CATALOGUE OF TEST SPECIMENS
FOR
NON-DESTRUCTIVE EXAMINATION

Prepared by the
CSNI Task Group on NDE Reliability

MAY 1985

COMMITTEE ON THE SAFETY OF NUCLEAR INSTALLATIONS
OECD NUCLEAR ENERGY AGENCY
38, boulevard Suchet, 75016 Paris, France
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NUCLEAR SAFETY DIVISION
The NEA Committee on the Safety of Nuclear Installations (CSNI) is an international committee made up of scientists and engineers who have responsibilities for nuclear safety research and nuclear licensing. The Committee was set up in 1973 to develop and coordinate the Nuclear Energy Agency’s work in nuclear safety matters, replacing the former Committee on Reactor Safety Technology (CREST) with its more limited scope.

The Committee’s purpose is to foster international cooperation in nuclear safety amongst the OECD member countries. This is done in a number of ways. Full use is made of the traditional methods of cooperation, such as information exchanges, establishment of working groups, and organization of conferences. Some of these arrangements are of immediate benefit to member countries, for example by enriching the data base available to national regulatory authorities and to the scientific community at large. Other questions may be taken up by the Committee itself with the aim of achieving an international consensus wherever possible. The traditional approach to cooperation is increasingly being reinforced by the creating of cooperative (international) research projects, such as PISC and LOFT, and by a novel form of collaboration known as the international standard problem exercise, for testing the performance of computer codes, test methods, etc., used in safety assessments. These exercises are now being conducted in most sectors of the nuclear safety program.

The greater part of the CSNI cooperative program is concerned with safety technology for water reactors. The principal areas covered are operating experience and the human factor, reactor system response during abnormal transients, various aspects of primary circuit integrity, the phenomenology of radioactive releases in reactor accidents, and risk assessment. The Committee also studies the safety of the fuel cycle, conducts periodic surveys of reactor safety research programs, and operates an international mechanism for exchanging reports on power plant incidents.

The Committee has set up a Subcommittee on Licensing which examines a variety of nuclear regulatory problems, provides a forum for the free discussion of licensing questions, and reviews the regulatory impact of the conclusions reached by CSNI.

Requests for additional copies should be addressed to:

Nuclear Safety Division
OECD Nuclear Energy Agency
38 boulevard Suchet
F-75016 Paris
France

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Foreword

One of the key elements in assuring the integrity of reactor primary circuits is the availability of trustworthy non-destructive methods for detecting dangerous defects that may be present.

Various approaches to making such examinations are being developed, including the use of ultrasonic (U/S) and radiographic techniques. To demonstrate their capability and reliability, they must be tested on steel specimens reproducing the various types of faults which may arise in real primary circuit vessels and piping.

Such specimens are costly to fabricate. It is therefore clearly desirable that existing specimens should be made accessible to as many organisations as possible for testing.

This catalogue contains detailed information on forty-odd deliberately flawed plates, blocks, vessels, etc. which have been produced in OECD countries, along with the name of a contact person to whom inquiries should be directed in each case.

The catalogue was prepared by the CSNI Task Group on Non-destructive Examination (NDE) Reliability. The Group was created in late 1982 by CSNI Principal Working Group no. 3, with the general objectives of: examining the long-term effectiveness of NDE, moving towards establishing an international clearing house for test specimens, and providing a forum for informal discussions on how NDE effectiveness could be improved. Contributors to the work of the Task Group are listed on pages 66 to 69.

Activities of the Group were brought to a close at the end of 1984. In addition to this catalogue, the Group has produced a state-of-the-art report on near-surface U/S inspection. Two other projects - an exercise on modelling U/S inspection, and a round-robin trial on U/S inspection of austenitic steels - are to continue as elements of a third Programme of Inspection of Steel Components (PISC-III), which will be carried out from 1985 to 1988 under the auspices of the OECD Nuclear Energy Agency and the Joint Research Centre of the Commission of the European Communities.
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Group on NDE Reliability

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<td>RTD</td>
<td>Nozzle and girth welds</td>
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<td>Mr. Cereceda</td>
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<td>Linear slag entrapment</td>
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<td>IAE 431625</td>
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<td>R30</td>
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<td>Near surface defects</td>
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<td>H13</td>
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A = AVAILABLE

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</tr>
<tr>
<td>EDC-5-0-50</td>
<td>Flat plate</td>
<td>Machined holes</td>
<td>375x300x150</td>
<td>132</td>
<td>**</td>
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<tr>
<td>EDC-5-0-70</td>
<td>Flat plate</td>
<td>Machined holes</td>
<td>275x200x99.5</td>
<td>43</td>
<td>**</td>
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<tr>
<td>EDC-5-0-3</td>
<td>Flat plate</td>
<td>Machined slots</td>
<td>215x175x50</td>
<td>15</td>
<td>**</td>
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<tr>
<td>EDC-5-0-7</td>
<td>Flat plate</td>
<td>Machined holes</td>
<td>530x400x195</td>
<td>325</td>
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<tr>
<td>EDC-5-0-8-1-0-0</td>
<td>Flat plate</td>
<td>Machined holes</td>
<td>570x250x195</td>
<td>218</td>
<td>**</td>
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</tr>
</tbody>
</table>

- 10 -
SPECIMEN IDENTITY
FRAMATOME F7 - AUSTENITIC FLAT PLATE WELDMENT

DRAWING
QED 78/0073
QED 79/0043

MATERIAL
AUSTENITIC (Z3 CND 1712 FORGED)

CLADDING
N/A

TYPES OF FLAW
5 NATURAL (LONGITUDINAL CRACKS AND INCLUSIONS)
4 CROSS-DRILLED HOLES Ø3 PARALLEL WITH WELD SEAM £
1 NOTCH 3x3x75 ALONG WELD £

CONTACT
M. J P LAUNAY
FRAMATOME
CHALON
SPECIMEN IDENTITY
FRAMATOME F9 - CAST AUSTENITIC FLAT PLATE WELDMENT

DRAWING
QED 78/0075

MATERIAL
AUSTENITIC (Z5 CN 19.9 - Z3 CND 1910 CAST)

CLADDING
N/A

TYPES OF FLAW
3 NATURAL
1 LONGITUDINAL CRACK
1 LACK OF ROOT PENETRATION
1 INCLUSION

CONTACT
M. J P LAUNAY
FRAMATOME
CHALON
SPECIMEN IDENTITY | FRAMATOME F10 CAST AUSTENITIC FLAT PLATE WELDMENT
DRAWING | QED 72/0075

| MATERIAL | AUSTENITIC (Z5 CN19.9 - Z3 CND1910 CAST) |
| CLADDING | N/A |
| TYPES OF FLAW | 3 NATURAL |
| | 1 LONGITUDINAL CRACK |
| | 1 LACK OF ROOT PENETRATION |
| | 1 INCLUSION |
| CONTACT | M. J P LAUNAY |
| | FRAMATOME |
| | CHALON |
SPECIMEN IDENTITY  
FRAMATOME F21 - CURVED BLOCK WITH TRANSITION WELD

DRAWING  
QED 78/0052

MATERIAL  
TRANSITION AUSTENITIC/FERRITIC
Z3 CND 19.10 - SA 216 WCC CAST
WELD ELECTRODES OK 16.30 & OK 63.25

CLADDING

TYPES OF FLAW  
NATURAL WELD DEFECTS

CONTACT  
M. J P LAUNAY
FRAMATOME
CHALON

- 14 -
SPECIMEN IDENTITY
FRAMATOME F90 WELD JOINTED FERRITIC PLATE CONTAINING NATURAL DEFECTS

DRAWING
QED 79/0100

MATERIAL
A533B Cl.1

CLADDING
N/A

TYPES OF FLAWS
18 NATURAL WELD FLAWS INCLUDING CRACKS, POROSITY, INCLUSIONS, LACK OF PENETRATION, SLAG

CONTACT
M. J P LAUNAY
FRAMATOME
CHALON
SPECIMEN IDENTITY
FRAMATOME F91 WELD JOINT CONTAINING NATURAL WELD FLAWS IN UNCLAD FERRITIC PLATE

DRAWING
QED 80/0003

MATERIAL
A533B CLASS 1

CLADDING
N/A

TYPES OF FLAWS
14 NATURAL WELD FLAWS INCLUDING CRACKS (4), POROSITY (2), INCLUSIONS (2), LACK OF PENETRATION (2), SLAG (2), SLAG AND INCLUSIONS (2)
22 ARTIFICIAL FLAWS 2mm DIA CROSS-DRILLED TO HOLES

CONTACT
M. J P LAUNAY
FRAMATOME
CHALON
SPECIMEN IDENTITY  FRAMATOME F92 SEAM WELD
IN CURVED AUSTENITIC SECTION

DRAWING  QED 80/0009

MATERIAL  Z3 CND 17-12 (AUSTENITIC)

CLADDING  N/A

TYPES OF FLAWS  3 NATURAL WELD FLAWS INCLUDING ROOT DEFECT,
SLAG OR INCLUSIONS AND LONGITUDINAL CRACKING.
4 ARTIFICIAL FLAWS INCLUDING 3mm DIA HOLES
AND A FATIGUE CRACK

CONTACT  M. J P LAUNAY
FRAMATOME
CHALON
MATERIAL Z3 CN 19.10 & Z5 CN 19.9

CLADDING N/A

TYPES OF FLAW WELD FLAWS INCLUDING LACK OF ROOT PENETRATION, INCLUSIONS, LACK OF FUSION AND LONGITUDINAL AND TRANSVERSE CRACKS

CONTACT M. J P LAUNAY FRAMATOME CHALON
SPECIMEN IDENTITY
FRAMATOME F96 - CLAD PLATE WITH SLEEVES
QED 78/0033

MATERIAL
LOW ALLOY STEEL - INCONEL

CLADDING
STAINLESS STEEL

TYPES OF FLAW
WELD FLAWS INCLUDING 2 INCLUSIONS
AND 1 LONGITUDINAL CRACK

CONTACT
M. J P LAUNAY
FRAMATOME
CHALON
SPECIMEN IDENTITY
FRAMATOME F131 - SKIRT TO FOOT JOINT

DRAWING

MATERIAL
A533

CLADDING
N/A

TYPES OF FLAW
LACK OF WELD PENETRATION

CONTACT
M. J P LAUNAY
FRAMATOME
CHALON
SPECIMEN IDENTITY
FRAMATOME F153 WELDED FERRITIC PLATE
TM/LTU 82.458 PAGE 2

MATERIAL: A533
CLADDING: N/A
TYPES OF FLAW: NATURAL
CONTACT: M. J P LAUNAY
FRAMATOME
CHALON

- 21 -
MATERIAL
A508

CLADDING
STAINLESS STEEL

TYPES OF FLAW
NATURALLY OCCURRING REFLECTORS

CONTACT
M. J P LAUNAY
FRAMATOME
CHALON
SPECIMEN IDENTITY: RTD test plate assembly

weight 12 tons incl. frame.

MATERIAL: STEEL ASME SA 533 Gr.B. Cl. 1 with one circumferential and one longitudinal weld, both partly cladded.

CLADDING: For 1 cladded with 2-layer strip clad 60x05 SANDVIK 3RE15 Nozzle area = manual cladded.

TYPES OF FLAWS: circular planar reflectors, with surface of broken tensile test bar.

depth range: throughout thickness - embedded "defect coin" range at weld preparation.

- 14 defects in longitudinal weld 6Ø and 10Ø
- 23 " circumferential weld
- 6 inner radius defects
- 4 undercladding cracks
- calibration reflectors according to:
  ASME I-3000
  KTA 3201-3

CONTACT: J.A. de Raad or R. van Agthoven
RTD, Röntgen Technische Dienst B.V.
Delftweg 144, 3046 NC Rotterdam.
Telex 23366, Telephone 010-150200

- 23 -
SPECIMEN IDENTITY: AC - 58/80  Weight: 188 Kg. (102)

Material: SA-533 Gr.B CL:2
Cladding: N.A.
One Weld: SAW

Types of flaw: 1: Simulated lack of fusion: 7
Depth range: 20 to 60 mm
Length range: 10 to 24 mm

2: Simulated slag inclusions: 3
Depth: 20 mm
Length range: 2.5 to 20 mm

Contact: Mr. Cereceda
Tecnatom, S.A.
C.N.-I, km. 19, Madrid-Irún
S. Sebastián de los Reyes
MADRID - SPAIN
SPECIMEN IDENTITY: AC - 58/80  Weight: 300 kg.

Material:  SA-533 Gr.B CL:2

Cladding:  N.A.

Two welds:  SAW

Types of flaw:  1: Simulated lack of fusion: 7
Depth range: 26 to 66 mm.
Length range: 10 to 20 mm.

2: Simulated slag inclusions: 6
Depth range: 23 to 63 mm.
Length range: 2.5 to 25 mm.

3. Fatigue Crack. Inserts: 7
Depth range: 18 to 59 mm.
Length range: 3.2 to 32 mm.

Contact:  Mr. Cereceda
Tecnatom, S.A.
C.N.-I, km. 19, Madrid-IRún
S. Sebastián de los Reyes
MADRID - SPAIN

- 25 -
SPECIMEN IDENTITY 3576/24/1 AUSTENITIC FLAT PLATE WELDMENT

DRAWING

MATERIAL
AISI GRADE 316 AUSTENITIC STAINLESS STEEL

CLADDING
N/A

TYPES OF FLAW
LACK OF SIDEWALL FUSION AND SLAG

CONTACT
MR B HEMSWORTH
HEALTH & SAFETY EXECUTIVE
THAMES HOUSE NORTH
MILLBANK
LONDON SW1P 4QJ
SPECIMEN IDENTITY

3576/24/2 AUSTENITIC FLAT PLATE WELDMENT

DRAWING

MATERIAL

AISI GRADE 316 AUSTENITIC STAINLESS STEEL

CLADDING

N/A

TYPES OF FLAW

LACK OF SIDEWALL FUSION

CONTACT

MR B HEMSWORTH
HEALTH & SAFETY EXECUTIVE
THAMES HOUSE NORTH
MILLBANK
LONDON SW1P 4QJ
SPECIMEN IDENTITY 3576/24/3 AUSTENITIC FLAT PLATE WELDMENT

DRAWING

MATERIAL AISI GRADE 316 AUSTENITIC STAINLESS STEEL

CLADDING N/A

TYPES OF FLAW LINEAR SLAG ENTRAPMENT

CONTACT MR B HEMSWORTH
HEALTH & SAFETY EXECUTIVE
THAMES HOUSE NORTH
MILLBANK
LONDON SW1P 4QJ
SPECIMEN IDENTITY
3576/24/4 AUSTENITIC FLAT PLATE WELDMENT

DRAWING

MATERIAL
AISI GRADE 316 AUSTENITIC STAINLESS STEEL

CLADDING
N/A

TYPES OF FLAW
ISOLATED SLAG ENTRAPMENT

CONTACT
MR B HEMSWORTH
HEALTH & SAFETY EXECUTIVE
THAMES HOUSE NORTH
MILLBANK
LONDON SW1P 4QJ
SPECIMEN IDENTITY 3576/24/6 AUSTENITIC FLAT PLATE WELDMENT

MATERIAL  
AISI GRADE 316 AUSTENITIC STAINLESS STEEL

CLADDING  
N/A

TYPES OF FLAW  
WELD METAL CRACKING

CONTACT  
MR B HEMSWORTH  
HEALTH & SAFETY EXECUTIVE  
THAMES HOUSE NORTH  
MILLBANK  
LONDON SW1P 4QJ
SPECIMEN IDENTITY
3576/24/7 AUSTENITIC FLAT PLATE WELDMENT

MATERIAL
AISI GRADE 316 AUSTENITIC STAINLESS STEEL

CLADDING
N/A

TYPES OF FLAW
LACK OF ROOT PENETRATION

CONTACT
MR B HEMSWORTH
HEALTH & SAFETY EXECUTIVE
THAMES HOUSE NORTH
MILLBANK
LONDON SW1P 4QJ
SPECIMEN IDENTITY
3576/24/8 AUSTENITIC FLAT PLATE WELDMEN

DRAWING

MATERIAL
AISI GRADE 316 AUSTENITIC STAINLESS STEEL

CLADDING
N/A

TYPES OF FLAW
FATIGUE CRACK GROWN FROM WELD TOE AND IS ENTIRELY IN PARENT PLATE

CONTACT
MR B HEMSWORTH
HEALTH & SAFETY EXECUTIVE
THAMES HOUSE NORTH
MILLBANK
LONDON SW1P 4QJ
SPECIMEN IDENTITY
3576/24/9 AUSTENITIC FLAT PLATE WELDMENT

DRAWING

MATERIAL
AISI GRADE 316 AUSTENITIC STAINLESS STEEL

CLADDING
N/A

TYPES OF FLAW
FATIGUE CRACK (ONLY SMALL INDICATIONS SEEN ON RADIOPHOTO)
VIRTUALLY DEFECT FREE

CONTACT
MR B HEMSWORTH
HEALTH & SAFETY EXECUTIVE
THAMES HOUSE NORTH
MILLBANK
LONDON SW1P 4QJ
Material       Mild steel

Cladding       2-layer stainless steel strip clad, 7 mm thick (as clad)

Types of Flaw
Rectangular EDM notches
Depth range 5 to 20 mm from clad interface
Length 10 to 20 mm
Inclination, varied 0° to 20°
Some of the defects are isolated clusters but others are in clusters
Defects are either parallel or normal to the weld deposition axis

Contact
Mr B Watkins
Risley Nuclear Power Development Laboratories
United Kingdom Atomic Energy Authority
(Northern Division)
Risley
Warrington WA3 6AT
ENGLAND

Tel No: Warrington (0925) 31244, extension 2881
Telex No: 629301
SPECIMEN IDENTITY
UKAEA R8

Drawing
R8

Weight
35 Kg

Material
Mild steel

Cladding
2-layer stainless steel, 7 mm thick (as clad)

Types of Flaw
Elliptical shaped EDM notches
Depth range 3 to 25 mm from clad/base plate interface
Length 10 to 60 mm
Inclination to clad direction, normal, 15° and 25°
Inclination surface waves 0-15°
Isolated and cluster of defect

Contact
Mr B Watkins
Risley Nuclear Power Development Laboratories
United Kingdom Atomic Energy Authority
(Northern Division)
Risley
Warrington WA3 6AT
ENGLAND

Tel No: Warrington (0925) 31244, extension 2881
Telex No: 629301

- 35 -
SPECIMEN IDENTIFICATION

UKAEA R27

Drawing 1AE 431493  Weight 4.4 Tonne

Material A508 Class III

Cladding 2-layer stainless steel strip clad
7 mm thick, ground to 0.5 mm on 50 mm

Types of Flaw
Coupon inserts, carbon and copper cracking, slag, lack of penetration and porosity
Cluster of flaws
Depth range 0 to 250 mm from clad/base metal interface
Flaw height 3 to 50 mm
Flaw length 10 to 50 mm
Flaw orientation parallel to weld direction
Clad orientation perpendicular to weld

Contact
Mr B Watkins
Risley Nuclear Power Development Laboratories
United Kingdom Atomic Energy Authority
(Northern Division)
Risley
Warrington WA3 6AT
ENGLAND

Tel No: Warrington (0925) 31244, extension 2881
Telex No: 629301

- 36 -
Material
A508 Class II

Cladding
2-layer stainless steel strip clad, 7 mm thick (as clad)
2-layer MMA, 7 mm, smooth ground

Types of Flaw
Elliptical EDM notches
Solidification cracks
Depth range 3 to 30 mm from clad/base plate and interface
Length 10 to 30 mm
Inclination to clad direction, normal
Inclination to surface, normal
Isolated and clusters of flaws

Contact
Mr B Watkins
Risley Nuclear Power Development Laboratories
United Kingdom Atomic Energy Authority
(Northern Division)
Risley
Warrington WA3 6AT
ENGLAND

Tel No: Warrington (0925) 31244, extension 2881
Telex No: 629301
SPECIMEN IDENTITY UKAEA R30

Drawing R30 Weight 1.5 tonne

Material A508 Class II

Cladding MMA on nozzle corner
2-layer strip clad on bore
7 mm thick, smooth ground

Types of Flaw Elliptical EDM notches
Solidification cracks
Depth range 2 to 30 mm from clad/base metal interface
Length 6 to 30 mm
Orientation, radial and circumferential
Inclination to surface, normal

Contact Mr B Watkins
Risley Nuclear Power Development Laboratories
United Kingdom Atomic Energy Authority
(Northern Division)
Risley
Warrington WA3 6AT
ENGLAND

Tel No: Warrington (0925) 31244, extension 2881
Telex No: 629301
SPECIMEN IDENTITY

UKAEA R31

Drawing

R31

Weight

1.4 tonne

Material

A508 Class II

Cladding

MMA on nozzle corner
Two layer strip clad on bore
7 mm thick, smooth ground

Types of Flaw

Elliptical EDM notches
Solidification cracks
Depth range 2 to 30 mm from cald/base metal interface
Length 6 to 30 mm
Orientation, radial and circumferential
Inclination to surface, normal

Contact

Mr B Watkins
Risley Nuclear Power Development Laboratories
United Kingdom Atomic Energy Authority
(Northern Division)
Risley
Warrington WA3 6AT
ENGLAND

Tel No: Warrington (0925) 31244, extension 2881
Telex No: 629301
SPECIMEN IDENTITY  UKAEA H13

Drawing  EH1 5146  Weight  2.7 tonne

Material  A508 Class II

Cladding  MMA clad, smooth ground on corner
          Strip clad on bore
          6 mm thick

Types of Flaw  Elliptical EDM notches
              Depth range 2.5 to 25 mm from clad/base metal interface
              Length 5 to 30 mm
              Orientation, radial
              Inclination, normal to surface

Contact  Mr B Watkins
          Risley Nuclear Power Development Laboratories
          United Kingdom Atomic Energy Authority
          (Northern Division)
          Risley
          Warrington WA3 6AT
          ENGLAND

          Tel No: Warrington (0925) 31244, extension 2881
          Telex No: 629301
SPECIMEN IDENTITY
UKAEA H14

Drawing
EH1 5285

Weight
3.1 tonne

Material
A508 Class II

Cladding
Unclad

Types of Flaw
Elliptical EDM notches
Depth range 3 to 30 mm from surface
Length 9 to 30 mm
Orientation, radial and skewed up to circumferential
Inclination, normal to surface

Contact
Mr B Watkins
Risley Nuclear Power Development Laboratories
United Kingdom Atomic Energy Authority
(Northern Division)
Risley
Warrington WA3 6AT
ENGLAND

Tel No: Warrington (0925) 31244, extension 2881
Telex No: 629301
SPECIMEN IDENTITY  FUN-1 (Feedwater Nozzle)

DRAWING  FUN-1

WEIGHT  7 tons

MATERIAL  Nozzle - SA508
          Plate - SA533B

CLADDING  Three-wire submerged arc, 6mm thick, on plate only

TYPES OF FLAWS  Thermal fatigue cracks, isolated
                Depth - 1mm to 8mm from nozzle ID
                Length - 12mm to 37mm
                Inclination to ID surface - Normal
                Orientation - Axial

CONTACT  Mr. Robert Stone
         J.A. Jones Applied Research Company
         EPRI NDE Center
         P.O. Box 217097
         Charlotte, NC 28221
         Telephone (704) 597-6125
SPECIMEN IDENTITY
CE-1

DRAWING
CE-1

WEIGHT
1,050 Kg

MATERIAL
SA533B

CLADDING
Three-wire submerged arc, 7mm thick

TYPES OF FLAWS
Chemically induced sub-surface flaws
approximately 6-25mm high and 75mm long
Inclination to surface is normal
Flaw direction is parallel to weld disposition

CONTACT
Mr. Robert Stone
J.A. Jones Applied Research Institute
EPRI NDE Center
P.O. Box 217097
Charlotte, NC 28221
SPECIMEN IDENTITY  SB-1

DRAWING  SB-1  WEIGHT  215 Kg

MATERIAL  SA533B

CLADDING  3-wire submerged arc, stainless steel, 7mm thick

TYPES OF FLAWS  Semi-elliptical notches and fatigue cracks, isolated
Flaws range from 3mm to 13mm in depth with aspect
ratios of 3 to 5:1
Inclination to surface is normal
Flaw orientations are 0°, 15°, 30°, 45° and 90° to clad direction

CONTACT  Mr. Robert Stone
J.A. Jones Applied Research Company
EPRI NDE Center
P.O. Box 217097
Charlotte, NC 28221
Telephone (704) 597-6125
SPECIMEN IDENTITY  SB-2

DRAWING  SB-2  WEIGHT  215 Kg

MATERIAL  SA533B

CLADDING  Manual SMAW, stainless steel, 7mm thick

TYPES OF FLAWS  Semi-elliptical notches and fatigue cracks, isolated
Flaws range from 3mm to 13mm in depth with aspect
ratios of 3 to 5:1
Inclination to surface is normal
Flaw orientations are 0°, 15°, 30°, 45° and 90°
to clad direction

CONTACT  Mr. Robert Stone
J.A. Jones Applied Research Company
EPRI NDE Center
P.O. Box 217097
Charlotte, NC  28221
Telephone (704) 597-6125
SPECIMEN IDENTIFICATION

SB-3

DRAWING
SB-3

WEIGHT
215Kg

MATERIAL
SA533B

CLADDING
3-wire submerged arc, stainless steel, 7mm thick

TYPES OF FLAWS
Semi-elliptical notches and fatigue cracks, isolated
Flaws range from 3mm to 13mm in depth with aspect
ratios of 3 to 5:1
Inclination to surface is normal
Flaw orientations are 0°, 15°, 30°, 45° and 90° to clad direction

CONTACT
Mr. Robert Stone
J.A. Jones Applied Research Company
EPRI MDE Center
P.O. Box 217097
Charlotte, NC 28221
Telephone (704) 597-6125

- 46 -
SPECIMEN IDENTITY  SB-4

DRAWING SB-4  WEIGHT  215 Kg

MATERIAL  SA533B

CLADDING  Manual SMAW, stainless steel, 7mm thick

TYPES OF FLAWS  Semi-elliptical notches and fatigue cracks, isolated
                  Flaws range from 3mm to 13mm in depth with aspect
                  ratios of 3 to 5:1
                  Inclination to surface is normal
                  Flaw orientations are 0°, 15°, 30°, 45° and 90° to
                  clad direction

CONTACT  Mr. Robert Stone
          J.A. Jones Applied Research Company
          EPRI NDE Center
          P.O. Box 277097
          Charlotte, NC  28221
          Telephone (704) 597-6125
SPECIMEN IDENTITY   SB-5

DRAWING           SB-5          WEIGHT       340 Kg

MATERIAL        SA533B

CLADDING        Thick manual SMAW, stainless steel, 13mm thick

TYPES OF FLAWS
Semi-elliptical notches and fatigue cracks, slag inclusions, isolated
Flaws range from 3mm to 13mm in depth with aspect ratios of 3 to 5:1
Inclination to surface is normal
Flaw orientations are 0°, 15°, 30°, 45° and 90° to clad direction

CONTACT           Mr. Robert Stone
J.A. Jones Applied Research Company
EPRI NDE Center
P.O. Box 217097
Charlotte, NC 28221
Telephone (704) 597-6125
SPECIMEN IDENTITY

SB-6

DRAWING

SB-6

WEIGHT

340 Kg

MATERIAL

SA533B

CLADDING

Thick 3-wire submerged arc, stainless steel, 13mm thick

TYPES OF FLAWS

Semi-elliptical notches and fatigue cracks, slag inclusions, isolated
Flaws range from 3mm to 13mm in depth with aspect ratios of 3 to 5:1
Inclination to surface is normal
Flaw orientations are 0°, 15°, 30°, 45° and 90° to clad direction

CONTACT

Mr. Robert Stone
J.A. Jones Applied Research Company
EPRI NDE Center
P.O. Box 217097
Charlotte, NC 28221
(704) 597-6125
SPECIMEN IDENTITY  SB-7

DRAWING  SB-7  WEIGHT  340 Kg

MATERIAL  SA533B

CLADDING  Thick manual SMAW, stainless steel, ground smooth but not level, 12mm thick

TYPES OF FLAWS  Semi-elliptical notches and fatigue cracks, slag inclusions, isolated
Flaws range from 3mm to 13mm in depth with aspect ratios of 3 to 5:1
Inclination to surface is normal
Flaw orientations are 0°, 15°, 30°, 45° and 90° to clad direction

CONTACT  Mr. Robert Stone
J.A. Jones Applied Research Company
EPRI NDE Center
P.O. Box 217097
Charlotte, NC 28221
Telephone (704) 597-6125
SPECIMEN IDENTITY PISC-II PLATE 3

DRAWING 81-1192-00G-a
WEIGHT ~16000 Kg

MATERIAL
PLATE ASME-SA 533 B cl.1
NOZZLE ASME-SA 508 cl.2

CLADDING
PLATE 1 layer stainless steel strip clad, more than 3.2 mm thick
NOZZLE 1 layer stainless steel wire clad, more than 3.2 mm thick
WELD ZONE covered with manual clad more than 3.2 mm thick

TYPES OF FLAW Slag inclusions - Lack of fusion - Smooth and Rough cracks (see Table 1)

CONTACT
E. BORLOO, S. CRUTZEN
Commission of the European Communities
Joint Research Centre, Non Destructive Testing Lab. - I-21020-Ispra, (Varese) Italy
Tel. : + (332) 789793 - 789789
Telex : 380042 - 380058 EUR I
<table>
<thead>
<tr>
<th>DEF.</th>
<th>SERVICE-INDUCED TYPE FLAWS</th>
<th>WELDING FLAWS</th>
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<td></td>
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<tr>
<td>2</td>
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<td>6</td>
<td>x</td>
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Main characteristics of the intended defects in PISC-II Plate No. 3
SPECIMEN IDENTITY

PISC EDC-1-0-3

DRAWING 81-1192-00E-EDC-2-F

WEIGHT ≈ 300 Kg

MATERIAL

ASME SA 533 B cl. 1

CLADDING

NONE

TYPES OF FLAW

RE-ENTRANT MACHINED SLOTS
25 mm THROUGH-THICKNESS SIZE
0 DEGREES TILT
SMOOTH SURFACE

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SPECIMEN Identity: PISC EDC-2-0-9

Drawing: 81-1192-00E-EDC-2-G  Weight: ~205 Kg

Material: ASME SA 533 B Cl. 1

Cladding: None

Types of Flaw:
- 25 mm Through Thickness Size Re-Enterant Machined
- Flat-Bottomed Hole
- 0 Degree Tilt - Smooth Surface
- ~10 mm Through Thickness Size Re-Enterant Spark-Eroded Flat-Bottomed Holes
- 0 Degrees Tilt - Smooth Surface

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- 54 -
SPECIMEN IDENTITY
PISC EDC-3-0-10

DRAWING  81-1192-00E-EDC-3G  WEIGHT  300 Kg

MATERIAL
ASME SA 533 B Cl. 1
(Attention this block contains a lot of segregations)

CLADDING
NONE

TYPES OF FLAW
Re-Entrant Machined Flat-Bottomed Hole
25 mm Through-Thickness Size
0 Degree Tilt
Smooth Surface

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MATERIAL
ASME SA 533 B Cl. 1

CLADDING
NONE

TYPES OF FLAW
Re-Entrant Machined Flat-Bottomed Holes
25 mm Through-Thickness Size
+ 7 and - 7 Degrees Tilt
Smooth Surface

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SPECIMEN IDENTITY
PISC EDC-40-0-2

DRAWING  84-1275-0C
WEIGHT  = 275 Kg

ALL DIMENSIONS IN MM

MATERIAL
ASME SA 533 B cl. 1

CLADDING
NONE

TYPES OF FLAW
SHRINK-FIT, FLAT-BOTTOMED HOLE
10 mm THROUGH THICKNESS SIZE
0 DEGREE S TILT
SMOOTH SURFACE

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SPECIMEN IDENTITY

PISC EDC-40-5

DRAWING 84-1275-08

WEIGHT ~ 255 Kg

MATERIAL

ASME SA 533 B Cl. 1

CLADDING

NONE

TYPES OF FLAW

Shrink-Fit, Flat-Bottomed Hole
17 mm Through Thickness Size
0 Degree Tilt
Smooth Surface

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SPECIMEN IDENTITY  PISC EDC-40-8

DRAWING  84-1275-0A  WEIGHT  ~ 275 Kg

ALL DIMENSIONS IN MM

MATERIAL  ASME SA 533 B cl. 1

CLADDING   NONE

TYPES OF FLAW  SHRINK-FIT, FLAT-BOTTOMED HOLES
25 mm THROUGH-THICKNESS SIZE
0 DEGREES TILT
SMOOTH SURFACE

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SPECIMEN IDENTITY

PISC EEC-45

DRAWING 84-1275-0B

WEIGHT ~ 170 Kg

ALL DIMENSIONS IN MM

MATERIAL

ASME SA 533 B Cl. 1

CLADDING

NONE

TYPES OF FLAW

- 45 Degrees Machined Flat-Bottomed Holes
  Diameter: 9.5 mm and 3 mm
  Smooth Surface
- Machined Slots
  Dimensions: 6 mm x 50.8 mm
  Extremities with Radius 6 mm
  Depth: 5 mm and 0.5 mm
  Smooth Surface

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- 60 -
SPECIMEN IDENTITY PISC EEC-60

DRAWING 81-1192-EEC-60  WEIGHT ~ 132 Kg

MATERIAL ASME SA 533 B Cl. 1

CLADDING NONE

TYPES OF FLAW
- 60 Degrees Machined Flat-Bottomed Hole
  Diameter : 9,5 mm and 3 mm
  Smooth Surface
- 0 Degrees Machined Flat-Bottomed Holes
  Diameter : 9,5 mm and 3 mm
  Smooth Surface

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SPECIMEN IDENTITY  
PISC EDC-70

DRAWING  
81-1192-EEC-70

WEIGHT  
~43 Kg

MATERIAL  
ASME SA 533 B Cl. 1

CLADDING  
NONE

TYPES OF FLAW.  
- 70 Degrees Machined Flat Bottomed Holes
  Diameter : 9 mm and 3 mm
  Smooth Surface

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SPECIMEN IDENTITY  PISC EEC-S

DRAWING  81-1192-EEC-S  WEIGHT  ~15 Kg

MATERIAL  ASME SA 533 B Cl. 1

CLADDING  NONE

TYPES OF FLAW
- Machined Slots
Dimensions: 6 mm x 36 mm
Depth: 5 mm and 0,5 mm
Smooth Surface

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SPECIMEN IDENTITY  PISC EEC-T

DRAWING  81-1192-EEC-T  WEIGHT  ~325 Kg

ALL DIMENSIONS IN MM

MATERIAL  ASME SA 533 B Cl. 1

CLADDING  NONE

TYPES OF FLAW  - 90 Degrees Machined Flat-Bottomed Holes
Dia. : 9,5 mm
Smooth Surface

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SPECIMEN IDENTITY  PISC EDC-C1-d

DRAWING  81-1192-EDC-C1-d  WEIGHT  ~218 Kg

MATERIAL  ASME SA 533 B Cl. 1

CLADDING  NONE

TYPES OF FLAW  - Machined Side-Drilled Holes
Diameter : 9,5 mm  Length : 125 mm
Smooth Surface

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