## Engineering Data Transmittal

**To:** (Receiving Organization)  
**From:** (Originating Organization)  
**Distribution:**  
**Proj./Prog./Dept./Div.:**  
**Design Authority/ Design Agent/Cog. Engr.:**  
**Originator Remarks:**  
**Originator Remarks:**  
**Receiver Remarks:**  
**Receiver Remarks:**  
**Design Baseline Document?** [X] Yes [ ] No  
**DATA TRANSMITTED**

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Document/Drawing No.</th>
<th>Title or Description of Data Transmitted</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>WHC-SD-WM-CN-078</td>
<td>Enraf Gauge Reference Level Calculations</td>
</tr>
</tbody>
</table>

**DATA TRANSMITTED**

<table>
<thead>
<tr>
<th>Approval Designator (F)</th>
<th>Reason for Transmittal (G)</th>
<th>Disposition (H) &amp; (I)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(see WHC-CM-3-5, Sec. 12.7)</td>
<td>2. Release 5. Post-Review</td>
<td>2. Approved w/comment 5. Reviewed w/comment</td>
</tr>
</tbody>
</table>

17. SIGNATURE/DISTRIBUTION  
(See Approval Designator for required signatures)

<table>
<thead>
<tr>
<th>(G) Reason</th>
<th>(H) Disp.</th>
<th>(J) Name</th>
<th>(K) Signature</th>
<th>(L) Date</th>
<th>(M) MSIN</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>I</td>
<td>Design Authority</td>
<td>[Signature]</td>
<td>74-03</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>I</td>
<td>Design Agent</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>I</td>
<td>Cog. Engr.</td>
<td>John Huber</td>
<td>10/1/96</td>
<td>74-07</td>
</tr>
<tr>
<td>1</td>
<td>I</td>
<td>Cog. Mgr.</td>
<td>J.J. Baden</td>
<td>10/1/96</td>
<td>74-07</td>
</tr>
<tr>
<td>1</td>
<td>I</td>
<td>QA</td>
<td>J.J. Baden</td>
<td>10/1/96</td>
<td>74-07</td>
</tr>
<tr>
<td>1</td>
<td>I</td>
<td>Safety</td>
<td>[Signature]</td>
<td>74-07</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>I</td>
<td>Env.</td>
<td>[Signature]</td>
<td>74-07</td>
<td></td>
</tr>
</tbody>
</table>

18. Signature of EDT Originator: [Signature]  
Date: 10/1/96  
19. Authorized Representative Date for Receiving Organization:  
20. Cognizant Manager:  
21. DOE APPROVAL (if required):  

Ctrl. No. 
[ ] Approved  
[ ] Approved w/comments  
[ ] Disapproved w/comments
ENRAF GAUGE REFERENCE LEVEL CALCULATIONS

John Huber
Lockheed Martin Hanford Company, Richland, WA 99352
U.S. Department of Energy Contract DE-AC06-96RL13200

EDT/ECN: EDT 609606  UC: 512 and 2030
Org Code: 77B60  Charge Code: N1G2J
B&R Code: EW3120071  Total Pages: 199

Key Words: Enraf, ATG, 854, Level Gauge, LIT, DIT, Level Indicating Transmitter, Densitometer, Calculation, Analysis

Abstract: This document describes the method for calculating reference levels for Enraf Series 854 Level Detectors as installed in the tank farms. The reference level calculation for each installed level gauge is contained herein.

TRADEMARK DISCLAIMER. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof or its contractors or subcontractors.

Printed in the United States of America. To obtain copies of this document, contact: Document Control Services, P.O. Box 950, Mailstop H6-08, Richland WA 99352, Phone (509) 372-2420; Fax (509) 376-4989.

Release Approval 2/6/97

Approved for Public Release

A-6400-073 (01/97) GEF321
ENRAF GAUGE REFERENCE LEVEL CALCULATIONS

October 1996

Prepared by: J. H. Huber, Senior Engineer
West Tank Farm Operations Engineering
Date: 10/14/96

Reviewed by: W. G. Brown, Senior Engineer
Design Authority Engineering
Date: 11/27/96

Approved by: J. J. Badden
West Tank Farm Operations Engineering
Date: 1/8/96

Lockheed Martin Hanford Company
P.O. Box 1970
Richland, Washington 99352
CHECKLIST FOR INDEPENDENT REVIEW

Document Reviewed: WHC-SD-WM-CN-078 Rev.0
Author: John Huber

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
<th>NA</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Problem completely defined.
Necessary assumptions explicitly stated and supported.
Computer codes and data files documented.
Data used in calculations explicitly stated in document.
Data checked for consistency with original source information as applicable.
Mathematical derivations checked including dimensional consistency of results.
Models appropriate and used within range of validity or use outside range of established validity justified.
Hand calculations checked for errors.
Code run streams correct and consistent with analysis documentation.
Acceptability limits on analytical results applicable and supported. Limits checked against sources.
Safety margins consistent with good engineering practices.
Conclusions consistent with analytical results and applicable limits.
Results and conclusions address all points required in the problem statement.

MANDATORY Software QA Log Number N/A

Reviewer: Warren O. Brown Date: 12/3/96
CONTENTS

1.0 INTRODUCTION ........................................ 1
2.0 PURPOSE AND SCOPE .................................... 1
3.0 OPEN ITEMS .......................................... 2
4.0 METHODS OF ANALYSIS .................................. 2
5.0 INPUT DATA ........................................... 4
6.0 RESULTS ............................................... 7
7.0 CONCLUSIONS .......................................... 7
8.0 RECOMMENDATIONS ...................................... 8
9.0 REFERENCES ............................................ 8
APPENDIX A ............................................... A-1
ENRAF GAUGE REFERENCE LEVEL CALCULATIONS

1.0 INTRODUCTION

Enraf Series 854 level gauges are certified by Factory Mutual (FM) for National Fire Protectional Association (NFPA 70) hazardous Class I, Division I, Groups B, C, and D Locations. Its level measuring principle is based on the detection of variations in the weight of a displacer suspended in the process fluid. The displacer is connected to a wire wound on a precision measuring drum. A level change causes a change in the weight of the displacer which will be detected by the force transducer. Electronics within the gauge cause a servo motor to adjust the position of the displacer and compute the tank level based on the new position of the displacer drum and reference level stored within the NOVRAM (Non-Volatile Random Access Memory) of the on-board computer. The gauge displays the level in decimal inches. Accurate computation of the product level is dependent on precise calculation of the tank reference level.

Listed from the tank riser upwards, the gauge installation consists of a full-port isolation ball valve, a flushing spool, a sight-glass (for viewing and accessing the displacer) and then the gauge. The tank reference level, as defined for the Enraf Series 854 gauge, is the distance from the absolute tank bottom to the top of the isolation ball valve.

2.0 PURPOSE AND SCOPE

2.1 PURPOSE

This document describes the calculation method of the tank reference level and serves as the formal record for each reference level calculation. It is required that all future reference level calculations be included in this document via Engineering Change Notice as described in WHC-IP-0842, Volume IV, Section 3.5.

This document will also provide verification of calculations that were previously not formally checked.

2.2 SCOPE

All Enrafs installed in the Tank Farms and related facilities shall have included the reference level calculation as described and required by this document.
3.0 OPEN ITEMS

None.

4.0 METHODS OF ANALYSIS

4.1 THE BASIC METHOD

As stated above, the basic method of calculating the reference level for any given method is to determine the distance from the absolute inside tank bottom to the top of the isolation ball valve. This is a simple addition and subtraction problem.

To perform this calculation, two basic parameters must be known: 1) The elevation of the bottom of the tank below the riser (or the centerline bottom of the tank for single-shell tanks which will be explained later); and 2) The elevation of the tank riser flange on which the Enraf is installed.

Often, the most difficult part of the calculation is locating the most appropriate and up to date documents and/or drawings that describe these parameters. Since the information available is different in many cases, the preferred method of obtaining the data will be described first, followed by alternate methods. Terminology related to these calculations maybe obtained from Figure 1 on the following page.
Figure 1

INNAGE = RL - D + IMMERSION DEPTH

TOP OF BALL IN BALL VALVE

D

ULLAGE

RL

INNAGE

DISPLACER

WASTE LEVEL

IMMERSION DEPTH
4.2 THE METHOD

4.2.1 Add the difference between the tank bottom and riser elevations to the length of the 4" ball valve (which is 9.0 inches standard). Then subtract the ball inset depth and add the immersion depth (if applicable). See section 5.0 INPUT DATA to determine where to obtain riser, bottom-of-tank elevation data, and how to calculate immersion depth.

The actual reference level calculations for each gauge can be found in Appendix A of this document.

5.0 INPUT DATA

5.1 INPUT DATA AND ASSUMPTIONS

This section describes or lists documents that contain the required input data (i.e. riser elevation, bottom elevation, etc.) Also discussed is the derivation of the immersion depth calculation.

5.2.1 DOUBLE SHELL TANKS

5.2.1.1 Operational Test Reports

In most cases where the document is available, the tank farm Operational Test Report (OTR) provides the most accurate data for determining tank-bottom to riser dimensions. The only exception known to date is 241-AN Tank Farm.

Known OTRs:


AN-Farm OTP-T-990-00042 Rev A-0, "Operability Test Procedure for 241-AN Tank Farm (AN-I)," dated May 16, 1980.


5.2.1.2 APPLICABLE DRAWINGS

Where the OTR is not available, or is incorrect (as it was determined for AN-Farm -- see section 5.2.1.2.1 of this document), the drawing for tank cross section shall be used to determine the bottom-of-tank elevation, and the latest revision of the Double Shell Underground Waste Storage Tanks Riser Survey (Anderson 1992) shall be used to determine the tank riser elevation. A list of Tank Cross Section drawings for the double shell tanks follows.
The OTP for AN-Farm, with regard to riser to tank-bottom dimensions, was found to be inadequate for reference level calculations. The OTP defines an acceptable dimension to be within 4 inches of the calculated dimension. Most of the field dimensions were close to 4-inch tolerance. This inaccuracy is not acceptable for calculating reference levels.

To determine the adequacy of the drawings elevations, field readings were obtained at the annulus leak detectors. These readings provide a riser to annulus tank bottom dimension. The primary tank bottom elevation can then be obtained by back-calculating using drawing dimensions for wall thicknesses and insulating concrete thickness. Results indicated that the drawing dimensions were acceptable for calculating reference levels.

5.2.1.3 BALL INSET DEPTH

To determine the location of the top of the ball in the ball valve, a field measurement must be taken before the ball valve is installed. However, this has already been done for two different types of ball valves, and it is assumed that this ball inset dimension does not change for ball valves of the same part number and manufacturer.

For a Worcester ball valve, 4", raised face, class 150, part number 4"8246UU150, the ball inset dimension is 1.21 inch.

For a Flow-Tek ball valve, 4", raised face, class 150, part number F15-WCB-SF-UHMW, ball inset dimension is 1.47 inch.
5.2.1.4 IMMERSION DEPTH

The product level calculated by the gauge is based on the bottom of the displacer. The gauge subtracts the amount of wire unreeled into the tank plus the displacer length, from the known tank reference level. However, the displacer is immersed to some degree into the waste. If this immersion depth were not accounted for in the reference level calculation, the gauge would always report a product level slightly less than actual. The equation for calculating immersion depth is derived as follows.

\[ F_b = \text{Bouyancy force (desired difference between displacer free weight and setpoint weight -- usually 15 grams).} \]

\[ H = \text{Immersion depth (cm)} \]

\[ \text{SpG} = \text{Specific Gravity} \]

\[ D = \text{Displacer Diameter, cm (it is assumed that the displacer does not immerse beyond the cylindrical portion of the displacer).} \]

\[ \pi = 3.1415 \]

\[ \rho = \text{Density (g/cm}^3) \]

Then,

\[ F_b = \text{volume displaced} \times \text{density of liquid displaced} \]

\[ F_b = \frac{\pi D^2}{4} \times H \times \rho \]

Solving for \( H \),

\[ H = \frac{4 F_b}{\pi D^2 \rho} \]

But numerically, \( \rho \) is equivalent to \( \text{SpG} \).

For example, the density of water is 1 gram/cm\(^3\), and the Specific Gravity is 1 as well. So,

\[ H = \frac{4 F_b}{\pi D^2 \text{SpG}} = \text{Displacer Immersion Depth, in cm, in any given liquid.} \]
It should be noted that in some cases with double-shell tanks, and in many cases with single-shell tanks, an immersion depth calculation will not be required where the waste surface is solid. The waste surface condition may be determined by reviewing historical or obtaining new in-tank videos/photos.

5.2.2 SINGLE-SHELL TANKS

5.2.2.1 The primary and most reliable source of information for determining riser and tank bottom elevations are the H-2- riser elevation drawings listed below.

<table>
<thead>
<tr>
<th>Farm</th>
<th>Drawing</th>
</tr>
</thead>
<tbody>
<tr>
<td>241-A</td>
<td>H-2-37850</td>
</tr>
<tr>
<td>241-AX</td>
<td>H-2-37854</td>
</tr>
<tr>
<td>241-B</td>
<td>H-2-1743</td>
</tr>
<tr>
<td>241-BX</td>
<td>H-2-37852</td>
</tr>
<tr>
<td>241-BY</td>
<td>H-2-1746</td>
</tr>
<tr>
<td>241-C</td>
<td>H-2-37912</td>
</tr>
<tr>
<td>241-CX</td>
<td>H-2-37912</td>
</tr>
<tr>
<td>241-CX</td>
<td>100 SERIES H-2-1744</td>
</tr>
<tr>
<td>241-CX</td>
<td>200 SERIES H-2-1744</td>
</tr>
<tr>
<td>241-CX</td>
<td>100 SERIES H-2-37912</td>
</tr>
<tr>
<td>241-CX</td>
<td>200 SERIES H-2-37912</td>
</tr>
<tr>
<td>241-CX</td>
<td>100 SERIES H-2-37909</td>
</tr>
<tr>
<td>241-CX</td>
<td>200 SERIES H-2-37909</td>
</tr>
<tr>
<td>241-CX</td>
<td>100 SERIES H-2-37910</td>
</tr>
<tr>
<td>241-CX</td>
<td>200 SERIES H-2-37910</td>
</tr>
<tr>
<td>241-CX</td>
<td>100 SERIES H-2-37910</td>
</tr>
<tr>
<td>241-CX</td>
<td>200 SERIES H-2-37910</td>
</tr>
<tr>
<td>241-U</td>
<td>H-2-37381 SH. 1</td>
</tr>
<tr>
<td>241-U</td>
<td>H-2-37381 SH. 2</td>
</tr>
<tr>
<td>241-U</td>
<td>H-2-37381 SH. 3</td>
</tr>
</tbody>
</table>

5.2.2.2 Assumptions 5.2.1.3 AND 5.2.1.4 apply to single-shell tank calculations as well as double-shells.

5.2.2.1 It should be noted that the Single-Shell Tank Riser Configuration Document (WHC-SD-WM-TI-053) has been found to contain errors with regard to both riser and tank bottom elevations. For this reason, that document is not used for Reference Level Calculations.

6.0 RESULTS

The results of these reference level calculations can be found in Appendix A of this document.

7.0 CONCLUSIONS

This document is considered to be a living document and shall be updated via ECN whenever a new reference level calculation is determined for new or existing Enraf gauges.
8.0 RECOMMENDATIONS

The reference levels found in this document should be considered the official record. In the event of discrepancy this record must take precedence over all other documents.

9.0 REFERENCES

WHC-IP-0842, Volume IV, Section 3.6, Revision 0a, "Engineering Calculations," dated August 30, 1996

APPENDIX A

ENRAF REFERENCE LEVEL CALCULATIONS
# DESIGN CALCULATION

**Drawing**: H-2-617534  
**Doc. No.**:  
**ECN**: 626494  
**Page 1 of 1**

**Building**: 241-A  
**Rev.**: 1  
**Job No.**:  
**Subject**: A-101 ENRAF REFERENCE LEVEL CALCULATION  
**Originator**: JOHN HUBER  
**Date**: 11/21/96  
**Checker**: Scott Netter  
**Date**: 11/6/96

---

**TANK NUMBER**: A-101  
**BOTTOM OF TANK TO RISER DIMENSION**

**DRAWING NUMBER**: (H-2-37850)  
**RISER NUMBER**: (6)  
**RISER ELEVATION** (Ft.): 690.4500  
**TANK INSIDE BOTTOM ELEVATION** (Ft.): 636.7300  
**TANK SIDE-BOTTOM ELEVATION** (Ft.): N/A  
**RISER TO TANK BOTTOM ELEVATION** (Ft.): 53.7200  
**TANK SIDE-BOTTOM ELEVATION** (In.): 644.6400

**DETERMINING REFERENCE LEVEL:**

1/16 GASKET @ 50% COMPRESSION (In.) + 0.0313 = (B)  
PVC FLANGE (OPTIONAL) (In.) + 1.0000 = (C)  
1/8 GASKET @ 50% COMPRESSION (In.) + 0.0625 = (D)  
BALL VALVE FLANGE TO FLANGE (In.) + 9.0000 = (E)  
SHORT SPOOL W/GASKETS - EXST (In.) + 4.0000 = (H) [FIELD MEASURED]  
BALL INSET DIM (FROM TOP) (In.) - 1.2100 = (F) [FIELD MEASURED FROM BALL VALVE FLANGE H-2-61754 - 20]  
IMMERSION DEPTH IN SOLIDS (In.) + 0 = (G)

**REFERENCE LEVEL** (In.): 657.5238

(A + B + C + D + E + H + F + G) = 667.5238

---

**A-2**
### DESIGN CALCULATION

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tank Number</td>
<td>A-103</td>
</tr>
<tr>
<td>Bottom of Tank to Riser Dimension</td>
<td></td>
</tr>
<tr>
<td>Drawing Number</td>
<td>(H-2-37850)</td>
</tr>
<tr>
<td>Riser Number</td>
<td>(6)</td>
</tr>
<tr>
<td>Riser Elevation (Ft.)</td>
<td>688.2500</td>
</tr>
<tr>
<td>Tank CL Bottom Elev. (Ft.)</td>
<td>634.7300</td>
</tr>
<tr>
<td>Riser to Tank Bottom Elev. (Ft.)</td>
<td>53.5200</td>
</tr>
<tr>
<td>Determining Reference Level</td>
<td></td>
</tr>
<tr>
<td>1/16 Gasket @ 50% Compression (In.)</td>
<td>+ 0.0313</td>
</tr>
<tr>
<td>PVC Flange (Optional) (In.)</td>
<td>+ 1.0000</td>
</tr>
<tr>
<td>1/8 Gasket @ 50% Compression (In.)</td>
<td>+ 0.0625</td>
</tr>
<tr>
<td>Ball Valve Flange to Flange (In.)</td>
<td>+ 9.0000</td>
</tr>
<tr>
<td>Short Spool W/Gaskets - Ext (In.)</td>
<td>+ 4.0000</td>
</tr>
<tr>
<td>Ball Inset Dim (From Top) (In.)</td>
<td>- 1.4700</td>
</tr>
<tr>
<td>Immersion Depth in Solids (In.)</td>
<td>+ 0.0000</td>
</tr>
<tr>
<td>Reference Level (In.)</td>
<td>654.8638</td>
</tr>
<tr>
<td>(A + B + C + D + E + H - F + G)</td>
<td>54.5720</td>
</tr>
</tbody>
</table>

FIELD MEASURED FROM BALL VALVE
PART NUMBER H-2-617634-48

A-4
TANK NUMBER: A-104

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER: (H-2-37850)
RISER NUMBER: (6)
RISER ELEVATION (Ft.): 689.2500
TANK CL BOTTOM ELEV. (Ft.): 635.7300
RISER TO TANK BOTTOM ELEV. (Ft.): 53.5200
RISER TO TANK BOTTOM ELEV. (In.): 642.24 (A)

DETERMINING REFERENCE LEVEL:

1/16 GASKET @ 50% COMPRESSION (In.) + 0.0313 (B)
PVC FLANGE (OPTIONAL) (In.) + 1.0000 (C)
1/8 GASKET @ 50% COMPRESSION (In.) + 0.0625 (D)
BALL VALVE FLANGE TO FLANGE (In.) + 9.0000 (E)
SHORT SPOOL W/GASKETS - EXT (In.) + 4.0000 (H)
BALL INSET DIM (FROM TOP) (In.) - 1.4700 (F)
IMMERSION DEPTH IN SOLIDS (In.) + 0.0000 (G)

REFERENCE LEVEL (In.): 654.8638
REFERENCE LEVEL (Ft.): 54.5720

(A + B + C + D + E + H - F + G)
THIS PAGE RESERVED FOR A-105
TANK NUMBER A-106

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER (H-2-37850)
RISER NUMBER (6)
RISER ELEVATION (Ft.) 687.1100
TANK CL BOTTOM ELEV. (Ft.) 633.7300

RISER TO TANK BOTTOM ELEV. (Ft.) 53.3800 (A)

DETERMINING REFERENCE LEVEL:

\[ \text{REFERENCE LEVEL (In.)} = (A + B + C + D + E + H - F + G) \]

1/16 GASKET @ 50% COMPRESSION (In.) + 0.0313 (B)
PVC FLANGE (OPTIONAL) (In.) + 1.0000 (C)
1/8 GASKET @ 50% COMPRESSION (In.) + 0.0625 (D)
BALL VALVE FLANGE TO FLANGE (In.) + 9.0000 (E)
SHORT SPOOL W/GASKETS - EXST (In.) + 4.0000 (H)
FIELD MEASURED FROM BALL VALVE
BALL INSET DIM (FROM TOP) (In.) - 1.4700 (F)
IMMERSION DEPTH IN SOLIDS (In.) + 0.0000 (G)

\[ \text{REFERENCE LEVEL (In.)} = 653.1838 \]
\[ \text{REFERENCE LEVEL (Ft.)} = 54.4320 \]
A-302-A CATCH TANK END REFERENCE LEVEL CALCULATION

Assumptions:
1. Riser flanges are exactly 12" above grade as shown on drawing (H-2-53096).
2. Tank was installed to elevations indicated on drawing.

**Determing Reference Level:**

1/16 GASKET @ 50% COMPRESSION (In) + 0.0313 (B)
6" TO 4" ADAPTER SPOOL (In) + 6.0000 (C)
1/16 GASKET @ 50% COMPRESSION (In) + 0.0313 (D)
BALL VALVE FLANGE TO FLANGE (In) + 9.0000 (E)
BALL INSET DIM (FROM TOP) (In) - 1.4700 (F)
IMMERSION DEPTH (In) + 0.2775 (G)
REFERENCE LEVEL (In) 342.6700 (A)
(A + B + C + D + E + F + G) 28.5558

**IMMERSION DEPTH CALCULATION**

GOVERNING EQUATION

\[ H = \frac{4Fb}{(Sg^2\pi^2D^4)} \]

\[ Fb = \text{BOUYANT FORCE} = \text{SET POINT} = 15,000 \text{ GRAMS} \]
\[ Sg = \text{SPECIFIC GRAVITY OF LIQUID} = 1.0500 \]
\[ D = \text{DISPLACER DIAMETER} = 2.0000 \text{ INCHES} \]

\[ H = \text{IMMERSION DEPTH (FROM EQUATION)} = 0.7048 \text{ CENTIMETERS} \]
\[ 0.2775 \text{ INCH} \]
TANK NUMBER  AN-101

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER  (H-2-71975)

RISER NUMBER  (2A)

RISER ELEVATION  (Ft.)  668.7500

TOP OF CONC. FOUNDATION  (Ft.)  612.3300

ANN. BOTTOM PL. THICKNESS  (Ft.)  0.0313

INSUL. CONC. THICKNESS  (Ft.)  0.6667

PRI. BOTTOM PL. THICKNESS  (Ft.)  0.0417

RISER TO TANK BOTTOM ELEVATION  (Ft.)  55.6803  (A)

668.1636  (A)

DETERMINING REFERENCE LEVEL:

1/16 GASKET @ 50% COMPRESSION (In.) + 0.0313  (B)

PVC FLANGE (OPTIONAL) (In.) + 1.0000  (C)

1/8 GASKET @ 50% COMPRESSION (In.) + 0.0625  (D)

BALL VALVE FLANGE TO FLANGE (In.) + 9.0000  (E)

BALL INSET DIM (FROM TOP) (In.) - 1.4700  (F)

IMMERSION DEPTH AT 1.05 Sp. G. (In.) + 0.2775  (G)

REFERENCE LEVEL (In.)  677.0648

(\(A + B + C + D + E - F + G\))  56.4221

GOVERNING EQUATION

\[ H = \left(4 \cdot Fb\right) / \left(Sg \cdot Ft \cdot D^2\right) \]

\[ Fb = BOUYANT \FORCE = \SET \POINT = 15.0000 \text{ \GRAMS} \]

\[ Sg = \SPECIFIC \GRAVITY \OF \LIQUID = 1.0500 \]

\[ D = \DISPLACER \DIAMETER = 2.0000 \text{ \INCHES} \]

\[ H = \IMMERSION \DEPTH \FROM \EQUATION = 0.7048 \text{ \CENTIMETERS} + 0.2775 \text{ \INCH} \]
**DESIGN CALCULATION**

**TANK NUMBER**: AN-102

**BOTTOM OF TANK TO RISER DIMENSION**

<table>
<thead>
<tr>
<th>Drawing Number</th>
<th>Doc. No.</th>
<th>ECN</th>
<th>Page</th>
<th>Job No.</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>H-2-71975</td>
<td></td>
<td></td>
<td></td>
<td>26-9C-1240</td>
<td></td>
</tr>
</tbody>
</table>

**RISER NUMBER**: (2A)

<table>
<thead>
<tr>
<th>Riser Number</th>
<th>Top of Conc. Elevation (Ft.)</th>
<th>Ann. Bottom PL. Thickness (Ft.)</th>
<th>Insul. Conc. Thickness (Ft.)</th>
<th>Pri. Bottom PL. Thickness (Ft.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(2A)</td>
<td>668.7500</td>
<td>0.0313</td>
<td>0.6667</td>
<td>0.0417</td>
</tr>
</tbody>
</table>

**DETERMINING REFERENCE LEVEL**

1/16 Gasket @ 50% Compression (In.) + 0.0313 (B)

PVC Flange (Optional) (In.) + 1.0000 (C)

1/8 Gasket @ 50% Compression (In.) + 0.0625 (D)

Ball Valve Flange to Flange (In.) + 9.0000 (E)

Ball Inset Dim. (From Top) (In.) - 1.4700 (F)

Immersion Depth at 1.05 Sp. G. (In.) + 0.2775 (G)

**REFERENCE LEVEL (In.)**: 677.0648

**GOVERNING EQUATION**

\[ H = \frac{4 \times F_b}{S_g \times P_l \times D^2} \]

15.0000 GRAMS

1.0500

2.0000 INCHES

**IMMERSION DEPTH (FROM EQUATION)**: 0.7048 CENTIMETERS

0.2775 INCH
TANK NUMBER

AN-103

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER (H-2-71975)

RISER NUMBER (2A)

RISER ELEVATION (Ft.) 668.7500

TOP OF CONC. FOUNDATION (Ft.) 612.3300

ANN. BOTTOM PL. THICKNESS (Ft.) 0.0313

INSUL. CONC. THICKNESS (Ft.) 0.6667

PRI. BOTTOM PL. THICKNESS (Ft.) 0.0417

RISER TO TANK BOTTOM ELEVATION (Ft.) 55.6803

RISER TO TANK BOTTOM ELEVATION (In.) 668.1636 (A)

DETERMINING REFERENCE LEVEL:

1/16 GASKET @ 50% COMPRESSION (In.) + 0.0313 (B)

PVC FLANGE (OPTIONAL) (In.) + 1.0000 (C)

1/8 GASKET @ 50% COMPRESSION (In.) + 0.0625 (D)

BALL VALVE FLANGE TO FLANGE (In.) + 9.0000 (E)

BALL INSET DIM (FROM TOP) (In.) - 1.2100 (F)

IMMERSION DEPTH IN SOLIDS (In.) + 0 (G)

REFERENCE LEVEL (In.) 677.0473

REFERENCE LEVEL (Ft.) 56.4206

(A + B + C + D + E - F + G)
### DESIGN CALCULATION

<table>
<thead>
<tr>
<th>TABLE</th>
<th>0.6667</th>
<th>0.0313</th>
<th>0.0417</th>
</tr>
</thead>
<tbody>
<tr>
<td>TT</td>
<td>701.64735</td>
<td></td>
<td></td>
</tr>
<tr>
<td>UR</td>
<td>701.64735</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MH</td>
<td>696.04735</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HH</td>
<td>689.04735</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HA</td>
<td>683.04735</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RL</td>
<td>677.04735</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AN</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AM</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TI</td>
<td>.AN104</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ML</td>
<td>6.0000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LA</td>
<td>12.0000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LL</td>
<td>1.0000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WT</td>
<td>EDE</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**DETERMINING REFERENCE LEVEL:**

1/16 GASKET @ 50% COMPRESSION (In.) + 0.0313 (B)  
PVC FLANGE (OPTIONAL) (In.) + 1.0000 (C)  
1/8 GASKET @ 50% COMPRESSION (In.) + 0.0625 (D)  
BALL VALVE FLANGE TO FLANGE (In.) + 9.0000 (E)  
BALL INSET DIM (FROM TOP) (In.) - 1.2100 (F)  
IMMERSION DEPTH IN SOLIDS (In.) + 0 (G)  

**REFERENCE LEVEL (In.)**  
677.0473 (A)  
56.4206 (Ft.)
### DESIGN CALCULATION

<table>
<thead>
<tr>
<th>TANK NUMBER</th>
<th>AN-105</th>
</tr>
</thead>
<tbody>
<tr>
<td>PARAMETERS</td>
<td></td>
</tr>
<tr>
<td>TT = 701.64735</td>
<td></td>
</tr>
<tr>
<td>UR = 701.64735</td>
<td></td>
</tr>
<tr>
<td>MH = 696.04735</td>
<td></td>
</tr>
<tr>
<td>HH = 689.04735</td>
<td></td>
</tr>
<tr>
<td>HA = 683.04735</td>
<td></td>
</tr>
<tr>
<td>RL = 677.04735</td>
<td></td>
</tr>
<tr>
<td>AN = N/A</td>
<td></td>
</tr>
<tr>
<td>AM = N/A</td>
<td></td>
</tr>
<tr>
<td>TI = .AN105</td>
<td></td>
</tr>
<tr>
<td>ML = 1.0000</td>
<td></td>
</tr>
<tr>
<td>LA = 12.0000</td>
<td></td>
</tr>
<tr>
<td>LL = 6.0000</td>
<td></td>
</tr>
<tr>
<td>WT = EDE</td>
<td></td>
</tr>
</tbody>
</table>

### BOTTOM OF TANK TO RISER DIMENSION

| DRAWING NUMBER | (H-2-71975) |
| RISER NUMBER | (2A) |
| RISER ELEVATION (Ft.) | 668.7500 |

**TOP OF CONC. FOUNDATION (Ft.)**

- 612.3300

**ANN. BOTTOM PL. THICKNESS (Ft.)**

- 0.0313

**INSUL. CONC. THICKNESS (Ft.)**

- 0.6667

**PRI. BOTTOM PL. THICKNESS (Ft.)**

- 0.0417

**RISER TO TANK BOTTOM ELEVATION (Ft.)**

| (In.) | 55.6803 |
| 668.1636 | (A) |

### DETERMINING REFERENCE LEVEL:

1/16 GASKET @ 50% COMPRESSION (In.) + 0.0313 (B)

PVC FLANGE (OPTIONAL) (In.) + 1.0000 (C)

1/8 GASKET @ 50% COMPRESSION (In.) + 0.0625 (D)

BALL VALVE FLANGE TO FLANGE (In.) + 9.0000 (E)

BALL INSET DIM (FROM TOP) (In.) - 1.2100 (F)

IMMERSION DEPTH IN SOLIDS (In.) + 0 (G)

**REFERENCE LEVEL (In.)**

| (Ft.) | 677.0473 |
| 56.4206 |

(A + B + C + D + E = F + G)
TANK NUMBER AN-106

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER (H-2-71975)

RISER NUMBER (2A)

RISER ELEVATION (Ft.) 668.7500

TOP OF CONC. FOUNDATION (Ft.) 612.3300

ANN. BOTTOM PL. THICKNESS (Ft.) 0.0313

INSUL. CONC. THICKNESS (Ft.) 0.6667

PRI. BOTTOM PL. THICKNESS (Ft.) 0.0417

RISER TO TANK BOTTOM ELEVATION (Ft.) 55.6883

(2A) 668.1636

DETERMINING REFERENCE LEVEL:

1/16 GASKET @ 50% COMPRESSION (In.) + 0.0313 (B)

PVC FLANGE (OPTIONAL) (In.) + 1.0000 (C)

1/8 GASKET @ 50% COMPRESSION (In.) + 0.0625 (D)

BALL VALVE FLANGE TO FLANGE (In.) + 9.0000 (E)

BALL INSET DIM (FROM TOP) (In.) - 1.4700 (F)

IMMERSION DEPTH AT 1.05 Sp. G. (In.) + 0.2775 (G)

REFERENCE LEVEL (In.) 677.0648

(A + B + C + D + E - F + G)

56.4221

GOVERNING EQUATION

H = (4*Fb) / (Sg*Pi*D**2)

Fb = BOUYANT FORCE = SET POINT - 15.0000 GRAMS

Sg = SPECIFIC GRAVITY OF LIQUID - 1.0500

D = DISPLACER DIAMETER = 2.0000 INCHES

H = IMMERSION DEPTH (FROM EQUATION) = 0.7048 CENTIMETERS

0.2775 INCH
TANK NUMBER AN-107

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER (H-2-71160) (A)
RISER NUMBER (2A) (B)
RISER ELEVATION (Ft.) 668.7500 (C)
TOP OF CONC. FOUNDATION (Ft.) 612.0000 (D)
ANN. BOTTOM PL. THICKNESS (Ft.) 0.0313 (E)
INSUL. CONC. THICKNESS (Ft.) 0.6667 (F)
PRI. BOTTOM PL. THICKNESS (Ft.) 0.0417 (G)

RISER TO TANK BOTTOM ELEVATION (Ft.) 56.0103
RISER TO TANK BOTTOM ELEVATION (In.) 672.1236

DETERMINING REFERENCE LEVEL:

1/16 GASKET @ 50% COMPRESSION (In.) + 0.0313 (A)
PVC FLANGE (OPTIONAL) (In.) + 1.0000 (B)
1/8 GASKET @ 50% COMPRESSION (In.) + 0.0625 (C)
BALL VALVE FLANGE TO FLANGE (In.) + 9.0000 (D)
BALL INSET DIM (FROM TOP) (In.) - 1.4700 (E)
IMMERSION DEPTH AT 1.05 Sp. G. (In.) + 0.2775 (F)
REFERENCE LEVEL (In.) 681.0249
REFERENCE LEVEL (Ft.) 56.7521

GOVERNING EQUATION
H = (Fb) / (Sg * Fd * D^2)
Fb = BOUYANT FORCE = SET POINT = 15.0000 GRAMS
Sg = SPECIFIC GRAVITY OF LIQUID = 1.0500
D = DISPLACER DIAMETER = 2.0000 INCHES
H = IMMERSION DEPTH (FROM EQUATION) = 0.7048 CENTIMETERS
H = IMMERSION DEPTH (FROM EQUATION) = 0.2775 INCH
THIS PAGE RESERVED FOR AP-101
THIS PAGE RESERVED FOR AP-102
THIS PAGE RESERVED FOR AP-103
THIS PAGE RESERVED FOR AP-104
THIS PAGE RESERVED FOR AP-106
THIS PAGE RESERVED FOR AP-107
THIS PAGE RESERVED FOR AP-108
ENRAF REFERENCE LEVEL CALCULATIONS

TANK NUMBER AW-101

BOTTOM OF TANK TO RISER DIMENSION

<table>
<thead>
<tr>
<th>DRAWING NUMBER</th>
<th>RISER NUMBER</th>
<th>RISER ELEVATION (Ft.)</th>
<th>TANK INSIDE BOTTOM ELEVATION (Ft.)</th>
<th>TANK SIDE-BOTTOM ELEVATION (Ft.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(H-2-70420)</td>
<td>(2A)</td>
<td>687.7500</td>
<td>632.2083</td>
<td>N/A</td>
</tr>
</tbody>
</table>

RISER TO TANK BOTTOM ELEVATION (Ft.: in.) 55.5417 (666.5004)

DETERMINING REFERENCE LEVEL:

1/16 GASKET @ 50% COMPRESSION (In.) + 0.0313 (B)
PVC FLANGE (OPTIONAL) (In.) + 1.0000 (C)
1/8 GASKET @ 50% COMPRESSION (In.) + 0.0625 (D)
BALL VALVE FLANGE TO FLANGE (In.) + 9.0000 (E)
BALL INSET DIM (FROM TOP) (In.) - 1.2100 (F)
IMMERSION DEPTH IN SOLIDS (In.) + 0 (G)

REFERENCE LEVEL (In.): 675.3842
                        (Ft.): 56.2820

(A + B + C + D + E - F + G)
TANK NUMBER: AW-102

BOTTOM OF TANK TO RISER

DRAWING NUMBER: H-2-70420
RISER NUMBER: 116C
MEASURED DEPTH FROM OTP: 54.125

RISER TO TANK BOTTOM DIMENSION (IN.): 54.1250

DETERMINING REFERENCE LEVEL:

1/16 GASKET @ 50% COMPRESSION + 0.0313 (B)
PVC FLANGE (OPTIONAL) (IN.) + 0.0000 (C)
EXTENSION SPOOL PIECE (IN.) + 16.0000 (H) H-2-817634 ASSY 63
1/16 GASKET @ 50% COMPRESSION + 0.0313 (D)
BALL VALVE FLANGE TO FLANGE + 9.0000 (E) FIELD MEASURED
BALL INSET DIM (FROM TOP) (IN.) - 1.4700 (F) FIELD MEASURED
IMMERSION DEPTH AT 1.05 Sp. G. + 0.2775 (G)

REFERENCE LEVEL (IN.): 673.3700

(A + B + C + H + D + E - F + G)

IMMERSION DEPTH CALCULATION

GOVERNING EQUATION

\[ H = \frac{4 \times Fb}{(Sg \times Pi \times D^2) + 2} \]

\[ Fb = \text{BOUYANT FORCE} = \text{SET POINT} = 15.0000 \text{ GRAMS} \]

\[ Sg = \text{SPECIFIC GRAVITY OF LIQUID} = 1.0500 \]

\[ D = \text{DISPLACER DIAMETER} = 2.0000 \text{ INCHES} \]

IMMERSION DEPTH (FROM EQUATION) = 0.7048 CENTIMETERS

0.2775 INCH
TANK NUMBER AW-103

BOTTOM OF TANK TO RISER

DRAWING NUMBER (H-2-70420)

RISER NUMBER (2A)

MEASURED DEPTH FROM OTP 55.578

RISER TO TANK BOTTOM ELEVATION (In.) 55.5780

DETERMINING REFERENCE LEVEL:

1/16 GASKET @ 50% COMPRESSION + 0.0313  (B)
PVC FLANGE (OPTIONAL) (In.) + 1.0000  (C)
1/8 GASKET @ 50% COMPRESSION + 0.0625  (D)
BALL VALVE FLANGE TO FLANGE + 9.0000  (E) FIELD MEASURED
BALL INSET DIM (FROM TOP) (In.) - 1.4700  (F) FIELD MEASURED

IMMERSION DEPTH AT 1.05 Sp. G. + 0.2775  (G)

REFERENCE LEVEL (In.) 675.8372
(A + B + C + D + E + F + G) 56.3198

*IMMERSION DEPTH CALCULATION

GOVERNING EQUATION

\[ H = \left(\frac{4 \times F_b}{S_g \times P_i \times D^2}\right) \]

\( F_b = \text{BOUYANT FORCE} = \text{SET POINT} = 15.0000 \text{ GRAMS} \)

\( S_g = \text{SPECIFIC GRAVITY OF LIQUID} = 1.0500 \)

\( D = \text{DISPLACER DIAMETER} = 2.0000 \text{ INCHES} \)

IMMERSION DEPTH (FROM EQUATION) = 0.7048 \text{ CENTIMETERS} 0.2775 \text{ INCH}
DESIGN CALCULATION

TANK NUMBER

AW-104

BOTTOM OF TANK TO RISER

DRAWING NUMBER (H-2-70420)

RIUSER NUMBER (2A)

MEASURED DEPTH FROM OTP 55.5885

RISER TO TANK BOTTOM ELEVATION 55.5885 (In.) 667.062 (A)

DETERMINING REFERENCE LEVEL:

1/16 GASKET & 50% COMPRESSION + 0.0313 (B)

PVC FLANGE (OPTIONAL) (In.) + 1.0000 (C)

1/8 GASKET @ 50% COMPRESSION + 0.0625 (D)

BALL VALVE FLANGE TO FLANGE + 9.0000 (E) FIELD MEASURED

BALL INSET DIM (FROM TOP) (In.) - 1.4700 (F) FIELD MEASURED

IMMERSION DEPTH AT 1.05 Sp. G. + 0.2775 (G)

REFERENCE LEVEL (In.) 675.9632

(A + B + C + D + E + F + G)

56.3303

*IMMERSION DEPTH CALCULATION

GOVERNING EQUATION

\[ H = \frac{(4*Fb)}{(Sg*Pi*D**2)} \]

\[ Fb = BOUYANT FORCE = SET POINT = 15.0000 \text{ GRAMS} \]

\[ Sg = SPECIFIC GRAVITY OF LIQUID = 1.0500 \]

\[ D = DISPLACER DIAMETER = 2.0000 \text{ INCHES} \]

IMMERSION DEPTH (FROM EQUATION) = 0.7048 CENTIMETERS

0.2775 INCH
TANK NUMBER       AW-105

BOTTOM OF TANK TO RISER

DRAWING NUMBER  (H-2-70420)  RISER NUMBER (2A)

MEASURED DEPTH FROM OTP     55.505     OTP-T-990-00034

RISER TO TANK BOTTOM ELEVATION  666.06

DETERMINING REFERENCE LEVEL:

1/16 GASKET @ 50% COMPRESSION + 0.0313 (B)
PVC FLANGE (OPTIONAL) (In.) + 1.0000 (C)
1/8 GASKET @ 50% COMPRESSION + 0.0625 (D)
BALL VALVE FLANGE TO FLANGE + 9.0000 (E) FIELD MEASURED
BALL INSET DIM (FROM TOP) (In.) - 1.4700 (F) FIELD MEASURED
IMMERSION DEPTH AT 1.05 Sp. G. + 0.2775 (G)

REFERENCE LEVEL (In.)  674.9612
(FT.)  56.2468

*IMMERSION DEPTH CALCULATION

GOVERNING EQUATION

H = (4*FB)/(Sg*Pi*D**2)

FB = BOUYANT FORCE = SET POINT = 15.0000 GRAMS
Sg = SPECIFIC GRAVITY OF LIQUID = 1.0500
D = DISPLACER DIAMETER = 2.0000 INCHES

IMMERSION DEPTH (FROM EQUATION) = 0.7048 CENTIMETERS
                                          0.2775 INCH
TANK NUMBER  
AW-106

BOTTOM OF TANK TO RISER

DRAWING NUMBER  (H-2-70420)

RISER NUMBER  (2A)

MEASURED DEPTH FROM OTP  55.5104

RISER TO TANK BOTTOM ELEVATION  55.5104 (In.)  666.1248

DETERMINING REFERENCE LEVEL:

1/16 GASKET @ 50% COMPRESSION + 0.0313 (B)
PVC FLANGE (OPTIONAL) (In.) + 1.0000 (C)
1/8 GASKET @ 50% COMPRESSION + 0.0625 (D)
BALL VALVE FLANGE TO FLANGE + 9.0000 (E) FIELD MEASURED
BALL INSET DIM (FROM TOP) (In.) - 1.4700 (F) FIELD MEASURED

IMMERSION DEPTH AT 1.05 Sp. G. + 0.2775 (G)

REFERENCE LEVEL (In.)  675.0260

IMMERSION DEPTH AT 1.05 Sp. G. (In.)  56.2522

*IMMERSION DEPTH CALCULATION

GOVERNING EQUATION

\[ H = \frac{4Fb}{(Sg \times P1 \times D^2)} \]

\[ Fb = BOUYANT \ FORCE = \ SET \ POINT = 15.0000 \ GRAMS \]

\[ Sg = SPECIFIC \ GRAVITY \ OF \ LIQUID = 1.0500 \]

\[ D = \ DISPLACER \ DIAMETER = 2.0000 \ INCHES \]

IMMERSION DEPTH (FROM EQUATION) = 0.7048 CENTIMETERS

0.2775 INCH
DESIGN CALCULATION

TANK NUMBER AX-101

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER (H-2-37854)

RISER NUMBER (8C)

RISER ELEVATION (Ft.) 681.6600

TANK INSIDE BOTTOM ELEVATION (Ft.) - 628.4200

TANK SIDE-BOTTOM ELEVATION (Ft.) - N/A

RISE TO TANK BOTTOM ELEVATION (Ft.) 53.2400

RISE TO TANK BOTTOM ELEVATION (In.) 638.88

DETERMINING REFERENCE LEVEL:

1/16 GASKET @ 50% COMPRESSION (In.) + 0.0313

PVC FLANGE (OPTIONAL) (In.) + 1.0000

1/8 GASKET @ 50% COMPRESSION (In.) + 0.0625

BALL VALVE FLANGE TO FLANGE (In.) + 9.0000

BALL INSET DIM (FROM TOP) (In.) - 1.2100

IMMERSSION DEPTH IN SOLIDS (In.) + 0

6" TO 4" ADAPTER SPOOL (In.) + 4.2500

1/8 GASKET @ 50% COMPRESSION (In.) + 0.0625

REFERENCE LEVEL (In.) 652.0763

REFERENCE LEVEL (Ft.) 54.3397

PARAMETERS

TT = 652.07625
UR = 652.07625
MH = 676.66675
HH = 671.07625
HA = 664.07625
RL = 652.07625
AN = N/A
AM = N/A
TI = AX101
ML = 6.0000
LA = 12.0000
LL = 1.0000
WT = EDE

A-30
THIS PAGE RESERVED FOR AX-102
**DETERMINING REFERENCE LEVEL:**

1/16 Gasket @ 50% Compression (In.) + 0.0313 (B)

PVC Flange (Optional) (In.) + 1.0000 (C)

1/8 Gasket @ 50% Compression (In.) + 0.0625 (D)

Ball Valve Flange to Flange (In.) + 9.0000 (E)

Ball Inset Dim (From Top) (In.) - 1.2100 (F)

Immersion Depth in Solids (In.) + 0 (G)

6" to 4" Adapter Spool (In.) + 4.2500 (H) *(field dimension)*

1/8 Gasket @ 50% Compression (In.) + 0.0625 (I)

---

**PARAMETERS**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>TT</td>
<td>651.83625</td>
</tr>
<tr>
<td>UR</td>
<td>651.83625</td>
</tr>
<tr>
<td>MH</td>
<td>676.43625</td>
</tr>
<tr>
<td>HH</td>
<td>670.83625</td>
</tr>
<tr>
<td>HA</td>
<td>663.83625</td>
</tr>
<tr>
<td>RL</td>
<td>651.83625</td>
</tr>
<tr>
<td>AN</td>
<td>N/A</td>
</tr>
<tr>
<td>AM</td>
<td>N/A</td>
</tr>
<tr>
<td>TI</td>
<td>AX103</td>
</tr>
<tr>
<td>ML</td>
<td>1.0000</td>
</tr>
<tr>
<td>LA</td>
<td>12.0000</td>
</tr>
<tr>
<td>LL</td>
<td>6.0000</td>
</tr>
<tr>
<td>WT</td>
<td>EDE</td>
</tr>
</tbody>
</table>

**REFERENCE LEVEL (In.)**

<table>
<thead>
<tr>
<th>(A + B + C + D + E - F + G + H + I)</th>
</tr>
</thead>
<tbody>
<tr>
<td>651.8363</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>(A + B + C + D + E - F + G + H + I)</th>
</tr>
</thead>
<tbody>
<tr>
<td>54.3197</td>
</tr>
</tbody>
</table>
### DESIGN CALCULATION

**Drawing**  H-2-317634  
**Doc. No.**  ECN  631302  
**Page** 1 of 1  
**Building**  241-AX  
**Rev.**  1  
**Job No.**  6E-91-614  
**Subject**  AX-104 ENRAF REFERENCE LEVEL CALCULATION  
**Originator**  JOHN HUBER  
**Date**  9/6/96  
**Checker**  L. Brown  
**Date**  9-9-96

**TANK NUMBER**  AX-104  

**BOTTOM OF TANK TO RISER DIMENSION**  
<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drawing Number</td>
<td>H-2-317634</td>
</tr>
<tr>
<td>Riser Number</td>
<td>9B</td>
</tr>
<tr>
<td>Riser Elevation (Ft.)</td>
<td>682.6100</td>
</tr>
<tr>
<td>Tank Inside Bottom Elevation (Ft.)</td>
<td>628.4200</td>
</tr>
<tr>
<td>Tank Side-Bottom Elevation (Ft.)</td>
<td>N/A</td>
</tr>
</tbody>
</table>

**Riser to Tank Bottom Elevation** (Ft.): 54.1900  

**Determining Reference Level:**  

- 1/16 Gasket @ 50% Compression (In.) + 0.0313 (B)  
- PVC Flange (Optional) (In.) + 1.0000 (C)  
- 1/8 Gasket @ 50% Compression (In.) + 0.0625 (D)  
- Ball Valve Flange to Flange (In.) + 9.0000 (E)  
- Ball Inset Dim (From Top) (In.) - 1.4700 (F)  
- Immersion Depth in Solids (In.) + 0 (G)  
- 6" to 4" Adapter Spool (In.) + 4.2500 (H)  
- 1/8 Gasket @ 50% Compression (In.) + 0.0625 (I)  

**Reference Level (In.):** 663.2163  

\[ \text{Reference Level (Ft.)} = \frac{663.2163 - 55.2680}{12} = 49.9860 \]
**TANK NUMBER**  AY-101

**BOTTOM OF TANK TO RISER DIMENSION**

<table>
<thead>
<tr>
<th>DRAWING NUMBER</th>
<th>H-2-37911</th>
</tr>
</thead>
<tbody>
<tr>
<td>RISER NUMBER</td>
<td>(22A)</td>
</tr>
<tr>
<td>RISER ELEVATION (Ft.)</td>
<td>680.5000</td>
</tr>
<tr>
<td>TANK BOTTOM ELEVATION (Ft.)</td>
<td>623.2300</td>
</tr>
</tbody>
</table>

**DETERMINING REFERENCE LEVEL:**

- 1/16 GASKET @ 50% COMPRESSION + 0.0313  (B)
- PVC FLANGE (OPTIONAL) (In.) + 0.0000  (C)
- 1/8 GASKET @ 50% COMPRESSION + 0.0000  (D)
- BALL VALVE FLANGE TO FLANGE (In.) + 9.0000  (E)
- BALL INSET DIM (FROM TOP) (In.) - 1.4700  (F)
- IMMERSION DEPTH (In.) + 0.2654  (G)

**REFERENCE LEVEL (In.)**  695.0666

**IMMERSION DEPTH (From Eqn.)**  57.9222

**IMMERSION DEPTH CALCULATION**

**GOVERNING EQUATION**

\[
H = \frac{(4*F_b)}{(S_g*P_l*D^2)}
\]

- **Fb = BOUyANT FORCE = SET POINT** = 15.0000 GRAMS
- **Sg = SPECIFIC GRAVITY OF LIQUID** = 1.0980
- **D = DISPLACER DIAMETER** = 2.0000 INCHES

**H = IMMERSION DEPTH** = 0.6740 CENTIMETERS 0.2654 INCH
TANK NUMBER
AY-102

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER
H-2-37911

RISER NUMBER
(22A)

RISER ELEVATION (Ft.)
680.6300

TANK BOTTOM ELEVATION (Ft.)
-623.2300

RISER TO TANK BOTTOM ELEVATION (IN.)
57.4000

DETERMINING REFERENCE LEVEL:

1/16 GASKET @ 50% COMPRESSION +
0.0313 (B)

PVC FLANGE (OPTIONAL) (IN.) +
0.0000 (C)

1/8 GASKET @ 50% COMPRESSION +
0.0000 (D)

BALL VALVE FLANGE TO FLANGE (IN.) +
9.0000 (E)

BALL INSET DIM (FROM TOP) (IN.) -
1.4700 (F)

IMMERSION DEPTH (IN.) +
0.2802 (G)

REFERENCE LEVEL (IN.)
696.6414

(A + B + C + D + E - F + G)

IMMERSION DEPTH (FROM EQTN) = 58.0535

*IMMERSION DEPTH CALCULATION

GOVERNING EQUATION
H = (4*Fb)/(Sg*Pi*D**2)

Fb = BOUYANT FORCE = SET POINT = 15.0000 GRAMS

Sg = SPECIFIC GRAVITY OF LIQUID = 1.0400

D = DISPLACER DIAMETER = 2.0000 INCHES

H = IMMERSION DEPTH (FROM EQTN) = 0.7116 CENTIMETERS

0.2802 INCH
### DESIGN CALCULATION

**Drawing** H-2-824485  
**Doc. No.** ECN 629527  
**Page** 1 of 1

**Subject** AY-102 REFERENCE LEVEL CALCULATION (DENSITOMETER)  
**Originator** JOHN HUBER  
**Date** 3-7-96

**Checker**  
**Date** 4-22-96

---

**TANK NUMBER** AY-102

**BOTTOM OF TANK TO RISER DIMENSION**

<table>
<thead>
<tr>
<th>DRAWING NUMBER</th>
<th>(H-2-37911)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RISER NUMBER</td>
<td>(15S)</td>
</tr>
<tr>
<td>RISER ELEVATION (Ft.)</td>
<td>680.1100</td>
</tr>
<tr>
<td>INSIDE BOTTOM OF TANK ELEVATION (Ft.)</td>
<td>623.2300</td>
</tr>
</tbody>
</table>

**RISER TO TANK BOTTOM ELEVATION** (Ft.) 56.8800

**INSIDE BOTTOM OF TANK ELEVATION** (In.) 682.56 (A)

**DETERMINING REFERENCE LEVEL**:

- 1/16 GASKET @ 50% COMPRESSION (In.) + 0.0313 (B)
- ADDAPTER SPOOL, ASSY -030 (In.) + 6.0000 (C)
- 1/16 GASKET @ 50% COMPRESSION (In.) + 0.0313 (D)
- BALL VALVE FLANGE TO FLANGE (In.) + 9.0000 (E)
- BALL INSET DIM (FROM TOP) (In.) - 1.4700 (F)

**REFERENCE LEVEL** (In.) 696.1526

**REFERENCE LEVEL** (Ft.) 58.0127

FLOW-TEK BALL VALVE, H-2-824485, ITEM 28, FIELD MEASURED
ENRAF REFERENCE LEVEL CALCULATIONS

TANK NUMBER AZ-101

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER (H-2-95497)
RISER NUMBER (22A)
RISER ELEVATION (Ft.) 673.2691
TANK INSIDE BOTTOM ELEVATION (Ft.) - 616.5417
TANK SIDE-BOTTOM ELEVATION (Ft.) - N/A

RISER TO TANK BOTTOM ELEVATION (Ft.) 56.7274

DETERMINING REFERENCE LEVEL:

1/16 GASKET @ 50% COMPRESSION (In.) + 0.0313 (B)
PVC FLANGE (OPTIONAL) (In.) + N/A (C)
1/8 GASKET @ 50% COMPRESSION (In.) + N/A (D)
BALL VALVE FLANGE TO FLANGE (In.) + 9.0000 (E)
BALL INSET DIM (FROM TOP) (In.) - 1.2100 (F)

IMMERSION DEPTH AT 1.05 Sp. G. (In.) + 0.2774923 (G)

REFERENCE LEVEL (In.) 688.8275
(\(A + B + C + D + E - F + G\)) (Ft.) 57.4023

*IMMERSION DEPTH CALCULATION

GOVERNING EQUATION
\[ H = \frac{(4*F_b)}{(S_g*\pi*D**2)} \]

\( F_b = \text{BOUYANT FORCE = SET POINT} = 15.0000 \text{ GRAMS} \)

\( S_g = \text{SPECIFIC GRAVITY OF LIQUID} = 1.0500 \)

\( D = \text{DISPLACER DIAMETER} = 2.0000 \text{ INCHES} \)

\[ H = \text{IMMERSION DEPTH (FROM EQUATION)} = 0.7048 \text{ CENTIMETERS} \]

0.2775 \text{ INCH}
TANK NUMBER  AZ-102

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER  (H-2-95497)

RISER NUMBER  (22A)

RISER ELEVATION (Ft.)  672.7500

TOP OF 16" FLG. TO 4" FLG (Ft.)  + 0.5885

1/16 GASKET @ 50% COMP. (Ft.)  + 0.0026

16" RF FLG THICKNESS (Ft.)  + 0.1200

TOP OF CONC. FOUNDATION (Ft.)  - 615.8000

ANN. BOTTOM PL. THICKNESS (Ft.)  - 0.0313

INSULATING CONC. THICKNESS (Ft.)  - 0.6667

PRI. BOTTOM PL. THICKNESS (Ft.)  - 0.0417

RISER TO TANK BOTTOM ELEV. (Ft.)  56.9214

DETERMINING REFERENCE LEVEL:

1/16 GASKET @ 50% COMPRESSION (In.)  + 0.0313  (B)
PVC FLANGE (OPTIONAL) (In.)  + N/A  (C)
1/8 GASKET @ 50% COMPRESSION (In.)  + N/A  (D)
BALL VALVE FLANGE TO FLANGE (In.)  + 9.0000  (E)
BALL INSET DIM (FROM TOP) (In.)  - 1.4700  (F)
IMMERSION DEPTH AT 1.1 Sp. G. (In.)  + 0.2649  (G)

REFERENCE LEVEL (In.)  690.8829

FIELD MEASURED FROM H-2-817634, P/N 48

IMMERSION DEPTH CALCULATION

*IMMERSION DEPTH CALCULATION

GOVERNING EQUATION

\[
H = \left( \frac{4*Fb}{(Sg*\pi*D^2)} \right)
\]

Fb  =  BOUYANT FORCE  =  SET POINT   =  15.0000  GRAMS
Sg  =  SPECIFIC GRAVITY OF LIQUID   =  1.1000
D  =  DISPLACER DIAMETER   =  2.0000  INCHES

H  =  IMMERSION DEPTH (FROM EQUATION)   =  0.6728  CENTIMETERS

0.2649  INCH
**TANK NUMBER**

B-101

**BOTTOM OF TANK TO RISER DIMENSION**

**DRAWING NUMBER** (H-2-37851)

**RISER NUMBER**

(8)

**RISER ELEVATION** (Ft.) 654.2100

**TANK CL BOTTOM ELEVATION** (Ft.) - 615.0000

**RISER TO TANK BOTTOM ELEVATION** (Ft.) 39.2100

**470.52 (A)**

**DETERMINING REFERENCE LEVEL:**

1/16 GASKET @ 50% COMPRESSION (In.) + 0.0313 (B)

PVC FLANGE (OPTIONAL) (In.) + 1.0000 (C)

1/8 GASKET @ 50% COMPRESSION (In.) + 0.0625 (D)

BALL VALVE FLANGE TO FLANGE (In.) + 9.0000 (E)

BALL INSET DIM (FROM TOP) (In.) - 1.4700 (F)

IMMERSION DEPTH IN SOLIDS (In.) + 0 (G)

**REFERENCE LEVEL** (Ft.) **479.1438**

(A + B + C + D + E - F + G)

**479.1438**
DESIGN CALCULATION
ENRAF REFERENCE LEVEL CALCULATIONS

(1) Drawing H-2-017634 (2) Doc. No. — (3) Page 1 of 1
(7) Subject B-102 End Ref. Level Calculations (8) Originator John Huber
(9) Checker — Date 4-4-85

(10) Reason for revision: Previous calc. based on 12 gram rather than 15 gram delta set point.

TANK NUMBER B-102

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER (H-2-37851)
RISER NUMBER (1)
RISER ELEVATION (Ft.) 653.6700
TANK INSIDE BOTTOM ELEVATION (Ft.) — N/A
TANK SIDE-BOTTOM ELEVATION (Ft.) — 615.0000

RISER TO TANK BOTTOM ELEVATION (Ft.) 38.6700
(IN.) 464.04 (A)

DETERMINING REFERENCE LEVEL:

1/16 GASKET @ 50% COMPRESSION (In.) + 0.0313 (B)
PVC FLANGE (OPTIONAL) (In.) + 1.0000 (C)
1/8 GASKET @ 50% COMPRESSION (In.) + 0.0625 (D)
BALL VALVE FLANGE TO FLANGE (In.) + 9.0000 (E)
BALL INSET DIM (FROM TOP) (In.) — 1.2100 (F)
IMMERSION DEPTH AT 1.05 Sp. G. (In.) + 0.2774923 (G)

REFERENCE LEVEL (IN.) 473.2012
(FT.) 39.4334

(A + B + C + D + E - F + G)

*IMMERSION DEPTH CALCULATION

GOVERNING EQUATION
H = (4*Fb)/(Sg*Pi*D**2)

Fb = BOUYANT FORCE = SET POINT = 15.0000 GRAMS
Sg = SPECIFIC GRAVITY OF LIQUID = 1.0500
D = DISPLACER DIAMETER = 2.0000 INCHES

H = IMMERSION DEPTH (FROM EQUATION) = 0.7048 CENTIMETERS
0.2775 INCH
THIS PAGE RESERVED FOR B-104
THIS PAGE RESERVED FOR B-105
THIS PAGE RESERVED FOR B-106
THIS PAGE RESERVED FOR B-108
THIS PAGE RESERVED FOR B-110
THIS PAGE RESERVED FOR B-111
Reason for revision: Previous calcs used wrong ball valve dimension. However, gauge in field accounts for correct ball valve and wrong delta for set point.

**B-112**

**SIDE-BOTTOM ELEVATION (FT.)**

**RISER TO TANK BOTTOM ELEVATION (FT.)**

**DETERMINING REFERENCE LEVEL:**

1/16 GASKET @ 50% COMPRESSION (IN.) + 0.0313 (B)

PVC FLANGE (OPTIONAL) (IN.) + 1.0000 (C)

1/8 GASKET @ 50% COMPRESSION (IN.) + 0.0625 (D)

BALL VALVE FLANGE TO FLANGE (IN.) + 9.0000 (E)

BALL INSET DIM (FROM TOP) (IN.) - 1.2100 (F)

**IMMERSION DEPTH 1.05 Sp. G> (IN.) + 0.2774923 (G)**

**REFERENCE LEVEL (IN.)**

**REFERENCE LEVEL (FT.)**

\[
(A + B + C + D + E - F + G)
\]

\[
472.8412
\]

\[
39.4034
\]

**IMMERSION DEPTH CALCULATION**

**GOVERNING EQUATION**

\[
H = \frac{(4*F_b)}{(S_g*\pi*D^2)}
\]

\[
F_b = \text{BOUYANT FORCE = SET POINT} = 15.0000 \text{ GRAMS}
\]

\[
S_g = \text{SPECIFIC GRAVITY OF LIQUID} = 1.0500
\]

\[
D = \text{DISPLACER DIAMETER} = 2.0000 \text{ INCHES}
\]

\[
H = \text{IMMERSION DEPTH (FROM EQUATION)} = 0.7048 \text{ CENTIMETERS}
\]

\[
0.2775 \text{ INCH}
\]
THIS PAGE RESERVED FOR B-201
**DESIGN CALCULATION**

**TANK NUMBER**  B-202

**BOTTOM OF TANK TO RISER DIMENSION**

<table>
<thead>
<tr>
<th>DRAWING NUMBER</th>
<th>RISER NUMBER</th>
<th>RISER ELEVATION (Ft.)</th>
<th>TANK CL BOTTOM ELEVATION (Ft.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(H-2-1743)</td>
<td>(B)</td>
<td>651.9400</td>
<td>613.5000</td>
</tr>
</tbody>
</table>

**DETERMINING REFERENCE LEVEL:**

1/16 GASKET @ 50% COMPRESSION (In.) + 0.0313 (B) NO PVC LINER, REPLACING

1/8 GASKET @ 50% COMPRESSION (In.) + 0.0000 (C)  NO PVC LINER, REPLACING

BALL VALVE FLANGE TO FLANGE (In.) + 9.0000 (E)

BALL INSET DIM (FROM TOP) (In.) - 1.4700 (F) FIELD MEASURED

IMMERSION DEPTH 1.05 Sp. G. (In.) + 0.2775 (G)

**REFERENCE LEVEL** (In.) 469.1187

(A + B + C + D + E - F + G)

**IMMERSION DEPTH CALCULATION**

GOVERNING EQUATION

\[ H = \frac{(4*F_b)}{(S_g*\pi*D^2)} \]

\[ F_b = \text{BOUYANT FORCE = SET POINT} = 15.0000 \text{ GRAMS} \]

\[ S_g = \text{SPECIFIC GRAVITY OF LIQUID} = 1.0500 \]

\[ D = \text{DISPLACER DIAMETER} = 2.0000 \text{ INCHES} \]

\[ H = \text{IMMERSION DEPTH (FROM EQUATION)} = 0.7048 \text{ CENTIMETERS} \]

\[ \text{0.2775 INCH} \]
TANK NUMBER BX-101

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER (H-2-37852)  
RISER NUMBER (8)  
RISER ELEVATION (Ft.) 657.0100  
TANK CL BOTTOM ELEV (Ft.) 616.0000  
RISER TO TANK BOTTOM ELEV (Ft.) 41.0100 (A)  
FIELD PUMP FLANGE TO FLANGE (In.) 9.0000 (E)

DETERMINING REFERENCE LEVEL:

1/16 GSKT @ 50% COMPRESSION (In.) + 0.0313 (B)  
PVC FLANGE (OPTIONAL) (In.) + 1.0000 (C)  
1/8 GSKT @ 50% COMPRESSION (In.) + 0.0625 (D)  
BALL VALVE FLANGE TO FLANGE (In.) + 1.4700 (F)  
BALL INSET DIM (FROM TOP) (In.) - 0.2775 (G)  

REFERENCE LEVEL (In.) 501.9212 (A + B + C + D + E - F + G)  

IMMERSION DEPTH CALCULATION

GOVERNING EQUATION  
H = (4*Fd)/(Sg*Pi*D**2)

Fd = BOUYANT FORCE = SET POINT = 15.0000 GRAMS  
Sg = SPECIFIC GRAVITY OF LIQUID = 1.0500  
D = DISPLACER DIAMETER = 2.0000 INCHES  

H = IMMERSION DEPTH (FROM EQUATION) = 0.7048 CENTIMETERS  

0.2775 INCH
**DESIGN CALCULATION**

**Bottom of Tank to Riser Dimension**

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>TANK NUMBER</td>
<td>BX-102</td>
</tr>
<tr>
<td>DRAWING NUMBER</td>
<td>(H-2-37852)</td>
</tr>
<tr>
<td>RISER NUMBER</td>
<td>(2)</td>
</tr>
<tr>
<td>RISER ELEVATION (Ft.)</td>
<td>656.1000</td>
</tr>
<tr>
<td>TANK CL BOTTOM ELEV (Ft.)</td>
<td>615.0000</td>
</tr>
<tr>
<td>RISER TO TANK BOTTOM ELEV (Ft.)</td>
<td>41.1000</td>
</tr>
<tr>
<td>RISER TO TANK BOTTOM ELEV (In.)</td>
<td>493.2</td>
</tr>
</tbody>
</table>

**Determining Reference Level:**

\[
\text{REFERENCE LEVEL (In.)} = \sum \text{item values} = 524.4489
\]

\[
\text{REFERENCE LEVEL (Ft.)} = \text{REFERENCE LEVEL (In.)} / 12 = 43.7041
\]
TANK NUMBER: BX-103

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER: (H-2-37852)

RISER NUMBER: (8)

RISER ELEVATION (FT.): 655.0400

TANK CL BOTTOM ELEV (FT.): -614.0000

RISER TO TANK BOTTOM ELEV (FT.): 41.0400

{IN.}: 492.4800 (A)

DETERMINING REFERENCE LEVEL:

1/16 GASKET @ 50% COMPRESSION (IN.): + 0.0313 (B)

PVC FLANGE (OPTIONAL) (IN.): + 1.0000 (C)

1/8 GASKET @ 50% COMPRESSION (IN.): + 0.0625 (D)

BALL VALVE FLANGE TO FLANGE (IN.): + 9.0000 (E)

BALL INSET DIM (FROM TOP) (IN.): - 1.4700 (F)

IMMERSION DEPTH AT 1.05 Sp. G. (IN.): + 0.2775 (G)

REFERENCE LEVEL (IN.): 501.3812

{FT.}: 41.7818

(A + B + C + D + E - F + G)

*IMMERSION DEPTH CALCULATION

GOVERNING EQUATION

\[ H = \frac{4 \times F_b}{(S_g \times P_l \times D^2)} \]

Fb = BOUYANT FORCE = SET POINT = 15.0000 GRAMS

Sg = SPECIFIC GRAVITY OF LIQUID = 1.0500

D = DISPLACER DIAMETER = 2.0000 INCHES

H = IMMERSION DEPTH (FROM EQUATION) = 0.7048 CENTIMETERS

0.2775 INCH
DESIGN CALCULATION

TANK NUMBER
BX-104

BOTTOM OF TANK TO RISER DIMENSION

| DRAWING NUMBER | (H-2-37852) |
| RISER NUMBER   | (8)         |
| RISER ELEVATION (Ft.) | 657.090  |
| TANK CL BOTTOM ELEV (Ft.) | 616.000  |
| RISER TO TANK BOTTOM ELEV (Ft.) | 41.0900  |
|               (In.) | 493.0800  |

DETERMINING REFERENCE LEVEL:

1/16 GASKET @ 50% COMPRESSION (In.) + 0.0313 (B)
PVC FLANGE (OPTIONAL) (In.) + 1.0000 (C)
1/8 GASKET @ 50% COMPRESSION (In.) + 0.0625 (D)
BALL VALVE FLANGE TO FLANGE (In.) + 9.0000 (E)
BALL INSET DIM (FROM TOP) (In.) - 1.4700 (F)
IMMERSION DEPTH AT 1.05 Sp. G. (In.) + 0.2775 (G)

REFERENCE LEVEL (In.)
(A + B + C + D + E - F + G) 501.9812

*IMMERSION DEPTH CALCULATION

GOVERNING EQUATION
H = (4*Fb)/(Sg*P1*P2*2)

Fb = BOUYANT FORCE = SET POINT = 15.0000 GRAMS
Sg = SPECIFIC GRAVITY OF LIQUID = 1.0500
D = DISPLACER DIAMETER = 2.0000 INCHES

H = IMMERSION DEPTH (FROM EQUATION) = 0.7048 CENTIMETERS
                             0.2775 INCH
TANK NUMBER EX-105

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER (H-2-37852)

RISER NUMBER (1)

RISER ELEVATION (Ft.) 656.4700

TANK CL BOTTOM ELEV (Ft.)  615.0000

RISER TO TANK BOTTOM ELEV (Ft.) 41.4700 (A)

DETERMINING REFERENCE LEVEL:

1/16 GASKET @ 50% COMPRESSION (In.) + 0.0313 (B)

PVC FLANGE (OPTIONAL) (In.) + 1.0000 (C)

1/8 GASKET @ 50% COMPRESSION (In.) + 0.0625 (D)

BALL VALVE FLANGE TO FLANGE (In.) + 9.0000 (E)

BALL INSET DIM (FROM TOP) (In.) - 1.4700 (F)

IMMERSION DEPTH IN SOLIDS (In.) + 0 (G)

REFERENCE LEVEL (In.) 506.2638 (A + B + C + D + E - F + G)

REFERENCE LEVEL (Ft.) 42.1886 (A + B + C + D + E - F + G)
### DESIGN CALCULATION

**PROJECT INFORMATION**
- **Drawing**: H-2-37852
- **Doc. No.**: ECN 22634
- **Page**: 1 of 1
- **Building**: 241-BX
- **Rev.**: 2
- **Job No.**: 2-95
- **Subject**: BX-106 ENRAF REFERENCE LEVEL CALCULATION
- **Originator**: JOHN HUBER
- **Date**: 1/9/96
- **Checker**: R. L. Pau
- **Date**: 1/24/96

---

**TANK NUMBER**
- **BX-106**

**BOTTOM OF TANK TO RISER DIMENSION**

<table>
<thead>
<tr>
<th>DRAWING NUMBER</th>
<th>RISER NUMBER</th>
<th>RISER ELEVATION (Ft.)</th>
<th>TANK CL BOTTOM ELEV (Ft.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(H-2-37852)</td>
<td>(€)</td>
<td>654.9300</td>
<td>614.0000</td>
</tr>
</tbody>
</table>

**RISER TO TANK BOTTOM ELEV (Ft.)**
- 40.9300

**DETERMINING REFERENCE LEVEL**

<table>
<thead>
<tr>
<th>COMPONENT</th>
<th>ADDITION/DEDUCTION</th>
<th>VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/16 GSKT @ 50% COMPRESSION (In.)</td>
<td>+</td>
<td>0.0313</td>
</tr>
<tr>
<td>PVC FLANGE (OPTIONAL) (In.)</td>
<td>+</td>
<td>1.0000</td>
</tr>
<tr>
<td>1/8 GSKT @ 50% COMPRESSION (In.)</td>
<td>+</td>
<td>0.0625</td>
</tr>
<tr>
<td>BALL VALVE FLANGE TO FLANGE (In.)</td>
<td>+</td>
<td>9.0000</td>
</tr>
<tr>
<td>BALL INSET DIM (FROM TOP) (In.)</td>
<td>-</td>
<td>1.2100</td>
</tr>
<tr>
<td>IMMERSION DEPTH IN SOLIDS (In.)</td>
<td>+</td>
<td>0</td>
</tr>
</tbody>
</table>

**REFERENCE LEVEL (Ft.)**
- 500.0437

**REFERENCE LEVEL (In.)**
- 41.6703
**DESIGN CALCULATION**

**Drawing** H-2-817634  
**Doc No.** ECN 621981

**Building** 241-BX  
**Rev.**  
**Job No.** 26-24-796

**Subject** EX-107 ENRAF REFERENCE LEVEL CALCULATION

**Originator** JOHN HUBER  
**Date** 1/11/86

**Checker**  
**Date** 1/24/86

---

**TANK NUMBER** BX-107

**BOTTOM OF TANK TO RISER DIMENSION**

<table>
<thead>
<tr>
<th>Item</th>
<th>Value</th>
<th>(In.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/16 GASKET @ 50% COMPRESSION</td>
<td>0.0313</td>
<td>(B)</td>
</tr>
<tr>
<td>PVC FLANGE (OPTIONAL)</td>
<td>1.0000</td>
<td>(C)</td>
</tr>
<tr>
<td>1/8 GASKET @ 50% COMPRESSION</td>
<td>0.0625</td>
<td>(D)</td>
</tr>
<tr>
<td>BALL VALVE FLANGE TO FLANGE</td>
<td>9.0000</td>
<td>(E)</td>
</tr>
</tbody>
</table>

**IMMERSION DEPTH AT 1.05 Sp. G**

\[ H = \frac{(4*Fb*F*\pi*D^2)}{Sg*F} \]

- **Fb** = BOUYANT FORCE = SET POINT = 15,000 GRAMS
- **Sg** = SPECIFIC GRAVITY OF LIQUID = 1.0500
- **D** = DISPLACER DIAMETER = 2.0000 INCHES

**H** = IMMERSION DEPTH (FROM EQUATION) = 0.7648 CENTIMETERS

**IMMERSION DEPTH (FROM EQUATION)** = 0.2775 INCH

---

**RISER TO TANK BOTTOM ELEV**

**RISER ELEVATION (Ft.)** 657.0800

**TANK CL BOTTOM ELEV (Ft.)** -616.0000

\[ R = 492.96 \] (A)

---

**DETERMINING REFERENCE LEVEL:**

\[ K = 41.0800 \] (A)

\[ T = 492.96 \] (A)

**REFERENCE LEVEL**

\[ (A + B + C + D + E - F + G) \]

\[ = 501.8612 \] (Ft.)

\[ = 41.8218 \] (In.)

---

[**IMMERSION DEPTH CALCULATION**]

**GOVERNING EQUATION**

\[ H = \frac{(4*Fb*F*\pi*D^2)}{Sg*F} \]

---

**IMMERSI**

\[ = 0.2775 \] INCH

---

**A-61**
TANK NUMBER BX-108

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER (H-2-37852)
RISER NUMBER (8)
RISER ELEVATION (Ft.) 656.0900
TANK CL BOTTOM ELEV (Ft.) - 615.0000
RISER TO TANK BOTTOM ELEV (Ft.) 41.0900 (A)

DETERMINING REFERENCE LEVEL:

1/16 GASKET @ 50% COMPRESSION (In.) + 0.0313 (B)
PVC FLANGE (OPTIONAL) (In.) + 0.0000 (C)
1/8 GASKET @ 50% COMPRESSION (In.) + 0.0000 (D)
BALL VALVE FLANGE TO FLANGE (In.) + 9.0000 (E)
BALL INSET DIM (FROM TOP) (In.) - 1.4700 (F)
IMMERSION DEPTH IN SOLIDS (In.) + 0.0000 (G)
REFERENCE LEVEL (Ft.) 500.6413
(A + B + C + D + E - F + G) 41.7201

USING OLD BALL VALVE, INSET DIMENSION FIELD MEASURED.
**DESIGN CALCULATION**

**TANK NUMBER** BX-109

**BOTTOM OF TANK TO RISER DIMENSION**

<table>
<thead>
<tr>
<th>DRAWING NUMBER</th>
<th>RISER NUMBER</th>
<th>RISER ELEVATION (Ft.)</th>
<th>TANK CL BOTTOM ELEV (Ft.)</th>
<th>RISER TO TANK BOTTOM ELEV (Ft.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(H-2-37852)</td>
<td>(8)</td>
<td>655.0900</td>
<td>614.0000</td>
<td>41.0900</td>
</tr>
</tbody>
</table>

**DETERMINING REFERENCE LEVEL:**

\[
\text{REFERENCE LEVEL (Ft.)} = \frac{501.7038 - 41.8086}{5} = 90.3202 \text{ Ft.}
\]

\[
\text{REFERENCE LEVEL (In.)} = 501.7038 - 41.8086 = 499.8952 \text{ In.}
\]

\[
(A + B + C + D + E) \text{ In.} = \text{REFERENCE LEVEL (In.)}
\]

\[
(F + G) \text{ In.} = \text{REFERENCE LEVEL (In.)}
\]

\[
(A + B + C + D + E - F - G) \text{ In.} = \text{REFERENCE LEVEL (In.)}
\]

\[
1/16 \text{ GSKT at } 50\% \text{ COMPRESSION (In.)} + 0.0313 (B)\]

\[
PVC \text{ FLANGE (OPTIONAL) (In.)} + 1.0000 (C)\]

\[
1/8 \text{ GSKT at } 50\% \text{ COMPRESSION (In.)} + 0.0625 (D)\]

\[
\text{BALL VALVE FLANGE TO FLANGE (In.)} + 9.0000 (E)\]

\[
\text{BALL INSET DIM (FROM TOP) (In.)} - 1.4700 (F)\]

\[
\text{IMMERSION DEPTH IN SOLIDS (In.)} + 0 (G)\]

\[
A = 501.7038, \quad B = 0.0313, \quad C = 1.0000, \quad D = 0.0625, \quad E = 9.0000, \quad F = 1.4700, \quad G = 0\]

\[
A - B - C - D - E + F + G = 501.7038 - 0.0313 - 1.0000 - 0.0625 - 9.0000 + 1.4700 + 0 = 499.8952 \text{ In.}
\]
TANK NUMBER BX-110

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER (H-2-37852)

RISE NUMBER (2)

RISE ELEVATION (Ft.) 657.5400

TANK CL BOTTOM ELEV (Ft.) 616.0000

RISE TO TANK BOTTOM ELEV (Ft.) 41.5400

(Asy 2 config.)

(A) 50% COMPRESSION (In.) + 0.0313 (B)

12" BLIND FLANGE - MODIFIED (In.) + 1.2500 (C)

1/16 GASKET @ 50% COMPRESSION (In.) + 0.0313 (D)

BALL VALVE FLANGE TO FLANGE (In.) + 9.0000 (E)

BALL INSET DIM (FROM TOP) (In.) - 1.4700 (F)

IMMERSION DEPTH SOLIDS (In.) + 0.0000 (G)

REFERENCE LEVEL (In.) 507.3225

(A + B + C + D + E - F + G) 42.2769

NOTE: USING OLD BALL VALVE, INSET DIMENSION FIELD MEASURED.
DESIGN CALCULATION

TANK NUMBER: BX-111

BOTTOM OF TANK TO RISER DIMENSION:

DRAWING NUMBER: (H-2-37852)
RISER NUMBER: (2)
RISER ELEVATION: (Ft.) 656.5800
TANK CL BOTTOM ELEV: (Ft.) - 615.0000

RISER TO TANK BOTTOM ELEV: (Ft.) 41.5800 (A)

DETERMINING REFERENCE LEVEL:

1/16 GASKET @ 50% COMPRESSION (In.) + 0.0313 (B)
PVC FLANGE (OPTIONAL) (In.) + 0.0000 (C)
1/8 GASKET @ 50% COMPRESSION (In.) + 0.0000 (D)
BALL VALVE FLANGE TO FLANGE (In.) + 9.0000 (E)
BALL INSET DIM (FROM TOP) (In.) - 1.4700 (F)
IMMERSION DEPTH IN SOLIDS (In.) + 0.0000 (G)

REFERENCE LEVEL (Ft.): 506.5213

(A + B + C + D + E - F + G) 42.2101

USING OLD BALL VALVE, INSET DIMENSION FIELD MEASURED.
TANK NUMBER  BX-112

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER (H-2-37852)

RISER NUMBER  (8)

RISER ELEVATION (Ft.)  655.1200

TANK CL BOTTOM ELEV (Ft.) - 614.0000

RISER TO TANK BOTTOM ELEV (Ft.)  41.1200  (A)

DETERMINING REFERENCE LEVEL:

1/16 GASKET @ 50% COMPRESSION (In.) + 0.0313  (B)

PVC FLANGE (OPTIONAL) (In.) + 1.0000  (C)

1/8 GASKET @ 50% COMPRESSION (In.) + 0.0625  (D)

BALL VALVE FLANGE TO FLANGE (In.) + 9.0000  (E)

BALL INSET DIM (FROM TOP) (In.) - 1.4700  (F)

IMMERSION DEPTH AT 1.05 Sp. G. (In.) + 0.2775  (G)

REFERENCE LEVEL (In.)  502.3412  (A + B + C + D + E - F + G)

(A)  41.8618

*IMMERSION DEPTH Calculates

GOVERNING EQUATION

\[ H = \frac{4Fb}{(Sg \cdot F_1 \cdot D^2)} \]

\[ Fb = BOUyant \ FORCe = SET \ POINT = 15.0000 \ grams \]

\[ Sg = SPECIFIC \ GRAVITY \ OF \ LIQUID = 1.0500 \]

\[ D = DISPLACER \ DIAMETER = 2.0000 \ inches \]

\[ H = IMMERSION \ DEPTH \ (FROM \ EQUATION) = 9.7048 \ centimeters \]

\[ 0.2775 \ inch \]
THIS PAGE RESERVED FOR BY-102
### DESIGN CALCULATION

**Drawing:** H-2-817934  |  **Doc No:** ECN  |  **ECN:** 635267  |  **Page:** 1 of 1  
**Building:** 241-BY  |  **Rev:** 0  |  **Job No:** 2W96-1150  

**Subject:** BY-103 ENRAF REFERENCE LEVEL CALCULATION  
**Originator:** JOHN HUBER  |  **Date:** 10/22/96  
**Checker:** J.A. Crawford  |  **Date:** 10/22/96

---

**TANK NUMBER:** BY-103  
**RISER NUMBER:** (12A)  
**RISER ELEVATION (Ft.)** 648.8600  
**TANK CL BOTTOM ELEVATION (Ft.)** 600.6500  
**RISER TO TANK BOTTOM ELEVATION (Ft.)** 45.2300 (A)  

**DETERMINING REFERENCE LEVEL:**

- 1/16 GASKET @ 50% COMPRESSION (In.) + 0.0313 (B)  
- "Y" ADAPTER SPOOL LENGTH (In.) + 18.0000 (C) PER H-2.85337  
- 1/16 GASKET @ 50% COMPRESSION (In.) + 0.0313 (D)  
- BALL VALVE FLANGE TO FLANGE (In.) + 9.0000 (E)  
- BALL INSET DIM (FROM TOP) (In.) - 1.4700 (F)  
- IMMERSION DEPTH IN SOLIDS (In.) + 0 (G)  

**REFERENCE LEVEL (In.)** 604.3526 (Ft.) 50.3627  

\[ (A + B + C + D + E - F + G) \]
THIS PAGE RESERVED FOR BY-105
THIS PAGE RESERVED FOR BY-106
THIS PAGE RESERVED FOR BY-109
**DESIGN CALCULATION**

**TANK NUMBER** BY-110

**BOTTOM OF TANK TO RISER DIMENSION**

**DRAWING NUMBER** (H-2-37853)

**RISER NUMBER** (4)

**RISER ELEVATION (Ft.)** 649.8500

**TANK CL BOTTOM ELEVATION (Ft.)** 602.6500

**RISER TO TANK BOTTOM ELEVATION (Ft.)** 47.2000

**REFERENCES LEVEL**

\[
\text{REFERENCE LEVEL } \left( \text{In.} \right) = 566.4 \quad \left( \text{Ft.} \right) = 47.8301
\]

\[
\left( A + B + C + D + E - F + G \right)
\]

\[
\begin{align*}
1/16 \text{ GASKET @ 50% COMPRESSION (In.)} & + 0.0313 \quad \left( B \right) \\
\text{PVC FLANGE (OPTIONAL) (In.)} & + 0.0000 \quad \left( C \right) \\
1/8 \text{ GASKET @ 50% COMPRESSION (In.)} & + 0.0000 \quad \left( D \right) \\
\text{BALL VALVE FLANGE TO FLANGE (In.)} & + 9.0000 \quad \left( E \right) \\
\text{BALL INSET DIM (FROM TOP) (In.)} & - 1.4700 \quad \left( F \right) \\
\text{IMMERSION DEPTH IN SOLIDS (In.)} & + 0 \quad \left( G \right)
\end{align*}
\]
**DESIGN CALCULATION**

**Drawing #:** H-2-817634  
**Doc. No.:** ECN 632839  
**Page of:** 1 of 1

**Building:** 241-BY  
**Rev.:** 0  
**Job No.:** 26-9-7159

**Subject:** BY-111 ENRAF REFERENCE LEVEL CALCULATION

**Originator:** JOHN HUBER  
**Date:** 1/2/13

**Checker:**  
**Date:** 11/4/13

---

**TANK NUMBER:** BY-111

**BOTTOM OF TANK TO RISER DIMENSION**

**DRAWING NUMBER:** (H-2-37653)

**RISER NUMBER:** (15)

**RISER ELEVATION (ft):** 649.9900

**TANK CL BOTTOM ELEVATION (ft):** 601.6500

**RISER TO TANK BOTTOM ELEVATION (ft):**

<table>
<thead>
<tr>
<th>Description</th>
<th>Value (in)</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/16 GASKET @ 50% COMPRESSION</td>
<td>0.0313</td>
<td>(B)</td>
</tr>
<tr>
<td>6&quot; TO 4&quot; ADAPTER SPOOL</td>
<td>6.0000</td>
<td>(C) PER H-2-817634 ASSY 78 ECN 632840</td>
</tr>
<tr>
<td>1/16 GASKET @ 50% COMPRESSION</td>
<td>0.0313</td>
<td>(D)</td>
</tr>
<tr>
<td>BALL VALVE FLANGE TO FLANGE</td>
<td>9.0000</td>
<td>(E)</td>
</tr>
<tr>
<td>BALL INSET DIM (FROM TOP)</td>
<td>1.4700</td>
<td>(F)</td>
</tr>
<tr>
<td>IMMERSION DEPTH IN SOLIDS</td>
<td>0</td>
<td>(G)</td>
</tr>
</tbody>
</table>

**REFERENCE LEVEL (ft):**

- **(A + B + C + D + E + F + G)**
  - **593.6726**
  - **49.4727**

---

A-77
THIS PAGE RESERVED FOR C-101
TANK NUMBER: C-102

BOTTOM OF TANK TO RISER DIMENSIONS:

DRAWING NUMBER: H-2-37912
RISER NUMBER: (3)
RISER ELEVATION (Ft.): 650.3000 FIELD MEASURED
TANK CL BOTTOM ELEVATION (Ft.): -608.0000
RISE TO TANK BOTTOM ELEVATION (Ft.): 42.3000
(II.): 507.6 (A)

DETERMINING REFERENCE LEVEL:

1/16 GASKET @ 50% COMPRESSION (In.): 0.0313 (B)
PVC FLANGE (OPTIONAL) (In.): 0.0000 (C)
1/8 GASKET @ 50% COMPRESSION (In.): 0.0000 (D)
BALL VALVE FLANGE TO FLANGE (In.): 9.0000 (E)
BALL INSET DIM (FROM TOP) (In.): 1.4700 (F) FIELD MEASURED
IMMERSION DEPTH IN SOLIDS (In.): 0 (G)

REFERENCE LEVEL (In.): 515.1612
(II.): 42.9301

A-80
TANK NUMBER: C-103

DETERMINING BOTTOM OF TANK TO RISER

DRAWING NUMBER: (H-2-37912)

RISER NUMBER: (8)

RISER ELEVATION (Ft.): 645.6700

TANK INSIDE BOTTOM ELEVATION (Ft.): - N/A

TANK SIDE-BOTTOM ELEVATION (Ft.): - 608.0000

RISER TO TANK BOTTOM ELEVATION (Ft.): 37.6700

DETERMINING REFERENCE LEVEL:

1/16 GASKET @ 50% COMPRESSION (In.): + 0.0313

PVC FLANGE (OPTIONAL) (In.): + 1.0000

1/8 GASKET @ 50% COMPRESSION (In.): + 0.0625

BALL VALVE FLANGE TO FLANGE (In.): + 9.0000

BALL INSET DIM (FROM TOP) (In.): - 1.2100

*IMMERSION DEPTH AT 1.05 Sp. G. (In.): + 0.8574

REFERENCE LEVEL (In.): 461.7811

A + B + C + D + E - F + G

IMMERSION DEPTH CALCULATION

GOVERNING EQUATION

\[ H = \frac{4 \cdot F_b}{(S_g \cdot F_l \cdot D^2) \cdot 2} \]

Fb = BOYANT FORCE = SET POINT = 15.0000 GRAMS

Sg = SPECIFIC GRAVITY OF LIQUID = 0.8700

D = DISPLACER DIAMETER = 1.2500 INCHES

H = IMMERSION DEPTH (FROM EQUATION) = 2.1777 CENTIMETERS

0.8574 INCH

A-81
THIS PAGE RESERVED FOR C-104
DESIGN CALCULATION

TANK NUMBER C-105

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER (H-2-37912)
RISER NUMBER (8)
RISER ELEVATION (Ft.) 646.7400
TANK INSIDE BOTTOM ELEVATION (Ft.) - N/A
TANK SIDE-BOTTOM ELEVATION (Ft.) - 609.0000
RISER TO TANK BOTTOM ELEVATION (Ft.) 37.7400
   (In.) 452.88 (A)

DETERMINING REFERENCE LEVEL:

1/16 GASKET @ 50% COMPRESSION (In.) + 0.0313 (B)
PVC FLANGE (OPTIONAL) (In.) + 1.0000 (C)
1/8 GASKET @ 50% COMPRESSION (In.) + 0.0625 (D)
BALL VALVE FLANGE TO FLANGE (In.) + 9.0000 (E)
BALL INSET DIM (FROM TOP) (In.) - 1.4700 (F)
IMMERSION DEPTH IN SOLIDS (In.) + 0 (G)

REFERENCE LEVEL (In.) 461.5038
   (Ft.) 38.4586

(A + B + C + D + E - F + G)
TANK NUMBER: C-106

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER: (H-2-37912)

RISER NUMBER: 1

RISER ELEVATION (Ft.) = 646.1500

TANK SIDEWALL BOTTOM ELEV (Ft.) = 608.0000

RISER TO TANK BOTTOM ELEV (Ft.) = 38.1500

(A)

DETERMINING REFERENCE LEVEL:

1/16 GASKET @ 50% COMPRESSN (In.) + 0.0313 (B)

PVC FLANGE (OPTIONAL) (In.) + 1.0000 (C)

1/8 GASKET @ 50% COMPRESSION (In.) + 0.0625 (D)

EXT. SPOOL ADAPT (ASSY 64) (In.) + 12.0000 (E)

1/16" GASKET (In.) + 0.0625 (F)

BALL VALVE FLANGE TO FLANGE (In.) + 9.0000 (G)

BALL INSET DIM (FROM TOP) (In.) + 1.4700 (H)

IMMERSN DPTH AT 1.00 Sp. G. (In.) + 0.2914 (I)

REFERENCE LEVEL (In.) = 478.7776

(A + B + C + D + E + F + G + H + I)

*IMMERSION DEPTH CALCULATION

GOVERNING EQUATION

H = (4*FB)/(SG*FI*D**2)

FB = BOUYANT FORCE = SET POINT = 15.0000 GRAMS

SG = SPECIFIC GRAVITY OF LIQUID = 1.0000

D = DISPLACER DIAMETER = 2.0000 INCHES

H = IMMERSION DEPTH (FROM EQUATION) = 0.7401 CENTIMETERS

0.2914 INCH
ENRAF REFERENCE LEVEL CALCULATIONS

TANK NUMBER C-107

BOTTOM OF TANK TO RISER DIMENSION

<table>
<thead>
<tr>
<th>DRAWING NUMBER</th>
<th>(H-2-37912)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RISER NUMBER</td>
<td>(8)</td>
</tr>
<tr>
<td>RISER ELEVATION (Ft.)</td>
<td>648.1800</td>
</tr>
<tr>
<td>TANK INSIDE BOTTOM ELEVATION (Ft.)</td>
<td>N/A</td>
</tr>
<tr>
<td>TANK SIDE-BOTTOM ELEVATION (Ft.)</td>
<td>610.0000</td>
</tr>
</tbody>
</table>

RISER TO TANK BOTTOM ELEVATION (Ft.) | 38.1800 |

DETERMINING REFERENCE LEVEL:

1/16 GASKET @ 50% COMPRESSION (In.) | 0.0313 (B)
PVC FLANGE (OPTIONAL) (In.) | 1.0000 (C)
1/8 GASKET @ 50% COMPRESSION (In.) | 0.0625 (D)
BALL VALVE FLANGE TO FLANGE (In.) | 9.0000 (E)
BALL INSET DIM (FROM TOP) (In.) | 1.2100 (F)
IMMERSION DEPTH IN SOLIDS (In.) | 0 (G)

REFERENCE LEVEL (In.) | 467.0437
(Ft.) | 38.9203

(A + B + C + D + E + F + G)
THIS PAGE RESERVED FOR C-110
TANK NUMBER C-112

BOTTOM OF TANK TO RISER

DRAWING NUMBER (H-2-37912)

RIAGER NUMBER (5)

RIAGER ELEVATION (Ft.) 645.7000

TANK INSIDE BOTTOM ELEVATION - N/A

TANK SIDE-BOTTOM ELEVATION - 680.0000

RIAGER TO TANK BOTTOM ELEVATION (In.) 37.7000

DETERMINING REFERENCE LEVEL:

1/16 GASKET @ 50% COMPRESSION + 0.0313 (B)

PVC FLANGE (OPTIONAL) (In.) + 0.0000 (C)

1/8 GASKET @ 50% COMPRESSION + 0.0000 (D)

BALL VALVE FLANGE TO FLANGE + 9.0000 (E)

BALL INSET DIM (FROM TOP) - 1.2100 (F)

IMMERSION DEPTH IN SOLIDS + 0 (G)

REFERENCE LEVEL (In.) 460.2213 (A + B + C + D + E - G)

REFERENCE LEVEL (Ft.) 38.3518 (A + B + C + D + E - G - F)
THIS PAGE RESERVED FOR C-204
# Design Calculation

**Drawing:** H-2-817634  
**Doc No.:** ECN 631266  
**Page:** 1 of 1

---

**Building:** 241-EW-151  
**Rev.:**  
**Job No.:** EW-86-578  
**Subject:** EW-151 VENT STATION END REFERENCE LEVEL CALCULATION

**Originator:** JOHN HUBER  
**Date:** 7/26/96  
**Checker:** GEORGE COLEMAN  
**Date:** 7/26/96

---

<table>
<thead>
<tr>
<th>TANK NUMBER</th>
<th>EW-151</th>
</tr>
</thead>
</table>

**Bottom of Tank to Riser Dimension**

<table>
<thead>
<tr>
<th>DRAWING NUMBER</th>
<th>H-2-43148</th>
</tr>
</thead>
<tbody>
<tr>
<td>RISER NUMBER</td>
<td>N/A</td>
</tr>
</tbody>
</table>

**Finished Floor Elev. (Ft.):** 745.0000

**Tank Outside Bottom Elevation (Ft.):** 745.3900

- H-2-43148 (Ft.) + 8.3300
- H-2-43148 (Ft.) + 1.5000
- H-2-43148 (Ft.) + 3.6700
- H-2-43148 (Ft.) + 2.0000
- H-2-43148 (Ft.) + 1.5000

**Tank Wall Thickness (Ft.):** 0.0313

**3" Blind Flange Thickness (Ft.):** 0.0833

**Riser to Tank Bottom Elevation (Ft.):** 16.4954

<table>
<thead>
<tr>
<th>Determining Reference Level:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/16 Gasket @ 50% Compression (In.) + 0.0313 (B)</td>
</tr>
<tr>
<td>3&quot; to 4&quot; Adapter Flange (In.) + 1.5000 (C)</td>
</tr>
<tr>
<td>1/16 Gasket @ 50% Compression (In.) + 0.0313 (D)</td>
</tr>
<tr>
<td>Ball Valve Flange to Flange (In.) + 9.0000 (E)</td>
</tr>
<tr>
<td>Ball Inset Dim (From Top) (In.) - 1.4700 (P)</td>
</tr>
<tr>
<td>Immersion Depth (In.) + 0.2775 (G)</td>
</tr>
</tbody>
</table>

**Reference Level (In.):** 207.3150

**Immersion Depth Calculation**

**GOVERNING EQUATION:**

\[ H = \left(\frac{4 \times \text{Fb}}{\text{Sg} \times \text{Pl} \times \text{D}^2 \times 2}\right) \]

- \( \text{Fb} \): Buoyant Force = Set Point = 15,000 Grams
- \( \text{Sg} \): Specific Gravity of Liquid = 1.0500
- \( \text{D} \): Displacer Diameter = 2.0000 Inches

**H:** Immersion Depth (From Equation) = 0.7048 Centimeters

**A-95**
**ENRAF REFERENCE LEVEL CALCULATIONS**

**TANK NUMBER**: S-101

**BOTTOM OF TANK TO RISER DIMENSION**

<table>
<thead>
<tr>
<th>DRAWING NUMBER</th>
<th>(H-2-37381)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RISER NUMBER</td>
<td>(3)</td>
</tr>
</tbody>
</table>

**RISER ELEVATION (Ft.)**: 665.9400

**TANK INSIDE BOTTOM ELEVATION (Ft.)**: 620.4300

**TANK SIDE-BOTTOM ELEVATION (Ft.)**: N/A

**RISER TO TANK BOTTOM ELEVATION (Ft.)**: 45.5100

**DETERMINING REFERENCE LEVEL**:

1/16 GASKET @ 50% COMPRESSION (In.) + 0.0313 (B)

PVC FLANGE (OPTIONAL) (In.) + 1.0000 (C)

1/8 GASKET @ 50% COMPRESSION (In.) + 0.0625 (D)

BALL VALVE FLANGE TO FLANGE (In.) + 9.0000 (E)

BALL INSET DIM (FROM TOP) (In.) - 1.2100 (F)

IMMERSION DEPTH ON SOLIDS (In.) + 0 (G)

**REFERENCE LEVEL (In.)**: 555.0038

**REFERENCE LEVEL (Ft.)**: 46.2503

**PARAMETERS**

- **TT** = 
- **UR** = 
- **MH** = 
- **HH** = 
- **HA** = 
- **RL** = 
- **AN** = 
- **AM** = 
- **S1** = 
- **S2** = 
- **S3** = 
- **TI** = 
- **ML** = 
- **LA** = 
- **LL** = 
- **WT** = 

**WHC-SD-WM-CN-078**

**REVISION 0**
TANK NUMBER S-102

Bottom of Tank to Riser Dimension

Drawing Number (H-2-37381)
Riser Number (2)
Riser Elevation (Ft.) 665.0500
Tank Inside Bottom Elevation (Ft.) - 619.4300
Tank Side-Bottom Elevation (Ft.) - N/A

Riser to Tank Bottom Elevation (Ft.): 45.6200

Determining Reference Level:

1/16 Gasket @ 50% Compression (In.) + 0.0313 (B)

PVC Flange (Optional) (In.) + 1.0000 (C)

1/8 Gasket @ 50% Compression (In.) + 0.0625 (D)

Ball Valve Flange to Flange (In.) + 9.0000 (E)

Ball Inset Dim (From Top) (In.) - 1.4700 (F)

Immerssion Depth on Solids (In.) + 0 (G)

Reference Level (In.): 556.0638

Reference Level (Ft.): 46.3386

(A + B + C + D + E + F + G)
ENRAF REFERENCE LEVEL CALCULATIONS

TANK NUMBER S-103

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER (H-2-37381)

RISER NUMBER (3)

RISER ELEVATION (Ft.) 664.0600

TANK INSIDE BOTTOM ELEVATION (Ft.) 618.4300

TANK SIDE-BOTTOM ELEVATION (Ft.) N/A

RISER TO TANK BOTTOM ELEVATION (Ft.) 45.6300

DETERMINING REFERENCE LEVEL:

1/16 GASKET @ 50% COMPRESSION (In.) + 0.0313 (B)

PVC FLANGE (OPTIONAL) (In.) + 1.0000 (C)

1/8 GASKET @ 50% COMPRESSION (In.) + 0.0625 (D)

BALL VALVE FLANGE TO FLANGE (In.) + 9.0000 (E)

BALL INSET DIM (FROM TOP) (In.) – 1.2100 (F)

IMMERSION DEPTH AT 1.05 Spec. G. (In.) + 0.2775 (G)

REFERENCE LEVEL (In.) 556.7212

(Ft.) 46.3934

*IMMERSION DEPTH CALCULATION

GOVERNING EQUATION

\[ H = \frac{(4*F_b)}{(S_g*F_i*D^2)} \]

\[ F_b = BOUyANT \ FORCE = \text{SET POINT} = 15.0000 \text{ GRAMS} \]

\[ S_g = \text{SPECIFIC GRAVITY OF LIQUID} = 1.0500 \]

\[ D = \text{DISPLACER DIAMETER} = 2.0000 \text{ INCHES} \]

\[ H = \text{IMMERSION DEPTH (FROM EQUATION)} = 0.7048 \text{ CENTIMETERS} \]

\[ 0.2775 \text{ INCH} \]
THIS PAGE RESERVED FOR S-104
DESIGN CALCULATION

TANK NUMBER S-105

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER (H-2-37381)

RISER NUMBER (3)

RISER ELEVATION (Ft.) 665.1300

TANK INSIDE BOTTOM ELEVATION (Ft.) - 619.4300

TANK SIDE-BOTTOM ELEVATION (Ft.) - N/A

RISER TO TANK BOTTOM ELEVATION (Ft.) 45.7000

DETERMINING REFERENCE LEVEL:

1/16 GASKET @ 50% COMPRESSION (In.) + 0.0313 (B)

PVC FLANGE (OPTIONAL) (In.) + 1.0000 (C)

1/8 GASKET @ 50% COMPRESSION (In.) + 0.0625 (D)

BALL VALVE FLANGE TO FLANGE (In.) + 9.0000 (E)

BALL INSET DIM (FROM TOP) (In.) - 1.4700 (F)

IMMERSION DEPTH IN SOLIDS (In.) + 0 (G)

REFERENCE LEVEL (IN.) 557.0238

(REFERENCE LEVEL (IN.) - 46.4186)

A-100
ENRAF REFERENCE LEVEL CALCULATIONS

TANK NUMBER S-106

PARAMETERS

TT = 581.25
UR = 581.25
MH = 575.65
HH = 568.65
HA = 562.65
RL = 556.60
AN = 201.80
AM = 151.80
TI = .S106
ML = 1.00
LA = 12.00
LL = 6.00
WT = EDE

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER (H-2-37381)

RISER NUMBER (3)

RISER ELEVATION (Ft.) 664.0500
TANK INSIDE BOTTOM ELEVATION (Ft.) - 618.4300
TANK SIDE-BOTTOM ELEVATION (Ft.) - N/A

RISER TO TANK BOTTOM ELEVATION (Ft.) 45.6200
(A) 547.44

Determining Reference Level:

1/16 GASKET @ 50% COMPRESSION (In.) + 0.0313 (B)

PVC FLANGE (OPTIONAL) (In.) + 1.0000 (C)

1/8 GASKET @ 50% COMPRESSION (In.) + 0.0625 (D)

BALL VALVE FLANGE TO FLANGE (In.) + 9.0000 (E)

BALL INSET DIM (FROM TOP) (In.) - 1.2100 (F)

IMMERSION DEPTH AT 1.05 Sp. G. (In.) + 0.2774923 (G)

REFERENCE LEVEL (In.) 556.6012
(Ft.) 46.3834

*IMMERSION DEPTH CALCULATION

GOVERNING EQUATION

\[ H = \frac{(4*Fb)}{(Sg*\pi*D^2)} \]

\[ Fb = BOUYANT FORCE = SET POINT = 15.0000 \text{ GRAMS} \]

\[ Sg = SPECIFIC GRAVITY OF LIQUID = 1.0500 \]

\[ D = DISPLACER DIAMETER = 2.0000 \text{ INCHES} \]

\[ H = IMMERSION DEPTH (FROM EQUATION) = 0.7048 \text{ CENTIMETERS} \]

\[ 0.2775 \text{ INCH} \]

A-101
TANK NUMBER: S-107

BOTTOM OF TANK TO RISER DIMENSION

<table>
<thead>
<tr>
<th>DRAWING NUMBER</th>
<th>(H-2-37381)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RISER NUMBER</td>
<td>(3)</td>
</tr>
<tr>
<td>RISER ELEVATION (Ft.)</td>
<td>666.0300</td>
</tr>
<tr>
<td>TANK INSIDE BOTTOM ELEVATION (Ft.)</td>
<td>-620.4300</td>
</tr>
<tr>
<td>TANK SIDE-BOTTOM ELEVATION (Ft.)</td>
<td>-N/A</td>
</tr>
</tbody>
</table>

RISER TO TANK BOTTOM ELEVATION (Ft.): 45.6000

DETERMINING REFERENCE LEVEL:

1/16 GASKET @ 50% COMPRESSION (In.) + 0.0313 (B)

PVC FLANGE (OPTIONAL) (In.) + 1.0000 (C)

1/8 GASKET @ 50% COMPRESSION (In.) + 0.0625 (D)

BALL VALVE FLANGE TO FLANGE (In.) + 9.0000 (E)

BALL INSET DIM (FROM TOP) (In.) - 1.2100 (F)

IMMERSION DEPTH AT 1.05 Sp. G. (In.) + 0.2774923 (G)

REFERENCE LEVEL (In.): 556.3612

(A + B + C + D + E - F + G)

PARAMETERS:

| TT   | 581.10 |
| UR   | 581.10 |
| MH   | 575.50 |
| HH   | 568.50 |
| HA   | 562.50 |
| RL   | 556.36 |
| AN   | 169.20 |
| AM   | 119.20 |
| TI   |         |
| ML   |         |
| LA   |         |
| LL   |         |
| WT   |         |

*IMMERSION DEPTH CALCULATION

GOVERNING EQUATION

\[ H = \frac{4 \cdot F_b}{(S_g \cdot \pi \cdot D^2)} \]

\[ F_b = \text{BOUYANT FORCE} = \text{SET POINT} = 15.0000 \text{ GRAMS} \]

\[ S_g = \text{SPECIFIC GRAVITY OF LIQUID} = 1.0500 \]

\[ D = \text{DISPLACER DIAMETER} = 2.0000 \text{ INCHES} \]

\[ H = \text{IMMERSION DEPTH (FROM EQUATION)} = 0.7048 \text{ CENTIMETERS} \]

\[ = 0.2775 \text{ INCH} \]
### DESIGN CALCULATION

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>H-2-37381</td>
<td></td>
<td>1</td>
<td>241-S</td>
<td>0</td>
<td></td>
<td>S-108</td>
<td>John Huber</td>
<td>Michael H.</td>
</tr>
</tbody>
</table>

### TANK NUMBER

**S-108**

### BOTTOM OF TANK TO RISER DIMENSION

<table>
<thead>
<tr>
<th>Drawing Number</th>
<th>Riser Number</th>
<th>Riser Elevation (ft.)</th>
<th>Tank Inside Bottom Elevation (ft.)</th>
<th>Tank Side-Bottom Elevation (ft.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>H-2-37381</td>
<td>(3)</td>
<td>665.0600</td>
<td>619.4300</td>
<td>N/A</td>
</tr>
</tbody>
</table>

### Riser to Tank Bottom Elevation (ft.)

45.6300

### Determining Reference Level:

- 1/16 Gasket @ 50% Compression (in.) + 0.0313 (B)
- PVC Flange (optional) (in.) + 1.0000 (C)
- 1/8 Gasket @ 50% Compression (in.) + 0.0625 (D)
- Ball Valve Flange to Flange (in.) + 9.0000 (E)
- Ball Inset Dim (from Top) (in.) - 1.4700 (F)
- Immersion Depth in Solids (in.) + 0 (G)

### Reference Level (ft.)

556.1838

\[
\text{Reference Level} = (A + B + C + D + E - F + G)
\]

\[
556.1838 = (45.6300 + 0.0313 + 1.0000 + 0.0625 + 9.0000 - 1.4700 + 0)
\]

\[
(A + B + C + D + E - F + G) = 46.3486
\]

A-103
TANK NUMBER  S-109

BOTTOM OF TANK TO RISER DIMENSION

<table>
<thead>
<tr>
<th>DRAWING NUMBER</th>
<th>(H-2-37381)</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>RISER NUMBER</th>
<th>(3)</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>RISER ELEVATION (Ft.)</th>
<th>664.0800</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>TANK INSIDE BOTTOM ELEVATION (Ft.)</th>
<th>-618.4300</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>TANK SIDE-BOTTOM ELEVATION (Ft.)</th>
<th>N/A</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>RISER TO TANK BOTTOM ELEVATION (Ft.)</th>
<th>45.6500</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>(In.)</th>
<th>547.8</th>
</tr>
</thead>
</table>

DETERMINING REFERENCE LEVEL:

- 1/16 Gasket @ 50% compression (In.) + 0.0313 (B)
- PVC flange (optional) (In.) + 1.0000 (C)
- 1/8 gasket @ 50% compression (In.) + 0.0625 (D)
- Ball valve flange to flange (In.) + 9.0000 (E)
- Ball inset dim (from top) (In.) - 1.4700 (F)
- Immersion depth in solids (In.) + 0 (G)

<table>
<thead>
<tr>
<th>REFERENCE LEVEL (In.)</th>
<th>556.4238</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>REFERENCE LEVEL (Ft.)</th>
<th>46.3686</th>
</tr>
</thead>
</table>

\[(A + B + C + D + E - F + G)\]
### DESIGN CALCULATION

**TANK NUMBER**  
S-110  

**BOTTOM OF TANK TO RISER**  

**DRAWING NUMBER**  (H-2-37381)  

**RISER NUMBER**  (3)  

**RISER ELEVATION** (Ft.)  666.3400  

**TANK INSIDE BOTTOM ELEVATION** - 620.4300  

**TANK SIDE-BOTTOM ELEVATION** - N/A  

**RISER TO TANK BOTTOM ELEVATION** (In.)  45.9100  

**DETERMINING REFERENCE LEVEL:**  

1/16 GASKET @ 50% COMPRESSION + 0.0313 (B)  

PVC FLANGE (OPTIONAL) (In.) + 1.0000 (C)  

1/8 GASKET @ 50% COMPRESSION + 0.0625 (D)  

BALL VALVE FLANGE TO FLANGE + 9.0000 (E)  

BALL INSET DIM (FROM TOP) (In.) - 1.4700 (F)  

IMMERSION DEPTH IN SOLIDS (In.) + 0 (G)  

**REFERENCE LEVEL (In.):** 559.5438  

**REFERENCE LEVEL (FL.):** 46.6286  

\[ A + B + C + D + E - F + G \]

---

A-105
ENRAF REFERENCE LEVEL CALCULATIONS

TANK NUMBER
S-111

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER (H-2-37381)

RISER NUMBER (3)

RISER ELEVATION (Ft.) 665.1600

TANK INSIDE BOTTOM ELEVATION (Ft.) - 619.4300

TANK SIDE-BOTTOM ELEVATION (Ft.) - N/A

RISER TO TANK BOTTOM ELEVATION (Ft.) 45.7300

DETERMINING REFERENCE LEVEL:

1/16 GASKET @ 50% COMPRESSION (In.) + 0.0313 (B)

PVC FLANGE (OPTIONAL) (In.) + 1.0000 (C)

1/8 GASKET @ 50% COMPRESSION (In.) + 0.0625 (D)

BALL VALVE FLANGE TO FLANGE (In.) + 9.0000 (E)

BALL INSET DIM (FROM TOP) (In.) - 1.2100 (F)

IMMERSION DEPTH AT 1.05 Sp. G. (In.) + 0.2774923 (G)

REFERENCE LEVEL (In.) 557.9212

(FT.) 46.4934

(A + B + C + D + E - F + G)

*IMMERSION DEPTH CALCULATION

GOVERNING EQUATION

H = (4*Fb)/(Sg*Pi*D**2)

Fb = BOUYANT FORCE = SET POINT = 15.0000 GRAMS

Sg = SPECIFIC GRAVITY OF LIQUID = 1.0500

D = DISPLACER DIAMETER = 2.0000 INCHES

H = IMMERSION DEPTH (FROM EQUATION) = 0.7048 CENTIMETERS

0.2775 INCH
ENRAF REFERENCE LEVEL CALCULATIONS

TANK NUMBER S-112

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER (H-2-37381)

RISER NUMBER (3)

RISER ELEVATION (Ft.) 664.0200

TANK INSIDE BOTTOM ELEVATION (Ft.) - 618.4300

TANK SIDE-BOTTOM ELEVATION (Ft.) - N/A

RISER TO TANK BOTTOM ELEVATION (Ft.) 45.5'300

DETERMINING REFERENCE LEVEL:

1/16 GASKET @ 50% COMPRESSION (In.) + 0.0313 (B)

PVC FLANGE (OPTIONAL) (In.) + 1.0000 (C)

1/8 GASKET @ 50% COMPRESSION (In.) + 0.0625 (D)

BALL VALVE FLANGE TO FLANGE (In.) + 9.0000 (E)

BALL INSET DIM (FROM TOP) (In.) - 1.4700 (F)

IMMERSION DEPTH ON SOLIDS (In.) + 0 (G)

REFERENCE LEVEL (In.) 555.7038

( A + B + C + D + E - F + G )

555.7038

46.3086

PARAMETERS

TT = 580.30
UR = 580.30
MH = 574.70
HH = 567.70
HA = 561.70
RL = 555.70
AN = N/A
AM = N/A
TI = .8112
ML = 1.00
LA = 12.00
LL = 6.00
WT = EDE

A-107
## DESIGN CALCULATION

<table>
<thead>
<tr>
<th>Drawing</th>
<th>H-2-517634</th>
<th>Doc No</th>
<th>ECN</th>
<th>G29524</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building</td>
<td>240-S</td>
<td>Rev</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Job No</td>
<td>2W-95-053</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subject</td>
<td>S-302 ENRAF REFERENCE LEVEL CALCULATION</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Originator</td>
<td>JOHN HUBER</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Checker</td>
<td>KEVIN HILL KALMAN</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Date</td>
<td>2-27-96</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Date</td>
<td>2/28/96</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**TANK NUMBER**  
S-302

**BOTTOM OF TANK TO RISER DIMENSION**

<table>
<thead>
<tr>
<th>DRAWING NUMBER</th>
<th>(H-2-5211)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RISER NUMBER</td>
<td>(N/A)</td>
</tr>
<tr>
<td>RISER ELEVATION (Ft.)</td>
<td>678.7300</td>
</tr>
</tbody>
</table>

**TANK INSIDE BOTTOM ELEVATION (Ft.)**  
646.5000

**RISER TO TANK BOTTOM ELEVATION**  
32.2300 (A)

**DETERMINING REFERENCE LEVEL:**

| 1/16 GASKET @ 50% COMPRESSION (In.) | + 0.0313 (B) |
| PVC FLANGE (OPTIONAL) (In.) | + 0.0000 (C) |
| 1/8 GASKET @ 50% COMPRESSION (In.) | + 0.0000 (D) |
| BALL VALVE FLANGE TO FLANGE (In.) | + 9.0000 (E) |
| BALL INSET DIM (FROM TOP) (In.) | - 1.4700 (F) |
| IMMERSION DEPTH IN SOLIDS (In.) | + 0 (G) |

**REFERENCE LEVEL**  
\[
\frac{394.3213}{A + B + C + D + E + F + G} = 32.8601
\]
TANK NUMBER  S-302-A

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER (H-2-1795)
RISER NUMBER (N/A)
RISER ELEVATION (Ft.) 662.6400
TANK INSIDE BOTTOM ELEVATION (Ft.) - 630.5000
RISER TO TANK BOTTOM ELEVATION (Ft.) 32.1400

DETERMINING REFERENCE LEVEL:

1/16 GASKET @ 50% COMPRESSION (In.) + 0.0313 (B)
PVC FLANGE (OPTIONAL) (In.) + 0.0000 (C)
1/8 GASKET @ 50% COMPRESSION (In.) + 0.0000 (D)
BALL VALVE FLANGE TO FLANGE (In.) + 9.0000 (E)
BALL INSET DIM (FROM TOP) (In.) - 1.4700 (F)
IMMERSION DEPTH IN SOLIDS (In.) + 0 (G)

REFERENCE LEVEL (In.) 393.2413

(A + B + C + D + E + F + G) 32.7701
## ENRAF Reference Level Calculations

### Reference Level Calculation:

**Prepared** [Signature] Date **2/1/95**

**Checked** [Signature] Date **2/3/95**

**TANK NUMBER** SX-101

**BOTTOM OF TANK TO RISER DIMENSION**

<table>
<thead>
<tr>
<th>DRAWING NUMBER</th>
<th>RISER NUMBER</th>
<th>RISER ELEVATION (Ft.)</th>
<th>TANK INSIDE BOTTOM ELEVATION (Ft.)</th>
<th>TANK SIDE-BOTTOM ELEVATION (Ft.)</th>
<th>RISER TO TANK BOTTOM ELEVATION (Ft.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(H-2-37855)</td>
<td>(4)</td>
<td>663.5100</td>
<td>611.1100</td>
<td>N/A</td>
<td>52.4000</td>
</tr>
</tbody>
</table>

### Determining Reference Level:

- 1/16 Gasket @ 50% Compression (In.) + 0.0313 (B)
- PVC Flange (Optional) (In.) + 1.0000 (C)
- 1/8 Gasket @ 50% Compression (In.) + 0.0625 (D)
- Ball Valve Flange to Flange (In.) + 9.0000 (E)
- Ball Inset Dim (From Top) (In.) + 1.4700 (F)
- Immersion Depth on Solids (In.) + 0 (G)

**REFERENCE LEVEL (In.)** 637.4238

**REFERENCE LEVEL (Ft.)** 53.1186

(A + B + C + D + E + F + G)
## ENRAF Reference Level Calculations

### Reference Level Calculation:

- **Prepared:** [Signature]
- **Date:** 2/11/95
- **Checked:** [Signature]
- **Date:** 2/24/95

### TANK NUMBER

- **SX-102**

### Bottom of Tank to Riser Dimension

- **Drawing Number:** (H-2-37855)
- **Riser Number:** (4)
- **Riser Elevation (Ft.):** 662.4200
- **TANK INSIDE BOTTOM Elevation (Ft.):** 610.1100
- **TANK SIDE-BOTTOM Elevation (Ft.):** N/A

### Riser to Tank Bottom Elevation (Ft.):

- **(In.):** 52.3100
- **(A):** 627.72

### Determining Reference Level:

- **1/16 Gasket @ 50% Compression (In.):** + 0.0313 (B)
- **PVC Flange (Optional) (In.):** + 1.0000 (C)
- **1/8 Gasket @ 50% Compression (In.):** + 0.0625 (D)
- **Ball Valve Flange to Flange (In.):** + 9.0000 (E)
- **Ball Inset Dim (From Top) (In.):** - 1.4700 (F)
- **Immersion Depth on Solids (In.):** + 0 (G)

### Reference Level (In.):

- **(Ft.):** 636.3437

### Parameters:

- **TT:** 660.94
- **UR:** 660.94
- **MH:** 655.34
- **HH:** 648.34
- **HA:** 642.34
- **RL:** 636.34
- **AN:** N/A
- **AM:** N/A
- **TI:** SX102
- **ML:** 1.00
- **LA:** 12.00
- **LL:** 6.00
- **WT:** EDE

### Additional Information:

- **Reference Level (Ft.):** 53.0286

---

A-111
ENRAF REFERENCE LEVEL CALCULATIONS

Reference Level Calculation:
Prepared [Signature] Date 2/16/95
Checked [Signature] Date 2/24/95

TANK NUMBER SX-103

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER (H-2-37855)
RISER NUMBER (3)
RISER ELEVATION (Ft.) 661.4400
TANK INSIDE BOTTOM ELEVATION (Ft.) - 609.1100
TANK SIDE-BOTTOM ELEVATION (Ft.) - N/A

RISER TO TANK BOTTOM ELEVATION (Ft.) 52.3300
(A)

DETERMINING REFERENCE LEVEL:

1/16 GASKET @ 50% COMPRESSION (In.) + 0.0313 (B)
PVC FLANGE (OPTIONAL) (In.) + 1.0000 (C)
1/8 GASKET @ 50% COMPRESSION (In.) + 0.0625 (D)
BALL VALVE FLANGE TO FLANGE (In.) + 9.0000 (E)
BALL INSET DIM (FROM TOP) (In.) - 1.4700 (F)
IMMERSION DEPTH ON SOLIDS (In.) + 0 (G)

REFERENCE LEVEL (In.) 636.5838
( In. ) 53.0486

PARAMETERS

TT = 661.18
UR = 661.18
MH = 655.58
HH = 648.58
HA = 642.58
RL = 636.58
AN = N/A
AM = N/A
TI = .SX103
ML = 1.00
LA = 12.00
LL = 6.00
WT = EDE

A-112
## ENRAF Reference Level Calculations

**TANK NUMBER**: SX-104

### Bottom of Tank to Riser Dimension

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drawing Number</td>
<td>H-2-37855</td>
</tr>
<tr>
<td>Riser Number</td>
<td>4</td>
</tr>
<tr>
<td>Riser Elevation (Ft.)</td>
<td>663.4500</td>
</tr>
<tr>
<td>Tank Inside Bottom Elevation (Ft.)</td>
<td>611.1100</td>
</tr>
<tr>
<td>Tank Side-Bottom Elevation (Ft.)</td>
<td>N/A</td>
</tr>
</tbody>
</table>

### Determining Reference Level:

\[
\text{Reference Level (In.)} = \left( \frac{A + B + C + D + E - F + G}{A + B + C + D + E + F + G} \right)
\]

<table>
<thead>
<tr>
<th>Component</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/16 Gasket @ 50% Compression (In.)</td>
<td>0.0313 (B)</td>
</tr>
<tr>
<td>PVC Flange (Optional) (In.)</td>
<td>1.0000 (C)</td>
</tr>
<tr>
<td>1/8 Gasket @ 50% Compression (In.)</td>
<td>0.0625 (D)</td>
</tr>
<tr>
<td>Ball Valve Flange to Flange (In.)</td>
<td>9.0000 (E)</td>
</tr>
<tr>
<td>Ball Inset Dim (From Top) (In.)</td>
<td>1.4700 (F)</td>
</tr>
<tr>
<td>Immersion Depth on Solids (In.)</td>
<td>0 (G)</td>
</tr>
</tbody>
</table>

\[
\text{Reference Level (In.)} = 636.7038
\]

\[
\text{Reference Level (Ft.)} = 53.0586
\]
ENRAF REFERENCE LEVEL CALCULATIONS

Reference Level Calculation:
Prepared [Signature] Date 2/14/95
Checked [Signature] Date 2/21/95

TANK NUMBER SX-105

BOTTOM OF TANK TO RISER DIMENSION

<table>
<thead>
<tr>
<th>DRAWING NUMBER</th>
<th>(H-2-37855)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RISER NUMBER</td>
<td>(4)</td>
</tr>
</tbody>
</table>

RISER ELEVATION (Ft.) 662.5000
TANK INSIDE BOTTOM ELEVATION (Ft.) - 610.1100
TANK SIDE-BOTTOM ELEVATION (Ft.) - N/A

RISER TO TANK BOTTOM ELEVATION (Ft.) 52.3900
   (In.) 628.68 (A)

DETERMINING REFERENCE LEVEL:

1/16 GASKET @ 50% COMPRESSION (In.) + 0.0313 (B)
PVC FLANGE (OPTIONAL) (In.) + 1.0000 (C)
1/8 GASKET @ 50% COMPRESSION (In.) + 0.0625 (D)
BALL VALVE FLANGE TO FLANGE (In.) + 9.0000 (E)
BALL INSET DIM (FROM TOP) (In.) - 1.4700 (F)
IMMERSION DEPTH ON SOLIDS (In.) + 0 (G)

REFERENCE LEVEL (In.) [A + B + C + D + E - F + G]
   (A + B + C + D + E - F + G) 637.3038
   (PL.) 53.1086

PARAMETERS

TT = 661.90
UR = 661.90
MH = 656.30
HH = 649.30
HA = 643.30
RL = 637.30
AN = N/A
AM = N/A
TI = SX105
ML = 1.00
LA = 12.00
LL = 6.00
WT = EDE

WHC-SD-WM-CN-078
REVISION 0
ENRAF REFERENCE LEVEL CALCULATIONS

### TANK NUMBER SX-106

<table>
<thead>
<tr>
<th>Bottom of Tank to Riser Dimension</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Drawing Number</strong></td>
<td>(H-2-37855)</td>
<td><strong>Riser Number</strong></td>
<td>(3)</td>
</tr>
<tr>
<td><strong>Riser Elevation (Ft.)</strong></td>
<td>661.4700</td>
<td><strong>Riser to Tank Bottom Elevation (Ft.)</strong></td>
<td>52.3630</td>
</tr>
<tr>
<td><strong>Tank Inside Bottom Elevation (Ft.)</strong></td>
<td>- 609.1100</td>
<td><strong>Tank Side-Bottom Elevation (Ft.)</strong></td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Riser to Tank Bottom Elevation (In.)</strong></td>
<td>52.3600</td>
<td><strong>Tank Inside Bottom Elevation (In.)</strong></td>
<td>-609.1100</td>
</tr>
<tr>
<td><strong>Riser Inside Bottom Elevation (In.)</strong></td>
<td>-609.1100</td>
<td><strong>Tank Side-Bottom Elevation (In.)</strong></td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Immersion Depth in Solids (In.)</strong></td>
<td>0</td>
<td><strong>Reference Level (In.)</strong></td>
<td>637.2038</td>
</tr>
<tr>
<td><strong>Reference Level (Ft.)</strong></td>
<td>53.1003</td>
<td><strong>Determining Reference Level:</strong></td>
<td></td>
</tr>
<tr>
<td><strong>TT</strong></td>
<td>662.13</td>
<td>1/16 Gasket @ 50% Compression (In.)</td>
<td>0.0313 (B)</td>
</tr>
<tr>
<td><strong>UR</strong></td>
<td>662.13</td>
<td>PVC Flange (Optional) (In.)</td>
<td>1.0000 (C)</td>
</tr>
<tr>
<td><strong>MH</strong></td>
<td>656.53</td>
<td>1/8 Gasket @ 50% Compression (In.)</td>
<td>0.0625 (D)</td>
</tr>
<tr>
<td><strong>HH</strong></td>
<td>649.53</td>
<td>Ball Valve Flange to Flange (In.)</td>
<td>9.0000 (E)</td>
</tr>
<tr>
<td><strong>HA</strong></td>
<td>643.53</td>
<td>Ball Inset Dim (From Top) (In.)</td>
<td>-1.2100 (F)</td>
</tr>
<tr>
<td><strong>RL</strong></td>
<td>637.20</td>
<td>Immersion Depth in Solids (In.)</td>
<td>0 (G)</td>
</tr>
<tr>
<td><strong>AN</strong></td>
<td>226.60</td>
<td><strong>Reference Level (In.)</strong></td>
<td>637.2038</td>
</tr>
<tr>
<td><strong>AM</strong></td>
<td>176.60</td>
<td><strong>Determining Reference Level:</strong></td>
<td></td>
</tr>
<tr>
<td><strong>TI</strong></td>
<td>.SX106</td>
<td>1/16 Gasket @ 50% Compression (In.)</td>
<td>0.0313 (B)</td>
</tr>
<tr>
<td><strong>ML</strong></td>
<td>1.00</td>
<td>PVC Flange (Optional) (In.)</td>
<td>1.0000 (C)</td>
</tr>
<tr>
<td><strong>LA</strong></td>
<td>12.00</td>
<td>1/8 Gasket @ 50% Compression (In.)</td>
<td>0.0625 (D)</td>
</tr>
<tr>
<td><strong>LL</strong></td>
<td>6.00</td>
<td>Ball Valve Flange to Flange (In.)</td>
<td>9.0000 (E)</td>
</tr>
<tr>
<td><strong>WT</strong></td>
<td>EDE</td>
<td>Ball Inset Dim (From Top) (In.)</td>
<td>-1.2100 (F)</td>
</tr>
</tbody>
</table>

A-115
THIS PAGE RESERVED FOR SX-107
THIS PAGE RESERVED FOR SX-108
**ENRAF REFERENCE LEVEL CALCULATIONS**

**DESIGN CALCULATION**

- **Drawing**: H2-817634
- **Doc. No.**: ECN 631228
- **Page**: 1 of 1
- **Building**: 241-SX
- **Rev.**: 0
- **Job No.**: 2N-96-288
- **Subject**: SX-109 ENRAF REFERENCE LEVEL CALCULATION
- **Originator**: JOHN HUBER
- **Date**: 4/10/96
- **Checker**: Date 4/11/96

**TANK NUMBER**: SX-109

**BOTTOM OF TANK TO RISER DIMENSION**

- **DRAWING NUMBER**: (H-2-37855)
- **RISER NUMBER**: (2)
- **RISER ELEVATION (Ft.)**: 661.4200
- **TANK CL BOTTOM ELEVATION (Ft.)**: 609.1100

**RISER TO TANK BOTTOM ELEVATION**

- **(Ft.)**: 52.3100
- **(In.)**: 627.72 (A)

**DETERMINING REFERENCE LEVEL**:

- **1/16 GASKET @ 50% COMPRESSION (In.)** + 0.0000 (B)
- **PVC FLANGE (OPTIONAL) (In.)** + 0.0000 (C)
- **1/8 GASKET @ 50% COMPRESSION (In.)** + 0.0625 (D)
- **BALL VALVE FLANGE TO FLANGE (In.)** + 9.0000 (E)
- **BALL INSET DIM (FROM TOP) (In.)** - 1.4700 (F)
- **IMMERSION DEPTH IN SOLIDS (In.)** + 0 (G)

**REFERENCE LEVEL (In.)**

- **(A + B + C + D + E - F + G)**: 635.3125

**REFERENCE LEVEL (Ft.)**

- **(A + B + C + D + E - F + G)**: 52.9427
THIS PAGE RESERVED FOR SX-110
THIS PAGE RESERVED FOR SX-112
THIS PAGE RESERVED FOR SX-113
THIS PAGE RESERVED FOR SX-114
TANK NUMBER
SY-101

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER (H-2-79556)

RISER NUMBER (1C)

RISER ELEVATION (FT.) 672.4100

TOP OF CONC. FOUNDATION (FT.) - 616.5000

ANN. BOTTOM PL. THICKNESS (FT.) - 0.0313

INSUL. CONC. THICKNESS (FT.) - 0.6667

PRI. BOTTOM PL. THICKNESS (FT.) - 0.0417

RISER TO TANK BOTTOM ELEVATION (FT.) 55.1703

For Tank Bottom Dimensions, Refer to H-2-37772

Determining Reference Level:

1/16 GASKET @ 50% COMPRESSION (IN.) + 0.0313 (B)
PVC FLANGE (OPTIONAL) (IN.) + 1.0000 (C)
1/8 GASKET @ 50% COMPRESSION (IN.) + 0.0625 (D)
BALL VALVE FLANGE TO FLANGE (IN.) + 9.0000 (E)
BALL INSET DIM (FROM TOP) (IN.) - 1.4700 (F)
IMMERSION DEPTH IN SOLIDS (IN.) + 0.0000 (G)

REFERENCE LEVEL (IN.) 670.6674

(A + B + C + D + E - F + G)


REFERENCE LEVEL (FT.) 55.8889
TANK NUMBER: SY-101

BOTTOM OF TANK TO RISER DIMENSION:

DRAWING NUMBER: H-2-79556
RISER NUMBER: 1A
RISER ELEVATION: 672.6500

TOP OF CONC. FOUNDATION: 616.5000
ANN. BOTTOM PL. THICKNESS: 0.0313
INSUL. CONC. THICKNESS: 0.6667
PRI. BOTTOM PL. THICKNESS: 0.0417

RISER TO TANK BOTTOM ELEVATION:
(FT.) 55.4103
(IN.) 664.9236

DETERMINING REFERENCE LEVEL:

1/16 GASKET @ 50% COMPRESSION (IN.) + 0.0313 (B)
PVC FLANGE (OPTIONAL) (IN.) + N/A (C)
1/8 GASKET @ 50% COMPRESSION (IN.) + N/A (D)
BALL VALVE FLANGE TO FLANGE (IN.) + 9.0000 (E)
BALL INSET DIM (FROM TOP) (IN.) - 1.2100 (F)
IMMERSION DEPTH IN SOLIDS (IN.) + 0.0000 (G)

REFERENCE LEVEL (IN.) 672.7449
(FT.) 56.0621
(A + B + C + D + E - F + G)

FOR TANK BOTTOM DIMENSIONS, REFER TO H-2-37772

IMMERSION DEPTH CHANGED TO ZERO SINCE DISPLACER SITS ON SOLIDS

A-126
ENRAF REFERENCE LEVEL CALCULATIONS

TANK NUMBER SY-102

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER (H-2-72213)

RISER NUMBER (2A)

RISER ELEVATION (Ft.) 672.5100

TANK INSIDE BOTTOM ELEVATION (Ft.) -617.2396

TANK SIDE-BOTTOM ELEVATION (Ft.) -55.2704

RISER TO TANK BOTTOM ELEVATION (Ft.) 55.2704

RISER TO TANK BOTTOM ELEVATION (In.) 663.2448 (A)

DETERMINING REFERENCE LEVEL:

1/16 GASKET @ 50% COMPRESSION (In.) + 0.0313 (B)
PVC FLANGE (OPTIONAL) (In.) + 1.0000 (C)
1/8 GASKET @ 50% COMPRESSION (In.) + 0.0625 (D)
BALL VALVE FLANGE TO FLANGE (In.) + 9.0000 (E)
BALL INSET DIM (FROM TOP) (In.) -1.2100 (F)
IMMERSION DEPTH AT 1.05 Sp. G. (In.) + 0.2774923 (G)

REFERENCE LEVEL (In.) 672.4060

(REFERENCE LEVEL (In.) (Ft.)) 56.0338

*IMMERSION DEPTH CALCULATION

GOVERNING EQUATION

\[ H = \frac{4*F_b}{(S_g*pi*D**2)} \]

\[ F_b = \text{BOUYANT FORCE = SET POINT} = 15.0000 \text{ GRAMS} \]

\[ S_g = \text{SPECIFIC GRAVITY OF LIQUID} = 1.0500 \]

\[ D = \text{DISPLACER DIAMETER} = 2.0000 \text{ INCHES} \]

\[ H = \text{IMMERSION DEPTH (FROM EQUATION)} = 0.7048 \text{ CENTIMETERS} \]

\[ 0.2775 \text{ INCH} \]
## ENRAF Reference Level Calculations

<table>
<thead>
<tr>
<th>TANK NUMBER</th>
<th>5Y-103</th>
</tr>
</thead>
</table>

**Bottom of Tank to Riser Dimension**

<table>
<thead>
<tr>
<th>DRAWING NUMBER</th>
<th>(H-2-85104)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RISER NUMBER</td>
<td>(2A)</td>
</tr>
<tr>
<td>RISER ELEVATION (Ft.)</td>
<td>672.5300</td>
</tr>
<tr>
<td>TANK INSIDE BOTTOM ELEVATION (Ft.)</td>
<td>617.2396</td>
</tr>
<tr>
<td>TANK SIDE-BOTTOM ELEVATION (Ft.)</td>
<td>N/A</td>
</tr>
<tr>
<td>RISER TO TANK BOTTOM ELEVATION (Ft.)</td>
<td>55.2904</td>
</tr>
</tbody>
</table>

### Determining Reference Level:

1/16 Gasket @ 50% Compression (In.) + 0.0313 (B)

PVC Flange (Optional) (In.) + 1.0000 (C)

1/8 Gasket @ 50% Compression (In.) + 0.0625 (D)

Ball Valve Flange to Flange (In.) + 9.0000 (E)

Ball Inset Dim (From Top) (In.) - 1.2100 (F)

**Immersion Depth at 1.05 Sp. Gr. (In.) + 0.2774923 (G)**

### Reference Level (In.)

672.6460

### Reference Level (Ft.)

56.0538

### Immersion Depth Calculation

**GOVERNING EQUATION**

\[ H = \frac{(4\times F_b)}{(S_g \times F_l \times D^2)} \]

**Fb** = Buoyant Force = Set Point = 15.0000 Grams

**Sg** = Specific Gravity of Liquid = 1.0500

**D** = Displacer Diameter = 2.0000 Inches

\[ H = \text{Immersion Depth (from Equation)} = 0.7048 \text{ Centimeters} \]

\[ H = \text{Immersion Depth (from Equation)} = 0.2775 \text{ Inch} \]
**DESIGN CALCULATION**

**TANK NUMBER**

**T-101**

**BOTTOM OF TANK TO RISER DIMENSION**

<table>
<thead>
<tr>
<th>DRAWING NUMBER (H-2-37909)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RISER NUMBER (1)</td>
</tr>
<tr>
<td>RISER ELEVATION (Ft.) 673.6200</td>
</tr>
<tr>
<td>TANK CL BOTTOM ELEVATION (Ft.) - 635.0000</td>
</tr>
<tr>
<td>RISER TO TANK BOTTOM ELEV (Ft.) 38.6200</td>
</tr>
<tr>
<td>(In.) 463.44 (A)</td>
</tr>
</tbody>
</table>

**DETERMINING REFERENCE LEVEL:**

1/16 GSKT @ 50% COMPRESSION (In.) + 0.0313 (B)

PVC FLANGE (OPTIONAL) (In.) + 1.0000 (C)

1/8 GSKT @ 50% COMPRESSION (In.) + 0.0625 (D)

BALL VALVE FLANGE TO FLANGE (In.) + 9.0000 (E)

BALL INSET DIM (FROM TOP) (In.) - 1.2100 (F)

IMMERSION DEPTH ON SOLIDS (In.) + 0 (G)

REFERENCE LEVEL (In.) 472.3238

(A + B + C + D + E + F + G) 39.3603
### DESIGN CALCULATION

**TANK NUMBER**  T-102  

**BOTTOM OF TANK TO RISER DIMENSION**  

- **DRAWING NUMBER**  (H-2-37909)  
- **RISER NUMBER**  (8)  
- **RISER ELEVATION**  (Ft.)  672.8500  
- **TANK CL BOTTOM ELEVATION**  (Ft.)  -634.0000  
- **RISER TO TANK BOTTOM ELEV**  (Ft.)  38.8500  
- **(In.)**  466.2  (A)  

**DETERMINING REFERENCE LEVEL:**  

1/16 GASKET @ 50% COMPRESSION (In.) + 0.0313  (B)  

<table>
<thead>
<tr>
<th>Component</th>
<th>Value</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>PVC FLANGE (OPTIONAL) (In.)</td>
<td></td>
<td>N/A (C)</td>
</tr>
<tr>
<td>1/8 GASKET @ 50% COMPRESSION (In.)</td>
<td></td>
<td>N/A (D)</td>
</tr>
<tr>
<td>BALL VALVE FLANGE TO FLANGE (In.)</td>
<td>9.0000</td>
<td>(E)</td>
</tr>
<tr>
<td>BALL INSET DIM (FROM TOP) (In.)</td>
<td>1.2100</td>
<td>(F)</td>
</tr>
<tr>
<td>IMMERSION DEPTH (In.)</td>
<td>0.2775</td>
<td>(G)</td>
</tr>
</tbody>
</table>

**REFERENCE LEVEL (In.)**  474.2987  

**IMMERSION DEPTH CALCULATION**  

\[ H = \frac{4 \times F_b \times S_g}{15.0000 \times (2.0000 \times 1.0500)^2} \]

- **F_b**  = BOUyANT FORCE = SET POINT = 15.0000 GRAMS  
- **S_g**  = SPECIFIC GRAVITY OF LIQUID = 1.0500  
- **D**  = DISPLACER DIAMETER = 2.0000 INCHES  
- **H**  = IMMERSION DEPTH (FROM EQUATION) = 0.7048 CENTIMETERS  
  
  \( 0.2775 \) INCH
TANK NUMBER T-103

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER (H-2-37909)

RISER NUMBER (1)

RISER ELEVATION (Ft.) 671.8300

TANK CL BOTTOM ELEVATION (Ft.) -633.0000

RISER TO TANK BOTTOM ELEV. (Ft.) 38.8300

DETERMINING REFERENCE LEVEL:

1/16 GASKET @ 50% COMPRESSION (In.) + 0.0313 (B)
PVC FLANGE (OPTIONAL) (In.) + 1.0000 (C)
1/8 GASKET @ 50% COMPRESSION (In.) + 0.0625 (D)
BALL VALVE FLANGE TO FLANGE (In.) + 9.0000 (E)
BALL INSET DIM (FROM TOP) (In.) - 1.4700 (F)
IMMERSION DEPTH (In.) + 0.2775 (G)

REFERENCE LEVEL (Ft.) 474.8612

IMMERSION DEPTH CALCULATION

GOVERNING EQUATION

\[ H = \frac{(4 \times F_b)}{(S_g \times F_l \times D \times 2)} \]

\[ F_b = \text{BOUYANT FORCE} = \text{SET POINT} = 15.0000 \text{ GRAMS} \]

\[ S_g = \text{SPECIFIC GRAVITY OF LIQUID} = 1.0500 \]

\[ D = \text{DISPLACER DIAMETER} = 2.0000 \text{ INCHES} \]

\[ H = \text{IMMERSION DEPTH (FROM EQUATION)} = 0.7048 \text{ CENTIMETERS} 0.2775 \text{ INCH} \]
DESIGN CALCULATION

TANK NUMBER T-104

BOTTOM OF TANK TO RISER DIMENSION

<table>
<thead>
<tr>
<th>DRAWING NUMBER</th>
<th>RISER NUMBER (5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>H-2-37909</td>
<td>673.8100</td>
</tr>
<tr>
<td>TANK CL BOTTOM ELEV. (Ft.)</td>
<td>635.0000</td>
</tr>
<tr>
<td>RISER TO TANK BOTTOM ELEV. (Ft.)</td>
<td>38.8100</td>
</tr>
<tr>
<td>(In.)</td>
<td>465.72</td>
</tr>
</tbody>
</table>

DETERMINING REFERENCE LEVEL:

1/16 GASKET @ 50% COMPRESSION (In.) + 0.0313 (B)
1/8 GASKET @ 50% COMPRESSION (In.) + 0.0000 (C)
BALL VALVE FLANGE TO FLANGE (In.) + 9.0000 (E)
BALL INSET DIM (FROM TOP) (In.) - 1.2100 (F)
IMMERSION DEPTH IN SOLIDS (In.) + 0 (G)

REFERENCE LEVEL (Ft.)
(A + B + C + D + E + F + G)
473.5412
39.4618

REVIEW OF MOST RECENT IN-TANK PHOTOS INDICATES PLUMMET IS LIKELY OVER SLUDGE/SOLIDS – NO IMMERSION DEPTH
DESIGN CALCULATION

Bottom of Tank to Riser Dimension

Drawing number (H-2-37909)
Riser number (1)
Riser elevation (Ft.) 672.6100
Tank inside bottom elevation (Ft.) - 634.000
Riser to tank bottom elevation (In.) 38.8100

Determining reference level:

1/16 gasket @ 50% compression (In.) + 0.0313 (B)
PVC flange (optional) (In.) + 1.0000 (C)
1/8 gasket @ 50% compression (In.) + 0.0625 (D)
Ball valve flange to flange (In.) + 9.0000 (E)
Ball inset dim (from top) (In.) - 1.4700 (F)
Immersion depth in solids (In.) + 0 (G)

Reference level (In.) 474.3437
(Pt.) 39.5286

A-133
**DESIGN CALCULATION**

**Drawing**: H-2-817634  
**Doc. No**: ECN 615941  
**Page**: 1 of 1  
**Building**: 241-T  
**Rev**: 1  
**Subject**: T-106 Engr. RF calculation  
**Job No**: DW-54-1118  
**Originator**: John Huber  
**Date**: 10/10/95  
**Check**: Kevin Hull  
**Date**: 10/10/95

**TANK NUMBER**: T-106

**BOTTOM OF TANK TO RISER DIMENSION**

- **DRAWING NUMBER**: (H-2-37909)
- **RISER NUMBER**: (1)
- **RISER ELEVATION**: (Ft.) 671.8000
- **TANK INSIDE BOTTOM ELEVATION**: (Ft.) - 633.0000
- **RISER TO TANK BOTTOM ELEV**: (Ft.) 38.8000 (In.) 465.6 (A)

**DETERMINING REFERENCE LEVEL**:

1/16 GASKET @ 50% COMPRESSION (In.) + 0.0313 (B)
- PVC FLANGE (OPTIONAL) (In.) + NONE (C)
- 1/8 GASKET @ 50% COMPRESSION (In.) + N/A (D)
- BALL VALVE FLANGE TO FLANGE (In.) + 9.0000 (E)
- BALL INSET DIM (FROM TOP) (In.) - 1.4700 (F)
- IMMERSION DEPTH IN SOLIDS (In.) + 0 (G)

**REFERENCE LEVEL** (In.) 473.1612  
**(Ft.)** 35.4301

---

A-134
TANK NUMBER  T-107

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER  (H-2-37909)
RISER NUMBER  (1)
RISER ELEVATION  (Ft.)  673.8209
TANK CL BOTTOM ELEV.  (Ft.)  635.0000
RISER TO TANK BOTTOM ELEV  (In.)  38.81

DETERMINING REFERENCE LEVEL:
1/16 GASKET @ 50% COMPRESSION (In.) + 0.0313 (B)
PVC FLANGE (OPTIONAL)  (In.) + 1.0000 (C)
1/8 GASKET @ 50% COMPRESSION (In.) + 0.0625 (D)
BALL VALVE FLANGE TO FLANGE (In.) + 9.0000 (E)
BALL INSET DIM. (FROM TOP) (In.) + 1.2100 (F)

REFERENCE LEVEL (In.)  4.0572

*IMMERSION DEPTH CALCULATION
GOVERNING EQUATION
H = (4*FB)/(Sg*D*D**2)
FB = BOUyANT FORCE = SET POINT = 15.0000  GRAMS
Sg = SPECIFIC GRAVITY OF LIQUID = 1.0500
D = DISPLACER DIAMETER = 2.0000  INCHES
H = IMMERSION DEPTH (FROM EQUATION) = 0.7048  CENTIMETERS

0.2775  INCH
TANK NUMBER T-108

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER (H-2-37909)
RISER NUMBER (13)
RISER ELEVATION (Ft.) 674.4600
TANK CL BOTTOM ELEVATION (Ft.) -634.0000
RISER TO TANK BOTTOM ELEV (Ft.) 40.4600 (A)

DETERMINING REFERENCE LEVEL:

1/16 GSKT @ 50% COMPRESSION (In.) + 0.0313 (B)
PVC FLANGE (OPTIONAL) (In.) + 1.0900 (C)
1/8 GSKT @ 50% COMPRESSION (In.) + 0.0625 (D)
BALL VALVE FLANGE TO FLANGE (In.) + 9.0000 (E)
BALL INSET DIM (FROM TOP) (In.) - 1.4700 (F)
IMMERSION DEPTH (In.) + 0.2775 (G)
1/16 GSKT @ 50% COMPRESSION (In.) + 0.0313 (H)
MULTIPOWER FLG (In.) + 1.2500 (I)
REFERENCE LEVEL (In.) 49.7825

IMMERSION DEPTH CALCULATION

GOVERNING EQUATION H = (4*FB)/(SG*PI*D**2)

FB = BOUYANT FORCE = SET POINT = 15.0000 GRAMS
SG = SPECIFIC GRAVITY OF LIQUID = 1.0500
D = DISPLACER DIAMETER = 2.0000 INCHES

H = IMMERSION DEPTH (FROM EQN) = 0.7048 CENTIMETERS

A-136
TANK NUMBER T-109

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER (H-2-37909)
RISER NUMBER (1)
RISER ELEVATION (Ft.) 671.8000
TANK CL BOTTOM ELEVATION (Ft.) 533.0000
RISER TO TANK BOTTOM ELEVATION (In.) 38.8000

DETERMINING REFERENCE LEVEL:

1/16 GASKET @ 50% COMPRESSION (In.) + 0.0313 (B)
PVC FLANGE (OPTIONAL) (In.) + 1.0000 (C)
1/8 GASKET @ 50% COMPRESSION (In.) + 0.0625 (D)
BALL VALVE FLANGE TO FLANGE (In.) + 9.0000 (E)
BALL INSET DIM (FROM TOP) (In.) - 1.2100 (F)
IMMERSION DEPTH IN SOLIDS (In.) + 0.0000 (G)

REFERENCE LEVEL (In.) 474.4837
REFERENCE LEVEL (Ft.) 39.5403
### DESIGN CALCULATION

**Drawing** H-2-817634  
**Doc No**  
**ECN**  
**Page 1 of 1**

**Building** 241.T  
**Rev** 1  
**Job No**  

**Subject** T-110 ENRAF REFERENCE LEVEL CALCULATION

**Originator** JOHN HUBER  
**Date** 12/16/85

**TANK NUMBER** T-110

**BOTTOM OF TANK TO RISER DIMENSION**

<table>
<thead>
<tr>
<th>DETERMINING REFERENCE LEVEL:</th>
<th>474.2237</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/16 GASKET @ 50% COMPRESSION (In.) +</td>
<td>0.0313</td>
</tr>
<tr>
<td>PVC FLANGE (OPTIONAL) (In.) +</td>
<td>1.0000</td>
</tr>
<tr>
<td>1/8 GASKET @ 50% COMPRESSION (In.) +</td>
<td>0.0625</td>
</tr>
<tr>
<td>BALL VALVE FLANGES TO FLANGE (In.) +</td>
<td>9.0000</td>
</tr>
<tr>
<td>BALL INSET DIM (FROM TOP) (In.) -</td>
<td>1.4700</td>
</tr>
<tr>
<td>IMMERSION DEPTH ON SOLIDS (In.)</td>
<td>0</td>
</tr>
<tr>
<td>REFERENCE LEVEL (In.)</td>
<td>474.2237</td>
</tr>
<tr>
<td>(A + B + C + D + E - F + G)</td>
<td>39.5186</td>
</tr>
</tbody>
</table>

**RISER ELEVATION (Ft.)** 673.8000

**TANK INSIDE BOTTOM ELEVATION (Ft.)** 635.0000

**RISER TO TANK BOTTOM ELEV (Ft.)** 38.8000

**TANK CL BOTTOM ELEVATION (Ft.)** 38.8000

**RISER NUMBER** (1)

**DRAWING NUMBER** (H-2-37909)
TANK NUMBER: T-111

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER: H-2-37909
RISER NUMBER: 4
TANK INSIDE BOTTOM ELEVATION (Ft.): 672.8200
RISER ELEVATION (Ft.): 634.0000

DETERMINING REFERENCE LEVEL:

1/16 GASKET @ 50% COMPRESSION (In.): 0.0313 (B)
PVC FLANGE (OPTIONAL) (In.): 1.0000 (C)
1/8 GASKET @ 50% COMPRESSION (In.): 0.0625 (D)
BALL VALVE FLANGE TO FLANGE (In.): 9.0000 (E)
BALL INSET DIM (FROM TOP) (In.): 1.4700 (F)
IMMERSION DEPTH IN SOLIDS (In.): 0 (G)

REFERENCE LEVEL (In.): 474.4638
REFERENCE LEVEL (Ft.): 39.5386

\[ A + B + C + D + E + F + G \]
### DESIGN CALCULATION

<table>
<thead>
<tr>
<th>Drawing</th>
<th>H-2-317634</th>
<th>Doc No</th>
<th>ECN 67594</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building</td>
<td>241 - T</td>
<td>Rev</td>
<td>1</td>
</tr>
<tr>
<td>Subject</td>
<td>T-112 Encal RL Calculation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Originator</td>
<td>John Huber</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Checker</td>
<td>Kevin Hull</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Date</td>
<td>10/10/95</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Date</td>
<td>10/10/95</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**TANK NUMBER**

**T-112**

**BOTTOM OF TANK TO RISER DIMENSION**

<table>
<thead>
<tr>
<th>DRAWING NUMBER (H-2-37909)</th>
<th>RISER NUMBER</th>
<th>(13)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RISER ELEVATION (Ft.)</td>
<td>673.4700</td>
<td></td>
</tr>
<tr>
<td>TANK CL BOTTOM ELEVATION (Ft.)</td>
<td>633.0000</td>
<td></td>
</tr>
<tr>
<td>RISER TO TANK BOTTOM ELEV (Ft.)</td>
<td>40.4700</td>
<td>485.64 (A)</td>
</tr>
</tbody>
</table>

**DETERMINING REFERENCE LEVEL:**

1/16 GASKET @ 50% COMPRESSION (In.) + 0.0313 (B)

PVC FLANGE (OPTIONAL) (In.) + 1.0000 (D)

1/8 GASKET @ 50% COMPRESSION (In.) + 0.0625 (D)

BALL VALVE FLANGE TO FLANGE (In.) + 9.0000 (E)

BALL INSET DIM (FROM TOP) (In.) - 1.4700 (F)

IMMERSSION DEPTH AT 1.05 Sp. G. + 0.2775 (G)

1/16 GASKET @ 50% COMPRESSION (In.) + 0.0313 (H)

MULTIPOINT FLG H-2-817634, ASSY 50 + 1.2500 (I)

**REFERENCE LEVEL (In.)**

40.4700 + 1.0000 + 0.0625 + 9.0000 - 1.4700 + 0.2775 + 1.2500 = 49.7601

**IMMERSSION DEPTH CALCULATION**

GOVERNING EQUATION

\[ H = \frac{4 \times F_b}{S_g \times \pi \times D^2} \]

\[ F_b = \text{BOUYANT FORCE} = \text{SET POINT} = 15.0000 \text{ GRAMS} \]

\[ S_g = \text{SPECIFIC GRAVITY OF LIQUID} = 1.0500 \]

\[ D = \text{DISPLACER DIAMETER} = 2.0000 \text{ INCHES} \]

\[ H = \text{IMMERSSION DEPTH (FROM EQUATION)} = 0.7048 \text{ CENTIMETERS} \]

\[ 0.2775 \text{ INCH} \]

A-140
THIS PAGE RESERVED FOR T-201
THIS PAGE RESERVED FOR T-202
TANK NUMBER

TANK NUMBER TX-101

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER (H-2-37910)

RISE R NUMBER (4)

RISE R ELEVATION (Ft.) 672.1300

TANK INSIDE BOTTOM ELEVATION (Ft.) - 624.7300

TANK SIDE-BOTTOM ELEVATION (Ft.) - N/A

RISE R TO TANK BOTTOM ELEVATION (Ft.) 47.4000 (A)

LENGTH OF TANK INSIDE BOTTOM ELEVATION (Ft.) 568.8

DETERMINING REFERENCE LEVEL:

1/16 GSKT @ 50% COMPRESSION (In.) + 0.0313 (B)

PVC FLANGE (OPTIONAL) (In.) + 1.0000 (C)

1/8 GSKT @ 50% COMPRESSION (In.) + 0.0625 (D)

EXTENSION SPOOL (In.) + 12.0000

1/8 GASKET @ 50% COMPRESSION (In.) + 0.0625

BALL VALVE FLANGE TO FLANGE (In.) + 9.0000 (E)

BALL INSET DIM (FROM TOP) (In.) - 1.4700 (F)

IMMERSION DEPTH @ 1.05 Sp. G. (In.) + 0.2775 (G)

REFERENCE LEVEL (In.)

A+B+C+D+E+F+G

589.7637

59.1470

*IMMERSION DEPTH CALCULATION

GOVERNING EQUATION

H = (4*FB)/(Sg*Fr*D**2)

FB = BOUyant FORCE = SET POINT = 15.0000 GRAMS

Sg = SPECIFIC GRAVITY OF LIQUID = 1.0500

D = DISPLACER DIAMETER = 2.0000 INCHES

H = IMMERSION DEPTH (FROM EQTN.) = 0.7048 CENTIMETERS

0.2775 INCH
**DESIGN CALCULATION**

<table>
<thead>
<tr>
<th>Drawing</th>
<th>Doc. No.</th>
<th>ECN</th>
<th>Page</th>
<th>Page 1 of 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>H-2-87634</td>
<td>68952.0</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Building**

<table>
<thead>
<tr>
<th>241-TX</th>
<th>Rev.</th>
<th>Job No.</th>
<th>2W-96-77</th>
</tr>
</thead>
</table>

**Subject**

<table>
<thead>
<tr>
<th>TX-102 ENGRAF REFERENCE LEVEL CALCULATION</th>
</tr>
</thead>
</table>

**Originator**

<table>
<thead>
<tr>
<th>JOHN HUBER</th>
</tr>
</thead>
</table>

**Checker**

<table>
<thead>
<tr>
<th>KEVIN HUB</th>
<th>Date 2/1/96</th>
</tr>
</thead>
</table>

---

**TANK NUMBER**

<table>
<thead>
<tr>
<th>TX-102</th>
</tr>
</thead>
</table>

**BOTTOM OF TANK TO RISER DIMENSION**

<table>
<thead>
<tr>
<th>DRAWING NUMBER</th>
<th>(H-2-37940)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RISER NUMBER</td>
<td>(9A)</td>
</tr>
<tr>
<td>RISER ELEVATION (Ft.)</td>
<td>673.1100</td>
</tr>
<tr>
<td>TANK INSIDE BOTTOM ELEVATION (Ft.)</td>
<td>623.7300</td>
</tr>
</tbody>
</table>

**RISER TO TANK BOTTOM ELEVATION**

<table>
<thead>
<tr>
<th>(Ft.)</th>
<th>49.3800</th>
</tr>
</thead>
</table>

**DETERMINING REFERENCE LEVEL:**

- 1/16 GSKT @ 50% COMPRESSION (In.) + 0.0313 (B)
- PVC FLANGE (OPTIONAL) (In.) + N/A (C)
- 1/8 GSKT @ 50% COMPRESSION (In.) + N/A (D)
- BALL VALVE FLANGE TO FLANGE (In.) + 9.0000 (E)
- BALL INSET DIM (FROM TOP) (In.) - 1.4700 (F)
- IMMRSN DEPTH IN SOLIDS (In.) + 0 (G)

**REFERENCE LEVEL**

<table>
<thead>
<tr>
<th>(In.)</th>
<th>600.1213</th>
</tr>
</thead>
</table>

**A + B + C + D + E - F + G**

<table>
<thead>
<tr>
<th>(Fe.)</th>
<th>50.0101</th>
</tr>
</thead>
</table>

---

A-146
TANK NUMBER: TX-103

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER: (H-2-37910)
RISER NUMBER: (8)
RISER ELEVATION (Ft.): 671.0400
TANK INSIDE BOTTOM ELEVATION: 622.7300
TANK SIDE-BOTTOM ELEVATION (Ft.): N/A
RISER TO TANK BOTTOM ELEVATION (In.): 48.3100

DETERMINING REFERENCE LEVEL:

1/16 GSKT @ 50% COMPRESSION (In.) + 0.0313
PVC FLANGE (OPTIONAL) (In.) + 1.0000
1/8 GSKT @ 50% COMPRESSION (In.) + 0.0625
BALL VALVE FLANGE TO FLANGE (In.) + 9.0000
BALL INSET DIM (FROM TOP) (In.) - 1.4700
IMMRSN DEPTH @ 1.05 Sp. G. (In.) + 0.2775

REFERENCE LEVEL (In.): 588.6212

*IMMERSION DEPTH CALCULATION

GOVERNING EQUATION
H = (4*FB)/(Sg*PI*D**2)

FB = BOUYANT FORCE = SET POINT = 15.0000 GRAMS
Sg = SPECIFIC GRAVITY OF LIQUID = 1.0500
D = DISPLACER DIAMETER = 2.0000 INCHES

H = IMMERSION DEPTH (FROM EQTN.) = 0.7048 CENTIMETERS

A-147
TANK NUMBER: TX-104

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER (H-2-37910)

RISER NUMBER (8)

RISER ELEVATION (Ft.) 669.9700

TANK INSIDE BOTTOM ELEVATION (Ft.) - 621.7300

TANK SIDE-BOTTOM ELEVATION (Ft.) - N/A

RISER TO TANK BOTTOM ELEVATION (Ft.) - 48.2400

578.88 (A)

DETERMINING REFERENCE LEVEL:

1/16 GSKT @ 50% COMPRESSION (In.) + 0.0313 (B)

FVC FLANGE (OPTIONAL) (In.) + 1.0000 (C)

1/8 GSKT @ 50% COMPRESSION (In.) + 0.0625 (D)

EXTENSION SPOOL (In.) + 12.0000

1/8 GASKET @ 50% COMPRESSION (In.) + 0.0625

BALL VALVE FLANGE TO FLANGE (In.) + 9.0000 (E)

BALL INSET DIM (FROM TOP) (In.) - 1.4700 (F)

IMMRSN DEPTH @ 1.05 Sp. G. (In.) + 0.2775 (G)

REFERENCE LEVEL (In.) + 599.8437

49.9870

(A + B + C + D + E + F + G)

*IMMERSSION DEPTH CALCULATION

GOVERNING EQUATION

H = (4 * Fb) / (Sg * F1 + D * 2)

Fb = BOUYANT FORCE = SET POINT = 15.0000 GRAMS

Sg = SPECIFIC GRAVITY OF LIQUID = 1.0500

D = DISPLACER DIAMETER = 2.0000 INCHES

H = IMMERSION DEPTH (FROM EQTN.) = 0.7448 CENTIMETERS

0.2775 INCH
DESIGN CALCULATION

Drawing: H-2-817634  Doc. No.: ECN 679520  Page 1 of 1

Building: 241-TX  Rev.: 0  Job No.: 2W-96-78

Subject: TX-105 ENGRAF REFERENCE LEVEL CALCULATION

Originate: JOHN HUBER  Date: 2/1/96

Checker: KEVIN HULME  Date: 2/12/96

TANK NUMBER: TX-105

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER: (H-2-37910)

RISER NUMBER: (8)

RISER ELEVATION (Ft.): 672.9100

TANK INSIDE BOTTOM ELEVATION (Ft.): 624.7300

TANK SIDE-BOTTOM ELEVATION (Ft.): N/A

RISER TO TANK BOTTOM ELEVATION (Ft.): 48.1800  (A)

RISER TO TANK BOTTOM ELEVATION (In.): 578.16  (A)

DETERMINING REFERENCE LEVEL:

1/16 GSKT @ 50% COMPRESSION (In.) + 0.0313  (B)

PVC FLANGE (OPTIONAL) (In.) + 1.0000  (C)

1/8 GSKT @ 50% COMPRESSION (In.) + 0.0625  (D)

EXTENSION SPOOL (In.) + 12.0000

1/8 GSKT @ 50% COMPRESSION (In.) + 0.0625

BALL VALVE FLANGE TO FLANGE (In.) + 9.0000  (E)

BALL INSET DIM (FROM TOP) (In.) - 1.4700  (F)

IMMRSN DEPTH IN SOLIDS (In.) + 0  (G)

REFERENCE LEVEL (In.): 598.8462  (A + B + C + D + E - F + G)

REFERENCE LEVEL (Ft.): 49.9039

A-149
TANK NUMBER: TX-106

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER: (H-2-37910)

RISER NUMBER: (8)

RISER ELEVATION (Ft.): 671.9600

TANK INSIDE BOTTOM ELEVATION (Ft.): -623.7300

TANK SIDE-BOTTOM ELEVATION (Ft.): N/A

RISER TO TANK BOTTOM ELEVATION (Ft.): 48.2300

In. 578.76 (A)

DETERMINING REFERENCE LEVEL:

1/16 GSKT @ 50% COMPRESSION (In.) + 0.0313 (B)

PVC FLANGE (OPTIONAL) (In.) + 1.0000 (C)

1/8 GSKT @ 50% COMPRESSION (In.) + 0.0625 (D)

EXTENSION SPOOL (In.) + 12.0000

1/8 GSKT @ 50% COMPRESSION (In.) + 0.0625

BALL VALVE FLANGE TO FLANGE (In.) + 9.0000 (H)

BALL INSET DIM (FROM TOP) (In.) - 1.4700 (F)

IMMRSN DEPTH IN SOLIDS (In.) + 0 (G)

REFERENCE LEVEL (In.) 599.4463

(A + B + C + D + E - F + G) 49.9539
**DESIGN CALCULATION**

<table>
<thead>
<tr>
<th>Drawing</th>
<th>H-2-37910</th>
<th>Doc. No.</th>
<th>ECN</th>
<th>629579</th>
<th>Page 1 of 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building</td>
<td>241 TX</td>
<td>Rev.</td>
<td>1</td>
<td>Job No.</td>
<td>2W-94-1176</td>
</tr>
<tr>
<td>Subject</td>
<td>TX-107 ENRIA REFERENCE LEVEL CALCULATION</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Originator</td>
<td>JOHN HUBER</td>
<td>Date</td>
<td>2/16/86</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Checker</td>
<td>KEVIN HUEY</td>
<td>Date</td>
<td>2/12/96</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**TANK NUMBER** TX-107

**BOTTOM OF TANK TO RISER DIMENSION**

<table>
<thead>
<tr>
<th>DRAWING NUMBER</th>
<th>H-2-37910</th>
</tr>
</thead>
<tbody>
<tr>
<td>RISER NUMBER</td>
<td>(8)</td>
</tr>
<tr>
<td>RISER ELEVATION (Ft.)</td>
<td>670.9400</td>
</tr>
<tr>
<td>TANK INSIDE BOTTOM ELEVATION (Ft.)</td>
<td>622.7300</td>
</tr>
<tr>
<td>TANK SIDE-BOTTOM ELEVATION (Ft.)</td>
<td>N/A</td>
</tr>
<tr>
<td>RISER TO TANK BOTTOM ELEVATION</td>
<td>46.2100</td>
</tr>
</tbody>
</table>

**DETERMINING REFERENCE LEVEL:**

1/16 GSKT @ 50% COMPRESSION (In.) + 0.0313 (B)

PVC FLANGE (OPTIONAL) (In.) + 1.0000 (C)

1/8 GSKT @ 50% COMPRESSION (In.) + 0.0625 (D)

EXTENSION SPOOL (In.) + 12.0000 (E)

1/8 GASKET @ 50% COMPRESSION (In.) + 0.0625 (F)

BALL VALVE FLANGE TO FLANGE (In.) + 9.0000 (G)

BALL INSET DIM (FROM TOP) (In.) + 1.4700 (H)

IMMRSN DEPTH IN SOLIDS (In.) + 0 (I)

**REFERENCE LEVEL** (In.)

(\(A + B + C + D + E + F + G\))

\(599.2063 + 49.9339 = 649.1402\)

A-151
TANK NUMBER TX-108

BOTTOM OF TANK TO RISER DIMENSION

<table>
<thead>
<tr>
<th>DRAWING NUMBER</th>
<th>RISER NUMBER</th>
<th>RISER ELEVATION (Ft.)</th>
<th>TANK INSIDE BOTTOM ELEVATION (Ft.)</th>
<th>TANK SIDE-BOTTOM ELEVATION (Ft.)</th>
<th>RISER TO TANK BOTTOM ELEVATION (In.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(H-2-37910)</td>
<td>(8)</td>
<td>669.9800</td>
<td>621.7300</td>
<td>N/A</td>
<td>48.2500</td>
</tr>
</tbody>
</table>

DETERMINING REFERENCE LEVEL:

\[
\text{REFERENCE LEVEL} = (A + B + C + D + E + F + G) \\
\]

<table>
<thead>
<tr>
<th>Component</th>
<th>Value (In.)</th>
<th>Calculation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/16 GSKT @ 50% COMPRESSION</td>
<td>0.0313</td>
<td>(B)</td>
</tr>
<tr>
<td>PVC FLANGE (OPTIONAL)</td>
<td>1.0000</td>
<td>(C)</td>
</tr>
<tr>
<td>1/8 GSKT @ 50% COMPRESSION</td>
<td>0.0625</td>
<td>(D)</td>
</tr>
<tr>
<td>EXTENSION SPOOL</td>
<td>12.0000</td>
<td></td>
</tr>
<tr>
<td>1/8 GASKET @ 50% COMPRESSION</td>
<td>0.0625</td>
<td></td>
</tr>
<tr>
<td>BALL VALVE FLANGE TO FLANGE</td>
<td>9.0000</td>
<td>(E)</td>
</tr>
<tr>
<td>BALL INSET DIM (FROM TOP)</td>
<td>1.4700</td>
<td>(F)</td>
</tr>
<tr>
<td>IMMERSION DEPTH IN SOLIDS</td>
<td>0</td>
<td>(G)</td>
</tr>
</tbody>
</table>

\[
\text{REFERENCE LEVEL} = 599.6863 \\
\text{(A + B + C + D + E + F + G)} = 49.9733
\]
TANK NUMBER TX-109

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER (H-2-37910)

RISER NUMBER (4)

RISER ELEVATION (Ft.) 672.1300

TANK INSIDE BOTTOM ELEVATION 624.7300

TANK SIDE-BOTTOM ELEVATION (Ft.) N/A

RISER TO TANK BOTTOM ELEVATION (Ft.) 47.4000

DETERMINING REFERENCE LEVEL:

1/16 GSKT @ 50% COMPRESSION (In.) + 0.0313 (B)

PVC FLANGE (OPTIONAL) (In.) + 1.0000 (C)

1/8 GSKT @ 50% COMPRESSION (In.) + 0.0625 (D)

BALL VALVE FLANGE TO FLANGE (In.) + 9.0000 (E)

BALL INSET DIM (FROM TOP) (In.) - 1.4700 (F)

IMMRSN DEPTH IN SOLIDS (In.) + 0.0000 (G)

REFERENCE LEVEL (In.) 577.4238

A-153
**DESIGN CALCULATION**

**Drawing**: H-2-817634  
**Doc. No.**: ECN 63952.0  
**Page**: 1 of 1  

**Building**: 241-TX  
**Rev.**: 0  
**Job No.**: 6W-96-90  

**Subject**: TX-110 ENRAF REFERENCE LEVEL CALCULATION  

**Originator**: JOHAN HUBER  
**Date**: 6/16/96  
**Checker**: KEVIN HUBER  
**Date**: 2/1/96  

---

**TANK NUMBER**: TX-110  
**BOTTOM OF TANK TO RISER DIMENSION**  

**DRAWING NUMBER**: (H-2-37910)  
**RISER NUMBER**: (7)  
**RISER ELEVATION** (Ft.): 671.2500  
**TANK INSIDE BOTTOM ELEVATION** (Ft.): 623.7300  
**TANK SIDE-BOTTOM ELEVATION** (Ft.): N/A  
**RISER TO TANK BOTTOM ELEVATION** (Ft.)  

<table>
<thead>
<tr>
<th>Description</th>
<th>Value (In.)</th>
<th>Description</th>
<th>Value (In.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/16 GSKT @ 50% COMPRESSION</td>
<td>0.0313</td>
<td>(B)</td>
<td></td>
</tr>
<tr>
<td>PVC FLANGE (OPTIONAL)</td>
<td>1.0000</td>
<td>(C)</td>
<td></td>
</tr>
<tr>
<td>1/8 GSKT @ 50% COMPRESSION</td>
<td>0.0625</td>
<td>(D)</td>
<td></td>
</tr>
<tr>
<td>MULTI-PORT</td>
<td>14.1250</td>
<td>(E)</td>
<td></td>
</tr>
<tr>
<td>1/8 GSKT @ 50% COMPRESSION</td>
<td>0.0625</td>
<td>(F)</td>
<td></td>
</tr>
<tr>
<td>BALL VALVE FLANGE TO FLANGE</td>
<td>9.0000</td>
<td>(G)</td>
<td></td>
</tr>
<tr>
<td>BALL INSET DIM (FROM TOP)</td>
<td>1.4700</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IMMRSN DEPTH IN SOLIDS</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>REFERENCE LEVEL</strong> (In.)</td>
<td>533.0513</td>
<td><strong>REFERENCE LEVEL</strong> (Ft.)</td>
<td>49.4209</td>
</tr>
</tbody>
</table>

**DETERMINING REFERENCE LEVEL**:

\[ A + B + C + D + E - F + G \]

---

A-154
TANK NUMBER  TX-111

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER  (H-2-37910)

RISER NUMBER  (1)

RISER ELEVATION  (Ft.)  670.1400

TANK INSIDE BOTTOM ELEVATION  (Ft.) - 622.7300

TANK SIDE-BOTTOM ELEVATION  (Ft.) - N/A

RISER TO TANK BOTTOM ELEVATION  (Ft.)  47.4100  (A)

DETERMINING REFERENCE LEVEL:

1/16 GSKT @ 50% COMPRESSION  (In.) + 0.0313  (B)

PVC FLANGE (OPTIONAL)  (In.) + 1.0000  (C)

1/8 GSKT @ 50% COMPRESSION  (In.) + 0.0625  (D)

EXTENSION SPOOL  (In.) + 12.0000

1/8 GSKT @ 50% COMPRESSION  (In.) + 0.0625

BALL VALVE FLANGE TO FLANGE  (In.) + 9.0000  (E)

BALL INSET DIM (FROM TOP)  (In.) - 1.4700  (F)

IMMRSN DEPTH IN SOLIDS  (In.) + 0  (G)

REFERENCE LEVEL  (In.)  569.6063

(A + B + C + D + E - F + G)  49.1339
DESIGN CALCULATION

Drawing Number: H-2-37910

Subject: TX-112 ENRAF REFERENCE LEVEL CALCULATION

TANK NUMBER: TX-112

DRAWING NUMBER: H-2-37910

RISER NUMBER: (1)

RISE ELEVATION (Ft.): 669.1800

TANK INSIDE BOTTOM ELEVATION (Ft.): 621.7300

TANK SIDE-BOTTOM ELEVATION (Ft.): N/A

RISE TO TANK BOTTOM ELEVATION (Ft.): 47.4500

DETERMINING REFERENCE LEVEL:

1/16 GSKT @ 50% COMPRESSION (In.) + 0.0313 (B)

PVC FLANGE (OPTIONAL) (In.) + 1.0000 (C)

1/8 GSKT @ 50% COMPRESSION (In.) + 0.0625 (D)

EXTENSION SPOOL (In.) + 36.0000

1/8 GSKT @ 50% COMPRESSION (In.) + 0.0625

BALL VALVE FLANGE TO FLANGE (In.) + 9.0000 (E)

BALL INSET DIM (FROM TOP) (In.) - 1.4700 (F)

IMMRSN DEPTH IN SOLIDS (In.) + 0 (G)

REFERENCE LEVEL (Ft.) = 614.0862 (A) + 51.1739

A-156
TANK NUMBER TX-113

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER (H-2-37910)
RISER NUMBER (1)
RISER ELEVATION (Ft.) 671.9700
TANK INSIDE BOTTOM ELEVATION (Ft.) - 624.7300
TANK SIDE-BOTTOM ELEVATION (Ft.) - N/A
RISER TO TANK BOTTOM ELEVATION (Ft.) - 47.2400

DETERMINING REFERENCE LEVEL:

1/16 GSKT @ 50% COMPRESSION (In.) + 0.0313 (B)
PVC FLANGE (OPTIONAL) (In.) + 1.0000 (C)
1/8 GSKT @ 50% COMPRESSION (In.) + 0.0625 (D)
BALL VALVE FLANGE TO FLANGE (In.) + 9.0000 (E)
BALL INSET DIM (FROM TOP) (In.) - 1.4700 (F)
IMMRSN DEPTH IN SOLIDS (In.) + 0 (G)

REFERENCE LEVEL (In.) 575.5038

(A + B + C + D + E - F + G) (Ft.) 47.9586
### DESIGN CALCULATION

**Drawing:** H-2-37910  
**Doc. No.:** ECN 625943  
**Page:** 1 of 1

**Building:** 241-TX  
**Rev.:** 0  
**Job No.:** 2W-96-84

**Subject:** TX-114 ENRAF REFERENCE LEVEL CALCULATION

**Originator:** JOHN HUBER  
**Date:** 2/19/96

**Checker:** KEVIN HOLL  
**Date:** 2/19/96

---

**TANK NUMBER:** TX-114

**BOTTOM OF TANK TO RISER DIMENSION**

<table>
<thead>
<tr>
<th>Description</th>
<th>Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>DRAWING NUMBER</td>
<td>H-2-37910</td>
</tr>
<tr>
<td>RISER NUMBER</td>
<td>(8)</td>
</tr>
<tr>
<td>RISER ELEVATION (Ft.)</td>
<td>671.1400</td>
</tr>
<tr>
<td>TANK INSIDE BOTTOM ELEVATION (Ft.)</td>
<td>623.7300</td>
</tr>
<tr>
<td>TANK SIDE-BOTTOM ELEVATION (Ft.)</td>
<td>N/A</td>
</tr>
<tr>
<td>RISER TO TANK BOTTOM ELEVATION (Ft.)</td>
<td>47.4100</td>
</tr>
<tr>
<td>RISER TO TANK BOTTOM ELEVATION (In.)</td>
<td>568.92 (A)</td>
</tr>
</tbody>
</table>

**DETERMINING REFERENCE LEVEL:**

- 1/16 GSKT @ 50% COMPRESSION (In.) + 0.0313 (B)
- PVC FLANGE (OPTIONAL) (In.) + 1.0000 (C)
- 1/8 GSKT @ 50% COMPRESSION (In.) + 0.0625 (D)
- BALL VALVE FLANGE TO FLANGE (In.) + 9.0000 (E)
- BALL INSET DIM (FROM TOP) (In.) + 1.4700 (F)
- IMMRSN DEPTH IN SOLIDS (In.) + 0 (G)

**REFERENCE LEVEL (In.)** 577.5438

**REFERENCE LEVEL (Ft.)** 48.1286

---

A-158
**DESIGN CALCULATION**

**TANK NUMBER** TX-115

**BOTTOM OF TANK TO RISER DIMENSION**

<table>
<thead>
<tr>
<th>DRAWING NUMBER</th>
<th>RISER NUMBER</th>
<th>RISER ELEVATION (Ft.)</th>
<th>TANK INSIDE BOTTOM ELEVATION (Ft.)</th>
<th>TANK SIDE-BOTTOM ELEVATION (Ft.)</th>
<th>RISER TO TANK BOTTOM ELEVATION (Ft.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(H-2-37910)</td>
<td>(1)</td>
<td>670.1500</td>
<td>622.7300</td>
<td>N/A</td>
<td>47.4200</td>
</tr>
</tbody>
</table>

**DETERMINING REFERENCE LEVEL:**

\[
\text{REFERENCE LEVEL (Ft.)} = (A + B + C + D + E + F + G)
\]

<table>
<thead>
<tr>
<th>Component</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/16 GSKT @ 50% COMPRESSION (In.)</td>
<td>0.0313</td>
</tr>
<tr>
<td>PVC FLANGE (OPTIONAL) (In.)</td>
<td>1.0000</td>
</tr>
<tr>
<td>1/8 GSKT @ 50% COMPRESSION (In.)</td>
<td>0.0625</td>
</tr>
<tr>
<td>BALL VALVE FLANGE TO FLANGE (In.)</td>
<td>9.0000</td>
</tr>
<tr>
<td>BALL INSET DIM (FROM TOP) (In.)</td>
<td>1.4700</td>
</tr>
<tr>
<td>IMMRSN DEPTH IN SOLIDS (In.)</td>
<td>0</td>
</tr>
</tbody>
</table>

\[
\text{REFERENCE LEVEL (Ft.)} = 577.6637
\]

\[
\text{REFERENCE LEVEL (Ft.)} = 48.1386
\]
TANK NUMBER: TX-116

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER: (H-2-37910)

RIKER NUMBER: (1)

RIKER ELEVATION (Ft.) 672.0300

TANK INSIDE BOTTOM ELEVATION (Ft.) - 624.7300

TANK SIDE-BOTTOM ELEVATION (Ft.) - N/A

RIKER TO TANK BOTTOM ELEVATION (Ft.) - 47.3000

(R) 567.6

DETERMINING REFERENCE LEVEL:

1/16 GSKT @ 50% COMPRESSION (In.) + 0.0313 (B)

PVC FLANGE (OPTIONAL) (In.) + 1.0000 (C)

1/8 GSKT @ 50% COMPRESSION (In.) + 0.0625 (D)

BALL VALVE FLANGE TO FLANGE (In.) + 9.0000 (E)

BALL INSERT DIM (FROM TOP) (In.) - 1.4700 (F)

IMMRSN DEPTH IN SOLIDS (In.) + 0 (G)

REFERENCE LEVEL (In.) 576.2237 (A)

[ A + B + C + D + E - F + G ] 48.0186 (P)
TANK NUMBER TX-117

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER (H-2-37910)

RISER NUMBER (11A)

RISER ELEVATION (Ft.) 670.3700

TANK INSIDE BOTTOM ELEVATION (Ft.) - 623.7300

TANK SIDE-BOTTOM ELEVATION (Ft.) - N/A

RISER TO TANK BOTTOM ELEVATION (Ft.) 46.6400 (A)

TANK INSIDE BOTTOM ELEVATION (Ft.) - 623.7300

RISER TO TANK BOTTOM ELEVATION (Ft.) 46.6400

DETERMINING REFERENCE LEVEL:

1/16 GSKT @ 50% COMPRESSION (In.) + 0.0313 (B)

PVC FLANGE (OPTIONAL) (In.) + 1.0000 (C)

1/8 GSKT @ 50% COMPRESSION (In.) + 0.0625 (D)

EXTENSION SPOOL (In.) + 12.0000

1/8 GSKT @ 50% COMPRESSION (In.) + 0.0625

BALL VALVE FLANGE TO FLANGE (In.) + 9.0000 (E)

BALL INSET DIM (FROM TOP) (In.) - 1.4700 (F)

INMRSN DEPTH IN SOLIDS (In.) + 0 (G)

REFERENCE LEVEL (In.) 580.3663

(A + B + C + D + E - F + G) 48.3639
TANK NUMBER TX-118

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER (H-2-37381)

RISER NUMBER (4)

RISER ELEVATION (Ft.) 670.2100

TANK INSIDE BOTTOM ELEVATION - 622.7300

TANK SIDE-BOTTOM ELEVATION (Ft.) - N/A

RISER TO TANK BOTTOM ELEVATION (In.) 47.4800

DETERMINING REFERENCE LEVEL:

1/16 GSKT @ 50% COMPRESSION (In.) + 0.0313 (B)
PVC FLANGE (OPTIONAL) (In.) + 1.0000 (C)
1/8 GSKT @ 50% COMPRESSION (In.) + 0.0625 (D)
BALL VALVE FLANGE TO FLANGE (In.) + 9.0000 (E)
BALL INSET DIM (FROM TOP) (In.) - 1.4700 (F)
IMMRSN DEPTH @ 1.05 Sp. G. (In.) + 0.2775 (G)

REFERENCE LEVEL (In.) 578.6612

(A + B + C + D + E - F + G) 48.2218

*IMMERSION DEPTH CALCULATION

GOVERNING EQUATION

\[ H = \frac{(4*Fb)}{(Sg*F1*D**2)} \]

\[ Fb = \text{BOUyANT FORCE = SET POINT} = 15.0000 \text{ GRAMS} \]

\[ Sg = \text{SPECIFIC GRAVITY OF LIQUID} = 1.0500 \]

\[ D = \text{DISPLACER DIAMETER} = 2.0000 \text{ INCHES} \]

\[ H = \text{IMMERSION DEPTH (FROM EQTN.)} = 0.7048 \text{ CENTIMETERS} \]

0.2775 \text{ INCH}
Note: Upon placing the Enraf into service using the Rev 0 Reference Level, it was a level of 1' was obtained as opposed to 34' — the last known FIC level. It was decided that the reference drawings used to calculate the original RL were wrong. A secondary method for determining RL is to use the old FIC RL and back-calculate the top-of-ball valve level (the RL). This method is used here.

<table>
<thead>
<tr>
<th>TANK NUMBER</th>
<th>TX-302-C</th>
</tr>
</thead>
<tbody>
<tr>
<td>OLD FIC REFERENCE LEVEL (In.)</td>
<td>466.6000</td>
</tr>
<tr>
<td>DIST FROM RISER FLG TO FIC REF. POINT (In.)</td>
<td>33.2500</td>
</tr>
<tr>
<td>BALL VALVE LENGTH (In.)</td>
<td>+9.0000</td>
</tr>
<tr>
<td>BALL VALVE INSET DIM. (In.)</td>
<td>-1.4700</td>
</tr>
<tr>
<td>REFERENCE LEVEL =</td>
<td>440.8800</td>
</tr>
</tbody>
</table>
TANK NUMBER    TY-101

BOTTOM OF TANK TO RISER

DRAWING NUMBER (H-2-37381)

RISER NUMBER (1)

RISER ELEVATION (Ft.) 671.9700  OK > 685

TANK INSIDE BOTTOM ELEVATION - 626.3300  OK

TANK SIDE-BOTTOM ELEVATION - N/A

RISER TO TANK BOTTOM ELEVATION (In.)  45.6400  (A) OK

547.68

DETERMINING REFERENCE LEVEL:

1/16 GASKET @ 50% COMPRESSION + 0.0313  (B) OK

PVC FLANGE (OPTIONAL)  (In.) + 1.0000  (C) OK

1/8 GASKET @ 50% COMPRESSION + 0.0625  (D) OK

BALL VALVE FLANGE TO FLANGE + 9.0000  (E) OK

BALL INSET DIM (FROM TOP) - 1.4700  (F) OK

IMMERSION DEPTH IN SOLIDS + 0  (G) OK

REFERENCE LEVEL (In.) 556.3038  (A+B+C+D+E+F+G)  OK > 685
TANK NUMBER: TY-102

BOTTOM OF TANK TO RISER

DRAWING NUMBER: (H-2-37381)

RISER NUMBER: (1)

RISER ELEVATION (Ft.): 50.000

TANK INSIDE BOTTOM ELEVATION: 625.3300

TANK SIDE-BOTTOM ELEVATION: N/A

RISER TO TANK BOTTOM ELEVATION: 547.68 (Ft.)

DETERMINING REFERENCE LEVEL:

1/16 GASKET @ 50% COMPRESSION + 0.0313 (B)

PVC FLANGE (OPTIONAL) (In.) + 1.0000 (C)

1/8 GASKET @ 50% COMPRESSION + 0.0625 (D)

BALL VALVE FLANGE TO FLANGE + 9.0000 (E)

BALL INSET DIM (FROM TOP) - 1.4700 (F)

IMMERSION DEPTH AT 1.05 Sp. G. + 0.2775 (G)

REFERENCE LEVEL (In.): 556.5812

IMMERSION DEPTH (FROM EQUATION): 46.3818 (A + B + C + D + E + F + G)

*IMMERSION DEPTH CALCULATION

GOVERNING EQUATION

\[ H = \frac{4 \times F_b}{S_g \times \pi \times D^2} \]

\[ F_b = \text{BOUYANT FORCE} = \text{SET POINT} = 15.0000 \text{ GRAMS} \]

\[ S_g = \text{SPECIFIC GRAVITY OF LIQUID} = 1.0500 \]

\[ D = \text{DISPLACER DIAMETER} = 2.0000 \text{ INCHES} \]

IMMERSION DEPTH (FROM EQUATION) = 0.2048 CENTIMETERS 0.02775 INCH OK - 565
TANK NUMBER: TY-103

BOTTOM OF TANK TO RISER

DRAWING NUMBER: (H-2-37381)

RISER NUMBER: (1)

RISER ELEVATION (Ft.): 671.9200

TANK INSIDE BOTTOM ELEVATION: 626.3300

TANK SIDE-BOTTOM ELEVATION: N/A

RISER TO TANK BOTTOM ELEVATION (In.): 45.5900

DETERMINING REFERENCE LEVEL:

1/16 GASKET @ 50% COMPRESSION + 0.0313 (B) OK

PVC FLANGE (OPTIONAL) (In.) + 1.0000 (C) OK

1/8 GASKET @ 50% COMPRESSION + 0.0625 (D) OK

BALL VALVE FLANGE TO FLANGE + 9.0000 (E) OK

BALL INSET DIM (FROM TOP) - 1.4700 (F) OK

IMMERSION DEPTH IN SOLIDS + 0 (G) OK

REFERENCE LEVEL (In.): 555.7037

(A + B + C + D + E - F + G) 46.3086 OK - SUS
TANK NUMBER  
TY-104

BOTTOM OF TANK TO RISER

DRAWING NUMBER (H-2-37381)
RISER NUMBER (1)
RISER ELEVATION (Ft.) 670.9700
TANK INSIDE BOTTOM ELEVATION - 625.3300
TANK SIDE-BOTTOM ELEVATION - N/A
RISER TO TANK BOTTOM ELEVATION (In.) 45.6400
547.68 (A)  

DETERMINING REFERENCE LEVEL:

1/16 GASKET @ 50% COMPRESSION + 0.0313 (B)  
PVC FLANGE (OPTIONAL) (In.) + 1.0000 (C) OK  
1/8 GASKET @ 50% COMPRESSION + 0.0625 (D)  
BALL VALVE FLANGE TO FLANGE + 9.0000 (E) OK  
BALL INSET DIM (FROM TOP) + 1.4700 (F) OK  
IMMERSION DEPTH AT 1.05 Sp. G. + 0.2775 (G) OK  

REFERENCE LEVEL (In.) 556.5812
546.3818 (Ft.)  

*IMMERSION DEPTH CALCULATION

GOVERNING EQUATION
H = (4*Fb)/(Sg*Pi*D**2)

Fb = BOUYANT FORCE = SET POINT = 15.0000 GRAMS
Sg = SPECIFIC GRAVITY OF LIQUID = 1.0500
D = DISPLACER DIAMETER = 2.0000 INCHES

IMMERSION DEPTH (FROM EQUATION) = 0.7048 CENTIMETERS
0.2775 INCH  

NEW BALL VALVE PER H-2-817634, 
PIN 48, INSET DIMENSION FIELD 
MEASURED  

OK - SLS
DESIGN CALCULATION

TANK NUMBER  TY-105

BOTTOM OF TANK TO RISER

DRAWING NUMBER (H-2-37381)
RISER NUMBER 414 Z
RISER ELEVATION (Ft.)  671.9500
TANK INSIDE BOTTOM ELEVATION - 626.3300
TANK SIDE-BOTTOM ELEVATION - N/A

RISER TO TANK BOTTOM ELEVATION (In.) 45.6200

DETERMINING REFERENCE LEVEL:

1/16 GASKET @ 50% COMPRESSION + 0.0313 (B) OK
PVC FLANGE (OPTIONAL) (In.) + 0.0000 (C) NO PVC LINER OK
1/8 GASKET @ 50% COMPRESSION + 0.0000 (D) OK
BALL VALVE FLANGE TO FLANGE + 9.0000 (E) OK
BALL INSET DIM (FROM TOP) - IMMERSION DEPTH AT IN SOLIDS + 1.4700 (F) OK
REFERENCE LEVEL (In.) 555.0013
(A + B + C + D + E - F + G)

547.44 (A) OK

REPLACING MT,

NEW BALL VALVE PER H-2-817634,
P/N 48, INSET DIMENSION FIELD MEASURED.

OK - 525
TANK NUMBER TY-106

BOTTOM OF TANK TO RISER

DRAWING NUMBER (H-2-37381)

RISER NUMBER (1)

RISER ELEVATION (Ft.) 670.8000 670.9680

TANK INSIDE BOTTOM ELEVATION 625.3300

TANK SIDE-BOTTOM ELEVATION N/A

RISER TO TANK BOTTOM ELEVATION (In.) 45.5900 45.6300

DETERMINING REFERENCE LEVEL:

1/16 GASKET @ 50% COMPRESSION + 0.0313 (B) BLANK FLANGE,

PVC FLANGE (OPTIONAL) (In.) + 0.0000 (C) NO PVC LINER

1/8 GASKET @ 50% COMPRESSION + 0.0000 (D)

BALL VALVE FLANGE TO FLANGE + 9.0000 (E)

BALL INSET DIM (FROM TOP) - 1.4700 (F)

IMMERSION DEPTH AT IN SOLIDS + 0 (G)

REFERENCE LEVEL (In.) 554.4012 555.1213 11/14/95

(A + B + C + D + E - F + G)

NEW BALL VALVE PER H-2-817634,
PIN 46, INSET DIMENSION FIELD MEASURED

V 234-2881 46.2621
THIS PAGE RESERVED FOR U-101
TANK NUMBER U-102

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER (H-2-37381)
RISER NUMBER (8)
RISER ELEVATION (Ft.) 665.8500
TANK CL BOTTOM ELEVATION (Ft.) - 627.0000
RISER TO TANK BOTTOM DIMENSION (Ft.) 38.8500 (In.) 466.2 (A)

DETERMINING REFERENCE LEVEL:

1/16 GASKET @ 50% COMPRESSION (In.) + 0.0313 (B)
PVC FLANGE (OPTIONAL) (In.) + 1.0000 (C)
1/8 GASKET @ 50% COMPRESSION (In.) + 0.0625 (D)
BALL VALVE FLANGE TO FLANGE (In.) + 9.0000 (E)
BALL INSET DIM (FROM TOP) (In.) - 1.4700 (F)
IMMERSION DEPTH AT 1.05 Sp. G. (In.) + 0.2775 (G)

REFERENCE LEVEL (In.) 475.1012 (Ft.) 39.5918

*IMMERSION DEPTH CALCULATION

GOVERNING EQUATION
H = (4*Fb)/(Sg*P1*D**2)

Fb = BOUYANT FORCE = SET POINT = 15.0000 GRAMS
Sg = SPECIFIC GRAVITY OF LIQUID = 1.0500
D = DISPLACER DIAMETER = 2.0000 INCHES

H = IMMERSION DEPTH (FROM EQUATION) = 0.7048 CENTIMETERS
0.2775 INCH
<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>TANK NUMBER</td>
<td>U-103</td>
</tr>
<tr>
<td>BOTTOM OF TANK TO RISER DIMENSION</td>
<td></td>
</tr>
<tr>
<td>DRAWING NUMBER</td>
<td>(H-2-37381)</td>
</tr>
<tr>
<td>RISER NUMBER</td>
<td>(8)</td>
</tr>
<tr>
<td>RISER ELEVATION (Ft.)</td>
<td>664.9000</td>
</tr>
<tr>
<td>TK CENTERLINE BOTTOM ELEV. (Ft.)</td>
<td>626.0000</td>
</tr>
<tr>
<td>RISER TO TANK BOTTOM ELEV. (Ft.)</td>
<td>38.9000</td>
</tr>
<tr>
<td>RISER TO TANK BOTTOM ELEV. (In.)</td>
<td>466.8</td>
</tr>
<tr>
<td>DETERMINING REFERENCE LEVEL:</td>
<td></td>
</tr>
<tr>
<td>1/16 GASKET @ 50% COMPRESSION (In.)</td>
<td>+ 0.0313</td>
</tr>
<tr>
<td>PVC FLANGE (OPTIONAL) (In.)</td>
<td>+ 1.0000</td>
</tr>
<tr>
<td>1/8 GASKET @ 50% COMPRESSION (In.)</td>
<td>+ 0.0625</td>
</tr>
<tr>
<td>BALL VALVE FLANGE TO FLANGE (In.)</td>
<td>+ 9.0000</td>
</tr>
<tr>
<td>BALL INSET DIM (FROM TOP) (In.)</td>
<td>- 1.2100</td>
</tr>
<tr>
<td>IMMERSION DEPTH AT 1.05 Sp. G. (In.)</td>
<td>+ 0.2775</td>
</tr>
<tr>
<td>REFERENCES LEVEL (In.)</td>
<td>+ 475.9612</td>
</tr>
<tr>
<td>REFERENCES LEVEL (Ft.)</td>
<td>39.5634</td>
</tr>
</tbody>
</table>

**IMMERSION DEPTH CALCULATION**

**GOVERNING EQUATION**

\[ H = \frac{4 \times F_b}{S_g \times F_1 \times D^2} \]

- \( F_b = \) BOUyANT FORCE = SET POINT = 15.0000 GRAMS
- \( S_g = \) SPECIFIC GRAVITY OF LIQUID = 1.0500
- \( D = \) DISPLACER DIAMETER = 2.0000 INCHES

- \( H = \) IMMERSION DEPTH (FROM EQUATION) = 0.7048 CENTIMETERS
- \( 0.2775 \) INCH
THIS PAGE RESERVED FOR U-104
TANK NUMBER U-105

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER (H-2-37381)
RISER NUMBER (B)
RISER ELEVATION (Ft.) 665.9500
TANK CL BOTTOM ELEV. (Ft.) - 627.0000
RISER TO TANK BOTTOM ELEV. (Ft.) 38.9500 (A)

DETERMINING REFERENCE LEVEL:

1/16 GASKET @ 50% COMPRESSION (In.) + 0.0313 (B)
PVC FLANGE (OPTIONAL) (In.) + 1.0000 (C)
1/8 GASKET @ 50% COMPRESSION (In.) + 0.0625 (D)
BALL VALVE FLANGE TO FLANGES (In.) + 9.0000 (E)
BALL INSET DIM (FROM TOP) (In.) - 1.2100 (F)
IMMERSION DEPTH AT 1.05 Sp. G. (In.) + 0.2775 (G)

REFERENCE LEVEL (In.) 476.5612 (A+B+C+D+E+F+G)

IMMERSION DEPTH CALCULATION

GOVERNING EQUATION
H = (4*Fb)/(Sg*Pi*D**2)

Fb = BOUyANT FORCE = SET POINT = 15.0000 GRAMS
Sg = SPECIFIC GRAVITY OF LIQUID = 1.0500
D = DISPLACER DIAMETER = 2.0000 INCHES

H = IMMERSION DEPTH (FROM EQUATION) = 0.7048 CENTIMETERS

0.2775 INCH
## DESIGN CALCULATION

### Tank Number
U-106

### Bottom of Tank to Riser Dimension

<table>
<thead>
<tr>
<th>Drawing Number</th>
<th>H-2-37381</th>
</tr>
</thead>
<tbody>
<tr>
<td>Riser Number</td>
<td>(8)</td>
</tr>
<tr>
<td>Riser Elevation (Ft.)</td>
<td>664.9300</td>
</tr>
<tr>
<td>Tank CL Bottom Elev. (Ft.)</td>
<td>-626.0000</td>
</tr>
<tr>
<td>Riser to Tank Bottom Elev. (Ft.)</td>
<td>38.9300</td>
</tr>
<tr>
<td>(In.)</td>
<td>467.16</td>
</tr>
</tbody>
</table>

### Determining Reference Level:

1/16 Gasket @ 50% Compression (In.) + 0.0313 (B)

PVC Flange (Optional) (In.) + 1.0000 (C)

1/8 Gasket @ 50% Compression (In.) + 0.0625 (D)

Ball Valve Flange to Flange (In.) + 9.0000 (E)

Ball Inset Dim (From Top) (In.) - 1.2100 (F)

Immiscion Depth at 1.05 Sp. G. (In.) + 0.2775 (G)

### Reference Level (In.)

- **A**: 39.6934
- **B**: 39.6934
- **C**: 39.6934
- **D**: 39.6934
- **E**: 39.6934
- **F**: 39.6934
- **G**: 39.6934

### Immiscion Depth Calculation

**Governing Equation**

\[
H = \left(\frac{4*Fb}{(Sg*\pi*D^2)}\right)
\]

- **Fb**: Bouyant Force = Set Point = 15.0000 grams
- **Sg**: Specific Gravity of Liquid = 1.0500
- **D**: Displacer Diameter = 2.0000 inches

**H**: Immiscion Depth (From Equation) = 0.7048 centimeters

0.2775 inch
TANK NUMBER

U-107

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER (H-2-37381)

RISER NUMBER (8)

RISER ELEVATION (Ft.) 666.9100

TANK CL BOTTOM ELEV. (Ft.) 628.0000

RISER TO TANK BOTTOM ELEV. (Ft.) 38.9100

DETERMINING REFERENCE LEVEL:

1/16 GASKET @ 50% COMPRESSION (In.) + 0.0313 (B)

PVC FLANGE (OPTIONAL) (In.) + 1.0000 (C)

1/8 GASKET @ 50% COMPRESSION (In.) + 0.0625 (D)

BALL VALVE FLANGES TO FLANGE (In.) + 9.0000 (E)

BALL INSET DIM (FROM TOP) (In.) - 1.2100 (F)

IMMERSION DEPTH AT 1.05 Sp. G. (In.) + 0.2775 (G)

REFERENCE LEVEL (In.) 476.0812

A + B + C + D + E - F + G

(FT.) 39.6734

*IMMERSION DEPTH CALCULATION

GOVERNING EQUATION

H = (4*Fb)/(Sg*Pl*D**2)

Fb = BOUYNANT FORCE = SET POINT = 15.0000 GRAMS

Sg = SPECIFIC GRAVITY OF LIQUID = 1.0500

D = DISPLACER DIAMETER = 2.0000 INCHES

H = IMMERSION DEPTH (FROM EQUATION) = 0.7048 CENTIMETERS

0.2775 INCH

A-176
TANK NUMBER U-108

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER (H-2-37381)
RISER NUMBER (8)
RISER ELEVATION (Ft.) 665.9500
TANK CL BOTTOM ELEV. (Ft.) - 627.0000
RISER TO TANK BOTTOM ELEV. (Ft.) 38.9500 (A)

DETERMINING REFERENCE LEVEL:

1/16 GASKET @ 50% COMPRESSION (In.) + 0.0313 (B)
PVC FLANGE (OPTIONAL) (In.) + 1.0000 (C)
1/8 GASKET @ 50% COMPRESSION (In.) + 0.0625 (D)
BALL VALVE FLANGE TO FLANGE (In.) + 9.0000 (E)
BALL INSET DIM (FROM TOP) (In.) - 1.4700 (F)
IMMERSION DEPTH AT 1.05 Sp. G. (In.) + 0.2775 (G)

REFERENCE LEVEL (In.) 476.3012
(A + B + C + D + E + F + G)
(FL.) 39.6918

*IMMERSION DEPTH CALCULATION

GOVERNING EQUATION
H = (4*Fb)/(Sg*Pi*D**2)

Fb = BOUYANT FORCE = SET POINT = 15.0000 GRAMS
Sg = SPECIFIC GRAVITY OF LIQUID = 1.0500
D = DISPLACER DIAMETER = 2.0000 INCHES

H = IMMERSION DEPTH (FROM EQUATION) = 0.7048 CENTIMETERS
0.2775 INCH
TANK NUMBER U-109

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER (H-2-37381)

RISER NUMBER (8)

RISER ELEVATION (Ft.) 664.9700

TANK CL BOTTOM ELEV. (Ft.) 626.0000

RISER TO TANK BOTTOM ELEV. (Ft.) 38.9700

Determining Reference Level:

1/16 GASKET @ 50% COMPRESSION (In.) + 0.0313 (B)

PVC FLANGE (OPTIONAL) (In.) + 1.0000 (C)

1/8 GASKET @ 50% COMPRESSION (In.) + 0.0625 (D)

BALL VALVE FLANGE TO FLANGE (In.) + 9.0000 (E)

BALL INSET DIM (FROM TOP) (In.) - 1.2100 (F)

IMMERSION DEPTH AT 1.05 Sp. G. (In.) + 0.2775 (G)

REFERENCE LEVEL (In.) 476.8012

(A + B + C + D + E + B - F + G)

Immersion Depth Calculation

GOVERNING EQUATION

H = (4*Fb)/(Sg*Pi*D**2)

Fb = BOUYANT FORCE = SET POINT = 15.0000 GRAMS

Sg = SPECIFIC GRAVITY OF LIQUID = 1.0500

D = DISPLACER DIAMETER = 2.0000 INCHES

H = IMMERSION DEPTH (FROM EQUATION) = 0.7048 CENTIMETERS

0.2775 INCH
## DESIGN CALCULATION

<table>
<thead>
<tr>
<th>Drawing</th>
<th>H-2-817634</th>
<th>Doc. No.</th>
<th>ECN</th>
<th>626467</th>
<th>Page 1 of 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building</td>
<td>241-U</td>
<td>Rev.</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subject</td>
<td>U-110 ENRAF REFERENCE LEVEL CALCULATION</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Originator</td>
<td>JOHN HUBER</td>
<td>Date</td>
<td>10/24/95</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Checker</td>
<td>Nasser Kazem</td>
<td>Date</td>
<td>11/6/95</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### TANK NUMBER

**U-110**

### BOTTOM OF TANK TO RISER DIMENSION

- **DRAWING NUMBER:** H-2-37381
- **RISER NUMBER:** (B)
- **RISER ELEVATION (Ft.):** 666.9200
- **TANK CL BOTTOM ELEVATION (Ft.):** -628.0000
- **RISER TO TANK BOTTOM DIMENSION (Ft.):** 38.9200
- **RISER TO TANK BOTTOM DIMENSION (In.):** 467.04

### DETERMINING REFERENCE LEVEL:

1/16 GASKET @ 50% COMPRESSION (In.) + 0.0313 (B)
- PVC FLANGE (OPTIONAL) (In.) + 1.0000 (C)
- 1/8 GASKET @ 50% COMPRESSION (In.) + 0.0625 (D)
- BALL VALVE FLANGE TO FLANGE (In.) + 9.0000 (E)
- BALL INSET DIM (FROM TOP) (In.) - 1.4700 (F)
- IMMERSION DEPTH IN SOLIDS (In.) + 0.0000 (G)

**REFERENCE LEVEL (IN.):** [FIELD MEASURED FROM H-2-817634 P/N 48]

\[
A = 475.6637
\]

**REFERENCE LEVEL (FT.):** 39.6386

---

A-179
TANK NUMBER  U-111

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER  (H-2-37381)

RISE R NUMBER  (8)

RISE ELEVATION  (Ft.)  665.9900

TANK CL BOTTOM ELEVATION  (Ft.) -627.0000

RISE TO TANK BOTTOM DIMENSION  (Ft.)  38.9900

( In.)  467.88  (A)

DETERMINING REFERENCE LEVEL:

1/16 GASKET @ 50% COMPRESSION  (In.) + 0.0313  (B)

PVC FLANGE (OPTIONAL)  (In.) + 1.0000  (C)

1/8 GASKET @ 50% COMPRESSION  (In.) + 0.0625  (D)

BALL VALVE FLANGE TO FLANGE  (In.) + 9.0000  (E)

BALL INSET DIM (FROM TOP)  (In.) - 1.4700  (F)

IMMERSION DEPTH IN SOLIDS  (In.) + 0.0000  (G)

REFERENCE LEVEL  (In.)  476.5038

(FT.)  39.7086

FIELD MEASURED FROM H-2-817634 P/N 48

A-180
THIS PAGE RESERVED FOR U-112
THIS PAGE RESERVED FOR U-201
THIS PAGE RESERVED FOR U-202
DESIGN CALCULATION

TANK NUMBER: U-203

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER: (H-2-1742)
RISER NUMBER: (1)
RISER ELEVATION (Ft): 664.9300
TANK CL BOTTOM ELEVATION (Ft): 626.5000
RISER TO TANK BOTTOM DIMENSION (Ft): 38.4300

DETERMINING REFERENCE LEVEL:

1/16 GASKET @ 50% COMPRESSION (In): 0.0313
PVC FLANGE (OPTIONAL) (In): 0.0000
1/8 GASKET @ 50% COMPRESSION (In): 0.0000
BALL VALVE FLANGE TO FLANGE (In): 9.0000
BALL INSET DIM (FROM TOP) (In): 1.4700
IMMERSION DEPTH IN SOLIDS (In): 0.0000
REFERENCE LEVEL (In): 468.7213
   (Ft): 39.0601
   (A + B + C + D + E - F + G)
**Design Calculation**

**TANK NUMBER**

**Bottom of Tank to Riser Dimension**

- **Drawing Number:** (H-2-1742)
- **Riser Number:** (1)
- **Riser Elevation (Ft):** 664.9700
- **Tank CL Bottom Elevation (Ft):** -628.5000
- **Riser to Tank Bottom Dimension (Ft):** 38.4700 (In.) 461.64 (A)

**Determining Reference Level:**

1/16 Gasket @ 50% Compression (In.) + 0.0313 (B)
PVC Flange (Optional) (In.) + 0.0000 (C)
1/8 Gasket @ 50% Compression (In.) + 0.0000 (D)
Ball Valve Flange to Flange (In.) + 9.0000 (E)
Ball Inset Dim (From Top) (In.) + 1.4700 (F)
Immersion Depth in Liquid (In.) + 0.2775 (G)

**Reference Level (In.)** 469.4788

**(A + B + C + D + E - F + G)**

**Immerion Depth Calculation**

**GOVERNING EQUATION**

\[ H = \frac{(4Fb)(Sg^3)^2}{D^2} \]

- **Fb = Bouyant Force = Set Point =** 15.0000 Grams
- **Sg = Specific Gravity of Liquid =** 1.0500
- **D = Displacer Diameter =** 5.0800 CM (2.00 Inches)
- **H = Immersion Depth (From Equation) =** 0.7048 Centimeters 0.2775 Inch
DESIGN CALCULATION

TANK NUMBER U-301

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER (H-2-1749)
RISER NUMBER (1)
RISER ELEVATION (Ft.) 664.9500
TANK CL BOTTOM ELEVATION (Ft.) 634.1300

RISER TO TANK BOTTOM DIMENSION (Ft.) 30.8200
(Inc.) 369.84 (A)

DETERMINING REFERENCE LEVEL:

1/16 GASKET @ 50% COMPRESSION (Inc.) + 0.0313 (B)
PVC FLANGE (OPTIONAL) (Inc.) + 0.5000 (C)
1/8 GASKET @ 50% COMPRESSION (Inc.) + 0.0625 (D)
BALL VALVE FLANGE TO FLANGE (Inc.) + 9.0000 (E)
BALL INSET DIM (FROM TOP) (Inc.) - 1.4700 (F)
IMMERSION DEPTH IN LIQUID (Inc.) + 0.2775 (G)

REFERENCE LEVEL (Inc.) 378.2412
(FT.) 31.5201

*IMMERSION DEPTH CALCULATION

GOVERNING EQUATION

H = (4*Fb)/(Sg*Pi*D**2)

Fb = BOUYANT FORCE = SET POINT = 15.0000 GRAMS
Sg = SPECIFIC GRAVITY OF LIQUID = 1.0500
D = DISPLACER DIAMETER = 2.0000 INCHES

H = IMMERSION DEPTH (FROM EQUATION) = 0.7048 CENTIMETERS

0.2775 INCH
UX-302-A ENRAF REFERENCE LEVEL CALCULATION

TANK NUMBER: UX-302-A

BOTTOM OF TANK TO RISER DIMENSION:

DRAWING NUMBER: (H-2-832)
RISER NUMBER: (N/A)
RISER ELEVATION (Ft.): 712.1800
TANK CL BOTTOM ELEVATION (Ft.): 682.5000
RISER TO TANK BOTTOM DIMENSION (Ft.): 29.6800
RISER TO TANK BOTTOM DIMENSION (In.): 356.16

DETERMINING REFERENCE LEVEL:

1/16 GASKET @ 50% COMPRESSION (In.) + 0.0313  (B)
PVC FLANGE (OPTIONAL) (In.) + 0.5000  (C)
1/8 GASKET @ 50% COMPRESSION (In.) + 0.0625  (D)
BALL VALVE FLANGE TO FLANGE (In.) + 9.0000  (E)
BALL INSET DIM (FROM TOP) (In.) - 1.4700  (F)
IMUMNION DEPTH IN LIQUID (In.) + 0.2775  (G)

REFERENCE LEVEL (In.) + 364.5612
REFERENCE LEVEL (Ft.) + 30.3801

*IMMERSION DEPTH CALCULATION

GOVERNING EQUATION:

\[ H = \frac{(4*F_b)}{(Sg*\pi*D^2)} \]

\[ F_b = BOUyANT \ FORCE = SET \ POINT = 15.0000 \ GRAMS \]

\[ Sg = SPECIFIC \ GRAVITY \ OF \ LIQUID = 1.0500 \]

\[ D = DISPLACER \ DIAMETER = 2.0000 \ INCHES \]

\[ H = IMMERSION \ DEPTH \ (FROM \ EQUATION) = 0.7048 \ CENTIMETERS \]

\[ H = IMMERSION \ DEPTH \ (FROM \ EQUATION) = 0.2775 \ INCH \]

A-187