

Storage Sphere - Data Sheet

Standardization

This Standard replaces and cancels its previous revision.

The CONTEC - Authoring Subcommittee provides guidance on the interpretation of this Standard when questions arise regarding its contents. The Department of PETROBRAS that uses this Standard is responsible for adopting and applying the sections, subsections and enumerates thereof.

Technical Requirement: A provision established as the most adequate and which shall be used strictly in accordance with this Standard. If a decision is taken not to follow the requirement ("non-conformity" to this Standard) it shall be based on well-founded economic and management reasons, and be approved and registered by the Department of PETROBRAS that uses this Standard. It is characterized by imperative nature.

Recommended Practice: A provision that may be adopted under the conditions of this Standard, but which admits (and draws attention to) the possibility of there being a more adequate alternative (not written in this Standard) to the particular application. The alternative adopted shall be approved and registered by the Department of PETROBRAS that uses this Standard. It is characterized by verbs of a nonmandatory nature. It is indicated by the expression: **[Recommended Practice]**.

Copies of the registered "non-conformities" to this Standard that may contribute to the improvement thereof shall be submitted to the CONTEC - Authoring Subcommittee.

Proposed revisions to this Standard shall be submitted to the CONTEC - Authoring Subcommittee, indicating the alphanumeric identification and revision of the Standard, the section, subsection and enumerate to be revised, the proposed text, and technical/economic justification for revision. The proposals are evaluated during the work for alteration of this Standard.

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CONTEC

Comissão de Normalização
Técnica

SC - 02

Tanks and Vessels

Introduction

PETROBRAS Technical Standards are prepared by Working Groups - WG (consisting specialized of Technical Collaborators from Company and its Subsidiaries), are commented by Company Units and its Subsidiaries, are approved by the Authoring Subcommittees - SCs (consisting of technicians from the same specialty, representing the various Company Units and its Subsidiaries), and ratified by the Executive Nucleus (consisting of representatives of the Company Units and its Subsidiaries). A PETROBRAS Technical Standard is subject to revision at any time by its Authoring Subcommittee and shall be reviewed every 5 years to be revalidated, revised or cancelled. PETROBRAS Technical Standards are prepared in accordance with PETROBRAS Technical Standard [N-1](#). For complete information about PETROBRAS Technical Standards see PETROBRAS Technical Standards Catalog.

Foreword

This Standard is the English version (issued in 12/2012) of PETROBRAS N-1520 REV. C 12/2010. In case of doubt, the Portuguese version, which is the valid document for all intents and purposes, shall be used.

1 Scope

1.1 This document standardizes the Data Sheet form for storage sphere to be used in the designs for PETROBRAS.

1.2 This Standard is applicable to designs started as of its date of issuance .

1.3 This Standard contains only Technical Requirements.

2 Normative References

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document applies.

Norma Regulamentadora nº 13 ([NR-13](#)) - Caldeiras e Vasos de Pressão;

PETROBRAS [N-381](#) - Execução de Desenhos e Outros Documentos Técnicos em Geral;

PETROBRAS [N-1281](#) - Projeto de Esfera;

PETROBRAS [N-1500](#) - Vasos de Pressão - Folha de Dados;

PETROBRAS [N-1521](#) - Identificação de Equipamentos Industriais.

NOTE For documents referred in this Standard and for which only the Portuguese version is available, the PETROBRAS department that uses this Standard should be consulted for any information required for the specific application.

3 Terms and Definitions

For the purposes of this document, the following terms and definitions apply.

3.1 The purpose of the Data Sheets of A and B Appendices is to record the purchaser's requirements and the supplier's design details and, after they are completed, they shall comprise a permanent document of the equipment.

3.2 The Data Sheet form is standardized in A4 size as in:


- a) Appendix A – form with units of the Engineering System;
- b) Appendix B - form with units of the International International System of Units - SI.


3.3 In order to complete the header and the footer of the Data Sheets of the A and B Appendices, the PETROBRAS [N-381](#) shall be applied.



3.4 On sheet 1 of the Data Sheets of the A and B Appendices, the identification of the storage sphere according to PETROBRAS [N-1521](#) shall be inserted in field "Title", beside the name of the equipment.

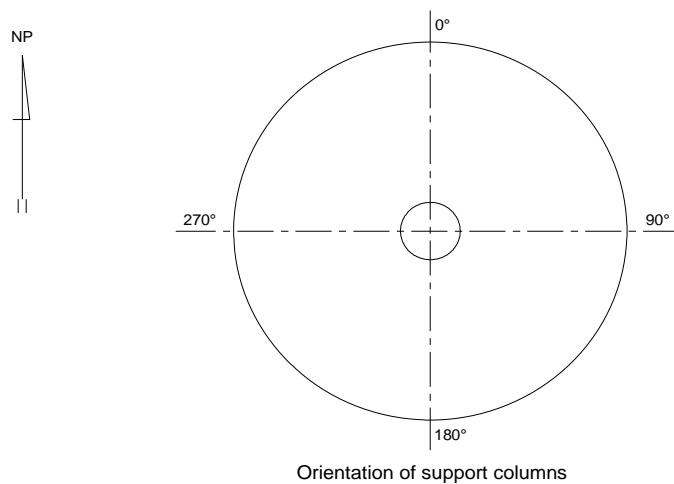
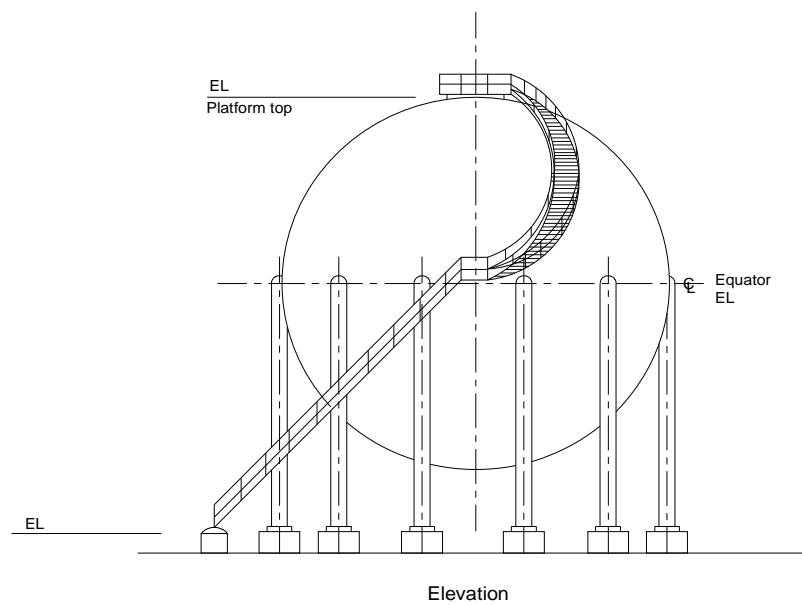
3.5 PETROBRAS [N-1281](#) shall be adhered to in order to complete the Data Sheet of the A and B Appendices.

	DATA SHEET		Nr.		REV.	
	TITLE: <div style="text-align: center; font-size: 1.2em; font-weight: bold;">STORAGE SPHERE</div>				SHEET of	
GENERAL DATA						
1	SERVICE:			QUANTITY:		
2						
3						
OPERATING DATA						
4	PRODUCT:			SPECIFIC GRAVITY:		
5	LIQUID STORAGE CAPACITY:					m ³
6	NOMINAL CAPACITY:					m ³
7						
8						
OPERATING CONDITIONS			MINIMUM	NORMAL	MAXIMUM	
9	INTERNAL PRESSURE (GAUCHE):		kgf/cm ²			
10	TEMPERATURE:		°C			
11	MAXIMUM PRODUCT LEVEL: m					
12	VACUUM (ABS): kgf/cm ²					
13	MAXIMUM PRODUCT FLOW RATE:		INLET: m ³ /h	OUTLET: m ³ /h		
14						
FATIGUE ANALYSIS DATA (SEE NOTE)						
	OPERATING CONDITIONS		MINIMUM	NORMAL	ANNUAL FREQUENCY	
15	PRESSURE (GAUCHE): kgf/cm ²					
16	CYCLE 1					
17	2					
18	3					
19						
20						
21	TEMPERATURE: °C					
22	CYCLE 1					
23	2					
24	3					
25						
26						
27	START-UPS AND SHUTDOWNS		—	—		
NOTA: OPCIONALMENTE ESTA TABELA PODE SER SUBSTITUÍDA POR UM GRÁFICO.						
DESIGN DATA						
28	CODE - EDITION - ADDENDA					
29	DESIGN PRESSURE (GAUCHE)					kgf/cm ²
30	DESIGN LIFETIME					YEARS
31	MAXIMUM DESIGN TEMPERATURE					°C
32	TOTAL VACUUM CHECK					<input type="checkbox"/> YES
33	OPENING PRESSURE OF THE SAFETY VALVE AGAINST FIRE (GAUCHE)					kgf/cm ²
34	OPENING PRESSURE OF THE SAFETY VALVE FOR ABNORMAL CONDITIONS (GAUCHE)					kgf/cm ²
35	MINIMUM DESIGN TEMPERATURE - SHELL					°C
36	MINIMUM DESIGN TEMPERATURE - NOZZLES					°C
37	INTERNAL DIAMETER					mm
38	RADIOGRAPHY EXAMINATION					<input type="checkbox"/> FULL <input type="checkbox"/> PARTIAL
39	SHELL JOINT EFFICIENCY (E)					
40	CORROSION ALLOWANCE					mm
41	BASIC WIND SPEED m/s					
42						
MATERIALS						
43	SHELL					
44	NOZZLES — FLANGES					
45	— NECK					
46	— COUPLINGS					
47	— REINFORCEMENT					
48	MANHOLES — FLANGE					
49	— NECK					
50	— REINFORCEMENT					
51	COLUMN REINFORCEMENT PAD					
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THIS FORM IS PART OF STANDARD PETROBRAS N-1520 REV. C ANNEX A - SHEET 02/06.						

	DATA SHEET		Nr.	REV.	
	TITLE: <div>STORAGE SPHERE</div>			SHEET	of
MATERIALS					
52	NON-PRESSURIZED PIPING				
53	WELDED ATTACHEMENT — INTERNAL				
54	— EXTERNAL				
55	BOLTS / NUTS — INTERNAL				
56	— EXTERNAL				
57	GASKETS				
58	SUPPORTING COLUMNS				
59	COLUMN BEARING PLATE				
60	COLUMN SLIDING PLATE				
61	ANCHOR BOLTS / NUTS				
62	STIFFENING TIE RODS				
63	TIE ROD STRETCHERS				
64	STAIR SPETS WITH CHECKERED PLATE				
65	PLATFORM GRATING PLATE				
66	STRUCTURAL SHAPES				
67	STRUCTURAL BOLTS, NUTS AND WASHERS				
68	INTERNAL LADDER				
69	THERMAL HEAT INSULATION				
70					
71					
LOADS AT BASE					
72	EMPTY WEIGHT			kgf	
73	REMOVABLE INTERNALS WEIGHT			kgf	
74	FIRE PROOFING WEIGHT			kgf	
75	TEST WEIGHT			kgf	
76	OPERATING WEIGHT			kgf	
77	WEIGHT OF LADDERS AND PLATFORMS			kgf	
78	MAXIMUM MOMENT			kgf.m	
79	MAXIMUM SHEAR			kgf	
80					
81					
MAXIMUM ALLOWABLE WORKING PRESSURE AND TEST PRESSURE					
82	MAX. ALLOWABLE WORKING PRESSURE (GAUCHE) — NEW			kgf/cm ²	
83	— CORRODED			kgf/cm ²	
84	HYDROSTATIC TEST PRESSURE (GAUCHE)			kgf/cm ²	
85					
86					
87					
FABRICATION AND ASSEMBLY					
88	POSTWELD HEAT TREATMENT		<input type="checkbox"/> FIELD	<input type="checkbox"/> FACTORY	
89	PARTS TO BE TREATED				
90	IMPACT TEST — ITEMS		kgf.m	a	°C
91	— ITEMS		kgf.m	a	°C
92	— STANDARD				
93	ELECTRODES				
94	THERMAL HEAT INSULATION (THICKNESS)			mm	
95	PAINTING — EXTERNAL		<input type="checkbox"/> YES	<input type="checkbox"/> NO	
96	— INTERNAL		<input type="checkbox"/> YES	<input type="checkbox"/> NO	
97	SHIPMENT		<input type="checkbox"/> ONE PIECE	<input type="checkbox"/> IN SECTIONS	
98					
99					
100					
NOTES					
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	DATA SHEET					Nr.		REV.	
								SHEET	of
	TITLE: STORAGE SPHERE								
NOZZLES AND MANHOLES									
	POS	NOMINAL DIAMETER	QUANTITY	RATING CLASS	FACING	TYPE	SERVICE	NOTE	
1							INLET / OUTLET		
2							OUTLET		
3							LOWER MANHOLE	HINGED	
4							UPPER MANHOLE	WITH DAVIT	
5							SAFETY VALVE	NORMAL OPERATION (PETROBRAS N-1281)	
6							SAFETY VALVE	FIRE CONDITION (PETROBRAS N-1281)	
7									
8							VENT	WITH BLIND FLANGE	
9									
10							PRESSURE INSTRUMENT		
11							LEVEL INSTRUMENT		
12							LEVEL INSTRUMENT		
13							TEMPERATURE INSTRUMENT		
14							TEMPERATURE INSTRUMENT		
15									
16									
17									
18							EQUALIZATION		
19							SAMPLE NOZZLES		
20									
21									
22									
23									
24									
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STORAGE SPHERE



NOTE 1 Dimensions in millimeters.
NOTE 2 The amount of support columns indicated in the elevation is merely illustrative.

Storage Sphere



DATA SHEET

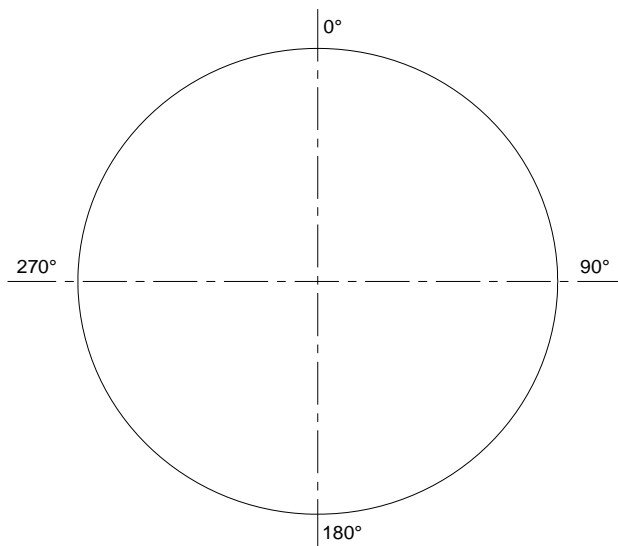
Nr.

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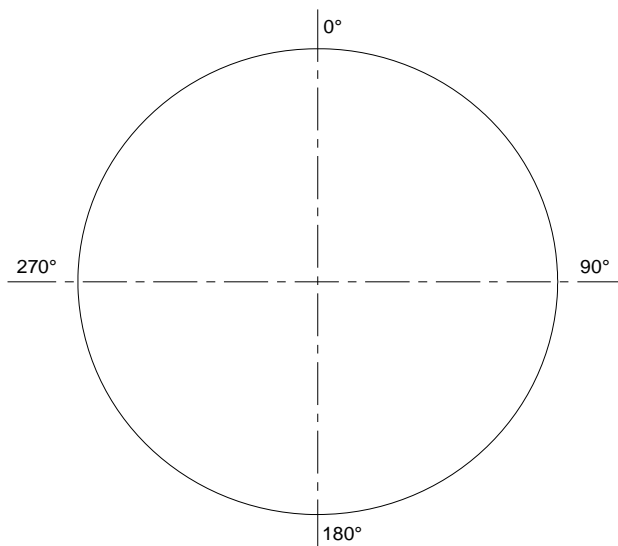
SHEET of

TITLE:

STORAGE SPHERE




Nozzle orientation on top
(top view)




Nozzle orientation at bottom
(top view)

Storage Sphere

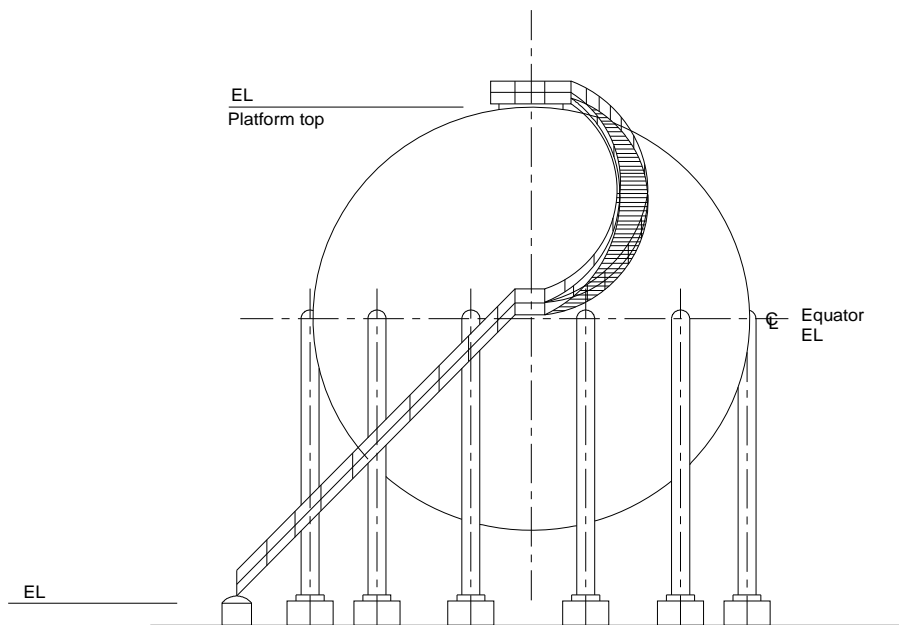
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	DATA SHEET		Nr.		REV.	
	TITLE: <div style="text-align: center; font-size: 1.2em; font-weight: bold;">STORAGE SPHERE</div>				SHEET	
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GENERAL DATA						
1	SERVICE:			QUANTITY:		
2						
3						
OPERATING DATA						
4	PRODUCT:			SPECIFIC GRAVITY:		
5	LIQUID STORAGE CAPACITY:					m ³
6	NOMINAL CAPACITY:					m ³
7						
8						
OPERATING CONDITIONS			MINIMUM	NORMAL	MAXIMUM	
9	INTERNAL PRESSURE (GAUCHE):		MPa			
10	TEMPERATURE:		°C			
11	MAXIMUM PRODUCT LEVEL:		m			
12	VACUUM (ABS):		MPa			
13	MAXIMUM PRODUCT FLOW RATE:		INLET:	m ³ /h	OUTLET:	m ³ /h
14						
FATIGUE ANALYSIS DATA (SEE NOTE)						
	OPERATING CONDITIONS		MINIMUM	NORMAL	ANNUAL FREQUENCY	
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30	DESIGN LIFETIME			YEARS		
31	MAXIMUM DESIGN TEMPERATURE			°C		
32	TOTAL VACUUM CHECK			<input type="checkbox"/> YES <input type="checkbox"/> NO		
33	OPENING PRESSURE OF THE SAFETY VALVE AGAINST FIRE (GAUCHE)			MPa		
34	OPENING PRESSURE OF THE SAFETY VALVE FOR ABNORMAL CONDITIONS (GAUCHE)			MPa		
35	MINIMUM DESIGN TEMPERATURE - SHELL			°C		
36	MINIMUM DESIGN TEMPERATURE - NOZZLES			°C		
37	INTERNAL DIAMETER			mm		
38	RADIOGRAPHY EXAMINATION			<input type="checkbox"/> FULL <input type="checkbox"/> PARTIAL		
39	SHELL JOINT EFFICIENCY (E)					
40	CORROSION ALLOWANCE			mm		
41	BASIC WIND SPEED			m/s		
42						
MATERIALS						
43	SHELL					
44	NOZZLES — FLANGES					
45	— NECK					
46	— COUPLINGS					
47	— REINFORCEMENT					
48	MANHOLES — FLANGE					
49	— NECK					
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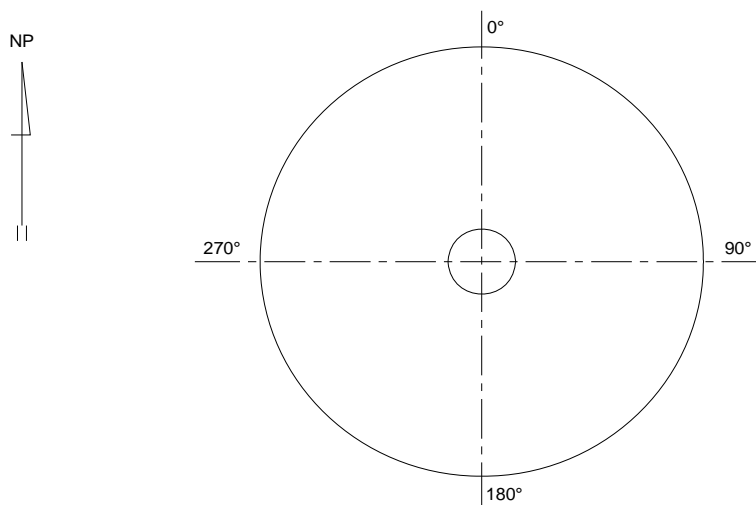
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69	THERMAL HEAT INSULATION				
70					
71					
LOADS AT BASE					
72	EMPTY WEIGHT				N
73	REMOVABLE INTERNALS WEIGHT				N
74	FIRE PROOFING WEIGHT				N
75	TEST WEIGHT				N
76	OPERATING WEIGHT				N
77	WEIGHT OF LADDERS AND PLATFORMS				N
78	MAXIMUM MOMENT				N.m
79	MAXIMUM SHEAR				N
80					
81					
MAXIMUM ALLOWABLE WORKING PRESSURE AND TEST PRESSURE					
82	MAX. ALLOWABLE WORKING PRESSURE (GAUCHE) — NEW				MPa
83	— CORRODED				MPa
84	HYDROSTATIC TEST PRESSURE (GAUCHE)				MPa
85					
86					
87					
FABRICATION AND ASSEMBLY					
88	POSTWELD HEAT TREATMENT			<input type="checkbox"/> FIELD	<input type="checkbox"/> FACTORY
89	PARTS TO BE TREATED				
90	IMPACT TEST — ITEMS			J	a °C
91	— ITEMS			J	a °C
92	— STANDARD				
93	ELECTRODES				
94	THERMAL HEAT INSULATION (THICKNESS)			mm	
95	PAINTING — EXTERNAL			<input type="checkbox"/> YES	<input type="checkbox"/> NO
96	— INTERNAL			<input type="checkbox"/> YES	<input type="checkbox"/> NO
97	SHIPMENT			<input type="checkbox"/> ONE PIECE	<input type="checkbox"/> IN SECTION
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	DATA SHEET					Nr.		REV.	
								SHEET	of
	TITLE: STORAGE SPHERE								
NOZZLES AND MANHOLES									
	POS	NOMINAL DIAMETER	QUANTITY	RATING CLASS	FACING	TYPE	SERVICE	NOTE	
1							INLET / OUTLET		
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19							SAMPLE NOZZLES		
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STORAGE SPHERE



Elevation



Orientation of support columns

NOTE 1 Dimensions in millimeters.

NOTE 2 The amount of support columns indicated in the elevation is merely illustrative.

Storage Sphere



DATA SHEET

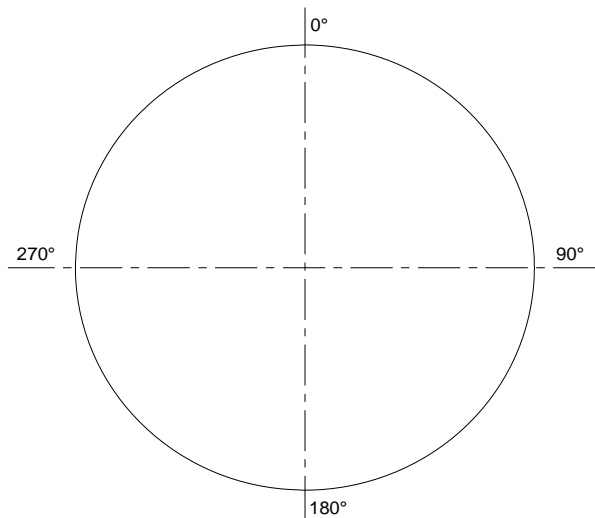
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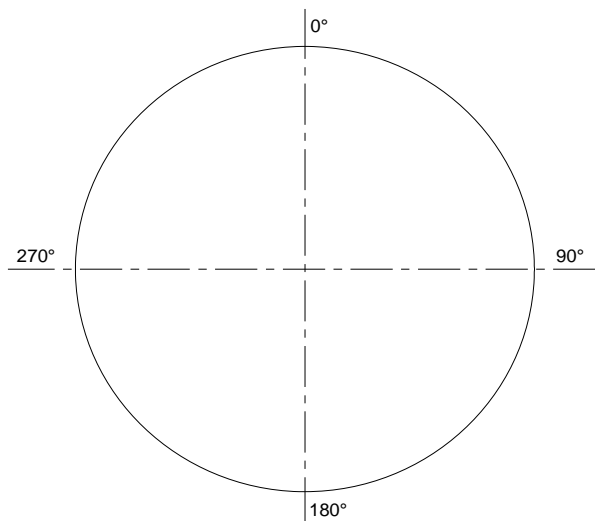
SHEET of

TITLE:

STORAGE SPHERE



Nozzle orientation on top
(top view)



Nozzle orientation at bottom
(top view)

Storage Sphere

INDEX OF REVISIONS

REV. A

There is no index of revisions.

REV. B

[illegible]