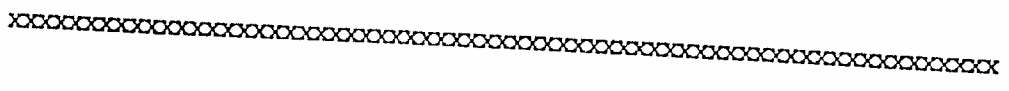


CLOSED BOOK TEST

NAME: Ahmed Jaryy TEST SCORE: _____
COMPANY NAME: Saipan START TIME: _____
DATE COMPLETED: _____ FINISH TIME: _____

The following test is "closed book". This test covers areas of knowledge related to projects that you will monitor for NAPIS in the Northern Area. The test is worth 100 points, with the un-weighted value of each question high-lighted at the end of each question (weight factor = $100 / 90 = 1.111$). You must pass this test with a minimum grade of 70. IF YOU HAVE QUESTIONS, PLEASE ASK THE TEST MENTOR:



1. What is the "Technical Definition" of a "slag inclusion"? (1 pt)

Non-metallic material trapped in a molten metal during welding or forging.

2. CONCERNING FINAL OPERATIONS, why should you not install a gate valve with its stem below the horizontal in oil service? (1pt)

Positioning of valve stem below horizontal is not preferred to prevent disposition of debris on the bonnet which will prevent closure of the valve. Corrosion is also a reason.

3. What specific areas do the following standards cover? (5pt)

a) ASME IX: *Welder and Welding Procedure Qualification*

b) ANSI B31.3: *Refinery / Plant Piping*

c) AWS D1.1: *Structural Welding*

d) ASNT TC-1A: *Training/and Certification for Non-Destructive Testing and Inspection*

e) ASME VIII: *Pressure Vessel*

4) List at least three (3) separate aspects of a permanent identification system that is required to appear on a radiograph in order to assure traceability? (3pt)

a) *B.I./J.O. or description of the equipment/piping*

b) *Weld Number*

c) *Penetrameter Date*

image quality indicator.

- 5) What is IQI (penetrameter) sensitivity and what does it determine? (2pt)

IQI determine the quality of the radiographic techniques used and therefore, will help us in knowing as to what degree of defect can be detected.

- 6) What has occurred if the light image of the letter "B" appears on your radiograph? (2pt)

There is backscatter

- * 9) You are monitoring an NDT inspection at a Vendor shop who is using the Magnetic Particle, dry powder prod method. They have located a "weak formation pattern". Where would you expect them to next place the prods to obtain a stronger indication pattern? (Please draw the 2nd location of the prods in relationship to the 1st location. Denote the direction of the defect for both prod placements) (3pt)

- 10) (A) What are the basic differences between a E-6010, E-7010, and an E-7018 electrode? (B) How long should each be dried after removal from their "hermatically sealed" container? (4pt)

a) *E-6010, E-7010 electrodes are non-low hydrogen electrodes, while E-7018 is a low hydrogen electrode.*

b) *E-6010 & E-7010 do not require drying after removal from hermatically sealed container.*

E-7018 does not require drying after removal from hermatically sealed container; however, if this is removed from the sealed container for more than 4 hours then there should be dried or baked for 2 hours.

- 11) Define the following terms "Welder performance qualification", WPS qualification" and "PQR". Explain their inter-relationship (6pt)

a) *This is a test undertaken by a welder to prove his ability or be certified to weld on a certain welding process and procedure.*

b) *WPS is a welding procedure specification. This is a written procedure to weld which states the essential and some non-essential variables. Qualification is performing the welding based on the WPS and performing of the mechanical tests to qualify the procedure.*

c) *PQR - This is the record of the mechanical tests conducted on the test piece welded to a given WPS.*

* *All these are closely relates because they refer to testing and qualification.*

Vacuum baking = Welder Oven. 65° more 4hrs

baking = 260° to 430° 2hrs

holding = 120° to 150°

12) Please denote the following acronyms: (4pt)

- a) SAW - *Submerged Arc Welding*
- b) FCAW - *Flux Cored Arc Welding*
- c) GMAW - *Gas Metal Arc Welding*
- d) SMAW - *Shielded Metal Arc Welding*

13) Please draw the completed weld detailed in the following AWS D1.1 WELD symbols and explain each element: (6pt)

15) (a) What is meant by the term "film density", and (b) How is it measured? (2pts):

- a) *Is the degree of blackness on the radiograph*
- b) *This is measured by using a densitometer or comparison with a density strip.*

16) What is PWHT and why is it required for some weldments? (2pt):

PWHT is bringing up the temperature of a welded material at a regulated heating rate up to its required soak temperature and held at a required holding time after which cooled down at the required cooling rate. This is required to remove any residual stress after welding.

17) Is it possible to locate defects by magnetic particle or liquid penetrant examination which can not be found by radiography? Explain; (2pt):

Yes, there are near surface or surface that may be perpendicular with the rays of radiation such as internal lamination and cold laps.

20) What is the basic difference between a DIN and an ASME penetrameters? (2pt)

a) *DIN is a wire penetrometer while an ASME penet is a penny type (a block consisting of holes)*

b)

22) Denote the three (3) main reasons to use preheat? (3pt)

- a) *To reduce the cooling rate during welding*
- b) *To prevent entrapment of hydrogen gas*
- c) *To prevent formation of hardenable microstructures that will result to brittleness.*

23. What are radiographic film ARTIFACTS. Give 4 examples ? (3pt):

Film Artifacts are defects formed on the radiograph that are not part of the defect or discontinuity of the material to be tested.

1. *Water Marks*
2. *Crimps*
3. *Scratches on the film*
4. *Disbondment of film emulsion*

24. What does the term "Holiday Detection" mean? (2pt):

This is a test performed to locate a break or discontinuity on a protective coating.

30. What is the purpose of a QC Plan vs. the QA/QC Manual? (3pt)

QC Plan is a list of a quality control activities to be performed in accordance with the approved QA/QC manual on a certain project.

37. What position is the gate to be in during a 'shell' test? Explain why (2pt)

Partially opened position so that any cavity on the valve body can be subjected to the test pressure.

38. What is the ultimate purpose of the backseat test for a gate valve? (2pt)

To ensure that there is no leakage through the bonnet and stem packing.

39. Please see the attached drawing to complete this question.

40. Is the packing gland to be tight during the backseat test of a gate valve? (2pt)

NO

41. Name at least 6 areas that should be checked during the dimensional inspection of a raised face welding neck flange? (2pt)

- *Rating*
- *No. of bolt holes*
- *Thickness of hub and all bend*
- *Soundness of bevel*
- *Ensure that raised face meets the required roughness per standard.*
- *Internal diameter*

45. If a valve body is to be painted, when should shell hydrostatic testing be performed? (1pt)

Before painting.

54. PLEASE FILL IN THE BLANKS:

DFT, is an acronym for Dry Film Thickness, and is normally specified in micrometers. One mil (.001") equals approximately 25 micrometers. (2pt)

55. During painting and coating, what does the term "profile depth" mean, and (b) how it is obtained and measured: (3pt)

a) *Profile is the measurement of the depth of peaks and valleys on the substrate material.*

b) *This is obtained by a profile gauge or a comparator gauge.*

59. What is the "Swedish Standards Institution" normally associated with? (2pts)

Degrees of surface preparation of metal before painting SA 2 $\frac{1}{2}$.

66. Why must alternate paint coats be tinted? (2pts)

To determine the number of coats applied and find areas you may have missed or lightly coated.

97. Which of the following is true? (2pts):

F a) All discontinuities are defects.

F b) Defects that effect the products usefulness are called discontinuities.

T c) Discontinuities that effect the product's usefulness are called defects.

F d) All discontinuities are unacceptable.

98. What do the letters "PSIA" mean? (2 pts):

a) Pressure referred to National Institute of Standards and Technology's absolute pressure,

b) Pascals per square inch absolute,

c) Pressure standard in absolute units,

d) *Pounds per square inch absolute.*

99. Draw the differences between; (6pts)

(a) "Double-V-groove weld butt joint":

(b) "Double-bevel-groove weld butt joint";

(c) "Single-bevel-groove weld butt joint";

Pump's Exam Questionnaire

1. Enumerate at least 3 types of pumps.
2. What tests have to be done as per API 610?
3. Enumerate at least 4 parts of a pump
4. What does NPSH stand for?
5. How can the NPSH test be carried out?
6. What information is shown in the performance curve?
7. What is the differential pressure in Positive Displacement Pumps?
8. What is the maximum vibration value peak to peak in a centrifugal pump as per API 610?
9. What records does the Manufacturer have to keep up to five years after construction of a pump?
10. Should welds in pressure parts be full penetration?
11. If a mechanical test has to stop due to a part failure before the specified duration, Can the mechanical test re-start and complete the remaining time? or Do you request for a new test?
12. If the casing paint shows damage after the hydrotest, Can the hydrotest be accepted?
13. What is the pressure value for the casing hydrotest?
14. How long is the holding time for a casing hydrotest?
15. What is the applicable standard to qualify welders and WPS as per API 610?
16. Why does the test fluid chloride content have to be controlled for the Hydrotest of Austenitic Steel Components?
17. What is the purpose of the diaphragm in a Positive Displacement Pump?
18. Which is not a centrifugal pump:
 - Single stage
 - Double stage
 - Propeller
 - Turbine
19. What are the API requirement for impellers?
20. What is the difference between static and dynamic balancing?
21. Is it required to balance the rotating arrangement despite each one of its parts (impeller, wear rings, shaft, etc) has been balanced already?
22. Determine the Hardness values for Casing and Impeller wear rings.
23. What kind of materials can be used in coupling guards if the motor is explosion proof?
24. What is cavitation?
25. What is the difference between witnessed and observed as per API 610?
26. What documentation does the supplier is requested to keep available for at least five years as per API 610?

5) What is IQI penetrator sensitivity and what does it determine? (2pt)

IQI determine the quality of the radiographic techniques used and therefore, will help us in knowing as to what degree of defect can be detected.

6) What has occurred if the light image of the letter "E" appears on your radiograph? (3pt)

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{ incl - view }
DIN → wires
ASME → wires

b)

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- (c) "Single-bevel-groove weld butt joint";

Aramco Vender Inspection Examination.

Pressure vessels.

- 1) For test pressure equal to 5000 psi which of the following would be the most appropriate gauge?
 - a) 5000psi
 - b) 15000psi
 - c) 10000psi
 - d) 20000psi

- 2) What is the diff -between hydrotesting stainless steel vessels as compared to carbon steel?

The maximum chloride content for the hydrotesting water in contact with the SS shall be limited to 50mg/lit.

- 3) Can weld repair be carried out on a vessel after heat treatment with the approval of the approved inspector?

Welding not permitted after PWHT of the vessel.

- 4) What are the regulations of the ASME VIII Div-1?

All pressure vessels shall be designed in accordance with the rules of the boiler and pressure vessel code ASME VIII Div-1

- 5) What are the recommendations of the ASME VIII-Div 2?

All pressure vessels shall be manufactured shall be as specified in the data sheet.

- 6) What are the material checking requirements of the NACE MR0175?

Vender shall comply with the fabrication heat treatment requirement on there in for all wetted parts

- 7) Apart for hardness testing what test require for NACE MR0175?

Hardness test only complies with all NACE 0175.

- 8) After cutting back cladding what precaution must be taken before welding support fitting integrally to vessel?
To be ultrasonically tested.
- 9) When cladding plates cut for integral fitting of the vessel what test must be done on plates prior to fitting?
The plate to be UT - tested before fitting.
- 10) In ASME VIII is vessel hydrostatic test only?
Vessel shall be hydro tested accordance to applicable code and spec.
Pneumatic testing in lieu of hydro test requires approval.
- 11) In structural steel vessel hydrotest what precaution or check must be done prior to test?
Chlorine content in the test medium shall be max. 50mg or 50 PPM allowed.
- 12) What is NACE MR 0175?
Sulfide stress cracking resistance metallic materials for oil field equipment.
- 13) What is hardness requirement for sour service according to Nace mr 0175?
Hardness testing shall be accordance with the standard drawing maximum allowable hardness is VHN 250. Only Vickers method in accordance with ASTM- E92
- 14) What is the other main requirement (beside the hardness level)
Require PWHT due to service.
- 15) Could a pressure vessel be hydrotested after internal/external painting?
Pressure vessel should be hydro tested before painting.
- 16) The term inspector refers to.
- National board registered inspector.
 - Manufacturer inspector
 - Client inspector
 - Asme inspector.

17) What is mean letter/number "RTI" on the nameplate?"

Radiographic category of the vessel "RTI"

18) If authorized inspector accept a deviation from the code is there any action required from third party?

19) Should all pressure vessels be hydrotested or pneumatic tested according to ASME VIII?

Yes

20) How is the test pressure calculated?

ASME VIII Div 1 -----1.5 times of design pressure (maop)

ASME VIII Div 2 ----- 1.25 times of the design pressure(maop)

20) Is pwht performed after hydro test?

- yes-

21) Name two items /attributes which are marked on the plate for pressure Vessel?

1) applicable code and requirements.

2) if vessel is internally coated name plate shall show , painting system, type of coating, brand name and date.

3) Radiography level of vessel.

22) When fitting up a large pore nozzle, name at least 8 point you usually inspect/monitor/check. ?

1) quantities

2) Size.

3) Ratings(asm pressure classes)

4) facings

5) Elevation

6) Orientation as specified on the data sheet

- 7) Projection for nozzle (if specified in data sheet)
- 8) location of fit-up as data sheet
- 9) Other dimensional checks
- 23) When is preening allowed to ANSI B31.3?
Preening is restricted on root and capping passes.
- 24) What is stopple?
Solder plug/temporary plug to stop the flow in the pipe.
- 25) What is mean by valve trim?
Mat. For. stem, gate seat surface, seat ring surface, stem hole guide.
- 26) Which standard cover dimensions of valves?
- 27) What is GTAW?
Gas tungsten arc welding.
- 28) How is the pneumatic pressure calculated in ANSI B31.3
Test pressure shall be 110% of the design pressure.
- 29) What do you use to measure the profile of the raised face on a flange?
Profile gauge/comparator gauge.
- 30) Name the most common American material specification for fitting?
ASME B16.5

- Q.1 What are the 4 types on Metal Transfer for MIG?
 A.1 *Spray, Dip, Globular, Background Voltage*
- Q.2 What is UG?
 A.2 *Geometric Unshapness Penumbra*
- Q.3 When Shooting an Ellipse, where will the penitrameter go?
 A.3 *Source side*
- ★ Q.4 What 4 parameters do we get from Tensile Test?
 A.4 *Elongation; Ultimate Stress; Yeald Stress; Cross Section Area*
- Q.5 Which section of ASME VIII are the Scatter/Distribution diagrams for radiography interpretation?
 A.5 *Section 4*
- Q.6 In what Section of ASME VIII are the other defects?
 A.6 *WU35*
- Q.7 What properties have the 3 sub-arc fluxes?
 A.7 *Inert; Chemical Change Active; alloying*
- ★ Q.8 Why do we maintain the interpass temperature when welding Stainless Steel?
 A.8 *To prevent Harding in the heat affected zone through dendritic growth under bead cracking*
- Q.9 What material do we use when welding dissimilar material?
 A.9 *309 / Inconel for greater ware resistance*
- Q.10 What is Dwell Time?
 A.10 *The time for the penitrant to soak into any surface opening and the time for the developer to draw out an indication*
- ★ Q.11 What is the difference between stress relieving and normalizing?
 A.11 *Normalizing temperature is above upper critical temperature, Stress Relieving is below upper critical temperature, normalizing, cool at a controlled rate or in still air.*
- Q.12 What are the three types of hardness
 ★ A.12 *Rockwell; Vickers; Brunell*

Aramco Vender Inspection Examination

Mechanical

1) What is a wps, pqr, and wpq?

WPS: welding procedure specification. This is a written procedure, which states essential and some non-essential variables on a specific job.

PQR: this is the record of mechanical and other testing conducted on the test coupon to a given wps.

WPQ: this is the test undertaken by the welder to prove his ability to be certified to weld on a certain welding procedure.

★ 2) What is the definition of the essential and non-essential variables?

Essential variables: changes beyond the limitation of the pqr are essential variables, shall require the requalification of procedure

Non-Essential variables: changes within the limitation of pqr is not require requalification of procedure.

3) What is the definition of the pre heating?

The application of the heat to the base metal immediately before the welding is pre heating.

4) Why is inter pass temp control required when welding of austenitic stainless steel?

To prevent the hardening in the heat affected zones through the dendrite growth and prevent under bead cracking

5) List five items that you would expect to find in a material test certificate?

- Manufactures name.
- Purchase order no.
- Specification (mat gr type/class)
- Mechanical test
- Chemical test
- Heat no.
- Lot no.

6) What is carbon equivalent and what is its important in regards to welding?

$$CE = C + \frac{(Mn + Si)}{6} + \frac{(Cr + Mo + V)}{5} + \frac{(Ni + Cu)}{15}$$

Chemical analysis may be obtained from:

1. Mill test certificate
2. typical production chemistry

7) Low Hydrogen electrodes are to be maintained in .

- a) - their resealed container
- b) - Electrode holder with an open lid
- c) - **electrode oven**

8) If the root gap have been found to small before welding a proper corrective action would be.

A - increase the welding heat.

B - open a wider gap by gauging or grinding.

C -- non of the above

9) Circular welds should always be done before longitudinal ones?

TRUE/FALSE

10) What the acronyms GTAW/FCAW/SMAW/GMAW/SAW. Stand for?

GTAW: Gas tungsten arc welding.

FCAW: Flux cored arc welding

SMAW: shielded metal arc welding.

SAW: submerged arc welding.

GMAW: gas metal arc welding.

11) Name the three basic steps to be checked before start welding?

- 1) Edge preparation and cleanness.
- 2) Consumables.
- 3) Welder qualification
- 4) Pre heat (if required)

12) What is most important to check before start welding of clad material?

Preheating.

13) What would the most appropriate welding processes be when welding full penetration joint from one side?

1) FCAW 2) GTAW 3) SAW 4) GMAW

14) What is inter-pass temperature?

* In a multi pass weld, the welding temperature of the weld area between weld passes is known as interpass temp

15) Why is pre heating important for welding alloy steels?

- a) To reduce the cooling rate during the welding.
- b) To prevent entrapment of hydrogen gas
- c) To prevent formation of hardenable microstructures that will result in brittleness.
- d) To eliminate the under bead cracking.

16) What is the purpose of the PWHT?

Purpose of the PWHT is to relieve the residual stress in the welding. PWHT of weldment is heating the weldment gradually to required soak temperature and holding for specific time and cool down to required cooling rate is PWHT.

17) What extra attention is paid for low hydrogen electrodes?

Should be kept in the electrode oven, not to be exposed to open atmosphere.

20) Why the crack appears?

- a) Because of heating while welding
- b) **Because of cooling after welding.**

21) How welding stress is relieved?

- a) Heating and quenching the weld.
- b) **Heating at a designed temperature and controlled cooling.**
- c) Drilling a hole in weld seams.

22) What is the diff. Between DCRS and DCES?

23) Which are the 3 main attribute mentioned on a tensile test report?

- 1) elongation
- 2) ultimate stress
- 3) yield stress
- 4) gross section area.

24) RT is the most suitable NDT method for detecting the edge wall lack of fusion?
TRUE /FALSE.

25) Why are the bevel edges controlled before welding?

To increase the joint efficiency and to eliminate the weld defects.

26) Which is the most appropriate method for detecting lamination on bevel edge?

1) RT 2) PT 3) BOTH 4) NONE

27) Name three methods for the transfer of filler material for GMAW

1) GLOBULAR 2) SPRAY 3) DROPLET 4) DIP

28) Describe the position "3G".

3 G is the position groove weld on the plate in vertical direction: the arc is started at the root of the joint at lowest side of the groove and carried upwards.

29) When a welder is qualified for position 5G in which position can he weld?

1G, 2G, & 5G.

30) Name four types of joints?

1) Butt-joint 2) T-joint 3) lap-joint 4) corner joint.

31) For PT fluorescent, MT fluorescent and leak test is used ultraviolet light?

TRUE / FALSE

32) Which are the most three suitable grooves geometric for SAW welding. ?

1) single v-groove weld. 2) single bevel groove 3) double v groove.

1G - Flat POS

2G - Hor POS

3G - Vertical position

4G - Over head position.

5G - 120° The welder has to move & weld the joint

6G - Pipe can fix in the 15°

6" pipe Qualified welder can weld from $2\frac{7}{8}$ " to unlimited

Thickness. 5 times

Pre-Welding?

1) Safety → Nuclear safety, work permit, Hot work, Hot work permit

2) Documentation:

1 - correct drawing
 fact drawing

Correct design: revision date

Fabrication design

Rev & date of applicable Code & Std.

3) Approved WPS with supporting PQR & (rev. date)

4) welder identification & Qualification.

5) All welding m/c's, tools; date of validity of calibration certificates.

6) All other ~~instruments~~ ^{instruments} should be suitable for good workmanship

7) Pre heating correct method (if required).

8) All faces ^{welding} may be inspected.

9) All welder must be qualified.

10)

Welding: welding (Prior welding)

1) Is the work atmosphere conditions suitable for the site work.

2) Welding process & Qualification as per WPS

3) Welding consumables as per WPS. (Electrode, filler wire, gas shield)

4) ~~Electrical~~ ~~Control~~ (Ampere, Voltage, Travel Speed) as per WPS

5) Inter pass Temp^r as per WPS, minimum to maximum

6) Run of Sequence, Interpass cleaning

Post welding.

1) Completion of WPS.

2) Visual inspection as per Code and Std.

3) NDT monitor;

4) Profit due to worker shift.

5) In case of repair as per procedure.

- 5) What is IQI (penetrameter) sensitivity and what does it determine? (2pt)

IQI determine the quality of the radiographic techniques used and therefore, will help us in knowing as to what degree of defect can be detected.

- 6) What has occurred if the light image of the letter "B" appears on your radiograph? (2pt)

There is backscatter

- 9) You are monitoring an NDT inspection at a Vendor shop who is using the Magnetic Particle, dry powder prod method. They have located a "weak formation pattern". Where would you expect them to next place the prods to obtain a stronger indication pattern? (Please draw the 2nd location of the prods in relationship to the 1st location. Denote the direction of the defect for both prod placements) (3pt)

- 10) (A) What are the basic differences between a E-6010, E-7010, and an E-7018 electrode? (B) How long should each be dried after removal from their "hermatically sealed" container? (4pt)

a) E-6010, E-7010 electrodes are non-low hydrogen electrodes, while E-7018 is a low hydrogen electrode.

b) E-6010 & E-7010 do not require drying after removal from hermatically sealed container.

E-7018 does not require drying after removal from hermatically sealed container; however, if this is removed from the sealed container for more than 4 hours then there should be dried or baked for 2 hours.

- 11) Define the following terms "Welder performance qualification", WPS qualification" and "PQR". Explain their inter-relationship (6pt)

a) This is a test undertaken by a welder to prove his ability or be certified to weld on a certain welding process and procedure.

b) WPS is a welding procedure specification. This is a written procedure to weld which states the essential and some non-essential variables. Qualification is performing the welding based on the WPS and performing of the mechanical tests to qualify the procedure.

c) PQR - This is the record of the mechanical tests conducted on the test piece welded to a given WPS.

** All these are closely relates because they refer to testing and qualification.*

12) Please denote the following acronyms: (4pt)

- a) SAW - *Submerged Arc Welding*
- b) FCAW - *Flux Cored Arc Welding*
- c) GMAW - *Gas Metal Arc Welding*
- d) SMAW - *Shielded Metal Arc Welding*

13) Please draw the completed weld detailed in the following AWS D1.1 WELD symbols and explain each element: (6pt)

15) (a) What is meant by the term "film density", and (b) How is it measured? (2pts):

- a) *Is the degree of blackness on the radiograph*
- b) *This is measured by using a densitometer or comparison with a density strip.*

16) What is PWHT and why is it required for some weldments? (2pt):

PWHT is bringing up the temperature of a welded material at a regulated heating rate up to its required soak temperature and held at a required holding time after which cooled down at the required cooling rate. This is required to remove any residual stress after welding.

17) Is it possible to locate defects by magnetic particle or liquid penetrant examination which can not be found by radiography? Explain; (2pt):

Yes, there are near surface or surface that may be perpendicular with the rays of radiation such as internal lamination and cold laps.

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- a) *DIN is a wire penetrometer while an ASME penet is a penny type (a block consisting of holes)*

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22) Denote the three (3) main reasons to use preheat? (3pt)

- a) *To reduce the cooling rate during welding*
- b) *To prevent entrapment of hydrogen gas*
- c) *To prevent formation of hardenable microstructures that will result to brittleness.*

23. What are radiographic film ARTIFACTS. Give 4 examples ? (3pt):

Film Artifacts are defects formed on the radiograph that are not part of the defect or discontinuity of the material to be tested.

1. *Water Marks*
2. *Crimps*
3. *Scratches on the film*
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This is a test performed to locate a break or discontinuity on a protective coating.

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QC Plan is a list of a quality control activities to be performed in accordance with the approved QA/QC manual on a certain project.

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To ensure that there is no leakage through the bonnet and stem packing.

39. Please see the attached drawing to complete this question.

40. Is the packing gland to be tight during the backseat test of a gate valve? (2pt)

NO

41. Name at least 6 areas that should be checked during the dimensional inspection of a raised face welding neck flange? (2pt)

- *Rating*
- *No. of bolt holes*
- *Thickness of hub and all bend*
- *Soundness of bevel*
- *Ensure that raised face meets the required roughness per standard.*
- *Internal diameter*

45. If a valve body is to be painted, when should shell hydrostatic testing be performed? (1pt)

Before painting.

54. PLEASE FILL IN THE BLANKS:

DFT, is an acronym for Dry Film Thickness, and is normally specified in micrometers. One mil (.001") equals approximately 25 micrometers. (2pt)

55. During painting and coating, what does the term "profile depth" mean, and (b) how it is obtained and measured: (3pt)

a) *Profile is the measurement of the depth of peaks and valleys on the substrate material.*

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59. What is the "Swedish Standards Institution" normally associated with? (2pts)

Degrees of surface preparation of metal before painting SA 2½.

66. Why must alternate paint coats be tinted? (2pts)

To determine the number of coats applied and find areas you may have missed or lightly coated.

97. Which of the following is true? (2pts):

F a) All discontinuities are defects.

F b) Defects that effect the products usefulness are called discontinuities.

T c) Discontinuities that effect the product's usefulness are called defects.

F d) All discontinuities are unacceptable.

98. What do the letters "PSIA" mean? (2 pts);

a) Pressure referred to National Institute of Standards and Technology's absolute pressure,

b) Pascals per square inch absolute,

c) Pressure standard in absolute units,

d) *Pounds per square inch absolute.*

99. Draw the differences between; (6pts)

(a) "Double-V-groove weld butt joint";

(b) "Double-bevel-groove weld butt joint";

(c) "Single-bevel-groove weld butt joint";

Aramco Vender Inspection Examination.

Pressure vessels.

- 1) For test pressure equal to 5000 psi which of the following would be the most appropriate gauge?
 - a) 5000psi
 - b) 15000psi
 - c) 10000psi
 - d) 20000psi.

- 2) What is the diff -between hydrotesting stainless steel vessels as compared to carbon steel?

The maximum chloride content for the hydrotesting water in contact with the SS shall be limited to 50mg/lit.

- 3) Can weld repair be carried out on a vessel after heat treatment with the approval of the approved inspector?

Welding not permitted after PWHT of the vessel.

- 4) What are the regulations of the ASME VIII Div-1?

All pressure vessels shall be designed in accordance with the rules of the boiler and pressure vessel code ASME VIII Div-1

- 5) What are the recommendations of the ASME VIII-Div 2?

All pressure vessels shall be manufactured shall be as specified in the data sheet.

- 6) What are the material checking requirements of the NACE MR0175?

Vender shall comply with the fabrication heat treatment requirement on there in for all wetted parts.

- 7) Apart for hardness testing what test require for NACE MR0175?

Hardness test only complies with all NACE 0175.

- 8) After cutting back cladding what precaution must be taken before welding
Support fitting integrally to vessel?
To be ultrasonically tested.
- 9) When cladding plates cut for integral fitting of the vessel what test must be done on plates prior to fitting?
The plate to be UT – tested before fitting.
- 10) In ASME VIII is vessel hydrostatic test only?
Vessel shall be hydro tested accordance to applicable code and spec.
Pneumatic testing in lieu of hydro test requires approval.
- 11) In structural steel vessel hydrotest what precaution or check must be done
Prior to test?
Chlorine contain in the test medium shall be max.50mg or 50 PPM allowed.
- 12) What is NACE MR 0175?
Sulfide stress cracking resistance metallic materials for oil field
equipment.
- 13) What is hardness requirement for sour service according to Nace mr 0175?
Hardness testing shall be accordance with the standard drawing maximum
allowable hardness is VHN 250. Only Vickers method in accordance with
ASTM- E92.
- 14) What is the other main requirement (beside the hardness level)
Require PWHT due to service.
- 15) Could a pressure vessel be hydrotested after internal/external painting?
Pressure vessel should be hydro tested before painting.
- 16) The term inspector refers to,
a) National board registered inspector.
b) Manufacturer inspector
c) Client inspector
d) Asme inspector.

17) What is mean letter/number 'RTI' on the nameplate?

Radiographic category of the vessel 'RTI'

18) If authorized inspector accept a deviation from the code is there any action required from third party?

19) Should all pressure vessels be hydrotested or pneumatic tested according to ASME VIII?

Yes

20) How is the test pressure calculated?

ASME VIII Div 1 -----1.5 times of design pressure (maop)

ASME VIII Div 2 ----- 1.25 times of the design pressure(maop)

20) Is pwht performed after hydro test?

- yes-

21) Name two items /attributes which are marked on the plate for pressure Vessel?

1) applicable code and requirements.

2) if vessel is internally coated name plate shall show , painting system, type of coating, brand name and date.

3) Radiography level of vessel.

22) When fitting up a large pore nozzle, name at least 8 point you usually

Inspect/monitor/check. ?

1) quantities

2) Size.

3) Ratings(asmc pressure classes)

4) facings

5) Elevation.

6) Orientation as specified on the data sheet.

- 7) Projection for nozzle(if specified in data sheet)
 - 8) location of fit-up as data sheet
 - 9) Other dimensional checks.
- 23) When is preening allowed to ANSI B31.3?
Preening is restricted on root and capping passes.
- 24) What is stopple?
Solder plug/temporary plug to stop the flow in the pipe.
- 25) What is mean by valve trim?
Mat. For. stem, gate seat surface, seat ring surface, stem hole guide..
- 26) Which standard cover dimensions of valves?
- 27) What is GTAW?
Gas tungsten arc welding.
- 28) How is the pneumatic pressure calculated in ANSI B31.3
Test pressure shall be 110% of the design pressure.
- 29) What do you use to measure the profile of the raised face on a flange?
Profile gauge/comparator gauge.
- 30) Name the most common American material specification for fitting?
ASME B16.5

- Q.1 What are the 4 types on Metal Transfer for MIG?
 A.1 *Spray, Dip, Globular, Background Voltage*
- Q.2 What is UG?
 A.2 *Geometric Unshapness - Penumbra*
- Q.3 When Shooting an Ellipse, where will the penetrameter go?
 A.3 *Source side*
- Q.4 What 4 parameters do we get from Tensile Test?
 A.4 *Elongation; Ultimate Stress; Yeadl Stress; Cross Section Area*
- Q.5 Which section of ASME VIII are the Scatter/Distribution diagrams for radiography interpretation?
 A.5 *Section 4*
- Q.6 In what Section of ASME VIII are the other defects?
 A.6 *WU35*
- Q.7 What properties have the 3 sub-arc fluxes?
 A.7 *Inert; Chemical Change Active; alloying*
- Q.8 Why do we maintain the interpass temperature when welding Stainless Steel?
 A.8 *To prevent Harding in the heat affected zone through dendritic growth under bead cracking*
- Q.9 What material do we use when welding dissimilar material?
 A.9 *309 / Inconel for greater ware resistance*
- Q.10 What is Dwell Time?
 A.10 *The time for the penetrant to soak into any surface opening and the time for the developer to draw out an indication*
- Q.11 What is the difference between stress relieving and normalizing?
 A.11 *Normalizing temperature is above upper critical temperature, Stress Relieving is below upper critical temperature, normalizing, cool at a controlled rate or in still air.*
- Q.12 What are the three types of hardness
 A.12 *Rockwell; Vickers; Brunell*

Aramco Vender Inspection Examination.

Mechanical

1) What is a wps, pqr, and wps?

WPS: welding procedure specification. This is a written procedure, which states essential and some non-essential variables on a specific job.

PQR: this is the record of mechanical and other testing conducted on the test coupon to a given wps.

WPQ: this is the test under taken by the welder to prove his ability to be certified To weld on a certain welding procedure.

2) What is the definition of the essential and non-essential variables?

Essential variables: changes beyond the limitation of the pqr are essential variables. shall require the requalification of procedure.

Non-Essential variables: changes within the limitation of pqr is not require requalification of procedure.

3) What is the definition of the pre heating?

The application of the heat to the base metal immediately before the welding is pre heating.

4) Why is inter pass temp control required when welding of austenitic stainless steel?

To prevent the hardening in the heat affected zones through the dendrite growth and prevent under bead cracking.

5) List five items that you would expect to find in a material test certificate?

- a) Manufactures name.
- b) Purchase order no.
- c) Specification (mat.gr. type/class)
- d) Mechanical test
- e) Chemical test
- f) Heat no.
- g) Lot no.

6) What is carbon equivalent and what is its important in regards to welding?

$$CE = C + \frac{(Mn + Si)}{6} + \frac{(Cr + Mo + V)}{5} + \frac{(Ni + Cu)}{15}$$

Chemical analysis may be obtained from:

1. Mill test certificate
2. typical production chemistry.

- 7) Low Hydrogen electrodes are to be maintained in :
- their rescaled container
 - Electrode holder with an open lid.
 - **electrode oven**
- 8) If the root gap have been found to small before welding a proper corrective action would be.
- increase the welding heat.
 - **open a wider gap by gauging or grinding.**
 - non of the above
- 9) Circular welds should always be done before longitudinal ones?

TRUE/FALSE

- 10) What the acronyms GTAW/FCAW/SMAW/GMAW/SAW. Stand for?
- GTAW: Gas tungsten arc welding.
- FCAW: Flux cored arc welding
- SMAW: shielded metal arc welding.
- SAW: submerged arc welding.
- GMAW: gas metal arc welding.
- 11) Name the three basic steps to be checked before start welding?
- Edge preparation and cleanness.
 - Consumables.
 - Welder qualification
 - Pre heat (if required).
- 12) What is most important to check before start welding of clad material?
- Preheating.
- 13) What would the most appropriate welding processes be when welding full penetration joint from one side?
- 1) FCAW 2)GTAW 3) SAW 4)GMAW
- 14) What is inter-pass temperature?

In a multi pass weld, the welding temperature of the weld area between weld passes is known as interpass temp.

15) Why is pre heating important for welding alloy steels?

- a) To reduce the cooling rate during the welding.
- b) To prevent entrapment of hydrogen gas.
- c) To prevent formation of hardenable microstructures that will result in brittleness.
- d) To eliminate the under bead cracking.

16) What is the purpose of the PWHT?

Purpose of the PWHT is to relieve the residual stress in the welding. PWHT of weldment is heating the weldment gradually to required soak temperature and holding for specific time and cool down to required cooling rate is PWHT.

17) What extra attention is paid for low hydrogen electrodes?

Should be kept in the electrode oven, not to be exposed to open atmosphere.

20) Why the crack appears?

- a) Because of heating while welding.
- b) **Because of cooling after welding.**

21) How welding stress is relieved?

- a) Heating and quenching the weld
- b) **Heating at a designed temperature and controlled cooling.**
- c) Drilling a hole in weld seams.

22) What is the diff. Between DCRS and DCES?

23) Which are the 3 main attribute mentioned on a tensile test report?

- 1) elongation
- 2) ultimate stress
- 3) yield stress
- 4) gross section area.

24) RT is the most suitable NDT method for detecting the edge wall lack of fusion?
TRUE /FALSE.

25) Why are the bevel edges controlled before welding?

To increase the joint efficiency and to eliminate the weld defects.

26) Which is the most appropriate method for detecting lamination on bevel edge?

1) RT 2) PT 3) BOTH 4) NONE.

27) Name three methods for the transfer of filler material for GMAW?

1) GLOBULAR 2) SPRAY 3) DROPLET 4) DIP.

28) Describe the position "3G".

3 G is the position groove weld on the plate in vertical direction; the arc is started at the root of the joint at lowest side of the groove and carried upwards.

29) When a welder is qualified for position 5G in which position can he weld?

1G, 2G, & 5G.

30) Name four types of joints?

1) Butt-joint 2) T-joint 3) lap-joint 4) corner joint.

31) For PT fluorescent, MT fluorescent and leak test is used ultraviolet light?

TRUE / FALSE

32) Which are the most three suitable grooves geometric for SAW welding. ?

1) single v-groove weld. 2) single bevel groove 3) double v groove.

SAUDI ARAMCO INSPECTION DEPARTMENT
NORTHERN AREA PROJECTS INSPECTION

CLOSED BOOK TEST

NAME: _____ TEST SCORE: _____

COMPANY NAME: _____ START TIME: _____

DATE COMPLETED: _____ FINISH TIME: _____

The following test is "closed book". This test covers areas of knowledge related to projects that you will monitor for MAPIS in the Northern Area. The test is worth 100 points, with the un-weighted value of each question high-lighted at the end of each question (weight factor = $100 / 90 = 1.111$). You must pass this test with a minimum grade of 75. IF YOU HAVE QUESTIONS, PLEASE ASK THE TEST MENTOR:

XX

1. What is the "Technical Definition" of a "slag inclusion"? (1 pt)
Non-metallic material trapped in a molten metal during welding or forging.

2. CONCERNING FINAL OPERATIONS, why should you not install a gate valve with its stem below the horizontal in oil service? (1pt)
Positioning of valve stem below horizontal is not preferred to prevent disposition of debris on the bonnet which will prevent closure of the valve. Corrosion is also a reason.

3. What specific areas do the following standards cover? (5pt)
 - a) ASME IX: *Welder and Welding Procedure Qualification*
 - b) ANSI B31.3: *Refinery / Plant Piping*
 - c) AWS D1.1: *Structural Welding - Steel*
 - d) ASNT TC-1A: *Training/and Certification for Non-Destructive Testing and Inspection*
 - e) ASME VIII: *Pressure Vessel*

- 4) List at least three (3) separate aspects of a permanent identification system that is required to appear on a radiograph in order to assure traceability? (3pt)
 - a) *B.I./J.O. or description of the equipment/piping*
 - b) *Weld Number*
 - c) *Penetrameter Date Date*
Date of RT

- 5) What is IQI (penetrameter) sensitivity and what does it determine? (2pt)

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- (c) "Single-bevel-groove weld butt joint";

Pump's Exam Questionnaire

1. Enumerate at least 3 types of pumps.
2. What tests have to be done as per API 610?
3. Enumerate at least 4 parts of a pump
4. What does NPSH stand for?
5. How can the NPSH test be carried out?
6. What information is shown in the performance curve?
7. What is the differential pressure in Positive Displacement Pumps?
8. What is the maximum vibration value peak to peak in a centrifugal pump as per API 610?
9. What records does the Manufacturer have to keep up to five years after construction of a pump?
10. Should welds in pressure parts be full penetration?
11. If a mechanical test has to stop due to a part failure before the specified duration, Can the mechanical test re-start and complete the remaining time? or Do you request for a new test?
12. If the casing paint shows damage after the hydrotest, Can the hydrotest be accepted?
13. What is the pressure value for the casing hydrotest?
14. How long is the holding time for a casing hydrotest?
15. What is the applicable standard to qualify welders and WPS as per API 610?
16. Why does the test fluid chloride content have to be controlled for the Hydrotest of Austenitic Steel Components?
17. What is the purpose of the diaphragm in a Positive Displacement Pump?
18. Which is not a centrifugal pump:
 - Single stage
 - Double stage
 - Propeller
 - Turbine
19. What are the API requirement for impellers?
20. What is the difference between static and dynamic balancing?
21. Is it required to balance the rotating arrangement despite each one of its parts (impeller, wear rings, shaft, etc) has been balanced already?
22. Determine the Hardness values for Casing and Impeller wear rings.
23. What kind of materials can be used in coupling guards if the motor is explosion proof?
24. What is cavitation?
25. What is the difference between witnessed and observed as per API 610?
26. What documentation does the supplier is requested to keep available for at least five years as per API 610?

mon 0100
NLT

ARAMCO VENDOR INSPECTION EXAMINATION

PRESSURE VESSELS

1) What is NACE MR 0175 ?

Answer: A NACE standard which refers to resistance of metallic materials to SSC in sour environments.

Nota:

NACE –National Association of Corrosion Engineers (USA)

Denumirea standardului: Sulfide Stress Cracking (SSC) Resistant Materials for Oilfield Equipment.

Sour environment: este definit (si) prin factorii care infl. SSC: (factors influencing SSC)

- compoz. ch., rezist., trat. termic, microstructura;
- concentr. in ioni de hidrogen (pH) a mediului;
- conc. si pres. totala a H₂S (Hydrogen Sulfide);
- starea de tensiuni (total tensile stress –actual and remanent);
- temp.
- time

SSC –brittle failure by cracking under combined action of:

- tensile stress
- corrosion in presence of water + H₂S.

2) What is hardness requirement for sour service acc. to NACE MR 0175 ?

A: 22 HRC (this is the main req)

3) What is the other main req. of NACE MR 0175 ?

A: HIC Test (determinarea rezistentei la coroziumea H₂; HIC = Hydrogen Induced Cracking)

4) Could a vessel be hydrotested after internal/external painting ?

A: Yes, but the purchaser must be awarred that paint can mask the leakage (ASME).
(e cam pe dos, dar am gasit asta in ASME)

(Note
Aramco Specs do not
allow this)

The term Inspector refer to: a) National Board Registered Inspector; b) Manufacturer's inspector; c) Client's inspector; d) ASME Inspector.

A: d; (acc. to ASME Code)

(Nota: in specificatiile Aramco, "Inspector" ^{means} inseamna Aramco Inspector. In ASME, National Board Reg. Inspector este numit "Authorized Inspector")

What means letters/numbers "RT 1" on the nameplate ?

A: Fully radiographed (100% of weld seams).

5) If Authorized Inspector (AI) accepts a deviation from the Code, is there any action required from third party inspector (TPI)?

A: (I presume the following: TPI must evaluate and can accept/reject the deviation, in the name of Client).

(Note:

- AI is employed by Manufacturer, for equipment requiring ASME U Stamp,
- TPI is employed by Client/Cumparator).

- 6) Should all pressure vessels be hydrotested acc. To ASME VIII, Div 1 ?
A: No. (some are pneumatically tested)
- 7) Should all pressure vessels be hydrotested or pneumatic tested acc. To ASME VIII, Div 1 ?
A: Yes
- 8) How is test pressure calculated ?
A: $1.3 \times \text{MAWP}$, corrected by ratio of S at test temperature by S at design temp
(conf ASME 2001; MAWP-max allowable working press; MAWP se înlocuiește cu Design Pressure,
daca nu se cere calcularea lui MAWP). *if MAWP calculation is not required.* *is replaced by*
- 9) Is PWHT performed after hydrotest ?
A: No
- 10) Name two items/attributes which are marked on a plate for pressure vessel
A: Material (Grade, type), Heat No.
- 11) When fitting up a large bore nozzle, name at least 8 points you usually inspect/check/monitor.
A: -nozzle size (pipe/neck OD x thk.) and material grade;
-flange (type, size, rating, grade), if flange already welded to pipe;
-fit up geometry (root face, root gap, bevel angle);
-fit up cleaning;
-nozzle projection (distance from flange face to vessel axis/shell) (taking into account the predicted shrinkage during welding);
-nozzle straightness or angle (flange face missaligment);
-orientation of the nozzle neck longitudinal weld seam –if not pipe;
-if reinforcing pad required, it will be possible to be installed after neck welding?
- 14) When a contractor, other than the vessel Manufacturer, supplies a part of a vessel, what is required.
A: Partial Manufacturer Data Report (Partial MDR)

MECHANICAL

Plot

- 12) What is a WPS, PQR, WPQ ?
A: see ASME IX, QW-200, 300 (and QW-492 –Definitions)
- 13) What extra attention is paid for Low Hydrogen electrodes ?
A: Storage/handling conditions to avoid humidity contamination.
(trebuie evitata absorbtia de H₂ (H₂O) in invelisul electrozilor –heated portable ovens/quivers).
- 14) What the acronyms GTAW, SMAW, GMAW, SAW, FCAW stands for ? Explain the basic process.
A: see ASME IX, QW-416, 492
(GTAW=TIG; SMAW=sudura manuala; GMAW=MIG; SAW=sub strat de flux; FCAW=... fluxul in interiorul sirmei tubulare)
- 15) What is Interpass Temperature ?
A: Temp intre straturile successive de sudura –temp stratului depus, cind vine urmatorul strat.
- 16) Why is pre-heating important for welding alloy steels ?
A: ...avoid grain/components transformation....
- 17) What is the purpose of PWHT ?
A: Stress relieving
- 18) Which is P-No. for SA 516 Gr. 70, acc to ASME IX ?
A: P 1 (see QW/QB-422). A/SA 516 este un otel carbon obisnuit (OL).
- 19) What is thermal expansion: a).....; b) increasing of volume due to heating input; c).....; d).....
A: b
- 20) Why the cracks appear: a) because the heating while welding; b) because of cooling after welding; c).....
A:
- 21) How welding stresses are relieved: a) heating and quenching the welds; b) heating at a designed temperature and controlled cooling; c) drilling holes in weld seam; d)
A:
- 22) Which are the main three attributes mentioned on a Tensile Test Report ?
A: Yield Strength, Tensile Strength, Elongation.
- 23) RT is the most suitable NDT method for detecting the edge wall lack of fusion.
A: TRUE/FALSE.
- 24) Which is the most appropriate method for detecting laminations on bevel edge ? a) RT; b) PT; c) both; d) none.
A: PT (de fapt specificatiile cer MT, dar si PT e bun)
- 25) Name three methods for the transfer of filler material for GMAW.
A: Short-circuiting transfer method, globular (droplet) transfer; spray transfer.
- 26) Describe the position “3G”.
A: Vertical butt weld (cap la cap, verticala), see IX, QW-461

27) When a welder is qualified for position 5G, in which positions can he weld ?

A:

28) What is joint efficiency ?

A: Joint coefficient, determined by joint type and extend of weld control (100% RT, spot randomly, etc.)
(Coefficient de sudura).

29) Which are the most 3 suitable groove geometries for SAW ?

A: V, U, J.

30) For PT fluorescent, MT fluorescent and Leak Test is used ultraviolet light. A: TRUE.

31) For inspection of stainless steel strip lining is used: a) RT; b) MT; c) both; d) none.

A: d. (it is PT -Liquid Penetrant)

VALVES AND FITTINGS

12) What is the required position of a gate during the shell test ?

A:

13) Which standard indicates the allowable leakage for Control Valves ?

A:

14) Which standard deals with Relief Valves ?

A:

15) Why the closure test is performed for both sides of wedge ?

A:

16) Name three types of wedges.

A: API 600, E 598

17) The backseat test is performed for Gate Valves, Butterfly Valves and Check Valves.

A: TRUE/FALSE.

18) What you check for dimensional inspection on a Valve?

A:

19) Name three types of flanges.

A:

20) What is marked on a butt-end fitting (name 2 items).

A:

Alto

ARAMCO VENDOR INSPECTION EXAMINATION

PRESSURE VESSELS

- * 1) What is the difference between a Certificate of Conformity and a CMTR? *Certified material
to conformity the results are indicated by as per
Test Report.*
- 2) Is there any specific NDT requirement for vessels made of stainless steel, wall thickness over 3/4"?
- 3) In a vessel where one of its two heads have been provided by a second manufacturer, what document should accompany the second head?
- 4) For a test pressure equal to 5000 psi, which of the following would be the most appropriate gauge?
 - a- 5000 psi
 - b - 15000 psi
 - c - 10000 psi
 - d - 20000 psi
- 5) What is the difference between hydrotesting stainless steel vessels as compared to carbon steel.
- 6) Can weld repair be carried out on a vessel after heat treatment with the approval of the approved inspector?
- 7) What are the regulations of ASME VIII, Div. 1?
- 8) What are the recommendations of ASME VIII, Div. 2?
- 9) What are the materials checking requisitions of NACE MR0175?
- 10) Apart for Hardness Testing, what other test required for NACE MR0175?
- 11) After cutting back cladding what precaution must be taken before welding support fitting integrally to vessel.
- * 12) What is denoted by "F" & "D" in vessel head.
- 13) When cladding plates cut for integral fitting of vessel, what test must be done on plates prior to fitting?
- 14) In ASME VIII is vessel hydrostatic tested only?
- 15) In Structural Steel vessel hydrotest, what precaution or check must be done prior to test. (may be to do with test medium). (50 mg or 50 ppm chlorides max allowed).
- 16) What is NACE MR0175?
- 17) What is the hardness requirement for sour service according to NACE MR0175?
- 18) What is the other main requirement (besides hardness level)
- 19) Could a pressure vessel be hydrotested after internal/external painting?

- 20) The term Inspector refers to: a) National Board Registered Inspector; b) Manufacturer's Inspector; c) Client's inspector; d) ASME inspector
- 21) What means letters/numbers "RT1" on the nameplate?
- 22) If authorized inspector accepts a deviation from the code, is there any action required from third party inspector?
- 23) Should all pressure vessels be hydrotested or pneumatic tested according to ASME VIII, D1?
- 24) How is test pressure calculated?
- 25) Is PWHT performed after hydrotest?
- 26) Name two (2) items/attributes which are marked on plate for pressure vessels
- 27) When fitting up a large bore nozzle, name at least 8 points you usually inspect/monitor/check.

ARAMCO VENDOR INSPECTION EXAMINATION

PIPING

- 1) How is the pneumatic test pressure calculated in ANSI B.31.3?
- 2) What depth of a defect in a fitting is considered harmful? According to ANSI B31.3
- 3) Name of the most common American Materials Specifications for fittings?
- * 4) What is category D and M according to ANSI B31.3?
- 5) What do you use to measure the profile of the raised face on a flange?
- 6) When is Peening allowed to ANSI B31.3?

ARAMCO VENDOR INSPECTION EXAMINATION

VALVES & FITTINGS

- 1) Which American standard specifies the dimensional requirements for face to face and end to end?
Answer: ANSI B16.10
API 600 – General Valve Design (and wall thick)
- 2) Which material should be used for high temperature valves?
- 3) Which additional destructive testing is required for low temperature valves?
Answer: Impact Testing for Metallic Material
- 4) What is the required position of a gate during the backseat test?
- 5) What is the meaning of valve “trim”?
Answer: Materials for: a) Stem; b) Gate Seat Surface; c) Seat Ring Surface
- 6) What is a hot-tap?
- 7) What is a stopple fitting?
- ✱ 8) What is the sequence for hydrotesting internally coated valves?
- 9) The allowable leak rate for a check valve is greater than for a gate valve.
TRUE/FALSE
- 10) What leak tests are required according to API 598?
Answer: Valve Inspection and Testing
- 11) What are the advantages of a flexible wedge?
- 12) What is the required position of a gate during the Shell Test?
- ✱ 13) Which standard indicates the allowable leakage for Control Valves?
- ✱ 14) Which standard deals with Relief Valves?
- ✱ 15) Why the closure test is performed for both sides of Wedge?
- ✱ 16) Name three (3) types of Wedges?
- 17) The backseat test is performed for Gate Valves, Butterfly Valves and Check Valves/
TRUE/FALSE
- 18) What you check for dimensional inspection on a Valve?
- 19) Name three (3) types of Flanges
- 20) What is marked on a butt-end fitting (name 2 items)

Q.1 When is Peening allowed to ANSI B31.3

A.1

Q.2 What is a Stoppel?

A.2 *Selder plug temporary plug to stop flow in a pipe.*

Q.3 What is meant by Value Trim?

A.3

Q.4 What are the essential variables of WPS?

A.4

Q.5 What is a WPS?

A.5

* Q.6 Which standard covers dimensions of valves?

A.6

ASME B 16.25

Q.7 What is GTAW?

A.7

* Q.8 Why do we maintain interpass temperature in Austenitic Stainless Steel?

A.8

Q.9 List (5) five things on a steel material certificate.

A.9

* Q.10 What are the advantages of a flexible wedge.

A.10

Q.11 What precaution do we need to take when welding a clad vessel?

A.11

preheating

Q.12 Can weld repair be carried out on a vessel after heat treatment with the approval of the approved inspector?

A.12

Q.13 Is the gate open when doing a seat test?

A.13

Q.14 When a contractor supplies a part of a vessel what is required

A.14

partial MDR

- Q.1 What are the 4 types on Metal Transfer for MIG?
 A.1 *Spray, Dip, Globular, Background Voltage*
- Q.2 What is UG?
 A.2 *Geometric Unshapness Penumbra*
- Q.3 When Shooting an Ellipse, where will the penitrameter go?
 A.3 *Source side*
- Q.4 What 4 parameters do we get from Tensile Test?
 A.4 *Elongation; Ultimate Stress; Yeald Stress; Cross Section Area*
- Q.5 Which section of ASME VIII are the Scatter/Distribution diagrams for radiography interpretation?
 A.5 *Section 4*
- Q.6 In what Section of ASME VIII are the other defects?
 A.6 *WU35*
- Q.7 What properties have the 3 sub-arc fluxes?
 A.7 *Inert; Chemical Change Active; alloying*
- Q.8 Why do we maintain the interpass temperature when welding Stainless Steel?
 A.8 *To prevent Harding in the heat affected zone through dendritic growth under bead cracking*
- * Q.9 What material do we use when welding dissimilar material?
 A.9 *309 Inconel for greater ware resistance*
- Q.10 What is Dwell Time?
 A.10 *The time for the penetrant to soak into any surface opening and the time for the developer to draw out an indication*
- Q.11 What is the difference between stress relieving and normalizing?
 A.11 *Normalizing temperature is above upper critical temperatnre, Stress Relieving is below upper critical temperature, normalizing, cool at a controlled rate or in still air.*
- Q.12 What are the three types of hardness
 A.12 *Rockwell; Vickers; Brunell*

ARAMCO VENDOR INSPECTION EXAMINATION

MECHANICAL

- 1) What is a WPS, PQR, WPQ?
- 2) What are the definitions of **essentials** and **non-essentials** variables?
- 3) What is the definition of pre-heating?
- 4) Why is inter-pass temperature control required when welding of austenitic stainless steel?
- 5) List five items that you would expect to find in a Materials Test Report?
Answers:
 - a) Purchase Order Number
 - b) Lot
 - c) Heat Number
 - d) Chemical Analysis
 - e) Mechanical Test Results
 - f) Specification (mat., grade, type/class)
 - g) Manufacturer's Name
- 6) What is Carbon Equivalent and what is its importance in regards to welding?
- 7) Low Hydrogen electrodes are to be maintained in
 - a – their **re-sealed** containers
 - b – electrode holders with an **open** lid.
 - c – electrode oven
- 8) If the root gap have been found too small before welding, a proper corrective action would be
 - a – increase the welding heat.
 - b.– open a wider gap by gouging or grinding
 - c – none of the above
- 9) Circular welds should always be done before longitudinal ones.
TRUE / FALSE
- 10) What the acronyms GTAW/FCAW/SMAW/GMAW/SAW stands for? Explain the basic process.
- 11) Name the three basic steps to be checked prior to welding
- 12) What is the most important to be checked before start welding of clad materials?

- 13) What would be the most appropriate welding process be when welding full penetration joints from only one side?
 - a – FCAW
 - b – GTAW
 - c – SAW
 - d – GMAW
- 14) What is “Interpass Temperature”
- 15) Why is pre-heating important for welding alloy steels?
- 16) What is the purpose of PWHT?
- 17) What extra attention is payed for Low Hydrogen Electrodes?
- 18) What is “P-No” for SA 516 Gr. 70, according to ASME IX?
- 19) What is Thermal Expansion”
- 20) Why the cracks appear: a) Because of Heating while welding; b) because of cooling after welding; c)
- 21) How welding stresses are relieved: a) Heating and quenching the welds; b) Heating at a designed temperature and controlled cooling; c) Drilling holes in weld seam; d) ...
- * 22) What is difference between DCRS and DCES
- 23) Which are the three main attribute mentioned on a Tensile Test Report?
- 24) RT is the most suitable NDT method for detecting the edge wall lack of fusion. TRUE/FALSE
- 25) Why are the bevel edges controlled before welding?
- 26) Which is the most appropriate method for detecting laminations on bevel edge? a) RT; b) PT; c) both; d) NONE
- 27) Name three (3) methods for the transfer of filler material for GMAW
- 28) Describe the position “3G”
- 29) When a welder is qualified for position 5G, in which position can he weld?
- 30) What is Joint Efficiency?
- 31) Name four (4) types of joints
- 32) Which are the most three (3) suitable groove geometries for SAW?
- 33) For PT fluorescent, MT fluorescent and Leak Test is used ultraviolet light. TRUE/FALSE
- 34) For inspection of stainless steels strip lining is used: a) RT; b) MT; c) both; d) None

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ANAMCO TEST PAPERS

QUESTIONS & RESPONSES

ANSWERS
17/6/02

PIPE FABRICATION

SECTION L
PAGE 1

- 1) What is the difference between a consumable insert and a backing ring in regard to pipe fabrication?
 - A consumable insert, after welding, becomes an integral part of the weld, a backing ring does not.

- 2) Why are vent holes put in reinforcement pads?
 - To provide venting during welding and heat treating operations and to reveal leakage in the weld between the branch and main run of the pipe.

- 3) Does ANSI 31.3 permit peening on both the root and cover passes?
 - Peening is not permitted on the root or cover passes.

- 4) What are some ways of visually identifying piping material on the shop floor?
 - Color code, stamping.

- 5) What is one of the serious faults with the use of MIG or MAG welding of pipe joints particularly in out of position welding?
 - Proper weld bevel, root gap, bore alignment. *Root Fusion / Ø*
OVER PENETRATION

- 7) How would you ensure radiograph have been taken on specific pipe welds?
 - Identification which has been entered on films and sometimes drawings.

- 8) On welds requiring 100% radiograph what is the minimum number of shots required on 3" diameter pipe?
 - 3.

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ANSWERS

PIPE FABRICATION

SECTION L
PAGE 2

- 9) How should dimensional checks be made on fabricated spool pieces?
 - Jack stands, V-blocks, or other methods of supporting spool pieces in a level position.

- 10) What are some of the precautions which should be taken when welding piping materials of alloy material such as 1 1/4 chrome, 5 chrome, etc.?
 - Preheat, interpass temperature and postweld heat treatment requirements are to be complied with.

- 11) What information should be contained in a radiograph of a pipe weld?
 - Penetrameter, joint number, welder symbol, ISO number.

- 12) What is meant by double wall radiography technique?
 - Source is offset approximately 5 - 15 degrees from perpendicular (depending on diameter) with film located on O.D. at far wall - Used on small bore and larger bore with no access to inside.

- 13) What type of system should the Inspector use for record keeping if assigned full time to shop inspection of fabricated piping?
 - Use ISOS - marked ISOS showing location of X-rays, etc. In addition, separate records should be maintained of welders performance showing number of X-rays, repairs, etc.

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RAMIRO TEST PAPERS

QUESTIONS ET REPONSES

Answers

PIPE AND FITTINGS

SECTION K
PAGE 1

- 1) Of what does pipe inspection at the mill consist?
 - Hydrostatic tests, non-destructive tests, destructive tests, surface visual inspection, dimensional inspection, marking. *6 steps*
- 2) What is included in a dimensional inspection of a length of pipe?
 - Length, diameter, wall thickness, end weld prep.
- 3) Does a pipe mill hydrostatically test each length of pipe or are hydrostatic tests done on a random basis?
 - Each length is tested
- 4) Do the ASTM Standards require pipe to be weighed?
 - Yes.
- 5) What is the purpose of a flattening test?
 - The first step of a flattening test is a test for ductility. The second step is a test for soundness.
- 6) How is a flattening test performed on pipe?
 - A sample piece of pipe not less than 2 1/2" (63.5 mm) in length is flattened cold between parallel plates.
- 7) What is looked for during the first step of a flattening test?
 - That no cracks or breaks occur in the sample prior to a specific dimension being reached between the parallel plates. The subject dimension is determined according to a standard formula.
- 8) Of what does the second step of a flattening test consist?
 - The flattening is continued until the sample break or the opposite walls of the tube meet.

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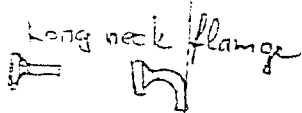
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PIPE AND FITTINGS

ANSWERS

SECTION K
PAGE 2

- 9) What imperfections in the sample would cause the second step of the flattening test to be rejected?
- Evidence of laminated or unsound material or incomplete weld.
- 10) Describe a reverse flattening test on a welded tube - what results would cause the test to be rejected?
- A section of tubing is split longitudinally 90 degrees on each side of the weld and the sample opened and flattened with the weld at the point of maximum bend. There shall be no evidence of cracks, lack of penetration or overlaps resulting from flash removal in the weld.
- 11) Describe a flaring test and its requirements.
- A section of tube shall stand being flared with a tool having a 60 degree included angle until the tube at the mouth of the flare has been expanded to a specified percentage without cracking or showing flaws.
- 12) What is a flange test and what results are required?
- A section of tube shall be capable of having a flange turned over at a right angle to the body of the tube without cracking or showing flaws.
- 13) What information should be stamped on a butt-weld fitting?
- Manufacturer's name or trade mark, schedule number or nominal wall thickness, size and type of material.
- 14) At what depth does an imperfection become injurious to a butt-weld fitting?
- When it is in excess of 12 1/4 percent of the nominal wall thickness or when it encroaches on the minimum wall thickness.
- 15) What non-destructive examination would you expect to have been performed on a 36" diameter welded elbow?
- Radiography of the weld.



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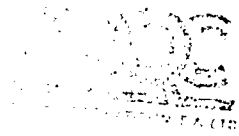
PIPE AND FITTINGS

ANSWER

SECTION K
PAGE 3

- 16) What dimensions should be checked when inspecting a raised face welding neck flange?
- Outside diameters; inside diameter; wall thickness; flange thickness; height of raised face; length through the hub; bolt circle diameter; bolt hole diameter.
- 17) What is the purpose of spot or back facing on flange bolt holes?
- Ensure a proper seating surface for the washer or nut.
- 18) How should a socket weld flange be set up for welding to a pipe?
- So as to maintain approximately a 1/16" gap between the face of the pipe and the inner lip of the flange ANSI 31.3).
- 19) Can a seal weld be considered as adding a strength to a threaded joint? ✓
- No. (ANSI 31.3).
- 20) If threaded joints are seal welded, what percentage of the threads must be covered by the weld? ✓
- 100% (ANSI 31.3).
- 21) If you were inspecting slip on flanges which were to be used in hydrogen service, what special fabrication technique would you expect to check?
- Drilled hole (approximately 1/8") to vent space between I. D. of flange and O. D. of pipe.

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Answers

VALVES

operable (voir)

SECTION F
PAGE 3 of 3

- 19) Can a solid wedge gate be fabricated by welding? ✓
- Yes.
- 20) Can gate seats be made by depositing weld metal on the gate? ✓
- Yes. *Notaise*
- 21) Is it permissible to supply gate valves with slots rather than holes in the packing gland? ✓
- No (holes only). *fente plutôt que*

QUESTIONS & RESPONSES

Answers

VALVES

AMERICAN NATIONAL STANDARDS
INSTITUTE

SECTION F

PAGE 1 of 3

- 1) Which API Specifications apply to the fabrication, inspection and testing of valves? ✓
- API 598, Valve Inspection and test.
 - API 599, Steel Plug Valves.
 - API 600, Steel Gate Valves.
 - API 604, Ductile Iron Gate Valves.
 - MSS SP-55 (Visual Inspection of Casting).
 - API 6D, Pipeline Valves.
- 2) Which API specification governs valve hydrostatic test pressures? ✓
- API 598.
- 3) What pressure tests are required on gate valves? ✓
- Shell or body, low pressure seat test and backseat test (high pressure closure test - only if specified in order).
- 4) For the low pressure seat test what test medium is used? ✓
- Air or inert gas.
- 5) Should the shell test be done after the valve is painted? ✓
- No.
- 6) What position is the gate in, during the shell test? ✓
- Partially closed.
- 7) What position is the gate in, during the backseat test? ✓
- Fully open.
- 8) Is the packing gland to be tight during the backseat test? ✓
- No, the packing gland is to be loose.
- 9) Is leakage permitted on the backseat test? ✓
- No.

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Answers

VALVES

SECTION F
PAGE 2 of 3

- 10) What is the purpose of the backseat test? ✓
 - To facilitate replacement of the stem packing without removing the valve from service.
Tige de serrage
- 11) What test mediums can be used for the shell, backseat and high pressure closure tests? ✓
 - Air, inert gas, kerosene or water (any liquids with a viscosity no higher than water can be used).
- 12) At what pressure is the low pressure test done? ✓
 - 60 to 100 psig (4.1 to 6.9 bar).
- 13) Describe the procedure for a low pressure seat test on a solid wedge gate valve. ✓
opérale (coin)
 - Pressure shall be applied successively to each side of the closed valve with the other side open to atmosphere to check for leakage of the downstream side of the seat.
- 14) Is it permissible for a vendor to lubricate valve seats prior to testing? ✓
 - Yes, but only with a film of oil not heavier than kerosene.
- 15) What does the term O, S and Y mean? ✓
arcade
 - Outside, Screw and Yoke.
- 16) What parts of a valve make up the "trim"? ✓
Tige HLG0
Bagne d'arrêt
 - Stem, body seat surface, gate seat surface, backseat bushing, stem hole guide.
alésage de tige (guide)
- 17) What flange finish is standard on steel gate valves? ✓
 - Serrated.
strie
- 18) Is it permissible to use a sealing compound for the installation of threaded seat rings? ✓
 - No (light lubricant only).

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ALAMCO TEL PAPER

QUESTIONS ET REPONSES

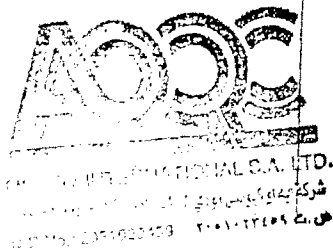
Answers

PIPE AND FITTINGS

SECTION K
PAGE 1

- 1) Of what does pipe inspection at the mill consist?
 - Hydrostatic tests, non-destructive tests, destructive tests, surface visual inspection, dimensional inspection, marking. *6 steps*
- 2) What is included in a dimensional inspection of a length of pipe?
 - Length, diameter, wall thickness, end weld prep.
- 3) Does a pipe mill hydrostatically test each length of pipe or are hydrostatic tests done on a random basis?
 - Each length is tested
- 4) Do the ASTM standards require pipe to be weighed?
 - Yes
- 5) What is the purpose of a flattening test?
 - The first step of a flattening test is a test for ductility. The second step is a test for soundness.
- 6) How is a flattening test performed on pipe?
 - A sample piece of pipe not less than 2 1/2" (63.5 mm) in length is flattened cold between parallel plates.
- 7) What is looked for during the first step of a flattening test?
 - That no cracks or breaks occur in the sample prior to a specific dimension being reached between the parallel plates. The subject dimension is determined according to a standard formula.
- 8) Of what does the second step of a flattening test consist?
 - The flattening is continued until the sample break or the opposite walls of the tube meet.

PIPEQK/08.12.87



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ANSWERS

PIPE AND FITTINGS

SECTION K
PAGE 2

9) What imperfections in the sample would cause the second step of the flattening test to be rejected?

- Evidence of laminated or unsound material or incomplete weld.

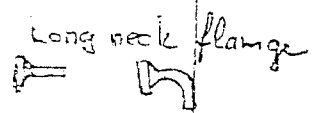
10) Describe a reverse flattening test on a welded tube - what results would cause the test to be rejected?

- * - A section of tubing is split longitudinally 90 degrees on each side of the weld and the sample opened and flattened with the weld at the point of maximum bend. There shall be no evidence of cracks, lack of penetration or overlaps resulting from flash removal in the weld.

11) Describe a flaring test and its requirements.

- * - A section of tube shall stand being flared with a tool having a 60 degree included angle until the tube at the mouth of the flare has been expanded to a specified percentage without cracking or showing flaws.

12) What is a flange test and what results are required?



- * - A section of tube shall be capable of having a flange turned over at a right angle to the body of the tube without cracking or showing flaws.

13) What information should be stamped on a butt-weld fitting?

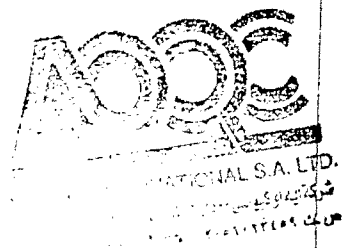
- Manufacturer's name or trade mark, schedule number or nominal wall thickness, size and type of material.

14) At what depth does an imperfection become injurious to a butt-weld fitting?

- When it is in excess of 12 1/4 percent of the nominal wall thickness or when it encroaches on the minimum wall thickness.

15) What non-destructive examination would you expect to have been performed on a 36" diameter welded elbow?

- Radiography of the weld.



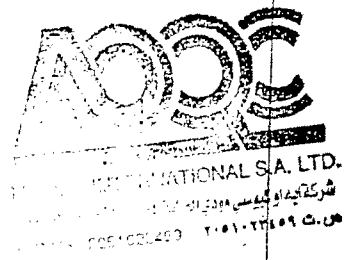
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ANSWER-RC

PIPE AND FITTINGS

SECTION K
PAGE 3

- 16) What dimensions should be checked when inspecting a raised face welding neck flange?
 - Outside diameters; inside diameter; wall thickness; flange thickness; height of raised face; length through the hub; bolt circle diameter; bolt hole diameter.
- 17) What is the purpose of spot or back facing on flange bolt holes?
 - Ensure a proper seating surface for the washer or nut.
- 18) How should a socket weld flange be set up for welding to a pipe?
 - So as to maintain approximately a 1/16" gap between the face of the pipe and the inner lip of the flange (ANSI 31.3).
- 19) Can a seal weld be considered as adding a strength to a threaded joint? ✓
 - No. (ANSI 31.3).
- 20) If threaded joints are seal welded, what percentage of the threads must be covered by the weld? ✓
 - 100% (ANSI 31.3).
- 21) If you were inspecting slip on flanges which were to be used in hydrogen service, what special fabrication technique would you expect to check?
 - Drilled hole (approximately 1/8") to vent space between I.D. of flange and O.D. of pipe.



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ANAMCO TEST PAPERS

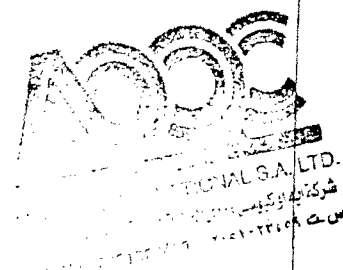
QUESTIONS & ANSWERS

ANSWERS

PIPE FABRICATION

SECTION L
PAGE 1

- 1) What is the difference between a consumable insert and a backing ring in regard to pipe fabrication?
 - A consumable insert, after welding, becomes an integral part of the weld, a backing ring does not.
- 2) Why are vent holes put in reinforcement pads?
 - To provide venting during welding and heat treating operations and to reveal leakage in the weld between the branch and main run of the pipe.
- 3) Does ANSI 31.3 permit peening on both the root and cover passes?
 - Peening is not permitted on the root or cover passes.
- 4) What are some ways of visually identifying piping material on the shop floor?
 - Color code, stamping.
- 5) What is one of the serious faults with the use of MIG or MAG welding of pipe joints particularly in out of position welding?
 - Proper weld bevel, root gap, bore alignment.
- 7) How would you ensure radiograph have been taken on specific pipe welds?
 - Identification which has been entered on films and sometimes drawings.
- 8) On welds requiring 100% radiograph what is the minimum number of shots required on 3" diameter pipe?
 - 3.



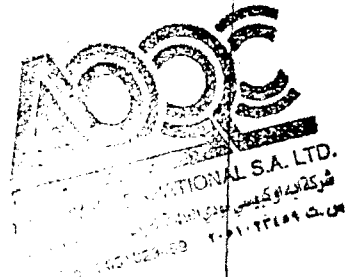
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ANSWERS

PIPE FABRICATION

SECTION L
PAGE 2

- 9) How should dimensional checks be made on fabricated spool pieces?
- Jack stands, V-blocks, or other methods of supporting spool pieces in a level position.
- 10) What are some of the precautions which should be taken when welding piping materials of alloy material such as 1 1/4 chrome, 5 chrome, etc.?
- Preheat, interpass temperature and postweld heat treatment requirements are to be complied with.
- 11) What information should be contained in a radiograph of a pipe weld?
- Penetrameter, joint number, welder symbol, ISO number.
- 12) What is meant by double wall radiography technique?
- Source is offset approximately 5 - 15 degrees from perpendicular (depending on diameter) with film located on O.D. at far wall - Used on small bore and larger bore with no access to inside.
- 13) What type of system should the Inspector use for record keeping if assigned full time to shop inspection of fabricated piping?
- Use ISOS - marked ISOS showing location of X-rays, etc. In addition, separate records should be maintained of welders performance showing number of X-rays, repairs, etc.



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ARAMECO TEST PAPERS

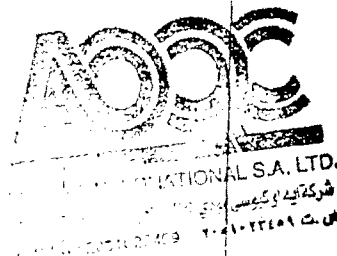
QUESTIONS & RESPONSES

Answers

VALVESSECTION F
PAGE 1 of 3

- 1) Which API Specifications apply to the fabrication, inspection and testing of valves? ✓
- API 598, Valve Inspection and test.
 - API 599, Steel Plug Valves.
 - API 600, Steel Gate Valves.
 - API 604, Ductile Iron Gate Valves.
 - MSS SP-55 (Visual Inspection of Casting).
 - API 6D, Pipelins Valves.
- 2) Which API specification governs valve hydrostatic test pressures? ✓
- API 598.
- 3) What pressure tests are required on gate valves? ✓
- Shell or body, low pressure seat test and backseat test (high pressure closure test - only if specified in order).
- 4) For the low pressure seat test what test medium is used? ✓
- Air or inert gas.
- 5) Should the shell test be done after the valve is painted? ✓
- No.
- 6) What position is the gate in, during the shell test? ✓
- Partially closed.
- 7) What position is the gate in, during the backseat test? ✓
- Fully open.
- 8) Is the packing gland to be tight during the backseat test? ✓
- No. the packing gland is to be loose.
- 9) Is leakage permitted on the backseat test? ✓
- No.

VALVESQF/26.11.87



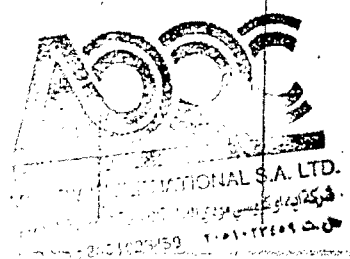
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Answers

VALVES

SECTION F
PAGE 2 of 3

- 10) What is the purpose of the backseat test? ✓
- To facilitate replacement of the stem packing without removing the valve from service.
Tige de soupape
- 11) What test mediums can be used for the shell, backseat and high pressure closure tests? ✓
- Air, inert gas, kerosene or water (any liquids with a viscosity no higher than water can be used).
- 12) At what pressure is the low pressure test done? ✓
- 60 to 100 psig (4.1 to 6.9 bar).
- 13) Describe the procedure for a low pressure seat test on a solid wedge gate valve. ✓
opération (coin)
- Pressure shall be applied successively to each side of the closed valve with the other side open to atmosphere to check for leakage of the downstream side of the seat.
- 14) Is it permissible for a vendor to lubricate valve seats prior to testing? ✓
- Yes, but only with a film of oil not heavier than kerosene.
- 15) What does the term O, S and Y mean? ✓
arcade
- Outside, Screw and Yoke.
- 16) What parts of a valve make up the "trim"? ✓
Tige N.C.40
alésage de tige (guide)
- Stem, body seat surface, gate seat surface, backseat bushing, stem hole guide. *Plaque d'appui*
- 17) What flange finish is standard on steel gate valves? ✓
strié
- Serrated.
- 18) Is it permissible to use a sealing compound for the installation of threaded seat rings? ✓
- No (light lubricant only).



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Answers

VALVES

operule (cote)

SECTION F
PAGE 3 of 3

- 19) Can a solid wedge gate be fabricated by welding? ✓
- Yes.
- 20) Can gate seats be made by depositing weld metal on the gate? ✓
- Yes. *Montaise*
- 21) Is it permissible to supply gate valves with slots rather than holes in the packing gland? ✓
- No (holes only). *fente plutôt que*



ARABIAN OIL CO
ALT

ARAMCO VENDOR INSPECTION EXAMINATION
PRESSURE VESSELS

1) What is NACE MR 0175 ?

Answer: A NACE standard which refers to resistance of metallic materials to SSC in sour environments.

Nota:

NACE –National Association of Corrosion Engineers (USA)

Denumirea standardului: Sulfide Stress Cracking (SSC) Resistant Materials for Oilfield Equipment.

Sour environment: este definit (si) prin factorii care infl. SSC: *(factors influencing SSC)*

- compoz. ch., rezist., trat. termic, microstructura,
- concentr. in ioni de hidrogen (pH) a mediului;
- conc. si pres. totala a H₂S (Hydrogen Sulfide);
- starea de tensiuni (total tensile stress –actual and remanent);
- temp.
- time

SSC –brittle failure by cracking under combined action of

- tensile stress
- corrosion in presence of water + H₂S.

2) What is hardness requirement for sour service acc. to NACE MR 0175 ?

A: 22 HRC (this is the main req)

3) What is the other main req. of NACE MR 0175 ?

A: HIC Test (determinarea rezistentei la corozia H₂; HIC = Hydrogen Induced Cracking)

4) Could a vessel be hydrotested after internal/external painting ?

A: Yes, but the purchaser must be awarred that paint can mask the leakage (ASME).

(e cam pe dos, dar am gasit asta in ASME)

Note
Aramco Specs do not allow this

The term Inspector refer to: a) National Board Registered Inspector; b) Manufacturer's inspector; c) Client's inspector; d) ASME Inspector.

A: d; (acc. to ASME Code)

(Nota: in specificatiile Aramco, "Inspector" ^{in sens} inseamna Aramco Inspector. In ASME, National Board Reg. Inspector este numit "Authorized Inspector")

What means letters/numbers "RT 1" on the nameplate ?

A: Fully radiographed (100% of weld seams).

5) If Authorized Inspector (AI) accepts a deviation from the Code, is there any action required from third party inspector (TPI)?

A: (I presume the following: TPI must evaluate and can accept/reject the deviation, in the name of Client).

(Note:

- AI is employed by Manufacturer, for equipment requiring ASME U Stamp;
- TPI is employed by Client/Cumparator).

- 6) Should all pressure vessels be hydrotested acc To ASME VIII, Div 1 ?
A: No. (some are pneumatically tested)
- 7) Should all pressure vessels be hydrotested or pneumatic tested acc. To ASME VIII, Div 1 ?
A: Yes
- 8) How is test pressure calculated ?
A: $1.3 \times \text{MAWP}$, corrected by ratio of S at test temperature by S at design temp
(conf ASME 2001; MAWP-max allowable working press; MAWP se înlocuiește cu Design Pressure,
dacă nu se cere calcularea lui MAWP). *if MAWP calculation is not required, it replaced by*
- 9) Is PWHT performed after hydrotest ?
A: No
- 10) Name two items/attributes which are marked on a plate for pressure vessel
A: Material (Grade, type), Heat No.
- 11) When fitting up a large bore nozzle, name at least 8 points you usually inspect/check/monitor.
A: -nozzle size (pipe/neck OD x thk.) and material grade;
-flange (type, size, rating, grade), if flange already welded to pipe;
-fit up geometry (root face, root gap, bevel angle);
-fit up cleaning;
-nozzle projection (distance from flange face to vessel axis/shell) (taking into account the predicted shrinkage during welding);
-nozzle straightness or angle (flange face missalignment);
-orientation of the nozzle neck longitudinal weld seam -if not pipe;
-if reinforcing pad required, it will be possible to be installed after neck welding?
- 14) When a contractor, other than the vessel Manufacturer, supplies a part of a vessel, what is required.
A: Partial Manufacturer Data Report (Partial MDR)

MECHANICAL

ALB

- 12) What is a WPS, PQR, WPQ ?
A: see ASME IX, QW-200, 300 (and QW-492 –Definitions)
- 13) What extra attention is paid for Low Hydrogen electrodes ?
A: Storage/handling conditions to avoid humidity contamination.
(trebuie evitata absorbtia de H₂ (H₂O) in invelisul electrozilor –heated portable ovens/quivers).
- 14) What the acronyms GTAW, SMAW, GMAW, SAW, FCAW stands for ? Explain the basic process.
A: see ASME IX, QW-416, 492
(GTAW=TIG; SMAW=sudura manuala; GMAW=MIG; SAW=sub strat de flux; FCAW=... fluxul in interiorul sirmei tubulare)
- 15) What is Interpass Temperature ?
A: Temp intre straturile successive de sudura –temp stratului depus, cind vine urmatorul strat.
- 16) Why is pre-heating important for welding alloy steels ?
A: ... avoid grain/components transformation....
- 17) What is the purpose of PWHT ?
A: Stress relieving
- 18) Which is P-No. for SA 516 Gr. 70, acc to ASME IX ?
A: P 1 (see QW/QB-422). A/SA 516 este un otel carbon obisnuit (OL).
- 19) What is thermal expansion: a).....; b) increasing of volume due to heating input; c).....; d).....
A: b
- 20) Why the cracks appear: a) because the heating while welding; b) because of cooling after welding; c).....
A:
- 21) How welding stresses are relieved: a) heating and quenching the welds; b) heating at a designed temperature and controlled cooling; c) drilling holes in weld seam; d)
A:
- 22) Which are the main three attributes mentioned on a Tensile Test Report ?
A: Yield Strength, Tensile Strength, Elongation.
- 23) RT is the most suitable NDT method for detecting the edge wall lack of fusion.
A: TRUE/FALSE.
- 24) Which is the most appropriate method for detecting laminations on bevel edge ? a) RT; b) PT; c) both; d) none.
A: PT (de fapt specificatiile cer MT, dar si PT e bun)
- 25) Name three methods for the transfer of filler material for GMAW.
A: Short-circuiting transfer method; globular (droplet) transfer; spray transfer.
- 26) Describe the position "3G".
A: Vertical butt weld (cap la cap, verticala), see IX, QW-461

- 27) When a welder is qualified for position 5G, in which positions can he weld ?
A:
- 28) What is joint efficiency ?
A: Joint coefficient, determined by joint type and extend of weld control (100% RT, spot randomly, etc.)
(Coefficient de sudura).
- 29) Which are the most 3 suitable groove geometries for SAW ?
A: V, U, J.
- 30) For PT fluorescent, MT fluorescent and Leak Test is used ultraviolet light. A: TRUE.
- 31) For inspection of stainless steel strip lining is used: a) RT; b) MT; c) both; d) none.
A: d. (it is PT -Liquid Penetrant)

VALVES AND FITTINGS

- 12) What is the required position of a gate during the shell test ?
A:
- 13) Which standard indicates the allowable leakage for Control Valves ?
A:
- 14) Which standard deals with Relief Valves ?
A:
- 15) Why the closure test is performed for both sides of wedge ?
A:
- 16) Name three types of wedges. *E 598*
A: *API 600*
- 17) The backseat test is performed for Gate Valves, Butterfly Valves and Check Valves.
A: TRUE/FALSE.
- 18) What you check for dimensional inspection on a Valve?
A:
- 19) Name three types of flanges.
A:
- 20) What is marked on a butt-end fitting (name 2 items).
A:

Alto