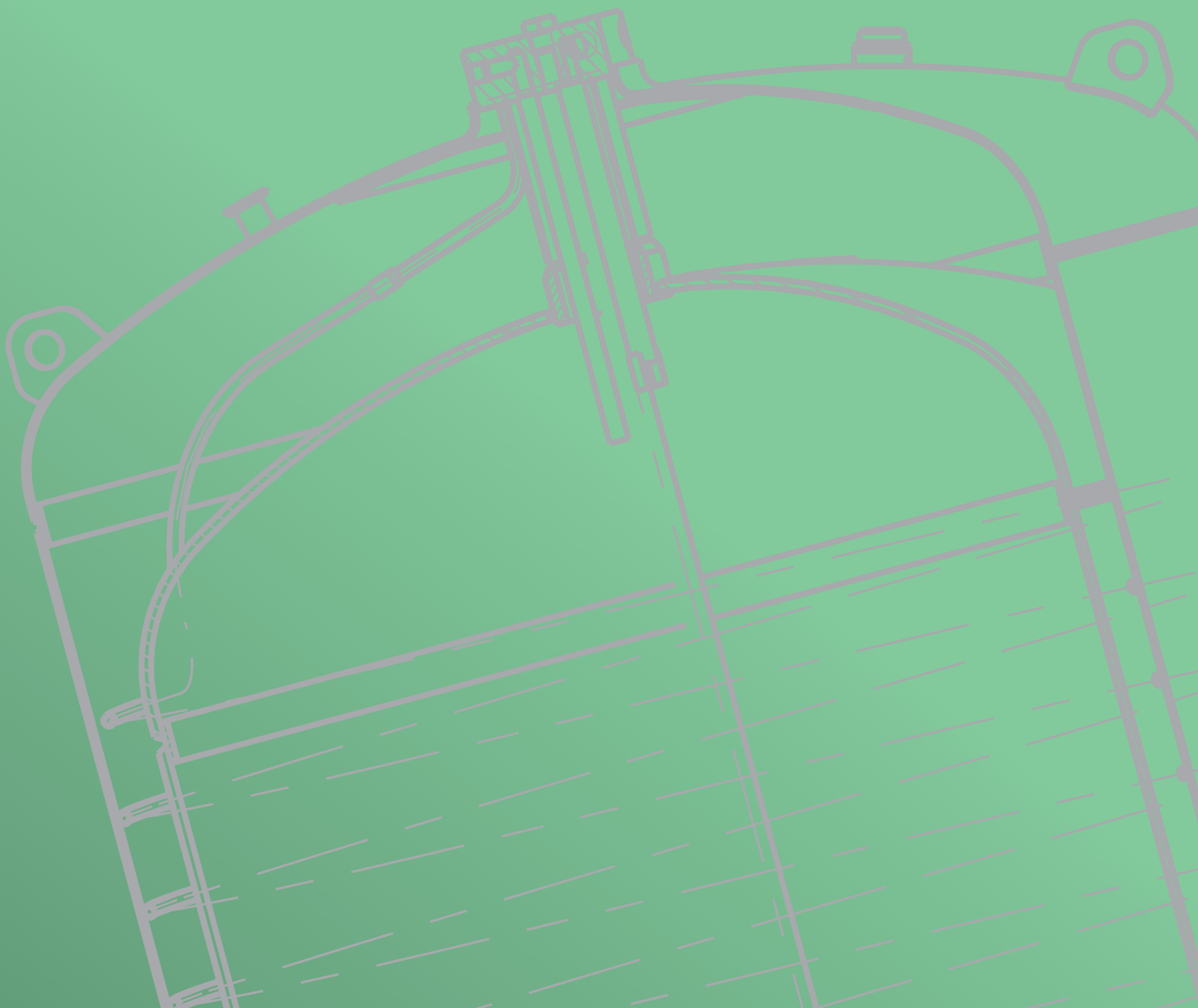
FERAD

Cool - Headed Solutions



COMPANY

Ferad s.r.o. is a Slovak company established in 2010. It is specialized on design, engineering, manufacturing, sales and service of stationary and mobile vessels for liquid technical gases storing, transporting and distributing in accordance with PED 2014/68/EU and TPED 2010/35/EU directives.

The company also designs and manufactures metallurgical production equipment, cooling, ventilating and filtering devices and accessories.

Our personnel with the long-year of experience with cryogenic equipment design, engineering and manufacturing is a guarantee of a professional technical solution, safe and high quality output.

The company is equipped with the full range of technologies enabling high quality engineering, manufacturing and testing of the cryogenic vessels.

We provide high flexibility for our customer's requirements including qualified advisory and consultancy.

Ferad s.r.o. is dedicated to continuous improvement program and has been certified according to ISO 9001:2015 and DIN EN 3834-2 standards. This is also a proof of our reliability and high standard of our products and services.

PRODUCT DESCRIPTION

CRYOGENIC VAPORIZERS

Ferad aluminium vaporizers are stationary equipments designed to provide safe and efficient cryogenic liquid to gas conversion (Argon, Nitrogen, Carbon dioxide, Oxygen, Nitrous oxide). The product range enables variety of combinations for your vaporising applications and solutions.

The vaporizers are designed and manufactured according to EN 13445-3 and in PED 2014/68/EU.

The equipment is designed for open-air environment exposed to climatic conditions. The pressure part of the vaporizer is made of high-quality aluminium alloys to withstand the maximum working pressure of 40 bars.

CRYOGENIC TANKS

The cryogenic tanks are designed for storage of low-temperature, liquified gases – Argon, Nitrogen, Carbon dioxide, Oxygen, Nitrous oxide.

Lowest application temperature for stainless inner vessel: -196 °C

Depending on the respective approval, the max. service pressure is from 8 to 37 bar.

Tanks consist of an inner and outer pressure vessel.

The inner and outer vessel is manufactured from stainless steel. Inner tank is tested by hydro pressure test. Inner vessel is super insulated by wrapping multi-layer insulation system. The inner space between the inner and the outer vessel is vacuumed to small pressure of 1 micron.

An automatic regulation system helps maintain the adjusted working pressure (pressure building function) and minimizes losses in case of lower withdrawal rates (economizer function).

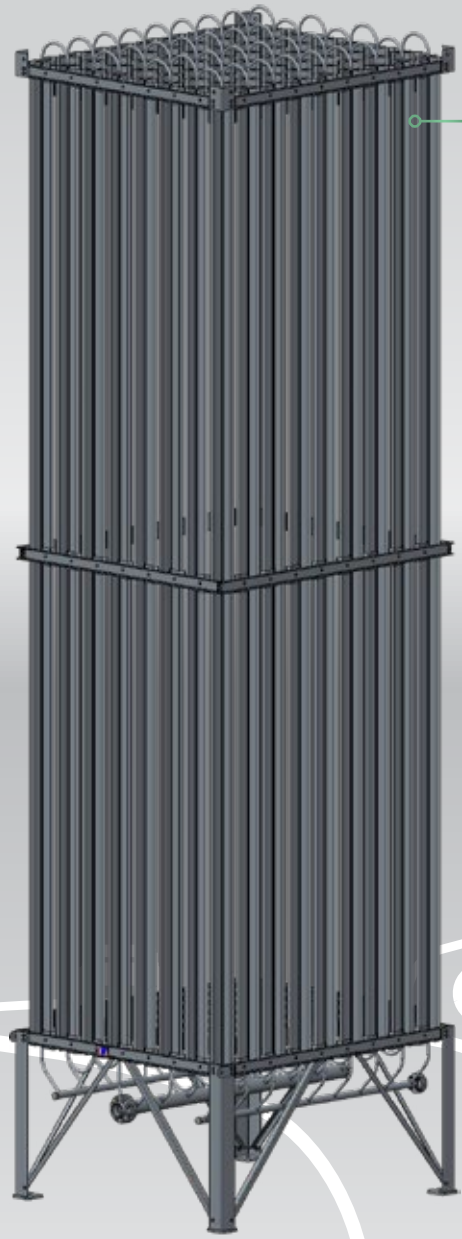
Stationary tanks *Easy*BASE - stationary, vacuum and multi-layer insulated pressure vessels, designed and built according to EN 13458-2 and approved to PED 2014/68/EU for the storage of low-temperature, liquefied gases

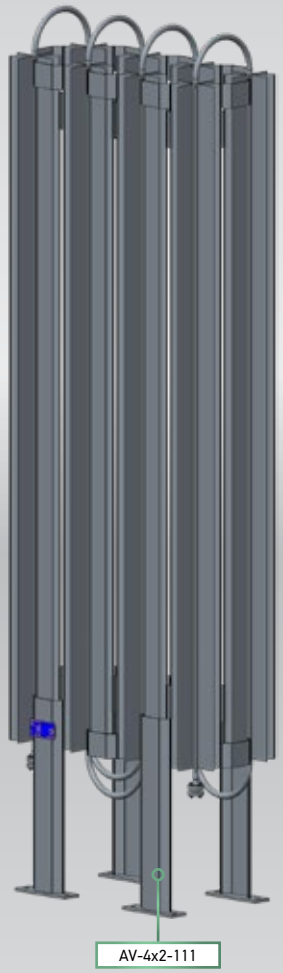
Transportable tanks *Easy*TRANS - transportable, vacuum and multi-layer insulated pressure vessels, designed and built according to EN 1251-2 and approved to TPED (2010/35/EU directives for the transportation and storage of low-temperature, liquefied gases. The tank is protected by a robust metal frame to enable safe mobility even with full liquid content.

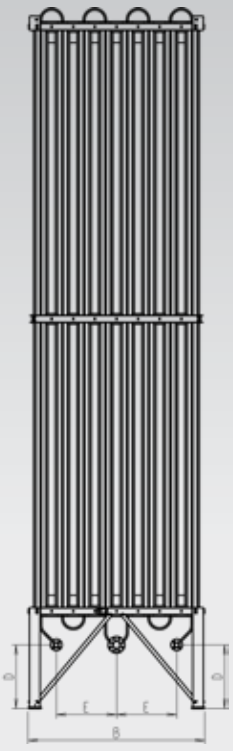
APPLICATIONS

- Metallurgy
- Food Industry
- Electrotechnical Industry and Electronics
- Chemistry and Pharmacy
- Environmental Applications
- Petrochemical Industry
- Glassworks
- Healthcare
- Mechanical Engineering
- Laser and Plasma Applications
- Nuclear Energy and Power Engineering
- Laboratories and R&D

Cryogenic Vaporizers





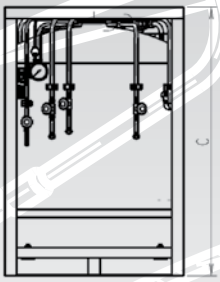


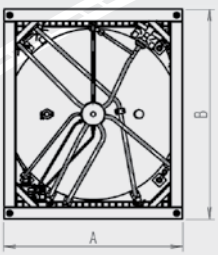
Type	Layout Sizes		Height	Connection Height	Connection Pitch	Capacity
	A	B	C	D	E	
	mm	mm	mm	mm	mm	Nm^3/h
AV-4x2-111	555	1125	3585	488	915	111
AV-6x4-250	1315	1885	3285	700	1090	251
AV-6x4-335	1315	1885	3985	700	1090	334
AV-6x4-500	1315	1885	5385	700	1090	501
AV-6x4-1000	1315	1885	9585	700	1090	1002
AV-6x6-750	1925	1885	5685	900	1090	751
AV-6x6-1250	1925	1885	8485	900	1090	1252
AV-6x6-1500	1925	1885	9885	900	1090	1502
AV-9x8-2000	2840	2495	7085	900	850	2004
AV-9x8-2500	2840	2495	8485	900	850	2504
AV-9x8-3000	2840	2495	9885	900	850	3006

Legend: AV (Atmospheric Vaporizer) - 4x2 (Number of tubes in layout matrix) - 111 (Capacity)

Cryogenic Transportable Tanks - *Easy*TRANS

TYPE FRDTC					
Name			***Easy*TRANS-550**	***Easy*TRANS-750**	***Easy*TRANS-1000**
MAWP		[bar]	8	8	8
Capacity					
Liquid (gross)		[liter]	536	727	973
Liquid (net)		[liter]	509	690	924
Gas (at 0 bar)	Ar	[Nm³]	399	540	723
	N_2	[Nm³]	329	446	597
	O_2	[Nm³]	407	552	739
Performance					
Evaporation rate	N_2	[% per day]	1,4	1,1	0,8
Dimensions					
Tank diameter		[mm]	1020		
Frame dimension	A	[mm]	1070		
	B	[mm]	1260		
	C	[mm]	1600	1900	2300
Weights					
Tare weight		[kg]	667	746	848
Maximum gross weight	Ar	[kg]	1376	1707	2136
	N_2	[kg]	1078	1304	1596
	O_2	[kg]	1247	1533	1903

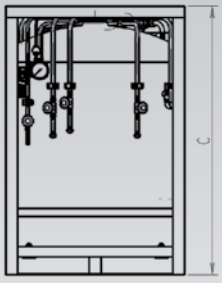


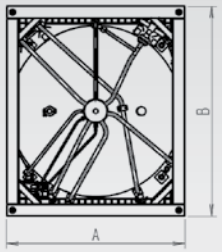


Dimensions A, B, and C subject to change without prior notice

Accessories can be found on www.ferad.eu

TYPE FRDTC								
Name			***Easy*TRANS-550**		***Easy*TRANS-750**		***Easy*TRANS-1000**	
MAWP		[bar]	24	37	24	37	24	37
Capacity								
Liquid (gross)		[liter]	536	535	727	724	973	967
Liquid (net)		[liter]	509	508	690	688	924	919
Gas (at 0 bar)	Ar	[Nm³]	399	398	540	539	723	720
	N_2	[Nm³]	329	328	446	444	597	594
	O_2	[Nm³]	407	406	552	550	739	735
Gas (at 10 bar)	CO_2	[Nm³]	290	290	393	392	527	524
	N_2O	[Nm³]	280	279	380	378	508	505
Performance								
Evaporation rate	N_2	[% per day]	1,4		1,1		0,8	
Gas flow (N_2,O_2,Ar) / with add. vaporizer		[Nm³/hr]	21 / 37	14 / 58	24 / 40	16 / 73	27 / 43	19 / 90
Gas flow (CO_2,N_2O) / with add. vaporizer		[Nm³/hr]	6,5 / 11	4 / 17	7 / 12	5 / 22	8 / 13	6 / 27
Dimensions								
Tank diameter		[mm]	1020					
Frame dimension	A	[mm]	1070					
	B	[mm]	1260	1440	1260	1440	1260	1440
	C	[mm]	1600		1900		2300	
Weights								
Tare weight		[kg]	667	782	746	881	848	1010
Maximum gross weight	Ar	[kg]	1376	1490	1707	1839	2136	2291
	N_2	[kg]	1078	1193	1304	1437	1596	1754
	O_2	[kg]	1247	1362	1533	1665	1903	2059
	CO_2	[kg]	1252	1366	1540	1671	1911	2067
	N_2O	[kg]	1289	1403	1590	1722	1979	2134





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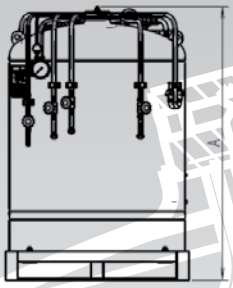
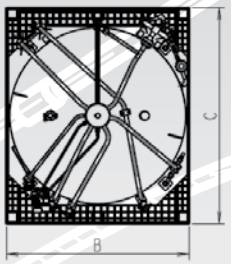
Cryogenic Stationary Tanks - *Easy*BASE

TYPE FRDS										
Name			***Easy*BASE-550**		***Easy*BASE-750**		***Easy*BASE-1000**		***Easy*BASE-1500**	
MAWP		[bar]	24	37	24	37	27	37	27	37
Capacity										
Liquid (gross)		[liter]	534	534	723	722	984	986	1524	1522
Liquid (net)		[liter]	507	507	687	686	935	937	1448	1446
Gas (at 0 bar)	Ar	[Nm³]	397	397	538	537	732	734	1134	1132
	N_2	[Nm³]	328	328	444	443	604	605	935	934
	O_2	[Nm³]	406	406	550	549	748	750	1158	1157
Gas (at 10 bar)	CO_2	[Nm³]	289	289	392	391	523	524	809	808
	N_2O	[Nm³]	279	279	378	377	497	498	770	769
Performance										
Evaporation rate	N_2	[% per day]	1,5		1,2		1,3		1,0	
Gas flow (N_2,O_2,Ar) / with add. vaporizer		[Nm³/hr]	21 / 37	14 / 25	24 / 40	16 / 27	27 / 43	24 / 35	27 / 43	24 / 35
Gas flow (CO_2,N_2O) / with add. vaporizer		[Nm³/hr]	6,5 / 11	4 / 9	7 / 12	5 / 10	9 / 14	8 / 12	9 / 14	8 / 12
Dimensions										
Tank diameter		[mm]	1020				1300			
Dimension	A	[mm]	1600		1900		1685		2185	
	B	[mm]	1070				1340			
	C	[mm]	1260				1490			
Weights										
Tare weight		[kg]	517	602	576	675	898	1006	1070	1209
Maximum gross weight	Ar	[kg]	1224	1309	1533	1631	2200	2311	3087	3223
	N_2	[kg]	928	1013	1132	1230	1654	1764	2241	2378
	O_2	[kg]	1096	1181	1360	1458	1965	2075	2722	2859
	CO_2	[kg]	1101	1186	1366	1464	1973	2083	2735	2872
	N_2O	[kg]	1138	1223	1417	1514	2041	2152	2840	2977





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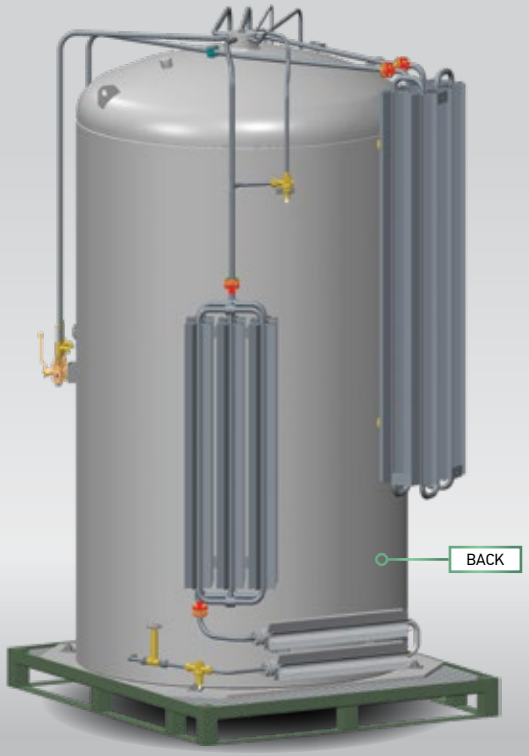
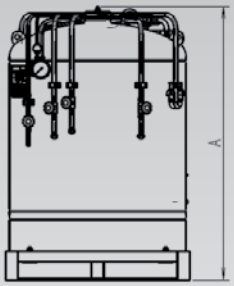
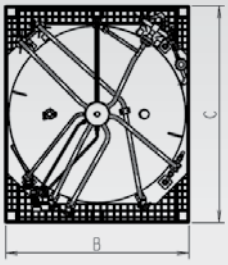


TYPE FRDS											
Name			***Easy*BASE-2000**			***Easy*BASE-2500**		***Easy*BASE-3000**		***Easy*BASE-5000**	
MAWP		[bar]	27	37	37 P	24	37	24	37	24	37
Capacity											
Liquid (gross)		[liter]	2064	2058	2058	2501	2488	2985	2968	4812	4826
Liquid (net)		[liter]	1961	1956	1956	2376	2364	2836	2820	4572	4585
Gas (at 0 bar)	Ar	[Nm³]	1535	1532	1532	1860	1851	2221	2208	3580	3590
	N_2	[Nm³]	1267	1264	1264	1535	1527	1832	1822	2954	2962
	O_2	[Nm³]	1569	1565	1565	1901	1891	2269	2256	3658	3668
Gas (at 10 bar)	CO_2	[Nm³]	1096	1093	1093	1354	1347	1617	1607	2606	2613
	N_2O	[Nm³]	1043	1041	1041	1307	1300	1560	1551	2515	2522
Performance											
Evaporation rate	N_2	[% per day]	0,9			0,8		0,7		0,55	
Gas flow (N_2,O_2,Ar) / with add. vaporizer		[Nm³/hr]	27 / 43	24 / 35	33 / 108	53 / 84	36 / 111	53 / 84	36 / 111	70 / 87	47 / 125
Gas flow (CO_2,N_2O) / with add. vaporizer		[Nm³/hr]	9 / 14	8 / 12	11 / 36	17 / 28	12 / 37	17 / 28	12 / 37	23 / 29	16 / 41
Dimensions											
Tank diameter		[mm]	1300			1450				1850	
Dimension	A	[mm]	2685			2600		3000		3000	
	B	[mm]	1340			1490				1890	
	C	[mm]	1490		1570	1720				2040	
Weights											
Tare weight		[kg]	1241	1407	1482	1513	1726	1646	1900	2825	3260
Maximum gross weight	Ar	[kg]	3972	4131	4206	4822	5019	5596	5826	9193	9646
	N_2	[kg]	2827	2989	3064	3435	3638	3940	4180	6523	6970
	O_2	[kg]	3478	3638	3714	4224	4423	4881	5116	8041	8491
	CO_2	[kg]	3496	3656	3731	4245	4444	4907	5141	8082	8532
	N_2O	[kg]	3639	3799	3874	4418	4617	5114	5347	8416	8867





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