2. To: (Receiving Organization) Distribution		3. From: (Originating Organization) WTF0 - Engineering Support		4. Related EDT No.: none	
5. Proj./Prog./Dept./Div.: 77B60		6. Design Authority/ Design Agent/Cog. Engr.: PF Kison/John Huber		7. Purchase Order No.: N/A	
8. Originator Remarks: For Release				9. Equip./Component No.:	
				10. System/Bldg./Facility:	
11. Receiver Remarks: 11A. Design Baseline Document? ☒ Yes ☐ No				12. Major Assm. Dwg. No.:	
				13. Permit/Permit Application No.: n/a	
				14. Required Response Date: ASAP	

15. DATA TRANSMITTED					(F)	(G)	(H)	(I)
(A) Item No.	(B) Document/Drawing No.	(C) Sheet No.	(D) Rev. No.	(E) Title or Description of Data Transmitted	Approval Designator	Reason for Transmittal	Originator Disposition	Receiver Disposition
1	WHC-SD-WM-CN-078	ALL	0	Enraf Gauge Reference Level Calculations	Q	1	1	

16. KEY					
Approval Designator (F)		Reason for Transmittal (G)		Disposition (H) & (I)	
E, S, Q, D or N/A (see WHC-CM-3-5, Sec. 12.7)	1. Approval 2. Release 3. Information	4. Review 5. Post-Review 6. Dist. (Receipt Acknow. Required)	1. Approved 2. Approved w/comment 3. Disapproved w/comment	4. Reviewed no/comment 5. Reviewed w/comment 6. Receipt acknowledged	

17. SIGNATURE/DISTRIBUTION (See Approval Designator for required signatures)											
(G) Reason	(H) Disp.	(J) Name	(K) Signature	(L) Date	(M) MSIN	(G) Reason	(H) Disp.	(J) Name	(K) Signature	(L) Date	(M) MSIN
1	1	Design Authority	WGBrown	10/11/96	T4-07						
1	1	Design Agent	N/A								
1	1	Cog. Eng. John Huber	John Huber	10/11/96	T4-07						
1	1	Cog. Mgr. J. J. Badden	J. J. Badden	10/11/96	T4-07						
1	1	QA	TJ	10/11/96	T4-07						
1	1	Safety									
1	1	Env.									

18. John Huber Signature of EDT Originator 10/11/96 Date		19. Authorized Representative Date for Receiving Organization		20. Design Authority/ Cognizant Manager 10/11/96 Date		21. DOE APPROVAL (if required) Ctrl. No. ☐ Approved ☐ Approved w/comments ☐ Disapproved w/comments	
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ENRAF GAUGE REFERENCE LEVEL CALCULATIONS

John Huber

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

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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.

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Release Approval

2/6/97
Date

Approved for Public Release

ENRAF GAUGE REFERENCE LEVEL CALCULATIONS

October 1996

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CHECKLIST FOR INDEPENDENT REVIEW

Document Reviewed WHC-SD-WM-CN-078 Rev. 0

Author John Huber

Yes No NA

- ☒ ☐ ☐ 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

Warren G. Brown 12/2/96
Reviewer Date

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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 1, 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

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:

AW-Farm OTP-T-990-00034 Rev A-0, "*Operability Test Procedure for 241-AW Tank Farm*," dated (unknown).

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

AP-Farm SD-WM-OTR-063 Rev 0, "*Operability Test Report for 241-AP Tank Farm*," dated July 22, 1986.

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.

TANK	DRAWING
241-AY	H-2-64449
241-AP	H-2-90534
241-AW	H-2-70394
241-AN-107	H-2-71160
241-AN-101 THRU 106	H-2-71975
241-SY-101	H-2-79556
241-SY-102	H-2-72213
241-SY-103	H-2-85104

5.2.1.2.1 AN-FARM

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 Worcestor 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 = Bouyancy force (desired difference between displacer free weight and setpoint weight -- usually 15 grams).

H = Immersion depth (cm)

SpG = Specific Gravity

D = Displacer Diameter, cm (it is assumed that the displacer does not immerse beyond the cylindrical portion of the displacer).

π = 3.1415

ρ = Density (g/cm³)

Then,

F_b = volume displaced x 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, ρ is equivalent to SpG .

For example, the density of water is 1 gram/cm³, and the Specific Gravity is 1 as well. So,

$$H = \frac{4 F_b}{\pi D^2 SpG} = \text{Displacer Immersion Depth, in cm, in any given liquid.}$$

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.

<u>Farm</u>	<u>Drawing</u>
241-A	H-2-37850
241-AX	H-2-37854
241-B	H-2-1743
241-BX	H-2-37852
241-BY	H-2-1746
241-C	H-2-37912
241-C	H-2-1744
241-S	H-2-37381 SH. 1
241-SX	H-2-37855
241-T	H-2-37909
241-T	H-2-1741
241-TX	H-2-37910
241-TY	H-2-37381 SH. 2
241-U	H-2-37381 SH. 3
241-U	H-2-1742

- 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 RECOMENDATIONS

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

WHC-SD-RE-TI-093 Revision 3, "*Double-Shell Underground Waste Storage Tanks Riser Survey*," dated May 11, 1992.

APPENDIX A
ENRAF REFERENCE LEVEL CALCULATIONS

DESIGN CALCULATION			
Drawing	H-2-817634	Doc. No.	ECN 626484
Building	241-A	Rev.	1
Subject	A-101 ENRAF REFERENCE LEVEL CALCULATION		
Originator	JOHN HUBER	Date	1/12/96
Checker	Scott Walker	Date	1/16/96

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
(In.) 644.6400 (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 - EXST (In.) + 4.0000 (H)

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

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

REFERENCE LEVEL (In.) 657.5238
(Ft.) 54.7936

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

[Field Measured]
[Field Measured from Ball Valve
in H-2-817634-20]

THIS PAGE RESERVED FOR A-102

DESIGN CALCULATION			
Drawing	H-2-817634	Doc. No.	ECN 631222
		Page	1 of 1
Building	241-A	Rev.	1
		Job No.	24-96-201
Subject	A-103 ENRAF REFERENCE LEVEL CALCULATION		
Originator	JOHN HUBER	Date	3-22-96
Checker	<i>Sandy L. P...</i>	Date	5/22/96

TANK NUMBER A-103

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER (H-2-37850)

RISER NUMBER (6)

RISER ELEVATION (Ft.) 688.2500

TANK CL BOTTOM ELEV. (Ft.) - 634.7300

RISER TO TANK BOTTOM ELEV. (Ft.) 53.5200
(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 - EXST (In.) +	4.0000	(H)
BALL INSET DIM (FROM TOP) (In.) -	1.4700	(F)
IMMERSION DEPTH IN SOLIDS (In.) +	0.0000	(G)

FIELD MEASURED FROM BALL VALVE
PART NUMBER H-2-817634-48

REFERENCE LEVEL (In.)	654.8638	
(A) + B + C + D + E + H - F + G	54.5720	

DESIGN CALCULATION			
Drawing	H-2-817634	Doc. No.	ECN <u>631238</u> Page <u>1</u> of <u>1</u>
Building	241-A	Rev.	1 Job No. <u>2E-96-310</u>
Subject	A-104 ENRAF REFERENCE LEVEL CALCULATION		
Originator	JOHN HUBER	Date	5-15-96
Checker	RL Powers per Telecom	Date	5-15-96

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.)	<u>635.7300</u>
RISER TO TANK BOTTOM ELEV. (Ft.)	53.5200
	(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 - EXST (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	
	(Ft.) 54.5720	
(A + B + C + D + E + H - F + G)		

FIELD MEASURED FROM BALL VALVE
PART NUMBER H-2-817634-48

THIS PAGE RESERVED FOR A-105

DESIGN CALCULATION			
Drawing	H-2-817634	Doc. No.	ECN <u>626483</u> Page <u>1</u> of <u>1</u>
Building	241-A	Rev.	1 Job No. <u>2E-85-1110</u>
Subject	<u>A-106 ENRAF REFERENCE LEVEL CALCULATION</u>		
Originator	<u>JOHN HUBER</u>	Date	<u>11/1/96</u>
Checker	<u>Scott Watson</u>	Date	<u>12 Feb '96</u>

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
(In.) 640.56 (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 - EXST (In.) + 4.0000 (H) [Field Measured]

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

IMMERSSION DEPTH IN SOLIDS (In.) + 0.0000 (G)

FIELD MEASURED FROM BALL VALVE
PART NUMBER H-2-817634-48

REFERENCE LEVEL (In.) 653.1838
(Ft.) 54.4320
(A + B + C + D + E + H - F + G)

DESIGN CALCULATION

Drawing	H-2-817634	Doc. No.	ECN_638755	Page	1 of 1
Building	202-A-302-A	Rev.	2	Job No.	2E-96-1044
Subject	A-302-A CATCH TANK ENRA REFERENCE LEVEL CALCULATION				
Originator	JOHN HUBER	Date	12-11-96		
Checker	Katie White	Date	12/11/96		

TANK NUMBER A-302-A

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER H-2-53096

RISER NUMBER N/A

GRADE ELEVATION (Ft.)	708.0000
RISER TO GRADE ELEV. (Ft.) +	1.0000
TANK CL ELEVATION (Ft.) -	686.1000
TANK RADIUS (Ft.) +	4.5000
RISER TO TANK BOTTOM ELEVATION (Ft.)	27.4000
(In.)	328.8

Assumptions:

1. Riser flanges are exactly 12" above grade as shown on drawing (H-2-53906).
2. Tank was installed to elevations indicated on drawing.

(A)

DETERMINING 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	
(Ft.)	28.5558	
(A + B + C + D + E - F + G)		

*IMMERSION DEPTH CALCULATION

GOVERNING EQUATION

$$H = (4 \cdot F_b) / (S_g \cdot P \cdot D^2)$$

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

DESIGN CALCULATION

Drawing H-2-817634 Doc. No. ECN Page 1 of 1
 Building 241-AN Rev. Job No.
 Subject AN-101 ENRAF REFERENCE LEVEL CALCULATION
 Originator JOHN HUBER Date 7/2/96
 Checker WE MEEUWSEN Date 7/9/96

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
 (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.) - 1.4700 (F)
 IMMERSION DEPTH AT 1.05 Sp. G. (In.) + 0.2775 (G)

REFERENCE LEVEL (In.) 677.0648
 (Ft.) 56.4221

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

GOVERNING EQUATION
 $H = (4 \cdot F_b) / (S_g \cdot F_1 \cdot D \cdot 2)$

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

DESIGN CALCULATION

Drawing H-2-817634 Doc. No. ECN Page 1 of 1
Building 241-AN Rev. 0 Job No. 2E-96-1240
Subject AN-102 ENRAF REFERENCE LEVEL CALCULATION
Originator JOHN HUBER Date 2-28-96
Checker WE MEEUWSEN Date 9-3-96

TANK NUMBER AN-102

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	
(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.) - 1.4700 (F)

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

REFERENCE LEVEL (In.) 677.0648

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

GOVERNING EQUATION
 $H = (4 * F_b) / (S_g * P_i * D^{**2})$

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

DESIGN CALCULATION

WHC-SD-WM-CN-078
REVISION 0

(1) Drawing 14-2-917634 (2) Doc. No. — (3) Page 1 of 1
 (4) Building 241-AN (5) Rev. 0 (6) Job No. —
 (7) Subject AN-103 Enraf Ref. Level Calc.
 (8) Originator John Huber Date 3/20/95
 (9) Checker Michael S. Johnston Date 3/21/95

(10)

TANK NUMBER	AN-103	PARAMETERS
<u>BOTTOM OF TANK TO RISER DIMENSION</u>		TT = 701.64735
DRAWING NUMBER	(H-2-71975)	UR = 701.64735
RISER NUMBER	(2A)	MH = 696.04735
RISER ELEVATION (Ft.)	668.7500	HH = 689.04735
TOP OF CONC. FOUNDATION (Ft.)	612.3300	HA = 683.04735
ANN. BOTTOM PL. THICKNESS (Ft.)	0.0313	RL = 677.04735
INSUL. CONC. THICKNESS (Ft.)	0.6667	AN = N/A
PRI. BOTTOM PL. THICKNESS (Ft.)	0.0417	AM = N/A
<u>RISER TO TANK BOTTOM ELEVATION (Ft.)</u>		TI = .AN103
<u>(In.)</u>		ML = 6.0000
55.6803		LA = 12.0000
668.1636		LL = 1.0000
		WT = EDE
		(A)
<u>DETERMINING REFERENCE LEVEL:</u>		
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)
<u>REFERENCE LEVEL (In.)</u>		677.0473
<u>(Ft.)</u>		56.4206
<u>(A + B + C + D + E - F + G)</u>		

DESIGN CALCULATION

WHC-SD-WM-CN-078
REVISION 0

(1) Drawing 14-2-817534 (2) Doc. No. --- (3) Page 1 of 1
 (4) Building 241-AN (5) Rev. 0 (6) Job No. ---
 (7) Subject AN-104 Enraft Ref. Level Calc.
 (8) Originator John Huber Date 3/20/95
 (9) Checker Michael H. Johnston Date 3/24/95

(10)

TANK NUMBER		AN-104	PARAMETERS
<u>BOTTOM OF TANK TO RISER DIMENSION</u>			
DRAWING NUMBER	(H-2-71975)		TT = 701.64735 UR = 701.64735 MH = 696.04735 HH = 689.04735 HA = 683.04735 RL = 677.04735 AN = N/A AM = N/A TI = .AN104 ML = 6.0000 LA = 12.0000 LL = 1.0000 WT = EDE
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		
<u>RISER TO TANK BOTTOM ELEVATION (Ft.)</u>		55.6803	
<u>(In.)</u>		668.1636	(A)
<u>DETERMINING REFERENCE LEVEL:</u>			
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)	
<u>REFERENCE LEVEL (In.)</u>		677.0473	
<u>(Ft.)</u>		56.4206	
<u>(A + B + C + D + E - F + G)</u>			

DESIGN CALCULATION

WHC-SD-WM-CN-078
REVISION 0

(1) Drawing H-2-917 634 (2) Doc. No. - (3) Page 1 of 1
 (4) Building 241-AN (5) Rev. 0 (6) Job No. -
 (7) Subject AN-105 Enraf Ref. Level Calc.
 (8) Originator John Huber Date 3/21/95
 (9) Checker Michael E. Johnson Date 3/21/95

(10)

TANK NUMBER		AN-105	PARAMETERS
<u>BOTTOM OF TANK TO RISER DIMENSION</u>			
DRAWING NUMBER	(H-2-71975)		TT = 701.64735 UR = 701.64735 MH = 696.04735 HH = 689.04735 HA = 683.04735 RL = 677.04735 AN = N/A AM = N/A TI = .AN105 ML = 1.0000 6.00 LA = 12.0000 LL = 6.0000 1.00 WT = EDE
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		
<u>RISER TO TANK BOTTOM ELEVATION (Ft.)</u>		55.6803	
<u>(In.)</u>		668.1636	(A)
<u>DETERMINING REFERENCE LEVEL:</u>			
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)	
<u>REFERENCE LEVEL (In.)</u>		677.0473	
<u>(Ft.)</u>		56.4206	
<u>(A + B + C + D + E - F + G)</u>			

DESIGN CALCULATION

Drawing H-2-817634 Doc. No. ECN Page 1 of 1
 Building 241-AN Rev. 0 Job No. 2E-96-610
 Subject AN-106 ENRAF REFERENCE LEVEL CALCULATION
 Originator JOHN HUBER Date 8-29-96
 Checker WE MEEUWSEN Date 9-3-96

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.)	55.6803	
(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.) - 1.4700 (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
 $H = (4 \cdot F_b) / (S_g \cdot P_1 \cdot D \cdot 2)$

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

DESIGN CALCULATION			
Drawing	H-2-817634	Doc. No.	ECN 631227
			Page 1 of 1
Building	241-AN	Rev.	0
		Job No.	2E-96-333
Subject AN-107 ENRAF REFERENCE LEVEL CALCULATION			
Originator	JOHN HUBER	Date	4-9-96
Checker	<i>[Signature]</i>	Date	4/10/96

TANK NUMBER AN-107

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER (H-2-71160)

RISER NUMBER (2A)

RISER ELEVATION (Ft.) 668.7500

TOP OF CONC. FOUNDATION (Ft.) 612.0000

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.) 56.0103
(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.) 681.0248 (G)
(Ft.) 56.7521

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

GOVERNING EQUATION
 $H = (4 * F_b) / (S_g * \pi * D^2)$

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

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ENRAF REFERENCE LEVEL CALCULATIONS

WHC-SD-WM-CN-078
REVISION 0

TANK NUMBER		AW-101	<u>PARAMETERS</u>	
<u>BOTTOM OF TANK TO RISER DIMENSION</u>			TT = 700.31	
DRAWING NUMBER	(H-2-70420)		UR = 700.31	
RISER NUMBER	(2A)		MH = 694.71	
RISER ELEVATION (Ft.)	687.7500		HH = 687.71	
TANK INSIDE BOTTOM ELEVATION (Ft.) -	632.2083		HA = 681.71	
TANK SIDE-BOTTOM ELEVATION (Ft.) -	N/A		RL = 675.38	
RISER TO TANK BOTTOM ELEVATION (Ft.)	55.5417		AN = 433.50	
	666.5004	(A)	AM = 383.50	
<u>DETERMINING REFERENCE LEVEL:</u>			TI =	
1/16 GASKET @ 50% COMPRESSION (In.) +	0.0313	(B)	ML =	
PVC FLANGE (OPTIONAL) (In.) +	1.0000	(C)	LA =	
1/8 GASKET @ 50% COMPRESSION (In.) +	0.0625	(D)	LL =	
BALL VALVE FLANGE TO FLANGE (In.) +	9.0000	(E)	WT =	
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)				

DESIGN CALCULATION

Drawing H-2-817634 Doc. No. ECN 624982 Page 1 of 1
Building ED1-AW Rev. 0 Job No. EE-95-290
Subject AW-102 Entry Reference Calculation
Originator John Huber Date 9-20-95
Checker Katie W. White Date 10/11/95

TANK NUMBER AW-102

BOTTOM OF TANK TO RISER

DRAWING NUMBER (H-2-70420)

RISER NUMBER (16C)

MEASURED DEPTH FROM OTP 54.125 OTP-T-990-00034

RISER TO TANK BOTTOM DEMENSION (In.) 54.1250
649.5 (A)

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)	56.1142		

***IMMERSION DEPTH CALCULATION**

GOVERNING EQUATION

$$H = (4 \cdot P_b) / (S_g \cdot \pi \cdot D^2 \cdot 2)$$

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

Drawing 14-2-B17634 Doc. No. ECN 624982 Page 1 of 1
Building 241-AW Rev. 0 Job No. EG-95-292
Subject AW-103 Enrat Ref. Level Calculation
Originator John Huber Date 9-7-95
Checker John White Date 10/11/95

TANK NUMBER AW-103

BOTTOM OF TANK TO RISER

DRAWING NUMBER (H-2-70420)

RISER NUMBER (2A)

MEASURED DEPTH FROM OTP 55.578 OTP-T-990-00034

RISER TO TANK BOTTOM ELEVATION 55.5780
(In.) 666.936 (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.} 675.8372
{Ft.} 56.3198
(A + B + C + D + E - F + G)

*IMMERSION DEPTH CALCULATION

GOVERNING EQUATION
 $H = (4 \cdot F_b) / (S_g \cdot \pi \cdot D^2)$
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

Drawing 14-2-817634 Doc. No. FCW 624982 Page 1 of 1
Building 241-AW Rev. _____ Job No. _____
Subject AW-104 Engrt Ref. Level Calculation
Originator John Huber JHHuber Date 9-7-95
Checker Katie R. Rite Date 10/11/95

TANK NUMBER AW-104

BOTTOM OF TANK TO RISER

DRAWING NUMBER (H-2-70420)

RISER NUMBER (2A)

MEASURED DEPTH FROM OTP 55.5885

OTP-T-990-00034

RISER TO TANK BOTTOM ELEVATION (In.) 55.5885
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
 $H = (4*Fb)/(Sg*Pi*D**2)$

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

DESIGN CALCULATION

Drawing 14-2-817634 Doc. No. ECN 624982 Page 1 of 1
Building 241-AW Rev. 0 Job No. EE-85-294
Subject AW-105 Enraf Ref. Level Calculation
Originator John Huber Date 9-7-95
Checker Kate Lehto Date 10/11/95

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 (In.) 55.5050
666.06 (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.)	674.9612	
(A + B + C + D + E - F + G)	56.2468	

*IMMERSION DEPTH CALCULATION

GOVERNING EQUATION

$$H = (4 * F_b) / (S_g * \pi * D^2 * 2)$$

F_b = BOUYANT FORCE = SET POINT = 15.0000 GRAMS

S_g = SPECIFIC GRAVITY OF LIQUID = 1.0500

D = DISPLACER DIAMETER = 2.0000 INCHES

IMMERSION DEPTH (FROM EQUATION) = 0.7048 CENTIMETERS
0.2775 INCH

DESIGN CALCULATION			
Drawing	H-2-817634	Doc. No.	ECN 624882 Page 1 of 1
Building	241-AW	Rev.	0 Job No. EE-95-285
Subject	AW-106 Engrg Ref. Level Calculation		
Originator	John Huber	Date	9-7-85
Checker	Kate W. Lick	Date	10/11/95

TANK NUMBER AW-106

BOTTOM OF TANK TO RISER

DRAWING NUMBER (H-2-70420)

RISER NUMBER (2A)

MEASURED DEPTH FROM OTP 55.5104 OTP-T-990-00034

RISER TO TANK BOTTOM ELEVATION	55.5104	
(In.)	666.1248	(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.}	675.0260	
{Pt.}	56.2522	
(A + B + C + D + E - F + G)		

***IMMERSION DEPTH CALCULATION**

GOVERNING EQUATION

$$H = (4 \cdot F_b) / (S_g \cdot \pi \cdot D^2)$$

F_b = BOUYANT FORCE = SET POINT = 15.0000 GRAMS

S_g = SPECIFIC GRAVITY OF LIQUID = 1.0500

D = DISPLACER DIAMETER = 2.0000 INCHES

IMMERSION DEPTH (FROM EQUATION) = 0.7048 CENTIMETERS
 0.2775 INCH

DESIGN CALCULATION

WHC-SD-WM-CN-078
REVISION 0

(1) Drawing H-2-917654 (2) Doc. No. - (3) Page 1 of 1
(4) Building 241-AX (5) Rev. 1 (6) Job No.
(7) Subject 241-AX-101 Enrap Reference Level Calculation
(8) Originator John Huber Date 3-28-85
(9) Checker Michael S. Johnson Date 3/29/85

(10)

TANK NUMBER		AX-101	PARAMETERS	
<u>BOTTOM OF TANK TO RISER DIMENSION</u>			TT = 652.07625	
DRAWING NUMBER	(H-2-37854)		UR = 652.07625	
RISER NUMBER	(8C)		MH = 676.67625	
RISER ELEVATION (Ft.)	681.6600		HH = 671.07625	
TANK INSIDE BOTTOM ELEVATION (Ft.) -	628.4200		HA = 664.07625	
TANK SIDE-BOTTOM ELEVATION (Ft.) -	N/A		RL = 652.07625	
RISER TO TANK BOTTOM ELEVATION (Ft.)	53.2400		AN = N/A	
(In.)	638.88	(A)	AM = N/A	
<u>DETERMINING REFERENCE LEVEL:</u>			TI = .AX101	
1/16 GASKET @ 50% COMPRESSION (In.) +	0.0313	(B)	ML = 6.0000	
PVC FLANGE (OPTIONAL) (In.) +	1.0000	(C)	LA = 12.0000	
1/8 GASKET @ 50% COMPRESSION (In.) +	0.0625	(D)	LL = 1.0000	
BALL VALVE FLANGE TO FLANGE (In.) +	9.0000	(E)	WT = EDE	
BALL INSET DIM (FROM TOP) (In.) -	1.2100	(F)		
IMMERSION DEPTH IN SOLIDS (In.) +	0	(G)		
6" TO 4" ADDAPTER SPOOL (In.) +	4.2500	(H) (field dimension)		
1/8 GASKET @ 50% COMPRESSION (In.) +	0.0625	(I)		
REFERENCE LEVEL (In.)	652.0763			
(Ft.)	54.3397			
(A + B + C + D + E - F + G + H + I)				

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DESIGN CALCULATION

WHC-SD-WM-CN-078
REVISION 0

(1) Drawing H-2-817634 (2) Doc. No. - (3) Page 1 of 1
(4) Building 241-AX (5) Rev. 1 (6) Job No. -
(7) Subject 241-AX-103 Enraf Reference Level Calculation
(8) Originator John Huber Date 3-28-95
(9) Checker Michael M. Johnson Date 3/29/95

(10)

TANK NUMBER AX-103

PARAMETERS

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER (H-2-37854)

RISER NUMBER (9C)

RISER ELEVATION (Ft.) 681.6400

TANK INSIDE BOTTOM ELEVATION (Ft.) - 628.4200

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

RISER TO TANK BOTTOM ELEVATION (Ft.) 53.2200
(In.) 638.64 (A)

TT = 651.83625
UR = 651.83625
MH = 676.43625
HH = 670.83625
HA = 663.83625
RL = 651.83625
AN = N/A
AM = N/A
TI = .AX103
ML = ~~1.0000~~ 6.00 *94*
LA = 12.0000
LL = ~~6.0000~~ 1.00 *94*
WT = EDE

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" ADDAPTER SPOOL (In.) + 4.2500 (H) (field dimension)

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

REFERENCE LEVEL (In.) 651.8363
(Ft.) 54.3197
(A + B + C + D + E - F + G + H + I)

DESIGN CALCULATION			
Drawing	H-2-817634	Doc. No. ECN	631302 Page 1 of 1
Building	241-AX	Rev.	1 Job No. 2E-96-614
Subject	AX-104 ENRAF REFERENCE LEVEL CALCULATION		
Originator	JOHN HUBER	Date	9/5/96
Checker	Randy L. Power	Date	9-9-96

TANK NUMBER AX-104

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER (H-2-37854)

RISER NUMBER (9B)

RISER ELEVATION (Ft.) 682.6100

TANK INSIDE BOTTOM ELEVATION (Ft.) - 628.4200

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

RISER TO TANK BOTTOM ELEVATION	(Ft.)	54.1900	
	(In.)	650.28	(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)

6" TO 4" ADDAPTER SPOOL (In.) + 4.2500 (H)

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

REFERENCE LEVEL	(In.)	663.2163	
	(Ft.)	55.2680	
(A + B + C + D + E - F + G)			

DESIGN CALCULATION

Drawing H-2-817634 Doc. No. ECN Page 1 of 1
 Building 241-AY Rev. 0 Job No. 2F-25417
 Subject AY-101 ENRAF REFERENCE LEVEL CALCULATION
 Originator JOHN HUBER Date 7-14-85
 Checker Large Sandiff Date 7-20-85

TANK NUMBER AY-101

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER H-2-37911

RISER NUMBER (22A)

RISER ELEVATION (Ft.) 680.5000

FIELD MEASURED PER KEH SURVEY
DATA REPORT 2EAY-006

TANK BOTTOM ELEVATION (Ft.) - 623.2300

H-2-37911

RISER TO TANK BOTTOM ELEVATION 57.2700
 (In.) 687.24

(A)

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)

NEW BALL VALVE PER
H-2-817634 P/N 48

REFERENCE LEVEL (In.) 695.0666
 (Ft.) 57.9222

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

***IMMERSION DEPTH CALCULATION**

GOVERNING EQUATION

$$H = (4 \cdot F_b) / (S_g \cdot \pi \cdot D \cdot 2)$$

F_b = BOUYANT FORCE = SET POINT = 15.0000 GRAMSS_g = SPECIFIC GRAVITY OF LIQUID = 1.0980

D = DISPLACER DIAMETER = 2.0000 INCHES

H = IMMERSION DEPTH (FROM EQTN) = 0.6740 CENTIMETERS
 0.2654 INCH

DESIGN CALCULATION

Drawing H-2-817634 Doc. No. ECN Page 1 of 1
 Building 241-AY Rev. 0 Job No. _____
 Subject AY-102 REFERENCE LEVEL CALCULATION
 Originator JOHN HUBER Date 7-20-15
 Checker [Signature] Date 7-20-15

TANK NUMBER AY-102

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER H-2-37911
 RISER NUMBER (22A) FIELD MEASURED PER KEH SURVEY
DATA REPORT 2EAY-006
 RISER ELEVATION (Ft.) 680.6300
 TANK BOTTOM ELEVATION (Ft.) - 623.2300 H-2-37911
 RISER TO TANK BOTTOM ELEVATION 57.4000
 (In.) 688.8 (A)

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) NEW BALL VALVE PER
H-2-817634 P/N 48
 IMMERSION DEPTH (In.) + 0.2802 (G)
 REFERENCE LEVEL (In.) 696.6414
 (A + B + C + D + E - F + G) 58.0535

***IMMERSION DEPTH CALCULATION**

GOVERNING EQUATION
 $H = (4 * F_b) / (S_g * \pi * D * 2)$
 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
Building 241-AY Rev. 0 Job No. 2E-96-233
Subject AY-102 REFERENCE LEVEL CALCULATION (DENSITOMETER)
Originator JOHN HUBER Date 3-7-96
Checker Watt Tiffany per telicon Date 4-22-96

TANK NUMBER AY-102

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER (H-2-37911)

RISER NUMBER (15S)

RISER ELEVATION (Ft.) 680.1100

INSIDE BOTTOM OF TANK ELEVATION (Ft.) 623.2300

RISER TO TANK BOTTOM ELEVATION (Ft.) 56.8800
(In.) 682.56 (A)

DETERMINING REFERENCE LEVEL:

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

ADAPTER 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
(Ft.) 58.0127

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

FLOW-TEK BALL VALVE, H-2-824485,
ITEM 26, FIELD MEASURED

ENRAF REFERENCE LEVEL CALCULATIONS

WHC-SD-WM-CN-078
REVISION 0

TANK NUMBER	AZ-101	PARAMETERS
<u>BOTTOM OF TANK TO RISER DIMENSION</u>		TT = 713.48
DRAWING NUMBER	(H-2-95497)	UR = 713.48
RISER NUMBER	(22A)	MH = 707.88
RISER ELEVATION (Ft.)	673.2691	HH = 700.88
TANK INSIDE BOTTOM ELEVATION (Ft.) -	616.5417	HA = 694.88
TANK SIDE-BOTTOM ELEVATION (Ft.) -	N/A	RL = 688.83
RISER TO TANK BOTTOM ELEVATION (Ft.)	56.7274	AN = 377.00
(In.)	680.7288 (A)	AM = 327.00
		TI = .AZ101
		ML = 1.00
		LA = 12.00
		LL = 6.00
		WT = EDE

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
(Ft.) 57.4023

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

*IMMERSION DEPTH CALCULATION

GOVERNING EQUATION

$$H = (4 \cdot F_b) / (S_g \cdot \pi \cdot D^2)$$

F_b = BOUYANT FORCE = SET POINT = 15.0000 GRAMSS_g = 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

Drawing	H-2-817634	Doc. No.	ECN	629516	Page	1	of	1
Building	241-AZ	Rev.	0	Job No.	2F-96-84			
Subject	AZ-102 ENRAF REFERENCE LEVEL CALCULATION							
Originator	JOHN HUBER	Date	3/5/96					
Checker	Matthew S. Tiffney		Date	3/5/96				

TANK NUMBER AZ-102

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER (H-2-95497)

RISER NUMBER (22A)

RISER ELEVATION (Ft.) 672.7500

H-2-70202

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

H-2-94872

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

16" RF FLG THICKNESS (Ft.) + 0.1200

ITT GRINNELL
FLANGE DATA

TOP OF CONC. FOUNDATION (Ft.) - 615.8000

H-2-67317

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
(In.)	683.0568

(A)

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)

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

REFERENCE LEVEL (In.)	690.8829
(Ft.)	57.5736

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

*IMMERSION DEPTH CALCULATIONGOVERNING EQUATION

$$H = (4 \cdot F_b) / (S_g \cdot P_1 \cdot D \cdot 2)$$
F_b = BOUYANT FORCE = SET POINT = 15.0000 GRAMSS_g = SPECIFIC GRAVITY OF LIQUID = 1.1000

D = DISPLACER DIAMETER = 2.0000 INCHES

H = IMMERSION DEPTH (FROM EQUATION) =	0.6728	CENTIMETERS
	0.2649	INCH

DESIGN CALCULATION

Drawing H-2-817534 Doc. No. ECN 631223 Page 1 of 1
 Building 241-B Rev. 0 Job No. 2F-96-204
 Subject B-101 ENRAF REFERENCE LEVEL CALCULATION
 Originator JOHN HUBER Date 3-22-96
 Checker Randy L. Powra Date 03/22/96

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	
{In.}	470.52	(A)

DETERMINING REFERENCE LEVEL:

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

PVC FLANGE (OPTIONAL) {In.} +	1.0000	(C)
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1/8 GASKET @ 50% COMPRESSION {In.} +	0.0625	(D)
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BALL VALVE FLANGE TO FLANGE {In.} +	9.0000	(E)
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BALL INSET DIM (FROM TOP) {In.} -	1.4700	(F)
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IMMERSION DEPTH IN SOLIDS {In.} +	0	(G)
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REFERENCE LEVEL {In.}	479.1438
{Ft.}	39.9286

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

DESIGN CALCULATION
ENRAF REFERENCE LEVEL CALCULATIONS

WHC-SD-WM-CN-078
REVISION 0

(1) Drawing H-2-817634 (2) Doc. No. — (3) Page 1 of 1
 (4) Building 241-B (5) Rev. 1 (6) Job No. —
 (7) Subject B-102 Enraf Ref. Level Calculations
 (8) Originator John Huber Date 4-4-85
 (9) Checker Michael A. Johnson Date 4-10-85

(10) Reason for revision: Previous calc. based on 12gram 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

$$H = (4 \cdot F_b) / (S_g \cdot P_1 \cdot D^{**2})$$

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

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DESIGN CALCULATION ENRAF REFERENCE LEVEL CALCULATIONS

WHC-SD-WM-CN-078
REVISION 0

(1) Drawing H-2-817634 (2) Doc. No. — (3) Page 1 of 1
 (4) Building 241-B (5) Rev. 2 (6) Job No. —
 (7) Subject B-112 Enraf Ref. Level Calculations
 (8) Originator John Huber Date 4-4-95
 (9) Checker Michael H. Johnson Date 4-10-95

(10) Reason for revision: Previous calcs used wrong ball valve dimension.
 However, gauge in field accounts for correct ball valve and wrong delta for setpoint.

TANK NUMBER B-112

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER (H-2-37851)

RISER NUMBER (4)

RISER ELEVATION (Ft.) 652.6400

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

TANK SIDE-BOTTOM ELEVATION (Ft.) - 614.0000

RISER TO TANK BOTTOM ELEVATION (Ft.)	38.6400	
(In.)	463.68	(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.) - 1.2100 (F)

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

REFERENCE LEVEL (In.)	472.8412
(Ft.)	39.4034

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

***IMMERSION DEPTH CALCULATION**

GOVERNING EQUATION

$$H = (4 \cdot F_b) / (S_g \cdot \pi \cdot D^2)$$

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

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ENRAF REFERENCE LEVEL CALCULATIONS

DESIGN CALCULATION

Drawing H-2-817634 Doc. No. ECN 625940 Page 1 of 1
 Building 241-B Rev. 0 Job No. 2E-15
 Subject B-202 ENRAF REFERENCE LEVEL CALCULATION
 Originator JOHN HUBER Date 10/5/95
 Checker Jo Mo Jones per telecon MM Date 10/17/95

TANK NUMBER B-202

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER (H-2-1743)

RISER NUMBER (8)

RISER ELEVATION (Ft.) 651.9400

TANK CL BOTTOM ELEVATION (Ft.) - 613.5000

RISER TO TANK BOTTOM ELEVATION (Ft.) 38.4400
(In.) 461.23 (A)

DETERMINING REFERENCE LEVEL:

1/16 GASKET @ 50% COMPRESSION (In.) + 0.0313 (B)
 PVC FLANGE (OPTIONAL) (In.) + 0.0000 (C) NO PVC LINER, REPLACING
 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 1.05 Sp. G. (In.) + 0.2775 (G)

REFERENCE LEVEL (In.) 469.1187
(Ft.) 39.0932

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

*IMMERSION DEPTH CALCULATION

GOVERNING EQUATION

$$H = (4 \cdot F_b) / (S_g \cdot \pi \cdot D^2)$$

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

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DESIGN CALCULATION			
Drawing	H-2-817634	Doc. No.	ECN 626479 Page 1 of 1
Building	241-BX	Rev.	0 Job No. 2E-95-1082
Subject	BX-112 ENRAF REFERENCE LEVEL CALCULATION		
Originator	JOHN HUBER	Date	1/3/96
Checker	Randy L. Powers	Date	1/24/96

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	
	492.1200	(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)
BALL VALVE FLANGE TO FLANGE (In.) +	9.0000	(E)
BALL INSET DIM (FROM TOP) (In.) -	1.4700	(F)
IMMERSION DEPTH IN SP. G. 1.05 (In.) +	0.2775	(G)

REFERENCE LEVEL (In.)	501.0212	
(A + B + C + D + E + F + G) (Ft.)	41.7518	

***IMMERSION DEPTH CALCULATION**

GOVERNING EQUATION
 $H = (4 \cdot F_b) / (S_g \cdot \pi \cdot D^2 \cdot 2)$

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

DESIGN CALCULATION

Drawing H-2-817634 Doc. No. ECN Page 1 of 1
Building 241-BX Rev. 1 Job No. EF-95-1095
Subject BX-102 ENRAF REFERENCE LEVEL CALCULATION
Originator JOHN HUBER Date 4-15-96
Checker RANDY L POWERS Date 4/15/96

TANK NUMBER BX-102

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER (H-2-37852)

RISER NUMBER (2)

RISER ELEVATION (Ft.) 656.1000

TANK CL BOTTOM ELEV (Ft.) - 615.0000

RISER TO TANK BOTTOM ELEV (Ft.) 41.1000
(In.) 493.2 (A)

DETERMINING REFERENCE LEVEL:

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

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

SLIP-ON FLANGE (In.) + 2.1875 (H)

12" PIPE LENGTH (In.) + 18.0000 (I)

SLIP-ON FLANGE (In.) + 2.1875 (J)

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

DUAL PORT FLANGE THKNES (In.) + 1.2500 (L)

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

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.) 524.4489
(Ft.) 43.7041

A*B*C*H*I*J*K*L*M*D*E*F*G

SCHEMATIC

OBSV PT/BREATHER PER H-2-63727 DET. 4

PER H-2-817634 ASSY 4B

FIELD MEASURED

DESIGN CALCULATION

Drawing H-2-817634 Doc. No. ECN 626979 Page 1 of 1
 Building 241-BX Rev. 0 Job No. 2E-25-1034
 Subject BX-103 ENRAF REFERENCE LEVEL CALCULATION
 Originator JOHN HUBER Date 1/3/95
 Checker Randy L. Parn Date 1/26/96

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

(A + B + C + D + E - F + G) 41.7818

*IMMERSION DEPTH CALCULATION

GOVERNING EQUATION

$$H = (4 * F_b) / (S_g * \pi * D^2)$$

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

DESIGN CALCULATION

Drawing H-2-817634 Doc. No. ECN 626479 Page 1 of 1
 Building 241-BX Rev. 0 Job No. 2E-95-1095
 Subject BX-104 ENRAF REFERENCE LEVEL CALCULATION
 Originator JOHN HUBER Date 1/3/16
 Checker [Signature] Date 1/26/16

TANK NUMBER BX-104

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER (H-2-37852)

RISER NUMBER (8)

RISER ELEVATION (Ft.) 657.0900

TANK CL BOTTOM ELEV (Ft.) - 616.0000

RISER TO TANK BOTTOM ELEV (Ft.) 41.0900
 (In.) 493.0800 (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.) 501.9812

(A + B + C + D + E - F + G) 41.8318

*IMMERSION DEPTH CALCULATION

GOVERNING EQUATION

$$H = (4 \cdot F_b) / (S_g \cdot \pi \cdot D^2)$$

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) = 0.7048 CENTIMETERS
 0.2775 INCH

DESIGN CALCULATION

Drawing	H-2-817634	Doc. No.	ECN 626479	Page	1 of 1
Building	241-BX	Rev.	0	Job No.	2E-85-1086
Subject	BX-105 ENRAF REFERENCE LEVEL CALCULATION				
Originator	JOHN HUBER			Date	1/3/96
Checker				Date	1/26/96

TANK NUMBER BX-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	
	497.64	(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)	42.1886

DESIGN CALCULATION

Drawing H-2-817634 Doc. No. ECN ⁶²⁶⁴⁹⁰ 626479 Page 1 of 1
 Building 241-BX Rev. 2 Job No. 2E-95-
 Subject BX-106 ENRAF REFERENCE LEVEL CALCULATION
 Originator JOHN HUBER *John Huber* Date 1/9/96
 Checker *Randy L. Pan* Date 1/24/96

TANK NUMBER BX-106

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER (H-2-37852)

RISER NUMBER (8)

RISER ELEVATION (Ft.) 654.9300

TANK CL BOTTOM ELEV (Ft.) - 614.0000

RISER TO TANK BOTTOM ELEV (Ft.) 40.9300
 (In.) 491.16 (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)
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.) 500.0437
 (Ft.) 41.6703

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

DESIGN CALCULATION			
Drawing	H-2-817634	Doc. No.	15CN 626981
		Page	1 of 1
Building	241-BX	Rev.	
		Job No.	26-94-796
Subject	BX-107 ENRAF REFERENCE LEVEL CALCULATION		
Originator	JOHN HUBER	Date	1/11/96
Checker	<i>Randy L. Par</i>	Date	1/24/96

TANK NUMBER BX-107

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER (H-2-37852)

RISER NUMBER (8)

RISER ELEVATION (Ft.) 657.0800

TANK CL BOTTOM ELEV (Ft.) - 616.0000

RISER TO TANK BOTTOM ELEV	(Ft.)	41.0800	
	(In.)	492.96	(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)

USING BALL VALVE H-2-817634 P/N 48
INSET DIMENTION FIELD MEASURED.

REFERENCE LEVEL (In.)	501.8612	
(A + B + C + D + E - F + G)	(Ft.)	41.8218

***IMMERSION DEPTH CALCULATION**

GOVERNING EQUATION
 $H = (4 * F_b) / (S_g * P_1 * D ** 2)$

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

Drawing H-2-817634 Doc. No. ECN 626479 Page 1 of 1
 Building 241-BX Rev. 0 Job No. 2E-95-1097
 Subject BX-108 ENRAF REFERENCE LEVEL CALCULATION
 Originator JOHN HUBER Date 2/1/96
 Checker S.L. WALTARI Keith Maltman Date 1 Feb '96

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
 (In.) 493.08 (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)

USING OLD BALL VALVE, INSET
DIMENTION FIELD MEASURED.

REFERENCE LEVEL (In.) 500.6413

(A + B + C + D + E - F + G) 41.7201

DESIGN CALCULATION			
Drawing	H-2-817634	Doc. No.	ECN 626480
		Page	1 of 1
Building	241-BX	Rev.	1
		Job No.	
Subject	BX-108 ENRAF REFERENCE LEVEL CALCULATION		
Originator	JOHN HUBER	Date	1/9/15
Checker	<i>Randy L. Pauer</i>	Date	1/24/16

TANK NUMBER BX-109

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER (H-2-37852)

RISER NUMBER (8)

RISER ELEVATION (Ft.) 655.0900

TANK CL BOTTOM ELEV (Ft.) - 614.0000

RISER TO TANK BOTTOM ELEV (Ft.)	41.0900	
(In.)	493.08	(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)
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.)	501.7038	
(Ft.)	41.8086	

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

DESIGN CALCULATION

Drawing H-2-817634 Doc. No. ECN 631279 Page 1 of 1
 Building 241-BX Rev 1 Job No. 2E-94-1088
 Subject BX-110 ENRAF REFERENCE LEVEL CALCULATION
 Originator JOHN HUBER Date 5-17-96
 Checker Randy L. Powers Date 05-20-96

TANK NUMBER BX-110

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER (H-2-37852)

RISER NUMBER (2)

RISER ELEVATION (Ft.) 657.5400

TANK CL BOTTOM ELEV (Ft.) - 616.0000

RISER TO TANK BOTTOM ELEV (Ft.) 41.5400
 (In.) 498.48 (A)

DETERMINING REFERENCE LEVEL:

1/16 GASKET @ 50% COMPRESSION (In.) + 0.0313 (B)
 12" BLIND FLANGE - MODIFIED (In.) + 1.2500 (C) (Assy 2 config.)
 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
 (Ft.) 42.2769
 (A + B + C + D + E - F + G)

NEW
 USING BALL VALVE, INSET
 DIMENTION FIELD MEASURED.

DESIGN CALCULATION

Drawing H-2-817634 Doc. No. ECN 626473 Page 1 of 1
 Building 241-BX Rev 0 Job No. 2E-95-1083
 Subject BX-111 ENRAF REFERENCE LEVEL CALCULATION
 Originator JOHN HUBER Date 1/3/15
 Checker Randy L. Poon Date 1/26/16

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
 {In.} 498.96 (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)

USING OLD BALL VALVE, INSET
DIMENTION FIELD MEASURED.

REFERENCE LEVEL {In.} 506.5213

{Ft.} 42.2101
 (A + B + C + D + E - F + G)

DESIGN CALCULATION			
Drawing	H-2-817634	Doc. No.	ECN 626479 Page 1 of 1
Building	241-BX	Rev.	0 Job No. 2E-95-1090
Subject	BX-112 ENRAF REFERENCE LEVEL CALCULATION		
Originator	JOHN HUBER	Date	1/3/96
Checker	<i>Long L. Parn</i>	Date	1/26/96

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
{In.} 493.4400 (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
{Ft.} 41.8618

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

***IMMERSION DEPTH CALCULATION**

GOVERNING EQUATION

$$H = (4 * F_b) / (S_g * \pi * D^2)$$

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

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DESIGN CALCULATION

Drawing H-2-817634 Doc. No. ECN 635267 Page 1 of 1
 Building 241-BY Rev. 0 Job No. 241-96-150
 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

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER (H-2-37853)
 RISER NUMBER (12A)
 RISER ELEVATION (Ft.) 648.8800
 TANK CL BOTTOM ELEVATION (Ft.) 600.6500
 RISER TO TANK BOTTOM ELEVATION (Ft.) 48.2300
 (In.) 578.76 (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)

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DESIGN CALCULATION

Drawing H-2-817634 Doc. No. ECN 632839 Page 1 of 1
 Building 241-BY Rev. 0 Job No. 26-96-1155
 Subject BY-110 ENRAF REFERENCE LEVEL CALCULATION
 Originator JOHN HUBER Date 10/17/16
 Checker [Signature] Date 10/24/16

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
 (In.) 566.4 (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 (In.) 573.9613
 (Ft.) 47.8301
 (A + B + C + D + E - F + G)

DESIGN CALCULATION

Drawing H-2-817634 Doc. No. ECN 632839 Page 1 of 1
 Building 241-BY Rev g Job No. 24-96-7159
 Subject BY-111 ENRAF REFERENCE LEVEL CALCULATION
 Originator JOHN HUBER Date 10/22/96
 Checker J. Campbell Date 11/04/96

TANK NUMBER BY-111

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER (H-2-37853)

RISER NUMBER (15)

RISER ELEVATION (Ft.) 649.9900

TANK CL BOTTOM ELEVATION (Ft.) - 601.6500

RISER TO TANK BOTTOM ELEVATION (Ft.) 48.3400
 (In.) 580.08 (A)

DETERMINING REFERENCE LEVEL:

1/16 GASKET @ 50% COMPRESSION (In.) +	0.0313	(B)	
6" TO 4" ADAPTER SPOOL (In.) +	6.0000	(C)	PER H-2-817634 ASSY 78 ECN 632840
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.)	593.6726		
(Ft.)	49.4727		
(A + B + C + D + E - F + G)			

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DESIGN CALCULATION			
Drawing	H-2-817634	Doc. No. ECN	629523 Page 1 of 1
Building	241-C	Rev.	1 Job No. 2E-95-854
Subject	C-102 ENRAF REFERENCE LEVEL CALCULATION		
Originator	JOHN HUBER	Date	2/24/96
Checker	Randy L. P...	Date	2/26/96

TANK NUMBER C-102

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER H-2-37912

RISER NUMBER (3)

RISER ELEVATION (Ft.) 650.3000 FIELD MEASURED

TANK CL BOTTOM ELEVATION (Ft.) - 608.0000

RISER TO TANK BOTTOM ELEVATION (Ft.) 42.3000
(In.) 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	
(Ft.)	42.9301	
(A + B + C + D + E - F + G)		

ENRAF REFERENCE LEVEL CALCULATIONS

TANK NUMBER	C-103	
<u>DETERMINING BOTTOM OF TANK TO RISER</u>		
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.)	- <u>608.0000</u>	
RISER TO TANK BOTTOM ELEVATION (Ft.)	37.6700	
(In.)	452.04	(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.)	+	0.8574	(G)
REFERENCE LEVEL (In.)		461.7811	
(Ft.)		38.4818	
A + B + C + D + E - F + G			

*IMMERSION DEPTH CALCULATION

GOVERNING EQUATION
 $H = (4 \cdot F_b) / (S_g \cdot P_1 \cdot D^{*2})$

Fb = BOUYANT 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

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DESIGN CALCULATION

Drawing H-2-817634 Doc. No. ECN Page 1 of 1
 Building 241-C Rev. 1 Job No. _____
 Subject C-105 ENRAF REFERENCE LEVEL CALCULATION
 Originator JOHN HUBER Date 6-13-96
 Checker Randy L. Powers Date 6/17/96

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)

DESIGN CALCULATION

Drawing H-2-817634 Doc. No. ECN Page 1 of 1
 Building 241-C Rev. 1 Job No. 7E-96-82
 Subject C-106 ENRAF REFERENCE LEVEL CALCULATION (AT RISER 1)
 Originator JOHN HUBER Date 2-27-96
 Checker Randy Powers per telecom Date 2/27/96

TANK NUMBER C-106

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER (H-2-37912)

BOTTOM OF TANK TO RISER DIMENSION

RISER NUMBER 1

RISER ELEVATION (Ft.) 646.1500

TANK SIDEWALL BOTTOM ELEV (Ft.) - 608.0000

RISER TO TANK BOTTOM ELEV (Ft.) 38.1500
(In.) 457.8 (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) 39.8981

USING BALL VALVE H-2-817634 P/N 48. INSET DEPTH IS FIELD MEASURED.

*IMMERSION DEPTH CALCULATION

GOVERNING EQUATION
 $H = (4 \cdot F_b) / (S_g \cdot \pi \cdot D^2)$

F_b = BOUYANT FORCE = SET POINT = 15.0000 GRAMS

S_g = 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

WHC-SD-WM-CN-078
REVISION 0

TANK NUMBER		C-107	<u>PARAMETERS</u>	
<u>BOTTOM OF TANK TO RISER DIMENSION</u>			TT =	
DRAWING NUMBER (H-2-37912)			UR =	
RISER NUMBER (8)			MH =	
RISER ELEVATION (Ft.) 648.1800			HH =	
TANK INSIDE BOTTOM ELEVATION (Ft.) - N/A			HA =	
TANK SIDE-BOTTOM ELEVATION (Ft.) - 610.0000			RL =	
RISER TO TANK BOTTOM ELEVATION (Ft.) 38.1800			AN =	
(In.) 458.16 (A)			AM =	
<u>DETERMINING REFERENCE LEVEL:</u>			TI =	
1/16 GASKET @ 50% COMPRESSION (In.) + 0.0313 (B)			ML =	
PVC FLANGE (OPTIONAL) (In.) + 1.0000 (C)			LA =	
1/8 GASKET @ 50% COMPRESSION (In.) + 0.0625 (D)			LL =	
BALL VALVE FLANGE TO FLANGE (In.) + 9.0000 (E)			WT =	
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)				

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DESIGN CALCULATION

Drawing H-2-817634 Doc. No. SCN 623211 Page 1 of 1
 Building 241-C Rev. 0 Job No. 25-25-426
 Subject C-112 ENRAF REFERENCE LEVEL CALCULATION
 Originator JOHN HUBER Date 6/1/75
 Checker J. m. Jones Joseph A. Jones Date 06-06-75

TANK NUMBER C-112

BOTTOM OF TANK TO RISER

DRAWING NUMBER (H-2-37912)

RISER NUMBER (5)

RISER ELEVATION (Ft.) 645.7000

TANK INSIDE BOTTOM ELEVATION - N/A

TANK SIDE-BOTTOM ELEVATION - 608.0000

RISER TO TANK BOTTOM ELEVATION 37.7000
 (In.) 452.4 (A)

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
 (Ft.) 38.3518

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

REPLACING MANUAL TAPE; NO RISER LINER

USING OLD BALL VALVE, H-2-817634, P/N 20

MOST RECENT PHOTOS INDICATE
 SOLIDS/SLUDGE BELOW PLUMMET - NO
 IMMERSION DEPTH

THIS PAGE RESERVED FOR C-201

THIS PAGE RESERVED FOR C-202

THIS PAGE RESERVED FOR C-203

THIS PAGE RESERVED FOR C-204

DESIGN CALCULATION

Drawing H-2-817634 Doc. No. ECN 672286 Page 1 of 1
 Building 241-EW-151 Rev. _____ Job No. 2W-86-578
 Subject EW-151 VENT STATION ENR REFERENCE LEVEL CALCULATION
 Originator JOHN HUBER Date 7/26/96
 Checker GEORGE COLEMAN H Coleman Date 7/26/96

TANK NUMBER EW-151

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER H-2-43148
 RISER NUMBER N/A

FINISHED FLOOR ELEV. (Ft.) 745.0000 [H-2-43155]
 TANK OUTSIDE BOTTOM ELEVATION (Ft.) - 745.3900 [H-2-43155]
 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

3/8" THICK TANK WALL PER H-2-43146

3" BLIND FLANGE THICKNESS (Ft.) - 0.0833

3" 150 # BLIND FLANGE IS 1" THK

RISER TO TANK BOTTOM ELEVATION (Ft.) 16.4954
 (In.) 197.945 (A)

DETERMINING REFERENCE LEVEL:

1/16 GASKET @ 50% COMPRESSION (In.) + 0.0313 (B)
 3" TO 4" ADAPTER FLANGE (In.) + 1.5000 (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.) 207.3150
 (Ft.) 17.2763

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

*IMMERSION DEPTH CALCULATION

GOVERNING EQUATION
 $H = (4 \cdot F_b) / (S_g \cdot \pi \cdot D^2)$

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

ENRAF REFERENCE LEVEL CALCULATIONS

WHC-SD-WM-CN-078
REVISION 0

TANK NUMBER		S-101	<u>PARAMETERS</u>	
<u>BOTTOM OF TANK TO RISER DIMENSION</u>			TT =	
DRAWING NUMBER	(H-2-37381)		UR =	
RISER NUMBER	(3)		MH =	
RISER ELEVATION (Ft.)	665.9400		HH =	
TANK INSIDE BOTTOM ELEVATION (Ft.) -	620.4300		HA =	
TANK SIDE-BOTTOM ELEVATION (Ft.) -	N/A		RL =	
RISER TO TANK BOTTOM ELEVATION (Ft.)	45.5100		AN =	
(In.)	546.12	(A)	AM =	
<u>DETERMINING REFERENCE LEVEL:</u>			S1 =	
1/16 GASKET @ 50% COMPRESSION (In.) +	0.0313	(B)	S2 =	
PVC FLANGE (OPTIONAL) (In.) +	1.0000	(C)	S3 =	
1/8 GASKET @ 50% COMPRESSION (In.) +	0.0625	(D)	TI =	
BALL VALVE FLANGE TO FLANGE (In.) +	9.0000	(E)	ML =	
BALL INSET DIM (FROM TOP) (In.) -	1.2100	(F)	LL =	
IMMERSION DEPTH ON SOLIDS (In.) +	0	(G)	WT =	
REFERENCE LEVEL (In.)	555.0038			
(Ft.)	46.2503			
(A + B + C + D + E - F + G)				

ENRAF REFERENCE LEVEL CALCULATIONS

WHC-SD-WM-CN-078
REVISION 0Reference Level Calculation:

Prepared [Signature] Date 2/16/95
 Checked Gracie L. & S. L. L. L. Date 2/24/95

TANK NUMBER S-102

PARAMETERSBOTTOM 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
 (In.) 547.44 (A)

TT = 580.66
 UR = 580.66
 MH = 575.06
 HH = 568.06
 HA = 562.06
 RL = 556.06
 AN = N/A
 AM = N/A
 TI = .8102
 ML = 1.00
 LA = 12.00
 LL = 6.00
 WT = EDE

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.) 556.0638
 (Ft.) 46.3386

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

ENRAF REFERENCE LEVEL CALCULATIONS

WHC-SD-WM-CN-078
REVISION 0

TANK NUMBER	S-103		<u>PARAMETERS</u>
<u>BOTTOM OF TANK TO RISER DIMENSION</u>			TT = 580.90
DRAWING NUMBER	(H-2-37381)		UR = 580.90
RISER NUMBER	(3)		MH = 575.30
RISER ELEVATION (Ft.)	664.0600		HH = 568.30
TANK INSIDE BOTTOM ELEVATION (Ft.) -	618.4300		HA = 562.30
TANK SIDE-BOTTOM ELEVATION (Ft.) -	<u>N/A</u>		RL = 556.72
RISER TO TANK BOTTOM ELEVATION (Ft.)	45.6300		AN = 129.80
(In.)	547.56	(A)	AM = 79.80
			TI =
			ML =
			LA =
			LL =
			WT =

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.)	556.7212
(Ft.)	46.3934
(A + B + C + D + E - F + G)	

*IMMERSION DEPTH CALCULATION

GOVERNING EQUATION

$$H = (4 \cdot F_b) / (S_g \cdot \pi \cdot D^2)$$

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) =	0.7048	CENTIMETERS
	0.2775	INCH

THIS PAGE RESERVED FOR S-104

DESIGN CALCULATION

WHC-SD-WM-CN-078

REVISION 0

(1) Drawing H-2-817634 (2) Doc. No. - (3) Page 1 of 1
 (4) Building 241-5 (5) Rev. 0 (6) Job No. -
 (7) Subject S-105 Enraf Reference Level Calculations
 (8) Originator John Huber Date 4-11-95
 (9) Checker Michael H. Johnson Date 4/24/95

(10)

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
 (In.) 548.4 (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.) 557.0238
 (Ft.) 46.4186

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

ENRAF REFERENCE LEVEL CALCULATIONS

WHC-SD-WM-CN-078
REVISION 0

TANK NUMBER		S-106	<u>PARAMETERS</u>	
<u>BOTTOM OF TANK TO RISER DIMENSION</u>			TT = 581.25	
DRAWING NUMBER	(H-2-37381)		UR = 581.25	
RISER NUMBER	(3)		MH = 575.65	
RISER ELEVATION (Ft.)	664.0500		HH = 568.65	
TANK INSIDE BOTTOM ELEVATION (Ft.) -	618.4300		HA = 562.65	
TANK SIDE-BOTTOM ELEVATION (Ft.) -	N/A		RL = 556.60	
RISER TO TANK BOTTOM ELEVATION (Ft.)	45.6200		AN = 201.80	
(In.)	547.44	(A)	AM = 151.80	
			TI = .S106	
			ML = 1.00	
			LA = 12.00	
			LL = 6.00	
			WT = EDE	

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

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

*IMMERSION DEPTH CALCULATIONGOVERNING EQUATION
 $H = (4 \cdot F_b) / (S_g \cdot \pi \cdot D^2)$

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) =	0.7048	CENTIMETERS
	0.2775	INCH

ENRAF REFERENCE LEVEL CALCULATIONS

WHC-SD-WM-CN-078
REVISION 0

TANK NUMBER	S-107	PARAMETERS
<u>BOTTOM OF TANK TO RISER DIMENSION</u>		TT = 581.10
DRAWING NUMBER	(H-2-37381)	UR = 581.10
RISER NUMBER	(3)	MH = 575.50
RISER ELEVATION (Ft.)	666.0300	HH = 568.50
TANK INSIDE BOTTOM ELEVATION (Ft.) -	620.4300	HA = 562.50
TANK SIDE-BOTTOM ELEVATION (Ft.) -	N/A	RL = 556.36
RISER TO TANK BOTTOM ELEVATION (Ft.)	45.6000	AN = 169.20
(In.)	547.2	AM = 119.20
	(A)	TI =
		ML =
		LA =
		LL =
		WT =

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
(Ft.)	46.3634
(A + B + C + D + E - F + G)	

*IMMERSION DEPTH CALCULATION

GOVERNING EQUATION		
$H = (4 * F_b) / (S_g * \pi * D^{**2})$		
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

WHC-SD-WM-CN-078
REVISION 0

(1) Drawing 14-2-817634 (2) Doc. No. ✓ (3) Page 1 of 1
 (4) Building 241-S (5) Rev. 0 (6) Job No. -
 (7) Subject S-108 Enraf Reference Level Calculations
 (8) Originator John Huber Date 4-11-85
 (9) Checker Michael G. Johnson Date 4/25/95

(10)

TANK NUMBER S-108

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER (H-2-37381)

RISER NUMBER (3)

RISER ELEVATION (Ft.) 665.0600

TANK INSIDE BOTTOM ELEVATION (Ft.) - 619.4300

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

RISER TO TANK BOTTOM ELEVATION (Ft.)	45.6300	
(In.)	547.56	(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.)	556.1838
(Ft.)	46.3486

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

DESIGN CALCULATION

WHC-SD-WM-CN-078
REVISION 0

(1) Drawing H-2-817634 (2) Doc. No. - (3) Page 1 of 1
(4) Building 241-5 (5) Rev. 0 (6) Job No. -
(7) Subject S-109 Enraf Reference Level Calculations
(8) Originator John Huber Date 4-11-95
(9) Checker Michael J. Gorman Date 4/25/95

(10)

TANK NUMBER S-109

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER (H-2-37381)

RISER NUMBER (3)

RISER ELEVATION (Ft.) 664.0800

TANK INSIDE BOTTOM ELEVATION (Ft.) - 618.4300

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

RISER TO TANK BOTTOM ELEVATION (Ft.)	45.6500	
(In.)	547.8	(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.)	556.4238
(Ft.)	46.3686

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

DESIGN CALCULATION

Drawing H-2-817634 Doc. No. ECN 623969 Page 1 of 1
 Building 241-S Rev. 0 Job No. 24-95-
 Subject S-110 ENRAF REFERENCE LEVEL CALCULATION
 Originator JOHN HUBER Date 7-13-95
 Checker J. Barnes Date 7/17/95

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	45.9100	
(In.)	550.92	(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)	
BALL INSET DIM (FROM TOP) (In.) -	1.4700	(F)	NEW BALL VALVE, H-2-817634, P/N 48
IMMERSION DEPTH IN SOLIDS (In.) +	0	(G)	
REFERENCE LEVEL (In.)	559.5438		
(A + B + C + D + E - F + G)	46.6286		

ENRAF REFERENCE LEVEL CALCULATIONS

WHC-SD-WM-CN-078
REVISION 0

TANK NUMBER		S-111	<u>PARAMETERS</u>	
<u>BOTTOM OF TANK TO RISER DIMENSION</u>			TT = 582.57	
DRAWING NUMBER	(H-2-37381)		UR = 582.57	
RISER NUMBER	(3)		MH = 576.97	
RISER ELEVATION (Ft.)	665.1600		HH = 569.97	
TANK INSIDE BOTTOM ELEVATION (Ft.) -	619.4300		HA = 563.97	
TANK SIDE-BOTTOM ELEVATION (Ft.) -	N/A		RL = 557.92	
RISER TO TANK BOTTOM ELEVATION (Ft.)	45.7300		AN = 227.60	
(In.)	548.76	(A)	AM = 177.60	
			TI = .8111	
			ML = 1.00	
			LA = 12.00	
			LL = 6.00	
			WT = EDE	

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		
$H = (4 \cdot F_b) / (S_g \cdot \pi \cdot D^2)$		
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) =	0.7048	CENTIMETERS
	0.2775	INCH

ENRAF REFERENCE LEVEL CALCULATIONS

WHC-SD-WM-CN-078
REVISION 0Reference Level Calculation:

Prepared

Date

2/16/95

Checked

Date

2/24/95

TANK NUMBER

S-112

PARAMETERSBOTTOM 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.)

45.5900

(In.)

547.08

(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.)

555.7038

(Ft.)

46.3086

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

DESIGN CALCULATION

Drawing H-2-817634 Doc. No. ECN 629524 Page 1 of 1
Building 240-S Rev. 2 Job No. 2W-95-853
Subject S-302 ENRAF REFERENCE LEVEL CALCULATION
Originator JOHN HUBER Date 2-27-96
Checker KEVIN HULL KA Date 2/28/96

TANK NUMBER S-302

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER (H-2-5211)

RISER NUMBER (N/A)

RISER ELEVATION (Ft.) 678.7300

TANK INSIDE BOTTOM ELEVATION (Ft.) - 646.5000

RISER TO TANK BOTTOM ELEVATION
(Ft.) 32.2300
(In.) 386.76 (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)

NEW BALL VALVE, H-2-
817634, P/N 48

REFERENCE LEVEL (In.) 394.3213

(A + B + C + D + E - F + G) 32.8601

DESIGN CALCULATION

Drawing H-2-817634 Doc. No. ECN 626471 Page 1 of 1
Building 241-S Rev. 0 Job No. EW-95-913
Subject S-302-A ENRAF REFERENCE LEVEL CALCULATION
Originator JOHN HUBER Date 12/12/95
Checker H. J. HULL Date 12/12/95

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
(In.) 385.68 (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)

NEW BALL VALVE, H-2-817634, P/N 48

REFERENCE LEVEL (In.) 393.2413
(Ft.) 32.7701
(A + B + C + D + E - F + G)

ENRAF REFERENCE LEVEL CALCULATIONS

WHC-SD-WM-CN-078
REVISION 0Reference Level Calculation:

Prepared W. L. Date 2/11/95
 Checked Michael S. Johnson Date 2/21/95

TANK NUMBER SX-101

PARAMETERSBOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER (H-2-37855)

RISER NUMBER (4)

RISER ELEVATION (Ft.) 663.5100

TANK INSIDE BOTTOM ELEVATION (Ft.) - 611.1100

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

RISER TO TANK BOTTOM ELEVATION (Ft.) 52.4000
 (In.) 628.8 (A)

TT = 662.02
 UR = 662.02
 MH = 656.42
 HH = 649.42
 HA = 643.42
 RL = 637.42
 AN = N/A
 AM = N/A
 TI = .SX101
 ML = 1.00
 LA = 12.00
 LL = 6.00
 WT = EDE

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
 (Ft.) 53.1186

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

ENRAF REFERENCE LEVEL CALCULATIONS

Reference Level Calculation:	
Prepared <u>[Signature]</u>	Date <u>2/14/95</u>
Checked <u>Michael J. Johnson</u>	Date <u>2/24/95</u>

TANK NUMBER SX-102

PARAMETERS

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.)	52.3100	
(In.)	627.72	(A)

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

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.)	636.3437
(Ft.)	53.0286
(A + B + C + D + E - F + G)	

ENRAF REFERENCE LEVEL CALCULATIONS

WHC-SD-WM-CN-078
REVISION 0Reference Level Calculation:Prepared WHLDate 2/16/95Checked Michael J. G. BatesDate 2/24/95

TANK NUMBER

SX-103

PARAMETERSBOTTOM 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	
(In.)	627.96	(A)

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

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
(Ft.)	53.0486

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

ENRAF REFERENCE LEVEL CALCULATIONS

<u>Reference Level Calculation:</u>	
Prepared <u>[Signature]</u>	Date <u>2/1/95</u>
Checked <u>Michael H. J. [Signature]</u>	Date <u>2/21/95</u>

TANK NUMBER SX-104

PARAMETERS

BOTTOM OF TANK TO RISER DIMENSION

TT = 661.30
UR = 661.30
MH = 655.70
HH = 648.70
HA = 642.70
RL = 636.70
AN = N/A
AM = N/A
TI = .5X104
ML = 1.00
LA = 12.00
LL = 6.00
WT = EDE

DRAWING NUMBER (H-2-37855)

RISER NUMBER (4)

RISER ELEVATION (Ft.) 663.4500

TANK INSIDE BOTTOM ELEVATION (Ft.) - 611.1100

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

RISER TO TANK BOTTOM ELEVATION (Ft.) 52.3400
(In.) 628.08 (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.) 636.7038
(Ft.) 53.0586

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

ENRAF REFERENCE LEVEL CALCULATIONS

<u>Reference Level Calculation:</u>	
Prepared <u>[Signature]</u>	Date <u>2/16/95</u>
Checked <u>Timothy J. Johnson</u>	Date <u>2/21/95</u>

TANK NUMBER SX-105

PARAMETERS

BOTTOM OF TANK TO RISER DIMENSION

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 = .5X105
ML = 1.00
LA = 12.00
LL = 6.00
WT = EDE

DRAWING NUMBER (H-2-37855)

RISER NUMBER (4)

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.)	637.3038
(Ft.)	53.1086

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

ENRAF REFERENCE LEVEL CALCULATIONS

WHC-SD-WM-CN-078
REVISION 0

TANK NUMBER		SX-106	<u>PARAMETERS</u>	
<u>BOTTOM OF TANK TO RISER DIMENSION</u>			TT = 662.13	
DRAWING NUMBER	(H-2-37855)		UR = 662.13	
RISER NUMBER	(3)		MH = 656.53	
RISER ELEVATION (Ft.)	661.4700		HH = 649.53	
TANK INSIDE BOTTOM ELEVATION (Ft.) -	609.1100		HA = 643.53	
TANK SIDE-BOTTOM ELEVATION (Ft.) -	N/A		RL = 637.20	
RISER TO TANK BOTTOM ELEVATION (Ft.)	52.3600		AN = 226.60	
(In.)	628.32	(A)	AM = 176.60	
<u>DETERMINING REFERENCE LEVEL:</u>			TI = .SX106	
1/16 GASKET @ 50% COMPRESSION (In.) +	0.0313	(B)	ML = 1.00	
PVC FLANGE (OPTIONAL) (In.) +	1.0000	(C)	LA = 12.00	
1/8 GASKET @ 50% COMPRESSION (In.) +	0.0625	(D)	LL = 6.00	
BALL VALVE FLANGE TO FLANGE (In.) +	9.0000	(E)	WT = EDE	
BALL INSET DIM (FROM TOP) (In.) -	1.2100	(F)		
IMMERSION DEPTH IN SOLIDS (In.) +	0	(G)		
REFERENCE LEVEL (In.)	637.2038			
(Ft.)	53.1003			
(A + B + C + D + E - F + G)				

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ENRAF REFERENCE LEVEL CALCULATIONS

DESIGN CALCULATION			
Drawing <u>H-2-817634</u>	Doc. No. <u>ECN 631228</u>	Page <u>1</u> of <u>1</u>	
Building <u>241-SX</u>	Rev. <u>0</u>	Job No. <u>24-96-288</u>	
Subject <u>SX-109 ENRAF REFERENCE LEVEL CALCULATION</u>			
Originator <u>JOHN HUBER</u>	Date <u>4-10-96</u>		
Checker <u>J. D. Baker</u>	Date <u>4/12/96</u>		

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	
	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.}	635.3125	
	52.9427	

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

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DESIGN CALCULATION

Drawing H-2-817634 Doc. No. ECN 638751 Page 1 of 1
 Building 241-SY Rev. 1 Job No. 2W-96-788
 Subject SY-101 RISER 1-C ENRAF REFERENCE LEVEL CALCULATION
 Originator JOHN HUBER Date 11/13/96
 Checker GEORGE J. COLEMAN Date 11/12/96

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

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

RISER TO TANK BOTTOM ELEVATION (Ft.) 55.1703
 (In.) 662.0436 (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.) 570.6674
 (Ft.) 55.8889

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

DESIGN CALCULATION

Drawing H-2-817634 Doc. No. ECN 638751 Page 1 of 1
 Building 241-SY Rev. 1 Job No. 2W-96-788
 Subject SY-101 RISER 1-A ENBAF REFERENCE LEVEL CALCULATION
 Originator JOHN HUBER Date 11/13/96
 Checker GEORGE J. COLEMAN Date 11/13/96

TANK NUMBER SY-101

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER	(H-2-79556)
RISER NUMBER	(1A)
RISER ELEVATION (Ft.)	672.6500
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.)	<u>- 0.0417</u>
RISER TO TANK BOTTOM ELEVATION (Ft.)	55.4103
(In.)	664.9236 (A)

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

IMMERSION DEPTH CHANGED
TO ZERO SINCE DISPLACER
SITS ON SOLIDS

ENRAF REFERENCE LEVEL CALCULATIONS

TANK NUMBER	SY-102	PARAMETERS
<u>BOTTOM OF TANK TO RISER DIMENSION</u>		TT = 697.06
DRAWING NUMBER	(H-2-72213)	UR = 697.06
RISER NUMBER	(2A)	MH = 691.46
RISER ELEVATION (Ft.)	672.5100	HH = 684.46
TANK INSIDE BOTTOM ELEVATION (Ft.) -	617.2396	HA = 678.46
TANK SIDE-BOTTOM ELEVATION (Ft.) -	N/A	RL = 672.41
RISER TO TANK BOTTOM ELEVATION (Ft.)	55.2704	AN = 301.00
(In.)	663.2448	AM = 251.00
		TI = .SY102
		ML = 1.00
		LA = 12.00
		LL = 6.00
		WT = EDE

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
(Ft.)	56.0338
(A + B + C + D + E - F + G)	

*IMMERSION DEPTH CALCULATION

GOVERNING EQUATION
 $H = (4 \cdot F_b) / (S_g \cdot \pi \cdot D^2)$

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

ENRAF REFERENCE LEVEL CALCULATIONS

TANK NUMBER	SY-103		<u>PARAMETERS</u>
<u>BOTTOM OF TANK TO RISER DIMENSION</u>			TT = 697.30
DRAWING NUMBER	(H-2-85104)		UR = 697.30
RISER NUMBER	(2A)		MH = 691.70
RISER ELEVATION (Ft.)	672.5300		HH = 684.70
TANK INSIDE BOTTOM ELEVATION (Ft.) -	617.2396		HA = 678.70
TANK SIDE-BOTTOM ELEVATION (Ft.) -	<u>N/A</u>		RL = 672.65
RISER TO TANK BOTTOM ELEVATION (Ft.)	55.2904		AN = 298.90
(In.)	663.4848	(A)	AM = 248.90
			TI =
			ML =
			LA =
			LL =
			WT =

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.)	672.6460	
(Ft.)	56.0538	
(A + B + C + D + E - F + G)		

*IMMERSION DEPTH CALCULATION

GOVERNING EQUATION
 $H = (4 \cdot F_b) / (S_g \cdot \pi \cdot D^2)$

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

$S_g = \text{SPECIFIC GRAVITY OF LIQUID} = 1.0500$

$D = \text{DISPLACER DIAMETER} = 2.0000 \text{ INCHES}$

$H = \text{IMMERSION DEPTH (FROM EQUATION)} = 0.7048 \text{ CENTIMETERS}$
 0.2775 INCH

DESIGN CALCULATION

Drawing H-2-817634 Doc. No. ECN Page 1 of 1
Building 241-T Rev. 1 Job No. _____
Subject T-101 ENRAF REFERENCE LEVEL CALCULATION
Originator JOHN HUBER Date 12/10/95
Checker K. J. HUBER Date 12/22/95

TANK NUMBER T-101

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER (H-2-37909)

RISER NUMBER (1)

RISER ELEVATION (Ft.) 673.6200

TANK CL BOTTOM ELEVATION (Ft.) - 635.0000

RISER TO TANK BOTTOM ELEV (Ft.) 38.6200
(In.) 463.44 (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)

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
(Ft.) 39.3603

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

DESIGN CALCULATION			
Drawing	H-2-817634	Doc. No.	ECN
			Page 1 of 1
Building	241-T	Rev.	1
		Job No.	
Subject	T-102 REFERENCE LEVEL CALCULATION		
Originator	JOHN HUBER	Date	12/15/95
Checker	<i>[Signature]</i>	Date	12/22/95

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)

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.) + 0.2775 (G)

REFERENCE LEVEL {In.} 474.2987
{Ft.} 39.5249

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

***IMMERSION DEPTH CALCULATION**

GOVERNING EQUATION

$$H = (4 \cdot P_b) / (S_g \cdot P_1 \cdot D \cdot 2)$$

P_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

DESIGN CALCULATION			
Drawing	H-2-B17634	Doc No	SCN 625941
Building	241-T	Rev	1
Subject	T-103 Encraft RL calculation		
Originator	John Huber	Date	10/10/85
Checker	KEVIN HULL	Date	10/10/95

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
(In.) 465.96 (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.) + 0.2775 (G)

REFERENCE LEVEL (In.) 474.8612
(Ft.) 39.5718

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

***IMMERSION DEPTH CALCULATION**

GOVERNING EQUATION

$$H = (4 \cdot F_b) / (S_g \cdot P_1 \cdot D^2 \cdot 2)$$

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

DESIGN CALCULATION

Drawing H-2-817634 Doc. No. ECN Page 1 of 1
 Building 241-T Rev. 1 Job No. _____
 Subject T-104 ENRAF REFERENCE LEVEL CALCULATION
 Originator JOHN HUBER Date 12/15/95
 Checker K. J. HULL Date 12/22/95

TANK NUMBER T-104

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER (H-2-37909)

RISER NUMBER (5)

RISER ELEVATION (Ft.) 673.8100

TANK CL BOTTOM ELEV. (Ft.) - 635.0000

RISER TO TANK BOTTOM ELEV (Ft.) 38.8100
 (In.) 465.72 (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.) - 1.2100 (F)

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

REFERENCE LEVEL (In.) 473.5412
 (Ft.) 39.4618

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

REPLACING MANUAL TAPE, NO PVC LINER

USING OLD BALL VALVE, H-2-817634 P/N 20

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

DESIGN CALCULATION			
Drawing	H-2-817634	Doc. No.	ECN 625941 Page 1 of 1
Building	241-T	Rev.	1 Job No. 2W-25-258
Subject	T-105 Enraf RL Calculation		
Originator	John Huber	Date	10/10/95
Checker	KEVIN HULL	Date	10/10/95
TANK NUMBER		T-105	

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER (H-2-37909)

RISER NUMBER (1)

RISER ELEVATION (Ft.) 672.8100

TANK INSIDE BOTTOM ELEVATION (Ft.) - 634.0000

RISER TO TANK BOTTOM ELEVATION (In.) 38.8100
465.72 (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.) 474.3437

(A + B + C + D + E - F + G) 39.5286

DESIGN CALCULATION			
Drawing	H-2-817634	Doc. No.	220 ECN 625941 Page 1 of 1
Building	241-T	Rev.	1 Job No. 22W-94-1118
Subject	T-106 Encr. PL calculation		
Originator	John Huber	Date	10/10/95
Checker	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

(A) + B + C + D + E - F + G (Ft.) 39.4301

DESIGN CALCULATION			
Drawing	H-2-817634	Doc. No.	ECN
Building	241-T	Rev.	1
Subject	T-107 ENRAF REFERENCE LEVEL CALCULATION		
Originator	JOHN HUBER	Date	12/15/95
Checker	K.J. Hule	Date	12/22/95

TANK NUMBER T-107

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER (H-2-37909)

RISER NUMBER (1)

RISER ELEVATION (Ft.) ~~673.8200~~ 673.81 K/H

TANK CL BOTTOM ELEV. (Ft.) - ~~635.0000~~

RISER TO TANK BOTTOM ELEV (Ft.) ~~38.8200~~ 38.81 K/H
(In.) ~~465.84~~ (A) WT = EDE
445.72 K/H

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.) ~~475.0012~~ 474.82 K/H

(A + B + C + D + E - F + G) ~~39.5034~~ 39.5734 K/H

***IMMERSION DEPTH CALCULATION**

GOVERNING EQUATION

$$H = (4 \cdot F_b) / (S_g \cdot \pi \cdot D^2)$$

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

DESIGN CALCULATION			
Drawing	H-2-817634	Doc. No.	ECN 625941
Building	241-T	Rev.	1
Subject	T-108 Enraf RL Calculation		
Originator	John Huber	Date	10/10/95
Checker	KEVIN HULL	Date	10/10/95

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
(In.) 485.52 (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)

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)

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

REFERENCE LEVEL (In.)

(A) + (B) + (C) + (D) + (E) - (F) + (G) + (H) + (I)
495.7075 494.6401 41.22
41.3085

***IMMERSION DEPTH CALCULATION**

GOVERNING EQUATION

$$H = (4 \cdot F_b) / (S_g \cdot P_1 \cdot D \cdot 2)$$

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 EQN) = 0.7048 CENTIMETERS
0.2775 INCH

DESIGN CALCULATION			
Drawing	H-2-817634	Doc. No.	ECN
Building	241-T	Rev.	1
Subject	T-109 ENRAF REFERENCE LEVEL CALCULATION		
Originator	JOHN HUBER	Date	12/15/95
Checker	K.J. HULL	Date	12/22/95

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.) - 633.0000

RISER TO TANK BOTTOM ELEVATION (Ft.) 38.8000
(In.) 465.6 (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.) + 0.0000 (G)

REFERENCE LEVEL (In.) 474.4837
(Ft.) 39.5403

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

DESIGN CALCULATION			
Drawing	H-2-817634	Doc. No.	ECN
Building	241-T	Rev.	1
Subject	T-110 ENRAF REFERENCE LEVEL CALCULATION		
Originator	JOHN HUBER	Date	12/15/95
Checker		Date	

TANK NUMBER T-110

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER	(H-2-37909)
TANK CL BOTTOM ELEVATION (Ft.)	
RISER NUMBER	(1)
RISER ELEVATION (Ft.)	673.8000
TANK INSIDE BOTTOM ELEVATION (Ft.)	<u>- 635.0000</u>
RISER TO TANK BOTTOM ELEV (Ft.)	38.8000
	465.6 (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.)	474.2237	
(A + B + C + D + E - F + G)	39.5186	

DESIGN CALCULATION			
Drawing	17-2-817634	Doc No	ECN 625941
Building	241-T	Rev	1
Subject	ET-111 Encl PL Calculation		
Originator	John Huber	Date	10/10/95
Checker	Kevin Hull	Date	10/10/95
TANK NUMBER		T-111	

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER (H-2-37909)

RISER NUMBER (4)

RISER ELEVATION (Ft.) 672.8200

TANK INSIDE BOTTOM ELEVATION (Ft.) - 634.0000

RISER TO TANK BOTTOM ELEV (Ft.) 38.8200
(In.) 465.84 (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.) 474.4638
(Ft.) 39.5386

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

DESIGN CALCULATION			
Drawing	H-2-817634	Doc. No.	ECN 625941
Building	241-T	Rev.	1
Subject	T-112 Encl. RL calculation		
Originator	John Huber	Date	10/10/95
Checker	Kevin Hull	Date	10/10/95

TANK NUMBER T-112

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER (H-2-37909)

RISER NUMBER (13)

RISER ELEVATION (Ft.) 673.4700

TANK CL BOTTOM ELEVATION (Ft.) - 533.0000

RISER TO TANK BOTTOM ELEV (Ft.) 40.4700
(In.) 485.64 (A)

DETERMINING REFERENCE LEVEL:

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

PVC FLANGE (OPTIONAL) (In.) + ~~1.0000~~ 2 1/8" 10/10/95

1/8 GASKET @ 50% COMPRESSION (In.) + ~~0.0625~~ 0 (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. + 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.) ~~495.8225~~ 494.7601 10/10/95
(A + B + C + D + E - F + G + H + I) ~~41.3185~~ 41.2300

***IMMERSION DEPTH CALCULATION**

GOVERNING EQUATION
 $H = (4 \cdot F_b) / (S_g \cdot P_i \cdot D^{**2})$

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

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DESIGN CALCULATION			
Drawing	H-2-817634	Doc. No.	ECN 629519
Building	241-TX	Rev.	1
Subject	TX-101 ENRAF REFERENCE LEVEL CALCULATION		
Originator	JOHN HUBER	Date	2/9/96
Checker	KENN HULL	Date	2/12/96

TANK NUMBER TX-101

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER (H-2-37910)

RISER NUMBER (4)

RISER ELEVATION (Ft.) 672.1300

TANK INSIDE BOTTOM ELEVATION (Ft.) - 624.7300

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

RISER TO TANK BOTTOM ELEVATION (Ft.) 47.4000
(In.) 568.8 (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 GASKET @ 50% COMPRESSION (In.) + 0.0625

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

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

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

REFERENCE LEVEL (In.) 589.7637
(Ft.) 49.1470

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

***IMMERSION DEPTH CALCULATION**

GOVERNING EQUATION
 $H = (4 \cdot F_b) / (S_g \cdot \pi \cdot D^2)$

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 EQTN.) = 0.7048 CENTIMETERS
0.2775 INCH

DESIGN CALCULATION			
Drawing	H-2-817634	Doc. No. ECN 629520	Page 1 of 1
Building	241-TX	Rev. 0	Job No. 2W-96-77
Subject	TX-102 ENRAF REFERENCE LEVEL CALCULATION		
Originator	JOHN HUBER	Date	2/2/96
Checker	Kevin Huu	Date	2/2/96

TANK NUMBER TX-102

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER (H-2-37910)

RISER NUMBER (9A)

RISER ELEVATION (Ft.) 673.1100

TANK INSIDE BOTTOM ELEVATION (Ft.) - 623.7300

RISER TO TANK BOTTOM ELEVATION (Ft.) 49.3800
(In.) 592.56 (A)

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 (In.) 600.1213
(Ft.) 50.0101

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

DESIGN CALCULATION

Drawing H-2-817634 Doc. No. ECN 623973 Page 1 of 1
Building 241-TX Rev. 0 Job No. 24-14-1177
Subject TX-103 Engrt Ref. Level Calculation
Originator John Huber Date 7-24-95
Checker Steve Sumner Date 7-24-95

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 ✓
579.72 (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)
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.) 588.6212 ✓
(A + B + C + D + E - F + G) 49.0518

*IMMERSION DEPTH CALCULATION

GOVERNING EQUATION
 $H = (4 \cdot F_b) / (S_g \cdot \pi \cdot D^2)$

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 EQTN.) = 0.7048 CENTIMETERS
0.2775 INCH

DESIGN CALCULATION

Drawing	H-2-817634	Doc. No.	ECN 629519	Page	1 of 1
Building	241.TX	Rev.	1	Job No.	2W-94-1109
Subject	TX-104 ENRAF REFERENCE LEVEL CALCULATION				
Originator	JOHN HUBER	Date	2/9/96		
Checker	KEVIN HOLL	Date	2/12/96		

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
(In.) 578.88 (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 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.) 598.8437
(Ft.) 49.5870

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

*IMMERSION DEPTH CALCULATION

GOVERNING EQUATION
 $H = (4 \cdot F_b) / (S_g \cdot \pi \cdot D^2)$

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 EQTN.) = 0.7048 CENTIMETERS
0.2775 INCH

DESIGN CALCULATION			
Drawing	H-2-817634	Doc. No.	ECN 679520
Building	241-TX	Rev.	0
Subject	TX-105 ENRAF REFERENCE LEVEL CALCULATION		
Originator	JOHN HUBER	Date	2/1/96
Checker	Kevin Hoke	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
(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
(Ft.) 49.9039

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

DESIGN CALCULATION			
Drawing	H-2-817634	Doc. No. ECN	629520
		Page	1 of 1
Building	241-TX	Rev.	0
		Job No.	24-86-79
Subject	TX-106 ENRAF REFERENCE LEVEL CALCULATION		
Originator	JOHN HUBER	Date	2/9/96
Checker	KEVIN HULL	Date	2/12/96

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 (E)

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			
Drawing	H-2-817634	Doc. No.	ECN 629579 Page 1 of 1
Building	241-TX	Rev.	1 Job No. 26-94-1176
Subject	TX-107 ENRAF REFERENCE LEVEL CALCULATION		
Originator	JOHN HUBER	Date	2/9/96
Checker	KEVIN HOWE	Date	2/12/96

TANK NUMBER TX-107

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER (H-2-37910)

RISER NUMBER (8)

RISER ELEVATION (Ft.) 670.9400

TANK INSIDE BOTTOM ELEVATION (Ft.) - 622.7300

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

RISER TO TANK BOTTOM ELEVATION (Ft.) 48.2100
(In.) 578.52 (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 GASKET @ 50% COMPRESSION (In.) + 0.0625

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

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

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

REFERENCE LEVEL (In.) 599.2063
(Ft.) 49.9339

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

DESIGN CALCULATION			
Drawing	H-2-817634	Doc. No. ECN	G29519 Page 1 of 1
Building	241-TX	Rev.	1 Job No. 20-94-1130
Subject	TX-108 ENRAF REFERENCE LEVEL CALCULATION		
Originator	JOHN HUBER	Date	2/9/96
Checker	KEVIN HULL	Date	2/12/96

TANK NUMBER TX-108

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER (H-2-37910)

RISER NUMBER (8)

RISER ELEVATION (Ft.) 669.9800

TANK INSIDE BOTTOM ELEVATION (Ft.) - 621.7300

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

RISER TO TANK BOTTOM ELEVATION

(Ft.) 48.2500

(In.) 579 (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 GASKET @ 50% COMPRESSION (In.) + 0.0625

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

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

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

REFERENCE LEVEL (In.) 599.6863

(Ft.) 49.9739

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

DESIGN CALCULATION

Drawing	H-2-817634	Doc. No.	ECN 623973	Page	1 of 1
Building	24-7X	Rev.		Job No.	24-14-1116
Subject	TX-109 Encl Ref. Level Calculation				
Originator	John Huber	Date	7-24-95		
Checker	Steve Surawey	Date	7-24-95		

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 47.4000 ✓
(In.) 568.8 (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)

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

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

IMMRN DEPTH IN SOLIDS (In.) + 0 ✓ (G)

REFERENCE LEVEL {In.} 577.4238 ✓
{Ft.} 48.1186
(A + B + C + D + E - F + G)

DESIGN CALCULATION			
Drawing	H-2-817634	Doc. No.	ECN 629520
Building	241-TX	Rev.	0
Subject	TX-110 ENRAF REFERENCE LEVEL CALCULATION		
Originator	JOHN HUBER	Date	2/8/96
Checker	KEVIN HULL	Date	2/12/96

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.) 47.5200

(In.) 570.24 (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)

MULTI-PORT (In.) + 14.1250

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.) 593.0513

(A) + B + C + D + E - F + G (Ft.) 49.4209

DESIGN CALCULATION

Drawing H-2-817534 Doc. No. ECN 622520 Page 1 of 1
Building 241-TX Rev. 0 Job No. 24-26-B1
Subject TX-111 ENRAF REFERENCE LEVEL CALCULATION
Originator JOHN HUBER Date 2/8/96
Checker KEVIN HULL Date 2/12/96

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
(In.) 568.92 (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.) 589.6063
(Ft.) 49.1339

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

DESIGN CALCULATION			
Drawing	H-2-817634	Doc. No.	ECN 629520
		Page	1 of 1
Building	241-TX	Rev.	0
		Job No.	24-96-B2
Subject	TX-112 ENRAF REFERENCE LEVEL CALCULATION		
Originator	JOHN HUBER	Date	2/8/96
Checker	KEVIN HULL	Date	2/12/96

TANK NUMBER TX-112

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER (H-2-37910)

RISER NUMBER (1)

RISER ELEVATION (Ft.) 669.1800

TANK INSIDE BOTTOM ELEVATION (Ft.) - 621.7300

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

RISER TO TANK BOTTOM ELEVATION (Ft.) 47.4500
(In.) 569.4 (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.) + 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 (In.) 614.0862
(Ft.) 51.1739

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

DESIGN CALCULATION			
Drawing	H-2-817634	Doc. No.	ECN <u>G25943</u>
Building	241-TX	Rev.	0
Subject	TX-113 ENRAF REFERENCE LEVEL CALCULATION		
Originator	JOHN HUBER	Date	2/9/86
Checker	<i>Kenneth</i>	Date	2/12/86

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
(In.) 566.88 (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)

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

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

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

REFERENCE LEVEL (In.) 575.5038

(A + B + C + D + E - F + G) 47.9586

DESIGN CALCULATION			
Drawing <u>H-2-817634</u>	Doc. No. <u>ECN 625943</u>	Page <u>1</u> of <u>1</u>	
Building <u>241-TX</u>	Rev. <u>0</u>	Job No. <u>2W-96-84</u>	
Subject <u>TX-114 ENRAF REFERENCE LEVEL CALCULATION</u>			
Originator <u>JOHN HUBER</u>			Date <u>2/9/96</u>
Checker <u>KEVIN HOLL</u>			Date <u>2/12/96</u>

TANK NUMBER TX-114

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER	(H-2-37910)
RISER NUMBER	(8)
RISER ELEVATION (Ft.)	671.1400
TANK INSIDE BOTTOM ELEVATION (Ft.) -	623.7300
TANK SIDE-BOTTOM ELEVATION (Ft.) -	<u>N/A</u>
RISER TO TANK BOTTOM ELEVATION (Ft.)	47.4100
(In.)	568.92 (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)
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	
(Ft.)	48.1286	
(A + B + C + D + E - F + G)		

DESIGN CALCULATION			
Drawing <u>H-2-817534</u>	Doc. No. <u>ECN 625243</u>	Page <u>1</u> of <u>1</u>	
Building <u>241-TX</u>	Rev. <u>0</u>	Job No. <u>2W-96-85</u>	
Subject <u>TX-115 ENRAF REFERENCE LEVEL CALCULATION</u>			
Originator <u>JOHN HUBER</u>	Date <u>2/9/96</u>		
Checker <u>KEVIN HULL</u>	Date <u>2/12/96</u>		

TANK NUMBER TX-115

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER (H-2-37910)

RISER NUMBER (1)

RISER ELEVATION (Ft.) 670.1500

TANK INSIDE BOTTOM ELEVATION (Ft.) - 622.7300

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

RISER TO TANK BOTTOM ELEVATION

(Ft.) 47.4200
(In.) 569.04 (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)

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.)

577.6637
48.1386

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

DESIGN CALCULATION

Drawing	H-2-817634	Doc. No.	ECN 625943	Page	1 of 1
Building	241-TX	Rev.	0	Job No.	2W-86-86
Subject	TX-116 ENRAF REFERENCE LEVEL CALCULATION				
Originator	JOHN HUBER	Date	2/9/96		
Checker	KEVIN HALL	Date	2/12/96		

TANK NUMBER TX-116

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER (H-2-37910)

RISER NUMBER (1)

RISER ELEVATION (Ft.) 672.0300

TANK INSIDE BOTTOM ELEVATION (Ft.) - 624.7300

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

RISER TO TANK BOTTOM ELEVATION (Ft.)	47.3000	
(In.)	567.6	(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)

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

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

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

REFERENCE LEVEL (In.)	576.2237
(Ft.)	48.0186

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

DESIGN CALCULATION			
Drawing	H-2-817634	Doc. No.	ECN 629520
Building	241-TX	Rev.	0
Subject	TX-117 ENRAF REFERENCE LEVEL CALCULATION		
Originator	JOHN HUBER	Date	2/9/96
Checker	KEVIN HULL	Date	2/12/96

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
(In.) 559.68 (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.) 580.3663
(Ft.) 48.3639

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

DESIGN CALCULATION			
Drawing	H-2-317634	Doc. No.	ECU 623973
Building	241-TX	Rev.	0
Subject	TX-118 Ensl. Level Calculation		Page 1 of 1
Originator	John Huber	Job No.	24-84-117
Checker	Steve Summary	Date	7-24-95
		Date	7-24-95

TANK NUMBER TX-118

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER (H-2-37381) 7/0

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 ✓
569.76 (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)
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
 $H = (4 * F_b) / (S_g * \pi * D^{**2})$

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 EQTN.) = 0.7048 CENTIMETERS
0.2775 INCH

DESIGN CALCULATION

Drawing H-2-817634 Doc. No. ECN Page of
 Building 241-TX Rev. 1 Job No.
 Subject TX-302-C ENRAF REFERENCE LEVEL CALCULATION
 Originator JOHN HUBER Date 2/27/96
 Checker KEVIN HULL KAUUM Date 2/28/96

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.

<u>TANK NUMBER</u>	TX-302-C
OLD FIC REFERENCE LEVEL (In.)	466.6000
<u>DIST FROM RISER FLG TO FIC REF. POINT</u> (In.)	- 33.2500
BALL VALVE LENGTH (In.)	+ 49.0000
BALL VALVE INSET DIM. (In.)	<u>- 1.4700</u>
REFERENCE LEVEL	= 440.8800

DESIGN CALCULATION

Drawing H-2-817634 Doc. No. ECN 623218 Page 1 of 1
 Building 241-TY Rev. 0 Job No. 2W-94-1178
 Subject TY-101 ENRAF REFERENCE LEVEL CALCULATION
 Originator JOHN HUBER Date 6-14/95
 Checker SL Sweeney Date 6-15/95

TANK NUMBER TY-101

BOTTOM OF TANK TO RISER

DRAWING NUMBER (H-2-37381)

RISER NUMBER (1)

RISER ELEVATION (Ft.) 671.9700 OK > SLS

TANK INSIDE BOTTOM ELEVATION - 626.3300 OK

TANK SIDE-BOTTOM ELEVATION - N/A

RISER TO TANK BOTTOM ELEVATION 45.6400
 (In.) 547.68 (A) OK

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

NEW BALL VALVE PER H-2-817634,
 P/N 48, INSET DIMENSION FIELD
 MEASURED

REFERENCE LEVEL (In.) 556.3038
 (Ft.) 46.3586
 (A + B + C + D + E - F + G)

OK - SLS

DESIGN CALCULATION

Drawing H-2-817634 Doc. No. ECN 623218 Page 1 of 1
Building 241-TY Rev. 0 Job No. 2W-94-1078
Subject TY-102 ENRAF REFERENCE LEVEL CALCULATION
Originator JOHN HUBER Date 6-14/85
Checker S. Swamy Date 6/15/85

TANK NUMBER TY-102

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 45.6400
(In.) 547.68

OK > 565
OK

(A) OK

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 AT 1.05 Sp. G. + 0.2775

(G) OK

NEW BALL VALVE PER H-2-817634,
P/N 48, INSET DIMENSION FIELD
MEASURED

REFERENCE LEVEL (In.) 556.5812
(Ft.) 46.3818
(A + B + C + D + E - F + G)

OK - 565

***IMMERSION DEPTH CALCULATION**

GOVERNING EQUATION
 $H = (4 \cdot F_b) / (S_g \cdot \pi \cdot D^2)$

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

OK - 565

DESIGN CALCULATION

Drawing H-2-817634 Doc. No. ECN 623218 Page 1 of 1
 Building 241-TY Rev. 0 Job No. 2W-94-1179
 Subject TY-103 ENRAF REFERENCE LEVEL CALCULATION
 Originator JOHN HUBER Date 6-19-95
 Checker S. S. way Date 6/15/95

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 45.5900
 (In.) 547.08 (A) OK

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)

REFERENCE LEVEL (In.) 555.7037
 (Ft.) 46.3086
 (A + B + C + D + E - F + G) OK - SUS

NEW BALL VALVE PER H-2-817634,
 P/N 48, INSET DIMENSION FIELD
 MEASURED

DESIGN CALCULATION

Drawing H-2-817634 Doc. No. ECN 623218 Page 1 of 1
 Building 241-TY Rev. 0 Job No. 2W-94-1079
 Subject TY-104 ENRAF REFERENCE LEVEL CALCULATION
 Originator JOHN HUBER Date 6-14-95
 Checker S. Swamy Stephen L. King Date 6/15/95

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 45.6400
 (In.) 547.68 (A)

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 AT 1.05 Sp. G. + 0.2775 (G) OK

REFERENCE LEVEL (In.) 556.5812
 (Ft.) 46.3818
 (A + B + C + D + E - F + G)

*IMMERSION DEPTH CALCULATION

GOVERNING EQUATION
 $H = (4 \cdot F_b) / (S_g \cdot \pi \cdot D^2 \cdot 2)$

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,
 P/N 48, INSET DIMENSION FIELD
 MEASURED

DESIGN CALCULATION

Drawing	H-2-817634	Doc. No.	ECN 623218	Page	1 of 1
Building	241-TY	Rev.	0	Job No.	2W-95-423
Subject	TY-105 ENRAF REFERENCE LEVEL CALCULATION				
Originator	JOHN HUBER	Date	6-14/95		
Checker	<i>SL Swamy</i>	Date	6/15/95		

TANK NUMBER TY-105

BOTTOM OF TANK TO RISER

DRAWING NUMBER (H-2-37381)

RISER NUMBER 41) 2 *OK / SCS*

RISER ELEVATION (Ft.) 671.9500

TANK INSIDE BOTTOM ELEVATION - 626.3300

TANK SIDE-BOTTOM ELEVATION - N/A

RISER TO TANK BOTTOM ELEVATION 45.6200
(In.) 547.44 (A) *OK*

DETERMINING REFERENCE LEVEL:

1/16 GASKET @ 50% COMPRESSION +	0.0313	(B) <i>OK</i>
PVC FLANGE (OPTIONAL) (In.) +	0.0000	(C) NO PVC LINER <i>OK</i>
1/8 GASKET @ 50% COMPRESSION +	0.0000	(D) <i>OK</i>
BALL VALVE FLANGE TO FLANGE +	9.0000	(E) <i>OK</i>
BALL INSET DIM (FROM TOP) -	1.4700	(F) <i>OK</i>
IMMERSION DEPTH AT IN SOLIDS +	0	(G)

NEW BALL VALVE PER H-2-817634,
P/N 48, INSET DIMENSION FIELD
MEASURED

REFERENCE LEVEL (In.) 555.0013
(Ft.) 46.2501

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

OK - SCS

DESIGN CALCULATION

Drawing H-2-817634 Doc. No. ECN 624887 Page 1 of 1
 Building 241-TY Rev. 1 Job No. 2W-95-424
 Subject TY-106 ENRAF REFERENCE LEVEL CALCULATION
 Originator JOHN HUBER Date 9/24/95
 Checker K.J. HULL Date 10/3/95

TANK NUMBER TY-106

BOTTOM OF TANK TO RISER

DRAWING NUMBER (H-2-37381)

RISER NUMBER (1)

RISER ELEVATION (Ft.) ~~670.9000~~ 670.9600

TANK INSIDE BOTTOM ELEVATION - 625.3300

TANK SIDE-BOTTOM ELEVATION - N/A

RISER TO TANK BOTTOM ELEVATION ~~45.5700~~ 45.6300
 (In.) ~~546.64~~ (A) 547.5600

DETERMINING REFERENCE LEVEL:

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

NEW BALL VALVE PER H-2-817634,
 P/N 48, INSET DIMENSION FIELD
 MEASURED

REFERENCE LEVEL (In.) ~~554.4012~~ 555.1213 K/H 10/3/95
 (A + B + C + D + E - F + G) ~~46.2001~~ 46.2601

THIS PAGE RESERVED FOR U-101

DESIGN CALCULATION

Drawing H-2-817634 Doc. No. ECN 625244 Page 1 of 1
Building 241-U Rev. 0 Job No. 24-95-816
Subject U-102 ENRAF REFERENCE LEVEL CALCULATION
Originator JOHN HUBER Date 10/26/95
Checker Nasser Razfar Date 11/6/95

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

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

*IMMERSION DEPTH CALCULATION

GOVERNING EQUATION

$$H = (4 \cdot F_b) / (S_g \cdot \pi \cdot D^2 \cdot 2)$$

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

DESIGN CALCULATION

Drawing H-2-817634 Doc. No. ECN Page 1 of 1
Building 241-U Rev. 1 Job No. _____
Subject U-103 ENRAF REFERENCE LEVEL CALCULATION
Originator JOHN HUBER Date 12/15/95
Checker KJ Hull Date 12/22/95

TANK NUMBER U-103

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER (H-2-37381)

RISER NUMBER (8)

RISER ELEVATION (Ft.) 664.9000

TK CENTERLINE BOTTOM ELEV. (Ft.) - 626.0000

RISER TO TANK BOTTOM ELEV. (Ft.) 38.9000
(In.) 466.8 (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.) + 0.2775 (G)

REFERENCE LEVEL (In.) 475.9612
(Ft.) 39.6634

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

*IMMERSION DEPTH CALCULATION

GOVERNING EQUATION

$$H = (4 \cdot F_b) / (S_g \cdot \pi \cdot D^2)$$

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

DESIGN CALCULATION

Drawing H-2-817634 Doc. No. ECN Page 1 of 1
 Building 241-U Rev. 1 Job No. _____
 Subject U-105 ENRAF REFERENCE LEVEL CALCULATION
 Originator JOHN HUBER Date 12/15/95
 Checker KJ Hull Date 12/22/95

TANK NUMBER U-105

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
 (In.) 467.4 (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.) + 0.2775 (G)

REFERENCE LEVEL (In.) 476.5612
 (Ft.) 39.7134

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

*IMMERSION DEPTH CALCULATION

GOVERNING EQUATION
 $H = (4 \cdot F_b) / (S_g \cdot P_1 \cdot D^{**2})$

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

DESIGN CALCULATION

Drawing H-2-817634 Doc. No. ECN Page 1 of 1
 Building 241-U Rev. 1 Job No. _____
 Subject U-106 ENRAF REFERENCE LEVEL CALCULATION
 Originator JOHN HUBER Date 12/15/15
 Checker [Signature] Date 12/22/95

TANK NUMBER U-106

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER (H-2-37381)

RISER NUMBER (8)

RISER ELEVATION (Ft.) 664.9300

TANK CL BOTTOM ELEV. (Ft.) - 626.0000

RISER TO TANK BOTTOM ELEV. (Ft.) 38.9300
 (In.) 467.16 (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.) + 0.2775 (G)

REFERENCE LEVEL (In.) 476.3212
 (Ft.) 39.6934

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

*IMMERSION DEPTH CALCULATION

GOVERNING EQUATION
 $H = (4 \cdot F_b) / (S_g \cdot \pi \cdot D^2)$

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) = 0.7048 CENTIMETERS
 0.2775 INCH

DESIGN CALCULATION

Drawing H-2-817634 Doc. No. ECN Page 1 of 1
 Building 241-U Rev. 1 Job No. _____
 Subject U-107 ENRAF REFERENCE LEVEL CALCULATION
 Originator JOHN HUBER Date 12/15/95
 Checker K.J. Hule BAI/M Date 12/22/95

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
 (In.) 466.92 (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.) + 0.2775 (G)

REFERENCE LEVEL (In.) 476.0812
 (Ft.) 39.6734

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

*IMMERSION DEPTH CALCULATION

GOVERNING EQUATION

$$H = (4 \cdot F_b) / (S_g \cdot \pi \cdot D^2 \cdot 2)$$

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

DESIGN CALCULATION

Drawing H-2-817634 Doc. No. ECN Page 1 of 1
Building 241-U Rev. 1 Job No. _____
Subject U-108 ENRAF REFERENCE LEVEL CALCULATION
Originator JOHN HUBER Date 12/15/85
Checker [Signature] Date 12/22/95

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
(In.) 467.4 (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
(Ft.) 39.6918

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

*IMMERSION DEPTH CALCULATION

GOVERNING EQUATION

$$H = (4 \cdot F_b) / (S_g \cdot \pi \cdot D^2)$$

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

DESIGN CALCULATION

Drawing H-2-817634 Doc. No. ECN Page 1 of 1
 Building 241-U Rev. 1 Job No. _____
 Subject U-109 ENRAF REFERENCE LEVEL CALCULATION
 Originator JOHN HUBER Date 12/15/95
 Checker KEVIN HULL Date 12/22/95

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
 (In.) 467.64 (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.) + 0.2775 (G)

REFERENCE LEVEL (In.) 476.8012
 (Ft.) 39.7334

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

*IMMERSION DEPTH CALCULATION

GOVERNING EQUATION

$$H = (4 \cdot F_b) / (S_g \cdot \pi \cdot D^2)$$

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

DESIGN CALCULATION

Drawing H-2-817634 Doc. No. ECN 626467 Page 1 of 1
 Building 241-U Rev. 0 Job No. 24-95-829
 Subject U-110 ENRAF REFERENCE LEVEL CALCULATION
 Originator JOHN HUBER Date 10/24/95
 Checker Nasser Kazfar per telecon Date 11/6/95

TANK NUMBER U-110

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER (H-2-37381)

RISER NUMBER (8)

RISER ELEVATION (Ft.) 666.9200

TANK CL BOTTOM ELEVATION (Ft.) - 628.0000

RISER TO TANK BOTTOM DIMENSION (Ft.) 38.9200
 (In.) 467.04 (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.) - 1.4700 (F)

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

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

REFERENCE LEVEL (In.) 475.6637

(A + B + C + D + E - F + G) 39.6386

DESIGN CALCULATION

Drawing H-2-817634 Doc. No. ECN 626468 Page 1 of 1
 Building 241-U Rev. 0 Job No. 2w-95-826
 Subject U-111 ENRAF REFERENCE LEVEL CALCULATION
 Originator JOHN HUBER Date 10/24/95
 Checker Nasser Raifar per telecon Date 11/6/95

TANK NUMBER U-111

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER (H-2-37381)

RISER NUMBER (8)

RISER ELEVATION (Ft.) 665.9900

TANK CL BOTTOM ELEVATION (Ft.) - 627.0000

RISER 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)

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

REFERENCE LEVEL (In.) 476.5038

(A) + B + C + D + E - F + G 39.7086

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THIS PAGE RESERVED FOR U-202

DESIGN CALCULATION

Drawing H-2-817634 Doc. No. ECN NOT assigned Page 1 of 1
 Building 241-U Rev. 0 Job No. NOT assigned
 Subject U-203 ENRAF REFERENCE LEVEL CALCULATION
 Originator JOHN HUBER *[Signature]* Date 1-28-97
 Checker KEVIN HULL *[Signature]* Date 1/29/97

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
 (In.) 461.16 (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)

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

REFERENCE LEVEL (In.) 468.7213
 (Ft.) 39.0601

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

DESIGN CALCULATION

Drawing	H-2-817634	Doc. No.	ECN	Not Assigned	Page	1	of	1
Building	241-U	Rev.	0		Job No.	Not assigned		
Subject	U-204 ENRAF REFERENCE LEVEL CALCULATION							
Originator	JOHN HUBER		Date	1-29-97				
Checker	KEVIN HOLL		Date	1/29/97				

TANK NUMBER U-204

BOTTOM OF TANK TO RISER DIMENSION

DRAWING NUMBER (H-2-1742)

RISER NUMBER (1)

RISER ELEVATION (Ft) 664.9700

TANK CL BOTTOM ELEVATION (Ft) - 626.5000

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

(Ft.) 39.1232

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

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

*IMMERSION DEPTH CALCULATION

GOVERNING EQUATION

$$H = (4 * F_b) / (S_g * \pi * D^2)$$

F_b = BOUYANT FORCE = SET POINT = 15.0000 GRAMS

S_g = 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

Drawing H-2-817634 Doc. No. ECN 629 514 Page 1 of 1
 Building 241-U Rev. 1 Job No. 24-95-799
 Subject U-301 ENRAF REFERENCE LEVEL CALCULATION
 Originator JOHN HUBER Date 1/26/96
 Checker SL Walter Date 26 Jan '96

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
 (In.) 369.84 (A)

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)

IMMERSION DEPTH IN LIQUID (In.) + 0.2775 (G)

NEW BALL VALVE PER H-2-817634 P/N 48

REFERENCE LEVEL (In.) 378.2412

(A + B + C + D + E - F + G) (Ft.) 31.5201

*IMMERSION DEPTH CALCULATION

GOVERNING EQUATION
 $H = (4 \cdot F_b) / (S_g \cdot \pi \cdot D^2 \cdot 2)$

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

DESIGN CALCULATION			
Drawing <u>H-2-817634</u>	Doc. No. <u>ECN 625514</u>	Page <u>1</u> of <u>1</u>	
Building <u>241-U</u>	Rev. <u>1</u>	Job No. <u>2W-95-900</u>	
Subject <u>UX-302-A ENRAF REFERENCE LEVEL CALCULATION</u>			
Originator <u>JOHN HUBER</u>	Date <u>1/26/96</u>		
Checker <u>SL Hester</u>	Date <u>26 Feb '96</u>		

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
{In.} 356.16 (A)

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)

IMMERSION DEPTH IN LIQUID (In.) + 0.2775 (G)

NEW BALL VALVE PER H-2-817634 P/N 48

REFERENCE LEVEL {In.} 364.5612
{Ft.} 30.3801

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

***IMMERSION DEPTH CALCULATION**

GOVERNING EQUATION

$$H = (4 * F_b) / (S_g * \pi * D^2 * 2)$$

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