Coded Note Number: **Y2430**
Revision: **C002**
Date: **October 20, 2017**
Title: **TI-AOR PIPE DETAILS/PIPE ASSEMBLIES**

This revision history is provided for convenience and does not alleviate the supplier's responsibility with understanding and complying with the full coded note.
Change from Revision C001 – Editorial change to reformat to current standard.
Bolded font indicates changed/added content.
[*Text deleted*] inserted in the document indicates the removal of content.

1. Material Procurement - Additional Ordering Requirements:

Pipe: ASTM-B861 GR 2 (MOD)

Chemical composition shall be as specified in ASTM B861 for Grade 2 with the following modifications:
(1) Maximum iron content not to exceed 0.20 percent.
(2) Maximum oxygen content not to exceed 0.20 percent.

Pipe shall be supplied in the annealed condition. The annealing heat treatment shall take place at 1200 - 1500 F in an inert atmosphere and/or vacuum. Cumulative annealing time shall not exceed 120 minutes. Piping shall be furnace cooled to below 800 F in an inert gas atmosphere and/or vacuum. Piping may be air cooled at temperatures below 800 F. Mechanical properties shall be as specified in ASTM B861 for Grade 2. The manufacturer shall supply a certification report as described in 21.1 of ASTM B861.

Pipe Fittings/Flanges: (D0600-450/ ASME B16.9) (B16.5A) - ASTM-B381; GR F-2 (MOD)

The modification to ASTM B381 is as follows:

a. Maximum Iron content not to exceed 0.20%.
b. Maximum Oxygen content not to exceed 0.20%.
c. Material shall be supplied in the annealed condition in accordance with MIL-H-81200.
d. ASTM B381 supplementary requirements S1.5, S1.7, S1.8, and S1.10 are invoked for these fittings. The manufacturer shall supply a certification report as described in 15.1 of ASTM B381.

The modification to ASTM B16.5A for pipe flanges is:

Forged material per ASTM-B381-99A GR-F2 UNS-R50400.

2 Miscellaneous Drawing Requirements:

1. Drawing Interpretation: Pipe detail drawing interpretation shall be in accordance with Construction note 5218, which reads as:

   PIPE DETAILS SHALL BE FABRICATED PER NEWPORT NEWS PROCEDURE M-123 "USER'S GUIDE FOR FABRICATION OF CVN-21 CLASS PIPE DETAILS".

2. Surface Defects: - Surface discontinuities that are 1/64-inch or less, are acceptable 'as-is'. Surface discontinuities on welds and their heat affected zones shall be dispositioned in accordance with the applicable welding standard for the pipe (Construction note 5226).

3. Dimensional Inspection: - End to End per Drawing.

4. Pipe Bending: – Pipe bending shall be qualified and performed in accordance with the following: (Construction note 5302).

   Pipe bending shall be performed in accordance with MIL-STD-1627C as modified below:

   1. Page 8, Table I: Add Group number S-51 entitled "Titanium and titanium alloy" along with ASTM-B861 and ASTM-B862 as Applicable documents. Specify GR2 in the "Form and Grade or Class" field. following:
   2. Page 12, Table II: Add the S-51 Group number entitled "Titanium and titanium alloy". The cold bending temperature is 600 degrees F maximum. Reference note 1 in the Hot bending column.
   3. Page 13, Paragraph 5.6: Delete and substitute the following:
      "5.6: Adjustments and corrections. Adjustments and corrections shall be in accordance with government approved shipbuilder procedures and Table II requirements."
   4. Page 13, Paragraph 5.6.1: Delete in its entirety.
   5. Page 13, Paragraph 5.6.2: Delete in its entirety.
   6. Page 13, Paragraph 5.6.3: Reverse bending of titanium is not permitted.
   7. Page 13, Paragraph 5.6.4: Delete in its entirety.
   8. Page 14, Table III: Add the S-51 Material group with the Bend radii specified as 5D and over, Bend temperature is Cold and no post bend heat treatment is required.
   9. Page 14, Paragraph 5.8.1: Delete in its entirety and substitute the following:

"5.8.1: Inspection Procedures: All production bends shall be visually inspected to the requirements of 5.9.1.

10. Page 15, Paragraph 5.9.2: Delete in its entirety.
11. Page 16, Paragraph 5.9.2.1: Delete in its entirety and substitute with the following:

"5.9.2.1 Out of Roundness: Bent pipe measure for out-of-roundness shall meet the following requirements:

Pipe bends shall not show out-of-roundness greater than eight percent.

12. Page 17, Paragraph 6.4: Delete in its entirety.