

Typical QUESTIONS in May 2015 API 510 Exam

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Kindly review and study carefully the hi-lighted API 510 Code 2014, I marked all Points came in exam.

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To detect HTHA use UT using a combination of velocity ratio and AUBT

To increase resistance to HTHA Use alloy steels with # chromium and molybdenum

C-0.5Mo is not suitable with HTHA

Sulfidation occurs at high temp above # 500 F

PMI is an effective for inspection of? Sulfidation (Open)

Most susceptible damage for equip. containing acidic fluid is : Hydrogen blistering above or below the level of fluid

the most affecting parameter in fatigue cracks is : design & the ratio of ultimate tensile strength and min stress.....

Chloride Stress Corrosion Cracking ..the most affected material is ? SS 300 Series

Figure 4-146 Recommended operating limits for C.S in Caustic Service. (Chart)

Will give you Mat. Working @140C against NAOH 30% what should you do in this Material?

Answer Use it after making stress relieving (PWHT) .

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Arc Blow def.:(577) The deflection of an arc from its normal path because of magnetic forces.

Toughness is.:(577) the ability of a metal to absorb energy and deform plastically before fracturing.

transition temperature: The temperature at which a material fracture mode changes from ductile to brittle.

ASME V

material 1.25 in, what is the hole type IQI shall be used if the weld is accessible from both sides? 30 .

The temperature of the calibration standard should be within 25°F (14°C) of the part to be examined.

#MT Examination part surface temperature outside of the temperature range recommended by the manufacturer of the particles or as previously qualified.

#Magnetizing equipment with an ammeter shall be calibrated whenever the equipment has been subjected to major electric repair, periodic overhaul.

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Safety Valve application?! **Steam**

A **typical safety valve** has a **lifting lever** for manual opening to ensure the freedom of the working parts.

on-stream testing of steam safety valves ? **Doesn't satisfy** the need to periodically remove the valve for physical inspection.

Setting of Valve Set Pressure pressures **less** than or equal to 70 lbf/in.2 ----deviation should not exceed **±2 lbf/in.2 & ±3 %** for pressures greater than 70 lbf/in.2 (**Example 400 max 412**) (Exam **300 PSI –Min.281-Max.309**)

For prebulged metal **rupture disks** installed ...the operating pressure of the protected system is usually limited to **65% to 85 %**.

The **scored tension** loaded rupture disk is manufactured from **thicker** material than is used for unscored disks for the same burst pressure.

Pilot operated safety relief valve limitation shouldn't be used in ? **Dirty –fouling medium**

Spring Failure main reason ---- **Surface Corrosion**

Spring Failure lead to : # **Uncontrolled open**

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If temp in creep range suspected then?! **Metallurgist or Eng should be consulted**

who is responsible for the quality craftsmanship of welding?! **Welder**

Welding is ?... **Casting**

Where corrosion, fouling, and other service conditions are not known and cannot be predicted with any degree of accuracy (as in new processes), the initial inspection should be? **Accomplished as soon as practical after operations begin to establish a safe and suitable testing interval.**

If nozzles should be internally inspected for corrosion, cracking, and distortion. The inspection should be ? **Done visually with a scraper and a flashlight**

9.3.3 Foundation inspection

ASME VIII

Peening Definition? UW-39 " Weld metal and heat affected zones may be **peened by manual, electric, or pneumatic means when it is deemed necessary or helpful to control distortion, to relieve residual stresses.**

UW-33 & UW-35 Offset + Reinforcement

PWHT Overlap **5 feet**

UW-33 & UW-35 **Offset .**

Shell corroded Material SA302 Gr.B need to be repaired by overlay cladding ..What is the max. Thick can be repaired without PWHT ?!

Answer# **go for ASME IX to find correspond PNO. QW-422 ...PNO 3 then go for ASME VIII UCS -56 max. Thick for PWHT =5/8"**

impact test for material SA-515 Grade 60 with thickness 1.125 in and PWHT performed and it wasn't mandatory by code shall be done at temp. ?!

Answer: Material covered under Curve **B Impact temp shall be 37°F _30°F PWHT = 7°F.**

what is the number of specimen required in charpy V test in ASME VIII? **3 specimens.**

Only Calculations of :

UG-27 Thickness of Shells under Internal Pressure (No Tricks)

UG-32 Formed Heads, and Sections, Pressure on Concave Side (Only Ellipsoidal Head Formula and It was very easy to solve)

Hydrostatic head press calculation (only the trick to convert inch > feet)

ASME IX

A welder qualified by welding in the 5G position, the welder can't weld: **horizontal.

To use RT for welder qualification in lieu of bend test, which case cannot be used for: **GMAW-S

PNO. 53 is : **Titanium Alloy Material** (Open Book)

**T-234 Article II ASME IX

PQR & WPS >>> Thickness range ? Tension test acceptance ? Bend test acceptance (Max. 1/8")

Other Typical MCQ in May 2015 Exam :

Where can u find these data: 1- unit designation 2- company Name 3- set pressure 4- equipment designation 5- test dates?

Answer: **Identification Tag for Pressure-relieving Device alteration.**

A physical change in any component that has design implications that affect the pressure-containing capability of a pressure vessel beyond the scope described in existing data reports. Answer: **Alteration.**

With carbon and low alloy steels, CUI usually causes? **Localized corrosion.**

Closed-cell foam glass materials will decrease **CUI** probability.

Fewer CMLs can be selected for pressure vessels if?

Answer: **Corrosion is general.**

CML should be distributed appropriately over the vessel to provide adequate monitoring ?

Answer: **major pressure parts.**

-The purpose of new vessel inspection is to? **Verify the equipment is safe for operation.**

For a large vessel with two or more zones of differing corrosion rates?

Answer: **each zone may be treated independently when determining the inspection intervals or for substituting the internal inspection.**

#-The inspection interval of Buried Vessels shall be based on?

Answer: **an assessment of the cathodic protection system.**

Most important method for detecting CUI is

Answer: **Visual inspection**

Inspection method that has globally agreement is ? **Visual test**

Temperature of pressure test medium shall be 10F above MDMT for Thickness 2 in.

When the extent of radiography originally performed is not known for joint type 1?

Answer: **use joint efficiency of 0.7.**

-C steel above **.35%** shall not be welded.

-If a pressure vessel component fail because an incorrect material was inadvertently substituted for the specified material, the inspector shall **consider the need for further verification** of existing materials in the pressure vessel.

Statistical analysis may not be applicable to **vessels with significant random corrosion.**

A pressure vessel is scheduled for pneumatic testing using the methodology of ASME Code, Section VIII, Division 1, with the maximum allowable working pressure = 635 psig at 375° F. The vessel is constructed of SA-516 Gr. 65 material and is neither enameled nor lined. The test metal temperature will be a minimum of 50° F, per the owner's specifications. How many pressurization steps are needed to achieve the minimum required test pressure, and at what minimum pressure will the visual examination be performed? Answer: **6 steps; 635 psig.**

A pressure vessel has been in service for 12 years and has a history of corrosion over its service life. The original thickness was 1.9375 inches; the current thickness is 1.405 inches. What is the corrosion rate for this vessel? Answer: **0.044 inch per year.**

What can be done to extend the life of a vessel with a corroded area in the shell plate 6 inches from the weld, a joint efficiency of less than 1, and a corrosion thickness currently near the minimum required thickness? Answer: **Recalculate t minimum for design conditions using E = 1.**

Normally, minimum thickness evaluation may be conducted by? Answer: **Ultrasonic testing.**

Temper embrittlement is **loss of ductility due to incorrect PWHT and High temperature service .**

If a discontinuity is found in weld, it should be size, **charecterized and evaluated.**

Best method to detected subsurface crack in carbon steel material is **WFMPT.**

which of the following method is most suitable for detecting lamination: **UT**

PSV cold set pressure is 400psi. What is the Max. acceptable tolerance in the set pressure: **412.**

As per API 510 the hydro test temperature of a 2" thick vessel is **A. MDMT + 10°F.**

A pressure vessel weld repair work has to be carried out. Who is responsible for having the WPS & PQR made: **Repair organization.**

For a new vessel the corrosion rate will be established based **on 6 month records.**

#External inspection of a pressure vessel starts with: **Ladder, stairs, walkway and platforms of the vessel.**

if bulged area under insulation is observe, this is indication **for corrosion built up beneath the insulation.**

Corrective procedures should be utilized when metal temperatures (typically above **150 °F [65 °C]**).

corrosion rate: vessel working 6 months only per year, last internal inspection at may 1995, onstream 2009, when will be next inspection.

Answer * **may 2015 >>>>>**(Max interval for internal inspection =10 years of working days ...

$$10 \times 2 \text{ (6months)} = 20 \text{ years} + 1995 = 2015$$

RT 4 for weld metal type 2 not receiving RT E= ?! **0.65**

Which method can be used in leu of PWHT for material PNO.1,3,**#4** Answer :**CDW**

S.S cladding Base metal strength= 17700 and used filler metal strength is 16600 base metal thick.=0.75" excavation in B.M =.25" What is the depth of weld metal needed to this rep.

$$T_{fill} = d \times S_{B.M} / S_{w.m}$$

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LOF in weld is relevant to which welding process from the following - **GMAW-S (Short circuit)**