

Consulta

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Assunto: UMA AJUDA

Gostaria de saber se vc's podem me ajudar.

Eu gostaria de saber o que significa ASME SEC VIII, SEÇÃO 1, PARAGRAFO UCS 56 ?

Ou em que lugar consigo ver o que significa?

Resposta

Caro Rodrigo,

Vamos por partes.

1º- ASME SEC VIII Div 1 é um código de projeto e fabricação de vasos de pressão, que são equipamentos pressurizados, quando em operação, muito utilizados em refinarias, tais como: vasos, torres, reatores, permutadores de calor, filtros, esferas de gás, dentre outros.

2º- Parágrafo UCS 56

O código ASME é dividido em subseções e em cada subseção é subdividida em partes ou parágrafos.

O parágrafo ou parte UCS 56 fica na Subseção C e descreve os requisitos aplicáveis ao TTAT- Tratamento Térmico de Alívio das Tensões Residuais resultantes da fabricação do equipamento, particularmente após a execução da soldagem.

SUBSECTION C REQUIREMENTS PERTAINING TO CLASSES OF MATERIALS

Part UCS Requirements for Pressure Vessels Constructed of Carbon and Low Alloy Steels

UCS-56 Requirements for Postweld Heat Treatment

Anexei parte do parágrafo UCS-56.

Para o material aço Carbono Pnumber 1 (ver na tabela que está anexada), o TTAT é requerido para espessuras de 38 mm (1 1/2 pol) e acima, pois, o volume de solda depositado é grande e cria altas tensões mecânicas, que devem ser aliviadas. Para outros materiais, as demais tabelas do UCS-56 devem ser consultadas.

Além dessa situação, o TTAT também é especificado para prevenir as trincas causadas por corrosão sob tensão juntos às soldas devido ao H₂S presente no fluido de processo, por exemplo.

Anexo

2010 ASME Boiler & Pressure Vessel Code

Section VIII Division 1

RULES FOR CONSTRUCTION OF PRESSURE VESSELS

UCS-56 REQUIREMENTS FOR POSTWELD HEAT TREATMENT

(a) Before applying the detailed requirements and exemptions in these paragraphs, satisfactory weld procedure qualifications of the procedures to be used shall be performed in accordance with all the essential variables of Section IX including conditions of postweld heat treatment or lack of postweld heat treatment and including other restrictions listed below.

Except as otherwise specifically provided in the notes to Table UCS-56 and Table UCS-56.1, all welds in pressure vessels or pressure vessel parts shall be given a postweld heat treatment at a temperature not less than specified in those Tables when the nominal thickness, as defined in UW-40(f), including corrosion allowance, exceeds the limits in those Tables. The exemptions provided in Table UCS-56 or Table UCS-56.1 are not permitted when postweld heat treatment is a service requirement as set forth in UCS-68, when welding ferritic materials greater than 1/8 in. (3 mm) thick with the electron beam welding process, or when welding P-No. 3, P-No. 4, P-Nos. 5A, 5B, and 5C, P-No. 10, and P-No. 15E materials of any thickness using the inertia and continuous drive friction welding processes. Electroslag welds in ferritic materials over 1 1/2 in. (38

mm) thickness at the joint shall be given a grain refining (austenitizing) heat treatment. Electrodeposited welds in ferritic materials with any single pass greater than 1 1/2 in. (38 mm) shall be given a grain refining (austenitizing) heat treatment. For P-No. 1 materials only, the heating and cooling rate restrictions of (d)(2) and (d)(5) below do not apply when the heat treatment following welding is in the austenitizing range.

The materials in Table UCS-56 are listed in accordance with Section IX P-Number material groupings of QW-422 and also listed in Table UCS-23.

(b) Except where prohibited in Table UCS-56, holding temperatures and/or holding times in excess of the minimum values given in Table UCS-56 may be used. Intermediate postweld heat treatments need not conform to the requirements of Table UCS-56. The holding time at temperature as specified in Table UCS-56 need not be continuous. It may be an accumulation of time of multiple postweld heat treatment cycles.

(c) When pressure parts of two different P-Number groups are joined by welding, the postweld heat treatment shall be that specified in either of Tables UCS-56 or UHA-32, with applicable notes, for the material requiring the higher postweld temperature. When nonpressure parts are welded to pressure parts, the postweld heat treatment temperature of the pressure part shall control.

(d) The operation of postweld heat treatment shall be carried out by one of the procedures given in UW-40 in accordance with the following requirements:

(1) The temperature of the furnace shall not exceed 800°F (425°C) at the time the vessel or part is placed in it.

(2) Above 800°F (425°C), the rate³ of heating shall be not more than 400°F/hr (222°C/h) divided by the maximum metal thickness of the shell or head plate in inches, but in no case more than 400°F/hr (222°C/h). During the heating period there shall not be a greater variation in temperature throughout the portion of the vessel being heated than 250°F (140°C) within any 15 ft (4.6 m) interval of length.

³ The rates of heating and cooling need not be less than 100°F/hr (56°C/h). However, in all cases consideration of closed chambers and complex structures may indicate reduced rates of heating and cooling to avoid structural damage due to excessive thermal gradients.

(3) The vessel or vessel part shall be held at or above the temperature specified in Table UCS-56 or Table UCS-56.1 for the period of time specified in the Tables. During the holding period, there shall not be a greater difference than 150°F (83°C) between the highest and lowest temperature throughout the portion of the vessel being heated, except where the range is further limited in Table UCS-56.

(4) During the heating and holding periods, the furnace atmosphere shall be so controlled as to avoid excessive oxidation of the surface of the vessel. The furnace shall be of such design as to prevent direct impingement of the flame on the vessel.

(5) Above 800°F (425°C), cooling shall be done in a closed furnace or cooling chamber at a rate³ not greater than 500°F/hr (280°C/h) divided by the maximum metal thickness of the shell or head plate in inches, but in no case more than 500°F/hr (280°C/h). From 800°F (425°C) the vessel may be cooled in still air.

(e) Except as permitted in (f) below, vessels or parts of vessels that have been postweld heat treated in accordance with the requirements of this paragraph shall again be postweld heat treated after welded repairs have been made.

(f) Weld repairs to P-No. 1 Group Nos. 1, 2, and 3 materials and to P-No. 3 Group Nos. 1, 2, and 3 materials and to the weld metals used to join these materials may be made after the final PWHT but prior to the final hydrostatic test, without additional PWHT, provided that PWHT is not required as a service requirement in accordance with UW-2(a), except for the exemptions in Table UCS-56, or as a service requirement in accordance with UCS-68. The welded repairs shall meet the requirements of (1) through (6) below. These requirements do not apply when the welded repairs are minor restorations of the material surface, such as those required after removal of construction fixtures, and provided that the surface is not exposed to the vessel contents.

(1) The Manufacturer shall give prior notification of the repair to the user or to his designated agent and shall not proceed until acceptance has been obtained. Such repairs shall be recorded on the Data Report.

(2) The total repair depth shall not exceed 1 1/2 in. (38 mm) for P-No. 1 Group Nos. 1, 2, and 3 materials and 5/8 in. (16 mm) for P-No. 3 Group Nos. 1, 2, and 3 materials. The total depth of a weld repair shall be taken as the sum of the depths for repairs made from both sides of a weld at a given location.

(3) After removal of the defect, the groove shall be examined, using either the magnetic particle or the liquid penetrant examination methods, in accordance with Appendix 6 for MT and Appendix 8 for PT.

(4) In addition to the requirements of Section IX for qualification of Welding Procedure Specifications for groove welds, the following requirements shall apply:

(a) The weld metal shall be deposited by the manual shielded metal arc process using low hydrogen electrodes. The electrodes shall be properly conditioned in accordance with Section II, Part C, SFA-5.5, Appendix A6.11. The maximum bead width shall be four times the electrode core diameter.

(b) For P-No. 1 Group Nos. 1, 2, and 3 materials, the repair area shall be preheated and maintained at a minimum temperature of 200°F (95°C) during welding.

(c) For P-No. 3 Group Nos. 1, 2, and 3 materials, the repair weld method shall be limited to the half bead weld repair and weld temper bead reinforcement technique.

The repair area shall be preheated and maintained at a minimum temperature of 350°F (175°C) during welding.

The maximum interpass temperature shall be 450°F (230°C). The initial layer of weld metal shall be deposited over the entire area using 1/8 in. (3 mm) maximum diameter electrodes.

Approximately one-half the thickness of this layer shall be removed by grinding before depositing subsequent layers. The subsequent weld layers shall be deposited using 5/32 in. (4 mm) maximum diameter electrodes in such a manner as to assure tempering of the prior weld beads and their heat affected zones. A final temper bead weld shall be applied to a level above the surface being repaired without contacting the base material but close enough to the edge of the underlying weld bead to assure tempering of the base material heat affected zone. After completing all welding, the repair area shall be maintained at a temperature of 400°F–500°F (205°C–260°C) for a minimum period of 4 hr. The final temper bead reinforcement layer shall be removed substantially flush with the surface of the base material.

(5) After the finished repair weld has reached ambient temperature, it shall be inspected using the same nondestructive examination that was used in (f)(3) above, except that for P-No. 3, Group No. 3 materials, the examination shall be made after the material has been at ambient temperature for a minimum period of 48 hr to determine the presence of possible delayed cracking of the weld. If the examination is by the magnetic particle method, only the alternating current yoke type is acceptable. In addition, welded repairs greater than 3/8 in. (10 mm) deep in materials and in welds that are required to be radiographed by the rules of this Division, shall be radiographically examined to the requirements of UW-51.

(6) The vessel shall be hydrostatically tested after making the welded repair.

TABLE UCS-56
POSTWELD HEAT TREATMENT REQUIREMENTS FOR CARBON AND LOW ALLOY STEELS

Material	Normal Holding Temperature, °F (°C), Minimum	Minimum Holding Time at Normal Temperature for Nominal Thickness [See UW-40(f)]		
		Up to 2 in. (50 mm)	Over 2 in. to 5 in. (50 mm to 125 mm)	Over 5 in. (125 mm)
P-No. 1 Gr. Nos. 1, 2, 3	1,100 (599)	1 hr/in. (25 mm), 15 min minimum	2 hr plus 15 min for each additional inch (25 mm) over 2 in. (50 mm)	2 hr plus 15 min for each additional inch (25 mm) over 2 in. (50 mm)
Gr. No. 4	NA	None	None	None

NOTES:

- (1) When it is impractical to postweld heat treat at the temperature specified in this Table, it is permissible to carry out the postweld heat treatment at lower temperatures for longer periods of time in accordance with Table UCS-56.1.
- (2) Postweld heat treatment is mandatory under the following conditions:
 - (a) for welded joints over 1½ in. (38 mm) nominal thickness;
 - (b) for welded joints over 1¼ in. (32 mm) nominal thickness through 1½ in. (38 mm) nominal thickness unless preheat is applied at a minimum temperature of 200°F (95°C) during welding. This preheat need not be applied to SA-841 Grades A and B, provided that the carbon content and carbon equivalent (CE) for the plate material, by heat analysis, do not exceed 0.14% and 0.40%, respectively, where

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

- (c) for welded joints of all thicknesses if required by UW-2, except postweld heat treatment is not mandatory under the conditions specified below:
 - (1) for groove welds not over ½ in. (13 mm) size and fillet welds with a throat not over ½ in. (13 mm) that attach nozzle connections that have a finished inside diameter not greater than 2 in. (50 mm), provided the connections do not form ligaments that require an increase in shell or head thickness, and preheat to a minimum temperature of 200°F (95°C) is applied;
 - (2) for groove welds not over ½ in. (13 mm) in size or fillet welds with a throat thickness of ½ in. (13 mm) or less that attach tubes to a tubesheet when the tube diameter does not exceed 2 in. (50 mm). A preheat of 200°F (95°C) minimum must be applied when the carbon content of the tubesheet exceeds 0.22%.
 - (3) for groove welds not over ½ in. (13 mm) in size or fillet welds with a throat thickness of ½ in. (13 mm) or less used for attaching nonpressure parts to pressure parts provided preheat to a minimum temperature of 200°F (95°C) is applied when the thickness of the pressure part exceeds 1¼ in. (32 mm);
 - (4) for studs welded to pressure parts provided preheat to a minimum temperature of 200°F (95°C) is applied when the thickness of the pressure part exceeds 1¼ in. (32 mm);
 - (5) for corrosion resistant weld metal overlay cladding or for welds attaching corrosion resistant applied lining (see UCL-34) provided preheat to a minimum temperature of 200°F (95°C) is maintained during application of the first layer when the thickness of the pressure part exceeds 1¼ in. (32 mm).

NA = not applicable