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DOSSIER CMP Arles:
CMP ARLES file N°.

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N° Cde Client :
Client order N°.Client :
Customer

AIR LIQUIDE AGS GmbH

Appareil : 1 x 1800MT LOX + 1 x 1000MT LIN STORAGE TANKS
Item

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CONTROLE NON DESTRUCTIF DES SOUDURES
NON DESTRUCTIVE WELDS EXAMINATION**BON POUR EXECUTION**
RELEASED FOR FABRICATION

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1 - INNER VESSEL**1.1 GENERAL**

The interpretation of longitudinal welds and circumferential welds of the inner vessel as well as circumferential welds between two pipes will follow the acceptability criteria of ASME VIII, div. 1
The minimum length of spot radiographs shall be 380 mm (15 inch)

The procedure for radiographic examination is CO20

The procedure for liquid penetrant examination is CO18.

The procedure for vacuum box examination is CRYO CO01

The procedure for visual examination is CO22

The procedure for ferrite test is CRYO CO14

1.2 SCOPE OF EXAMINATION**1.2.1 Bottom**

. Bottom annular plate radial butt-welds :

- 25 % of joints shall be spot radiographed for a minimum length of 150mm. The location shall be at the outer edge of the joint and under the tank shell
- 100 % of joints shall be checked by vacuum box before and after hydro pneumatic test

. Centre part of bottom : lap-joints shall be checked by vacuum box before and after hydro pneumatic test

1.2.2 Bottom periphery to shell junction

- . Dye penetrant after the first pass, inside and outside
- . Dye penetrant after weld completion, inside and outside before and after hydro pneumatic test

1.2.3 Shell

. Longitudinal joints

- for 1800 MT LOX tank:
 - 100 % radiography for shells 3.1 to 3.6
 - One spot shall be taken in each joint + one spot in the first 3m for each welder for shell 3.7
- for 1000 MT LIN tank:
 - 100 % radiography for shells 3.1 to 3.7
 - One spot shall be taken in each joint + one spot in the first 3m for each welder for shells 3.8 and 3.9

- . Circumferential joints :
 - . 1 film in first 3 m. for each welding operator of each type and thickness
 - Thereafter without regard to number of welders 1 film between each longitudinal joint .
- . 100 % of intersections of joints
- . Dye penetrant test on both sides of the joint on non radiographed weld parts

1.2.4. Roof periphery to shell junction

- . Fillet welds tested by dye penetrant

1.2.5 Roof

- . Compression ring butt-welds :
 - 25 % of joints shall be spot radiographed for a minimum length of 150mm.
 - 100 % Dye penetrant of parts non radiographed

- . Butt-welds of the central part of roof : 100 % dye penetrant

- . Lap joints of the roof : external welds tested by dye penetrant

1.2.6 Anchor straps

- . Fillet welds for embedded part : 100 % dye penetrant test and ferrite test.
- . Butt weld : 100 % radiographed + ferrite test.
- . Welds of straps to the pad. and pad to the shell : tested by dye penetrant before and after the hydrostatic test + ferrite test.

1.2.7 Stiffeners

- . Stiffeners and other attachments to the shell : dye penetrant test.
- . Stiffeners butt-welds : Visual examination

2 - PIPING

2.1 Piping below liquid level

- . Circumferential joints: 100 % of joints shall be 100 % radiographed

2.2 Piping above liquid level

- . Circumferential joints: 30 % of joints shall be 100 % radiographed

2.3 Manhole (M)

- . Longitudinal joint: 100 % radiographed.

2.4 Nozzle attachments

- . 100 % dye penetrant test of root pass.
- . 100 % dye penetrant test of final weld.

3 - OUTER CASING**3.1 Bottom**

- . Bottom peripheral butt-welds: visual examination
- . Centre part of bottom: lap-joints: visual examination

3.2 Bottom periphery to shell junction :

- . Double fillet weld: visual examination and 100 % dye penetrant

3.3 Shell :

- . Butt-weld: visual examination

3.4 Shell to roof junction :

- . Fillet weld: visual examination

3.5 Roof :

- . Lap-weld: visual examination

4 - TEMPORARY ATTACHMENTS ON INNER VESSEL

All locations of temporary attachments welds (such as lifting lugs ..): dye penetrant test after removal of attachments.

5 – PRODUCTION TEST PLATE**5.1 Scope for 1800MT LOX tank**

1 test plate shall be welded on site:

- 2 parts dimension : 600 x 150 on thickness 6 mm (Cutting transverse of lamination)
- Material : A240 Type 304
- Name of test plate: APP1
- Welded with WPS1108 in 3G Up position

5.2 Scope for 1000MT LIN tank

1 test plate shall be welded on site:

- 2 parts dimension : 600 x 150 on thickness 5 mm (Cutting transverse of lamination)
- Material : A240 Type 304
- Name of test plate: APP2
- Welded with WPS1108 in 3G Up position

5.3 Test on test plates

Each test plate shall be impact tested:

- 1 set of Charpy V-notch specimen on weld metal
- 1 set of Charpy V-notch specimen on heat affected zone
- Temperature of test : -196°C

Required Impact values:

- 25 J/cm² on 1 specimen and 34 J/cm² on average of 3 specimens
- Minimum lateral expansion : 0.38 mm