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Pressure Vessel Engineering Ltd. provides: ASME Vessel Code Calculations - Finite Element Analysis (FEA) - Solid Modeling / Drafting - Canadian Registration Number (CRN) Assistance

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## **Comment: Only ASME can make interpretations on the ASME VIII-1 Code**

### **Weld Efficiencies for ASME VIII-1 vessels - Section UW-11(a)(5)(b)**

#### **Part 1 - introduction**

I have long struggled with the weld efficiencies presented in section UW of the ASME VIII-1 code. I have had more trouble with it than many other sections of the book combined. The ideas in this section are simple, but the ASME code written around it is anything but. Where ASME has not made the code readable, we must live with confused and diverging interpretations.

The problem area is sections UW-11 and UW-12 and any section of the code that references UW-11(a)(5)(b) - and there are many. What weld efficiencies to use when seams with different efficiencies intersect? I do not believe that circ weld efficiencies can affect longitudinal efficiencies however; these rules as presented in UW-12 and UW-11(a)(5)(b) exist and must be dealt with. I do believe that I will have to read the infinitely confusing sentence UW-11(a)(5)(b) many more times in my career.

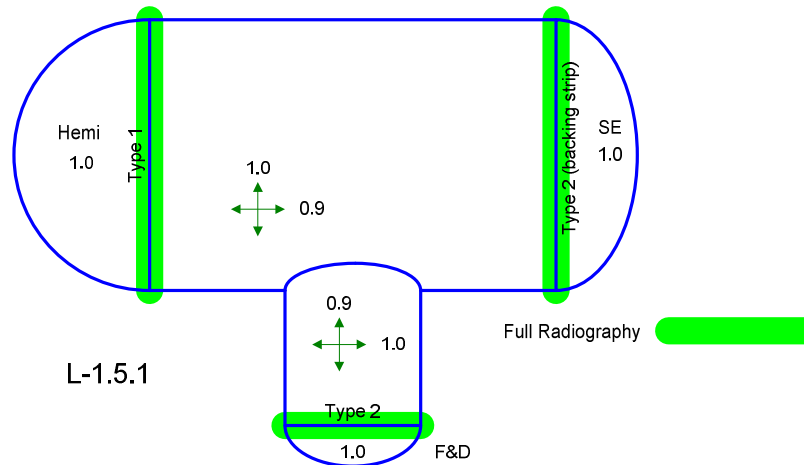
I and others have tried to reason their way through this section of the code. An example can be found at <http://www.authorizedinspector.com/Joint%20Efficiencies.htm> I think what I present here agrees with their interpretation, but I do not like this method. Even if you agree with what is presented, then you still have to persuade others - best of luck.

Only ASME can provide interpretations as to what this code means, and someone can ask them, but - how about doing something simple instead? Samples of what the code committee wants can be found in appendix L. In specific samples L-1.5.1 through L-1.6.3 show the correct weld efficiency to use with differing radiography, and they also show the effect of circ efficiency on long seams. The meaning of UW-11(a)(5)(b) can be inferred.

This article comments on the 6 sample vessels found in Appendix L. A simple spreadsheet is introduced that calculates the same weld efficiencies. The spreadsheet can be downloaded from [http://www.pveng.com/documents/content\\_156.xls](http://www.pveng.com/documents/content_156.xls) Each Appendix L sample is calculated at the end of this article.

Pressure Vessel Engineering Ltd. assumes no responsibility for this sheets use, and reminds you that only ASME can provide code interpretations. We would however be very happy if everyone could use the same interpretation to this difficult code section.

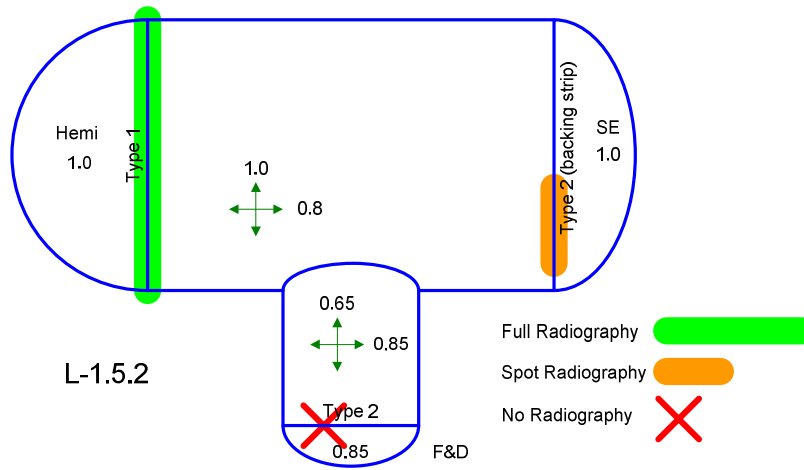
## Part 2 - samples from Appendix L-1.5 with Comments



### Example L-1.5.1

Comments:

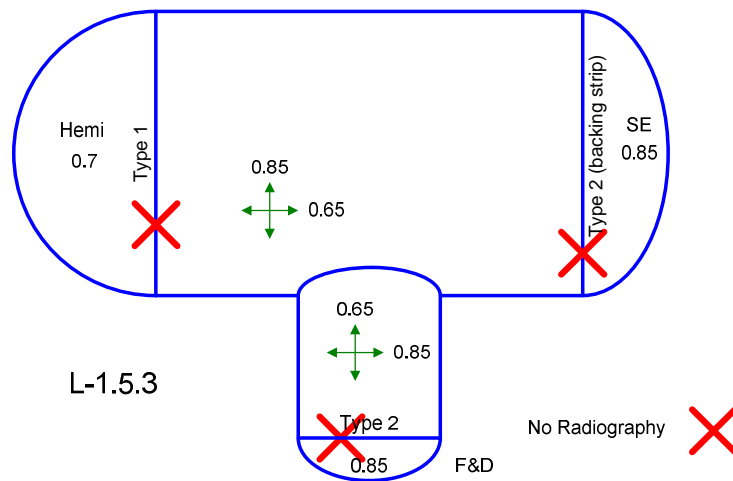
- 1) All efficiencies are from table UW-12
- 2) Nozzle or sump has no effect on the shell efficiencies (Type 8 in table UW-12 corner joints have an efficiency of 1.0. (This is true for all examples in Appendix L-1.5))
- 3) The long and circ efficiency on shells and pipes is tracked separately and both are calculated
- 4) The shell circ weld efficiency is different at each end. 1.0 for the Type 1 and 0.9 for the type 2 joint. The lower efficiency governs.



### Example L-1.5.2

Comments:

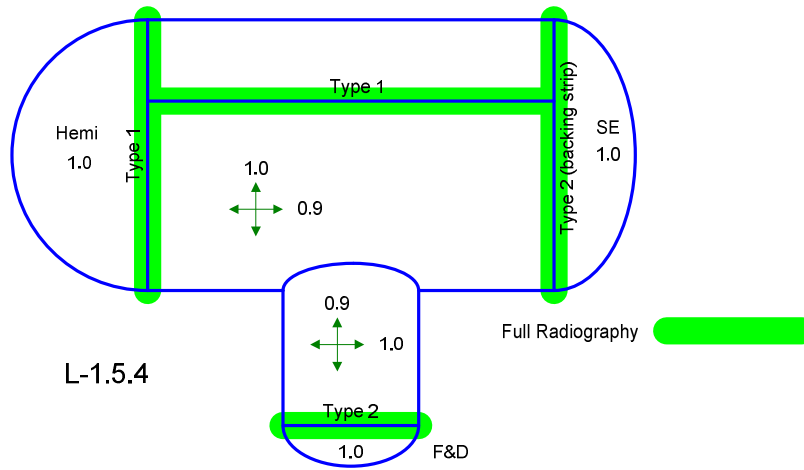
- 1)  $E = 0.85$  for the sump per UW-12(d)
- 2) All other efficiencies are from Table UW-12



### Example L-1.5.3

Comments:

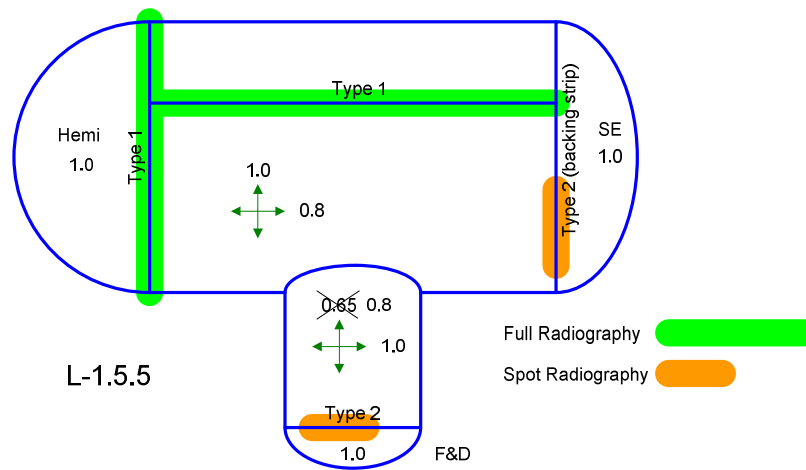
- 1)  $E = 0.85$  for the SE and F&D heads per UW-12(d)
- 2) The circ weld on the Hemispherical head is part of the head. The 0.7 efficiency for the Type 1 joint with no RT (from table UW-12) becomes the head efficiency as well.
- 3)  $E = 0.85$  for the shell log seam efficiency, *even though there is no long seam*. There is no different than the heads
- 3) All other efficiencies are from Table UW-12



### **Example L-1.5.4**

Comments:

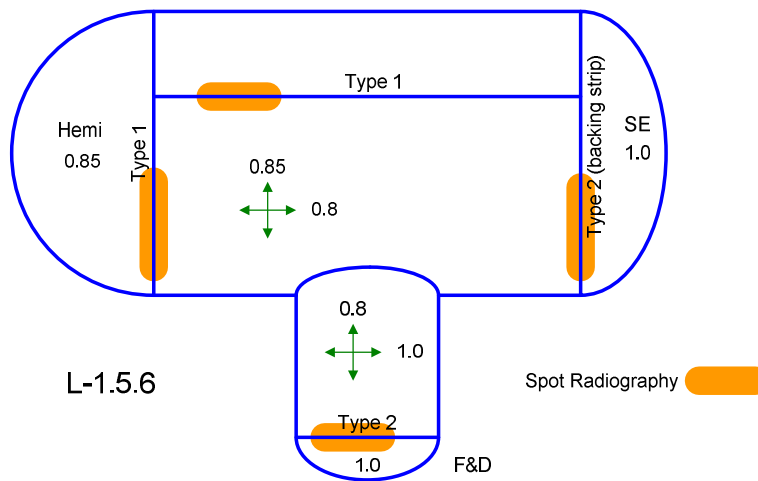
- 1) All efficiencies are from Table UW-12



### Example L-1.5.5

Comments:

- 1) Long seam efficiency for the sump is incorrectly shown as 0.65 in the code book (the correct value of 0.8 can be found in sample L-1.5.6)
- 1) All efficiencies are from Table UW-12



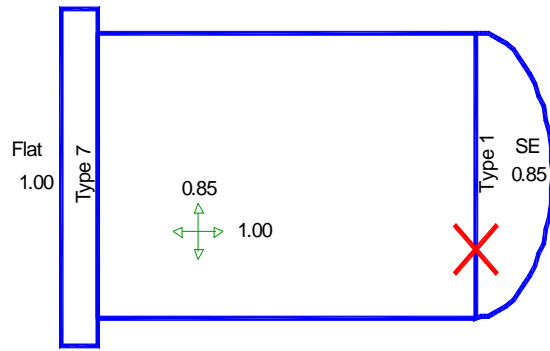
### Example L-1.5.6

Comments:

- 1) **This case shows that UW-11(a)(5)(b) can be satisfied for a vessel with spot radiography on the long seam.** The heads have imaginary long seam welds with the equivalent of 100% radiography *as required by UW-11(a)*. The radiography in question is not that of the adjoining rolled shell which has no effect on the elliptical head, but that on the imaginary long seam in the head which is 100%. UW-11(a)(5)(b) is met for the semi elliptical head of this vessel, but not for the shell. The semi-elliptical head can have an efficiency of 1.0. **This is the leading cause of disagreement on allowable weld efficiencies.**

*Note: If your authorized inspector or review engineer does not agree that this example L-1.5.6 is correct, then they are implying that the adjacent shell affects the efficiency of the head. This sample shows that this effect does not exist. If you lose your argument, you will have to fully radiograph the long seam. This design change involves extra cost, but material does not have to be re-ordered / re-worked.*

- 2) All efficiencies are from table UW-12
- 3) See L-1.5.3 comment on the hemispherical head efficiency.

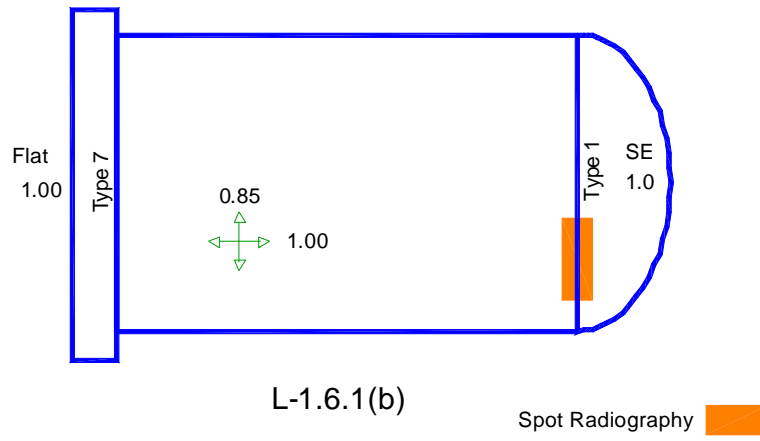


L-1.6.1(a)

### **Example L-1.6.1(a)**

Comments:

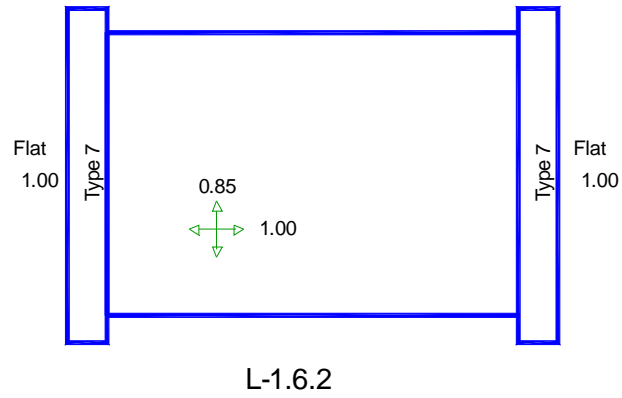
- 1) All efficiencies are from table UW-12



**Example L-1.6.1(b)**

Comments:

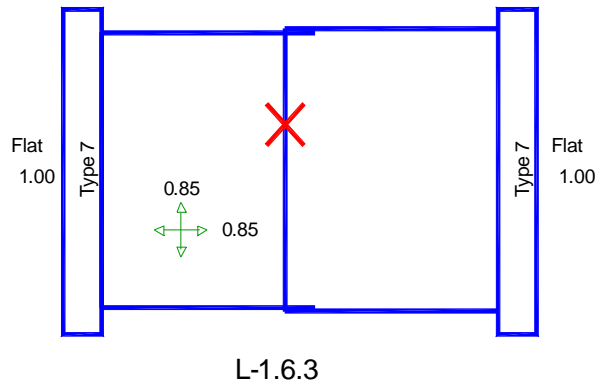
- 1) All efficiencies are from table UW-12



### ***Example L-1.6.2***

Comments:

- 1) All efficiencies are from table UW-12



### **Example L-1.6.3**

Comments:

- 1) All efficiencies are from table UW-12
- 2) The two shells are welded using either type number 3, 4, 5 or 6 welds

## Part 3 - Radiography Rules

These weld efficiency rules are derived from the above examples

- 1) Start with all weld efficiencies from table UW-12 - these are the efficiencies in isolation of any other welds. Other rules below may lower the allowed efficiencies where applicable.
- 2) Nozzles or sumps attached with corner joints have no effect on the efficiency of the shells they are attached to
- 3.1) Track both the long and circ efficiency for a pipe or rolled shell. The shell required thickness (or allowed operating pressure) must be calculated for both directions.
- 3.2) When a shell has different circ efficiencies at each end, the lower efficiency governs.
- 3.3) When there is no RT on a circ connection, the maximum body long seam efficiency is 0.85 per UW-12(d). Maximum efficiency of an imaginary weld seam is also 0.85 (same as for a head).
- 4) If there are seams in the head, reduce efficiency as required per Table UW-12
- 5) A Hemispherical head is different from F&D and SE. The efficiency of the Hemi head is the lowest of the attachment efficiency or any seam in the head.

## Part 4 - Samples from weld efficiency sheet follow...

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Revised Dec 15 2008  
(Original Sept 8 2008)

**Vessel Weld Efficiency** ver 1.00

ASME VIII-1 Section UW

**ASME Sample L-1.5.1 for Main Body** Project

<b>Left Head: [Category A] - long seam weld in head, not head to shell weld</b>		
<b>Hemispherical</b>	Left head	UW12 Column for this weld <b>a</b>
<b>Seamless</b>	Left head <b>weld type</b>	UW12 Column for joining circ weld <b>a</b>
<b>Seamless</b>	Left head weld <b>radiography</b>	Weld Type Number <b>0</b>
		Isolated long seam efficiency <b>1.00</b>
		Allowed UW12 Column <b>a</b>
		Allowed <b>Head Efficiency</b> <b>1.00</b>

<b>Left Circ Weld: [Category A, B, C or D]</b>		
<b>Double</b>	Left head to body circ-weld <b>type</b>	UW12 Column for this weld <b>a</b>
<b>Full</b>	Left head to body circ-weld <b>radiography</b>	Circ seam type number <b>1</b>
		Left circ weld efficiency <b>1.00</b>

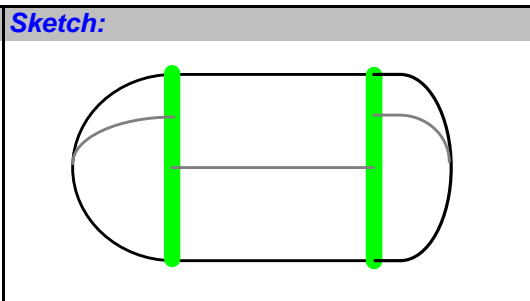
<b>Body Long Seam: [Category A]</b>		
<b>Seamless</b>	Body long <b>weld type</b>	UW12 column for the body long seam <b>a</b>
<b>Seamless</b>	Body long-weld <b>radiography</b>	UW12 column for left circ weld <b>a</b>
		UW12 column for right circ weld <b>a</b>
		Long seam type number <b>0</b>
left circ efficiency <b>1</b>		Isolated long seam efficiency <b>1.00</b>
right circ efficiency <b>0.9</b>		Allowed UW12 Column <b>a</b>
Allowed <b>Circ Efficiency</b> <b>0.90</b>		Allowed <b>Long Seam Efficiency</b> <b>1.00</b>

<b>Right Circ Weld: [Category A, B, C or D]</b>		
<b>Single_W_Backing</b>	Right head to body circ-weld <b>type</b>	UW12 Column <b>a</b>
<b>Full</b>	Right head to body circ-weld <b>radiography</b>	Circ seam type number <b>2</b>
		Right circ weld efficiency <b>0.90</b>

<b>Right Head: [Category A] - long seam weld in head, not head to shell weld</b>		
<b>Semi-Elliptical</b>	Right head	UW12 Column for this weld <b>a</b>
<b>Seamless</b>	Right head <b>weld type</b>	UW12 Column for joining circ weld <b>a</b>
<b>Seamless</b>	Right head weld <b>radiography</b>	Weld Type Number <b>0</b>
		Isolated long seam efficiency <b>1.00</b>
		Allowed UW12 Column <b>a</b>
		Allowed <b>Head Efficiency</b> <b>1.00</b>

**Notes:**

UW-11(a)(5)(b) is met for the left head  
 UW-11(a)(5)(b) is met for the body  
 UW-11(a)(5)(b) is met for the right head



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## Vessel Weld Efficiency ver 1.00

ASME VIII-1 Section UW

**ASME Sample L-1.5.1 for Sump** Project

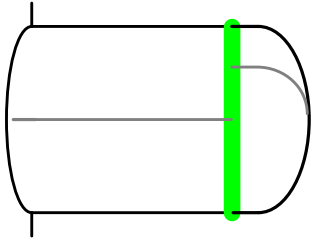
<b>Left Head: [Category A] - long seam weld in head, not head to shell weld</b>		
<b>Corner</b>	Left head	UW12 Column for this weld <b>a</b>
<b>Corner</b>	Left head <b>weld type</b>	UW12 Column for joining circ weld <b>a</b>
<b>None</b>	Left head weld <b>radiography</b>	Weld Type Number <b>7</b>
		Isolated long seam efficiency <b>1.00</b>
		Allowed UW12 Column <b>a</b>
		Allowed <b>Head Efficiency</b> <b>1.00</b>

<b>Left Circ Weld: [Category A, B, C or D]</b>		
<b>Corner</b>	Left head to body circ-weld <b>type</b>	UW12 Column for this weld <b>a</b>
<b>None</b>	Left head to body circ-weld <b>radiography</b>	Circ seam type number <b>7</b>
		Left circ weld efficiency <b>1.00</b>

<b>Body Long Seam: [Category A]</b>		
<b>Seamless</b>	Body long <b>weld type</b>	UW12 column for the body long seam <b>a</b>
<b>Seamless</b>	Body long-weld <b>radiography</b>	UW12 column for left circ weld <b>a</b>
		UW12 column for right circ weld <b>a</b>
		Long seam type number <b>0</b>
		left circ efficiency <b>1</b>
		right circ efficiency <b>0.9</b>
		Isolated long seam efficiency <b>1.00</b>
		Allowed UW12 Column <b>a</b>
		Allowed <b>Long Seam Efficiency</b> <b>1.00</b>

<b>Right Circ Weld: [Category A, B, C or D]</b>		
<b>Single_W_Backing</b>	Right head to body circ-weld <b>type</b>	UW12 Column <b>a</b>
<b>Full</b>	Right head to body circ-weld <b>radiography</b>	Circ seam type number <b>2</b>
		Right circ weld efficiency <b>0.90</b>

<b>Right Head: [Category A] - long seam weld in head, not head to shell weld</b>		
<b>F&amp;D</b>	Right head	UW12 Column for this weld <b>a</b>
<b>Seamless</b>	Right head <b>weld type</b>	UW12 Column for joining circ weld <b>a</b>
<b>Seamless</b>	Right head weld <b>radiography</b>	Weld Type Number <b>0</b>
		Isolated long seam efficiency <b>1.00</b>
		Allowed UW12 Column <b>a</b>
		Allowed <b>Head Efficiency</b> <b>1.00</b>

<b>Notes:</b>	<b>Sketch:</b>
<p>UW-11(a)(5)(b) is met for the left head                  UW-11(a)(5)(b) is met for the body                  UW-11(a)(5)(b) is met for the right head</p>	

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**Vessel Weld Efficiency** ver 1.00

ASME VIII-1 Section UW

**ASME Sample L-1.5.2 for Main Body** Project

<b>Left Head: [Category A] - long seam weld in head, not head to shell weld</b>		
<b>Hemispherical</b>	Left head	UW12 Column for this weld <b>a</b>
<b>Seamless</b>	Left head <b>weld type</b>	UW12 Column for joining circ weld <b>a</b>
<b>Seamless</b>	Left head weld <b>radiography</b>	Weld Type Number <b>0</b>
		Isolated long seam efficiency <b>1.00</b>
		Allowed UW12 Column <b>a</b>
		Allowed <b>Head Efficiency</b> <b>1.00</b>

<b>Left Circ Weld: [Category A, B, C or D]</b>		
<b>Double</b>	Left head to body circ-weld <b>type</b>	UW12 Column for this weld <b>a</b>
<b>Full</b>	Left head to body circ-weld <b>radiography</b>	Circ seam type number <b>1</b>
		Left circ weld efficiency <b>1.00</b>

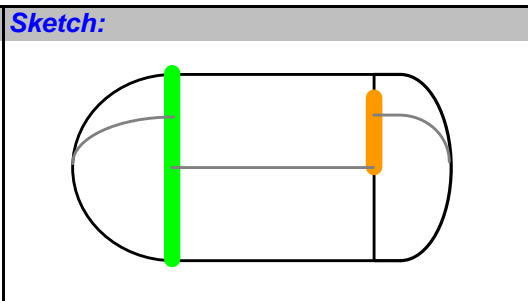
<b>Body Long Seam: [Category A]</b>		
<b>Seamless</b>	Body long <b>weld type</b>	UW12 column for the body long seam <b>a</b>
<b>Seamless</b>	Body long-weld <b>radiography</b>	UW12 column for left circ weld <b>a</b>
		UW12 column for right circ weld <b>b</b>
		Long seam type number <b>0</b>
left circ efficiency <b>1</b>		Isolated long seam efficiency <b>1.00</b>
right circ efficiency <b>0.8</b>		Allowed UW12 Column <b>a</b>
Allowed <b>Circ Efficiency</b> <b>0.80</b>		Allowed <b>Long Seam Efficiency</b> <b>1.00</b>

<b>Right Circ Weld: [Category A, B, C or D]</b>		
<b>Single_W_Backing</b>	Right head to body circ-weld <b>type</b>	UW12 Column <b>b</b>
<b>Spot</b>	Right head to body circ-weld <b>radiography</b>	Circ seam type number <b>2</b>
		Right circ weld efficiency <b>0.80</b>

<b>Right Head: [Category A] - long seam weld in head, not head to shell weld</b>		
<b>Semi-Elliptical</b>	Right head	UW12 Column for this weld <b>a</b>
<b>Seamless</b>	Right head <b>weld type</b>	UW12 Column for joining circ weld <b>b</b>
<b>Seamless</b>	Right head weld <b>radiography</b>	Weld Type Number <b>0</b>
		Isolated long seam efficiency <b>1.00</b>
		Allowed UW12 Column <b>a</b>
		Allowed <b>Head Efficiency</b> <b>1.00</b>

**Notes:**

UW-11(a)(5)(b) is met for the left head  
 UW-11(a)(5)(b) is met for the body  
 UW-11(a)(5)(b) is met for the right head



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## Vessel Weld Efficiency ver 1.00

ASME VIII-1 Section UW

ASME Sample L-1.5.2 for Sump Project

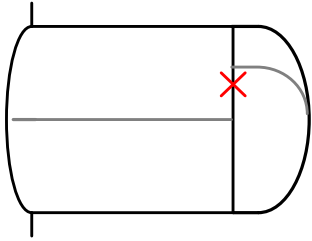
<b>Left Head: [Category A] - long seam weld in head, not head to shell weld</b>		
<b>Corner</b>	Left head	UW12 Column for this weld <b>a</b>
<b>Corner</b>	Left head <b>weld type</b>	UW12 Column for joining circ weld <b>a</b>
<b>None</b>	Left head weld radiography	Weld Type Number <b>7</b>
		Isolated long seam efficiency <b>1.00</b>
		Allowed UW12 Column <b>a</b>
		Allowed <b>Head Efficiency</b> <b>1.00</b>

<b>Left Circ Weld: [Category A, B, C or D]</b>		
<b>Corner</b>	Left head to body circ-weld <b>type</b>	UW12 Column for this weld <b>a</b>
<b>None</b>	Left head to body circ-weld radiography	Circ seam type number <b>7</b>
		Left circ weld efficiency <b>1.00</b>

<b>Body Long Seam: [Category A]</b>		
<b>Seamless</b>	Body long <b>weld type</b>	UW12 column for the body long seam <b>a</b>
<b>Seamless</b>	Body long-weld radiography	UW12 column for left circ weld <b>a</b>
		UW12 column for right circ weld <b>c</b>
		Long seam type number <b>0</b>
	left circ efficiency <b>1</b>	Isolated long seam efficiency <b>1.00</b>
	right circ efficiency <b>0.65</b>	Allowed UW12 Column <b>b</b>
	Allowed <b>Circ Efficiency</b> <b>0.65</b>	Allowed <b>Long Seam Efficiency</b> <b>0.85</b>

<b>Right Circ Weld: [Category A, B, C or D]</b>		
<b>Single_W_Backing</b>	Right head to body circ-weld <b>type</b>	UW12 Column <b>c</b>
<b>None</b>	Right head to body circ-weld radiography	Circ seam type number <b>2</b>
		Right circ weld efficiency <b>0.65</b>

<b>Right Head: [Category A] - long seam weld in head, not head to shell weld</b>		
<b>F&amp;D</b>	Right head	UW12 Column for this weld <b>a</b>
<b>Seamless</b>	Right head <b>weld type</b>	UW12 Column for joining circ weld <b>c</b>
<b>Seamless</b>	Right head weld radiography	Weld Type Number <b>0</b>
		Isolated long seam efficiency <b>1.00</b>
		Allowed UW12 Column <b>b</b>
		Allowed <b>Head Efficiency</b> <b>0.85</b>

<b>Notes:</b>	<b>Sketch:</b>
<p style="color: #800000;"><i>Body efficiency is reduced by head to body welds</i></p> <p style="color: #800000;"><i>Right head efficiency is reduced by right head to body weld</i></p> <p style="color: #800000;"><i>UW-11(a)(5)(b) is met for the left head</i></p> <p style="color: #800000;"><i>UW-11(a)(5)(b) is NOT met for the body</i></p> <p style="color: #800000;"><i>UW-11(a)(5)(b) is NOT met for the right head</i></p>	

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**Vessel Weld Efficiency** ver 1.00

ASME VIII-1 Section UW

**ASME Sample L-1.5.3 for Main Body** Project

<b>Left Head: [Category A] - long seam weld in head, not head to shell weld</b>		
<b>Hemispherical</b>	Left head	UW12 Column for this weld <b>a</b>
<b>Seamless</b>	Left head <b>weld type</b>	UW12 Column for joining circ weld <b>c</b>
<b>Seamless</b>	Left head weld radiography	Weld Type Number <b>0</b>
		Isolated long seam efficiency <b>1.00</b>
		Allowed UW12 Column <b>c</b>
		Allowed <b>Head Efficiency</b> <b>0.70</b>

<b>Left Circ Weld: [Category A, B, C or D]</b>		
<b>Double</b>	Left head to body circ-weld <b>type</b>	UW12 Column for this weld <b>c</b>
<b>None</b>	Left head to body circ-weld radiography	Circ seam type number <b>1</b>
		Left circ weld efficiency <b>0.70</b>

<b>Body Long Seam: [Category A]</b>		
<b>Seamless</b>	Body long <b>weld type</b>	UW12 column for the body long seam <b>a</b>
<b>Seamless</b>	Body long-weld radiography	UW12 column for left circ weld <b>c</b>
		UW12 column for right circ weld <b>c</b>
		Long seam type number <b>0</b>
		Isolated long seam efficiency <b>1.00</b>
		Allowed UW12 Column <b>b</b>
left circ efficiency <b>0.7</b>		Allowed <b>Long Seam Efficiency</b> <b>0.85</b>
right circ efficiency <b>0.65</b>		
Allowed <b>Circ Efficiency</b> <b>0.65</b>		

<b>Right Circ Weld: [Category A, B, C or D]</b>		
<b>Single_W_Backing</b>	Right head to body circ-weld <b>type</b>	UW12 Column <b>c</b>
<b>None</b>	Right head to body circ-weld radiography	Circ seam type number <b>2</b>
		Right circ weld efficiency <b>0.65</b>

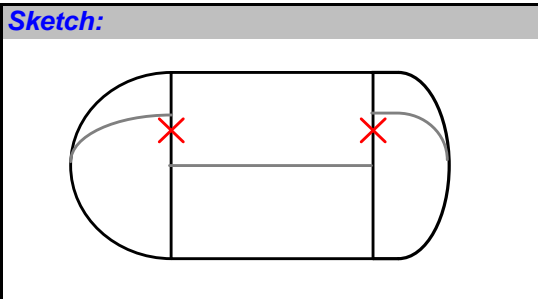
<b>Right Head: [Category A] - long seam weld in head, not head to shell weld</b>		
<b>Semi-Elliptical</b>	Right head	UW12 Column for this weld <b>a</b>
<b>Seamless</b>	Right head <b>weld type</b>	UW12 Column for joining circ weld <b>c</b>
<b>Seamless</b>	Right head weld radiography	Weld Type Number <b>0</b>
		Isolated long seam efficiency <b>1.00</b>
		Allowed UW12 Column <b>b</b>
		Allowed <b>Head Efficiency</b> <b>0.85</b>

**Notes:**

Left head efficiency is reduced by left circ-weld efficiency  
 Body efficiency is reduced by head to body welds

Right head efficiency is reduced by right head to body weld

UW-11(a)(5)(b) is NOT met for the left head  
 UW-11(a)(5)(b) is NOT met for the body  
 UW-11(a)(5)(b) is NOT met for the right head



**Comments:**

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## Vessel Weld Efficiency ver 1.00

ASME VIII-1 Section UW

**ASME Sample L-1.5.3 for Sump** Project

<b>Left Head: [Category A] - long seam weld in head, not head to shell weld</b>		
<b>Corner</b>	Left head	UW12 Column for this weld <b>a</b>
<b>Corner</b>	Left head <b>weld type</b>	UW12 Column for joining circ weld <b>a</b>
<b>None</b>	Left head weld radiography	Weld Type Number <b>7</b>
		Isolated long seam efficiency <b>1.00</b>
		Allowed UW12 Column <b>a</b>
		Allowed <b>Head Efficiency</b> <b>1.00</b>

<b>Left Circ Weld: [Category A, B, C or D]</b>		
<b>Corner</b>	Left head to body circ-weld <b>type</b>	UW12 Column for this weld <b>a</b>
<b>None</b>	Left head to body circ-weld radiography	Circ seam type number <b>7</b>
		Left circ weld efficiency <b>1.00</b>

<b>Body Long Seam: [Category A]</b>		
<b>Seamless</b>	Body long <b>weld type</b>	UW12 column for the body long seam <b>a</b>
<b>Seamless</b>	Body long-weld radiography	UW12 column for left circ weld <b>a</b>
		UW12 column for right circ weld <b>c</b>
		Long seam type number <b>0</b>
		left circ efficiency <b>1</b>
		Isolated long seam efficiency <b>1.00</b>
		right circ efficiency <b>0.65</b>
		Allowed UW12 Column <b>b</b>
		Allowed <b>Long Seam Efficiency</b> <b>0.85</b>

<b>Right Circ Weld: [Category A, B, C or D]</b>		
<b>Single_W_Backing</b>	Right head to body circ-weld <b>type</b>	UW12 Column <b>c</b>
<b>None</b>	Right head to body circ-weld radiography	Circ seam type number <b>2</b>
		Right circ weld efficiency <b>0.65</b>

<b>Right Head: [Category A] - long seam weld in head, not head to shell weld</b>		
<b>F&amp;D</b>	Right head	UW12 Column for this weld <b>a</b>
<b>Seamless</b>	Right head <b>weld type</b>	UW12 Column for joining circ weld <b>c</b>
<b>Seamless</b>	Right head weld radiography	Weld Type Number <b>0</b>
		Isolated long seam efficiency <b>1.00</b>
		Allowed UW12 Column <b>b</b>
		Allowed <b>Head Efficiency</b> <b>0.85</b>

<b>Notes:</b>	<b>Sketch:</b>
<p>Body efficiency is reduced by head to body welds</p> <p>Right head efficiency is reduced by right head to body weld</p> <p>UW-11(a)(5)(b) is met for the left head</p> <p>UW-11(a)(5)(b) is NOT met for the body</p> <p>UW-11(a)(5)(b) is NOT met for the right head</p>	

**Comments:**  
 This sheet is for educational use only. Only ASME can make code interpretations.

**Vessel Weld Efficiency** ver 1.00

ASME VIII-1 Section UW

**ASME Sample L-1.5.4 for Main Body** Project

<b>Left Head: [Category A] - long seam weld in head, not head to shell weld</b>		
<b>Hemispherical</b>	Left head	UW12 Column for this weld <b>a</b>
<b>Seamless</b>	Left head <b>weld type</b>	UW12 Column for joining circ weld <b>a</b>
<b>Seamless</b>	Left head weld <b>radiography</b>	Weld Type Number <b>0</b>
		Isolated long seam efficiency <b>1.00</b>
		Allowed UW12 Column <b>a</b>
		Allowed <b>Head Efficiency</b> <b>1.00</b>

<b>Left Circ Weld: [Category A, B, C or D]</b>		
<b>Double</b>	Left head to body circ-weld <b>type</b>	UW12 Column for this weld <b>a</b>
<b>Full</b>	Left head to body circ-weld <b>radiography</b>	Circ seam type number <b>1</b>
		Left circ weld efficiency <b>1.00</b>

<b>Body Long Seam: [Category A]</b>		
<b>Double</b>	Body long <b>weld type</b>	UW12 column for the body long seam <b>a</b>
<b>Full</b>	Body long-weld <b>radiography</b>	UW12 column for left circ weld <b>a</b>
		UW12 column for right circ weld <b>a</b>
		Long seam type number <b>1</b>
		Isolated long seam efficiency <b>1.00</b>
		Allowed UW12 Column <b>a</b>
left circ efficiency <b>1</b> right circ efficiency <b>0.9</b>		Allowed <b>Long Seam Efficiency</b> <b>1.00</b>
Allowed <b>Circ Efficiency</b> <b>0.90</b>		

<b>Right Circ Weld: [Category A, B, C or D]</b>		
<b>Single_W_Backing</b>	Right head to body circ-weld <b>type</b>	UW12 Column <b>a</b>
<b>Full</b>	Right head to body circ-weld <b>radiography</b>	Circ seam type number <b>2</b>
		Right circ weld efficiency <b>0.90</b>

<b>Right Head: [Category A] - long seam weld in head, not head to shell weld</b>		
<b>Semi-Elliptical</b>	Right head	UW12 Column for this weld <b>a</b>
<b>Seamless</b>	Right head <b>weld type</b>	UW12 Column for joining circ weld <b>a</b>
<b>Seamless</b>	Right head weld <b>radiography</b>	Weld Type Number <b>0</b>
		Isolated long seam efficiency <b>1.00</b>
		Allowed UW12 Column <b>a</b>
		Allowed <b>Head Efficiency</b> <b>1.00</b>

<b>Notes:</b>	<b>Sketch:</b>
UW-11(a)(5)(b) is met for the left head UW-11(a)(5)(b) is met for the body UW-11(a)(5)(b) is met for the right head	

**Comments:**  
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## Vessel Weld Efficiency ver 1.00

ASME VIII-1 Section UW

**ASME Sample L-1.5.4 for Sump** Project

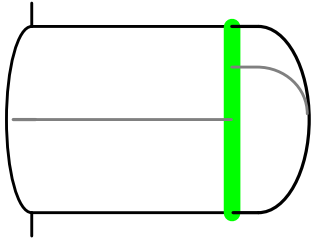
<b>Left Head: [Category A] - long seam weld in head, not head to shell weld</b>		
<b>Corner</b>	Left head	UW12 Column for this weld <b>a</b>
<b>Corner</b>	Left head <b>weld type</b>	UW12 Column for joining circ weld <b>a</b>
<b>None</b>	Left head weld <b>radiography</b>	Weld Type Number <b>7</b>
		Isolated long seam efficiency <b>1.00</b>
		Allowed UW12 Column <b>a</b>
		Allowed <b>Head Efficiency</b> <b>1.00</b>

<b>Left Circ Weld: [Category A, B, C or D]</b>		
<b>Corner</b>	Left head to body circ-weld <b>type</b>	UW12 Column for this weld <b>a</b>
<b>None</b>	Left head to body circ-weld <b>radiography</b>	Circ seam type number <b>7</b>
		Left circ weld efficiency <b>1.00</b>

<b>Body Long Seam: [Category A]</b>		
<b>Seamless</b>	Body long <b>weld type</b>	UW12 column for the body long seam <b>a</b>
<b>Seamless</b>	Body long-weld <b>radiography</b>	UW12 column for left circ weld <b>a</b>
		UW12 column for right circ weld <b>a</b>
		Long seam type number <b>0</b>
		left circ efficiency <b>1</b>
		right circ efficiency <b>0.9</b>
		Isolated long seam efficiency <b>1.00</b>
		Allowed UW12 Column <b>a</b>
		Allowed <b>Long Seam Efficiency</b> <b>1.00</b>

<b>Right Circ Weld: [Category A, B, C or D]</b>		
<b>Single_W_Backing</b>	Right head to body circ-weld <b>type</b>	UW12 Column <b>a</b>
<b>Full</b>	Right head to body circ-weld <b>radiography</b>	Circ seam type number <b>2</b>
		Right circ weld efficiency <b>0.90</b>

<b>Right Head: [Category A] - long seam weld in head, not head to shell weld</b>		
<b>F&amp;D</b>	Right head	UW12 Column for this weld <b>a</b>
<b>Seamless</b>	Right head <b>weld type</b>	UW12 Column for joining circ weld <b>a</b>
<b>Seamless</b>	Right head weld <b>radiography</b>	Weld Type Number <b>0</b>
		Isolated long seam efficiency <b>1.00</b>
		Allowed UW12 Column <b>a</b>
		Allowed <b>Head Efficiency</b> <b>1.00</b>

<b>Notes:</b>	<b>Sketch:</b>
<p>UW-11(a)(5)(b) is met for the left head</p> <p>UW-11(a)(5)(b) is met for the body</p> <p>UW-11(a)(5)(b) is met for the right head</p>	

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## Vessel Weld Efficiency ver 1.00

ASME VIII-1 Section UW

### ASME Sample L-1.5.5 for Main Body Project

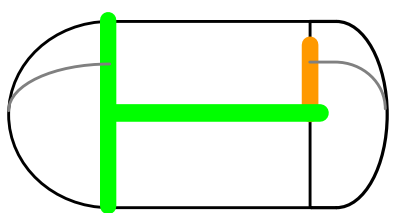
<b>Left Head: [Category A] - long seam weld in head, not head to shell weld</b>		
<b>Hemispherical</b>	Left head	UW12 Column for this weld <b>a</b>
<b>Seamless</b>	Left head <b>weld type</b>	UW12 Column for joining circ weld <b>a</b>
<b>Seamless</b>	Left head weld <b>radiography</b>	Weld Type Number <b>0</b>
		Isolated long seam efficiency <b>1.00</b>
		Allowed UW12 Column <b>a</b>
		Allowed <b>Head Efficiency</b> <b>1.00</b>

<b>Left Circ Weld: [Category A, B, C or D]</b>		
<b>Double</b>	Left head to body circ-weld <b>type</b>	UW12 Column for this weld <b>a</b>
<b>Full</b>	Left head to body circ-weld <b>radiography</b>	Circ seam type number <b>1</b>
		Left circ weld efficiency <b>1.00</b>

<b>Body Long Seam: [Category A]</b>		
<b>Double</b>	Body long <b>weld type</b>	UW12 column for the body long seam <b>a</b>
<b>Full</b>	Body long-weld <b>radiography</b>	UW12 column for left circ weld <b>a</b>
		UW12 column for right circ weld <b>b</b>
		Long seam type number <b>1</b>
		Isolated long seam efficiency <b>1.00</b>
		Allowed UW12 Column <b>a</b>
		Allowed <b>Long Seam Efficiency</b> <b>1.00</b>
		left circ efficiency <b>1</b>
		right circ efficiency <b>0.8</b>
		Allowed <b>Circ Efficiency</b> <b>0.80</b>

<b>Right Circ Weld: [Category A, B, C or D]</b>		
<b>Single_W_Backing</b>	Right head to body circ-weld <b>type</b>	UW12 Column <b>b</b>
<b>Spot</b>	Right head to body circ-weld <b>radiography</b>	Circ seam type number <b>2</b>
		Right circ weld efficiency <b>0.80</b>

<b>Right Head: [Category A] - long seam weld in head, not head to shell weld</b>		
<b>Semi-Elliptical</b>	Right head	UW12 Column for this weld <b>a</b>
<b>Seamless</b>	Right head <b>weld type</b>	UW12 Column for joining circ weld <b>b</b>
<b>Seamless</b>	Right head weld <b>radiography</b>	Weld Type Number <b>0</b>
		Isolated long seam efficiency <b>1.00</b>
		Allowed UW12 Column <b>a</b>
		Allowed <b>Head Efficiency</b> <b>1.00</b>

<b>Notes:</b>	<b>Sketch:</b>
<p>UW-11(a)(5)(b) is met for the left head                      UW-11(a)(5)(b) is met for the body                      UW-11(a)(5)(b) is met for the right head</p>	

**Comments:**  
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## Vessel Weld Efficiency ver 1.00

ASME VIII-1 Section UW

**ASME Sample L-1.5.5 for Sump** Project

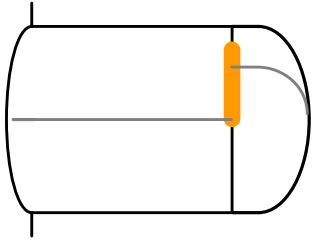
<b>Left Head: [Category A] - long seam weld in head, not head to shell weld</b>		
<b>Corner</b>	Left head	UW12 Column for this weld <b>a</b>
<b>Corner</b>	Left head <b>weld type</b>	UW12 Column for joining circ weld <b>a</b>
<b>None</b>	Left head weld <b>radiography</b>	Weld Type Number <b>7</b>
		Isolated long seam efficiency <b>1.00</b>
		Allowed UW12 Column <b>a</b>
		Allowed <b>Head Efficiency</b> <b>1.00</b>

<b>Left Circ Weld: [Category A, B, C or D]</b>		
<b>Corner</b>	Left head to body circ-weld <b>type</b>	UW12 Column for this weld <b>a</b>
<b>None</b>	Left head to body circ-weld <b>radiography</b>	Circ seam type number <b>7</b>
		Left circ weld efficiency <b>1.00</b>

<b>Body Long Seam: [Category A]</b>		
<b>Seamless</b>	Body long <b>weld type</b>	UW12 column for the body long seam <b>a</b>
<b>Seamless</b>	Body long-weld <b>radiography</b>	UW12 column for left circ weld <b>a</b>
		UW12 column for right circ weld <b>b</b>
		Long seam type number <b>0</b>
	left circ efficiency <b>1</b>	Isolated long seam efficiency <b>1.00</b>
	right circ efficiency <b>0.8</b>	Allowed UW12 Column <b>a</b>
	Allowed <b>Circ Efficiency</b> <b>0.80</b>	Allowed <b>Long Seam Efficiency</b> <b>1.00</b>

<b>Right Circ Weld: [Category A, B, C or D]</b>		
<b>Single_W_Backing</b>	Right head to body circ-weld <b>type</b>	UW12 Column <b>b</b>
<b>Spot</b>	Right head to body circ-weld <b>radiography</b>	Circ seam type number <b>2</b>
		Right circ weld efficiency <b>0.80</b>

<b>Right Head: [Category A] - long seam weld in head, not head to shell weld</b>		
<b>F&amp;D</b>	Right head	UW12 Column for this weld <b>a</b>
<b>Seamless</b>	Right head <b>weld type</b>	UW12 Column for joining circ weld <b>b</b>
<b>Seamless</b>	Right head weld <b>radiography</b>	Weld Type Number <b>0</b>
		Isolated long seam efficiency <b>1.00</b>
		Allowed UW12 Column <b>a</b>
		Allowed <b>Head Efficiency</b> <b>1.00</b>

<b>Notes:</b>	<b>Sketch:</b>
<p>UW-11(a)(5)(b) is met for the left head</p> <p>UW-11(a)(5)(b) is met for the body</p> <p>UW-11(a)(5)(b) is met for the right head</p>	

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**Vessel Weld Efficiency** ver 1.00

ASME VIII-1 Section UW

**ASME Sample L-1.5.6 for Main Body** Project

<b>Left Head: [Category A] - long seam weld in head, not head to shell weld</b>		
<b>Hemispherical</b>	Left head	UW12 Column for this weld <b>a</b>
<b>Seamless</b>	Left head <b>weld type</b>	UW12 Column for joining circ weld <b>b</b>
<b>Seamless</b>	Left head weld <b>radiography</b>	Weld Type Number <b>0</b>
		Isolated long seam efficiency <b>1.00</b>
		Allowed UW12 Column <b>b</b>
		Allowed <b>Head Efficiency</b> <b>0.85</b>

<b>Left Circ Weld: [Category A, B, C or D]</b>		
<b>Double</b>	Left head to body circ-weld <b>type</b>	UW12 Column for this weld <b>b</b>
<b>Spot</b>	Left head to body circ-weld <b>radiography</b>	Circ seam type number <b>1</b>
		Left circ weld efficiency <b>0.85</b>

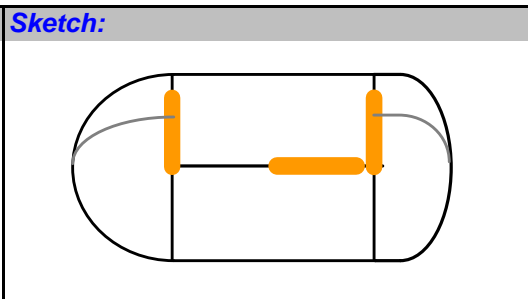
<b>Body Long Seam: [Category A]</b>		
<b>Double</b>	Body long <b>weld type</b>	UW12 column for the body long seam <b>b</b>
<b>Spot</b>	Body long-weld <b>radiography</b>	UW12 column for left circ weld <b>b</b>
		UW12 column for right circ weld <b>b</b>
		Long seam type number <b>1</b>
		Isolated long seam efficiency <b>0.85</b>
		Allowed UW12 Column <b>b</b>
		Allowed <b>Long Seam Efficiency</b> <b>0.85</b>

<b>Right Circ Weld: [Category A, B, C or D]</b>		
<b>Single_W_Backing</b>	Right head to body circ-weld <b>type</b>	UW12 Column <b>b</b>
<b>Spot</b>	Right head to body circ-weld <b>radiography</b>	Circ seam type number <b>2</b>
		Right circ weld efficiency <b>0.80</b>

<b>Right Head: [Category A] - long seam weld in head, not head to shell weld</b>		
<b>Semi-Elliptical</b>	Right head	UW12 Column for this weld <b>a</b>
<b>Seamless</b>	Right head <b>weld type</b>	UW12 Column for joining circ weld <b>b</b>
<b>Seamless</b>	Right head weld <b>radiography</b>	Weld Type Number <b>0</b>
		Isolated long seam efficiency <b>1.00</b>
		Allowed UW12 Column <b>a</b>
		Allowed <b>Head Efficiency</b> <b>1.00</b>

**Notes:**  
 Left head efficiency is reduced by left circ-weld efficiency

UW-11(a)(5)(b) is NOT met for the left head  
 UW-11(a)(5)(b) is NOT met for the body  
 UW-11(a)(5)(b) is met for the right head



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## Vessel Weld Efficiency ver 1.00

ASME VIII-1 Section UW

**ASME Sample L-1.5.6 for Sump** Project

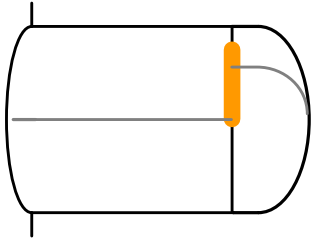
<b>Left Head: [Category A] - long seam weld in head, not head to shell weld</b>		
<b>Corner</b>	Left head	UW12 Column for this weld <b>a</b>
<b>Corner</b>	Left head <b>weld type</b>	UW12 Column for joining circ weld <b>a</b>
<b>None</b>	Left head weld <b>radiography</b>	Weld Type Number <b>7</b>
		Isolated long seam efficiency <b>1.00</b>
		Allowed UW12 Column <b>a</b>
		Allowed <b>Head Efficiency</b> <b>1.00</b>

<b>Left Circ Weld: [Category A, B, C or D]</b>		
<b>Corner</b>	Left head to body circ-weld <b>type</b>	UW12 Column for this weld <b>a</b>
<b>None</b>	Left head to body circ-weld <b>radiography</b>	Circ seam type number <b>7</b>
		Left circ weld efficiency <b>1.00</b>

<b>Body Long Seam: [Category A]</b>		
<b>Seamless</b>	Body long <b>weld type</b>	UW12 column for the body long seam <b>a</b>
<b>Seamless</b>	Body long-weld <b>radiography</b>	UW12 column for left circ weld <b>a</b>
		UW12 column for right circ weld <b>b</b>
		Long seam type number <b>0</b>
	left circ efficiency <b>1</b>	Isolated long seam efficiency <b>1.00</b>
	right circ efficiency <b>0.8</b>	Allowed UW12 Column <b>a</b>
	Allowed <b>Circ Efficiency</b> <b>0.80</b>	Allowed <b>Long Seam Efficiency</b> <b>1.00</b>

<b>Right Circ Weld: [Category A, B, C or D]</b>		
<b>Single_W_Backing</b>	Right head to body circ-weld <b>type</b>	UW12 Column <b>b</b>
<b>Spot</b>	Right head to body circ-weld <b>radiography</b>	Circ seam type number <b>2</b>
		Right circ weld efficiency <b>0.80</b>

<b>Right Head: [Category A] - long seam weld in head, not head to shell weld</b>		
<b>F&amp;D</b>	Right head	UW12 Column for this weld <b>a</b>
<b>Seamless</b>	Right head <b>weld type</b>	UW12 Column for joining circ weld <b>b</b>
<b>Seamless</b>	Right head weld <b>radiography</b>	Weld Type Number <b>0</b>
		Isolated long seam efficiency <b>1.00</b>
		Allowed UW12 Column <b>a</b>
		Allowed <b>Head Efficiency</b> <b>1.00</b>

<b>Notes:</b>	<b>Sketch:</b>
<p>UW-11(a)(5)(b) is met for the left head                  UW-11(a)(5)(b) is met for the body                  UW-11(a)(5)(b) is met for the right head</p>	

**Comments:**  
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**Vessel Weld Efficiency** ver 1.00

ASME VIII-1 Section UW

**ASME Sample L-1.6.1(a) Project**

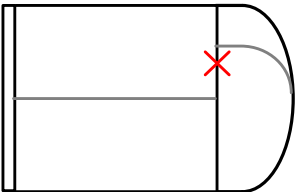
<b>Left Head: [Category A] - long seam weld in head, not head to shell weld</b>		
<b>Flat</b>	Left head	UW12 Column for this weld <b>a</b>
<b>Seamless</b>	Left head <b>weld type</b>	UW12 Column for joining circ weld <b>a</b>
<b>Seamless</b>	Left head weld <b>radiography</b>	Weld Type Number <b>0</b>
		Isolated long seam efficiency <b>1.00</b>
		Allowed UW12 Column <b>a</b>
		Allowed <b>Head Efficiency</b> <b>1.00</b>

<b>Left Circ Weld: [Category A, B, C or D]</b>		
<b>Corner</b>	Left head to body circ-weld <b>type</b>	UW12 Column for this weld <b>a</b>
<b>None</b>	Left head to body circ-weld <b>radiography</b>	Circ seam type number <b>7</b>
		Left circ weld efficiency <b>1.00</b>

<b>Body Long Seam: [Category A]</b>		
<b>Seamless</b>	Body long <b>weld type</b>	UW12 column for the body long seam <b>a</b>
<b>Seamless</b>	Body long-weld <b>radiography</b>	UW12 column for left circ weld <b>a</b>
		UW12 column for right circ weld <b>c</b>
		Long seam type number <b>0</b>
	left circ efficiency <b>1</b>	Isolated long seam efficiency <b>1.00</b>
	right circ efficiency <b>0.7</b>	Allowed UW12 Column <b>b</b>
	Allowed <b>Circ Efficiency</b> <b>0.70</b>	Allowed <b>Long Seam Efficiency</b> <b>0.85</b>

<b>Right Circ Weld: [Category A, B, C or D]</b>		
<b>Double</b>	Right head to body circ-weld <b>type</b>	UW12 Column <b>c</b>
<b>None</b>	Right head to body circ-weld <b>radiography</b>	Circ seam type number <b>1</b>
		Right circ weld efficiency <b>0.70</b>

<b>Right Head: [Category A] - long seam weld in head, not head to shell weld</b>		
<b>Semi-Elliptical</b>	Right head	UW12 Column for this weld <b>a</b>
<b>Seamless</b>	Right head <b>weld type</b>	UW12 Column for joining circ weld <b>c</b>
<b>Seamless</b>	Right head weld <b>radiography</b>	Weld Type Number <b>0</b>
		Isolated long seam efficiency <b>1.00</b>
		Allowed UW12 Column <b>b</b>
		Allowed <b>Head Efficiency</b> <b>0.85</b>

<b>Notes:</b>	<b>Sketch:</b>
<p><i>Body efficiency is reduced by head to body welds</i></p> <p><i>Right head efficiency is reduced by right head to body weld</i></p> <p><i>UW-11(a)(5)(b) is met for the left head</i></p> <p><i>UW-11(a)(5)(b) is NOT met for the body</i></p> <p><i>UW-11(a)(5)(b) is NOT met for the right head</i></p>	

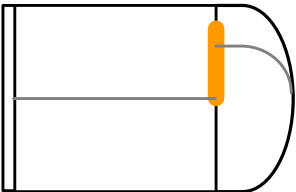
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## Vessel Weld Efficiency ver 1.00

ASME VIII-1 Section UW

**ASME Sample L-1.6.1(b)** Project

<b>Left Head: [Category A] - long seam weld in head, not head to shell weld</b>		
<b>Flat</b>	Left head	UW12 Column for this weld <b>a</b>
<b>Seamless</b>	Left head <b>weld type</b>	UW12 Column for joining circ weld <b>a</b>
<b>Seamless</b>	Left head weld <b>radiography</b>	Weld Type Number <b>0</b>
		Isolated long seam efficiency <b>1.00</b>
		Allowed UW12 Column <b>a</b>
		Allowed <b>Head Efficiency</b> <b>1.00</b>
<b>Left Circ Weld: [Category A, B, C or D]</b>		
<b>Corner</b>	Left head to body circ- <b>weld type</b>	UW12 Column for this weld <b>a</b>
<b>None</b>	Left head to body circ-weld <b>radiography</b>	Circ seam type number <b>7</b>
		Left circ weld efficiency <b>1.00</b>
<b>Body Long Seam: [Category A]</b>		
<b>Seamless</b>	Body long <b>weld type</b>	UW12 column for the body long seam <b>a</b>
<b>Seamless</b>	Body long-weld <b>radiography</b>	UW12 column for left circ weld <b>a</b>
		UW12 column for right circ weld <b>b</b>
		Long seam type number <b>0</b>
	left circ efficiency <b>1</b>	Isolated long seam efficiency <b>1.00</b>
	right circ efficiency <b>0.85</b>	Allowed UW12 Column <b>a</b>
	Allowed <b>Circ Efficiency</b> <b>0.85</b>	Allowed <b>Long Seam Efficiency</b> <b>1.00</b>
<b>Right Circ Weld: [Category A, B, C or D]</b>		
<b>Double</b>	Right head to body circ- <b>weld type</b>	UW12 Column <b>b</b>
<b>Spot</b>	Right head to body circ-weld <b>radiography</b>	Circ seam type number <b>1</b>
		Right circ weld efficiency <b>0.85</b>
<b>Right Head: [Category A] - long seam weld in head, not head to shell weld</b>		
<b>Semi-Elliptical</b>	Right head	UW12 Column for this weld <b>a</b>
<b>Seamless</b>	Right head <b>weld type</b>	UW12 Column for joining circ weld <b>b</b>
<b>Seamless</b>	Right head weld <b>radiography</b>	Weld Type Number <b>0</b>
		Isolated long seam efficiency <b>1.00</b>
		Allowed UW12 Column <b>a</b>
		Allowed <b>Head Efficiency</b> <b>1.00</b>

<b>Notes:</b>	<b>Sketch:</b>
<p>UW-11(a)(5)(b) is met for the left head UW-11(a)(5)(b) is met for the body UW-11(a)(5)(b) is met for the right head</p>	

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## Vessel Weld Efficiency ver 1.00

ASME VIII-1 Section UW

**ASME Sample L-1.6.2** Project


<b>Left Head: [Category A] - long seam weld in head, not head to shell weld</b>		
<b>Flat</b>	Left head	UW12 Column for this weld <b>a</b>
<b>Seamless</b>	Left head <b>weld type</b>	UW12 Column for joining circ weld <b>a</b>
<b>Seamless</b>	Left head weld radiography	Weld Type Number <b>0</b>
		Isolated long seam efficiency <b>1.00</b>
		Allowed UW12 Column <b>a</b>
		Allowed <b>Head Efficiency</b> <b>1.00</b>

<b>Left Circ Weld: [Category A, B, C or D]</b>		
<b>Corner</b>	Left head to body circ-weld <b>type</b>	UW12 Column for this weld <b>a</b>
<b>None</b>	Left head to body circ-weld radiography	Circ seam type number <b>7</b>
		Left circ weld efficiency <b>1.00</b>

<b>Body Long Seam: [Category A]</b>		
<b>Seamless</b>	Body long <b>weld type</b>	UW12 column for the body long seam <b>a</b>
<b>Seamless</b>	Body long-weld radiography	UW12 column for left circ weld <b>a</b>
		UW12 column for right circ weld <b>a</b>
		Long seam type number <b>0</b>
	left circ efficiency <b>1</b>	Isolated long seam efficiency <b>1.00</b>
	right circ efficiency <b>1</b>	Allowed UW12 Column <b>a</b>
	Allowed <b>Circ Efficiency</b> <b>1.00</b>	Allowed <b>Long Seam Efficiency</b> <b>1.00</b>

<b>Right Circ Weld: [Category A, B, C or D]</b>		
<b>Corner</b>	Right head to body circ-weld <b>type</b>	UW12 Column <b>a</b>
<b>None</b>	Right head to body circ-weld radiography	Circ seam type number <b>7</b>
		Right circ weld efficiency <b>1.00</b>

<b>Right Head: [Category A] - long seam weld in head, not head to shell weld</b>		
<b>Flat</b>	Right head	UW12 Column for this weld <b>a</b>
<b>Seamless</b>	Right head <b>weld type</b>	UW12 Column for joining circ weld <b>a</b>
<b>Seamless</b>	Right head weld radiography	Weld Type Number <b>0</b>
		Isolated long seam efficiency <b>1.00</b>
		Allowed UW12 Column <b>a</b>
		Allowed <b>Head Efficiency</b> <b>1.00</b>

<b>Notes:</b>	<b>Sketch:</b>
<p>UW-11(a)(5)(b) is met for the left head</p> <p>UW-11(a)(5)(b) is met for the body</p> <p>UW-11(a)(5)(b) is met for the right head</p>	

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## Vessel Weld Efficiency ver 1.00

ASME VIII-1 Section UW

**ASME Sample L-1.6.3** Project

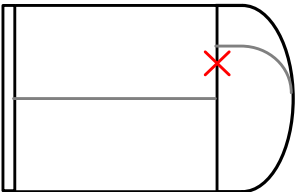
<b>Left Head: [Category A] - long seam weld in head, not head to shell weld</b>		
<b>Flat</b>	Left head	UW12 Column for this weld <b>a</b>
<b>Seamless</b>	Left head <b>weld type</b>	UW12 Column for joining circ weld <b>a</b>
<b>Seamless</b>	Left head weld radiography	Weld Type Number <b>0</b>
		Isolated long seam efficiency <b>1.00</b>
		Allowed UW12 Column <b>a</b>
		Allowed <b>Head Efficiency</b> <b>1.00</b>

<b>Left Circ Weld: [Category A, B, C or D]</b>		
<b>Corner</b>	Left head to body circ-weld <b>type</b>	UW12 Column for this weld <b>a</b>
<b>None</b>	Left head to body circ-weld radiography	Circ seam type number <b>7</b>
		Left circ weld efficiency <b>1.00</b>

<b>Body Long Seam: [Category A]</b>		
<b>Seamless</b>	Body long <b>weld type</b>	UW12 column for the body long seam <b>a</b>
<b>Seamless</b>	Body long-weld radiography	UW12 column for left circ weld <b>a</b>
		UW12 column for right circ weld <b>c</b>
		Long seam type number <b>0</b>
	left circ efficiency <b>1</b>	Isolated long seam efficiency <b>1.00</b>
	right circ efficiency <b>0.55</b>	Allowed UW12 Column <b>b</b>
	Allowed <b>Circ Efficiency</b> <b>0.55</b>	Allowed <b>Long Seam Efficiency</b> <b>0.85</b>

<b>Right Circ Weld: [Category A, B, C or D]</b>		
<b>Double Fillet</b>	Right head to body circ-weld <b>type</b>	UW12 Column <b>c</b>
<b>None</b>	Right head to body circ-weld radiography	Circ seam type number <b>4</b>
		Right circ weld efficiency <b>0.55</b>

<b>Right Head: [Category A] - long seam weld in head, not head to shell weld</b>		
<b>Semi-Elliptical</b>	Right head	UW12 Column for this weld <b>a</b>
<b>Seamless</b>	Right head <b>weld type</b>	UW12 Column for joining circ weld <b>c</b>
<b>Seamless</b>	Right head weld radiography	Weld Type Number <b>0</b>
		Isolated long seam efficiency <b>1.00</b>
		Allowed UW12 Column <b>b</b>
		Allowed <b>Head Efficiency</b> <b>0.85</b>

<b>Notes:</b>	<b>Sketch:</b>
<p><i>Body efficiency is reduced by head to body welds</i></p> <p><i>Right head efficiency is reduced by right head to body weld</i></p> <p><i>UW-11(a)(5)(b) is met for the left head</i></p> <p><i>UW-11(a)(5)(b) is NOT met for the body</i></p> <p><i>UW-11(a)(5)(b) is NOT met for the right head</i></p>	

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