load kp | Festigkeit / Strength kp/mm² | Festigkeit / Strength psi | Dehnung / Elongation mm | Dehnung / Elongation % |
|---|---|---|---|---|---|---|---|---|
| 10-2 | ø12.7 | | Bruch / Rupture | 68.3 | | | | 26.4 |
| | | | Streckgrenze / Yield | 61.5 | | | | |

**Kerbschlag-Proben / Impact-Tests**

Proben gemäss / Specimens acc. to: Charpy-V-notch

| Probe-Nr. / Sample-No. | Lage / Location | Prüf-Temp. / Test-Temp. °C | Fläche / Area mm² | Schlagarbeit / Absorbed energy mkp | Schlagarbeit / Absorbed energy mkp/cm² | Schlagarbeit / Absorbed energy ft. lbs | Aufweitung / Lateral Expansion mm | Aufweitung / Lateral Expansion inch | Duktilität in % / Ductile area in % |
|---|---|---|---|---|---|---|---|---|---|
| 15.1 | weld-metal | -12 | 0.8 | | 10.6 | | 1,18 | | 47 |
| 16.1 | weld-metal | -12 | 0.8 | | 9.1 | | 1.02 | | 55 |
| 17.1 | weld metal | -12 | 0.8 | | 9.8 | | 1.12 | | 62 |

**Durchführung / Performance**

| | | | |
|---|---|---|---|
| Schweisser / Welder | Brayenovitch, Croce | Schweisser Stamp-No. | 87, 158 |
| Durchgeführt bei / Conducted by | Sulzer, 8307 | Schweiss-Datum / Weld-Date | 30./31.8.1971 |
| Prot. Mat. Prüfung / Prot. Mat. Testing | 3/4-387.25 | Prüf-Datum / Test-Date | 15.9.1971 |
| Abnahmestelle / Inspection-Agency | SVDB Müller | Inspektor / Inspector | Lloyd's A Ramisch |

**Bestätigung / Certification**

Wir bestätigen, dass die Angaben in diesem Protokoll korrekt sind.
We certify that the statements in this record are correct.

Ort und Datum / Place and Date: Winterthur, 15.9.1971

Unterschrift / Signed by

Sulzer Brothers Limited
Inspection Dept. for Nuclear Equipment

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28280 rsv a nl
76165z sulz ch

rsv-a rotterdam nl 28280 14.6.1979
attn. mr. van de poll

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westinghouse weld material documentation
rsv-a fs tx/ds/68 t/vdp of 16.5.1979
our telex of 11.6.1979, point 3.
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record no. analysis

| | c | p | s | si | mn | mo |
|---|---|---|---|---|---|---|
| ~~r-3003~~ | ~~0.07~~ | ~~0.015~~ | ~~0.015~~ | ~~0.24~~ | ~~1.69~~ | ~~0.48~~ |
| ~~r-3012~~ | ~~0.08~~ | ~~0.017~~ | ~~0.014~~ | ~~0.20~~ | ~~1.74~~ | ~~0.43~~ |
| ~~r-3046~~ | ~~0.09~~ | ~~0.006~~ | ~~0.009~~ | ~~0.21~~ | ~~1.95~~ | ~~0.51~~ |
| r-3035 | 0.06 | 0.014 | 0.008 | 0.05 | 1.93 | 0.46 |
| ~~r-3036~~ | ~~0.04~~ | ~~0.009~~ | ~~0.008~~ | ~~0.02~~ | ~~2.03~~ | ~~0.47~~ |
| ~~r-3045~~ | ~~0.06~~ | ~~0.009~~ | ~~0.006~~ | ~~0.25~~ | ~~2.1~~ | ~~0.53~~ |
| ~~r-3044~~ | ~~0.06~~ | ~~0.007~~ | ~~0.007~~ | ~~0.19~~ | ~~2.0~~ | ~~0.54~~ |

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SULZER
QUALITY CONTROL

# PROTOKOLL DER SCHWEISSMATERIAL-PRÜFUNG
# RECORD OF WELD MATERIAL QUALIFICATION

Blatt / Sheet 1 von / of 1

| | | | | |
|---|---|---|---|---|
| Zusatz-Material / Filler-Material | Handelsmarke / Trade-Name | Wire : S 3 Mo<br>Flux : I.W 320 | Hersteller / Manufacturer | Böhler B34.1<br>Linde |
| | Klassifikation / Classification | EM-12 K | A- und F-Nummer / A- and F-Number | A-2, F-6 |
| | Durchmesser / Diameter | ∅ 3,25 | Chargen-Nr. / Heat-No. | 27622 + 26 |
| Schweissen / Welding | Grundwerkstoff / Base-Material | SA-508 Cl.2 | Form, Dimension / Form, Dimension | Plate 100 mm thickn. |
| | Schweissverfahren / Weld-Procedure | autom. submerged arc | Schweiss-Spez. / Weld-Spec. | 3AB/3304, rev.1 |
| | Stromart, Polarität / Current, Polarity | D.C. wire positive | Stromstärke / Amperage | 380-420 Amp. |

| | | |
|---|---|---|
| Wärmebehandlung / Heat Treatment | Vorwärmen / Preheating | 130-180° C |
| | Zwischenlagentemperatur / Interpass temperature | max. 250° C |
| | Nachbehandlung / Post weld heat treatment | 610° C/30 hrs |
| | Spannungsfrei glühen / Stress relief treatment | |

| | | | | |
|---|---|---|---|---|
| Zerstörungsfreie Prüfung / NDT-Examination | Prüfart / Examination-Method | | | |
| | Spezifikation / Applied Specification | | | |
| | Prüfer und Datum / Operator and Date | | | |
| | Prüf-Resultat / Test-Result | | | |

| Zug-Probe / Tensile-Test | Probe-Nr. / Sample-No. | Durchm. / Diameter mm | Fläche / Area mm² | | Belastung / Load kp | Festigkeit / Strength kp/mm² | Festigkeit / Strength psi | Dehnung / Elongation mm | Dehnung / Elongation % |
|---|---|---|---|---|---|---|---|---|---|
| | 10-1 | ∅12.7 | | Bruch / Rupture | | 60.8 | | | 32.8 |
| | | | | Streckgrenze / Yield | | 53.1 | | | |

Kerbschlag-Proben / Impact-Tests — Proben gemäss / Specimens acc. to: Charpy-V-notch

| Probe-Nr. / Sample-No. | Lage / Location | Prüf-Temp. / Test-Temp. °C | Fläche / Area mm² | Schlagarbeit / Absorbed energy mkp | mkp/cm² | ft. lbs | Aufweitung / Lateral Expansion mm | inch | Duktilität in % / Ductile area in % |
|---|---|---|---|---|---|---|---|---|---|
| 15.2 | weld-metal | -12 | 0.8 | | 5.8 | | 0.70 | | 35 |
| 16.2 | weld-metal | -12 | 0.8 | | 6.6 | | 0.78 | | 34 |
| 17.2 | weld-metal | -12 | 0.8 | | 5.9 | | 0.68 | | 39 |

| Durchführung / Performance | | | | |
|---|---|---|---|---|
| | Schweisser / Welder | Mastandrea, Grassi | Schweisser Stamp-No. | 96, 52 |
| | Durchgeführt bei / Conducted by | Sulzer, 8307 | Schweiss-Datum / Weld-Date | 30./31.8.1971 |
| | Prot. Mat. Prüfung / Prot. Mat. Testing | 3/4-387, 2D | Prüf-Datum / Test-Date | 15.9.1971 |
| | Abnahmebehörde / Inspection-Agency | SVDB Nader | Inspektor / Inspector | Lloyd's A. Oliveira |

Bestätigung / Certification

Wir bestätigen, dass die Angaben in diesem Protokoll korrekt sind.

We certify that the statements in this record are correct.

Ort und Datum / Place and Date: Winterthur, 15.9.1971

Unterschrift / Signed by

Sulzer Brothers Limited
Inspection Dept. for Nuclear Equipment

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record no. analysis

| | c | p | s | si | mn | mo |
|---|---|---|---|---|---|---|
| ~~r-3008~~ | ~~0.07~~ | ~~0.015~~ | ~~0.015~~ | ~~0.24~~ | ~~1.69~~ | ~~0.48~~ |
| ~~r-3012~~ | ~~0.08~~ | ~~0.017~~ | ~~0.014~~ | ~~0.20~~ | ~~1.74~~ | ~~0.43~~ |
| ~~r-3046~~ | ~~0.09~~ | ~~0.006~~ | ~~0.009~~ | ~~0.21~~ | ~~1.85~~ | ~~0.51~~ |
| ~~r-3035~~ | ~~0.06~~ | ~~0.014~~ | ~~0.008~~ | ~~0.05~~ | ~~1.93~~ | ~~0.46~~ |
| r-3036 | 0.04 | 0.009 | 0.008 | 0.02 | 2.03 | 0.47 |
| ~~r-3045~~ | ~~0.06~~ | ~~0.009~~ | ~~0.006~~ | ~~0.25~~ | ~~2.1~~ | ~~0.53~~ |
| ~~r-3044~~ | ~~0.06~~ | ~~0.007~~ | ~~0.007~~ | ~~0.19~~ | ~~2.0~~ | ~~0.54~~ |

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SULZER
QUALITY CONTROL

# PROTOKOLL DER SCHWEISSMATERIAL-PRUEFUNG
# RECORD OF WELD MATERIAL QUALIFICATION

No. R - 3049
Blatt / Sheet 1 von / of 1

| | | | | |
|---|---|---|---|---|
| Zusatz-Material / Filler-Material | Handelsmarke / Trade-Name | S3Mo + LW 32o | Hersteller / Manufacturer | Böhler + Linde |
| | Klassifikation / Classification | EM-12K mod. (SA-558) | A-und F-Nummer / A- and F-Number | A-2, F-6 |
| | Durchmesser / Diameter | 3.25 mm | Chargen-Nr. / Heat-No. | 27622 + 28 |
| Schweissen / Welding | Grundwerkstoff / Base-Material | SA-5o8 Cl.2 | Form, Dimension / Form, Dimension | Plate 1oo mm thick |
| | Schweissverfahren / Weld-Procedure | autom. submerged arc | Schweiss-Spez. / Weld-Spec. | 3AB/33o3 |
| | Stromart, Polarität / Current, Polarity | D.C. wire positive | Stromstärke / Amperage | 44o Amps. |

| Wärmebehandlung / Heat Treatment | | |
|---|---|---|
| Vorwärmen / Preheating | min. 13o °C | |
| Zwischenlagentemperatur / Interpass temperature | max. 25o °C | |
| Nachbehandlung / Post weld heat treatment | None | |
| Spannungsfrei glühen / Stress relief treatment | 61o °C / 31 hours | |

| Zerst.freie Prüfung / ND-Examination | | | |
|---|---|---|---|
| Prüfart / Examination-Method | | | |
| Spezifikation / Applied Specification | | | |
| Prüfer und Datum / Operator and Date | | | |
| Prüf-Resultat / Test-Result | | | |

Zug-Probe / Tensile-Test

| Probe-Nr. / Sample-No. | Durchm. / Diameter | Fläche / Area | | Belastung / Load | Festigkeit / Strength | | Dehnung / Elongation | |
|---|---|---|---|---|---|---|---|---|
| | mm | mm² | | kp | kp/mm² | psi | mm | % |
| 407-3,25 | 12.7 | | Bruch / Rupture | | 62,1 | | | 29,0 |
| | | | Streckgrenze / Yield | | 55,6 | | | |

Kerbschlag-Proben / Impact-Tests

Proben gemäss / Specimens acc. to: Charpy V-notch acc. SA-37o

| Probe-Nr. / Sample-No. | Lage / Location | Prüf-Temp. / Test-Temp. | Fläche / Area | Schlagarbeit / Absorbed energy | | | Aufweitung / Lateral Expansion | | Duktilität in % / Ductile area in % |
|---|---|---|---|---|---|---|---|---|---|
| | | °C | mm² | mkp | mkp/cm² | ft. lbs | mm | inch | |
| 407-3,25M | Weld-mat. | - 12 | 8o | | 7,9 | | 1.o | | 49 |
| - " - | " | - 12 | 8o | | 8,0 | | o.9 | | 5o |
| - " - | " | - 12 | 8o | | 8,4 | | 1.1 | | 68 |

Durchführung / Performance

| | | | |
|---|---|---|---|
| Schweisser / Welder | Fischer | Schweisser Stamp-No. | 99 |
| Durchgeführt bei / Conducted by | Sulzer, 856o | Schweiss-Datum / Weld-Date | 5.11.1971 |
| Prot. Mat. Prüfung / Prot. Mat. Testing | 3/4-4o7 | Prüf-Datum / Test-Date | 17.11.1971 |
| Abnahmebehörde / Inspection-Agency | SVDB | Inspektor / Inspector | Lloyd's |

Bestätigung / Certification

Wir bestätigen, dass die Angaben in diesem Protokoll korrekt sind.
We certify that the statements in this record are correct.

Ort und Datum / Place and Date: Winterthur 17.11.1971

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rsv-a fs tx/ds/68 t/vdp of 16.5.1979
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record no. analysis

| | c | p | s | si | mn | mo |
|---|---|---|---|---|---|---|
| ~~r-3008~~ | ~~0.07~~ | ~~0.015~~ | ~~0.015~~ | ~~0.24~~ | ~~1.69~~ | ~~0.48~~ |
| ~~r-3012~~ | ~~0.08~~ | ~~0.017~~ | ~~0.014~~ | ~~0.20~~ | ~~1.74~~ | ~~0.43~~ |
| ~~r-3046~~ | ~~0.09~~ | ~~0.006~~ | ~~0.009~~ | ~~0.21~~ | ~~1.55~~ | ~~0.54~~ |
| ~~r-3035~~ | ~~0.06~~ | ~~0.014~~ | ~~0.008~~ | ~~0.05~~ | ~~1.93~~ | ~~0.4[illegible]~~ |
| ~~r-3036~~ | ~~0.04~~ | ~~0.009~~ | ~~0.008~~ | ~~0.02~~ | ~~2.03~~ | ~~0.47~~ |
| r-3045 | 0.06 | 0.009 | 0.006 | 0.25 | 2.1 | 0.53 |
| ~~r-3044~~ | ~~0.06~~ | ~~0.007~~ | ~~0.007~~ | ~~0.19~~ | ~~2.0~~ | ~~0.54~~ |

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QUALITY CONTROL

# PROTOKOLL DER SCHWEISSMATERIAL PRUEFUNG
# RECORD OF WELD MATERIAL QUALIFICATION

No. [illegible]

Blatt / Sheet 1 von / of 1

| | | | | |
|---|---|---|---|---|
| Zusatz-Material Filler-Material | Handelsmarke Trade-Name | Wire : S 3 Mo<br>Flux : LW 320 | Hersteller Manufacturer | Phönix Union, Germany<br>Linde, Germany |
| | Klassifikation Classification | approx. EM-12K | A- und F-Nummer A- and F-Number | A-2, F-6 |
| | Durchmesser Diameter | 4.0 mm | Chargen-Nr. Heat-No. | 716126 + 26 |
| Schweissen Welding | Grundwerkstoff Base-Material | SA-533 Gr.B Cl.1 | Form, Dimension Form, Dimension | 150 x 600 x 1000 mm |
| | Schweissverfahren Weld-Procedure | autom. submerged arc | Schweiss-Spez. Weld-Spec. | EN4-502 = 3AB/3303 |
| | Stromart, Polarität Current, Polarity | D.C. | Stromstärke Amperage | 520 - 600 Amp. |

| | | | |
|---|---|---|---|
| Wärmebehandlung Heat Treatment | Vorwärmen Preheating | min. 150 °C | |
| | Zwischenlagentemperatur Interpass temperature | max. 250 °C | |
| | Nachbehandlung Post weld heat treatment | None | |
| | Spannungsfrei glühen Stress relief treatment | 610 °C / 30 hours | |

| | | | | |
|---|---|---|---|---|
| Zerstörfreie Prüfung NDT-Examination | Prüfart Examination-Method | X-Ray | MP | |
| | Spezifikation Applied Specification | V.700.545.020 | V.700.545.017 | |
| | Prüfer und Datum Operator and Date | Roling 11.1.71 | Hofer 8.1.71 | |
| | Prüf-Resultat Test-Result | Film Li 736 i.O | i.O. | |

| Zug-Probe Tensile-Test | Probe-Nr. Sample-No. | Durchm. Diameter | Fläche Area | | Belastung Load | Festigkeit Strength | | Dehnung Elongation | |
|---|---|---|---|---|---|---|---|---|---|
| | | mm | mm² | | kp | kp/mm² | psi | mm | % |
| | 355-T6 | 10 | | Bruch Rupture | | 59,5 | 84600 | | 28.3 |
| | | | | Streckgrenze Yield | | 51,0 | 72500 | | |

Kerbschlag-Proben Impact-Tests

Proben gemäss Specimens acc. to: Charpy-V-notch

| Probe-Nr. Sample-No. | Lage Location | Prüf-Temp. Test-Temp | Fläche Area | Schlagarbeit Absorbed energy | | | Aufweitung Lateral Expansion | | Duktilität in % Ductile area in % |
|---|---|---|---|---|---|---|---|---|---|
| | | °C | mm² | mkp | mkp/cm² | ft. lbs | mm | inch | |
| 355.1. DM | weld-mat. | - 12 | 80 | | 14,1 | | | | |
| " | " | - 12 | 80 | | 14,1 | | | | |
| " | " | - 12 | 80 | | 10,8 | | | | |

| Durchführung Performance | | | | |
|---|---|---|---|---|
| | Schweisser Welder | Musso | Schweisser Stempel-No. | 124 |
| | Durchgeführt bei Performed by | Sulzer | Schweiss-Datum Weld-Date | 15.12.70-6.1.71 |
| | Prod. Mat. Prüfung Prod. Mat. Testing | 3/1-355 | Prüf-Datum Test-Date | 20.1.71 u. 2.3.71 |
| | Abnahmebehörde Inspection Agency | [illegible] | Inspektor Inspector | GETSCO P. [illegible] |

Bestätigung Certification

Wir bestätigen, dass die Angaben in diesem Protokoll korrekt sind.
We certify that the statements in this record are correct.



Ort und Datum / Place and Date: Winterthur, 4.3.1971

Unterschrift / Signed by

Sulzer Brothers Limited
[illegible] Dept. for Nuclear Equipment
[illegible]

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westinghouse weld material documentation
rsv-a fs tx/ds/68 t/vdp of 16.5.1979
our telex of 11.6.1979, point 3.
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| record no. | analysis | | | | | |
|---|---|---|---|---|---|---|
| | c | p | s | si | mn | mo |
| ~~r-3008~~ | ~~0.07~~ | ~~0.015~~ | ~~0.015~~ | ~~0.24~~ | ~~1.69~~ | ~~0.48~~ |
| r-3012 | 0.08 | 0.017 | 0.014 | 0.20 | 1.74 | 0.43 |
| ~~r-3046~~ | ~~0.09~~ | ~~0.006~~ | ~~0.009~~ | ~~0.21~~ | ~~1.75~~ | ~~0.51~~ |
| ~~r-3035~~ | ~~0.06~~ | ~~0.014~~ | ~~0.008~~ | ~~0.05~~ | ~~1.93~~ | ~~0.46~~ |
| ~~r-3036~~ | ~~0.04~~ | ~~0.009~~ | ~~0.008~~ | ~~0.02~~ | ~~2.03~~ | ~~0.47~~ |
| ~~r-3045~~ | ~~0.06~~ | ~~0.009~~ | ~~0.006~~ | ~~0.25~~ | ~~2.1~~ | ~~0.53~~ |
| ~~r-3044~~ | ~~0.06~~ | ~~0.007~~ | ~~0.007~~ | ~~0.19~~ | ~~2.0~~ | ~~0.54~~ |

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SULZER
QUALITY CONTROL

# PROTOKOLL DER SCHWEISSMATERIAL-PRUEFUNG
# RECORD OF WELD MATERIAL QUALIFICATION

No. K - 3046
Blatt / Sheet 1 von / of 1

**Zusatz-Material / Filler-Material**

| | | | |
|---|---|---|---|
| Handelsmarke / Trade - Name | S3No + LW 320 | Hersteller / Manufacturer | Union + Linde |
| Klassifikation / Classification | EN-12K mod. (SA-558) | A- und F-Nummer / A- and F-Number | A-2, F-6 |
| Durchmesser / Diameter | 4.0 mm | Chargen-Nr. / Heat-No. | 716126 + 28 |

**Schweissen / Welding**

| | | | |
|---|---|---|---|
| Grundwerkstoff / Base-Material | SA-508 Cl.2 | Form, Dimension / Form, Dimension | Plate 100 mm thick |
| Schweissverfahren / Weld-Procedure | autom. submerged arc | Schweiss-Spez. / Weld-Spec. | 3AB/3303 |
| Stromart, Polarität / Current, Polarity | D.C. wire positive | Stromstärke / Amperage | 580 Amps. |

**Wärmebehandlung / Heat Treatment**

| | |
|---|---|
| Vorwärmen / Preheating | min. 150 °C |
| Zwischenlagentemperatur / Interpass temperature | max. 250 °C |
| Nachbehandlung / Post weld heat treatment | None |
| Spannungsfrei glühen / Stress relief treatment | 610 °C / 31 hours |

**Zerst.freie Prüfung / ND-Examination**

| | | | |
|---|---|---|---|
| Prüfart / Examination-Method | | | |
| Spezifikation / Applied Specification | | | |
| Prüfer und Datum / Operator and Date | | | |
| Prüf-Resultat / Test-Result | | | |

**Zug-Probe / Tensile-Test**

| Probe-Nr. / Sample-No. | Durchm. / Diameter | Fläche / Area | | Belastung / Load | Festigkeit / Strength | | Dehnung / Elongation | |
|---|---|---|---|---|---|---|---|---|
| | mm | $mm^2$ | | kp | $kp/mm^2$ | psi | mm | % |
| 407-4.6 | 12.7 | | Bruch / Rupture | | 62,9 | | | 27,8 |
| | | | Streckgrenze / Yield | | 57,3 | | | |

**Kerbschlag-Proben / Impact-Tests**

Proben gemäss / Specimens acc. to: Charpy-V-notch acc. SA-370

| Probe-Nr. / Sample-No. | Lage / Location | Prüf-Temp. / Test-Temp. | Fläche / Area | Schlagarbeit / Absorbed energy | | | Aufweitung / Lateral Expansion | | Duktilität in % / Ductile area in % |
|---|---|---|---|---|---|---|---|---|---|
| | | °C | $mm^2$ | mkp | $mkp/cm^2$ | ft. lbs | mm | inch | |
| 407-4.6M | wire-dir. | - 12 | 80 | | 13,6 | | | | |
| -"- | " | - 12 | 80 | | 14,3 | | | | |
| -"- | " | - 12 | 80 | | 12,9 | | | | |

**Durchführung / Performance**

| | | | |
|---|---|---|---|
| Schweisser / Welder | fischer | Schweisser Stamp-No. | 99 |
| Durchgeführt bei / Conducted by | Sulzer, 8560 | Schweiss-Datum / Weld-Date | 5.11.1971 |
| Prot. Mat. Prüfung / Prot. Mat. Testing | 3/4-407 | Prüf-Datum / Test-Date | 17.11.1971 |
| Abnahmebehörde / Inspection-Agency | SVDB | Inspektor / Inspector | Lloyd's |

**Bestätigung / Certification**

Wir bestätigen, dass die Angaben in diesem Protokoll korrekt sind.
We certify that the statements in this record are correct.

Ort und Datum / Place and Date: Winterthur 17.11.1971

Unterschrift / Signed by

Sulzer Brothers Limited
Inspection Dept. for Nuclear Equipment

12.50
28280 rsv a nl
76165z sulz ch

rsv-a rotterdam nl 28280 14.6.1979
attn. mr. van de poll

u r g e n t

westinghouse weld material documentation
rsv-a fs tx/ds/68 t/vdp of 16.5.1979
our telex of 11.6.1979, point 3.
---

| record no. | analysis | | | | | |
|---|---|---|---|---|---|---|
| | c | p | s | si | mn | mo |
| ~~r-3008~~ | ~~0.07~~ | ~~0.015~~ | ~~0.015~~ | ~~0.24~~ | ~~1.69~~ | ~~0.48~~ |
| ~~r-3012~~ | ~~0.08~~ | ~~0.017~~ | ~~0.014~~ | ~~0.20~~ | ~~1.74~~ | ~~0.43~~ |
| r-3046 | 0.09 | 0.006 | 0.009 | 0.21 | 1.85 | 0.51 |
| ~~r-3035~~ | ~~0.06~~ | ~~0.014~~ | ~~0.008~~ | ~~0.05~~ | ~~1.93~~ | ~~0.46~~ |
| ~~r-3036~~ | ~~0.04~~ | ~~0.009~~ | ~~0.008~~ | ~~0.02~~ | ~~2.03~~ | ~~0.47~~ |
| ~~r-3045~~ | ~~0.06~~ | ~~0.009~~ | ~~0.006~~ | ~~0.25~~ | ~~2.1~~ | ~~0.53~~ |
| ~~r-3044~~ | ~~0.06~~ | ~~0.007~~ | ~~0.007~~ | ~~0.19~~ | ~~2.0~~ | ~~0.54~~ |

regards sulzer winterthur

0342-2/35/21056/ammann/mz
14.6.79 11.55h an

28280 rsv a nl
76165z sulz ch

B38.1

F ELECTRODE QUALIFICATION TEST

| SIZE | ELECTRODE SPECIFICATION | ELECTRODE IDENTIFICATION | CORE WIRE HT |
|---|---|---|---|
| 1/8" Dia | MIL-E-22200/5C<br>NAVSHIPS 250-1500-1A | MIL-E-22200/5 E-3 | 5861 |

| POWER | TYPE OF CURRENT | |
|---|---|---|
| 218-021726 | | Pad # 177 |

WET BATCH EQUIVALENCY CHEMICAL ANALYSIS TESTS

| ONE WELD ST | BATCH | LOT NO. | PAD | C. | MN. | P. | S. | SI. | CR. | NI. | MO. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | E-51831 1779 | | .06 | .90 | .012 | .017 | .28 | 1.03 | 1.06 | .55 |
| | 2 | " | " | .05 | .99 | .004 | .021 | .34 | 1.04 | 1.01 | .55 |
| | 3 | " | " | .04 | .90 | .013 | .022 | .29 | 1.03 | 1.06 | .54 |
| | 4 | E-51857 | " | .06 | 1.02 | .011 | .026 | .25 | 1.04 | .98 | .54 |

TENSILE PROPERTIES

| | HEAT TREATMENT | ULT. TEN. STR. PSI | YIELD POINT PSI | ELONG IN 2" % | RED OF AREA % |
|---|---|---|---|---|---|
| AW | NO | 121000 | 93500 | 24.0 | 66.0 |
| GW | YES | 124250 | 94000 | 25.0 | 63.4 |

FERRITE CONTENT

| BATCH | FERRITE |
|---|---|
| | |
| | |
| | |

RAD TESTS

CHARPY V-NOTCH IMPACT TEST @ 0°C OF 240 FT/LBS ENERGY LEVEL

| TEST NO. | FT/LBS. 0° | TEST NO. | FT/LBS. |
|---|---|---|---|
| 1 | 70 | 1 | 78 |
| 2 | 72 | 2 | 76 |
| 3 | 79 | 3 | 85 |

FILLET WELD TEST

| TEST NO. | POSITION | SIZE | LEG. | CONCAVITY |
|---|---|---|---|---|
| | OVERHEAD | | | |
| | VERTICAL | | | |
| | HORIZONTAL | | | |



WE HEREBY CERTIFY THAT THE ABOVE MATERIAL HAS BEEN TESTED IN ACCORDANCE WITH THE ABOVE LISTED SPECIFICATION AND IS IN CONFORMANCE WITH ALL REQUIREMENTS.

SIGNED

DATE

C ND OF FILLER WIRE QUALIFICATION TEST

TEST NO. EL 37 B38.2

| DIAMETER | WELDING PROCEDURE SPECIFICATION AND NO. | FILLER WIRE SPECIFICATION AND NO. | CORE WIRE HEAT NO. |
|---|---|---|---|
| 1/32" | 2E4-142-1 M.M.A. | B&W 8015 C3 MIL | 818-021736 |

| VOLTS: | TRAVEL SPEED (IPM) | TYPE OF CURRENT | AMPERES |
|---|---|---|---|
| | | | 100 |

WELD BATCH EQUIVALENCY CHEMICAL ANALYSIS TESTS

| LOT | LAB NO. | PAD | C. | MN. | P. | S. | SI. | CR. | NI. | MO. | Va |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 12237 | | .035 | 1.10 | .018 | .020 | .39 | .02 | .87 | .41 | .02 |

DROP WEIGHTS

| HEAT TREATMENT | TEST NO. | TEMP. (°F.) | RESULTS |
|---|---|---|---|
| 1102-1150°F FOR 48 HRS. FURNACE COOLED TO 600°F AT 10°F/HR. | EL 37 (LT) | -50 | NF |
| | | -70 | NF, NF |
| | | -80 | NF, NF |
| | | -90 | F |

TENSILE PROPERTIES

| TEST NO. | HEAT TREATMENT | ULT. TEN. STR. PSI | YIELD POINT PSI | E-LONG IN 2" % | RED OF AREA % |
|---|---|---|---|---|---|
| EL 37 | (ABOVE) | 87,750 | 78,750 | 25.0 | 58.5 |
| LT | | | | | |

CHARPY V-NOTCH IMPACT TEST OF 240 FT/LB. ENERGY LOAD

| HEAT TREATMENT | TEST NO. | FT/LB. | LAT. EXP. | % SHEAR |
|---|---|---|---|---|
| (ABOVE) | EL 37 | 81 | .064 | 75 |
| | SURFACE | 91 | .071 | 85 |
| | AT +10°F | 85 | .068 | 75 |
| | EL 37 | 65 | .052 | 65 |
| | LT | 52 | .044 | 60 |
| | AT -30°F | 55 | .045 | 60 |



GUIDED BEND TESTS

| FACE | ROOT | SIDE |
|---|---|---|
| | | |

RESULTS OF RADIOGRAPHIC EXAMINATION:

| MATERIAL APPROVAL | APPROVAL |
|---|---|
| NAVSHIPS - 250/1500-1 | X |
| ASME - COMPL NUCLEAR STEAM GENERATORS | X |

GROUP YIELD TEST

RADIOGRAPHIC EXAMINATION

I HEREBY CERTIFY THAT THE ABOVE MATERIAL HAS BEEN TESTED IN ACCORDANCE WITH THE ABOVE LISTED SPECIFICATION AND IS IN CONFORMANCE WITH ALL REQUIREMENTS.

PURCHASE ORDER NO. 818-021736

WIRE FOLIO NO. 503-739

DX FOLIO NO.

WORKS MT. VERNON

CONTRACT NO.

DATE DECEMBER 5, 1972

SIGNED BABCOCK & WILCOX CO.

INSPECTION AGENCY

INSPECTOR J.S. TOOR

THE BABCOCK & WILCOX COMPANY
BOILER DIVISION
BARBERTON, OHIO

26

B39.1

D OF ELECTRODE QUALIFICATION TEST

| ZE | ELECTRODE SPECIFICATION | ELECTRODE IDENTIFICATION | CORE WIRE HEAT. NO |
|---|---|---|---|
| 8" DIA | MIL-E 22200/6 + NAVSHIPS 250 1500-1 ★ | MIL-8015-C3 | 86C127 |

| IE NUMBER | TYPE OF CURRENT | ~~MARKS~~ ES |
|---|---|---|
| 818-022103 | | Pad # 2023 |

Radiography - Good

WET BATCH EQUIVALENCY CHEMICAL ANALYSIS TESTS

| O E WELD EST | BATCH | LAB. NO. | PAD | C. | MN. | P. | S. | SI. | CR. | NI. | MO. | V |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| pad | 1 | E59475 | 2023 | .054 | .74 | .013 | 016 | .32 | .02 | 1.06 | 52 | Nil |
| | 2 | E59337 | | .040 | .72 | 012 | 015 | .33 | .03 | 1.06 | .54 | " |
| | 3 | E59313 | | .051 | .72 | 010 | 015 | .34 | .02 | 1.12 | .51 | " |
| | 4 | | | .055 | .72 | 010 | 014 | .34 | .02 | 1.10 | .52 | " |
| | 5 | | | .051 | .66 | 011 | 015 | .31 | .02 | 1.12 | .52 | " |
| | 6 | | | .049 | .68 | 010 | 015 | .31 | .02 | 1.14 | .51 | " |
| | 7 | | | .052 | .66 | 012 | 014 | .33 | .02 | 1.12 | .51 | " |
| | 8 | | | .048 | .65 | 011 | 015 | .32 | .02 | 1.14 | .52 | " |
| | 9 | | | .050 | .74 | 010 | 016 | .34 | .02 | 1.12 | .51 | " |
| | 10 | ↓ | ↓ | .050 | .70 | 010 | 015 | .32 | .02 | 1.12 | 52 | " |

TENSILE PROPERTIES

| ES. O. | HEAT TREATMENT | ULT. TEN. STR. PSI | YIELD POINT PSI | E-LONG IN 2" % | RED OF AREA % |
|---|---|---|---|---|---|
| 1 | NONE | 94750 | 86500 | 23.5 | 64.2 |
| 1 | 2 hrs at 1130°F | 95000 | 87500 | 22.0 | 62.0 |

FERRITE CONTENT

| BATCH | | BATCH | |
|---|---|---|---|
| | | | |
| | | | |
| | | | |

E ND TESTS

UIDED FACE-BEND

UIDED ROOT-BEND

IDED SIDE-BEND

CHARPY V-notch IMPACT TEST @ 0°F/10°F 24.0 FT/LBS ENERGY LOAD.

| TEST NO. | FT/LBS. 0°F | TEST NO. | ★ FT/LBS. +10°F |
|---|---|---|---|
| 2023-2 | 95.0 | 2023 48 | 91 |
| 2023-2 | 90.0 | " | 114 |
| 2023-2 | 97.0 | " | 94 |

FILLET WELD TEST

| TEST NO. | POSITION | SIZE | LEG. | CONVEXITY |
|---|---|---|---|---|
| | OVERHEAD | | | |
| | VERTICAL | | | |
| | HORIZONTAL | | | |

2023-48 Impacts were cycled at 1100 1150°F for 8.6 hr cycles

WE HEREBY CERTIFY THAT THE ABOVE MATERIAL HAS BEEN TESTED IN ACCORDANCE WITH THE ABOVE LISTED SPECIFICATION AND IS IN CONFORMANCE WITH ALL REQUIREMENTS.

SIGNED P E Campbell /Fbm

INSPECTION DATE Oct 31 1967

INSPECTOR C.F. Bode, DCASO

B40.1

ELECTRODE QUALIFICATION TEST

| ELECTRODE SPECIFICATION | ELECTRODE IDENTIFICATION | CORE WIRE HEAT |
|---|---|---|
| ASTM A-316-LVT | E-2015-G | 772439 |

| NUMBER | TYPE OF CURRENT | AMPERES |
|---|---|---|
| 917-022778 | D.C. | 145 |

WET, BATCH EQUIVALENCY CHEMICAL ANALYSIS TEST

| WELD | BATCH | LAB. NO. | PAD | C. | MN. | P. | S. | SI. | CR. | NI. | MO. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | E10326 | 2109 | .04 | .77 | .011 | .020 | .34 | 18.03 | 12.02 | 2.54 |

TENSILE PROPERTIES

| HEAT TREATMENT | ULT. TEN. STR. PSI | YIELD POINT PSI | E-LONG IN 2" % | RED OF AREA % |
|---|---|---|---|---|
| | | | | |

FERRITE CONTENT

| BATCH | | BATCH | |
|---|---|---|---|
| | | | |

BEND TESTS

| FACE-BEND |
|---|
| |

| ROOT-BEND |
|---|
| |

| SIDE-BEND |
|---|
| |

CHARPY _____ IMPACT TEST @ _____ °F _____ FT/LBS ENERGY LOAD

| TEST NO. | FT/LBS. | TEST NO. | FT/LBS. |
|---|---|---|---|
| | | | |

FILLET WELD TEST.

| TEST NO. | POSITION | SIZE | LEG. | CONVEXITY. | |
|---|---|---|---|---|---|
| | OVERHEAD | | | | |
| | VERTICAL | | | | |
| | HORIZONTAL | | | | |

WE HEREBY CERTIFY THAT THE ABOVE MATERIAL HAS BEEN TESTED IN ACCORDANCE WITH THE ABOVE LISTED SPECIFICATION AND IS IN CONFORMANCE WITH ALL REQUIREMENTS.

SIGNED _____

INSPECTION AGENCY BABCOCK & WILCOX-OC

INSPECTOR _____

27

THE BABCOCK & WILCOX COMPANY
BOILER DIVISION
BARBERTON, OHIO

# OF ELECTRODE QUALIFICATION TEST

| SIZE | ELECTRODE SPECIFICATION | ELECTRODE IDENTIFICATION | CORE WIRE HEAT. NO. |
|---|---|---|---|
| 1/8" | A.S.T.M. A-316-64T | E-8015-B | 75C438 |

| R NUMBER | TYPE OF CURRENT | AMPERES |
|---|---|---|
| 918 023006 | D.C. | 140 |

WET BATCH EQUIVALENCY CHEMICAL ANALYSIS TESTS SEP 23 '71

| WELD TEST | BATCH | LAB. NO. | PAD | C. | MN. | P. | S. | SI. | CR. | NI. | MO. | Cu |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | E-9462 | 2020 | .049 | .62 | .014 | .019 | .26 | .03 | 11.5 | 1.9 | .01 |

TENSILE PROPERTIES

| ST NO. | HEAT TREATMENT | ULT. TEN. STR. PSI | YIELD POINT PSI | E-LONG IN 2" % | RED OF AREA % |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |

FERRITE CONTENT

| BATCH | | BATCH | |
|---|---|---|---|
| | | | |
| | | | |
| | | | |

BEND TESTS

| | |
|---|---|
| 1 | 0 FACE-BEND |
| | |
| | |
| | |
| | |
| 1 | 0 ROOT-BEND |
| | |
| | |
| | |
| | |
| 0 | SIDE-BEND |
| | |
| | |
| | |
| | |

CHARPY _____ IMPACT TEST @ _____ °F _____ FT/LBS ENERGY LOAD.

| TEST NO. | FT/LBS. | TEST NO. | FT/LBS. |
|---|---|---|---|
| | | | |
| | | | |
| | | | |

FILLET WELD TEST.

| TEST NO. | POSITION | SIZE | LEG. | CONVEXITY. | |
|---|---|---|---|---|---|
| | OVERHEAD | | | | |
| | VERTICAL | | | | |
| | HORIZONTAL | | | | |

WE HEREBY CERTIFY THAT THE ABOVE MATERIAL HAS BEEN TESTED IN ACCORDANCE WITH THE ABOVE LISTED SPECIFICATION AND IS IN CONFORMANCE WITH ALL REQUIREMENTS.

SIGNED L. H. Kline

INSPECTION AGENCY BABCOCK & WILCOX CO.

INSPECTOR _____

THE BABCOCK & WILCOX COMPANY
BOILER DIVISION
BARBERTON, OHIO

49

B42.1

OF ELECTRODE QUALIFICATION TEST

| SIZE | ELECTRODE SPECIFICATION | ELECTRODE IDENTIFICATION | CORE WIRE HEAT. NO. |
|---|---|---|---|
| 3/32 | A 316-64T | E-8015 B | 78C446 |

| NUMBER | 818-024509 | TYPE OF CURRENT | D.C | AMPERES | 180-185 |
|---|---|---|---|---|---|

WET BATCH EQUIVALENCY CHEMICAL ANALYSIS TESTS

| WELD TEST | BATCH | LAB. NO. | PAD | C. | MN. | P. | S. | SI. | CR. | NI. | MO. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | E-63807 | 2361 | 054 | 68 | 010 | 017 | 33 | 02 | 1.06 | 47 | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
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| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |

TENSILE PROPERTIES

| HEAT TREATMENT | ULT. TEN. STR. PSI | YIELD POINT PSI | E-LONG IN 2" % | RED OF AREA % |
|---|---|---|---|---|
| | | | | |
| | | | | |

FERRITE CONTENT

| BATCH | | BATCH | |
|---|---|---|---|
| | | | |
| | | | |
| | | | |

BEND TESTS

GUIDED FACE-BEND

GUIDED ROOT-BEND

GUIDED SIDE-BEND

CHARPY _____ IMPACT TEST @ _____ °F _____ FT/LBS ENERGY LOAD.

| TEST NO. | FT/LBS. | TEST NO. | FT/LBS. |
|---|---|---|---|
| | | | |
| | | | |
| | | | |

FILLET WELD TEST

| TEST NO. | POSITION | SIZE | LEG. | CONVEXITY | |
|---|---|---|---|---|---|
| | OVERHEAD | | | | |
| | VERTICAL | | | | |
| | HORIZONTAL | | | | |

WE HEREBY CERTIFY THAT THE ABOVE MATERIAL HAS BEEN TESTED IN ACCORDANCE WITH THE ABOVE LISTED SPECIFICATION AND IS IN CONFORMANCE WITH ALL REQUIREMENTS.

SIGNED B. Hartle

INSPECTION AGENCY BABCOCK & WILCOX CO.

INSPECTOR _____

THE BABCOCK & WILCOX COMPANY
BOILER DIVISION
BARBERTON, OHIO

3L

B43.1

) OF ELECTRODE QUALIFICATION TEST

| ZE | ELECTRODE SPECIFICATION | ELECTRODE IDENTIFICATION | CORE WIRE HEAT. NO. |
|---|---|---|---|
| 5/16 | A316-64T | E8015-B | 78C491 |

| NUMBER 818-024510 | TYPE OF CURRENT D.C | AMPERES 260 |
|---|---|---|

WET BATCH EQUIVALENCY CHEMICAL ANALYSIS TESTS

| WELD TEST | BATCH | LAB. NO. | PAD | C. | MN. | P. | S. | SI. | CR. | NI. | MO. | V |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | E-63809 | 2362 | 045 | 76 | 010 | 017 | 20 | 02 | 96 | 54 | 01 |

TENSILE PROPERTIES

| HEAT TREATMENT | ULT. TEN. STR. PSI | YIELD POINT PSI | E-LONG IN 2" % | RED OF AREA % |
|---|---|---|---|---|
| | | | | |
| | | | | |

FERRITE CONTENT

| BATCH | | BATCH | |
|---|---|---|---|
| | | | |
| | | | |
| | | | |

D TESTS

CHARPY _____ IMPACT TEST @ _____ °F _____ FT/LBS ENERGY LOAD.

| TEST NO. | FT/LBS. | TEST NO. | FT/LBS. |
|---|---|---|---|
| | | | |
| | | | |
| | | | |

IDED FACE-BEND

D ROOT-BEND

ED SIDE-BEND

FILLET WELD TEST.

| TEST NO. | POSITION | SIZE | LEG. | CONVEXITY. |
|---|---|---|---|---|
| | OVERHEAD | | | |
| | VERTICAL | | | |
| | HORIZONTAL | | | |

WE HEREBY CERTIFY THAT THE ABOVE MATERIAL HAS BEEN TESTED IN ACCORDANCE WITH THE ABOVE LISTED SPECIFICATION AND IS IN CONFORMANCE WITH ALL REQUIREMENTS

SIGNED B. Hinkle

INSPECTION AGENCY BABCOCK & WILCOX CO.

INSPECTOR _____

B44.1

BABCOCK & WILCOX

ELECTRODE QUALIFICATION TEST

| ELECTRODE SPECIFICATION | ELECTRODE IDENTIFICATION | CORE WIRE HEAT. NO. |
|---|---|---|
| A-316-64T | E-8015-B1 | 830261 |

| NUMBER 81E-024790 | TYPE OF CURRENT D.C | AMPERES 240-260 |
|---|---|---|

WET BATCH EQUIVALENCY CHEMICAL ANALYSIS TESTS 6316 & 5512

| BATCH | LAB. NO. | PAD | C. | MN. | P. | S. | SI. | CR. | NI. | MO. | V |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | E-65019 | 2427 | 05 | 82 | | | 29 | 01 | 97 | 60 | .01 |

G. N. [illegible]
AUG 1968

TENSILE PROPERTIES

| HEAT TREATMENT | ULT. TEN. STR. PSI | YIELD POINT PSI | E-LONG IN 2" % | RED OF AREA % |
|---|---|---|---|---|
| | | | | |
| | | | | |

FERRITE CONTENT

| BATCH | | BATCH | |
|---|---|---|---|
| | | | |
| | | | |
| | | | |

CHARPY _____ IMPACT TEST @ _____ °F _____ FT/LBS ENERGY LOAD

| TEST NO. | FT/LBS. | TEST NO. | FT/LBS. |
|---|---|---|---|
| | | | |
| | | | |
| | | | |

FILLET WELD TEST

| TEST NO. | POSITION | SIZE | LEG. | CONVEXITY. | |
|---|---|---|---|---|---|
| | OVERHEAD | | | | |
| | VERTICAL | | | | |
| | HORIZONTAL | | | | |

BEND TESTS

FACE-BEND

ROOT-BEND

SIDE-BEND

WE HEREBY CERTIFY THAT THE ABOVE MATERIAL HAS BEEN TESTED IN ACCORDANCE WITH THE ABOVE LISTED SPECIFICATION AND IS IN CONFORMANCE WITH ALL REQUIREMENTS.

SIGNED G. Winkle

INSPECTION AGENCY BABCOCK & WILCOX CO.

INSPECTOR _____

THE BABCOCK & WILCOX COMPANY
BOILER DIVISION
BARBERTON, OHIO

25

B45.1

D OF ELECTRODE QUALIFICATION TEST

| ZE | ELECTRODE SPECIFICATION | ELECTRODE IDENTIFICATION | CORE WIRE HEAT. NO. |
|---|---|---|---|
| 1/8 | A-316-64T | E8015-B | 898285 |

| NUMBER 818-024965 | TYPE OF CURRENT D.C | AMPERES 140-145 |
|---|---|---|

WET BATCH EQUIVALENCY CHEMICAL ANALYSIS TESTS

| E WELD TEST | BATCH | LAB. NO. | PAD | C. | MN. | P. | S. | SI. | CR. | NI. | MO. | V |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | E-65125 | 2442 | 05 | 71 | 012 | .018 | 31 | 02 | .97 | 54 | .01 |

TENSILE PROPERTIES

| ST D. | HEAT TREATMENT | ULT. TEN. STR. PSI | YIELD POINT PSI | E-LONG IN 2" % | RED OF AREA % |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |

FERRITE CONTENT

| BATCH | | BATCH | |
|---|---|---|---|
| | | | |
| | | | |
| | | | |

BEND TESTS

| IDED FACE-BEND |
|---|
| |
| |
| |

| IDED ROOT-BEND |
|---|
| |
| |
| |

| DED - DE-BEND |
|---|
| |
| |
| |

CHARPY _____ IMPACT TEST @ ____ °F _____ FT/LBS ENERGY LOAD.

| TEST NO. | FT/LBS. | TEST NO. | FT/LBS. |
|---|---|---|---|
| | | | |
| | | | |
| | | | |

FILLET WELD TEST.

| TEST NO. | POSITION | SIZE | LEG. | CONVEXITY. | |
|---|---|---|---|---|---|
| | OVERHEAD | | | | |
| | VERTICAL | | | | |
| | HORIZONTAL | | | | |

WE HEREBY CERTIFY THAT THE ABOVE MATERIAL HAS BEEN TESTED IN ACCORDANCE WITH THE ABOVE LISTED SPECIFICATION AND IS IN CONFORMANCE WITH ALL REQUIREMENTS.

SIGNED G. Hubble

INSPECTION AGENCY BABCOCK & WILCOX CO.

INSPECTOR _____

B46.1

THE BABCOCK & WILCOX COMPANY
BOILER DIVISION
BARBERTON, OHIO

OF ELECTRODE QUALIFICATION TEST

| SIZE | ELECTRODE SPECIFICATION | ELECTRODE IDENTIFICATION | CORE WIRE HEAT. |
|---|---|---|---|
| 5/32 | A-316-64T | E8015-B. | 81C629 |

| ORDER NUMBER | TYPE OF CURRENT | AMPERES |
|---|---|---|
| 818-025134 | D.C. | — |

WET BATCH EQUIVALENCY CHEMICAL ANALYSIS TESTS

| OVE WELD TEST | BATCH | LAB. NO. | PAD | C. | MN. | P. | S. | SI. | CR. | NI. | MO. | ✓ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | E-65767 | 2485 | 04 | 69 | 010 | 022 | 27 | 01 | 95 | 39 | 0 |

SEP 25 19[illegible]

TENSILE PROPERTIES

| E! | HEAT TREATMENT | ULT. TEN. STR. PSI | YIELD POINT PSI | E-LONG IN 2" % | RED OF AREA % |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |

FERRITE CONTENT

| BATCH | | BATCH | |
|---|---|---|---|
| | | | |
| | | | |
| | | | |

E ND TESTS

UIDED FACE-BEND

UIDED ROOT-BEND

DED SIDE-BEND

CHARPY _____ IMPACT TEST @ _____ °F _____ FT/LBS ENERGY LOAD.

| TEST NO. | FT/LBS. | TEST NO. | FT/LBS. |
|---|---|---|---|
| | | | |
| | | | |
| | | | |

FILLET WELD TEST.

| TEST NO. | POSITION | SIZE | LEG. | CONVEXITY. | |
|---|---|---|---|---|---|
| | OVERHEAD | | | | |
| | VERTICAL | | | | |
| | HORIZONTAL | | | | |

WE HEREBY CERTIFY THAT THE ABOVE MATERIAL HAS BEEN TESTED IN ACCORDANCE WITH THE ABOVE LISTED SPECIFICATION AND IS IN CONFORMANCE WITH ALL REQUIREMENTS.

SIGNED G. Hinkle

INSPECTION AGENCY BABCOCK & WILCOX CO.

INSPECTOR _____

THE BABCOCK & WILCOX COMPANY
BOILER DIVISION
BARBERTON, OHIO

41

B47.1

D OF ELECTRODE QUALIFICATION TEST

| IZE | ELECTRODE SPECIFICATION | ELECTRODE IDENTIFICATION | CORE WIRE HEAT. NO. |
|---|---|---|---|
| 5/32" | A316-64T | E8015 b. | 89B285 |

| NUMBER 818-025185 | TYPE OF CURRENT D.C | AMPERES 180-200 |
|---|---|---|

WET BATCH EQUIVALENCY CHEMICAL ANALYSIS TESTS

| YE WELD TEST | BATCH | LAB. NO. | PAD | C. | MN. | P. | S. | SI. | CR. | NI. | MO. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | E-66061 | 2501 | .04 | .66 | .010 | .020 | .23 | .03 | 1.04 | .48 | |

TENSILE PROPERTIES

| SI D. | HEAT TREATMENT | ULT. TEN. STR. PSI | YIELD POINT PSI | E-LONG IN 2" % | RED OF AREA % |
|---|---|---|---|---|---|
| | | | | | |

FERRITE CONTENT

| BATCH | | BATCH | |
|---|---|---|---|
| | | | |

ND TESTS

CHARPY _____ IMPACT TEST @ _____ °F _____ FT/LBS ENERGY LOAD.

| TED FACE-BEND |
|---|
| |

| TEST NO. | FT/LBS. | TEST NO. | FT-LBS. |
|---|---|---|---|
| | | | |

| ED ROOT-BEND |
|---|
| |

FILLET WELD TEST.

| ED SIDE-BEND |
|---|
| |

| TEST NO. | POSITION | SIZE | LEG. | CONVEXITY. | |
|---|---|---|---|---|---|
| | OVERHEAD | | | | |
| | VERTICAL | | | | |
| | HORIZONTAL | | | | |

WE HEREBY CERTIFY THAT THE ABOVE MATERIAL HAS BEEN TESTED IN ACCORDANCE WITH THE ABOVE LISTED SPECIFICATION AND IS IN CONFORMANCE WITH ALL REQUIREMENTS.

SIGNED B. Hinkle

INSPECTION AGENCY BABCOCK & WILCOX CO.

INSPECTOR _____

BABCOCK & WILCOX COMPANY
BOILER DIVISION
BARBERTON, OHIO

B48.1

D OF ELECTRODE QUALIFICATION TEST

| SIZE | ELECTRODE SPECIFICATION | ELECTRODE IDENTIFICATION | CORE WIRE HEAT. NO. |
|---|---|---|---|
| 5/32 | A316-64T | E8015-B | 35B13.5 |

| E NUMBER 8I8-025186 | TYPE OF CURRENT D.C | AMPERES 180-185 |
|---|---|---|

WET BATCH EQUIVALENCY CHEMICAL ANALYSIS TESTS WT & WX

| WELD TEST | BATCH | LAB. NO. | PAD | C. | MN. | P. | S. | SI. | CR. | NI. | MO. | V |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | E-66520 | 2500 | 04 | 66 | 010 | .018 | 25 | .04 | 1.04 | 37 | 01 |

TENSILE PROPERTIES

| ST D | HEAT TREATMENT | ULT. TEN. STR. PSI | YIELD POINT PSI | E-LONG IN 2" % | RED OF AREA % |
|---|---|---|---|---|---|
| | | | | | |

FERRITE CONTENT

| BATCH | | BATCH | |
|---|---|---|---|
| | | | |

BEND TESTS

| D FACE-BEND |
|---|
| |

| D ROOT-BEND |
|---|
| |

| D SIDE-BEND |
|---|
| |

CHARPY _____ IMPACT TEST @ _____ °F _____ FT/LBS ENERGY LOAD.

| TEST NO. | FT/LBS. | TEST NO. | FT/LBS. |
|---|---|---|---|
| | | | |

FILLET WELD TEST.

| TEST NO. | POSITION | SIZE | LEG. | CONVEXITY. | |
|---|---|---|---|---|---|
| | OVERHEAD | | | | |
| | VERTICAL | | | | |
| | HORIZONTAL | | | | |

WE HEREBY CERTIFY THAT THE ABOVE MATERIAL HAS BEEN TESTED IN ACCORDANCE WITH THE ABOVE LISTED SPECIFICATION AND IS IN CONFORMANCE WITH ALL REQUIREMENTS.

SIGNED G. Hinkle

INSPECTION AGENCY BABCOCK & WILCOX CO.

INSPECTOR _____

40

THE BABCOCK & WILCOX COMPANY
BOILER DIVISION
BARBERTON, OHIO

B49.1

D OF ELECTRODE QUALIFICATION TEST

| ZE | ELECTRODE SPECIFICATION | ELECTRODE IDENTIFICATION | CORE WIRE HEAT. |
|---|---|---|---|
| 1/8" | A 316-647 | 5308-B | 550496 |

| E NUMBER E19-025371 | TYPE OF CURRENT D.C. | AMPERES 140-160 |
|---|---|---|

WET BATCH EQUIVALENCY CHEMICAL ANALYSIS TESTS

| E WELD TEST | BATCH | LAB. NO. | PAD | C. | MN. | P. | S. | SI. | CR. | NI. | MO. | V |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 333347 | 2517 | 03 | 81 | 015 | 013 | 86 | 03 | 81 | 43 | .01 |

G. K. [illegible]
OCT 17 19[illegible]

TENSILE PROPERTIES

| HEAT TREATMENT | ULT. TEN. STR. PSI | YIELD POINT PSI | E-LONG IN 2" % | RED OF AREA % |
|---|---|---|---|---|
| | | | | |
| | | | | |

FERRITE CONTENT

| BATCH | | BATCH | |
|---|---|---|---|
| | | | |
| | | | |

NDT TESTS

| DE FACE-BEND |
|---|
| |
| |
| |
| |

CHARPY _____ IMPACT TEST @ _____ °F _____ FT/LBS ENERGY LOAD.

| TEST NO. | FT/LBS. | TEST NO. | FT/LBS. |
|---|---|---|---|
| | | | |
| | | | |
| | | | |

| E ROOT-BEND |
|---|
| |
| |
| |
| |

FILLET WELD TEST

| TEST NO. | POSITION | SIZE | LEG. | CONVEXITY. |
|---|---|---|---|---|
| | OVERHEAD | | | |
| | VERTICAL | | | |
| | HORIZONTAL | | | |

| E SIDE-BEND |
|---|
| |
| |
| |
| |

WE HEREBY CERTIFY THAT THE ABOVE MATERIAL HAS BEEN TESTED IN ACCORDANCE WITH THE ABOVE LISTED SPECIFICATION AND IS IN CONFORMANCE WITH ALL REQUIREMENTS.

SIGNED [signature]

INSPECTION AGENCY BABCOCK & WILCOX CO.

INSPECTOR _____

BOILER DIVISION
BARBERTON, OHIO

36

B50.1

F ELECTRODE QUALIFICATION TEST

| SIZE | ELECTRODE SPECIFICATION | ELECTRODE IDENTIFICATION | CORE WIRE HEAT. NO. |
|---|---|---|---|
| 1/4" | 2E4-156-1 | E8015-B | 83D529 |

| R NUMBER | TYPE OF CURRENT | AMPERES |
|---|---|---|
| 818-025391 | D.C. | 110-150 |

WET BATCH EQUIVALENCY CHEMICAL ANALYSIS TESTS D.C. REV

VE WELD T'ST

| BATCH | LAB. NO. | PAD | C. | MN. | P. | S. | SI. | CR. | NI. | MO. | V |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | E-67234 | 2571 | 04 | 73 | 010 | 014 | 34 | .01 | 90 | 48 | 01 |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

TENSILE PROPERTIES

| T. | HEAT TREATMENT | ULT. TEN. STR. PSI | YIELD POINT PSI | E-LONG IN 2" % | RED OF AREA % |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |

FERRITE CONTENT

| BATCH | | BATCH | |
|---|---|---|---|
| | | | |
| | | | |
| | | | |

END TESTS

| C | FACE-BEND |
|---|---|
| | |
| | |
| | |

| | IDED ROOT-BEND |
|---|---|
| | |
| | |

| E | SIDE-BEND |
|---|---|
| | |
| | |

CHARPY _____ IMPACT TEST @ _____ °F _____ FT/LBS ENERGY LOAD.

| TEST NO. | FT/LBS. | TEST NO. | FT/LBS. |
|---|---|---|---|
| | | | |
| | | | |
| | | | |

FILLET WELD TEST.

| TEST NO. | POSITION | SIZE | LEG. | CONVEXITY. | |
|---|---|---|---|---|---|
| | OVERHEAD | | | | |
| | VERTICAL | | | | |
| | HORIZONTAL | | | | |

WE HEREBY CERTIFY THAT THE ABOVE MATERIAL HAS BEEN TESTED IN ACCORDANCE WITH THE ABOVE LISTED SPECIFICATION AND IS IN CONFORMANCE WITH ALL REQUIREMENTS.

SIGNED G Hinkle

INSPECTION AGENCY BABCOCK & WILCOX CO.

INSPECTOR _____

BOILER DIVISION
BARBERTON, OHIO

B51.1

OF ELECTRODE QUALIFICATION TEST

| | ELECTRODE SPECIFICATION | ELECTRODE IDENTIFICATION | CORE WIRE HEAT. NO. |
|---|---|---|---|
| 2 | 2E4-156-1 | E8015-B2 | 78C1491 |

| NUMBER 818-22-5392 | TYPE OF CURRENT D.C. | AMPERES 160-225 |
|---|---|---|

WET BATCH EQUIVALENCY CHEMICAL ANALYSIS TESTS

| BATCH | LAB. NO. | PAD | C. | MN. | P. | S. | SI. | CR. | NI. | MO. | V |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | E66704 | 2539 | .07 | .82 | .012 | .013 | .35 | .02 | .72 | .5% | .01 |

TENSILE PROPERTIES

| HEAT TREATMENT | ULT. TEN. STR. PSI | YIELD POINT PSI | E-LONG IN 2" % | RED OF AREA % |
|---|---|---|---|---|
| | | | | |

FERRITE CONTENT

| BATCH | | BATCH | |
|---|---|---|---|
| | | | |

CHARPY _____ IMPACT TEST @ _____ °F _____ FT/LBS ENERGY LOAD.

| TEST NO. | FT/LBS. | TEST NO. | FT/LBS. |
|---|---|---|---|
| | | G. K. BRYAN | |
| | | NOV 17 1983 | |

FILLET WELD TEST.

| TEST NO. | POSITION | SIZE | LEG. | CONVEXITY. | |
|---|---|---|---|---|---|
| | OVERHEAD | | | | |
| | VERTICAL | | | | |
| | HORIZONTAL | | | | |

WE HEREBY CERTIFY THAT THE ABOVE MATERIAL HAS BEEN TESTED IN ACCORDANCE WITH THE ABOVE LISTED SPECIFICATION AND IS IN CONFORMANCE WITH ALL REQUIREMENTS.

SIGNED _____

INSPECTION AGENCY BABCOCK & WILCOX

INSPECTOR _____

B52.1

THE BABCOCK & WILCOX COMPANY
BOILER DIVISION
BARBERTON, OHIO

## ) OF ELECTRODE QUALIFICATION TEST

| S ZE | ELECTRODE SPECIFICATION | ELECTRODE IDENTIFICATION | LOT OF WIRE HEAT, NO. |
|---|---|---|---|
| 1/8 | 2E4-156-1 | E7015-D | F8N636 |

| CI NUMBER | TYPE OF CURRENT | AMPERES |
|---|---|---|
| 818-025561 | D.C. | 110-150 |

WET BATCH EQUIVALENCY CHEMICAL ANALYSIS TESTS JAN 9 1968

| D' WELD TEST | BATCH | LAB. NO. | PAD | C. | MN. | P | S. | SI. | CR. | NI. | MO. | V |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | E-67711 | 2622 | 05 | 76 | 009 | 014 | 33 | 02 | .81 | 46 | .01 |

### TENSILE PROPERTIES

| ST D | HEAT TREATMENT | ULT. TEN. STR. PSI | YIELD POINT PSI | E-LONG IN 2" % | RED OF AREA % |
|---|---|---|---|---|---|
| | | | | | |

### FERRITE CONTENT

| BATCH | | BATCH | |
|---|---|---|---|
| | | | |

### BEND TESTS

| I D FACE-BEND |
|---|
| |

| D ROOT-BEND |
|---|
| |

| D SIDE-BEND |
|---|
| |

CHARPY _____ IMPACT TEST @ _____ °F _____ FT/LBS ENERGY LOAD.

| TEST NO. | FT/LES. | TEST NO. | FT/LES. |
|---|---|---|---|
| | | | |

### FILLET WELD TEST

| TEST NO. | POSITION | SIZE | LEG. | CONVEXITY | |
|---|---|---|---|---|---|
| | OVERHEAD | | | | |
| | VERTICAL | | | | |
| | HORIZONTAL | | | | |

WE HEREBY CERTIFY THAT THE ABOVE MATERIAL HAS BEEN TESTED IN ACCORDANCE WITH THE ABOVE LISTED SPECIFICATION AND IS IN CONFORMANCE WITH ALL REQUIREMENTS.

SIGNED _____

INSPECTION AGENCY _____

INSPECTOR _____

E. BABCOCK & WILCOX COMPANY
BOILER DIVISION
BARBERTON, OHIO

B53.1

OF ELECTRODE QUALIFICATION TEST

| SIZE | ELECTRODE SPECIFICATION | ELECTRODE IDENTIFICATION | CORE WIRE HEAT |
|---|---|---|---|
| 5/32 | 3E4-156 | E8015-B | 81C629 |

| CR NUMBER | TYPE OF CURRENT | AMPERES |
|---|---|---|
| 218-02-5562 | D.C. | 180-225 |

WET BATCH EQUIVALENCY CHEMICAL ANALYSIS TESTS

| WELD TEST | BATCH | LAB. NO. | HEAT | C. | MN. | P. | S. | SI. | CR. | NI. | MO. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | P-66860 | 9857 | .09 | .58 | .008 | .018 | .33 | .01 | .25 | .45 |

TENSILE PROPERTIES

| HEAT TREATMENT | ULT. TEN. STR. PSI | YIELD POINT PSI | E-LONG IN 2" % | RED OF AREA % |
|---|---|---|---|---|
| | | | | |

DIFFUSIBLE CONTENT

| BATCH | | BATCH |
|---|---|---|
| | | |

IMPACTS — ENERGY — TEST @ °F — FT/LBS ENERGY LOAD.

| TEST NO. | FT/LBS. | TEST NO. | FT/LBS. |
|---|---|---|---|
| | | | |

B54.1

# ...D OF FILLER WIRE QUALIFICATION TEST

TEST NO. _____

| SIZE | ELECTRODE SPECIFICATION | ELECTRODE IDENTIFICATION | CORE WIRE HEAT NO. |
|---|---|---|---|
| 1/8" | 2E4-156-1 | E8015-D. | 83D360 |

| ...ER NUMBER | TYPE OF CURRENT | AMPERES |
|---|---|---|
| 818-025611 | D.C. | 110-150 |

WET BATCH EQUIVALENCY CHEMICAL ANALYSIS TESTS

| LAB. NO. | PAD | C. | MN. | P. | S. | SI. | CR. | NI. | MO. | V |
|---|---|---|---|---|---|---|---|---|---|---|
| F-67896 | 2642 | .05 | .74 | 010 | .017 | .34 | .03 | .87 | .51 | 01 |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| TEST REPORT | ANALYSIS | | | | | | | | | |

TENSILE PROPERTIES

| ...NO. | HEAT TREATMENT | ULT. TEN. STR. PSI | YIELD POINT PSI | E-LONG IN 2" % | RED OF AREA % |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

...PY _____ IMPACT TEST @ _____ °F _____ FT/LB. ENERGY LOAD

| ...TREATMENT | TEST NO. | FT/LB. | TEST NO. | FT. LB. |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

GUIDED BEND TESTS

| FACE | ROOT | SIDE |
|---|---|---|
| | | |
| | | |

| ...OR MACRO ...RE ANALYSIS. | |
|---|---|

...EBY CERTIFY THAT THE ABOVE MATERIAL HAS BEEN ...ED IN ACCORDANCE WITH THE ABOVE LISTED SPECIFICA-...ON AND IS IN CONFORMANCE WITH ALL REQUIREMENTS.

FILLET WELD TEST

| | |
|---|---|
| | OVERHEAD |
| SIZE | |
| LEG. | |
| CONVEXITY | |
| | VERTICAL |
| SIZE | |
| LEG. | |
| CONVEXITY | |
| | HORIZONTAL |
| SIZE | |
| LEG. | |
| CONVEXITY | |

MATERIAL APPROVAL

| | |
|---|---|
| NAVSHIPS | |
| ASME | |
| NAVY NUCLEAR STD. | |
| STEAM GENERATORS | |
| COMMERCIAL NUCLEAR STD. | |
| OSCILLATED COVER BEAD | |

GROOVE WELD TEST

RADIOGRAPHIC EXAMINATION

DATE JAN 23 1959

SIGNED G. Winkle

INSPECTION AGENCY BABCOCK & WILCOX CO.

INSPECTOR _____

THE BABCOCK & WILCOX COMPANY
POWER GENERATION DIVISION
BARBERTON, OHIO

B55.1

# ...D OF FILLER WIRE QUALIFICATION TEST

TEST NO.

| SIZE | ELECTRODE SPECIFICATION | ELECTRODE CLASSIFICATION | CORE WIRE HEAT NO. |
|---|---|---|---|
| 5/32" | 2.E4-156-1 | E8015-B2 | 818667 |

| FLUX NUMBER | TYPE OF CURRENT | AMPERES |
|---|---|---|
| 818-025612 | D.C. | 150-190 |

WET BATCH EQUIVALENCY CHEMICAL ANALYSIS TESTS

| CH | LAB. NO. | PAD | C. | MN. | P. | S. | SI. | CR. | NI. | MO. | V. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | E-68335 | 2666 | 07 | .69 | 011 | 019 | .22 | 02 | .84 | .52 | .01 |

G.V. DATE
ACCEPTABLE

TEST REPORT | ANALYSIS

TENSILE PROPERTIES

| TEST NO. | HEAT TREATMENT | ULT. TEN. STR. PSI | YIELD POINT PSI | E-LONG IN 2" % | RED OF AREA % |
|---|---|---|---|---|---|
| | | | | | |

FILLET WELD TEST

| | OVERHEAD |
|---|---|
| SIZE | |
| LEG | |
| CONVEXITY | |
| | VERTICAL |
| SIZE | |
| LEG. | |
| CONVEXITY | |
| | HORIZONTAL |
| SIZE | |
| LEG. | |
| CONVEXITY | |

...T TEST NO. ... FT/LB. ENERGY LEVEL

| ... | ... | ...T/LB. | TEST NO. | FT. LB. |
|---|---|---|---|---|
| | | | | |

MATERIAL APPROVAL

NAVSHIPS
ASME
NAVY NUCLEAR STD.
...DAM MODIFICATIONS
...ONAL NUCLEAR POWER STD.
...CIFICATION NO.

THE BABCOCK & WILCOX COMPANY
POWER GENERATION DIVISION
BARBERTON, OHIO

# D OF FILLER WIRE QUALIFICATION TEST

TEST NO. EL-18

| | | | |
|---|---|---|---|
| | A-142-1 | B&W Co. E8015G | CORE WIRE HEAT NO. 818-025612 |
| 32 | Groove Weld | | |
| | TYPE OF CURRENT | | AMPERES 140 |

WET BATCH EQUIVALENCY CHEMICAL ANALYSIS TESTS

| LAB. NO. | PAD | C. | MN. | P. | S. | SI. | CR. | NI. | MO. | V |
|---|---|---|---|---|---|---|---|---|---|---|
| 10015 | EL-18 | .041 | .90 | .014 | .016 | .33 | NIL. | .94 | .24 | .008 |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| TEST REPORT | ANALYSIS | | | | | | | | | |

TENSILE PROPERTIES

| HEAT TREATMENT | ULT. TEN. STR. PSI | YIELD POINT PSI | E-LONG IN 2" % | RED OF AREA % |
|---|---|---|---|---|
| 48 hrs. at 1100° - 1150°F. | 82,500 | 72,000 | 28.1 | 73.5 |
| As Welded | 87,750 | 73,500 | 28.1 | 74.9 |

CHARPY IMPACT TEST @ 0 °F. 240 FT/LB. ENERGY LOAD

| HEAT TREATMENT | TEST NO. | FT/LB. | TEST NO. | FT. LB. |
|---|---|---|---|---|
| hrs. at 1100° - 1150°F. | EL-18 | 123 | | |
| | | 117 | | |
| | | 116 | | |

GUIDED BEND TESTS

| SIDE | | SIDE | |
|---|---|---|---|
| N/R | | N/R | |
| N/R | | | |

| MATERIAL APPROVAL | APPROVED | REJECTED |
|---|---|---|
| SPECIFICATIONS 1250/1500-1 | X | |
| ASME - CODE NUCLEAR | N/A | |
| STEAM GENERATORS | N/A | |



NOV 16 1971

B & W Co.

B55.3
31

THE [illegible] COMPANY
POWER GENERATION DIVISION
[illegible]

D OF FILLER WIRE QUALIFICATION TEST — TEST NO. EL45

| | | | |
|---|---|---|---|
| | | | COIL OR HEAT NO. |
| 32" | ZEE-240 B.M.A. | [illegible] | 818-025612 818867 |

| | | | |
|---|---|---|---|
| IS: | TRAVEL SPEED (IPM) | TYPE OF CURRENT | AMPERES 170 |

WET BATCH EQUIVALENCY CHEMICAL ANALYSIS TESTS

| TEST NO. | PAD | C. | MN. | P. | S. | SI. | CR. | NI. | MO. | V. |
|---|---|---|---|---|---|---|---|---|---|---|
| EL45 | | .039 | .85 | .016 | .014 | .31 | .043 | .89 | .36 | .026 |

DROP WEIGHTS

| HEAT TREATMENT | TEST NO. | TEMP. (°F.) | RESULTS |
|---|---|---|---|
| 00 1150°F FOR 48 HRS. | EL 45 | -50 | NF |
| FURNACE COOLED TO 600°F | | -70 | BF, NF |
| 100°F/HR. | ½T | -80 | F |

TENSILE PROPERTIES

| HEAT TREATMENT | ULT. TEN. STR. PSI | YIELD POINT PSI (.2%) | ELONG IN 2" % | RED OF AREA % |
|---|---|---|---|---|
| (ABOVE) | 80,750 | 70,000 | 29.0 | 75.0 |

[illegible] 240 FT/LB. ENERGY ABSD

| HEAT TREATMENT | TEST NO. | FT/LB. | LAT. EXP. | % SHEAR |
|---|---|---|---|---|
| (ABOVE) | EL45 S | 108 | .082 | 85 |
| | SURFACE | 108 | .083 | 85 |
| | 1100°F | 106 | .080 | 85 |
| | EL45 AT | 131 | .079 | 70 |
| | ½T | 134 | .079 | 70 |
| | 600°F | 130 | .075 | 70 |

| MATERIAL APPROVAL | |
|---|---|
| WASHIES - ZEE/ [illegible] | X |
| [illegible] | X |
| [illegible] | |

THE BABCOCK & WILCOX COMPANY
POWER GENERATION GROUP
MT. VERNON, INDIANA

LOT OF FILLER M[illegible] QUALIFICATION TEST — TEST NO. EL 100-1

| VOLTS | TRAVEL SPEED | AMPERES | HEAT NO. |
|---|---|---|---|
| 5/32" | 12-2 M.M.A. | [illegible] 3&W 8015 | 819967 |

| FLUX LOT NO. | SPEC. NO. |
|---|---|
| | 818-025612 (B2) |

CHEMICAL ANALYSIS

| LAB NO. | LAD | C. | CR. | NI. | MN. | SI. | P. | S. | MO. | CU. | V. | CO | AL. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 165 | | .034 | N11 | .89 | .90 | .56 | .011 | | .41 | .026 | .026 | | | |

DROP WEIGHTS

| HEAT TREATMENT | TEST NO. | TEMP. (°F.) | BREAKS | FREE |
|---|---|---|---|---|
| 1100-1150°F FOR 50 HRS. FURNACE COOLED TO 600°F AT 10°F/HR. | EL 100-1 CENTER | +20 | NB, NB | |

TENSILE PROPERTIES

| TEST NO. | HEAT TREATMENT | ULTIMATE STR. PSI | YIELD PT. PSI | % ELONG. | % RED. OF AREA |
|---|---|---|---|---|---|
| EL 100-1 CENTER | [illegible] | 85,500 | 75,000 | 28.0 | 69.7 |

CHARPY V-NOTCH IMPACT TEST 240FT./LB. ENERGY LOAD

| TEST NO. | FT./LBS. | LAT. EXP. | % SHEAR | TEST NO. | FT./LBS. | LAT. EXP. | % SHEAR |
|---|---|---|---|---|---|---|---|
| EL100-1 | 72 | .057 | 70 | EL100-2 | 98 | .065 | 85 |
| CENTER | 105 | .079 | 85 | CENTER | 101 | .070 | 90 |
| +10 | 98 | .070 | 85 | +10 | 104 | .076 | 90 |
| EL100-3 | 78 | .085 | 100 | | | | |
| CENTER | 113 | .080 | 90 | | | | |
| +70 | 123 | .039 | 50 | | | | |

[illegible] APPROVAL

REMARKS: [illegible] EL 100-1 — X

ASME - [illegible]

THE [illegible] COMPANY
POWER GENERATION GROUP
MT. VERNON, INDIANA

# D OF FILLER WIRE QUALIFICATION TEST

TEST NO. FL101

| DIAMETER | FILLER WIRE SPECIFICATION | CORE WIRE HEAT NO. |
|---|---|---|
| 12-2-MOT-19<br>M.M.A. | NSV 0015 | 818-025612 B3<br>81D667 |
| .12" | | |

| TRAVEL SPEED (IPM) | TYPE OF EQUIPMENT | AMPERES | PURCHASE ORDER NO. |
|---|---|---|---|
| | | 180 | |

## CHEMICAL ANALYSIS

| NO. | PAD | C. | CR. | NI. | MN. | SI. | P. | S. | MO. | CU. | V. | CO. | AL. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | .045 | Ni1 | .98 | .65 | .30 | .012 | .016 | .35 | .020 | .027 | | | |
| | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |

## DROP WEIGHTS

| HEAT TREATMENT | TEST NO. | TEMP. (°F.) | RESULTS | TNDT |
|---|---|---|---|---|
| 1150°F FOR 50 HRS. | FL101 (½T) | -80 | NF,NF | |
| FURNACE COOLED TO 600°F AT | | -90 | F | -90°F |
| 10°F/HR. | | | | |
| | | | | |
| | | | | |

## TENSILE PROPERTIES

| NO. | HEAT TREATMENT | ULTIMATE STR. PSI | YIELD PT. PSI | %ELONG. | % RED. OF AREA |
|---|---|---|---|---|---|
| | (ABOVE) | 80,000 | 69,750 | 28.0 | 73.0 |

## CHARPY V-NOTCH IMPACT TEST 240 FT./LB. ENERGY LOAD

| HEAT TREATMENT | TEST NO. | FT./LBS. | LAT. EXP. | % SHEAR | TEST NO. | FT./LBS. | LAT. EXP. | % SHEAR |
|---|---|---|---|---|---|---|---|---|
| (ABOVE) | FL101 | 86 | .062 | 60 | FL101 | 139 | .091 | 100 |
| | ½T | 83 | .056 | 60 | ½T | 146 | .086 | 100 |
| | 150°F | 100 | .066 | 75 | +200°F | 143 | .086 | 100 |
| | | | | | | | | |
| | FL101 | 123 | .080 | 90 | RT | | | |
| | SURFACE | 122 | .085 | 90 | NDT IS -90°F | | | |
| | 600°F | 121 | .081 | 90 | | | | |

| MATERIAL APPROVAL | ACCEPTED | REJECTED |
|---|---|---|
| B&W SHIPS - 10/1500.1 | | |
| ASME - CHAPTER IX/QW-430 | X | |
| SECTION IX/QW-405 | | |

POWER GENERATION DIVISION
BARBERTON, OHIO

B56.1

# ...D OF FILLER WIRE QUALIFICATION TEST

TEST NO. ...

| SIZE | ... SPECIFICATION | ... ELECTRODE CLASSIFICATION | CODE OR HEAT NO. |
|---|---|---|---|
| 1/8" | 3E4-156-1 | E8015-G. | 81D491 |

| ORDER NUMBER | TYPE OF ... CURRENT | AMPERES |
|---|---|---|
| 818-025655 | D.C | 110-150 |

WET BATCH EQUIVALENCY CHEMICAL ANALYSIS TESTS

| BATCH | LAB. NO. | PAD | C. | MN. | P. | S. | SI. | CR. | NI. | MO. | V. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | E-66938 | 2693 | .07 | .76 | .019 | .018 | .30 | .02 | .26 | .43 | .01 |
| | TEST REPORT | ANALYSIS | | | | | | | | | |

TENSILE PROPERTIES

| TEST NO. | HEAT TREATMENT | ULT. TEN. STR. PSI | YIELD POINT PSI | ELONG IN 2" % | RED OF AREA % |
|---|---|---|---|---|---|
| | | | | | |

... TEST NO. ... OF ... LBS. ... LOAD

| ... | HEAT TREATMENT | TEST NO. | C1/C0. | ... NO. | ... |
|---|---|---|---|---|---|
| | | | | | |

... TEST RESULTS

| ... | SIDE |
|---|---|
| | |

FILLET WELD TEST

| | OVERHEAD |
|---|---|
| SIZE | |
| LEG. | |
| CONVEXITY | |
| | VERTICAL |
| SIZE | |
| LEG. | |
| CONVEXITY | |
| | HORIZONTAL |
| SIZE | |
| LEG. | |
| CONVEXITY | |

MATERIAL ...

...ED
...E G. R. ...
...AY SPECIMEN SIZE
...IFICATIONS
...OSITE MATERIAL AND/OR A...
...ERIAL AND/OR ALLOYED

BOARD OF FILLER WIRE QUALIFICATION TEST

TEST NO. P31266

S32211

S18-025962

ALL WELD METAL CHEMICAL ANALYSIS (%)

| TEST REPORT | LAB. NO. | ANALYSIS | C | Mn | P | S | Si | Cr | Ni | Mo | Cb |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | E-68066 | 2656 | .04 | .66 | .012 | .016 | .43 | .03 | .01 | .53 | .01 |
| | | | .04 | .71 | .012 | .015 | .49 | .03 | .01 | .53 | .01 |
| | | | .03 | .69 | .013 | .016 | .46 | .03 | .01 | .51 | .01 |
| | | | .04 | .64 | .012 | .015 | .47 | .03 | .01 | .51 | .01 |
| | | | .03 | .58 | .012 | .016 | .44 | .03 | .01 | .52 | .01 |
| | | | .03 | .64 | .012 | .016 | .38 | .03 | .01 | .49 | .01 |
| | | | .03 | .66 | .012 | .016 | .40 | .03 | .01 | .52 | .01 |
| | | | .04 | .69 | .012 | .016 | .40 | .03 | .01 | .52 | .01 |
| | | | .04 | .67 | .012 | .016 | .43 | .03 | .01 | .52 | .01 |
| | | | .04 | .66 | .013 | .015 | .43 | .03 | .01 | .53 | .01 |

TENSILE PROPERTIES

| TEST NO. | HEAT TREATMENT | ULT. TEN. STR. PSI | YIELD POINT PSI | E-LONG IN 2" % | RED OF AREA % |
|---|---|---|---|---|---|
| W | as welded | 83,000 | 68000 | 25.0 | 69.2 |
| S | 48 hrs. at 1100-1150°F | 78000 | 62000 | 32.0 | 75.2 |

| HEAT TREATMENT | TEST NO. | FT/LB. | FT. LB. |
|---|---|---|---|
| 48 hrs. at 1100-1150°F | 22-68 | 125 | 110 | 126 |

BALTIMORE, DUNDALK, MARYLAND

# QUALITY ASSURANCE TEST REPORT

DATE: 5/14/68

D TO: Industrial Welding Equip.
4501 Prospect Avenue
Cleveland 3, Ohio

SHIPPED TO: Babcock & Wilcox Co
Highway #69 West
Mt. Vernon, Indiana

DATE SHIPPED: 5/14/68

p.- 3819

P.O. NO.- 63959-B

IFICATION: MIL-E-22200/1D/ MIL Type 8018C3

| EM | POUNDS | SIZE | TYPE | LOT NO. | HEAT NO. |
|---|---|---|---|---|---|
| | 4,750# | 1/4" | 8018-C3 | 81042A | 401W9661 |
| | 4,400# | 1/4" | 8018-C3 | 81042B | 401W9661 |
| | 5,850# | 1/4" | 8018-C3 | 81042C | 401W9661 |
| | 2,500# | 1/4" | 8018-C3 | 81042D | 401W9661 |
| | 7,500# | 1/4" | 8018-C3 | 81042E | 401W9661 |
| | 5,200# | 1/4" | 8018-C3 | 81042F | 401W9661 |

## CHEMICAL ANALYSIS OF WIRE OR WELD METAL

| EM | C | MN | P | S | SI | CR | NI | MO | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |

## ADDITIONAL TEST RESULTS

| EM | YIELD | TENSILE | ELONGATION | RED. OF AREA |
|---|---|---|---|---|
| | 70,500 psi | 82,500 psi | 30% | 71% |
| 2. | 70,000 psi | 82,000 psi | 31% | 74% |
| | 70,000 psi | 82,500 psi | 30% | 74% |
| | 72,000 psi | 86,500 psi | 30% | 70% |
| 5. | 72,000 psi | 85,000 psi | 30% | 74% |
| 6. | 70,000 psi | 81,000 psi | 30% | 67% |

t of Maryland

y of Baltimore

ribed and sworn to before me this 14th day

May 1968

ory Public

commission expires July 1, 1969

I certify the chemical analysis and physical or mechanical test results reported above meet the specifications on the described material and are correct as contained in the records of the company.

Harold E. Hancock

BALTIMORE, DUNDALK, MARYLAND DATE: 11/4/68

# QUALITY ASSURANCE TEST REPORT

TO: Industrial Welding Equip.
4501 Prospect Avenue
Cleveland, Ohio

SHIPPED TO: Babcock & Wilcox Co
Boiler Division
Second Street
Barberton, Ohio 44203

DATE SHIPPED:

O.- 3931

P.O NO:- 3220050-3 (Mollo 503-7727)

FICATION: MIL-E-22200/1

| POUNDS | SIZE | TYPE | LOT NO. | HEAT NO. |
|---|---|---|---|---|
| 1,700# | 1/4" x 18" | 308BCB | 81521B | 401.9561 |
| 300# | 1/4" x 18" | 308BCB | 81521B | 401.9561 |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

## CHEMICAL ANALYSIS OF WIRE OR WELD METAL

| C | MN | P | S | SI | CR | NI | MO | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |



## ADDITIONAL TEST RESULTS

| ITEM | YIELD | TENSILE | ELONGATION | RED. OF AREA |
|---|---|---|---|---|
| 1. | 74,000 psi | 87,500 psi | 28% | 65% |
| 2. | 72,000 psi | 84,000 psi | 30% | 72% |

G. K. BRYAN

Heat prev OK'd
re P.O 64087

NOV 19 1968

e of Maryland

of Baltimore

n bed and sworn to before me this 4th day

October 19 68

ary Public

e expires July 1, 1969

I certify the chemical analysis and physical or mechanical test results reported above meet the specifications on the described material and are correct as contained in the records of the company.

THE BABCOCK & WILCOX COMPANY
BOILER DIVISION
BARBERTON, OHIO

Qualified

D OF ELECTRODE QUALIFICATION TEST

| SIZE | ELECTRODE SPECIFICATION | ELECTRODE IDENTIFICATION | CORE WIRE HEAT. NO. |
|---|---|---|---|
| t DIA | MIL-E22200/1 + navships 250-1500-1 - 2EW-142-2 | Raco 8018 | 401W9661 |

| ER NUMBER | TYPE OF CURRENT | AMPERES |
|---|---|---|
| Purchased electrodes | | Pa-1 ++ 2360 |

WET BATCH EQUIVALENCY CHEMICAL ANALYSIS TESTS

OVE WELD EST

| BATCH | LAB. NO. | PAD | C. | MN. | P. | S. | SI. | CR. | NI. | MO. | V |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | E63803 | 2360 | .06 | .95 | .016 | .010 | .37 | .03 | .97 | .14 | .01 |

Impacts were tested after 50 hours at 1110-1150°F

TENSILE PROPERTIES

| S O | HEAT TREATMENT | ULT. TEN. STR. PSI | YIELD POINT PSI | E-LONG IN 2" % | RED OF AREA % |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |

FERRITE CONTENT

| BATCH | | BATCH | |
|---|---|---|---|
| | | | |
| | | | |
| | | | |

BEND TESTS

LED FACE-BEND

IDED ROOT-BEND

E SIDE-BEND

CHARPY V-Notch IMPACT TEST @ +10 °F 240 FT/LBS ENERGY LOAD.

| TEST NO. | FT/LBS. | TEST NO. | FT/LBS. |
|---|---|---|---|
| 1 | 144 | | |
| 2 | 153 | | |
| 3 | 200 | | |

FILLET WELD TEST.

| TEST NO. | POSITION | SIZE | LEG. | CONVEXITY. | |
|---|---|---|---|---|---|
| | OVERHEAD | | | | |
| | VERTICAL | | | | |
| | HORIZONTAL | | | | |

WE HEREBY CERTIFY THAT THE ABOVE MATERIAL HAS BEEN TESTED IN ACCORDANCE WITH THE ABOVE LISTED SPECIFICATION AND IS IN CONFORMANCE WITH ALL REQUIREMENTS.

1857 Hubert Howe

SIGNED P E Campbell AA/Zinn

INSPECTION DATE May 14 1965

INSPECTOR Ted V Cook DCASD

B59.1

SCN 80 [illegible]

[illegible] REELS

ROLLS

BUNDLES 612514

DRUMS 1

CARTONS

PALLETS 24

COILS

CARTONS

DRUMS 71

[illegible] 11/7/67

[illegible] Q [illegible] -A

LUCAS MFG COMPANY INC.
[illegible] PENNSYLVANIA AVENUE
[illegible] PITTSBURGH PENNSYLVANIA
33

H.A. COCK & WILCOX CO
HIGHWAY 66 WEST
MT VERNON INDIANA 47620
MARK 61[illegible]-D FOLIO 0506223

[illegible] OF THE 10 DAY NET DISCOUNT AMOUNT OF INVOICE UNLESS OTHERWISE INDICATED

PREPAID

LENNIS FRT LINE

[illegible] GROSS WEIGHT 56499 | NET WEIGHT 53220 | NUMBER OF PACKAGES 25 | DATE SHIPPED 11/21/67

| ITEM NO. | QUANTITY ORDERED | QUANTITY SHIPPED | DESCRIPTION | CONTAINER NOS | GROSS WEIGHT | NET WEIGHT |
|---|---|---|---|---|---|---|
| 01 [illegible] | [illegible] | 24 Pallets 11 Pops | LBS 1/8 INCH SPECIAL ANALYSIS NICKEL MANG.MOLY C.C. WELDING WIRE PACK-23 INCH I.D. 700# PAK ON 48 INCH X 40 INCH PALLETS. ABOVE TO BE PRODUCED FROM HEAT LAYING TUBE & DELIVERING [illegible] ANALYSIS- [illegible] .10 [illegible] .12 [illegible] 1.75-2.25 [illegible] [illegible] [illegible] [illegible] | | 55725 | 53110 |
| | | 1 Pop | | | 774 | 150 |

THE BABCOCK & WILCOX COMPANY, BARBERTON, OHIO

# RECORD OF ELECTRODE QUALIFICATION TEST

## 254-130

| MODE | NAME | SIZE | POSITION |
|---|---|---|---|
| [illegible] Filler Wire | Page Mn-Mo-Ni Ht-No. 72415 | 1/8" dia. | [illegible] |

| DATE WELDED | CURRENT | AMPERES |
|---|---|---|
| 2-3-68 | A.C. Travel speed 10"/min. | [illegible] |

50 Lbs Flux
[illegible]

### TENSILE PROPERTIES

| TEST NO. | STRESS RELIEVE | DIA. | AREA SQ. IN. | ULT. TEN. STR. PSI | YIELD POINT PSI | % ELONG IN 2" | % OF AREA |
|---|---|---|---|---|---|---|---|
| [illegible]-1283 | 1100-1150°F | .505 | | 92,500 | 67,000 | 25.0 | |
| [illegible]-1283 | 6-6 hr/cycle | .505 | | 85,500 | 64,500 | 24.0 | |

### GUIDED FACE BEND TEST

| TEST NO. | APPEARANCE & REMARKS |
|---|---|
| | NOT REQUIRED |

### GUIDED ROOT BEND TEST

| TEST NO. | APPEARANCE & REMARKS |
|---|---|
| | NOT REQUIRED |

### CHARPY V-NOTCH IMPACT TEST @ +10 °F. 240 FT. LBS. ENERGY LOAD

| TEST NO. | FT. LBS. | TEST NO. | FT. LBS. |
|---|---|---|---|
| [illegible]-1253 | 30, 26, 42 | | |

### GUIDED SIDE BEND TEST

| TEST NO. | APPEARANCE & REMARKS |
|---|---|
| | NOT REQUIRED |

### CHEMISTRY TEST

| TEST NO. | C. | Mn | P | S | Si | Cr | Ni | Mo | Cu |
|---|---|---|---|---|---|---|---|---|---|
| [illegible]-1253 | .08 | 1.60 | .019 | .013 | [illegible] | [illegible] | .57 | 1.0 | [illegible] |

### FILLET WELD TEST

| TEST NO. | POSITION | SIZE | LEG | CONVEXITY |
|---|---|---|---|---|
| | OVERHEAD | | | |
| | VERTICAL | | | |
| | HORIZONTAL | | | |

THE UNDERSIGNED MANUFACTURER CERTIFIES THAT THE STATEMENTS MADE IN THIS REPORT ARE CORRECT AND THAT THE TEST WELDS WERE MADE AND TESTED IN ACCORDANCE WITH THE REQUIREMENTS OF THE TENTATIVE SPECIFICATIONS FOR [illegible] ELECTRODES SERIAL DESIGNATION A_____ ISSUED IN_____ BY THE AWS AND ASTM.

2-16-68

CLASSIFICATION OF WIRE & FLUX COMBINATION

SIGNED [illegible]

BY [illegible]

INSPECTOR_____

LABORATORY WORK REQUEST & REPORT

B59.3

THE BABCOCK & WILCOX CO.

PRODUCTION DEPARTMENT

TO Barberton WORKS ATTENTION J. Volak DATE 1-17-68

PLEASE PERFORM THE FOLLOWING WORK OR LAB TEST:

NON DESTRUCTIVE TESTS
- ☐ LIQUID PENETRANT
- ☐ UT ASME ☐ UT NAVSHIPS
- ☐ MAGNETIC PARTICLE
- ☐ RADIOGRAPHY

DESTRUCTIVE TESTS
- ☐ BENDS ☐ FACE ☐ ROOT ☐ SIDE
- ☐ TENSION ☐ IMPACTS
- ☐ MACRO ☐ MICRO
- ☐ CHEMICAL
- FISSURE ANALYSIS ☐ FERRITE
- PREHEAT ____ OF
- INTERPASS ____ OF
- STRESS RELIEF ____ OF
- ____ HOURS FURNACE
- COOL TO ____ OF
- OTHER

DESCRIPTION OF TEST

WELDING PROCESS:
- ☐ MANUAL METAL ARC
- ☒ SUBMERGED ARC
- ☐ SIGMA
- ☐ TIG
- ☐ TIG COLD WIRE FEED
- ☐ OTHER

OTHER INSTRUCTIONS:

TYPE OF CURRENT ☐ A.C. ☐ D.C. ☐ STRAIGHT ☐ REVERSE

| | |
|---|---|
| TEST NO. | SA-1263 |
| DESCRIPTION OF TEST MATERIAL | |
| SOURCE | Page |
| SPEC. | M 1[illegible] |
| SIZE | 1/8 x [illegible] |
| HEAT NO. | 72415 |
| FOLIO NO. | 501-223 |
| QUANTITY | 84750 lbs |
| FLUX TYPE | Linde RC 43 x A |
| FLUX LOT. | 850-1 |
| FOLIO NO. | 489-063 |
| QUANTITY | 12,200 lbs |
| OTHER DESC. | [illegible] |
| TEST IN ACCORDANCE WITH QUALITY CONTROL SPECIFICATION | 2EA. |

DATE TEST RESULTS ARE REQUIRED 2-2-68 REQUESTED BY [illegible]

L. NO.

TEST REPORT

CHEMICAL ANALYSIS

| EL | M. | ASM | | | |
|---|---|---|---|---|---|
| C | | .08 | | | |
| | | .650 | | | |
| I | | .019 | | | |
| S | | .013 | | | |
| | | .46 | | | |
| CR | | .06 | | | |
| N | | .47 | | | |
| MO | | .40 | | | |
| C | | .24 | | | |
| CB | | | | | |
| C | | | | | |
| TA | | | | | |
| A | | | | | |

| | | | |
|---|---|---|---|
| YIELD POINT | 66,000<br>69,500 | BEND TESTS | |
| ELONGATION % IN 2" | 28.2 – 29.5 | TRANSVERSE | NR |
| ULTIMATE STRENGTH | 81,500<br>83,500 | LONGITUDINAL | NR |
| REDUCTION OF AREA % | 65.2 – 65.7 | | |
| CHARPY V-NOTCH IMPACTS @ +10° F | 39 | | |
| | 46 | | |
| 240 FT. LB. ENERGY LOAD | 42 | | |

DESCRIPTION OF TEST MATERIAL | APPROVED | X | REJECT |

MAT'L. (CERTIFIED) TO SPECIFICATION NO.

| NAVSHIP 250-1500-1 | ASME SECTION 3 | ASME SECTION 1 & 8 | OTHER |
|---|---|---|---|
| ☒ | ☐ | ☐ | |

HAS BEEN APPROVED FOR ☒ A.C. ☐ D.C. ☐ STRAIGHT ☐ REVERSE

LAB. REPRESENTATIVE [illegible] DATE 2-16-68

B59.4

2

THE BABCOCK & WILCOX COMPANY, BARBERTON, OHIO

# RECORD OF ELECTRODE QUALIFICATION TEST

## SFA-5.20

| ELECTRODE | NAME | SIZE | WELDER |
|---|---|---|---|
| Arc Filler Wire | Page Mn-Mo-Ni, Ht-No. 72845 | 1/8" dia. | R. Wharton |

| WELDED | CURRENT | AMPERES |
|---|---|---|
| 6-30-68 | A.C. Travel speed 10"/min. | 625 amps, 32 volts |

Arc 50 Acid flux
F8578

TENSILE PROPERTIES

| TEST NO. | STRESS RELIEVE | DIA. | AREA SQ. IN. | ULT. TEN. STR. PSI | YIELD POINT PSI | % ELONG IN 2" % | % OF AREA % |
|---|---|---|---|---|---|---|---|
| 471 | 100-1150F 48 hrs. | | | 88,000 | | | |

GUIDED FACE BEND TEST

| TEST NO. | APPEARANCE & REMARKS |
|---|---|
| | Not Required |

GUIDED ROOT BEND TEST

| TEST NO. | APPEARANCE & REMARKS |
|---|---|
| | Not Required |

CHARPY V-notch IMPACT TEST @ +10 °F 25.0 FT. LBS. ENERGY LOAD

| TEST NO. | FT. LBS. | TEST NO. | FT. LBS. |
|---|---|---|---|
| 471 | 39.0, 25.0, 35.0 | | |

GUIDED SIDE BEND TEST

| TEST NO. | APPEARANCE & REMARKS |
|---|---|
| | Not Required |

CHEMISTRY TEST

| TEST NO. | C | Mn | P | S | Si | Cr | Ni | Mo | Cu | OTHER |
|---|---|---|---|---|---|---|---|---|---|---|
| 471 | .09 | 1.46 | .012 | .014 | .50 | .09 | .54 | .37 | .15 | |

FILLET WELD TEST

| TEST NO. | POSITION | SIZE | LEG | CONVEXITY |
|---|---|---|---|---|
| | HO | Not Required | | |
| | VERT | | | |
| | OVHD | | | |

WE CERTIFY THAT THE STATEMENTS IN THIS REPORT ARE CORRECT AND THAT THE TEST WELDS WERE PREPARED, WELDED AND TESTED IN ACCORDANCE WITH THE REQUIREMENTS OF THE SPECIFICATIONS AND CLASSIFICATIONS AND THE ASME BOILER AND PRESSURE VESSEL CODE, SECTIONS IX AND ASTM.

THE BABCOCK & WILCOX COMPANY

By [illegible]

B59.5

WORKS ATTENTION A. VIDOSH DATE 10-

PLEASE PERFORM THE FOLLOWING WORK OR LAB TESTS

NON DESTRUCTIVE TESTS
- ☐ LIQUID PENETRANT
- ☐ UT ASME UT NAVSHIPS
- ☐ MAGNETIC PARTICLE
- ☐ RADIOGRAPHY

DESTRUCTIVE TESTS
- ☐ BENDS ☐ FACE ☐ ROOT ☐ SIDE
- ☐ TENSION ☐ IMPACTS
- ☐ MACRO ☐ MICRO
- ☐ CHEMICAL
- ☐ TISSUE ANALYSIS ☐ FERRITE

REHEAT ____ OF
INTERPASS ____ OF
STRESS RELIEF [illegible] OF
[illegible] HOURS FURNACE
COOL TO [illegible] OF
OTHER

DESCRIPTION OF TEST
WELDING PROCESS:
- ☐ MANUAL METALARC
- ☒ SUBMERGED ARC
- ☐ SIGMA
- ☐ TIG
- ☐ TIG COLD WIRE FEED
- ☐ OTHER

OTHER INSTRUCTIONS:
STEAM GENERATOR
WELDING REQUIRED ALSO,
MULTI-OSCILLATED
CIRCUMFERENTIAL

TYPE OF CURRENT ☒ A.C. ☐ D.C.
☐ STRAIGHT ☐ REVERSE

10-11-68 RUSH

TEST RESULTS ARE REQUIRED [illegible] RUSH

REQUESTED BY: [illegible]

| | |
|---|---|
| TEST NO. | SA-1471 |
| DESCRIPTION OF TEST MATERIAL | |
| SOURCE | Page Str. |
| SPEC. | [illegible] |
| SIZE | 1/8 dia x P.O.P |
| HEAT NO. | 72445 |
| FOLIO NO. | 501.223 |
| QUANTITY | 670 lbs |
| FLUX TYPE | Linde 80 1/8 XD |
| FLUX LOT. | 8578 |
| FOLIO NO. | 49-7063 |
| QUANTITY | 1 M V |
| OTHER DESC. | For 1 M V |
| TEST IN ACCORDANCE WITH QUALITY CONTROL SPECIFICATION 2E4. | 142.6 |

S. O.

TEST REPORT

CHEMICAL ANALYSIS

| | Ast | | | |
|---|---|---|---|---|
| FM. | | | | |
| C | .085 | | | |
| | 1.06 | | | |
| P | .014 | | | |
| S | .014 | | | |
| SI | .12 | | | |
| | .16 | | | |
| | .11 | | | |
| | .12 | | | |

| | |
|---|---|
| YIELD POINT | NR |
| ELONGATION % IN 2" | NR |
| ULTIMATE STRENGTH | 68,000 |
| REDUCTION OF AREA % | NR |
| CHARPY V-NOTCH | 89.0 |
| IMPACTS @ [illegible]° F | 25.0 |
| 240 FT. LB. ENERGY LOSS | 35.0 |

BEND TESTS

| | |
|---|---|
| TRANSVERSE | NR |
| LONGITUDINAL | NR |

[illegible] OF TEST ☐ FINAL ☐ APPROVED ☒ REJECT

[illegible] (IF REJECTED) OR ORIGINATION NO.

[illegible] ☐ ASME SECTION I & VIII ☐ OTHER

[illegible] ☐ A.C. ☐ D.C.

[illegible] ☐ AWS

[illegible] 10-11-68

BABCOCK & WILCOX CO. AND
READER MECHANICAL SYSTEMS
FABRICATION, OHIO

# RECORD OF FILLER WIRE QUALIFICATION TEST

TEST NO. E-1557

WELD CO ARCO SIMS, DOE [illegible]

| SIZE | ACCEPTABLE SPECIFICATION | RESULTS OF TEST CERTIFICATES | ALLOY DESIGNATION |
|---|---|---|---|
| 1/8" dia. | 2[illegible]-1[illegible]-6<br>2[illegible]-1[illegible]-6 | [illegible]-[illegible]-[illegible]-11 | [illegible]5 |
| ORDER NUMBER | TYPE OF CURRENT DCRP | AMPERES 120 DCRP<br>32 volts | |

CHEMICAL ANALYSIS TESTS

| HEAT | LAB. NO. | PAD | C. | Mn. | P. | S. | Si. | Cr. | Ni. | Mo. | OTHER |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | E-67783 | | .05 | 1.45 | .017 | .010 | .43 | .07 | .49 | .40 | |
| | | | | | | | | | | Cu | .14 |
| | TEST REPORT | ANALYSIS | | | | | | | | | |

TENSILE PROPERTIES

| HEAT | HEAT TREATMENT | ULT. TEN. STR. PSI | YIELD POINT PSI | ELONG IN 2" % | RED OF AREA % |
|---|---|---|---|---|---|
| [illegible] | [illegible] | [illegible] | | | |
| [illegible] | [illegible] | [illegible] | | | |
| [illegible] | [illegible] | [illegible] | | | |

FILLET WELD TEST

| | OVERHEAD |
|---|---|
| SIZE | |
| LEG | |
| CONCAVITY | |
| | VERTICAL |
| SIZE | |
| LEG | 1/4 |
| CONCAVITY | |
| | HORIZONTAL |
| SIZE | |
| LEG | |
| CONCAVITY | |

[illegible] IMPACT VALUES AT 40 OF 80 FT/LB. ENERGY ABS

| HEAT | TEST TEMPERATURE | FT/LB. | | FT. LB. |
|---|---|---|---|---|
| [illegible] | [illegible] | 49.0 | 40.0 | 52.0 |
| [illegible] | [illegible] | 49.0 | 47.0 | 46.0 |

MATERIAL APPROVAL

| | |
|---|---|
| NAVSHIPS | X |
| ASME | X |
| NAVY NUCLEAR STD. | X |
| STEAM GENERATORS | X |
| COMMERCIAL NUCLEAR STD. | X |
| OSCILLATED COLD LEAD | X |

GUIDED BEND TESTS

| CODE | TEST | SIDE |
|---|---|---|
| | | |

APPROVE WELD TEST

[illegible]

[illegible]

B59.7

TEST NO. SA-1585

...OF FILLER WIRE QUALIFICATION TEST

...FIRE HEAT NO. 72485

Lincoln Electric Co
Type L-60 1/8" Dia, Lot 258597

...ARC DATA: 450 amps 38V
Non pulse 625 amps 32V

A C,

MECHANICAL AND CHEMICAL ANALYSIS TESTS

| LAB. NO. | PAD | C. | MN. | P. | S. | SI. | CR. | NI. | MO. | OTHERS |
|---|---|---|---|---|---|---|---|---|---|---|
| C-66579 | | .08 | 1.35 | .016 | .011 | .43 | .05 | .51 | .35 | |
| | | | | | | | | | Cu | .20 |
| TEST REPORT | ANALYSIS | | | | | | | | | |

TENSILE PROPERTIES

| TEST NO. | HEAT TREATMENT | ULT. TEN. STR. PSI | YIELD POINT PSI | ELONG IN 2" % | RED OF AREA % |
|---|---|---|---|---|---|
| SA-1585 | 60 hrs. @ 1100-1150°F | | | | |
| | Surface | 83,000 | | | |
| | Center | 81,000 | | | |

...IMPACT TEST @ 210°F 280 FOOT-POUND ENERGY LOAD

| HEAT TREATMENT | | TEST NO. | FT/LB. | TEST NO. | FT. LB. |
|---|---|---|---|---|---|
| 60 hrs. @ 1100-1150°F | | | | | |
| | Surface | SA-1585 | 31,32,31 | | |
| | Center | SA-1585 | 50,54,51 | | |

...SPECIAL APPROVAL

| | |
|---|---|
| NAVSHIPS | A |
| ASME | X |
| NAVY NUCLEAR STD. | A |
| [illegible] | A |
| [illegible] | X |
| [illegible] | X |

18

D 30730-1

# LABORATORY WORK REQUEST & REPORT

THE BABCOCK & WILCOX CO. — PRODUCTION DEPARTMENT

TO MT. VERNON WORKS ATTENTION I. BARNES DATE 4-8-69

PLEASE PERFORM THE FOLLOWING WORK OR LAB TEST:

NON DESTRUCTIVE TESTS
- ☐ LIQUID PENETRANT
- ☐ UT ASME UT NAVSHIPS
- ☐ MAGNETIC PARTICLE
- ☐ RADIOGRAPHY

DESTRUCTIVE TESTS
- ☐ BENDS ☐ FACE ☐ ROOT ☐ SIDE
- ☒ TENSION ☒ IMPACTS ☐ MACRO ☐ MICRO
- ☐ FISSUE ANALYSIS ☒ CHEMICAL ☐ FERRITE
- PREHEAT 250 OF
- INTERPASS 500 OF
- STRESS RELIEF 1100-1150 OF
- 48 HOURS FURNACE
- COOL TO 600 OF
- OTHER

DESCRIPTION OF TEST

WELDING PROCESS:
- ☐ MANUAL METAL ARC
- ☒ SUBMERGED ARC
- ☐ SIGMA
- ☐ TIG
- ☐ TIG COLD WIRE FEED
- ☐ OTHER

OTHER INSTRUCTIONS:

48 HRS. STRESS RELIEF AT1100°-1150° ONLY

TYPE OF CURRENT ☒ A.C. ☐ D.C. ☐ STRAIGHT ☐ REVERSE

| | |
|---|---|
| TEST NO. | WE-9 |
| DESCRIPTION OF TEST MATERIAL | |
| SOURCE | PAGE |
| SPEC. | Mn-Mo-Ni |
| SIZE | 1/8" |
| HEAT NO. | 72445 |
| FOLIO NO. | 504-223 |
| QUANTITY | 25,980 |
| FLUX TYPE. | LINDE GR. 80 48XD |
| FLUX LOT. | 8632 |
| FOLIO NO. | 499X063 |
| QUANTITY | 75,000 LB. |
| OTHER DESC. | MT. VERNON |
| TEST IN ACCORDANCE WITH QUALITY CONTROL SPECIFICATION 2E4. | 142-6 |

DATE TEST RESULTS ARE REQUIRED — REQUESTED BY

LAB. NO.

## TEST REPORT

CHEMICAL ANALYSIS

| ELEM. | 1ST | 2ND | 3RD | 4TH |
|---|---|---|---|---|
| C | .076 | | | |
| MN | 1.30 | | | |
| P | .015 | | | |
| S | .012 | | | |
| SI | .55 | | | |
| CR | | | | |
| NI | .60 | | | |
| MO | .55 | | | |
| CU | .174 | | | |
| B | | | | |
| CO | | | | |
| A | | | | |
| AL | | | | |

| | | | |
|---|---|---|---|
| YIELD POINT | 65,000 | BEND TESTS | |
| ELONGATION % IN 2" | 30.5 | TRANSVERSE | NR |
| ULTIMATE STRENGTH | 81,000 | LONGITUDINAL | NR |
| REDUCTION OF AREA % | NR | | |
| CHARPY V-NOTCH IMPACTS @ +10° F 240 FT. LB. ENERGY LOAD | 46-43-45 | | |

DESCRIPTION OF TEST MATERIAL — APPROVED — REJECT

Mn-Mo-Ni PAD BUILD-UP

MAT'L. (CERTIFIED) TO SPECIFICATION NO.

| NAVSHIP 250-1500-1 | ASME SECTION 3 | ASME SECTION I A & B | OTHER |
|---|---|---|---|
| X | ☐ | ☐ | |

HAS BEEN APPROVED FOR ☒ A.C. ☐ D.C. ☐ STRAIGHT ☐ REVERSE

B&W REPRESENTATIVE

DATE 4-23-69

FOS 121472

THE BABCOCK & WILCOX COMPANY
POWER GENERATION DIVISION
BARBERTON, OHIO

B59.9 21

# RECORD OF FILLER WIRE QUALIFICATION TEST

TEST NO. SA-165D

| DIAMETER | WELDING SPECIFICATION | FILLER WIRE CLASSIFICATION | X-RAY WIRE HEAT |
|---|---|---|---|
| 1/8" dia. | Auto Submerged Arc | Para Mn-Mo-Ni | |
| | 214-142-6 | Linde 80 480XD Flux, Lot 6932 | 72445 |

| P. ORDER NUMBER | TYPE OF CURRENT | AMPERES |
|---|---|---|
| | A.C. | 625 amps 32 volts |

## XXXXXXXXXXXXXXX CHEMICAL ANALYSIS TESTS

| BATCH | LAB. NO. | PAD | C. | MN. | P. | S. | SI. | CR. | NI. | MO. |
|---|---|---|---|---|---|---|---|---|---|---|
| | E-70132 | | .09 | 1.43 | .018 | .014 | .40 | .06 | .47 | .57 |
| | TEST REPORT | ANALYSIS | | | | | | | | |

## TENSILE PROPERTIES

| TEST NO. | HEAT TREATMENT | ULT. TEN. STR. PSI | YIELD POINT PSI | E-LONG IN 2" % | RED OF AREA % |
|---|---|---|---|---|---|
| SA-165D | 48 hrs. @ 1100-1150°F | 92,000 | | | |
| SA-165D | 50 hrs. @ 1100-1150°F Plus 50 hrs. @ 900-1000°F | 101,000 | | | |

C-VARPY V-NOTCH IMPACT TEST @ +10 OF 240 FT/LB. ENERGY LOAD

| HEAT TREATMENT | TEST NO. | FT/LB. | TEST NO. | FT. LB. |
|---|---|---|---|---|
| 48 hrs. @ 1100-1150°F | *SA-165D | 48, 40, 40 | | |
| 50 hrs. @ 1100-1150°F Plus 50 hrs @ 900-1000°F | *SA-165D | 35, 35, 25 | | |

## GUIDED BEND TESTS

| FACE | ROOT | SIDE |
|---|---|---|
| | NR | |

| MICRO OR MACRO FISSURE ANALYSIS. | NR |
|---|---|

WE HEREBY CERTIFY THAT THE ABOVE MATERIAL HAS BEEN TESTED IN ACCORDANCE WITH THE ABOVE LISTED SPECIFICATION AND IS IN CONFORMANCE WITH ALL REQUIREMENTS.

## MATERIAL APPROVAL

| | |
|---|---|
| NAVSHIPS | |
| ASME | |
| NAVY NUCLEAR STD. | |
| STEAM GENERATORS * | |
| COMMERCIAL NUCLEAR STD. | |
| OSCILLATED COVER BEAD | |

GROOVE WELD TEST

RADIOGRAPHIC EXAMINATION

NR

| | |
|---|---|
| WIRE FOLIO NO. | 214-212 |
| FLUX FOLIO NO. | 480-203 |
| ADRAS | Barberton |
| CONTRACT NO. | |

DATE 6-4-69

SIGNED Babcock & Wilcox Company

INSPECTION AGENCY

XXXXXXXX Paul E Campbell

THE BABCOCK & WILCOX COMPANY
POWER GENERATION DIVISION
BARBERTON, OHIO

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B59.10

# RECORD OF FILLER WIRE QUALIFICATION TEST

TEST NO. SA-1651

| DIAMETER | ELECTRODE IDENTIFICATION | FILLER WIRE SPECIFICATION | WELD WIRE HEAT NO. |
|---|---|---|---|
| 1/8" dia. | Auto Submerged Arc 2B4-196-6 | Page Mn-Mo-Ni Linde 80 Acid Flux, lot 552 | 70145 |

| ORDER NUMBER | TYPE OF CURRENT | AMPERES |
|---|---|---|
| | DCRP | 625 amps 32 volts |

## CHEMICAL ANALYSIS TESTS

| BATCH | LAB. NO. | PAD | C. | MN. | P. | S. | SI. | CR. | NI. | MO. | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | E-70139 | | .09 | 1.43 | .018 | .016 | .43 | .05 | .55 | .39 | .5 |
| | TEST REPORT | ANALYSIS | | | | | | | | | |

## TENSILE PROPERTIES

| TEST NO. | HEAT TREATMENT | ULT. TEN. STR. PSI | YIELD POINT PSI | E-LONG IN 2" % | RED OF AREA % |
|---|---|---|---|---|---|
| SA-1651 | 48 hrs. @ 1100-1150°F | 83,000 | | | |

CHARPY V-notch IMPACT TEST @ +10 OF 250 FT/LB. ENERGY LOAD

| HEAT TREATMENT | TEST NO. | FT/LB. | TEST NO. | FT. LB. |
|---|---|---|---|---|
| 48 hrs. @ 1100-1150°F | SA-1651 | 41,43,35 | | |

## GUIDED BEND TESTS

| FACE | ROOT | SIDE |
|---|---|---|
| | NR | |

| MICRO OR MACRO ISSUE ANALYSIS. | NR |
|---|---|

## MATERIAL APPROVAL

| | |
|---|---|
| NAVSHIPS | |
| ASME | |
| NAVY NUCLEAR STD. | |
| STEAM GENERATORS | |
| COMMERCIAL NUCLEAR STD. | |
| OSILLATED COVER BEAD | |

GROOVE WELD TEST

RADIOGRAPHIC EXAMINATION

WE HEREBY CERTIFY THAT THE ABOVE MATERIAL HAS BEEN TESTED IN ACCORDANCE WITH THE ABOVE LISTED SPECIFICATION AND IS IN CONFORMANCE WITH ALL REQUIREMENTS.

| | |
|---|---|
| WIRE FOLIO NO. | 504-212 |
| FLUX FOLIO NO. | 499-063 |
| WORKS | Barberton |
| CONTRACT NO. | |

DATE 6-9-69

SIGNED Babcock & Wilcox Company

INSPECTION AGENCY

Paul E Campbell

RECORD OF FILLER WIRE QUALIFICATION TEST

TEST NO. SA-1651

Auto Submerged Arc — Page Mn-Mo-Ni

1/8" dia. — 2EA-142-6 — Linde 80 48XD flux, Lot #8532 — 725 amps — DCRP — 625 rpm — 32 volts

XXXXXXXXXXXXXXXXXX CHEMICAL ANALYSIS (WT %) Cu

| LAP NO. | C | Mn | P | S | Si | Ni | Mo | Cu |
|---|---|---|---|---|---|---|---|---|
| E-70139 | .09 | 1.43 | .018 | .016 | .43 | .05 | .55 | .39 |

| HEAT TREATMENT | TEST NO. | YIELD POINT (PSI) | TENSILE STR. (PSI) | % ELONG. IN 2" | % RED. OF AREA |
|---|---|---|---|---|---|
| SA-1651 48 hrs. @ 1100-1150°F | | | 88,000 | | |
| SA-1651 50 hrs. @ 1100-1150°F Plus 90 hrs. @ 900-950°F | | | 88,000 | | |

V-notch IMPACT TEST +10 (-240) IMPACT VALUES

| HEAT TREATMENT | TEST NO. | FT. LBS. | TEST NO. | FT. LBS. |
|---|---|---|---|---|
| 48 hrs. @ 1100-1150°F | *SA-1651 | 41,43,36 | | |
| 50 hrs. @ 1100-1150°F Plus 90 hrs. @ 900-950°F | *SA-1651 | 37,28,35 | | |



NR

NR

WELDER'S CERTIFICATE

NR

WE HEREBY CERTIFY THAT THE ABOVE WELDS WERE TESTED IN ACCORDANCE WITH THE ABOVE LISTED SPECIFICATIONS AND ARE CORRECT AND TRUE IN ALL RESPECTS

504-212

499-053

Barberton

6-9-69

Babcock & Wilcox Company

Paul E Campbell

T. OF TESTS

811554 42

United States Steel Corporation

DUPLICATE COPY

61322

DATE FEB. 9, 1968 B60.1

ICE TO THE BABCOCK AND WILCOX CO., BOILER DIV., BARBERTON, OHIO

TO SAME, HIGHWAY 69 WEST, MOUNT VERNON, INDIANA

WEIGHT SHIPPED 33,078 LBS DATE SHIPPED DEC. 21, 1967

TOMER ORDER NO. 613228 ORDER NUMBER M-5460

PTION OF MATERIAL 1/8" DIA., ELECTRIC FURNACE ALLOY WELDING WIRE, COPPER COATED.

| ANALYSIS | | PHYSICAL PROPERTIES | | | | |
|---|---|---|---|---|---|---|
| | 8T1554 | SIZE | | | | |
| | (See attached sheets for check analysis) | HEAT NO. | | | | |
| ON | | SIZE TEST PIECE | | | | |
| SE | | YIELD (POINT) (STRENGTH) ACTUAL (LBS.) | | | | |
| PHORUS | | YIELD (POINT) (STRENGTH) M.P.S.I. | | | | |
| R | | TENSILE ACTUAL (LBS.) | | | | |
| CON | | TENSILE M.P.S.I. | | | | |
| R | | ELONGATION IN INCHES | | | | |
| ITUM | | REDUCTION OF AREA | | | | |
| BDENUM | | BRINELL | | | | |
| M | | ROCKWELL | | | | |
| IUM | | SALT SPRAY | | | | |
| | | BEND TEST | | | | |
| | | | | | | |

E OF ILLINOIS) SS
NTY OF LAKE )

D.E. Schultz, Being duly sworn according to law deposes and says that the figures set forth above are correct, as contained in the records of the company.

D. E. SCHULTZ
DIVISION METALLURGIST
PROCESS CONTROL

C. DURST
WORKS METALLURGIST

ed and sworn to before me,
day of 1968.

NOTARY PUBLIC

TEST REPORT OF R ILL

WORKS SOUTH U.S.S. ORDER NO YJ 11876 LOAD TALLY OR INVOICE NO

CUSTOMER ORDER NO

CAR OR TRUCK NO SHIPPER NO & DATE

WE HEREBY CERTIFY THAT THE CHEMI ANALYSIS AND/OR TESTS SHOWN IN T REPORT ARE CORRECT AS CONTAINED THE RECORDS OF THE COMPANY.

R. E. STOLL, CHIEF METALL

SOLD TO: UNITED STATES STEEL CORPORATION
JOLIET WORKS
JOLIET, ILLINOIS

SHIPPED FROM: UNITED STATES STEEL CORPORATION
JOLIET WORKS
JOLIET, ILLINOIS
WILL COUNTY

P. BILLETS E F ALLOY JOLIET SPEC 7500098

T/R-/ /4 MILL A/R ON T/R AV OS CHECK ANALYSIS ON 9 POSITIONS
T/R ATTN: 1-T.C. CABLE, JOLIET WORKS 1-J.C. CHESNEY, FAIRFIELD WORKS
1-A.J. WERDICK, JOLIET WORKS 1-C. DURST, FAIRFIELD WORKS

SIGNATURE

DATE 5-8-69

| ITEM NO | HEAT NO | TEST OR PIECE IDENTITY NO | NO PCS | THICKNESS OR SECTION | WIDTH, DIA OR FT WT | LENGTH | WEIGHT | YIELD PT PSI | TENSILE STR PSI | ELONGATION % IN 8" | ELONGATION % IN 2" |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 8T1554 | 1 - 1T | 2 | 1/2 X 2 1/2 | RCS | 28/31' | | C LCI | P S | 61 | NI |
| | | 1 - 5T | | | | | | 12 2.10 | | | |
| | | 1 - 8B | | | | | | 13 2.09 | | | |
| | | 7 - 1T | | | | | | 12 2.16 | | | |
| | | 7 - 5T | | | | | | 12 2.07 | | | |
| | | 7 - 8B | | | | | | 12 2.11 | 009 012 | 05 | 62 |
| | | 15 - 1T | | | | | | 12 2.12 | | | |
| | | 15 - 5T | | | | | | 12 2.09 | 009 | | |
| | | 15 - 8B | | | | | | 12 2.16 | | | |
| | | | | | | | | 12 2.09 | 009 013 | 05 | 62 |

STATE OF ILLINOIS) SS
COUNTY OF LAKE )

Subscribed and sworn to before me, this day of 1968.

NOTARY PUBLIC

MY COMMISSION EXPIRES

SPECIMEN SIZE TESTED ACCORDING TO COMPANY RECORDS CONFORMS TO THE REQUIREMENTS OF THE SPECIFICATION LISTED ABOVE

* B OR H INDICATE COMPLIANCE OF BEND OR HOMO TESTS

| HEAT NO | TYPE | C | Mn | P | S | Si | Cu | Ni | Cr | Mo | Sn | Al | N | V | B | Ti | Pb | Ca |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8T1554 | L | 12 | 200 | 008 | 013 | 08 | 07 | 63 | 09 | 26 | 031 | 05 | | 005 | | | | |

D.E. SCHULTZ, being duly sworn accordi to law, deposes and says that the figures set forth above are correct a contained in the records of the comp

D.E. SCHULTZ, DIV. MET., PROCESS CONTR

C. DURST, WORKS METALLURGIST

FORM G-20331 REV. 1165 02,000,041

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B60.3

THE BABCOCK & WILCOX COMPANY, BARBERTON, OHIO

# RECORD OF ELECTRODE QUALIFICATION TEST

## 2E4-130

| TRODE | NAME | SIZE | WELDER |
|---|---|---|---|
| Arc Filler Wire | United States Stl. Mn-Mo-Ni, Ht-#8T1554 | 1/8" dia. | Mr. [illegible] |

| ELDED | CURRENT | AMPERES |
|---|---|---|
| 10-22-68 | DC+ travelspd 2-1/2"/m<br>AC mon-osc travelspd 10"/min | DC+ 475 amps, [illegible] volts<br>Mon-osc 625 amps, 32 volts |

Linde 80 48XD flux
#8579

### TENSILE PROPERTIES

| TEST NO. | STRESS RELIEVE | DIA. | AREA SQ. IN. | ULT. TEN. STR. PSI | YIELD POINT PSI | E LONG IN 2" % | RED OF AREA % |
|---|---|---|---|---|---|---|---|
| 1404 | 1100-1150F<br>48 hrs. | | | 81,000 | | | |

### GUIDED FACE BEND TEST

| T NO. | APPEARANCE & REMARKS |
|---|---|
| | Not Required |

### GUIDED ROOT BEND TEST

| TEST NO. | APPEARANCE & REMARKS |
|---|---|
| | Not Required |

CHARPY V-notch IMPACT TEST @ +10 °F. 240 FT. LBS. ENERGY LOAD

| TEST NO. | FT. LBS. | TEST NO. | FT. LBS. |
|---|---|---|---|
| Surface | 36.0, 36.0, 32.0 | | |
| Center | 54.0, 25.0, 44.0 | | |

### GUIDED SIDE BEND TEST

| T NO. | APPEARANCE & REMARKS |
|---|---|
| | Not Required |

### CHEMISTRY TEST

| EST NO | C | Mn | P | S | Si | Cr | Ni | Mo | Cu | OTHER |
|---|---|---|---|---|---|---|---|---|---|---|
| 1404 | .09 | 1.52 | .015 | .012 | .44 | .07 | .45 | .42 | .14 | |

### FILLET WELD TEST

| NO. | POSITION | SIZE | LEG | CONVEXITY |
|---|---|---|---|---|
| | OVERHEAD | | | |
| | VERTICAL | Not Required | | |
| | HORIZONTAL | | | |

H UNDERSIGNED MANUFACTURER CERTIFIES THAT THE STATEMENTS MADE IN THIS REPORT ARE CORRECT AND THAT THE TEST R MADE AND TESTED IN ACCORDANCE WITH THE REQUIREMENTS OF THE TENTATIVE SPECIFICATIONS FOR IRON AND STEEL ARC ELECTRODES SERIAL DESIGNATION A_____ ISSUED IN____BY THE AWS AND ASTM.

1-4-68

SIGNED The Babcock & Wilcox Company

BY F. J. Mueller

INSPECTOR_____

Qualification of wire & flux combination for oscillated top bead

THE BABCOCK & WILCOX CO. — PRODUCTION DEPARTMENT

TO Beaver Falls WORKS ATTENTION J. Walsh DATE 10-14-67

PLEASE PERFORM THE FOLLOWING WORK OR LAB TEST:

NON DESTRUCTIVE TESTS
- ☐ LIQUID PENETRANT
- ☐ UT ASME UT NAVSHIPS
- ☐ MAGNETIC PARTICLE
- ☐ RADIOGRAPHY

DESTRUCTIVE TESTS
- ☐ BENDS ☐ FACE ☐ ROOT ☐ SIDE
- ☐ TENSION ☐ IMPACTS
- ☐ MACRO ☐ MICRO
- TISSUE ANALYSIS ☐ CHEMICAL ☐ FERRITE
- PREHEAT _____ OF
- INTERPASS _____ OF
- STRESS RELIEF 1120°-1150° OF
- 48 HOURS FURNACE
- COOL TO _____ OF
- OTHER

DESCRIPTION OF TEST

WELDING PROCESS:
- ☐ MANUAL METALARC
- ☒ SUBMERGED ARC NON-OSCILLATED COVER CARD
- ☐ SIGMA
- ☐ TIG
- ☐ TIG COLD WIRE FEED
- ☐ OTHER

OTHER INSTRUCTIONS:
REQUIRE FOR USE ON STEAM GENERATORS ALSO

TYPE OF CURRENT ☐ A.C. ☐ D.C. ☐ STRAIGHT ☐ REVERSE

| | |
|---|---|
| TEST NO. | SA-1494 |
| DESCRIPTION OF TEST MATERIAL | |
| SOURCE | U.S. STEEL |
| SPEC. | MIL-W-11 |
| SIZE | 1/8 DIA X 1.5 LB |
| HEAT NO. | 2T1554 |
| FOLIO NO. | 504-1-2 |
| QUANTITY | 617.3 LB |
| FLUX TYPE. | LINDE 0091 |
| FLUX LOT. | 2577 |
| FOLIO NO. | 497.063 |
| QUANTITY | 2000 LB |
| OTHER DESC. | FOR 1/4 L-T-1 |
| TEST IN ACCORDANCE WITH QUALITY CONTROL SPECIFICATION 2E4. | 142-6 |

DATE TEST RESULTS ARE REQUIRED 10-31-67 REQUESTED BY [illegible]

L. NO.

## TEST REPORT

### CHEMICAL ANALYSIS

| EL | M. | ~~1ST~~ | ~~END~~ | ~~3RD~~ | ~~4TH~~ |
|---|---|---|---|---|---|
| C | .09 | | | | |
| MN | 1.52 | | | | |
| P | .015 | | | | |
| S | .012 | | | | |
| SI | .44 | | | | |
| CR | .07 | | | | |
| NI | .45 | | | | |
| MO | .42 | | | | |
| CU | .14 | | | | |
| CB | | | | | |
| C | | | | | |
| TA | | | | | |
| | | | | | |
| | | | | | |

| | | |
|---|---|---|
| YIELD POINT | NR | |
| ELONGATION % IN 2" | NR | |
| ULTIMATE STRENGTH | 81,000 | |
| REDUCTION OF AREA % | NR | |
| CHARPY V-NOTCH IMPACTS @ +10° F 240 FT. LB. ENERGY LOAD | 54<br>25<br>44 | |

BEND TESTS

| | |
|---|---|
| TRANSVERSE | NR |
| LONGITUDINAL | NR |

| DESCRIPTION OF TEST MATERIAL | APPROVED | | REJECT | |
|---|---|---|---|---|

MAT'L. (CERTIFIED) TO SPECIFICATION NO.

| NAVSHIP 250-1500-1 | | ASME SECTION 3 | | ASME SECTION 1 & 8 | | OTHER |
|---|---|---|---|---|---|---|

HAS BEEN APPROVED FOR ☒ A.C. ☐ D.C. ☐ STRAIGHT ☐ REVERSE

LAB. REPRESENTATIVE [illegible] DATE 11-5-68

OF TESTS

United States Steel Corporation
DUPLICATE COPY

B61.1

DATE FEB. 9, 1968

TO THE BABCOCK WILCOX CO., BOILER DIV., PAULSEN, OHIO

TO SAME, HIGHWAY 69 WEST, MOUNT VERNON, INDIANA

WEIGHT SHIPPED 36,014 LBS

DATE SHIPPED FEB. 1, 1968

MAR ORDER NO. 61322 B

ORDER NUMBER DC P5460

DESCRIPTION OF MATERIAL 1/8" DIA. ELECTRIC FURNACE ALLOY WELDING WIRE

| ANALYSIS | | | | PHYSICAL PROPERTIES | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | SIZE | | | | | |
| | 8T1762 | | | HEAT NO. | | | | | |
| | (See attached sheets for check analysis) | | | SIZE TEST PIECE | | | | | |
| | | | | YIELD (POINT) (STRENGTH) ACTUAL (LBS.) | | | | | |
| | | | | YIELD (POINT) (STRENGTH) M.P.S.I. | | | | | |
| | | | | TENSILE ACTUAL (LBS.) | | | | | |
| | | | | TENSILE M.P.S.I. | | | | | |
| | | | | ELONGATION IN INCHES | | | | | |
| | | | | REDUCTION OF AREA | | | | | |
| | | | | BEND | | | | | |
| | | | | GUIDED BEND | | | | | |
| | | | | NICK BREAK | | | | | |
| | | | | HARDNESS | | | | | |

WE HEREBY CERTIFY THAT THE CHEMICAL ANALYSES AND/OR TESTS SHOWN IN THIS REPORT ARE CORRECT AS CONTAINED IN THE RECORDS OF THE COMPANY.

R. E. STULL, CHIEF METALLURG.

UNITED STATES STEEL CORP
JOLIET WORKS
JOLIET, ILLINOIS
WILL COUNTY



| HEAT NO. | MILL ORDER NO. | SIZE | LENGTH | WEIGHT |
|---|---|---|---|---|
| | | WDS | 23/31FT | |

STATE OF ILLINOIS } SS
COUNTY OF LAKE )

Subscribed and sworn to before me,
this ____ day of ____ 1968

NOTARY PUBLIC
MY COMMISSION EXPIRES
AUGUST 26, 1969

| HEAT NO. | YIELD PT. PSI | TENSILE STR. PSI | ELONGATION % IN 8" | IN 2" |
|---|---|---|---|---|
| C Mn P S | | | | |
| 11 2.16 | | | | |
| 11 2.16 | | | | |
| 10 2.16 | | | | |
| 11 2.16 | | | | |
| 11 2.16 010 010 05 | | | | 60 |
| 10 2.16 | | | | |
| 11 2.16 010 | | | | |
| 11 2.16 | | | | |
| 10 2.16 010 010 05 | | | | 50 |

* B OR H INDICATE COMPLIANCE OF END OR HOOD TESTS

ACCORDING TO COMPANY RECORDS, CONFORMS TO THE REQUIREMENTS OF THE SPECIFICATION LISTED ABOVE

| HEAT NO. | TYPE | C | Mn | P | S | Si | Cu | Ni | Cr | Mo | Sn | Al | N | V | B | Ti | Cb |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| [illegible] | E | 12 | 2 | 00 | 012 | 012 | 00 | 05 | 58 | 10 | 11 | 026 | 03 | | 005 | | | |

Co

D.E. SCHULTZ, being duly sworn according to law, deposes and that the figures set forth ab are correct, as contained in records of the company.

D. E. Schultz

D.E. SCHULTZ, D.Y. MGR. ENGINEERING

B61.3

18-2 THE BABCOCK & WILCOX COMPANY, BARBERTON, OHIO

# RECORD OF ELECTRODE QUALIFICATION TEST

## 2E4-120

| TRADE | NAME | SIZE | WELDER |
|---|---|---|---|
| Arc Filler Wire | United States Stl. Mn-Mo-Ni, Ht# 8T1762 | 1/8" dia. | [illegible] |

| WELDED | CURRENT | AMPERES |
|---|---|---|
| 10-23-68 | A.C. Travel speed 10"/min | 625 amps, 32 volts |

Linde 80 48XD flux
Lot #8578

### TENSILE PROPERTIES

| TEST NO. | STRESS RELIEVE | DIA. | AREA SQ. IN. | ULT. TEN. STR. PSI | YIELD POINT PSI | E LONG IN 2" % | RED OF AREA % |
|---|---|---|---|---|---|---|---|
| 1403 | 1100-1150F 48 hrs | | | 82,000 | | | |

### GUIDED FACE BEND TEST

| TEST NO. | APPEARANCE & REMARKS |
|---|---|
| | Not Required |

### GUIDED ROOT BEND TEST

| TEST NO. | APPEARANCE & REMARKS |
|---|---|
| | Not Required |

CHARPY V-notch IMPACT TEST @ +10 °F 240 FT. LBS. ENERGY LOAD.

| TEST NO. | FT. LBS. | TEST NO. | FT. LBS. |
|---|---|---|---|
| 1403 | 41.0, 35.0, 40.0 | | |

### GUIDED SIDE BEND TEST

| TEST NO. | APPEARANCE & REMARKS |
|---|---|
| | Not Required |

### CHEMISTRY TEST

| TEST NO. | C | Mn | P | S | Si | Cr | Ni | Mo | Cu | OTHER |
|---|---|---|---|---|---|---|---|---|---|---|
| 1403 | .08 | 1.51 | .017 | .010 | .46 | .12 | .43 | .45 | .22 | |

### FILLET WELD TEST

| TEST NO. | POSITION | SIZE | LEG | CONCAVITY |
|---|---|---|---|---|
| | OVERHEAD | Not Required | | |
| | VERTICAL | | | |
| | HORIZONTAL | | | |

THE UNDERSIGNED MANUFACTURER CERTIFIES THAT THE STATEMENTS MADE IN THIS REPORT ARE CORRECT AND THAT THE TEST WELDS WERE MADE AND TESTED IN ACCORDANCE WITH THE REQUIREMENTS OF THE TENTATIVE SPECIFICATIONS FOR IRON AND STEEL ARC WELDING ELECTRODES SERIAL DESIGNATION A_____ ISSUED IN_____ BY THE AWS AND ASTM.

11-4-68

Qualification of wire & flux combination

SIGNED The Babcock & Wilcox Company

BY T. D. Mullins

INSPECTOR_____

THE BABCOCK & WILCOX CO. BARBERTON WORKS ATTENTION J. WALSH PRODUCTION DEPARTMENT DATE 10-15-68

PLEASE PERFORM THE FOLLOWING WORK OR LAB TEST:

NON DESTRUCTIVE TESTS
- ☐ LIQUID PENETRANT
- ☐ UT ASME UT NAVSHIPS
- ☐ MAGNETIC PARTICLE
- ☐ RADIOGRAPHY

DESTRUCTIVE TESTS
- ☐ BENDS ☐ FACE ☐ ROOT ☐ SIDE
- ☐ TENSION ☐ IMPACTS
- ☐ MACRO ☐ MICRO
- ☐ CHEMICAL TISSUE ANALYSIS ☐ FERRITE
- PREHEAT _____ OF
- INTERPASS _____ OF
- STRESS RELIEF 1100°-1150° OF 4/6 HOURS FURNACE COOL TO _____ OF
- OTHER.

DESCRIPTION OF TEST

WELDING PROCESS:
- ☐ MANUAL METALARC
- ☒ SUBMERGED ARC NON-OSCILLATED COMB BEAD
- ☐ SIGMA
- ☐ TIG
- ☐ TIG COLD WIRE FEED
- ☐ OTHER

OTHER INSTRUCTIONS:

REQUIRE FOR USE ON STEAM GENERATORS -

TYPE OF CURRENT ☐ A.C. ☐ D.C. ☐ STRAIGHT ☐ REVERSE

| | |
|---|---|
| TEST NO. | SA-1433 |
| DESCRIPTION OF TEST MATERIAL | |
| SOURCE | U.S. STEEL |
| SPEC. | MIL-S-11310 |
| SIZE | 1/8 DIA X 65 LG |
| HEAT NO. | 8T1762 |
| FOLIO NO. | 504-212 |
| QUANTITY | 7700 LBS |
| FLUX TYPE. | LINDE 124 PKD |
| FLUX LOT. | 5573 |
| FOLIO NO. | 494-063 |
| QUANTITY | 1140 LBS |
| OTHER DESC. | USE MIX |
| TEST IN ACCORDANCE WITH QUALITY CONTROL SPECIFICATION 2E4. | 142-6 |

ALL TEST RESULTS ARE REQUIRED 11-1-68 REQUESTED BY C. HUDSON

LAB. NO.

## TEST REPORT

### CHEMICAL ANALYSIS

| ELEM. | ~~1ST~~ | 2ND | 3RD | ~~4TH~~ |
|---|---|---|---|---|
| C | .08 | | | |
| MN | 1.51 | | | |
| P | .017 | | | |
| S | .010 | | | |
| SI | .46 | | | |
| CR | .12 | | | |
| NI | .43 | | | |
| MO | .45 | | | |
| CU | .22 | | | |
| CB | | | | |
| CD | | | | |
| AL | | | | |

| | | | |
|---|---|---|---|
| YIELD POINT | NR | BEND TESTS | |
| ELONGATION % IN 2" | NR | TRANSVERSE | NR |
| ULTIMATE STRENGTH | 82,000 | LONGITUDINAL | NR |
| REDUCTION OF AREA % | NR | | |
| CHARPY V-NOTCH IMPACTS @ +10° F 240 FT. LB. ENERGY LOAD | 41<br>35<br>40 | | |

| DESCRIPTION OF TEST MATERIAL | APPROVED | ☒ | REJECT |
|---|---|---|---|

MAT'L. (CERTIFIED) TO SPECIFICATION NO.

| NAVSHIP 250-1500-1 | ☒ | ASME SECTION 3 | ☐ | ASME SECTION 1 & 8 | ☐ | OTHER |
|---|---|---|---|---|---|---|

HAS BEEN APPROVED FOR ☑ A.C. ☐ D.C. ☐ STRAIGHT ☐ REVERSE

LAB. REPRESENTATIVE N. Walsh DATE 11-5-68

POWER GENERATION DIVISION
BARBERTON, OHIO

B61.5

# RECORD OF FILLER WIRE QUALIFICATION TEST

TEST NO. SA-1580

| DIAMETER | ELECTRODE SPECIFICATION AND WELDING PROCESS | FILLER WIRE IDENTIFICATION AND/OR FLUX | XXXXX WIRE HEAT NO. |
|---|---|---|---|
| 1/8" dia. | Auto Submerged Arc 2E4-142-6 | United States Steel Mn-Mo-Ni Linde 80 48MD flux, lot #8556 | 8T1752 |

| ORDER NUMBER | TYPE OF CURRENT | AMPERES |
|---|---|---|
| | A.C. | 625 amps 32 volts |

XXXXXXXXXXXXXXXXXX CHEMICAL ANALYSIS TESTS

| BATCH | LAB. NO. | PAD | C. | Mn. | P. | S. | Si. | Cr. | Ni. | Mo. | OTHER |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | E-68283 | | .07 | 1.45 | .015 | .013 | .43 | .13 | .60 | .43 | |
| | | | | | | | | | | Cu | .22 |
| | TEST REPORT | ANALYSIS | | | | | | | | | |

## TENSILE PROPERTIES

| TEST NO. | HEAT TREATMENT | ULT. TEN. STR. PSI | YIELD POINT PSI | E-LONG IN 2" % | RED OF AREA % |
|---|---|---|---|---|---|
| -1580 | 80 hrs. @ 1100-1150°F. | 86,000 | | | |

CHARPY V-notch IMPACT TEST @ +10°F 240 FT/LB. ENERGY LOAD

| HEAT TREATMENT | TEST NO. | FT/LB. | TEST NO. | FT. LB. |
|---|---|---|---|---|
| 80 hrs. @ 1100-1150°F | SA-1580 | 49.0, 41.0 | | |
| | | 40.0 | | |



## GUIDED BEND TESTS

| FACE | ROOT | SIDE |
|---|---|---|
| | NR | |

| MICRO OR MACRO FISSURE ANALYSIS. | NR |
|---|---|

## MATERIAL APPROVAL

| | |
|---|---|
| NAVSHIPS | X |
| ASME | NA |
| NAVY NUCLEAR STD. | X |
| STEAM GENERATORS | NA |
| COMMERCIAL NUCLEAR STD. | NA |
| OSILLATED COVER BEAD | NA |

GROOVE WELD TEST

RADIOGRAPHIC EXAMINATION

NR

WE HEREBY CERTIFY THAT THE ABOVE MATERIAL HAS BEEN TESTED IN ACCORDANCE WITH THE ABOVE LISTED SPECIFICATION AND IS IN CONFORMANCE WITH ALL REQUIREMENTS.

WIRE FOLIO NO. _____

FLUX FOLIO NO. _____

WORKS 3C

CONTRACT NO. _____

DATE 2-10-69

SIGNED Babcock & Wilcox Company

INSPECTION AGENCY _____

XXXXXXX Paul E Campbell

POWER GENERATION DIVISION
BARBERTON, OHIO

34
B61.6

# RECORD OF FILLER WIRE QUALIFICATION TEST

TEST NO. SA-1580

| DIAMETER | ELECTRODE SPECIFICATION AND CLASSIFICATION | FILLER WIRE IDENTIFICATION AND/OR TRADE NAME | X-RAY WIRE HEAT NO. |
|---|---|---|---|
| 1/8" dia. | Auto Submerged Arc 221-156-6 | United States Steel No. 10-M1 Linde 80 A8AD flux, lot #5595 | 89765 |

ORDER NUMBER

TYPE OF CURRENT: A.C.

AMPERES 625 amps
32 volts

CHEMICAL ANALYSIS TESTS

| TEST | LAB. NO. | PAD | C. | MN. | P. | S. | SI. | CR. | NI. | MO. | OTH. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | F-62288 | | .07 | 1.45 | .015 | .013 | .43 | .13 | .60 | .43 | |
| | | | | | | | | | | Cu. | .21 |
| | TEST REPORT | ANALYSIS | | | | | | | | | |

TENSILE PROPERTIES

| TEST NO. | HEAT TREATMENT | ULT. TENS. STR. PSI | YIELD POINT PSI | E-LONG IN 2" % | RED OF AREA % |
|---|---|---|---|---|---|
| 1580 | 80 hrs. @ 1100-1150°F | 89,000 | | | |
| | | 85,000 | | | |

Acc. V-notch IMPACT TEST 5/10 @ 20° FT/LB. ENERGY LOAD

| HEAT TREATMENT | TEST NO. | FT/LB. | TEST NO. | FT. LB. |
|---|---|---|---|---|
| 80 hrs. @ 1100-1150°F Surface | SA-1580 | 31.0, 29.0, 25.0 | | |
| Center | SA-1580 | 40.0, 41.0, 40.0 | | |



GUIDED BEND TESTS

| FACE | ROOT | SIDE |
|---|---|---|
| | NR | |

% OF WELD WIRE ANALYSIS: NR

MATERIAL APPROVAL

| | |
|---|---|
| NAVSHIPS | NA |
| ASME | X |
| NAVY NUCLEAR STD. | NR |
| STEAM GENERATORS | NA |
| COMMERCIAL NUCLEAR STD. | X |
| OSCILLATED OVER DEAD | NR |
| GROOVE WELD TEST | |
| RADIOGRAPHIC EXAMINATION | |
| NR | |

I HEREBY CERTIFY THAT THE ABOVE MATERIAL HAS BEEN TESTED IN ACCORDANCE WITH THE ABOVE LISTED SPECIFICATIONS AND IS IN CONFORMANCE WITH ALL REQUIREMENTS

This to be used for oscillated cover bead

MACRO PHOTO NO.

X-RAY PHOTO NO.

OTHER

TEST NO.

DATE 2-10-60

SIGNED Babcock & Wilcox Company

INSPECTION AGENCY

REPRESENTATIVE Bureau of Ships

B61.7

# ORATORY WORK REQUEST & REPORT

PRODUCTION DEPARTMENT

E BABCOCK & WILCOX CO.
MT. VERNON WORKS ATTENTION T. BARNES DATE 3-20-69

PLEASE PERFORM THE FOLLOWING WORK OR LAB TEST:

NON DESTRUCTIVE TESTS
- ☐ LIQUID PENETRANT
- ☐ UT ASME UT NAVSHIPS
- ☐ MAGNETIC PARTICLE
- ☐ RADIOGRAPHY

DESTRUCTIVE TESTS
- ☐ BENDS ☐ FACE ☐ ROOT ☐ SIDE
- ☒ TENSION ☒ IMPACTS
- ☐ MACRO ☐ MICRO
- ☒ CHEMICAL
- TISSUE ANALYSIS ☐ FERRITE
- PREHEAT 250 °F MIN.
- INTERPASS 500 °F
- STRESS RELIEF 1100-1150 °F
- 80 HOURS FURNACE
- COOL TO 600 °F
- OTHER

DESCRIPTION OF TEST
WELDING PROCESS:
- ☐ MANUAL METAL ARC
- ☒ SUBMERGED ARC
- ☐ SIGMA
- ☐ TIG
- ☐ TIG COLD WIRE FEED
- ☐ OTHER

OTHER INSTRUCTIONS:

TYPE OF CURRENT ☒ A.C. ☐ D.C.
☐ STRAIGHT ☐ REVERSE

| | |
|---|---|
| TEST NO. | WF - 4 |
| DESCRIPTION OF TEST MATERIAL | |
| SOURCE | U.S. STEEL |
| SPEC. | Mn-Mo-Ni |
| SIZE | 1/8 |
| HEAT NO. | 8T1762 |
| FOLIO NO. | 504-212 |
| QUANTITY | 36520 LB. |
| FLUX TYPE | LINDE GR. 80 48 ☒ L |
| FLUX LOT. | 8597 |
| FOLIO NO. | 499-063 |
| QUANTITY | 69000 LB. |
| OTHER DESC. | MT. VERNON |
| TEST IN ACCORDANCE WITH QUALITY CONTROL SPECIFICATION REA. | 142-6 156-6 |

IF TEST RESULTS ARE REQUIRED 4-4-69 REQUESTED BY C.A. MAHER

## TEST REPORT

LAB. NO. WF - 4

CHEMICAL ANALYSIS

| ELEM. | 1ST | 2ND | 3RD | 4TH |
|---|---|---|---|---|
| C | .07 | | | |
| Mn | 1.48 | | | |
| P | .017 | | | |
| S | .011 | | | |
| Si | .31 | | | |
| Cr | .11 | | | |
| Ni | .53 | | | |
| Mo | .39 | | | |
| Cu | .17 | | | |
| Sb | | | | |
| Co | | | | |
| Sn | | | | |
| Al | | | | |
| | (10) | | | |

| | |
|---|---|
| YIELD POINT | 65,060 |
| ELONGATION % IN 2" | 25 |
| ULTIMATE STRENGTH | 82,250 |
| REDUCTION OF AREA % | 64.9 |
| CHARPY V-NOTCH IMPACTS @ +10° F 240 FT. LB. ENERGY LOAD | 40-31-34 |

BEND TESTS

| | |
|---|---|
| TRANSVERSE | NR |
| LONGITUDINAL | NR |

80 HRS. STRESS RELIEF AT 1100-1150

DESCRIPTION OF TEST MATERIAL | APPROVED | x | REJECT

Mn-Mo-Ni PAD BUILD-UP

MATL. (CERTIFIED) TO SPECIFICATION NO.

NAVSHIP 250-1500-1 ☒ ASME SECTION 3 ☒ ASME SECTION 1 & 8 ☐ OTHER

HAS BEEN APPROVED FOR ☒ A.C. ☐ D.C.
☐ STRAIGHT ☐ REVERSE

REPRESENTATIVE DATE 4-15-69

B61.8

# ORATORY WORK REQUEST & REPO

PRODUCTION DEPARTMENT

THE BABCOCK & WILCOX CO.

T. BARNES

DATE 4-8-69

O . MT. VERNON - WORKS ATTENTION

Revised 11-12-70

Advised to show qualification for commercial application

PLEASE PERFORM THE FOLLOWING WORK OR LAB TEST:

NON DESTRUCTIVE TESTS
- ☐ LIQUID PENETRANT
- ☐ UT ASME UT NAVSHIPS
- ☐ MAGNETIC PARTICLE
- ☐ RADIOGRAPHY

DESTRUCTIVE TESTS
- ☐ BENDS ☐ FACE ☐ ROOT ☒ SIDE
- ☒ TENSION ☒ IMPACTS
- ☐ MACRO ☐ MICRO
- ☒ CHEMICAL
- ☐ TISSUE ANALYSIS ☐ FERRITE

AS WELDED 250 °F
INTERPASS 500 °F
STRESS RELIEF 1100-1150°F
48 HOURS FURNACE COOLED 600 °F

DESCRIPTION OF TEST

WELDING PROCESS:
- ☐ MANUAL METAL ARC
- ☒ SUBMERGED ARC
- ☐ SIGMA
- ☐ TIG
- ☐ TIG COLD WIRE FEED
- ☐ OTHER

OTHER INSTRUCTIONS:

48 HRS. STRESS RELIEF 1100°-1150° ONLY

TYPE OF CURRENT: ☒ A.C. ☐ D.C.
☐ STRAIGHT ☐ REVERSE

TEST NO. WF-8

DESCRIPTION OF TEST MATERIAL

| | |
|---|---|
| SOURCE | U.S. STEEL |
| SPEC. | Mn-Mo-Ni |
| SIZE | 1/8" |
| HEAT NO. | 8T1762 |
| FOLIO NO. | 504-212 |
| QUANTITY | 33920 |
| FLUX TYPE. | LINDE GR. 80 48XT |
| FLUX LOT. | 8632 |
| FOLIO NO. | 499-063 |
| QUANTITY | 75,000 LB. |
| OTHER DESC. | MT. VERNON |
| TEST IN ACCORDANCE WITH QUALITY CONTROL & SPECIFICATION PFA. | 156 6 142-6 |

DATE TEST RESULTS ARE REQUIRED

REQUESTED BY

LAB. NO.

## TEST REPORT

CHEMICAL ANALYSIS

| | 1ST | 2ND | 3RD | AVG |
|---|---|---|---|---|
| C | .093 | | | |
| Mn | 1.65 | | | |
| P | .009 | | | |
| S | .012 | | | |
| Si | .23 | | | |
| Ni | .57 | | | |
| Cr | .04 | | | |
| Mo | .51 | | | |
| Cu | .04 | | | |
| Al | .004 | | | |
| Co | .008 | | | |
| V | .003 | | | |
| Sn | .008 | | | |
| Ti | .003 | | | |
| Nb | .001 | | | |
| Ta | .001 | | | |
| W | .01 | | | |
| B | .0001 | | | |
| Zr | .001 | | | |

| | |
|---|---|
| YIELD POINT | 71,000 |
| ELONGATION % IN 2" | 25.0 |
| TENSILE STRENGTH | 85,500 |
| REDUCTION OF AREA % | NR |
| CHARPY V-NOTCH FT. LBS. +10° F | 65 38-90 |
| 320 FT. LB. ENERGY LOAD | |

BEND TESTS

| | |
|---|---|
| TRANSVERSE | NR |
| LONGITUDINAL | NR |

REJECT

POOR ORIGINAL

TR

28

61850

UNION CARBIDE CORPORATION
LINDE DIVISION

CERTIFICATE OF ANALYSIS

B62.1

BABCOCK AND WILCOX COMPANY
BOILER DIVISION
SECOND STREET
BARBERTON, OHIO 44203

MARCH 12, 1969

Your Order No. 61850B

LINDE Shipper's Order 1700

Quantity Shipped 14,000#

Date Shipped 3/22/68

Welding Wire - Linde #44

Wire Size 1/8"

Stock No. 1155E32

Package 200# Coils

Heat or Lot No. 299144

This is to certify that our records show that the material in the aforementioned shipment conforms to our standard specifications for this grade of LINDE welding wire and has the following analysis:

| | |
|---|---|
| CARBON | .13 |
| MANGANESE | 2.08 |
| PHOSPHORUS | .015 |
| SULPHUR | .019 |
| SILICON | .04 |
| COPPER | .15 |
| NICKEL | .65 |
| MOLYBDENUM | .41 |
| ALUMNIUM | .02 |

Ht prev OK'd
per P.O. 61849
6-5-17

E. A. Murray
Union Carbide Corporation - Linde Division
Electric Welding Department

R.K. MAHON
MAR 19 1969

R.J. KEAGY
MAR 13 1969

THE BABCOCK & WILCOX COMPANY
POWER GENERATION DIVISION
BARBERTON, OHIO

28

B62.2

# ORD OF FILLER WIRE QUALIFICATION TEST

TEST NO. SA-1526

Linde 80 48XD flux, Lot #3596

| SIZE | ELECTRODE SPECIFICATION | ELECTRODE IDENTIFICATION | CORE WIRE HEAT NO. |
|---|---|---|---|
| 5/32" dia. | | Linde Mn-Mo-Ni | 29914A |

| ORDER NUMBER | TYPE OF CURRENT | AMPERES |
|---|---|---|
| | A.C. | 625 amps<br>32 volts |

XXXXXXXXXXXXXXXXXX CHEMICAL ANALYSIS TESTS

| | LAB. NO. | PAD | C. | MN. | P. | S. | SI. | CR. | NI. | MO. | OTHER |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 67239 | | .06 | 1.40 | .016 | .012 | .40 | .06 | .60 | .43 | |
| | | | | | | | | | | Cu | .46 |
| | TEST REPORT | ANALYSIS | | | | | | | | | |

TENSILE PROPERTIES

| XXXX | HEAT TREATMENT | ULT. TEN. STR. PSI | YIELD POINT PSI | E-LONG IN 2" % | RED OF AREA % |
|---|---|---|---|---|---|
| | ars @ 1100-1150F | 88,000 | | | |

FILLET WELD TEST

| | OVERHEAD |
|---|---|
| SIZE | |
| LEG. | |
| CONVEXITY | |
| | VERTICAL |
| SIZE | |
| LEG. | Not Required |
| CONVEXITY | |
| | HORIZONTAL |
| SIZE | |
| LEG. | |
| CONVEXITY | |

RPY V-notch IMPACT TEST @ +10 °F 240 FT/LB. ENERGY LOAD

| T TREATMENT | XXXXX | FT/LB. | XXXXX | FT. LB. |
|---|---|---|---|---|
| ars @ 1100-1150F | | 33.0 | 33.0 | 33.0 |

MATERIAL APPROVAL

| | |
|---|---|
| NAVSHIPS | X |
| ASME | X |
| NAVY NUCLEAR STD. | X |
| STEAM GENERATORS | X |
| COMMERCIAL NUCLEAR STD. | X |
| OSCILLATED COVER BEAD | X |

GUIDED BEND TESTS

| FACE | ROOT | SIDE |
|---|---|---|
| NR | NR | NR |

| C OR MACRO SSURE ANALYSIS. | NR |
|---|---|

GROOVE WELD TEST
RADIOGRAPHIC EXAMINATION

NR

EREBY CERTIFY THAT THE ABOVE MATERIAL HAS BEEN STED IN ACCORDANCE WITH THE ABOVE LISTED SPECIFICA-ON AND IS IN CONFORMANCE WITH ALL REQUIREMENTS.

DATE 12-17-68

SIGNED The Babcock & Wilcox Company

INSPECTION AGENCY

# DE ROTTERDAMSCHE DROOGDOK MAATSCHAPPIJ N.V.

Quality and Metallurgical Department

~~663-W02.01-01~~
~~663-W02.03-01~~

Ordered by: Westinghouse Electric Corporation.

Reference : W02, 1-2, 1-3

Item : 02. Bottom Head Spherical ring

Material : Weld material of long seams

R.D.M. Order no.: 30663

Lab.report no.: K623

Drawing no.:

Inspection by :

Chemical composition

| | C % | Mn % | Si % | P % | S % | Ni % | Mo % | Cu % | Co | MG : 6236-4450 or 7011-6032 |
|---|---|---|---|---|---|---|---|---|---|---|
| uired | | | | | | | | | | |
| | ~~0,06~~ | ~~1,51~~ | ~~0,32~~ | ~~0,009~~ | ~~0,017~~ | ~~1,08~~ | ~~0,30~~ | ~~0,02~~ | ~~<0,01~~ | ~~1 - 2~~ |
| | 0,05 | 1,54 | 0,29 | 0,011 | 0,014 | 1,07 | 0,29 | 0,02 | <0,01 | 1 - 3 |



Mr. Slegtenhorst
Mr. v. Nes A.
Lab. archief

LLOYD'S REGISTER INDUSTRIAL SERVICES ROTTERDAM

Laboratory R.D.M., 3-10-1979

# DE ROTTERDAMSCHE DROOGDOK MAATSCHAPPIJ N.V.

Quality and Metallurgical Department

663-W02.01-015
~~663-W02.02-025~~

Ordered by: Westinghouse Electric Corporation.

Reference : W02, 1-2, 1-3

Item : 02. Bottom Head Spherical ring

Material : Weld material of long seams

R.D.M. Order no.: 30663

Lab.report no.: K623

Drawing no.:

Inspection by :

Chemical composition

| | C % | Mn % | Si % | P % | S % | Ni % | Mo % | Cu % | Co | KG : 6507-4705 or 7011-6032 |
|---|---|---|---|---|---|---|---|---|---|---|
| ired | | | | | | | | | | |
| | 0,06 | 1,51 | 0,32 | 0,009 | 0,017 | 1,28 | 0,30 | 0,02 | <0,01 | 1 - 2 |
| | ~~0,05~~ | ~~1,54~~ | ~~0,29~~ | ~~0,011~~ | ~~0,014~~ | ~~1,07~~ | ~~0,29~~ | ~~0,02~~ | ~~<0,01~~ | ~~1 - 3~~ |

Dr. Slegtenhorst
Dr. v. Nes A.
Lab. archief

Laboratory R.D.M., 3-12-1970

# DE ROTTERDAMSCHE DROOGDOK MAATSCHAPPIJ N.V.

Quality and Metallurgical Department

Ordered by: Westinghouse Electric Corporation

Reference :

Item :

Material : A.S.T.M. 508

R.D.M. Order no.: 30663

Lab.report no.: K 535

Drawing no.:

Inspection by : W.E.C. Lloyd's

Chemical composition

| | C % | Mn % | Si % | P % | S % | Ni % | Mo % | Co % | Cu % | S4Mo : 1725 |
|---|---|---|---|---|---|---|---|---|---|---|
| quired | | | | | | | | | | 89 : 02275 |
| | 0,071 | 1,62 | 0,33 | 0,012 | 0,008 | 0,12 | 0,50 | 0,028 | 0,11 | item nr. 01.02 circle seam W01 weld material, _ height of weld 30-10-70 |
| | 0,072 | 1,68 | 0,33 | 0,012 | 0,008 | 0,12 | 0,48 | 0,028 | 0,11 | item nr. 01.02 circle seam W01 weld material, 5 th bead 29-10-70 |
| | 0,064 | 1,64 | 0,38 | 0,013 | 0,009 | 0,11 | 0,49 | 0,026 | 0,11 | item nr. 01.02 circle seam W01 weld material, last bead. |
| | | | | | | | | | | |

x Hr. Slegtenhorst (C.D.)
x Hr. v. Nes (A.F.)
x Lab. archief



DE ROTTERDAMSCHE DROOGDOK MAATSCHAPPIJ N.V. THE ROTTERDAM DOCKYARD CO. LABORATORY LABORATORIUM

25-11-70.

HRC

Cont.

# DE ROTTERDAMSCHE DROOGDOK MAATSCHAPPIJ N.V.

Quality and Metallurgical Department

Ordered by : W.E.C.
Material : Carbonsteel
Applicent : Mr. Bland

RDM order nr. : 30663
Item nr. : 03-04
Lab. Report nr. : M535

| ...ired | Chemical Composition C % | Mn % | Si % | P % | S % | Ni % | Mo % | Cu% | Co% | Weld/ Cladding Identification | Bead | Layer | Date | Analyse ...st | ... |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0.074 | 1.59 | 0.34 | 0.011 | 0.010 | 0.13 | 0.49 | 0.11 | 0.01 | W04, 5th layer | | | 21-12-'71 | | |
| | 0.066 | 1.71 | 0.38 | 0.011 | 0.010 | 0.10 | 0.49 | 0.12 | 0.01 | W04 ½ filled weldjoint | | | 23-12-'71 | | |
| | | | | | | | | | | 54Mo:1725<br>89 :02275 | | | | | |

Chemical composition determined according to spec. nr. :
deR Ferrite content determined according to spec. nr. :

Laboratory, R.D.M., 17-1-1972.

DE ROTTERDAMSCHE DROOGDOK MIJ N.V. THE ROTTERDAM DOCKYARD CO LABORATORY LABORATORIUM

C03.2

# DE ROTTERDAMSCHE DROOGDOK MAATSCHAPPIJ N.V.

Quality and Metallurgical Department

Ordered by : W.E.C.
Material : Carbonsteel
Applicant : Mr. Eland

RDM Order nr. : 30663
Item nr. : 03-04
Lab. Report nr. : K535

| Chemical Composition | | | | | | | | | | Weld/ Cladding Identification | Bead | Layer | Date | Hardness |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| quired | C % | Mn % | Si % | P % | S % | Ni % | Mo % | Cu % | Co % | | | | | |
| | 0.082 | 1.63 | 0.35 | 0.011 | 0.009 | 0.18 | 0.52 | 0.11 | 0.01 | W04<br>S4Mo: 1725<br>89 02275 | | final | 3-1-'72 | |

Chemical composition determined according to spec. nr. :
eR Ferrite content determined according to spec. nr. :

Laboratory, R.D.M., 21-1-1972.
January,

THE ROTTERDAM DRYDOCK CO. N.V. LABORATORY LABORATORIUM

Ruler

C033

DE ROTTERDAMSCHE DROOGDOK MAATSCHAPPIJ N.V.

Quality and Metallurgical Department

Ordered by: W.E.C.

Reference :

Item :

Material :



R.D.M. Order no.: 30663

Lab.report no.: K 535

Drawing no.:

Inspection by :

Chemical composition

| | C % | Mn % | Si % | P % | S % | Ni % | Mo % | Co % | Cu % | S4Mo : 1725<br>89 : 02275 |
|---|---|---|---|---|---|---|---|---|---|---|
| Lead | | | | | | | | | | |
| | 0.063 | 1.74 | 0.33 | 0.012 | 0.008 | 0.09 | 0.49 | 0.009 | 0.10 | rondnaad 07-08 WOB<br>½ hoogte binnennaad<br>26-1-'71 |
| | 0.064 | 1.68 | 0.35 | 0.012 | 0.007 | 0.08 | 0.49 | 0.012 | 0.11 | rondnaad 07-08<br>Sn. 5 binnennaad<br>26-1-'71 |
| | 0.054 | 1.47 | 0.40 | 0.011 | 0.009 | 0.06 | 0.49 | 0.010 | 0.10 | rondnaad 07-08<br>sluitlaag binnen<br>30-1-'71 |

LLOYD'S REGISTER OF SHIPPING

Laboratory R.D.M., 25-2-1971.

Copy

# DE ROTTERDAMSCHE DROOGDOK MAATSCHAPPIJ N.V.

Quality and Metallurgical Department

Ordered by: W.E.C.

Reference :

Item :

Material :

R.D.M. Order no.: 30663

Lab.report no.: K 535

Draving no.:

Inspection by :

Chemical composition

| | C % | Mn % | Si % | P % | S % | Ni % | Mo % | Co % | Cu % | S4Mo: 1725 |
|---|---|---|---|---|---|---|---|---|---|---|
| quired | | | | | | | | | | BG 02175 |
| | 0,072 | 1,58 | 0,37 | 0,011 | 0,009 | 0,08 | 0,49 | 0,014 | 0,10 | nozzle 12 W12<br>½ filled weldjoint<br>5-4-71 |
| | 0,10 | 1,39 | 0,36 | 0,010 | 0,009 | 0,25 | 0,51 | 0,017 | 0,11 | nozzle 12<br>5th layer<br>5-4-71 |
| | 0,083 | 1,55 | 0,36 | 0,011 | 0,009 | 0,10 | 0,50 | 0,014 | 0,11 | nozzle 12<br>final layer<br>8-4-71 |

Laboratory R.D.M., 21-4-1971

Cows

# DE ROTTERDAMSCHE DROOGDOK MAATSCHAPPIJ N.V.

Quality and Metallurgical Department

Ordered by: W.B.C.

Reference :

Item :

Material :

R.D.M. Order no.: 30663

Lab.report no.: K 535

Drawing no.:

Inspection by :

Chemical composition

| | C % | Mn % | Si % | P % | S % | Ni % | Mo % | Co % | Cu % | S4Mo1725 |
|---|---|---|---|---|---|---|---|---|---|---|
| quired | | | | | | | | | | 89 02275 |
| | 0,066 | 1,54 | 0,40 | 0,010 | 0,007 | 0,07 | 0,49 | 0,014 | 0,11 | nozzle 13 W13<br>½ filled weld joint<br>1-4-71 |
| | 0,11 | 1,35 | 0,38 | 0,009 | 0,010 | 0,28 | 0,52 | 0,019 | 0,11 | nozzle 13<br>5th layer<br>31-3-71 |
| | 0,065 | 1,53 | 0,43 | 0,011 | 0,007 | 0,06 | 0,48 | 0,013 | 0,11 | nozzle 13<br>final layer<br>2-4-71 |

LLOYD'S REGISTER INDUSTRIAL SERVICES ROTTERDAM



DE ROTTERDAMSCHE DROOGDOK MAATSCHAPPIJ N.V. THE ROTTERDAM DOCKYARD CO. LABORATORY LABORATORIUM

R.D.M., 21 april 1971

C036

# DE ROTTERDAMSCHE DROOGDOK MAATSCHAPPIJ N.V.

Quality and Metallurgical Department

Ordered by: W.E.C.

Reference :

Item :

Material :

R.D.M. Order no.: 30663

Lab.report no.: K 535

Drawing no.:

Inspection by :



Chemical composition

| | C % | Mn % | Si % | P % | S % | Ni % | Mo % | Co % | Cu % | S4M6 : 1725 |
|---|---|---|---|---|---|---|---|---|---|---|
| quired | | | | | | | | | | 89 : 02275 |
| | 0,067 | 1,56 | 0,40 | 0,010 | 0,010 | 0,06 | 0,49 | 0,014 | 0,11 | Nozzle 14 W14 ½ filled weldjoint 29-3-71 |
| | 0,09 | 1,39 | 0,36 | 0,010 | 0,010 | 0,22 | 0,50 | 0,014 | 0,11 | Nozzle 14 5th layer 30-3-71 |
| | 0,076 | 1,56 | 0,40 | 0,010 | 0,010 | 0,08 | 0,50 | 0,014 | 0,11 | Nozzle 14 final layer 30-3-71 |

LLOYD'S REGISTER HOUDT ZICH AANBEVOLEN ROTTERDAM

DE ROTTERDAMSCHE DROOGDOK MAATSCHAPPIJ N.V. THE ROTTERDAM DRYDOCK CO. LABORATORY LABORATOIRE

M., 21-4-1971

R Ulay

C037

# DE ROTTERDAMSCHE DROOGDOK MAATSCHAPPIJ N.V.

Quality and Metallurgical Department

Ordered by: W.E.C.

Reference :

Item :

Material :

R.D.M. Order no.: 30663

Lab.report no.: K 535

Drawing no.:

Inspection by :

Chemical composition

| | C % | Mn % | Si % | P % | S % | Ni % | Mo % | Co % | Cu % | SuMo : 1725 |
|---|---|---|---|---|---|---|---|---|---|---|
| aired | | | | | | | | | | 89 : 02275 |
| | 0.065 | 1.62 | 0.38 | 0.011 | 0.007 | 0.11 | 0.51 | 0.008 | 0.10 | surv.mat. / sterktelas<br>½ lashoogte buitennaad<br>26-1-'71 |
| | 0.063 | 1.67 | 0.35 | 0.011 | 0.008 | 0.10 | 0.50 | 0.015 | 0.11 | surv.mat. / sterktelas<br>Sn. 5 buitennaad<br>26-1-'71 |
| | 0.099 | 1.33 | 0.36 | 0.010 | 0.010 | 0.29 | 0.54 | 0.015 | 0.11 | surv.mat. / sterktelas<br>lasapp. buitennaad<br>26-1-'71 |

LLOYD'S REGISTER INDUSTRIAL SERVICE

Laboratory R.D.M., 25-2-1971

# DE ROTTERDAMSCHE DROOGDOK MAATSCHAPPIJ N.V.

Quality and Metallurgical Department

Ordered by: Westinghouse Electric Corp.

Reference : 54-6-CVQ-100212 BP

Item :

Material : ASTM 508

R.D.M. Order no.: 30665

Lab.report no.:

Drawing no.:

Inspection by : W.E.C. / Lloyd's

Chemical composition

| | C % | Mn % | Si % | P % | S % | Ni % | Mo % | Cu % | Co % | S4Mo : 4275 |
|---|---|---|---|---|---|---|---|---|---|---|
| ired | | | | | | | | | | 89 : 02275 |
| | ~~0,063~~ | ~~1,37~~ | ~~0,33~~ | ~~0,018~~ | ~~0,015~~ | ~~0,10~~ | ~~0,53~~ | ~~0,11~~ | ~~0,02~~ | ~~Item nr. W05 / circle seam [illegible] leg. 04-05. ASME SA 508 class 2 (Weld material) Last bead of weld outside (08-9-70 10.00 h).~~ |
| | ~~0,11~~ | ~~1,37~~ | ~~0,29~~ | ~~0,013~~ | ~~0,015~~ | ~~0,40~~ | ~~0,60~~ | ~~0,11~~ | ~~0,02~~ | ~~Item nr. / circle seam [illegible] ASME SA 508 class 2 (weld material) bead nr. 5 (3-9-70 10.00 h)~~ |
| | ~~0,071~~ | ~~1,41~~ | ~~0,29~~ | ~~0,017~~ | ~~0,016~~ | ~~0,11~~ | ~~0,52~~ | ~~0,08~~ | ~~0,02~~ | ~~item nr. W05 (circle seam between leg 04 - 05. ASME SA 508 class 2 (weld material) + height of weld (7-9-70 10.~~ |
| | 0,105 | 1,46 | 0,35 | 0,010 | 0,010 | 0,20 | 0,51 | 0,11 | 0,02 | item nr. W07 / circle seam between ring 05-06. (weld material) bead nr. 5 (11-9-70 21.00 h). |
| | | | | | | | | | | |

LLOYD'S REGISTER INDUSTRIAL ROTTERDAM

DE ROTTERDAMSCHE DROOGDOK MIJ. N.V. LTD. ROTTERDAM DOCKYARD CO. LABORATORY LABORATORIUM

R.D.M., 28-10-1970.

# DE ROTTERDA. SCHE DROOGDOK MAATSC. APPIJ N.V.

Quality and Metallurgical Department

Ordered by: Westinghouse Electric Corporation.

Reference : 54-6-CVQ-100212 BP

Item :

Material : ASTM 508

R.D.M. Order no.: 30033

Lab.report no.:

Drawing no.:

Inspection by : W.E.C. / Lloyd's

Chemical composition

| | C % | Mn % | Si % | P % | S % | Ni % | Mo % | Cu % | Co % | S4Mo 4275 |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | 89 : 02275 |
| | 0,060 | 1,67 | 0,35 | 0,011 | 0,012 | 0,04 | 0,49 | 0,12 | 0,02 | Item nr. W07 / circle seam ring 05 - (weld material) & height of weld (21-9-70 14.00 h) |
| | 0,059 | 1,63 | 0,37 | 0,011 | 0,009 | 0,10 | 0,51 | 0,12 | 0,02 | item nr. W07 / circle seam between ring 05 - 06. (weld material) last bead outside |

LLOYD'S REGISTER NOTTEDAM

DE ROTTERDAMSCHE DROOGDOK MAATSCHAPPIJ N.V. THE ROTTERDAM DOCKYARD CO. LABORATORY LABORATORIUM

Laboratory R.D.M., 28-10-1970.

# DE ROTTERDAMSCHE DROOGDOK MAATSCHAPPIJ N.V.

Quality and Metallurgical Department

Ordered by: W.E.C.

Reference :

Item : 05

Material :

R.D.M. Order no.: 30663

Lab.report no.: K 535

Drawing no.:

Inspection by :

Chemical composition

| | C % | Mn % | Si % | P % | S % | Ni % | Mo % | Co % | Cu % | S4Mo 4292 89 02275 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| mired | | | | | | | | | | | |
| | 0.097 | 1.31 | 0.33 | 0.011 | 0.011 | 0.29 | 0.54 | 0.014 | 0.13 | nozzle 9 W09 | sterktelas snoer 5 4-2-'71 |
| | 0.072 | 1.40 | 0.35 | 0.010 | 0.011 | 0.13 | 0.50 | 0.004 | 0.14 | nozzle 9 W09 | sterktelas ½ hoogte lasnaad buitenzijde 6-2-'71 |
| | 0.058 | 1.39 | 0.44 | 0.012 | 0.010 | 0.09 | 0.51 | 0.013 | 0.12 | nozzle 9 W09 | sterktelas sluitlaag buitenzijde 10-2-'71 |

LLOYD'S REGISTER INDUSTRIAL SERVICE

Laboratory R.D.M., 25-2-1971

Cop.

# DE ROTTERDAMSCHE DROOGDOK MAATSCHAPPIJ N.V.

Quality and Metallurgical Department

Ordered by: W.E.C.

Reference :

Item :

Material :

R.D.M. Order no.: 30663

Lab.report no.: K 535

Drawing no.:

Inspection by :

Chemical composition

| | C % | Mn % | Si % | P % | S % | Ni % | Mo % | Co % | Cu % | S4Mo: 4292 |
|---|---|---|---|---|---|---|---|---|---|---|
| quired | | | | | | | | | | 89: 02275 |
| | 0.10 | 1.25 | 0.39 | 0.010 | 0.011 | 0.28 | 0.53 | 0.023 | 0.12 | nozzle 10 W10<br>5th layer 11-2-71 |
| | 0.060 | 1.53 | 0.41 | 0.011 | 0.010 | 0.09 | 0.50 | 0.019 | 0.11 | nozzle 10 W10<br>½ filled weldjoint 12-2-71 |
| | 0.072 | 1.64 | 0.34 | 0.010 | 0.010 | 0.12 | 0.52 | 0.016 | 0.12 | nozzle 10 W10<br>final layer 23-2-71 |

ROTTERDAM
Dec 1613
RWay

Laboratory R.D.M., 17-3-1971.

COS 2

# DE ROTTERDAMSCHE DROOGDOK MAATSCHAPPIJ N.V.

Quality and Metallurgical Department

Ordered by: W.E.C.

Reference :

Item :

Material :

R.D.M. Order no.: 30663

Lab.report no.: K 535

Drawing no.:

Inspection by :

Chemical composition

| | C % | Mn % | Si % | P % | S % | Ni % | Mo % | Co % | Cu % | S4Mo: 4292 89: 02275 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ired | | | | | | | | | | | |
| | 0.072 | 1.66 | 0.36 | 0.011 | 0.009 | 0.10 | 0.51 | 0.019 | 0.13 | nozzle 11 W11 | ½ filled weldjoint 22-2-71 |
| | 0.074 | 1.54 | 0.36 | 0.011 | 0.009 | 0.17 | 0.52 | 0.015 | 0.12 | nozzle 11 W11 | 5th layer 22-2-71 |
| | 0.071 | 1.66 | 0.34 | 0.010 | 0.010 | 0.10 | 0.52 | 0.015 | 0.12 | nozzle 11 W11 | final layer 23-2-71 |

ROTTERDAM LLOYD'S REGISTER NOSTRA SERVICES

Laboratory R.D.M., 17-3-1971

COSS

# DE ROTTERD. ISCHE DROOGDOK MAAT: HAPPIJ N.V.

Quality and Metallurgical Department

Ordered by: Westinghouse Electric Corp.

Reference : 54-6-CVQ-100212 BP

Item :

Material : ASTM 508

R.D.M. Order no.: 30663

Lab.report no.:

Drawing no.:

Inspection by : W.E.C. / Lloyd's

Chemical composition

40 : 25531

89 : 01211

| | C % | Mn % | Si % | P % | S % | Ni % | Mo % | Cu % | Co % | |
|---|---|---|---|---|---|---|---|---|---|---|
| quired | | | | | | | | | | |
| | 0,063 | 1,37 | 0,33 | 0,018 | 0,015 | 0,10 | 0,53 | 0,11 | 0,02 | Item nr. W05 / circle seam between leg. 04-05. ASME SA 508 class 2 (weld material) last bead of weld buttcil (09-8-70 10.00 h). |
| | 0,11 | 1,37 | 0,29 | 0,013 | 0,015 | 0,40 | 0,60 | 0,11 | 0,02 | Item nr. / circle seam ring / ASME SA 508 class 2 (weld material bead nr. 5 (5-9-70 10.00 h) |
| | 0,071 | 1,41 | 0,29 | 0,017 | 0,016 | 0,11 | 0,52 | 0,08 | 0,02 | item nr. W05 (circle seam between 04 - 05. ASME SA 508 class 2 (weld terial) à height of weld (7-9-70 1 |
| | ~~0,105~~ | ~~1,46~~ | ~~0,35~~ | ~~0,010~~ | ~~0,010~~ | ~~0,20~~ | ~~0,51~~ | ~~0,11~~ | ~~0,02~~ | item nr. W07 / circle seam between ring 05-06. (weld material) bead nr. 5 (11-9-70 21.00 h). |
| | | | | | | | | | | |

LLOYD'S REGISTER INDUSTRIAL SERVICES ROTTERDAM

DE ROTTERDAMSCHE DROOGDOK MAATSCHAPPIJ N.V. THE ROTTERDAM DOCKYARD CO. LABORATORY LABORATORIUM

R.D.M., 28-10-1970.

SULZER
QUALITY CONTROL

# IN - PROCESS - CONTROL - RECORD
## ANALYSEN - PROTOKOLL

No. V-1008
Sheet / Blatt 1 of / von 1

**Generals / Allgemeines**

| | | | |
|---|---|---|---|
| Customer / Kunde | RDM/Westinghouse | Order - No. / Kunden Best. No. | 30663 SSP |
| Object / Objekt | Ringhals-2 Reactor-Vessel | Works-No. / Sulzer Best. No. | 3-352.0297 |
| Part / Teil | Lower Shell Assembly | Drwg.-No. / Zeichnung | 1-103.080.793 |
| Material / Werkstoff | S 3 Mo | Man. Serial No. / Fabrikations Nr. | Weld W.03 |
| Weld - Proc. / Schweiss - Verf. | autom. submerged arc | Spec. - No. / Spez. - Nr. | 3AB/3303, rev.3 |

**Selection of samples / Proben - Entnahme**

| | | | | | | |
|---|---|---|---|---|---|---|
| Sample - No / Probe - Nr. | | 38 | 39 | 41 | 42 | 43 |
| Designation / Entnahme | | 2 pass | 28 pass | 92 pass | final pass | finalpass |
| Date / Datum | | 14.6.71 | 15.6.71 | 16.6.71 | 20.6.71 | 20.6.71 |
| Heat / Charge - Nr. | Wire | 716126 | 716126 | 716126 | 716126 | 716126 |
| Heat / Charge - Nr. | Flux | 26 | 26 | 26 | 26 | 26 |
| Heat / Charge - Nr. | | | | | | |
| Welder / Schweisser | | 143 | 143 | 143 | 175 | 175 |

**Technical Datas and Results / Technische Daten und Resultate**

Analyse - Meth. / Analysen - Meth.: Quantovac Spec. 3AB/3112, rev.0
Ferrite - Meth. / Ferrit - Messung:

**Analysis / Analyse**

| Element / Element | Requirement / Anforderung | | | | | |
|---|---|---|---|---|---|---|
| C | | 0.073 | 0.092 | 0.083 | 0.077 | 0.054 |
| P | | 0.0124 | 0.0134 | 0.0176 | 0.0185 | 0.0162 |
| S | | 0.0134 | 0.0143 | 0.0124 | 0.0134 | 0.0177 |
| Mn | | 1.69 | 1.69 | 1.73 | 1.65 | 1.90 |
| Si | | 0.237 | 0.227 | 0.227 | 0.225 | 0.188 |
| Cr | | 0.03 | 0.03 | 0.03 | 0.03 | 0.08 |
| Ni | | 0.03 | 0.03 | 0.04 | 0.04 | 0.08 |
| Mo | | 0.37 | 0.378 | 0.415 | 0.378 | 0.527 |
| Nb | | 0.01 | 0.01 | 0.02 | 0.02 | 0.02 |
| Ti | | 0.002 | 0.000 | 0 | 0 | 0 |
| Co | | 0.00 | 0.00 | 0.01 | 0.01 | 0.02 |
| Cu | | 0.061 | 0.062 | 0.079 | 0.064 | 0.262 |
| [illegible]V | | 0.003 | 0.003 | 0.003 | 0.003 | 0.006 |
| [illegible] Al | | 0.089 | 0.069 | 0.0175 | 0.0164 | 0.0159 |
| As | | 0.0196 | 0.0213 | 0,024 | 0.034 | 0.0428 |

Signature / Unterschrift

SULZER BROTHERS LIMITED
Works - Quality - Control
Date / Datum
Visa / Visum

SULZER BROTHERS LIMITED
Inspection Dept. for Nuclear Equipment
Date / Datum 12.8.1971
Visa / Visum

Quality and Metallurgical Department

Order no.: 30663

Ordered by: Westinghouse Electric Corp. (WAPD)

Lab.no.: 0-513 Rev.1

Item: Surveillance test material (Welded samples 03/04C and 03/04D).

Drawing no.: 30663-1161 Rev.E

Witnessed by:
Lloyd's: Mr.v. Bezuye
TRC : Mr. Svedberg

BaseMaterial: ASTM A508 cl. 2
Charge no.: 990713/294525 : ring 03
990622/293414 : ring 04 1)
Heat treatment: Stress relief of 20 h and 16 min at 610°C

impact test acc. to ASTM E 23

Type of bar: Charpy - V

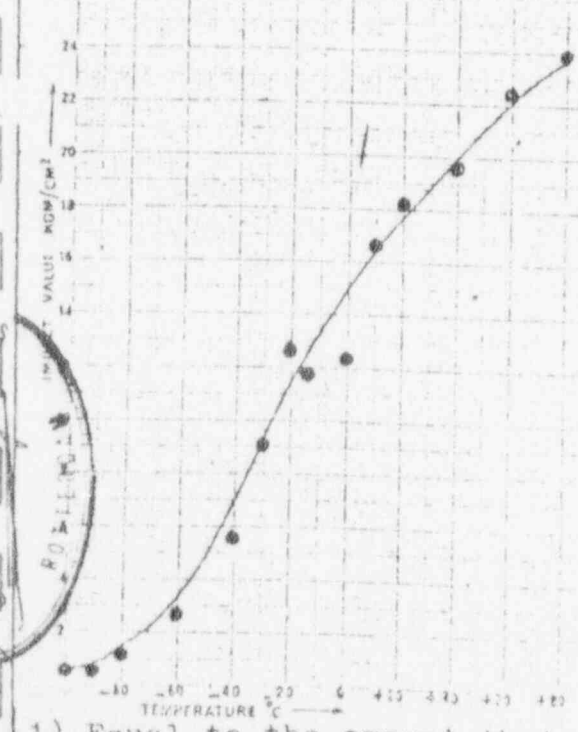
| Centre of weld No. | Energy kgm/cm² | Average energy kgm/cm² | Shear fracture % | Lateral exp. " | Temp. °C |
|---|---|---|---|---|---|
| Required | | | | | |
| 633RK1 | 0.5 | | 0 | 0.000 | -100 |
| K2 | 0.6 | | 0 | 0.000 | - 90 |
| K3 | 1.1 | | 0 | 0.006 | - 80 |
| K4 | 2.8 | | 6 | 0.012 | - 60 |
| K5 | 5.6 | | 12 | 0.020 | - 40 |
| K6 | 9.1 | | 23 | 0.047 | - 30 |
| K7 | 12.8 | | 41 | 0.063 | - 20 |
| K8 | 11.9 | | 44 | 0.063 | - 12 |
| K9 | 12.0 | | 44 | 0.067 | - 12 |
| K10 | 12.0 | | 45 | 0.063 | - 12 |
| K11 | 12.4 | | 44 | 0.059 | 0 |
| K12 | 16.8 | | 68 | 0.079 | + 10 |
| K13 | 18.1 | | 75 | 0.087 | + 20 |
| K14 | 19.8 | | 81 | 0.099 | + 40 |
| K15 | 22.5 | | 100 | 0.099 | + 60 |
| K16 | 24.0 | | 100 | 0.099 | + 80 |

| HAZ 2) No. | Energy | Average energy | Shear fracture | Lateral exp. | Tem |
|---|---|---|---|---|---|
| | kgm/cm² | kgm/cm² | % | " | °C |

54Mo: 1725
89: 02275

-20°C (2x) no break; -25°C: break

N.D.T Temp. (ASTM E 208, type P3): -25°C




TRC 01



1) Equal to the amount that ring 04 has seen including final stress relief.

2) Impact specimen taken from base metal with highest NDT-Temperature.

Laboratory R.D.M. April 20th, 1972
(Rev.1) August 25th, 1972

DE ROTTERDAMSCHE DROOGDOK MIJ
THE ROTTERDAM DOCKYARD CO
CONTROL DEPARTMENT

Quality and Metallurgical Departme : Order nº : 30663

Ordered by: Westinghouse Electric Corp. (WAPD) Lab.nº : 0-513 **Rev.1**
Item : Surveillance test material (Welded Samples 03/04C and 03/04D) Drawing nº: 30663-1161 Rev
Base material : ASTM A508 cl. 2 Witnessed by:
Charge nº : 990710/294525 : ring 03 Lloyd's: Mr.v. Bezuye
990622/293414 : ring 04 TRC : Mr. Svedberg
Heat treatment nº: Stress relief of 20 h and 16 min at 610°C

Chemical composition all weld metal

| | C % | Mn % | Si % | P % | S % | Cr % | Ni % | Mo % | Cu % | Co % | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Required | | | | | | | | | | | |
| 633RA1 | 0.064 | 1.76 | 0.36 | 0.009 | 0.007 | | 0.06 | 0.50 | 0.11 | 0.013 | ¥ |
| 633RA2 | 0.064 | 1.77 | 0.36 | 0.010 | 0.008 | | 0.06 | 0.51 | 0.10 | 0.013 | |
| 633RA3 | 0.064 | 1.73 | 0.35 | 0.010 | 0.007 | | 0.08 | 0.50 | 0.09 | 0.014 | |

Tensile test

| Nº | Diameter | Yield stress th | Tensile strength | Elongation | Reduct. of area | Temp. | Remarks |
|---|---|---|---|---|---|---|---|
| | mm | kg/mm² | kg/mm² | $l_s = d$ % | % | °C | Location |
| Required | 12.83 | | | | | | |
| | | | | | | | S4Mo: 1725 89: 02275 |



Impact test acc. to ASTM E 23 Type of bar: Charpy - V

| Nº | Energy | Average energy | Shear fracture | Lateral exp. | Temp. | Nº | Energy | Average energy | Shear fracture | Lateral exp. | Temp. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | kgm/cm² | kgm/cm² | % | " | °C | | kgm/cm² | kgm/cm² | % | " | °C |
| Required | | 5.2 | | | -12 | Required | | 5.2 | | | -12 |
| K51 | 6.8 | | 21 | 0.035 | | | | | | | |
| K52 | 4.8 | 5.9 | 27 | 0.032 | -12 | | | | | | |
| K53 | 6.1 | | 36 | 0.039 | | | | | | | |

| Specimens nrs. of notched specimen | Specimen nrs. of unnotched (not tested) specimens | Location/direction |
|---|---|---|
| 633RK51, 52, 53 | 633RK54, 55, 56 | centre of weld, ¼T |

Note: All notched specimens taken from O.D. and all unnotched specimens taken from I.D. rings.

¥ A1 = ¼T from upper surface
A2 = ½T
A3 = ¾T from lower surface

Versl/deR TRC 021

DE ROTTERDAMSCHE DROOGDOK MIJ. N.V. THE ROTTERDAM DOCKYARD CO.

Laboratory R.D.M., April 20th, 1972.
(rev.1) August 25th, 1972.

Quality and Metallurgical Department — Order no.: 30663

Ordered by: Westinghouse Electric Corp. (WAPD) — Lab. no.: 0.513 Rev.1

Item: Surveillance test material (Welded samples 03/04C and 03/04D). — Drawing no.: 30663-1161 Rev.E

Witnessed by: Lloyd's: Mr.v. Bezuye, TRC : Mr. Svedberg

Material: ASTM A508 cl. 2

Charge no.: 990710/294525 : ring 03
990622/293414 : ring 04

Heat treatment: Stress relief of 20 h and 16 min at 610°C

Tensile test: (from samples 03/04D)

| No | Diameter mm | Yield strength kgf/mm² | Tensile strength kgf/mm² | Elongation l=4 d | Reduction of area % | Temp. °C | Remarks Location/Direction | |
|---|---|---|---|---|---|---|---|---|
| Required | 12.83 | 38.2 | 56.2 | 18 | 38 | 20 | | fracture |
| 633RT1 | Ø12.83 | 44.1 | 56.3 | 22.8 | 67.6 | 20 | T(from O.D.), transverse to weld | weld metal |
| RT2 | Ø12.83 | 45.7 | 56.9 | 20.4 | 70.2 | 20 | T(from I.D.), " " | " |
| [redacted] | | | | | | | base metal 03 radial | - |
| [redacted] | | | | | | | | - |
| [redacted] | | | | | | | base metal 04 tang. | - |
| [redacted] | | | | | | | | - |
| Required | Ø12.83 | | | | | 350 | | |
| 633RWT1 | Ø12.83 | 40.2 | 52.6 | 13.4 | 61.1 | 350 | T(from O.D.), transverse to weld | weld metal |
| WT2 | Ø12.83 | 42.6 | 54.6 | 19.0 | 55.1 | 350 | T(from I.D.), " " | " |
| [redacted] | | | | | | | base metal 04, tang. | - |
| [redacted] | | | | | | | base metal 04, tang. | - |

S4Mo: 1725
89: 02275

TRC 021

Versl/deR

Laboratory R.D.M. April 28th, 19[illegible]
(rev. 1) August 25th, 1972

DE ROTTERDAMSCHE DROOGDOK MIJ. N.V. THE ROTTERDAM DOCKYARD CO. QUALITY

Quality and Metallurgical Department

Order no.: 30663

Ordered by: Westinghouse Electric Corp. (WAPD)

Lab.no.: L 599

Item: Surveillance testplate "Sample E"
ring 03 and ring 04

Drawing no.: 30663-1161 Rev.E

Witnessed by:
Lloyd's: Mr. Witteman
Westinghouse: Mr. R.May
TRC : Mr. Svedberg

Base Material: ASTM A 508 cl.2

Charge no.: 990710/29452 : ring 03
990622/293414: ring 04

Heat treatment: 30 h at 615°C/ simulated postweld heattreatment

Chemical composition

| | C % | Mn % | Si % | P % | S % | Cr % | Ni % | Mo % | Cu % | Co % | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Required | | | | | | | | | | | |
| 6334A1 | 0.07 | 1.68 | 0.42 | 0.011 | 0.009 | | 0.10 | 0.49 | 0.09 | 0.007 | see below |
| 6334A2 | 0.06 | 1.68 | 0.43 | 0.010 | 0.009 | | 0.09 | 0.49 | 0.09 | 0.007 | |
| 6334A3 | 0.07 | 1.66 | 0.40 | 0.010 | 0.010 | | 0.12 | 0.49 | 0.09 | 0.008 | |

Tensile test

| No | Dimensions | Yield strength | Tensile strength | Elongation | Reduct. of area | Temp. | Remarks |
|---|---|---|---|---|---|---|---|
| | mm | kg/mm² | kg/mm² | % d | % | °C | Location |
| Required | Ø12.83 | | | | | 350°C | transverse to weld. |
| 6334WT1 | Ø12.83 | 39.9 | 53.0 | 17.0 | 56.1 | 350°C | ¼T from Upper Surface |
| 6334WT2 | Ø12.83 | 40.6 | 53.9 | 17.6 | 60.1 | 350°C | ¼T from lower surface |

Impact test acc. to ASTM E 23 Type of bar: Charpy - V

| No | Energy | Average energy | Shear fracture | Lateral exp. | Temp. |
|---|---|---|---|---|---|
| | kgm/cm² | kgm/cm² | % | " | °C |
| Required | | 5.2 | | | -12 |

| No | Energy | Average energy | Shear fracture | Lateral exp. | Temp. |
|---|---|---|---|---|---|
| | kgm/cm² | kgm/cm² | % | " | °C |
| Required | | 5.2 | | | -12 |

Center of weld specimens

| | | | | | |
|---|---|---|---|---|---|
| 6334K41 | 12.5 | | 38 | 0.063 | |
| K42 | 11.4 | 11.6 | 38 | 0.059 | -12 |
| K43 | 10.8 | | 23 | 0.055 | |
| 6334K44 | 15.0 | | 55 | 0.075 | |
| K45 | 9.9 | 13.1 | 38 | 0.051 | -12 |
| K46 | 14.4 | | 41 | 0.075 | |
| 6334K47 | 12.5 | | 35 | 0.063 | |
| K48 | 8.5 | 10.6 | 42 | 0.047 | -12 |
| K49 | 10.9 | | 33 | 0.055 | |

S4Mo: 1725
89: 02275

Location of impact specimens + analysis of deposit

A1, K.1 - K.3 ¼T from upper surface
A2, K.4 - K.6 ¼T from upper surface
A3, K.7 - K.9 ¼T from lower surface

TRC 121

TRC P.Wan

LLOYD'S REGISTER INDUSTRIAL SERVICES

THE ROTTERDAM DOCKYARD CO

LABORATORY
LABORATORIUM

Laboratory R.D.M.

April 27, 1971

# DE ROTTERDAMSCHE DROOGDOK MAATSCHAPPIJ N.V.

Quality and Metallurgical Department

Order no.: 30624

Ordered by: Westinghouse Electric Corporation (WAPD) Lab.no.: N589

Item: Surveillance test material (sample "C") Drawing no.: 30616-1033
of ring 04 and ring 05.

Witnessed by:

Material: ASTM A508 cl.2 Lloyd's: Mr.v. Bezuye

Charge no.: ring 04: 990469/29323; ring 05: 288757/981057

Heat treatment: Stress relief[1] of 23h 12 min. at 610°C ± 20°C.

Impact test acc. to ASTM E 23 Type of bar: Charpy - V

| No | Energy kgm/cm² | Average energy kgm/cm² | Shear fracture % | Lateral exp. " | Temp. °C |
|---|---|---|---|---|---|
| Required | | | | | |

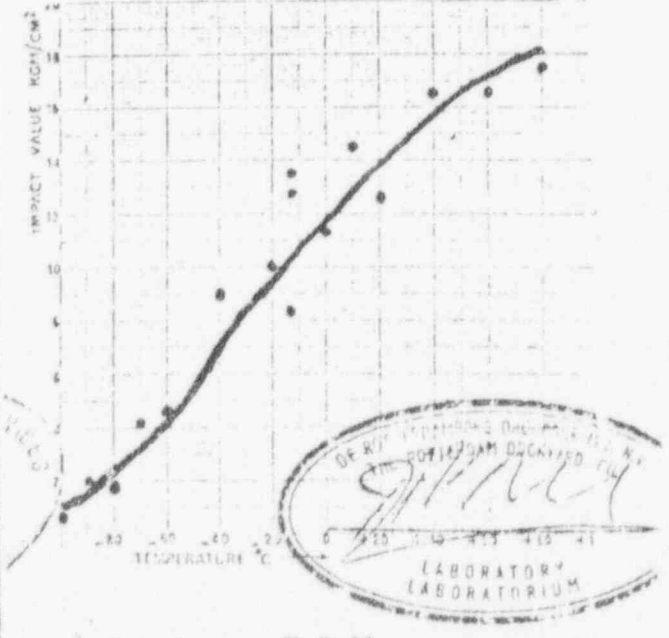
| No | Energy kgm/cm² | Average energy kgm/cm² | Shear fracture % | Lateral exp. " | Tem °C |
|---|---|---|---|---|---|
| Required | | | | | |
| 2445K17 | 0.9 | | 0 | 0.008 | -1 |
| K18 | 2.0 | | 0 | 0.032 | - |
| K19 | 1.9 | | 0 | 0.012 | - |
| K20 | 4.1 | | 6 | 0.028 | - |
| K21 | 4.6 | | 6 | 0.024 | - |
| K22 | 9.0 | | 19 | 0.043 | - |
| K23 | 10.0 | | 19 | 0.051 | - |
| K24 | 12.9 | | 31 | 0.067 | - |
| K25 | 13.5 | | 37 | 0.067 | - |
| K26 | 8.1 | | 25 | 0.043 | - |
| K27 | 11.5 | | 31 | 0.059 | |
| K28 | 14.5 | | 60 | 0.063 | + |
| K29 | 12.6 | | 42 | 0.067 | + |
| K30 | 16.5 | | 57 | 0.079 | + |
| K31 | 16.5 | | 69 | 0.083 | + |
| K32 | 17.5 | | 100 | 0.091 | + |

S4Mo: 4278
89 : 01211

-15 °C: (2x) no break; -20 °C: break

N.D.T. Temp. (ASTM E 208, type P3): -20

Specimens taken from center of weld.




Laboratory R.D.M.

February 1st, 1972.

[1] Equal to the total amount that course 05

DE ROTTERDAMSCHE DROOGDOK MAATSCHAPPIJ N.V.

Quality and Metallurgical Department

Order no.: 30616

Ordered by: Westinghouse Electric Corporation

Lab.no: N 579

Item: Surveillance test material of ring 04 and ring 05 (weldsample C)

Drawing no.: 30616-1033

Witnessed by:

Base Material: ASTM A508 cl.2

Lloyd's: N.V. Bezoe

Charge no.: ring 04: 980919/281587. ring 05: 980807/281489

Heat treatment: Stress relief[1] of 27 h 24 min. at 610°C.

Impact test acc. to ASTM E 23

Type of bar: Charpy V

| No | Energy | Average energy | Shear fracture | Lateral exp. | Temp. |
|---|---|---|---|---|---|
| | kgm/cm² | kgm/cm² | % | " | °C |
| Required | | | | | |
| 1645K1 | 3,5 | | 6 | 0,016 | -100 |
| K2 | 3,6 | | 6 | 0,020 | - 90 |
| K3 | 3,6 | | 12 | 0,020 | - 80 |
| K4 | 5,6 | | 17 | 0,028 | - 60 |
| K5 | 8,5 | | 33 | 0,039 | - 40 |
| 1645K6 | 11,3 | | 44 | 0,055 | - 30 |
| K7 | 13,1 | | 52 | 0,075 | - 20 |
| K8 | 13,3 | | 57 | 0,063 | - 12 |
| K9 | 12,9 | | 49 | 0,059 | - 12 |
| K10 | 13,3 | | 57 | 0,071 | - 12 |
| 1645K11 | 13,8 | | 65 | 0,071 | 0 |
| K12 | 16,4 | | 80 | 0,083 | + 10 |
| K13 | 14,4 | | 69 | 0,075 | + 20 |
| K14 | 18,9 | | 90 | 0,094 | + 40 |
| K15 | 20,1 | | 99 | 0,099 | + 60 |
| K16 | 20,3 | | 100 | 0,099 | + 80 |

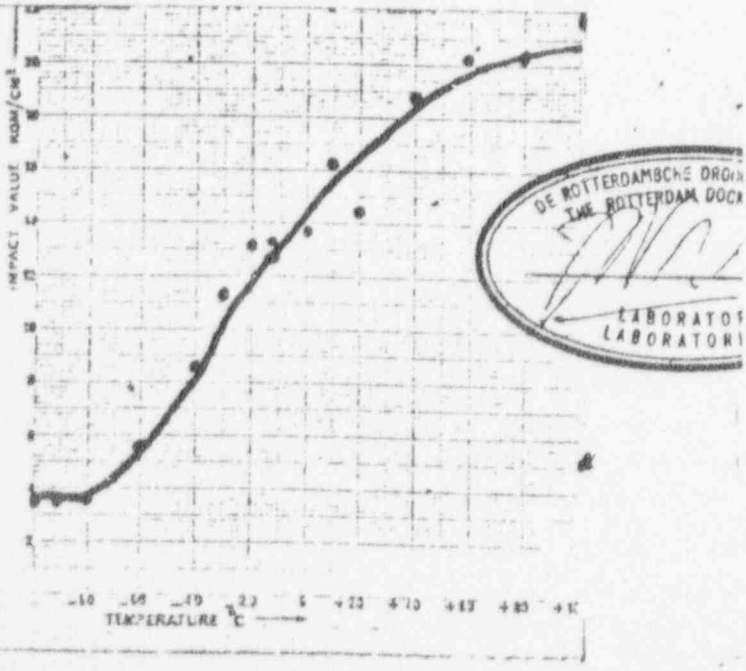
| No | Energy | Average energy | Shear fracture | |
|---|---|---|---|---|
| | kgm/cm² | kgm/cm² | % | |
| Required | | | | |

Smit 40: 25295
89: 01103

-35°C: (2x) no break; -40°C: break

N.D.T. Temp. (ASTM E 208, type P3): -40°C

Specimens taken from center of weld.




DE ROTTERDAMSCHE DROOGDOK MAATSCHAPPIJ N.V. ROTTERDAM DOCK LABORATORIUM

Laboratory R.D.M. January 4th, 1972.

Br/deR

1)

Quality and Metallurgical Department

Order no.: 30661

Ordered by: Westinghouse Electric Corp. (WAPD)

Lab. no.: 0-506 Rev.1

Item: Surveillance test material of ring 03 and ring 04 (Weld sample C)

Drawing no.: 30660-1151

Witnessed by:
Lloyd's: Mr.v. Bezuye

Base Material: ASTM A508 cl. 2

Charge no.: 990400 / 2[illegible]2332: ring 03
990311 / 2[illegible]8244: ring 04

Heat treatment: Stress relief [1]) of 20 h 16 min at 610°C.

Impact test acc. to ASTM E 23

Type of bar: Charpy - V from centre weld

| No. | Energy kgm/cm² | Average energy kgm/cm² | Shear fracture % | Lateral exp. " | Temp. °C |
|---|---|---|---|---|---|
| Required | | | | | |
| 6134K17 | 1.4 | | 0 | 0.008 | -100 |
| 18 | 0.8 | | 0 | 0.004 | - 90 |
| 19 | 3.3 | | 6 | 0.020 | - 80 |
| 20 | 4.3 | | 6 | 0.024 | - 60 |
| 21 | 3.1 | | 11 | 0.024 | - 40 |
| 22 | 5.6 | | 16 | 0.032 | - 30 |
| 23 | 8.1 | | 19 | 0.043 | - 20 |
| 24 | 9.3 | | 38 | 0.051 | - 12 |
| 25 | 3.6 | | 21 | 0.028 | - 12 |
| 26 | 3.9 | | 33 | 0.024 | - 12 |
| 38 | 5.0 | | 36 | 0.035 | - 1 |
| 39 | 7.1 | | 44 | 0.043 | + 5 |
| 40 | 8.5 | | 38 | 0.043 | + 4 |
| 41 | 7.9 | | 42 | 0.047 | + 4 |
| 42 | 7.3 | | 37 | 0.043 | + 4 |
| 27 | 8.1 | | 47 | 0.047 | + 7 |

| No. | Energy kgm/cm² | Average energy kgm/cm² | Shear fracture % | Lateral exp. " | Te |
|---|---|---|---|---|---|
| Required | | | | | |
| 6134K28 | 7.0 | | 51 | 0.051 | + |
| 29 | 7.4 | | 43 | 0.043 | + |
| 30 | 10.8 | | 58 | 0.059 | + |
| 31 | 14.0 | | 85 | 0.083 | + |
| 32 | 15.0 | | 85 | 0.083 | + |

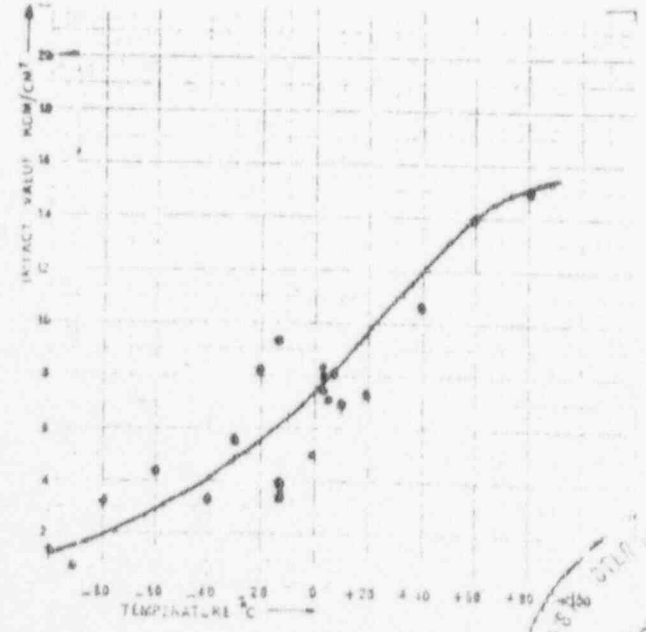
| No. | Temp. | Energy | Energy (avg. |
|---|---|---|---|
| 6134K40 | | 49.2 ftlb. | |
| K41 | +40°F | 45.6 " | 45.6 ftl |
| K42 | | 41.9 " | |

-20 °C (2x) no break; -25 °C: break

NDT Temp (ASTM E 208, type P3): -25 °C

Specimens taken from centre of weld at ¼T.

1) Equal to the total amount that course 04 has seen including final stress relief.




Smit 40: 25531
89: 01211

Laboratory R.D.M. April 6th, 1972
(rev.1) August 25th, 1972.

Quality and Metallurgical Department — Order no.: 30664/92100

Ordering: Westinghouse Electric Corp. (WAPD) — Lab.no.: P 542

Item: Surveillance Test Material ring 04/05; Weldsample C. — Drawing no.: 30738-1523 rev. B.

Base material: ASTM A508 cl.2.

Witnessed by:
Lloyd's: Mr. v. Bezuije.
W.L.C.: Mr. Chiandone.

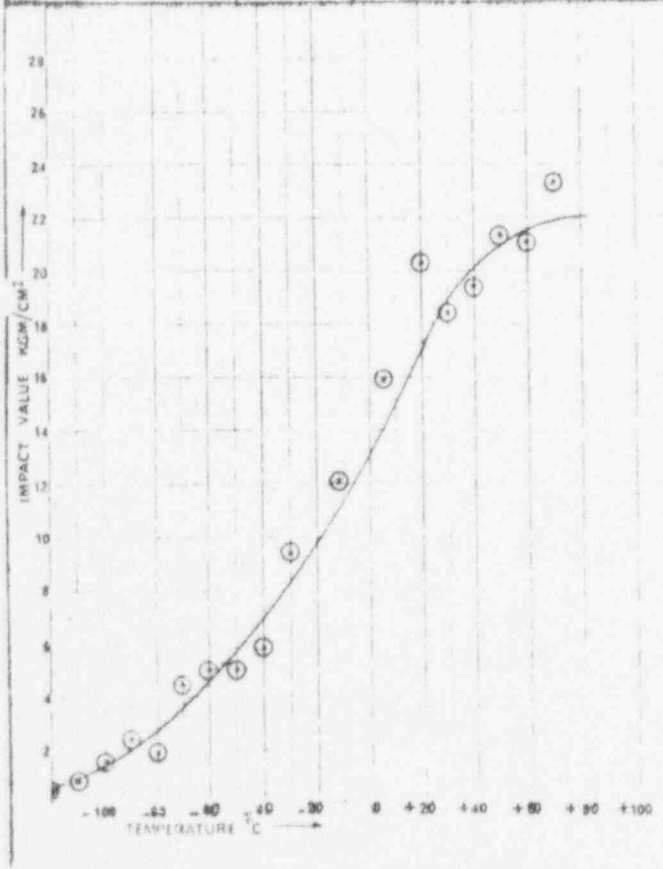
Charge no.: ring 04: 411337/11
ring 05: 526840

Heat treatment: See drawing thermal history of Surveillance Material.

Impact test acc.to ASTM E 23 — Type of bar: Charpy-V

| | Energy kgm/cm² | Shear fracture % | Lateral exp. " | Temp. °C |
|---|---|---|---|---|
| Required | | | | |
| 6445 K1 | 20.3 | 92 | 0.087 | + 20 |
| K2 | 18.4 | 98 | 0.091 | + 30 |
| K3 | 4.5 | 16 | 0.016 | - 70 |
| K4 | 5.0 | 30 | 0.028 | - 60 |
| K5 | 5.0 | 34 | 0.032 | - 50 |
| K6 | 5.8 | 47 | 0.028 | - 40 |
| K7 | 9.4 | 56 | 0.047 | - 30 |
| K8 | 12.1 | 66 | 0.063 | - 12 |
| K9 | 15.9 | 76 | 0.071 | +4.4 |

| | Energy kgm/cm² | Shear fracture % | Lateral exp. " | Temp. °C |
|---|---|---|---|---|
| Required | | | | |
| 6445 K10 | 0.9 | 6 | 0.008 | -110 |
| K11 | 0.6 | 0 | 0.004 | -120 |
| K12 | 1.6 | 5 | 0.012 | -100 |
| K13 | 2.4 | 16 | 0.016 | - 90 |
| K14 | 1.9 | 11 | 0.012 | - 80 |
| K15 | 23.3 | 100 | 0.094 | + 70 |
| K16 | 21.1 | 100 | 0.091 | + 60 |
| K17 | 21.4 | 95 | 0.094 | + 50 |
| K18 | 19.4 | 90 | 0.094 | + 40 |




-55 °C: (2x) no break; -60 °C: break

N.D.T.Temp.(ASTM E 208, type P3): -60 °C

* Note: All specimen taken at centre of weld.

S3NiMo: 895075
LW320: P46

S3NiMo: 899680
LW320: P23

LLOYD'S REGISTER OF SHIPPING
LABORATORY

Quality and Metallurgical Department

Order no.: 30743/921-80

Ordered by: Westinghouse Electric Corp. (WAPD)

Lab.no.: P.513 revision 1

Item: Surveillance test material
ring 04/05. Weld sample C

Drawing no.: 30748-1523 rev.1

Base material: ASTM A508 cl.2

Witnessed by:
Lloyd's: Mr. [illegible]
W.E.C. : Mr. Chiandone

Charge no.: 527708: ring 04
411005: ring 05

Heat treatment: See drawing thermal history of Surveillance Material.

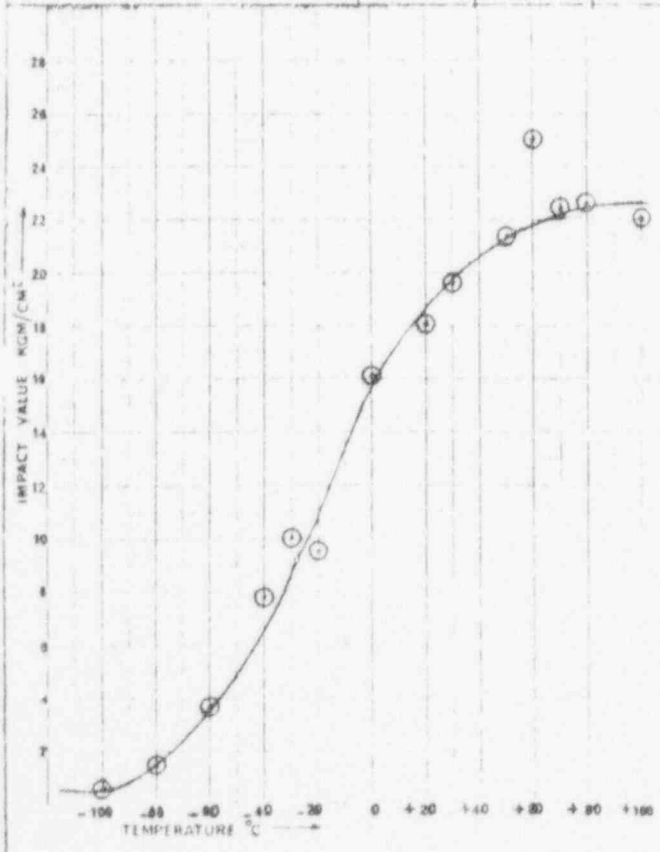
Impact test acc.to ASTM E 23

Type of bar : Charpy-V

| | Energy kgm/cm² | Shear fracture % | Lateral exp. " | Temp. °C |
|---|---|---|---|---|
| Required | | | | |
| 4345K1,2,3 | 18.1 | 92 | 0.081 | +20 |
| K4,5,6 | 3.7 | 33 | 0.023 | -60 |
| K7 | 22.0 | 100 | 0.087 | +100 |
| K8 | 0.6 | 0 | 0.004 | -100 |
| K9 | 1.5 | 15 | 0.012 | -80 |
| K10 | 7.8 | 43 | 0.039 | -40 |
| K11 | 10.0 | 55 | 0.047 | -30 |

| | Energy kgm/cm² | Shear fracture % | Lateral exp. " | Temp. °C |
|---|---|---|---|---|
| Required | | | | |
| 4345K12 | 9.5 | 47 | 0.043 | -20 |
| K13 | 16.1 | 76 | 0.071 | 0 |
| K14 | 19.6 | 89 | 0.091 | +30 |
| K15 | 21.4 | 93 | 0.083 | +50 |
| K16 | 25.0 | 100 | 0.099 | +60 |
| K17 | 22.4 | 98 | 0.094 | +70 |
| K18 | 22.6 | 98 | 0.087 | +80 |

| | | |
|---|---|---|
| S3NiMo: | 8950 | 75 |
| LW320: | P46 | |
| S3NiMo: | 8996 | 80 |
| LW320: | P23 | |




-55 °C.(2x) no break; -60 °C: break

N.D.T.Temp.(ASTM E 208, type P3): -60 °C

* All specimens taken at center of weld

Sm/vdB

Laboratory [illegible]

Quality and Metallurgical Department

Order no.: 30749/92100

Ordered by: Westinghouse Electric Corp (WAPD)

Lab.no.: P.542

Item: Surveillance Test Material
ring 04/05 ; weldsample C.

Drawing no.: 30738-1523 rev.1

Base material: ASTM A 508 cl.2.

Charge no.: ring 04: 528522
ring 05: 527536

Witnessed by:
Lloyd's : Mr.v.Bezuije
W.E.C. : Mr.Chiandone

Heat treatment: See drawing thermal history of Surveillance Material.

Impact test acc.to ASTM E 23

Type of bar : Charpy - V

| | | Energy kgm/cm² | Shear fracture % | Lateral exp. " | Temp. °C |
|---|---|---|---|---|---|
| Required | | | | | |
| 4945 | K1 | 18.9 | 85 | 0.087 | + 20 |
| | K2 | 20.6 | 95 | 0.087 | + 30 |
| | K3 | 1.5 | 16 | 0.008 | - 70 |
| | K4 | 2.0 | 11 | 0.016 | - 60 |
| | K5 | 2.5 | 16 | 0.016 | - 50 |
| | K6 | 7.0 | 40 | 0.032 | - 40 |
| | K7 | 8.5 | 43 | 0.043 | - 30 |
| | K8 | 13.4 | 69 | 0.063 | - 12 |
| | K9 | 15.8 | 75 | 0.071 | + 44 |

| | | Energy kgm/cm² | Shear fracture % | Lateral exp. " | Temp. °C |
|---|---|---|---|---|---|
| Required | | | | | |
| 4945 | K10 | 0.6 | 0 | 0.004 | -110 |
| | K11 | 0.5 | 0 | 0.004 | -120 |
| | K12 | 1.3 | 5 | 0.008 | -100 |
| | K13 | 1.9 | 10 | 0.020 | - 90 |
| | K14 | 1.4 | 17 | 0.008 | - 80 |
| | K15 | 22.5 | 98 | 0.091 | + 70 |
| | K16 | 20.5 | 92 | 0.087 | + 60 |
| | K17 | 19.6 | 88 | 0.079 | + 50 |
| | K18 | 22.6 | 90 | 0.079 | + 40 |

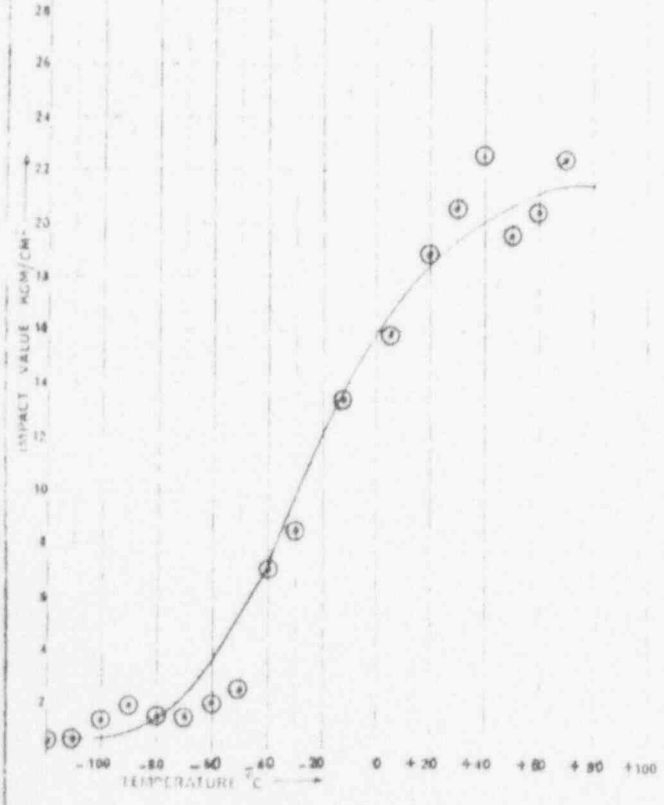
S3NiMo : 895075
LW320 : P46

S3NiMo : 899680
LW320 : P23

-50°C:(2x) no break; - 55 °C: break

N.D.T.Temp.(ASTM E 208, type P3): -55 °C

Note: All specimens taken at centre of weld.



Quality and Metallurgical Department

Order no.: 30750/92100

Ordered by: Westinghouse Electric Corp (WAPD)

Lab.no.: P.542

Item: Surveillance Test Material
ring 04/05 ; weldsample C.

Drawing no.: 30738-1523 rev.

Base material: ASTM A508 cl.2.

Charge no.: ring 04 : 528658
ring 05 : 527828

Witnessed by:
Lloyd's: Mr.v.Bezuije
W.E.C. . Mr.Chiandone

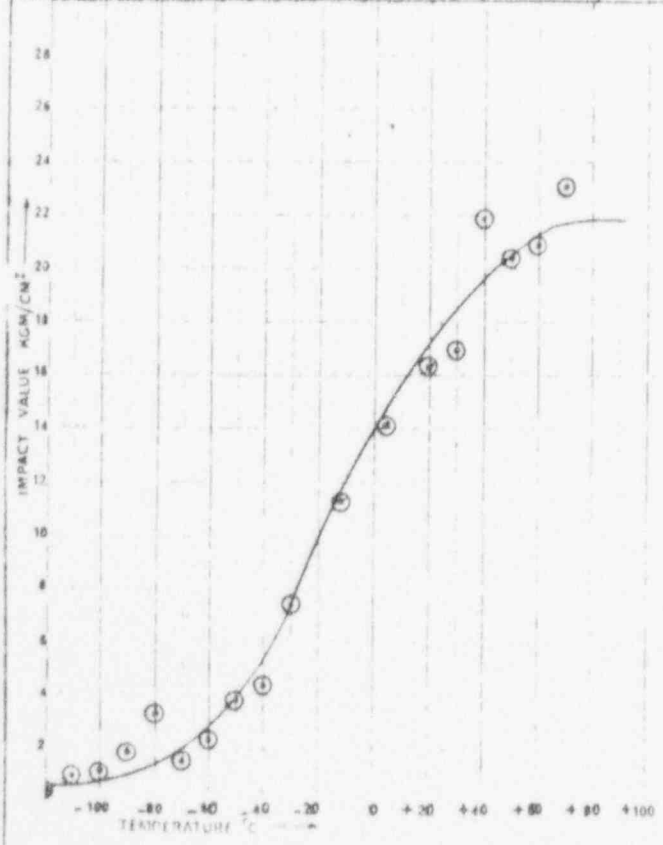
Heat treatment: See drawing thermal history of Surveillance Material.

Impact test acc.to ASTM E 23

Type of bar : Charpy - V

| | | Energy kgm/cm² | Shear fracture % | Lateral exp. " | Temp. °C |
|---|---|---|---|---|---|
| Required | | | | | |
| 5045 | K1 | 16.3 | 78 | 0.079 | +20 |
| | K2 | 16.9 | 97 | 0.083 | +30 |
| | K3 | 1.5 | 10 | 0.012 | -70 |
| | K4 | 2.3 | 15 | 0.016 | -60 |
| | K5 | 3.8 | 30 | 0.024 | -50 |
| | K6 | 4.4 | 30 | 0.028 | -40 |
| | K7 | 7.4 | 40 | 0.039 | -30 |
| | K8 | 11.3 | 62 | 0.055 | -12 |
| | K9 | 14.1 | 76 | 0.071 | +4.4 |
| | | | | | |
| | | | | | |

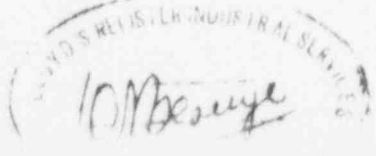
| | | Energy kgm/cm² | Shear fracture % | Lateral exp. " | Temp. °C |
|---|---|---|---|---|---|
| Required | | | | | |
| 5045 | K10 | 0.9 | 0 | 0.004 | -110 |
| | K11 | 0.3 | 0 | 0.004 | -120 |
| | K12 | 1.1 | 5 | 0.008 | -100 |
| | K13 | 1.8 | 16 | 0.012 | - 90 |
| | K14 | 3.3 | 17 | 0.020 | -80 |
| | K15 | 23.1 | 98 | 0.094 | +70 |
| | K16 | 20.9 | 98 | 0.094 | +60 |
| | K17 | 20.4 | 90 | 0.083 | +50 |
| | K18 | 21.9 | 95 | 0.079 | +40 |
| | | | | | |
| S3NiMo : | | 8950 | 75 | | |
| LW320 : | | P46 | | | |
| | | | | | |
| S3NiMo : | | 8996 | 80 | | |
| LW320 : | | P23 | | | |




-55°C (2x) no break; -60 °C: break

N.D.T. resp.(ASTM E 208, type P3): °C

Note: All specimens taken at centre of weld.



Quality and Metallurgical Department

Doc.1

Order no.: 30662

Ordered by: Westinghouse Electric Corp. W.A.P.D. Lab.no.: 0.577 rev. 1

Item: Surveillance test material of ring 03 and 04 (Weld sample C)

Drawing no.: 30660-1151

Base material: ASTM A508 cl.2

Charge no.: 990533/297355 (ring 3)
990496/292424 (ring 4)

Witnessed by:
Lloyd's: Mr. Witteman
W.E.C. : Mr. May

Heat treatment: Stress relief[1] of 13 hrs and 26 min at 610°C.

Impact test acc.to ASTM E 23

Type of bar: Charpy - V

| | Energy kgm/cm² | Shear fracture % | Lateral exp. " | Temp. °C |
|---|---|---|---|---|
| Required | | | | |
| 6234 K1 | 0.5 | 0 | 0.000 | -100 |
| K2 | 0.8 | 5 | 0.004 | - 90 |
| K3 | 1.4 | 10 | 0.012 | - 80 |
| K4 | 2.3 | 30 | 0.016 | - 60 |
| K5 | 11.9 | 67 | 0.067 | - 40 |
| K6 | 10.1 | 51 | 0.051 | - 20 |
| K7 | 13.8 | 69 | 0.067 | - 12 |
| K8 | 7.8 | 47 | 0.039 | - 12 |
| K9 | 12.1 | 66 | 0.063 | - 12 |
| K10 | 14.0 | 62 | 0.067 | 0 |
| K11 | 17.3 | 75 | 0.079 | + 10 |
| K12 | 17.4 | 91 | 0.087 | + 20 |
| K13 | 18.3 | 98 | 0.094 | + 40 |
| K14 | 19.3 | 99 | 0.099 | + 60 |
| K15 | 18.0 | 95 | 0.094 | + 80 |

| | Energy kgm/cm² | Shear fracture % | Lateral exp. " | Temp. °C |
|---|---|---|---|---|
| Required | | | | |

S3Mo: 716126
LW320: 26

-50°C;(2x) no break; -55 °C: break

N.D.T.Temp.(ASTM E 208, type P3): -55°C

Specimens taken from center of weld at ¼T.

1) Equal to the total amount that circular seam of ring 03 to 04 has seen including final stress relief.

For NDT curves, see attachment I.

Bras

LLOYD'S REGISTER INDUSTRIAL SERVICES ROTTERDAM

DE NIEUWE DORDRECHTSCHE SCHEEPSWERF EN MACHINEFABRIEK N.V. THE ROTTERDAM DRYDOCK CO. LTD. LABORATORY LABORATORIUM

Laboratory R.D.M.,

Quality and Metallurgical Department

Attachment 1 D06.2
Order no.: 30662

Ordered by: Westinghouse Electric Corp. W.A.P.D. Lab.no.: 0.577

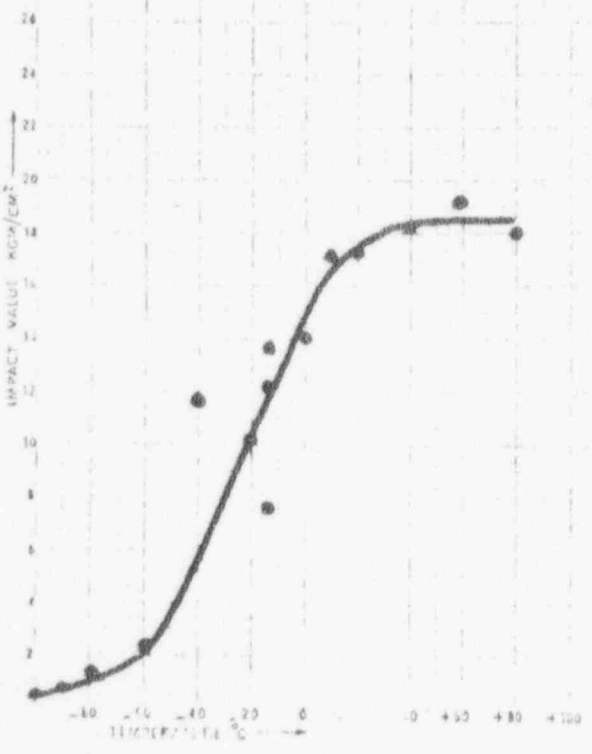
Item: Surveillance test material of ring 03 and 04 (Weld sample C) Drawing no.: 30660-1151

Base material: ASTM A508 cl.2

Charge no.: 990533/297355 (ring 3)
990496/292424 (ring 4)

Witnessed by:
Lloyd's: Mr. Witteman
W.E.C. : Mr. May

Heat treatment: Stress relief of 15 hrs and 26 min. at 610°C.




S3MO: 716126
LW320: 26

Center of weld

SURVEILLANCE TEST MATERIAL

Project: Surry 2

The Surveillance Test Material was welded by Sulzer and tested by B&W.

No drop weight data is presented by B&W.
This lack of drop weight data is a deviation from W E-Spec. W accepted this deviation and the NDTT was estimated as permitted by NRC Standard Review Plan Section 5.3.2.

Note: The data of Attachment D07.2, D07.3 and D07.4 are taken from W WCAP Report - Surveillance Weldment submitted to RSV-A as Attachment No. 7 of W letter PE-RVP-2426 of August 1, 1979.

SURVEILLANCE TEST MATERIAL

Project: Surry 2

Made by: Sulzer

Welding Process : Submerged Arc

Weld Control No. : R-3008

Weld Wire: Type : MnMo

Heat No.: 0227

Flux : Type : LW320

Lot No. : 14

PWHT : 1140°F - 15¼ HR - FC

Chemical Composition :

| | | |
|---|---|---|
| C | .09 | % |
| Mn | 1.51 | % |
| P | .017 | % |
| S | .016 | % |
| Si | .46 | % |
| Cr | .10 | % |
| Ni | .56 | % |
| Mo | .41 | % |
| Cu | .19 | % |

Mechanical Properties:

| | | |
|---|---|---|
| $T_{NDT}$* | 0 | °F |
| Energy at 10°F | 53, 47, 35 | Ft-Lbs |
| $RT_{NDT}$* | 0 | °F |
| Shelf Energy | 91 | Ft-Lbs |
| YS | 70.85 | Psi |
| UTS | 86.50 | Psi |
| Elong | 26.4 | % |
| RA | 67.8 | % |

* Estimated per NRC Standard Review Plan Section 5.3.2.
See also Attachment D07.1.

TABLE 4

PREIRRADIATION CHARPY V-NOTCH IMPACT
DATA FOR SURRY UNIT NO. 2
REACTOR PRESSURE VESSEL CORE REGION WELD METAL

| Test Temp. (°F) | Impact Energy (ft-lb) | Shear (%) | Lateral Expansion (mils) |
|---|---|---|---|
| -100 | 7 | 9 | 5 |
| -100 | 7.5 | 9 | 5 |
| -100 | 7 | 5 | 3 |
| -40 | 15.5 | 17 | 15 |
| -40 | 24 | 37 | 20 |
| -40 | 34 | 33 | 31 |
| -20 | 31 | 53 | 29 |
| -20 | 27.5 | 47 | 25 |
| -20 | 29 | 33 | 25 |
| 10 | 53 | 68 | 47 |
| 10 | 47 | 58 | 40 |
| 10 | 35 | 47 | 33 |
| 40 | 50 | 74 | 50 |
| 40 | 55.5 | 74 | 51 |
| 40 | 53.5 | 68 | 51 |
| 73 | 75 | 100 | 68 |
| 73 | 81 | 100 | 72 |
| 73 | 78 | 100 | 71 |
| 210 | 69.5 | 100 | 66 |
| 210 | 72 | 100 | 70 |
| 210 | 86 | 100 | 80 |
| 300 | 91 | 100 | 82 |
| 300 | 91 | 100 | 81 |
| 300 | 91 | 100 | 83 |

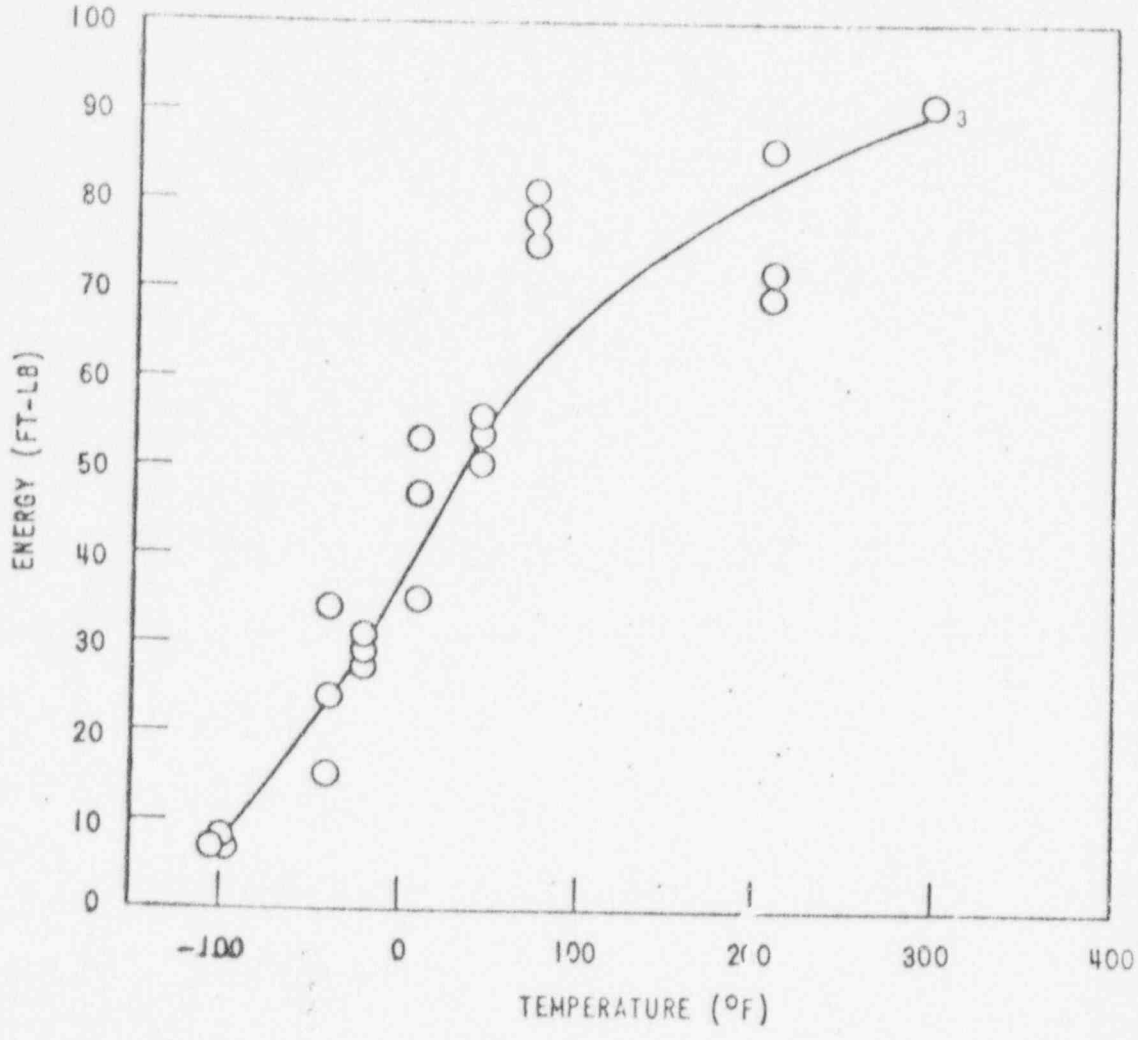



**Figure 9.** Preirradiation Charpy V-Notch Impact Energy for the Surry Unit No. 2 Reactor Pressure Vessel Core Region Weld Metal

SURVEILLANCE TEST MATERIAL

Project: Surry 1

The Surveillance Test Material was welded and tested by B&W.

No drop weight data is presented by B&W.
This lack of drop weight data is a deviation from W E-Spec.
W accepted this deviation and the NDTT was estimated as permitted by NRC Standard Review Plan Section 5.3.2.

Note: The data of Attachment D08.2, D08.3 and D08.4 are taken from W WCAP Report - Surveillance Weldment submitted to RSV-A as Attachment No. 7 of W letter PE-RVP-2426 of August 1, 1979.

SURVEILLANCE TEST MATERIAL

Project: Surry 1
Made by: B&W

Welding Process : Submerged Arc
Weld Control No. : SA1526
Weld Wire: Type : MnMoNi
Heat No.: 299L44
Flux : Type : Linde 80
Lot No. : 8596
PWHT : 1125°F - 15½ HR - FC

Chemical Composition :

| | | |
|---|---|---|
| C | : .10 | % |
| Mn | : 1.49 | % |
| P | : .011 | % |
| S | : .010 | % |
| Si | : .37 | % |
| Cr | : .076 | % |
| Ni | : .68 | % |
| Mo | : .46 | % |
| Cu | : .25 | % |

Mechanical Properties:

| | | |
|---|---|---|
| $T_{NDT}$* | : 0 | °F |
| Energy at 10°F | : 43, 35.5, 37 | Ft-Lbs |
| $RT_{NDT}$* | : 0 | °F |
| Shelf Energy | : 70 | Ft-Lbs. |
| YS | : 69.67 | Psi |
| UTS | : 83.20 | Psi |
| Elong | : 26.5 | % |
| RA | : 66.7 | % |

* Estimated per NRC Standard Review Plan Section 5.3.2.
See also Attacment D08.1.

TABLE 5

PREIRRADIATION CHARPY V-NOTCH IMPACT DATA FOR THE SURRY UNIT NO. 1 REACTOR PRESSURE VESSEL WELD METAL

| Test Temp. (°F) | Impact Energy (ft-lb) | Shear (%) | Lateral Expansion (mils) |
|---|---|---|---|
| -150 | 23.5 | 18 | 20 |
| -150 | 5.5 | 5 | 3 |
| -150 | 5.5 | 5 | 3 |
| -100 | 19.0 | 17 | 16 |
| -100 | 9.0 | 13 | 8 |
| -100 | 16.0 | 13 | 15 |
| -50 | 10.0 | 18 | 13 |
| -50 | 17.5 | 14 | 18 |
| -50 | 23.5 | 29 | 20 |
| -25 | 38.0 | 29 | 36 |
| -25 | 31.0 | 25 | 26 |
| 10 | 43.0 | 46 | 40 |
| 10 | 35.5 | 40 | 35 |
| 10 | 37.0 | 37 | 40 |
| 75 | 65.0 | 97 | 67 |
| 75 | 54.0 | 69 | 49 |
| 75 | 55.0 | 71 | 55 |
| 110 | 66.0 | 95 | 70 |
| 110 | 61.5 | 90 | 62 |
| 110 | 69.0 | 100 | 72 |
| 210 | 70.0 | 100 | 71 |
| 210 | 68.5 | 100 | 70 |
| 210 | 71.0 | 100 | 76 |

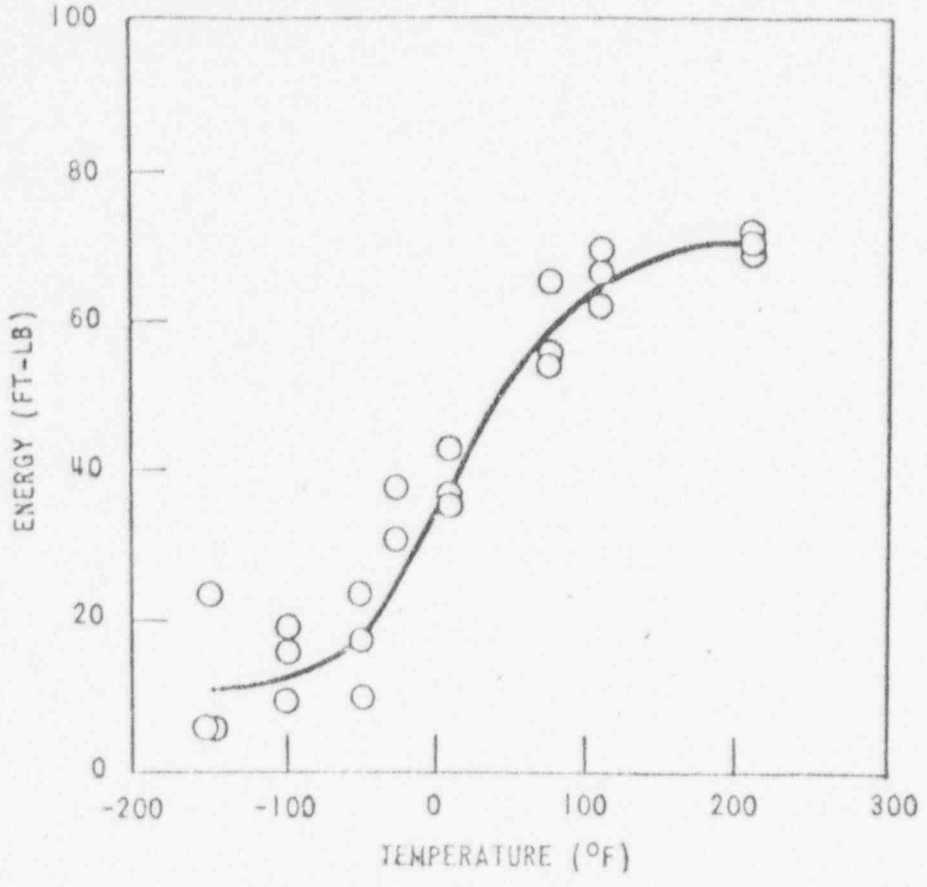



Figure 9. Preirradiation Charpy V-Notch Impact Energy for the Surry Unit No. 1 Reactor Pressure Vessel Weld Metal

E01.1

# DE ROTTERDAMSCHE DROOGDOK MAATSCHAPPIJ N.V.

## RAPPORT VAN AFWIJKING
## REPORT OF DEVIATION

| | | | |
|---|---|---|---|
| Tek./Drw. No.: 3.663-1163<br>Leg./Item No.: 02 | Order No.: 2665<br>Spec. No.: — | AF<br>Div. MF<br>Afd. Sdg<br>KD Lab<br>Tek | No.<br>K/M- 665-N29-016 |
| Contr./Insp.: Lloyds A.D.<br>Datum/Date: Dec 3rd 14 | Test of onderz.: Chem.<br>Test or inspect.: analysis | | |

V21

1. Onderzoek / Inspection: bij ontvangst / after receiving — in productie / in process — eind toestand / in final condition

2. Onderdeel / Subject: bottom head spher ring

3. Onderzocht gedeelte / Part examined: Weldmaterial in weldjoints plates 1 & 2 and 1 & 3

4. Resultaat / Results: Weld plates 1-2: Ni 2% actual 1.28 %
Weldjoint requires 1,2 %

5. Opmerkingen / Remarks: accoord/onacceptabel / accept/reject — voortgang productie / proceed product: ja/neen / yes/no

Voorstel / Proposed action: Use as is



| | | |
|---|---|---|
| Acc. / Agree: QC. | Acc. / Agree: Prod. | Acc. / Agree: Insp. |

LLOYD'S REGISTER ... ROTTERDAM

E02.1

# DE ROTTERDAMSCHE DROOGDOK MAATSCHAPPIJ N.V.

DEVIATION REQUEST (Material Review Board)

No. 616-W05-007-D17
Ex no 616-W05-007
sheet 1 of 2

Prepared by : J. Laan date: 4-20-1971
Client : Westinghouse Electric Corp.
Project : TVA 1
Ref. nr. : 54-6CVQ-84996
Order nr. R.D.M. : 30616
Drawing : 30616-1050 sheet: 1 revision: D
Item nr. : W 05
Item description : Circular seam between items 04 and 05
Material spec. : SA 508 cl.2, $A_2$ weld metal

Description of Deviation

Surveillance testplate for this weld was welded with different wire/flux combination as actual weld. (See sheet Nr. 2)

Decision proposed

- ☐ repair in acc. with attached repair procedure
- ☐ use as is
- ☐ scrap
- ☒ see attachement

Signed by: Eng. J. Laan
Q.C.

Customer review by: date:

Comments ~~inclosed~~/not inclosed

Signed by:

Decision of Westinghouse E.C.

| approved by | date |
|---|---|
| | |
| | |
| | May 26 71 |

Occurrence of deviation: 4-5-71

Approval required before: as soon as possible.

Distribution:

| | | | | | |
|---|---|---|---|---|---|
| WNES orig | 1+1/2 | Engineering | 1 | Q.C. adm. | 1 |
| PWRSD | 1 | K.B.W. | 1 | Q.C. Boiler sh. | 1 |
| LLoyd's R.I.S. | 3 | | 2 | Q.C. Mach. sh. | 1 |
| T.V.A. | | | | | 1 |

# DE ROTTERDAMSCHE DROOGDOK MAATSCHAPPIJ N.V.

E02.2

DEVIATION REQUEST (Material Review Board)

No. 616-W05-007-D17
Ex no 616-W05-007
sheet 1 of 2

Prepared by : J. Laan date: 4-20-1971
Client : Westinghouse Electric Corp.
Project : TVA 1
Ref. nr. : 54-6CVQ-84996
Order nr. R.D.M. : 30616
Drawing : 30616-1050 sheet: 1 revision: D
Item nr. : W 05
Item description : Circular seam between items 04 and 05
Material spec. : SA 508 cl.2, $A_2$ weld metal

Description of Deviation

Surveillance testplate for this weld was welded with different wire/flux combination as actual weld. (See sheet Nr. 2)

Decision proposed

- ☐ repair in acc. with attached repair procedure
- ☐ use as is
- ☐ scrap
- ☒ see attachement

Signed by: Eng. J. Laan
Q.C.

Customer review by: date:

Comments ~~incloced~~/not inclosed

Signed by:

Decision of Westinghouse E.C.

| approved by | date |
|---|---|
| | |
| | |

LLOYD'S REGISTER INDUSTRIAL SERVICES
3.6.71
APPROVED
ROTTERDAM

Occurrence of deviation: 4-5-71

Approval required before: as soon as possible.

Distribution:

| | | | | | |
|---|---|---|---|---|---|
| WNES orig | 1+1/2 | Engineering | 1 | Q.C. adm. | 1 |
| PWRSD | 1 | K.B.W. | 1 | Q.C. Boiler sh. | 1 |
| LLoyd's R.I.S. | 3 | | | Q.C. Mach. sh. | 1 |
| T.V.A. | 1 | | | Laboratory | 1 |

| R.D.M. | Soort document: | Doc.nr. 616-W05-007-D17* rev. |
|---|---|---|
| | | Blz. 2 van 2 blzn. |

* Ex no 616-W05-007

For welding the final seam of the vessel a sufficient amount of wire and flux used for welding the surveillance test plate should have been stored.
Unfortunately all reserved flux has been used for production welds other than this seam.

Surveillance test plate was welded with following combination:

(5.25.69) wire 40 lotnr. 25295
flux SAF 89 lotnr. 1103

Actual weld was welded with:

(4.5.71) wire 40 lotnr. 25295
flux SAF 89 lotnr. 2275

So deviation is only in flux lotnumber.

Test weld for combination used in production shows following mechanical properties:

| | |
|---|---|
| UT S | 59.1 kg/mm$^2$ |
| Y S | 48.0 kg/mm$^2$ |
| Elongation l=4d | 30.0% |
| Reduction of area | 64.9% |
| Charpy impact values at - 12°C | 10.5 kgm/cm$^2$ |
| | 10.8 " |
| | 11.1 " |

Proposal : Use as is.

# INCOMPLETE B&W DOCUMENTATION OF MECHANICAL PROPERTIES

## 1.0. INTRODUCTION

The following is an abstract of the following B&W Reports :

- BAW-1402 of January 1973, "Investigation of Steam Generator Weld Records", and
- BAW-1403 of January 1973, "Investigation of Major Component Weld Records".

Complete documentation has not been found for certain lots of weld filler metal used for the manual metal arc process. All of these lots have satisfactory documentation of their chemistry but incomplete documentation of mechanical properties. B & W produced them by the same methods used in the manufacture of electrodes of the same type that had been tested and found to have the required properties for nuclear construction.

This report provides the data necessary to justify the tensile and impact properties of the electrodes having incomplete documentation. The justification is based upon comparing the known data from lots having incomplete documentation with corresponding data for fully documented lots.

## 2.0. EVALUATION

### 2.1. Introduction

All related weld records have been reviewed in detail.

### 2.2. Type 8015 Weld Filler Metal

Each lot of the 8015-type electrodes was manufactured in B & W's electrode shop. To obtain the data needed to justify the mechanical properties of the weld filler metal for which incomplete documentation exists, a search was made for test certification data of similar electrodes manufactured by B & W during the past five years. This search revealed that 27 production lots of type 8015 electrodes [illegible]en tested and documented as required for nuclear applications.

The chemical analyses, tensile strengths, and Charpy V-notch impact strengths are tabulated in Table 5. Impact strength was determined at +10F after stress relief in the 1100 to 1150F range for 48 hours minimum. These tables also include the "carbon equivalent", which has been calculated by the equation :

$$CE = \%C + \frac{\%Mn}{6} + \frac{\%Cr + \%Mo}{10} + \frac{\%Ni}{20} \qquad (1)$$

The carbon equivalent, a measure of the hardenability of ferrous materials, is used to define the chemical limits of certain steels with respect to weldability and is commonly used for evaluating the strength of weld filler metals. The data from Table 5 were used to plot the tensile strength versus carbon equivalent as shown in Figure 2. Table 7 lists the chemical analyses and carbon equivalents of the lots of 8015-type electrodes for which mechanical properties were incompletely documented. Reference to the carbon equivalent versus tensile strength curves in Figure 2 shows that all of the weld filler metals listed in Table 7 have tensile strength in excess of the minimum requirements.

All of the Charpy V-notch impact data shown in Table 5 are expressed in foot-pounds of energy absorbed at +10F. The minimum impact strength is 30 ft-lbs at +10F. The 30 ft-lbs criterion is based on the requirement for matching the weld filler metal properties and the base metal properties. Since all data for type 8015 electrodes exceed 65 ft-lbs, at +10F, it is evident that the lots in question exceed the minimum specified impact strength by a wide margin.

2.3. Summary

All weld filler metal having incomplete documentation is considered to be satisfactory and acceptable.

---

(1) R.D. Stout and W.D. Doty, "Weldability of Steels", Welding Research Council (1971).

Table 5. Type-8015 Test Certification Background Data

| %Mn | %Cr + %Mo | %Ni | Carbon equivalent | Tensile strength, psi | Charpy V-notch, ft-lb at +10F |
|---|---|---|---|---|---|
| | | | .03% Carbon | | |
| .61 | .55 | .85 | .225 | 86,000 | 91/95/95 |
| .58 | .48 | .84 | .22 | 82,000 | 100/101/149 |
| .68 | .58 | 1.01 | .25 | 84,500 | 65/76/89 |
| | | | .04% Carbon | | |
| .65 | .64 | .87 | .26 | 82,000 | 80/83/105 |
| .79 | .56 | 1.01 | .275 | 87,500 | 88/90/100 |
| .69 | .62 | .97 | .265 | 84,750 | 99/105/105 |
| .75 | .61 | .92 | .27 | 87,500 | 70/84/75 |
| .68 | .48 | 1.04 | .25 | 85,500 | 102/104/107 |
| .82 | .51 | 1.00 | .28 | 86,000 | 84/92/95 |
| .72 | .51 | .97 | .26 | 85,000 | 109/117/120 |
| .68 | .49 | 1.01 | .25 | 83,250 | 118/118/125 |
| 1.06 | .58 | .97 | .33 | 85,000 | 90/91/96 |
| .53 | .49 | .87 | .225 | 86,000 | 65/90/91 |
| | | | .05% Carbon | | |
| .81 | .61 | .82 | .285 | 90,500 | 91/99/100 |
| 1.04 | .53 | .97 | .325 | 90,500 | 95/100/103 |
| .77 | .45 | .88 | .27 | 84,000 | 94/96/113 |
| .90 | .54 | .90 | .30 | 87,000 | 87/94/97 |
| .82 | .57 | 1.04 | .295 | 83,000 | 94/103/105 |
| .66 | .61 | 1.10 | .275 | 85,500 | 105/110/118 |
| .86 | .64 | .92 | .30 | 88,000 | 95/98/102 |
| .64 | .56 | .90 | .26 | 83,500 | 98/98/103 |
| .94 | .67 | .95 | .32 | 89,750 | 83/96/102 |
| .66 | .44 | .87 | .25 | 84,000 | 105/119/120 |
| | | | .06% Carbon | | |
| .83 | .65 | .95 | .31 | 85,500 | 109/110/112 |
| .75 | .47 | .96 | .28 | 86,000 | 95/95/110 |
| .80 | .54 | 1.05 | .295 | 87,000 | 95/100/104 |
| | | | .07% Carbon | | |
| .94 | .52 | 1.10 | .335 | 92,250 | 94/97/99 |

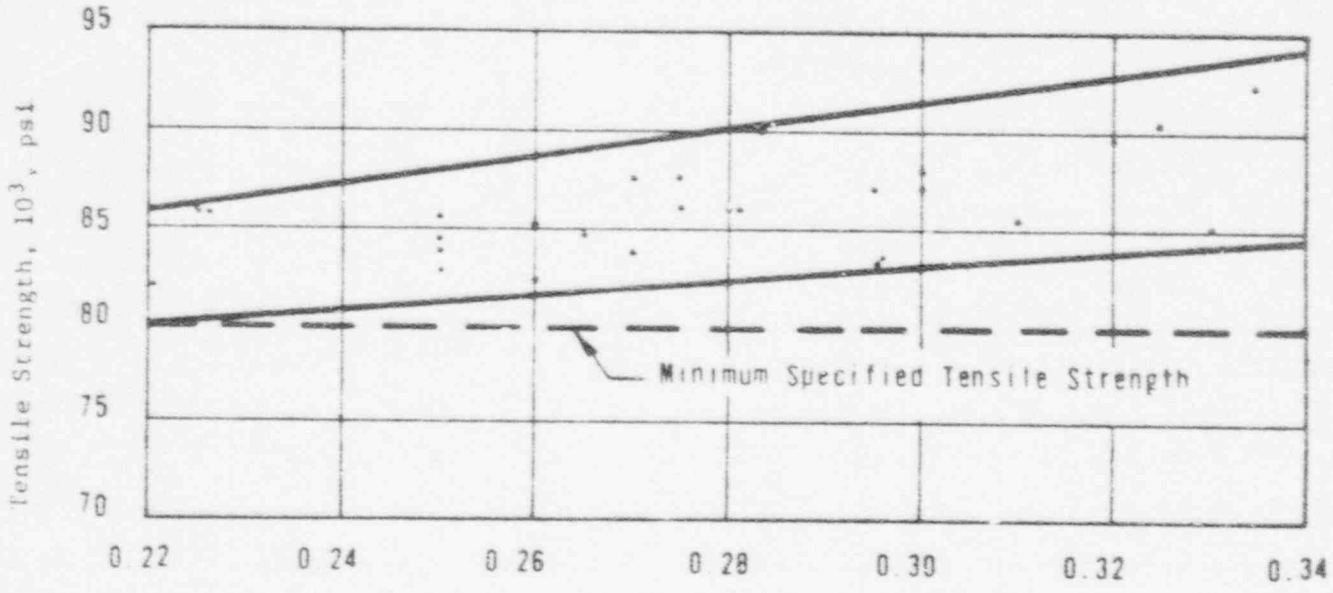
Table 7. Type-8015 Lots With Incomplete Documentation (revised by RSV-A)

| Lot No. | %C | %Mn | %Cr + %Mo | %Ni | Carbon equivalent |
|---|---|---|---|---|---|
| 818-022778 | .04 | .77 | .57 | 1.07 | .28 |
| ~~818-023004~~ | ~~.043~~ | ~~.68~~ | ~~.61~~ | ~~.93~~ | ~~.26~~ |
| 818-023006 | .049 | .62 | .52 | 1.15 | .255 |
| ~~818-023008~~ | ~~.039~~ | ~~.54~~ | ~~.55~~ | ~~.92~~ | ~~.23~~ |
| ~~818-024791~~ | ~~.04~~ | ~~.70~~ | ~~.53~~ | ~~.74~~ | ~~.25~~ |
| 818-024965 | .05 | .71 | .56 | .97 | .27 |
| 818-025134 | .04 | .69 | .40 | .95 | .24 |
| 818-025185 | .04 | .66 | .51 | 1.04 | 25 |
| 818-025391 | .04 | .73 | .49 | .90 | .255 |
| 818-025562 | .04 | .58 | .46 | .85 | .22 |
| 818-025611 | .05 | .74 | .54 | .87 | .27 |
| ~~818-026348~~ | ~~.04~~ | ~~.66~~ | ~~.55~~ | ~~.87~~ | ~~.25~~ |
| 818-024509 | .054 | .68 | .49 | 1.06 | .27 |
| 818-024510 | .045 | .76 | .56 | .96 | .28 |
| 818-024790 | .05 | .82 | .61 | .97 | .30 |
| 818-025186 | .04 | .68 | .41 | 1.04 | .25 |
| 818-025371 | .06 | .81 | .51 | .81 | .29 |
| 818-025392 | .07 | .82 | .56 | .92 | .31 |
| 818-025561 | .05 | .76 | .48 | .81 | .27 |
| 818-025655 | .07 | .76 | .45 | .76 | .28 |

Babcock & Wilcox

E03.4

Figure 2. Tensile Strength Vs Carbon Equivalent for B&W Type-8015 Electrodes




$$CE = \% C + \frac{\% Mn}{6} + \frac{\% Cr + \% Mo}{10} + \frac{\% Ni}{20}$$

B&W E7015 electrode Heat No. 818-025962

This electrode is listed on "TABULATION OF B&W WELD DATA VIR Reactor Vessel (B&W 610-147-51)", submitted by W to RSV-A as Attachment 1 to letter PE-RVP-2426 of August 1, 1979.

Since this electrode does not occur on the B&W weld control records for low alloy steel welding on this reactor vessel (submitted as Attachment 6, 1 of 2, to above mentioned letter), it is likely that this electrode has not been used in the reactor vessel primary pressure boundary ferritic welds, and thus not applicable to this Report.

# INCOMPLETE RDM DOCUMENTATION OF MECHANICAL PROPERTIES

## 1.0 INTRODUCTION

Complete documentation has not been found for one lot of weld filler metal used for the manual metal arc process.

The Lot No. is 6236.4450.

Only 2 Charpy specimens are indicated on the test report (Att. B04.1), while the initial report shows the presence of three specimens.

The results of the 3rd specimen has not been found.

## 2.0 EVALUATION

To obtain the lowest possible impact strength of the missing 3rd specimen, the following evaluation has been made.

In Table 1 the Charpy V-notch impact strength are tabulated for all E9018-G electrodes.
The + and - deviation in % with respect to the middle value are also listed.

The maximum deviation is -32.1%, so the lowest possible impact strength of the missing specimen is:

$17.5 - (0.321 \times 17.5) = 13.3$ kgm/cm$^2$ at $-12^{\circ}$C

Since the minimum impact strength is 5.2 kgm/cm$^2$ at $-12^{\circ}$C, the weld filler metal is considered to be satisfactory and acceptable.

Table 1 - Charpy V-notch impact strength E9018-G electrodes

| Lot No. | Charpy V-notch kgm/cm$^2$ at -12$^o$C | | | Deviation from middle value in % | |
|---|---|---|---|---|---|
| 5835.3423 | 16.4 | 17.0 | 17.5 | - 3.5 | + 2.9 |
| 5835.3900 | 12.0 | 13.9 | 14.8 | -13.7 | + 6.5 |
| 6236.4063 | 17.0 | 22.0 | 23.4 | -22.7 | + 6.4 |
| 6236.4450 | ---- | 17.5 | 18.6 | | + 6.3 |
| 6497.4647 | 8.9 | 13.1 | 15.9 | -32.1 | +21.4 |
| 6497.4675 | 14.1 | 14.1 | 14.9 | 0 | + 5.7 |
| 6507.4705 | 11.5 | 13.3 | 14.8 | -13.5 | +11.3 |
| 6747.5458 | 15.8 | 16.5 | 17.5 | - 4.2 | + 6.1 |
| 7011.6032 | 13.8 | 13.8 | 15.0 | 0 | + 8.7 |
| 7011.6143 | 15.8 | 16.0 | 16.5 | - 1.3 | + 3.1 |
| 7359.6708 | 9.4 | 9.6 | 10.9 | - 2.1 | +13.5 |
| 7565.7158 | 17.9 | 18.5 | 18.6 | - 3.2 | + 0.5 |
| 7703.7265 | 17.5 | 18.8 | 19.4 | - 6.9 | + 3.2 |

# INCOMPLETE RDM DOCUMENTATION OF MECHANICAL PROPERTIES

## 1.0. INTRODUCTION

As a result of an intensive investigation we found that the documentation was incomplete for some of the welds made by the submerged arc method.

All of these lots have satisfactory documentation of their chemistry of the bare wire.

The chemistry of the wires concerned lies in a very narrow range with respect of the major elements : C, Mn, Si and Mo.

(See table 1).

All of these wires have been tested with one or more heats of fluxes of the same type.

This report provides the data to justify the tensile and impact properties of the wire-flux combinations having incomplete documentation.

## 2.0. EVALUATION

All receiving inspections concerning the wire flux combinations related to the missing records B24.1, B24.2, B25.1, B25.2, B26.4 and B28.1 have been reviewed.

The test results from these receiving inspection reports are tabulated in Table 2.

As the chemical results of the bare wires are within a very narrow range ( See Table 1), the mechanical and chemical testresults are influenced by both the welding data and the heat lot of the flux.

Since all these tests do not fail and the variation of the C.E. remains within 0% we consider the weld metal to be satisfactory.

Table 1.Chemical composition of bare wire with incomplete documentation

| Lot nr | Suppl. | Type of wire | %C | %Mn | %Mo | %Si | %P | %S |
|---|---|---|---|---|---|---|---|---|
| 25006** | Smit | MnMo (S4Mo) | .13 | 1.9 | .48 | .06 | .013 | .013 |
| 25017** | Smit | MnMo (S4Mo) | .13 | 1.9 | .48 | .06 | .013 | .013 |
| 25295 | Smit | MnMo (S4Mo) | .14 | 2.03 | .48 | .16 | .016 | .011 |
| 721858 | Arcos | MnMo (S4Mo) | .15 | 2.04 | .51 | .18 | .019 | .010 |

Table 2.Test Certification Background Data

| Lot nr wire | Heat Lot Flux | Tensile Strength $kg/mm^2$ | %C | %Mn | %Mo | CE* | Charpy V-notch $kgm/cm^2$ at $-12^{\circ}C$ |
|---|---|---|---|---|---|---|---|
| 25017 | 1197 | 58.2 | .093 | 1.67 | .44 | .417 | 11.1 |
| 25295 | 1170 | 61.1 | .10 | 1.50 | .37 | .387 | 10.4 |
| 25295 | 1103 | 57.0 | .066 | 1.54 | .41 | .387 | 6.5 |
| 25295 | 1135 | 56.5 | .093 | 1.46 | .41 | .377 | 7.7 |
| 25295 | 2275 | 59.1 | .081 | 1.52 | .44 | .405 | 10.8 |
| 721858 | 1197 | 57.7 | .11 | 1.52 | .43 | .433 | 11.8 |

* Carbon equivalent calculated by the equation: CE=%C +%Mn/6 +%Mo/10

** Lots made from the same heat