LITS - F2

Leading International Tank Standard

Storage Tanks for Nitrogen, Oxygen, Argon and Carbon Dioxide

T18V30, T18V60, T18V110, T18V200, T18V300, T18V490, T18V610, T18V800
T36V30, T36V60, T36V110, T36V200, T36V300, T36V490, T36V610
T22V30, T22V60, T22V110, T22V200, T22V300, T22V490

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Datenblatt LITS F2
DATASHEET LITS F2

1. Maßbild und technische Daten/ SKETCH AND TECHNICAL DATA

1.1. Tanküberblick/ TANK OVERVIEW

Auslegungsdaten
DESIGN DATA

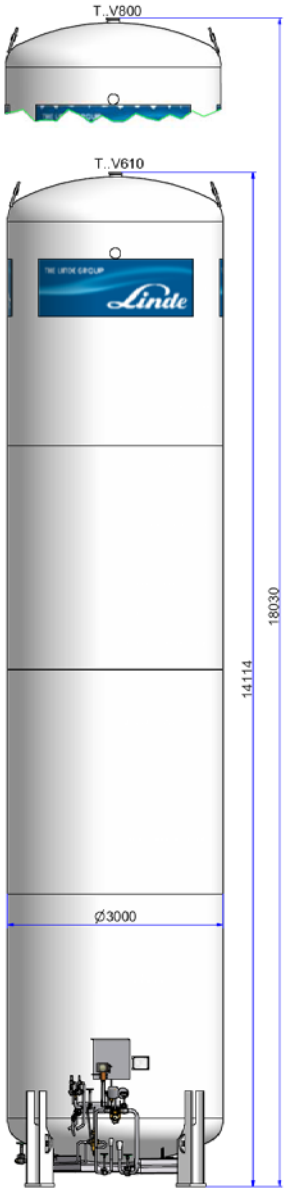
Druckstufe PRESSURE RANGE		T18 V..	T36 V..	T22 V..		Bemerkungen REMARKS
Inhalt VOLUME	V				L	
Berechnungstemperatur DESIGN TEMPERATURE		+ 50	+ 50	+ 50	°C	
Maximal zulässige Temperatur MAXIMUM ALLOWABLE TEMPERATURE	TS	+ 50	+ 50	+ 50	°C	
Minimal zulässige Temperatur MINIMUM ALLOWABLE TEMPERATURE	TS	- 196	- 196	- 196	°C	
Berechnungsdruck DESIGN PRESSURE		18	36	22	bar (g)	
Maximal zulässiger Druck MAXIMUM ALLOWABLE PRESSURE	PS	18	36	22	bar (g)	
Werkstattprüfdruck SHOP TEST PRESSURE	PT	-	-	-	bar (g)	☐ Wasser WATER
	PT	19,8	39,6	24,2	bar (g)	☒ Luft AIR

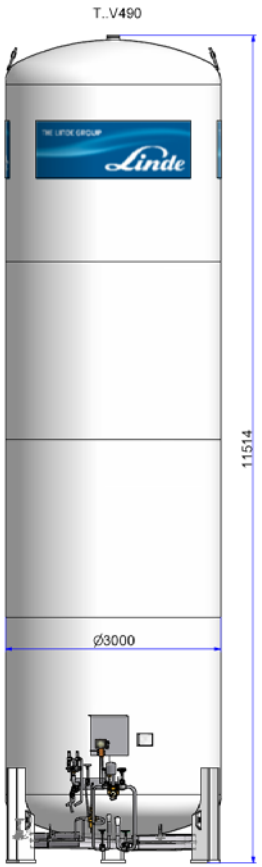
Gewichte
WEIGHTS

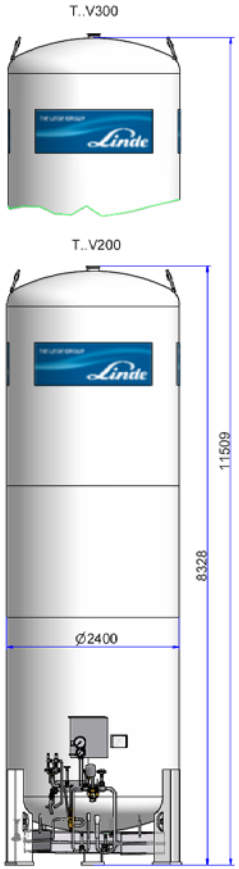
Tank komplett; Angaben in [kg]
COMPLETE TANK; DATA IN [kg]

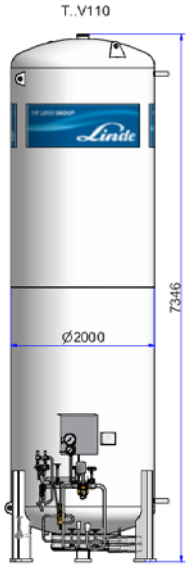
(± 10 %)

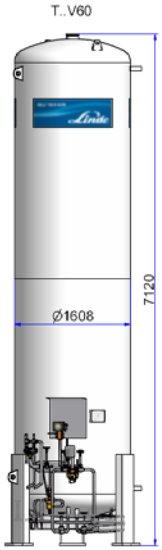
T18V30-F2	2.510	T36V30-F2	2.600	T22V30-F2	2.510
T18V60-F2	4.910	T36V60-F2	5.220	T22V60-F2	4.910
T18V110-F2	5.940	T36V110-F2	7.180	T22V110-F2	6.300
T18V200-F2	9.840	T36V200-F2	12.310	T22V200-F2	10.250
T18V300-F2	13.920	T36V300-F2	17.090	T22V300-F2	14.500
T18V490-F2	19.300	T36V490-F2	24.570	T22V490-F2	20.500
T18V610-F2	23.370	T36V610-F2	30.260		
T18V800-F2	29.650				

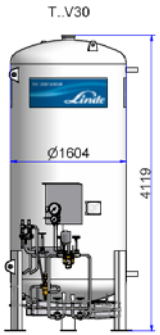












Datenblatt LITS F2
DATASHEET LITS F2

1.2. Technische Daten/ TECHNICAL DATA

TANK-TYPE				T...V30	T...V60	T...V110	T...V200	T...V300	T...V490	T...V610	T18V800
Bauvolumen (ca.)/ TOTAL CAPACITY (APPR.)			[l]	3.160	6.365	11.535	20.355	30.205	49.020	61.620	80.360
Nutzvolumen (ca.)/ NET CAPACITY (APPR.)	T18... at	95%	[l]	3.000	6.050	10.960	19.340	28.700	46.570	58.540	76.340
	T36... at	90%	[l]	2.840	5.730	10.380	18.320	27.180	44.120	55.460	-
	T22... at	93%	[l]	2.940	5.920	10.730	18.930	28.090	45.590	-	-
max. Füllungsgrad / max. Filling ratio 95%, 1 bar a	T18...	LIN	[kg]	2.425	4.890	8.855	15.630	23.190	37.630	47.300	61.680
		LOX	[kg]	3.425	6.910	12.530	22.090	32.885	53.180	66.850	-
		LAR	[kg]	4.185	8.440	15.290	26.980	40.040	64.965	81.660	-
max. Füllungsgrad / max. Filling ratio 93%, 1 bar a	T36...	LIN	[kg]	2.300	4.630	8.390	14.800	21.970	35.650	44.810	-
		LOX	[kg]	3.250	6.540	11.850	20.920	31.050	50.390	63.340	-
		LAR	[kg]	3.970	7.990	14.480	25.560	37.920	61.550	77.370	-
max. Füllungsgrad / max. Filling ratio 90%, 15 bar a	T22...	CO2	[kg]	3.120	6.280	11.370	20.065	29.780	48.330	-	-
max. zul. Betriebsüberdruck MAX. ALLOW. WORKING PRESSURE	T18...		[bar]	18	18	18	18	18	18	18	18
	T36...		[bar]	36	36	36	36	36	36	36	-
	T22...		[bar]	22	22	22	22	22	22	-	-
Verdampfungsrate (1 bar, 15°C, Bauvolumen) BOIL-OF RATE (1 BAR, 15°C, TOTAL CAPACITY) Vacuum < 2*10-2mbar		LIN	[%/d]	0,67	0,58	0,44	0,31	0,30	0,21	0,20	0,19
		LOX	[%/d]	0,42	0,37	0,29	0,20	0,19	0,13	0,12	-
		LAR	[%/d]	0,46	0,40	0,32	0,21	0,21	0,15	0,14	-
		CO2	[%/d]	0,22	0,19	0,14	0,10	0,10	0,07	-	-

Entnahmeleistung mit Standard Druckaufbauverdampfer bei 0,7*zul. Betriebsüberdruck
DISCHARGE CAPACITY AT STANDARD PRESSURE BUILD UP VAPORIZER @ 0,7*MAX. ALLOW. WORKING PRESSURE

Druckstufe PRESSURE STAGE	18	LIN	[Nm³/h]	150	300	600		600
		LOX	[Nm³/h]	190	380	750		-
		LAR	[Nm³/h]	190	380	750		-
	36	LIN	[kg/h]	140		280		-
		LOX	[Nm³/h]	180		360		-
		LAR	[Nm³/h]	180		360		-
	22	CO2	[Nm³/h]	70	140	280	-	-

Abblaseleistung für ein Tanksicherheitsventil bei 1,1*zul. Betriebsüberdruck / CAPACITY OF ONE SAFTEY VALVE AT 1,1*MAWP
kalter Zustand/ COLD CONDITIONS

Druckstufe PRESSURE STAGE	18	LIN	[kg/h]	1.090	1.090
		LOX	[kg/h]	1.010	-
		LAR	[kg/h]	1.240	-
	36	LIN	[kg/h]	5.610	-
		LOX	[kg/h]	2.260	-
		LAR	[kg/h]	2.850	-
	22	CO2	[kg/h]	975 -	-

Der Tanktyp T18 V800 ist nur für den LIN-Einsatz ausgelegt. Dieser Tank darf nur mit Stickstoff gefüllt werden. Andere Füllmedien sind verboten.
TANKTYPE T18 V800 IS ONLY DESIGNED FOR LIN SERVICE. IT IS ONLY ALLOWED TO FILL THE TANK WITH NITROGEN. IT IS PROHIBITED TO FILL THE TANK WITH ANY OTHER LIQUID MEDIA.

1.3. Isolierung - Vakuum / INSULATION - VACUUM

Der Tank ist vakuumisoliert. Die Isolierung besteht aus Perlite. Das Vakuum beträgt bei Auslieferung (warmer Zustand) ca. 0,05 mbara. Beim in Betrieb genommenen Tank stellt sich ein Vakuum von < 0,05 mbara ein.

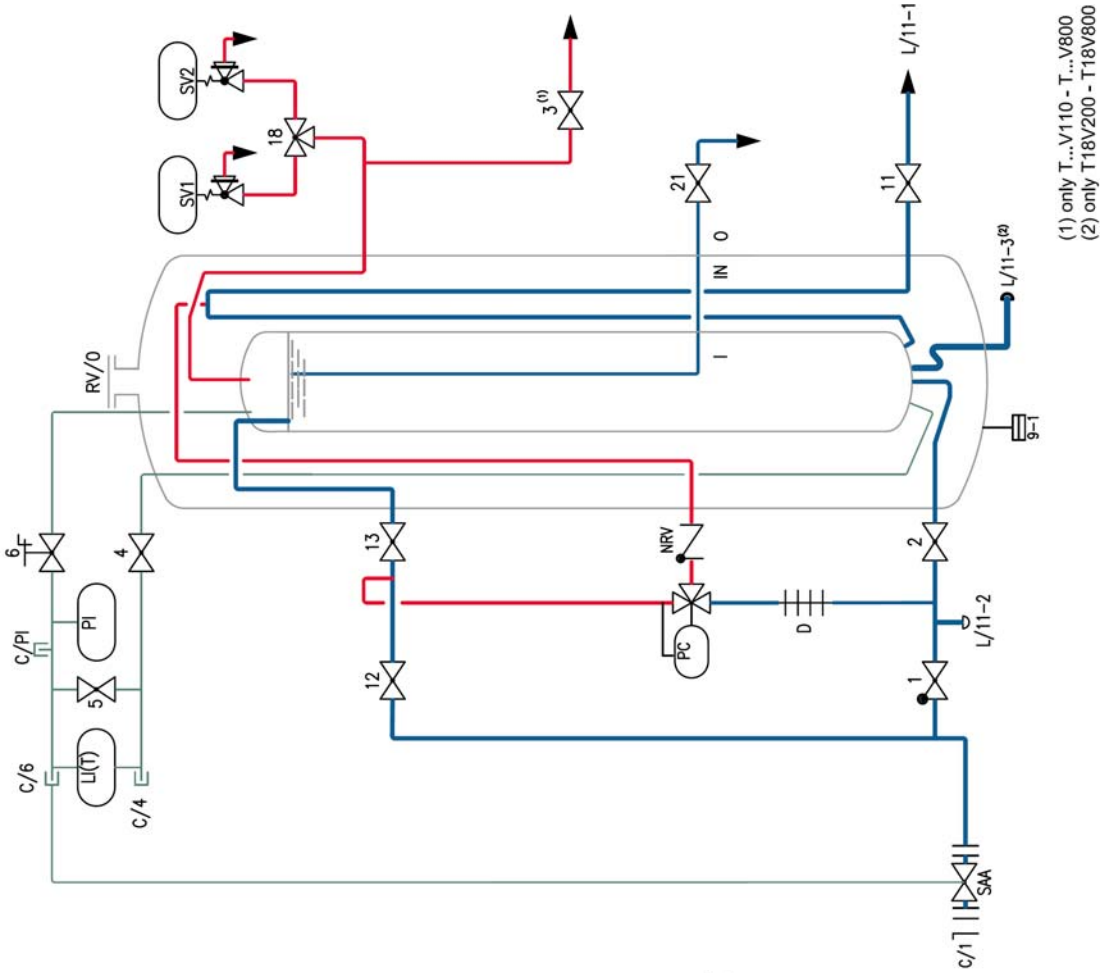
THE TANK IS VACUUMINSULATION: THE INSULATION CONSISTS OF PERLIITE. IN THE STATUS OF DELIVERY (WARM CONDITIONS) THE VACUUM WILL BE APPR. 0,05 MBARA. UNDER OPERATING CONDITIONS THE VALUE OF THE VACUUM IS < 0,05 MBARA.

1.4. Verdampfer / VAPORIZER

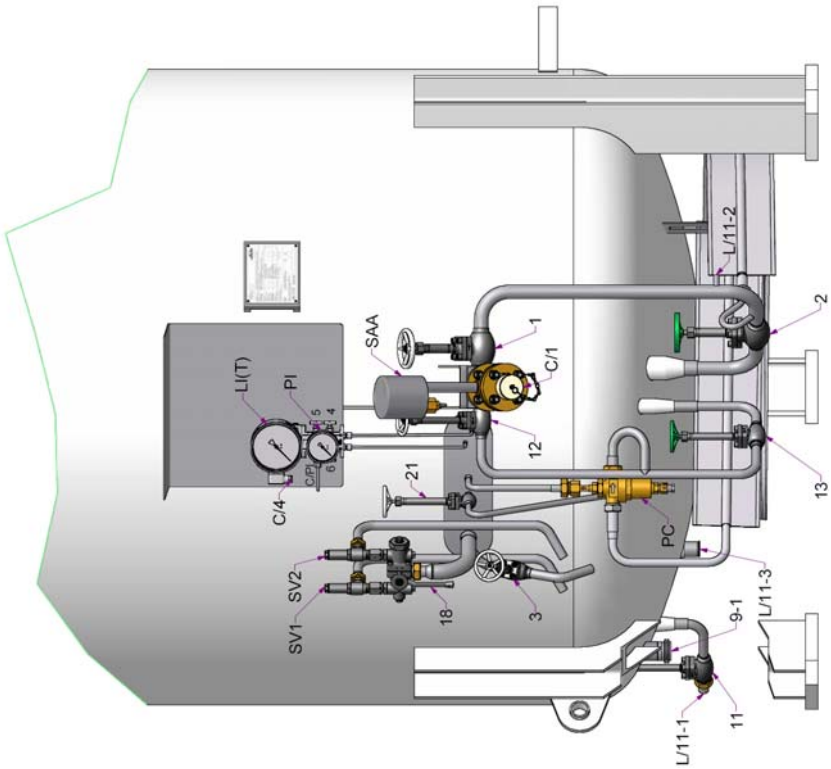
Tanks der Baugröße T.. V30 – T.. V300 können mit einem Clip-On-Produktverdampfer ausgerüstet werden. Diese Verdampfer sind in den Leistungsstufen (@N2) 30 Nm^3/h, 60 Nm^3/h und 120 Nm^3/h verfügbar. Produktverdampfer für größere Entnahmeleistungen sind separat zu installieren.
Für Entnahmemengen, die die max. Entnahmeleistung mit Standard Druckaufbauverdampfern übersteigen, sind zusätzliche Druckaufbauverdampfer zu installieren.

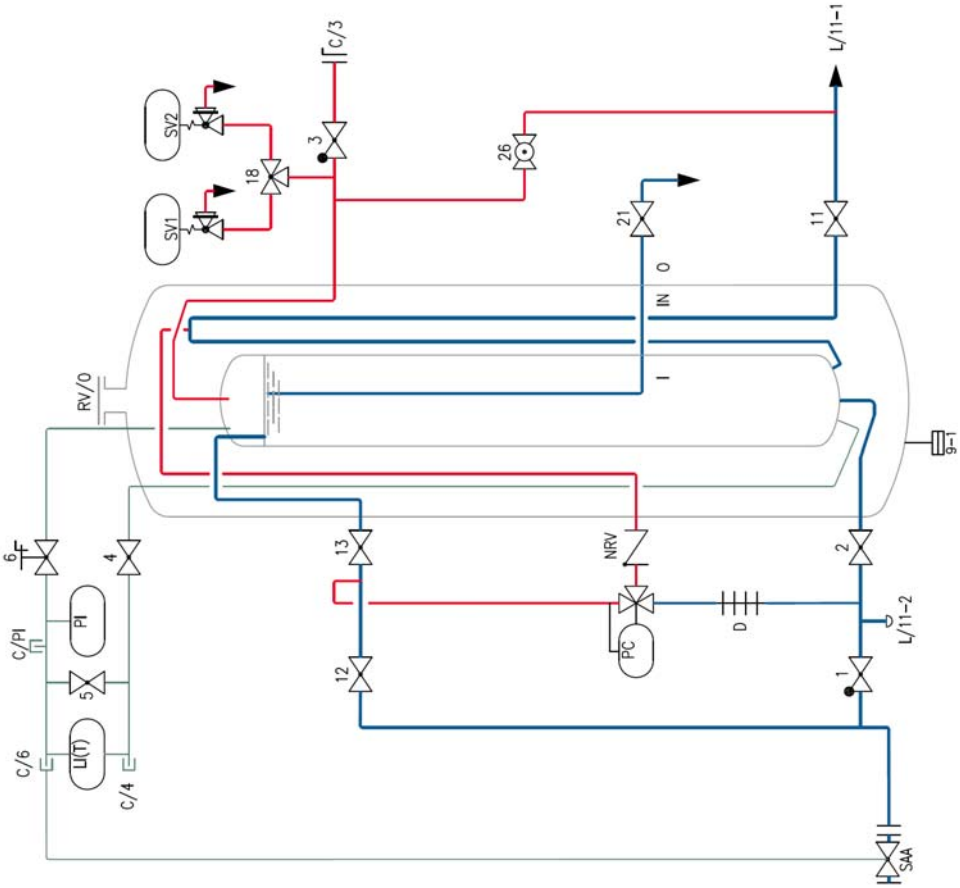
TANKS, TANK-TYPE T.. V30 – T.. V300 CAN BE EQUIPPED WITH CLIP-ON PRODUCT-VAPORIZERS. THESE VAPORIZERS ARE AVAILABLE FOR DISCHARGE CAPACITIES (@N2): 30 Nm^3/h, 60 Nm^3/h AND 120 Nm^3/h. PRODUCT-VAPORIZERS FOR HIGHER DISCHARGES HAVE TO BE INSTALLED SEPARATELY.
FOR DISCHARGE CAPACITIES HIGHER THAN POINTED IN ITEM 1.2., ADDITIONAL PRESSURE BUILD-UP VAPORIZERS HAVE TO BE INSTALLED SEPERATELY.

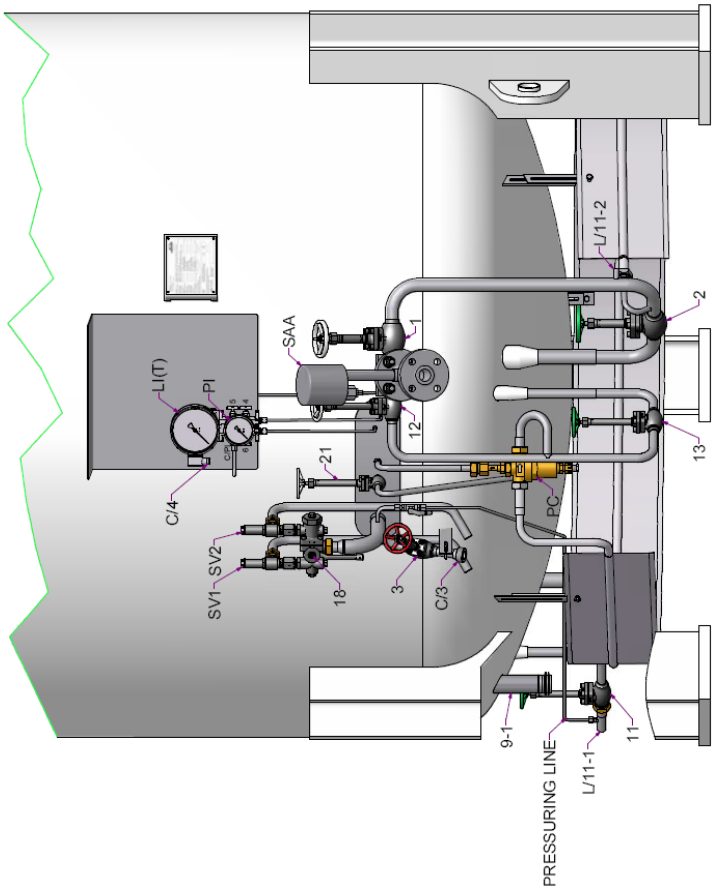
2. Ventile - Anschlüsse / VALVES - CONNECTIONS



LIN / LOX / LAR




SV2
SV1
C/3
18
3
26
L/11-1
21
11
IN
O
I
RV/0
9-1
6
4
13
NRV
2
C/PI
PI
5
12
PC
D
L/11-2
1
C/6
LI(T)
C/4
SAA


LI(T)
PI
SAA
1
L/11-2
2
12
21
13
C/4
SV1–SV2
18
3
C/3
PC
9-1
PRESSURING LINE
L/11-1
11

CO2

Ventile/ VALVES

Nr.	Bezeichnung NAME	T18V30 T36V30 T22V30	T18V60 T36V60 T22V60	T18V110 T36V110 T22V110	T18V200 T36V200 T22V200	T18V300 T36V300 T22V300	T18V490 T36V490 T22V490	T18V610 T36V610 -	T18V800 - -
1	FILLING; BOTTOM	DN 25	DN 25	DN 40	DN 40	DN 40	DN 40	DN 40	DN 40
2	PRESSURE BUILD UP	DN 25	DN 25	DN 40	DN 40	DN 40	DN 40	DN 40	DN 40
3	VENT VALVE	DN25[1)]	DN25[1)]	DN 25	DN 25	DN 25	DN 25	DN 25	DN 25
4	BOTTOM GAUGE (+)	DN 6	DN 6	DN 6	DN 6	DN 6	DN 6	DN 6	DN 6
5	GAUGE BYPASS	DN 6	DN 6	DN 6	DN 6	DN 6	DN 6	DN 6	DN 6
6	TOP GAUGE (-)	DN 6	DN 6	DN 6	DN 6	DN 6	DN 6	DN 6	DN 6
11	DISCHARGE	DN15	DN15	DN 25	DN 25	DN 25	DN 40	DN 40	DN 40
12	FILLING; TOP	DN 25	DN 25	DN 25	DN 25	DN 25	DN 25	DN 25	DN 25
13	GAS SHUT OF	DN 25	DN 25	DN 25	DN 25	DN 25	DN 25	DN 25	DN 25
18	CHANGE OVER VALVE	DN 20	DN 20	DN 20	DN 20	DN 20	DN 20	DN 20	DN 20
21	TRYCOCK	DN 15	DN 15	DN 15	DN 15	DN 15	DN 15	DN 15	DN 15
26[2)]	PRESSURING	DN 10	DN 10	DN 10	DN 10	DN 10	DN 10	DN 10	DN 10
SV1	SAFETY VALVE in - out	¾" – 1"	¾" – 1"	¾" – 1"	¾" – 1"	¾" – 1"	¾" – 1"	¾" – 1"	¾" – 1"
SV2	SAFETY VALVE in - out	¾" – 1"	¾" – 1"	¾" – 1"	¾" – 1"	¾" – 1"	¾" – 1"	¾" – 1"	¾" – 1"
PC	PRESSURE REGULATOR	DN 25	DN 25	DN 25	DN 25	DN 25	DN 25	DN 25	DN 25
NRV	NON RETURN VALVE	DN 15	DN 15	DN 15	DN 15	DN 15	DN 15	DN 15	DN 15
RV/O	RELIEF VALVE – OUTER JACKET	DN 150	DN 150	DN 150	DN 150	DN 150	DN 150	DN 150	DN 150

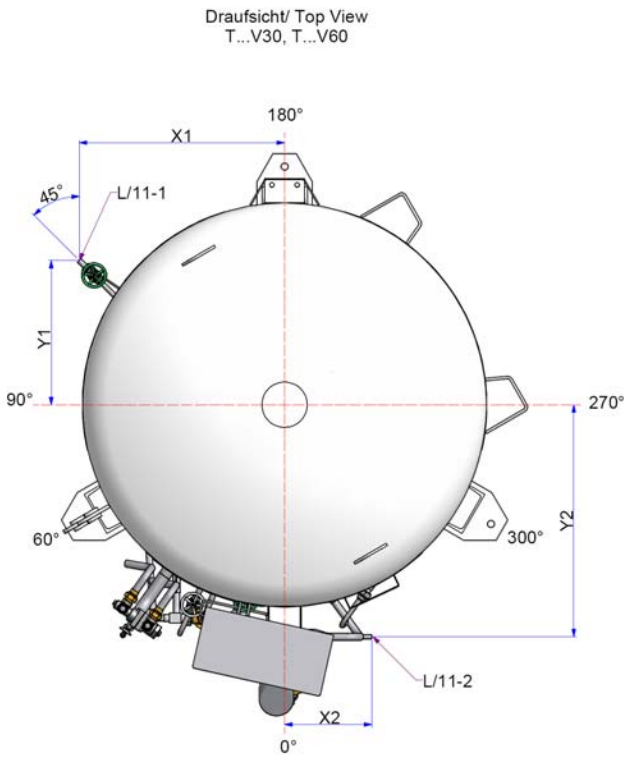
[1)] nicht bei T18/36V30-60 / NOT AT T18/36V30-60
[2)] nur bei T22... /ONLY AT T22...

Anschlüsse/ CONNECTIONS

Nr.	Bezeichnung NAME	T18V30 T36V30 T22V30	T18V60 T36V60 T22V60	T18V110 T36V110 T22V110	T18V200 T36V200 T22V200	T18V300 T36V300 T22V300	T18V490 T36V490 T22V490	T18V610 T36V610 -	T18V800 - -
9-1	EVACUATION CONNECTION	50mm	50mm	50mm	50mm	50mm	50mm	50mm	50mm
C/1	FILL COUPLING	DN 40	DN 40	DN 40	DN 40	DN 40	DN 40	DN 40	DN 40
C/3[3)]	COUPLING VENT	G 1 ½"	G 1 ½"	G 1 ½"	G 1 ½"	G 1 ½"	G 1 ½"	---	---
C/4	ADD. CONNECTION	(*)	(*)	(*)	(*)	(*)	(*)	(*)	(*)
L/11-1	DISCHARGE (see page 11)	SCREW CONNECTION M26x1,5 [18x1]		SCREW CONNECTION M40x2 [28x1]			SCREW CONNECTION M55x2 [42x1]		
L/11-2	ADD. DISCHARGE (see page 11)	DN 15	DN 15	DN 15	DN 15	DN 15	DN 15	DN 15	DN 15
L/11-3[4)]	ADD. DISCHARGE (see page 11)	-	-	-	DN 40	DN 40	DN 40	DN 40	DN 40
C/PI	TEST CONNECTION PRESSURE INDICA-TOR	¼"	¼"	¼"	¼"	¼"	¼"	¼"	¼"
LI(T)	LEVEL INDICATOR (OPTIONAL WITH TRANSMITTER)	WIKA OR SAMSON AVAILABLE							

[3)] nur bei T22... / ONLY AT T22...
[4)] Standard nur bei T18V200-T18V800 / STANDARD ONLY AT T18V200-T18V800
[*)] abhängig vom LI(T) / DEPENDS ON LI(T)

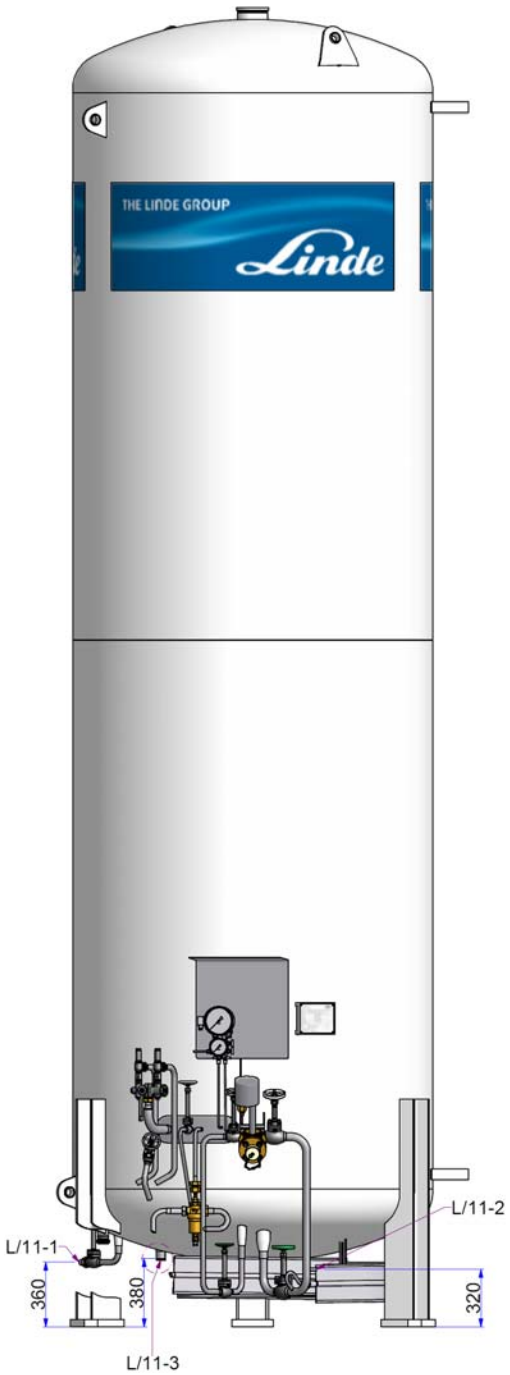
T...V30 / T...V60

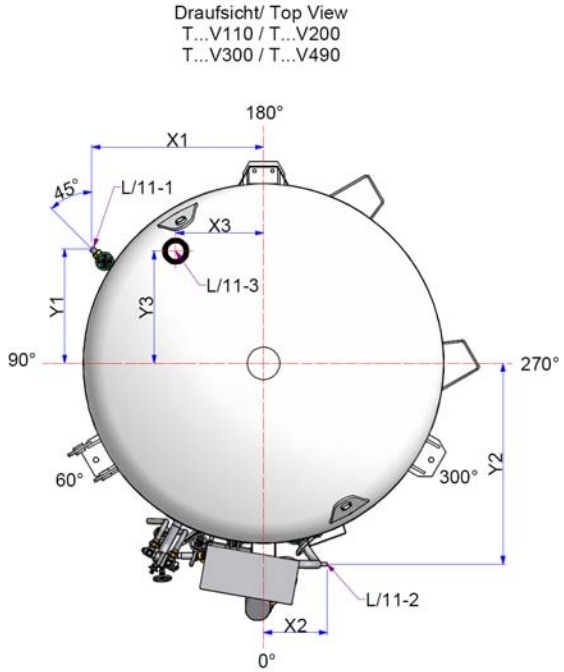


T18/36...	V30	V60
X1	815	817
Y1	573	574
X2	346	346
Y2	922	924

T22...	V30	V60
X1	866	867
Y1	623	624
X2	346	346
Y2	922	924

T...V110 / T...V200 / T...V300 / T...V490





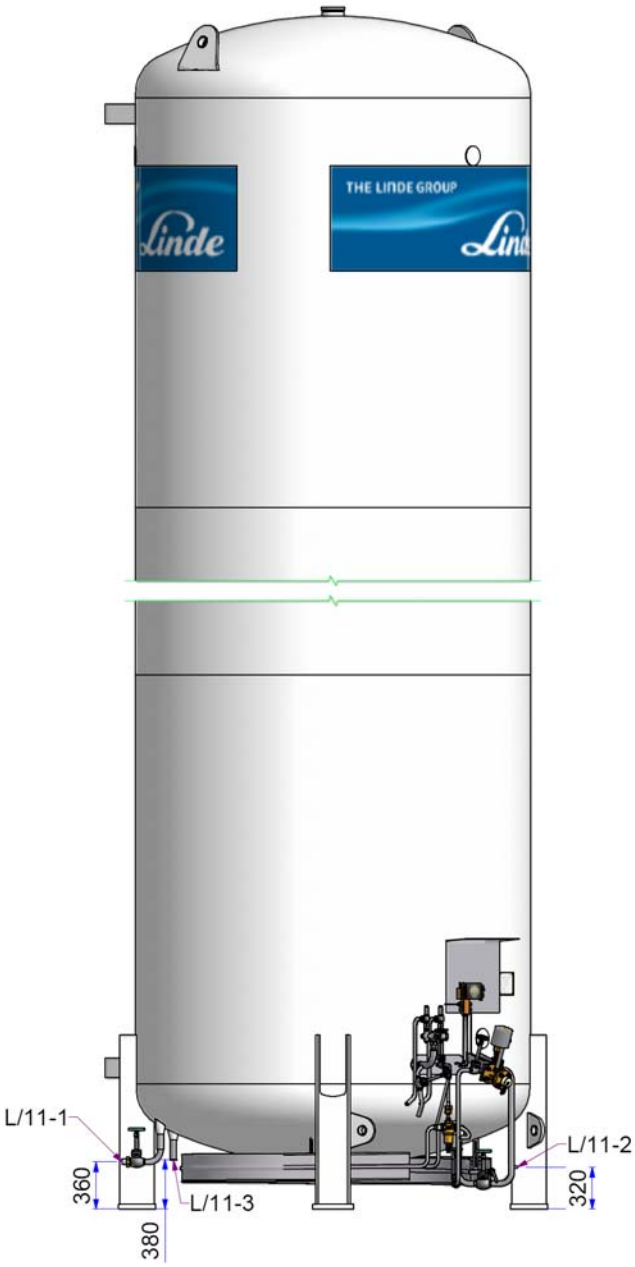
T18/36...	V110	V200	V300	V490
X1	953	1126	1126	1381
Y1	638	738	738	884
X2	354	354	354	354
Y2	1118	1320	1320	1620
X3[1)]	-	681	681	830
Y3[1)]	-	812	812	989

T22...	V110	V200	V300	V490
X1	999	1173	1173	1422
Y1	685	785	785	924
X2	354	354	354	354
Y2	1120	1320	1320	1620

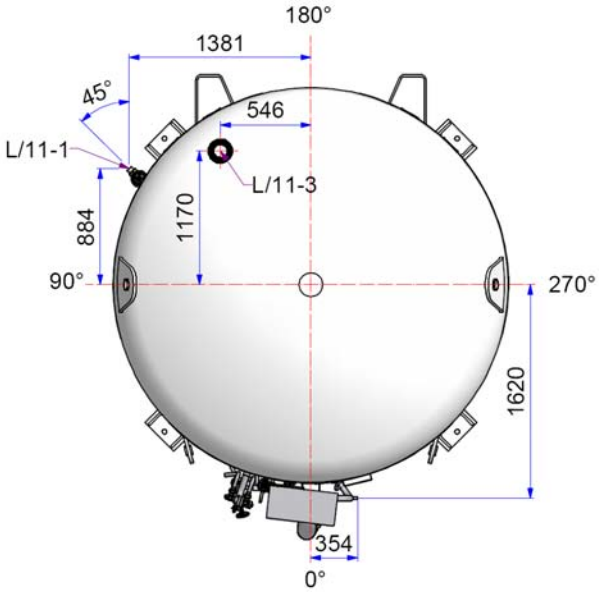
[1)] only T18...

T...V610 / T18V800

Frontansicht (45° gedreht)
Front View (45° rotated)

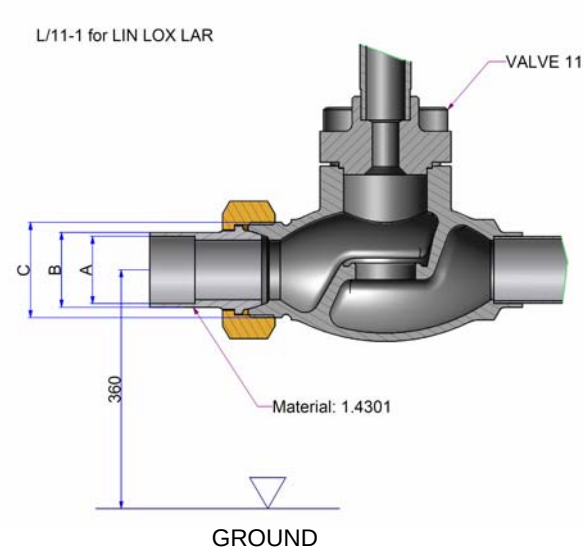


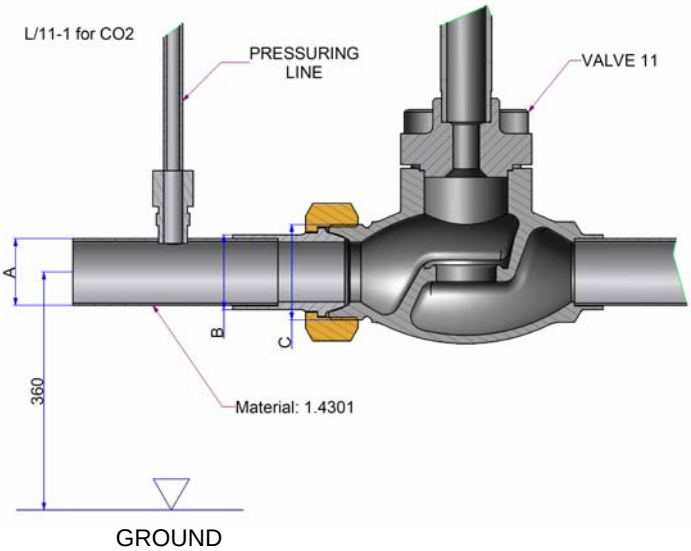
Draufsicht/ Top View
T...V610 / T18V800



L/11-3 nur für/only for T18V...

L/11-1

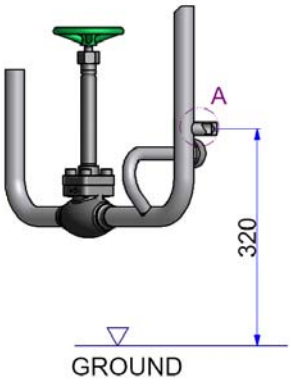


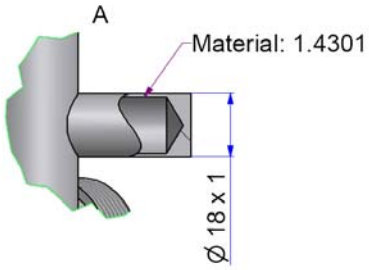


LIN LOX LAR		T18V30 T36V30	T18V60 T36V60	T18V110 T36V110	T18V200 T36V200	T18V300 T36V300	T18V490 T36V490	T18V610 T36V610	T18V800
L/11-1	A	18,2	18,2	28,2	28,2	28,2	42,2	42,2	42,2
Entnahme	B	21,4	21,4	31,4	31,4	31,4	45,6	45,6	45,6
DISCHARGE	C	M26 x 1,5	M26 x 1,5	M40 x 2	M40 x 2	M40 x 2	M55 x 2	M55 x 2	M55 x 2

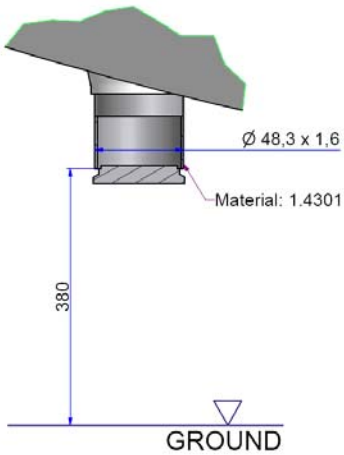
CO2		T22V30	T22V60	T22V110	T22V200	T22V300	T22V490
L/11-1	A	18 x 1	18 x 1	28 x 1	28 x 1	28 x 1	42 x 1
Entnahme	B	21,4	21,4	31,4	31,4	31,4	45,6
DISCHARGE	C	M26 x 1,5	M26 x 1,5	M40 x 2	M40 x 2	M40 x 2	M55 x 2

L/11-2 for LIN / LOX / LAR / CO2
(sealed)



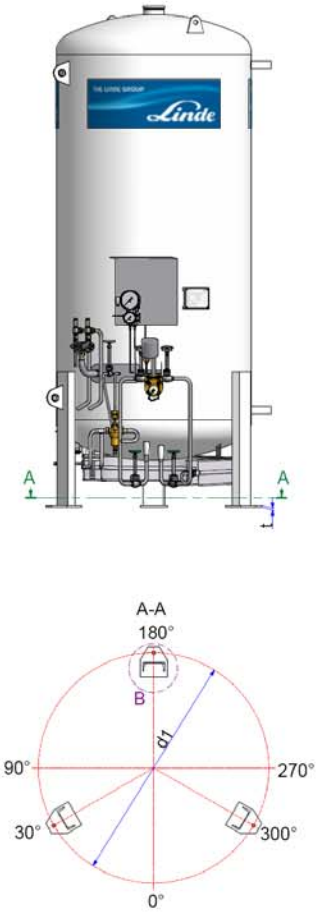


L/11-3 for LIN / LOX / LAR
(sealed)

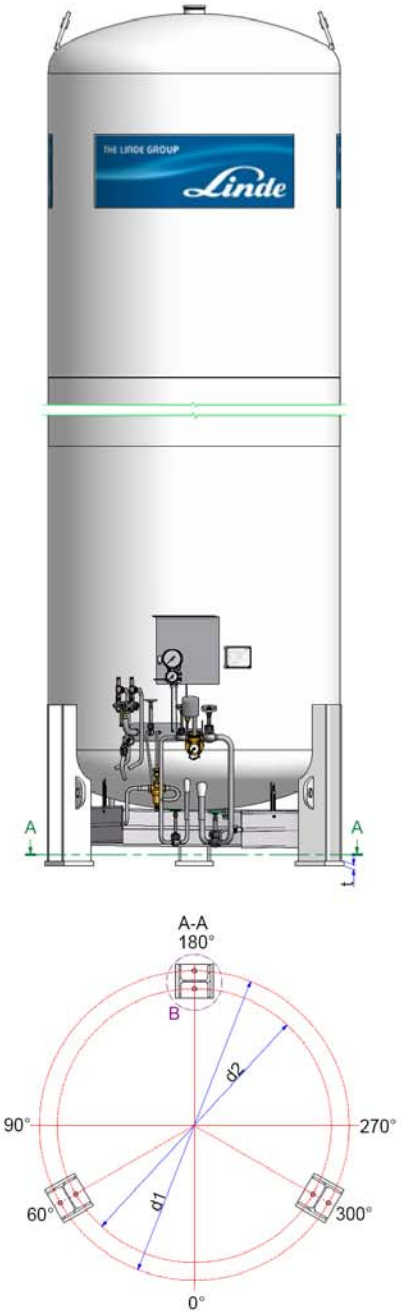


3. Fundamentplan/ FOUNDATION

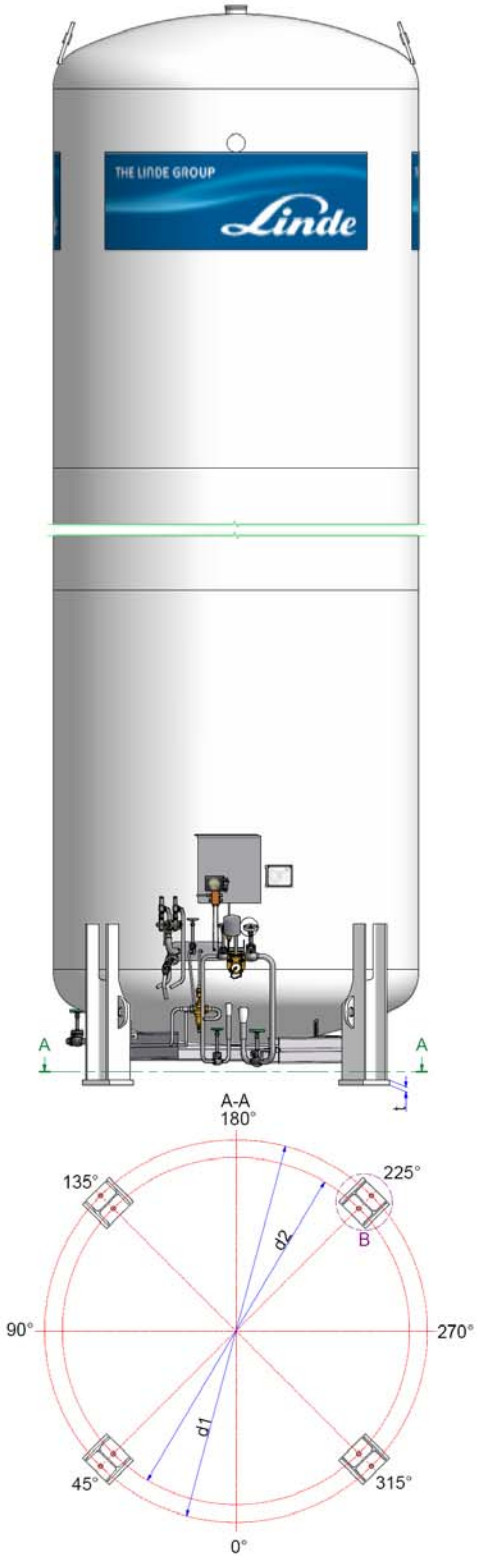
Tank Typ/ TYPE
T...V30 / T...V60



Tank Typ/ TYPE
T...V110 / T...V200
T...V300 / T...V490

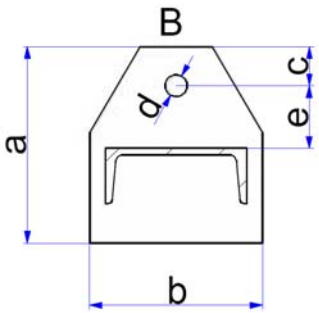


Tank Typ/ TYPE
T...V610 / T18V800

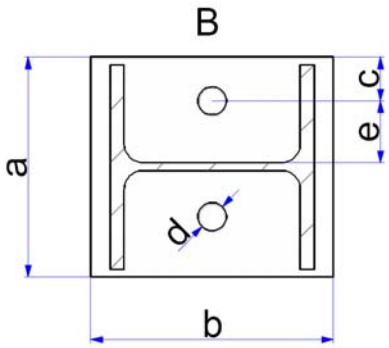


	TANK-TYPE		T...V30	T...V60	T...V110	T...V200	T...V300	T...V490	T...V610	T18V800
Fußplatte/ BASE PLATE	a	[mm]	250	280	235	280	280	290	280	350
	b	[mm]	220	360	230	310	310	340	310	350
	c	[mm]	50	50	50	56	56	58	56	85
	e	[mm]	80	80	80	80	80	78	80	85
Anzahl der Füße/ NUMBERS OF LEGS	n	[-]	3	3	3	3	3	3	4	4
Lochkreis/ HOLE CIRCLE	d1	[mm]	1894	1940	2150	2546	2546	3148	3148	3157
	d2	[mm]	-	-	-	2252	2252	2854	2854	2877
Bohrung Fußplatte/ HOLE BASE PLATE	d	[mm]	28	28	28	36	36	36	36	40
Fußplattendicke/ THICKNESS OF BASE PLATE	t	[mm]	15	30	40	40	40	40	40	40
Profil/ PROFILE			U180 (DIN 1026-1, DIN EN 10279)	U320 (DIN 1026-1, DIN EN 10279)	IPB 180	IPB 260 (DIN 1025-2)	IPB 260	IPBv 260 (DIN 1025-4)	IPB 260 (DIN 1025-2)	IPB 300 (DIN 1025-2)

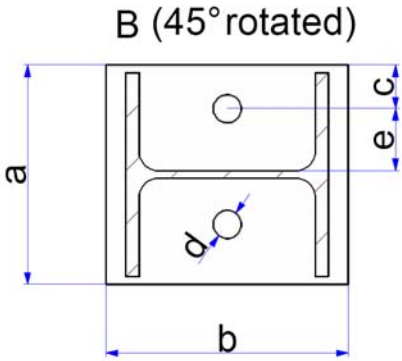
Tank Typ/ TYPE
T...V30 / T...V60



Tank Typ/ TYPE
T...V110 / T...V200
T...V300 / T...V490



Tank Typ/ TYPE
T...V610 / T18V800



4. Standfestigkeit/ STABILITY

Bodenfuge, Betonfundament:
Die Bodenpressung ist den örtlichen Vorschriften und der Bodenbeschaffenheit anzupassen.
Die Bemessung der Ankerschrauben und des Fundamentes gehören nicht zum Lieferumfang des Tankherstellers.

GROUND JOINT, CONCRETE FOUNDATION:
THE SOIL PRESSING IS TO DESIGN ACC. TO THE LOCAL CODES AND COMPOSITION OF THE SOIL.
DESIGN FOR ANCHOR BOLTS AND FOUNDATION IS NOT INCLUDED BY TANK SUPPLY.

4.1. Windlast - Moment/ WIND LOAD - MOMENT

Maximale Windlasten und Momente sind für die folgenden Tank-Typen zulässig.
MAXIMUM WIND LOADS AND MOMENTS ARE ALLOWABLE FOR FOLLOWING TANK-TYPES.

	Tank-Type	T...V30	T...V60	T...V110	T...V200	T...V300	T...V490	T...V610	T18V800
Max. Windlasten/ MAX. WIND LOADS	F_{max} [kN]	9,9	17,2	21,3	29,6	47,4	51,1	63,9	84,1
Max. Moment	M_{max} [kNm]	24,8	72,2	91,9	135,8	296,1	315,8	479,1	789,3

4.2. Erdbeben/ EARTHQUAKES

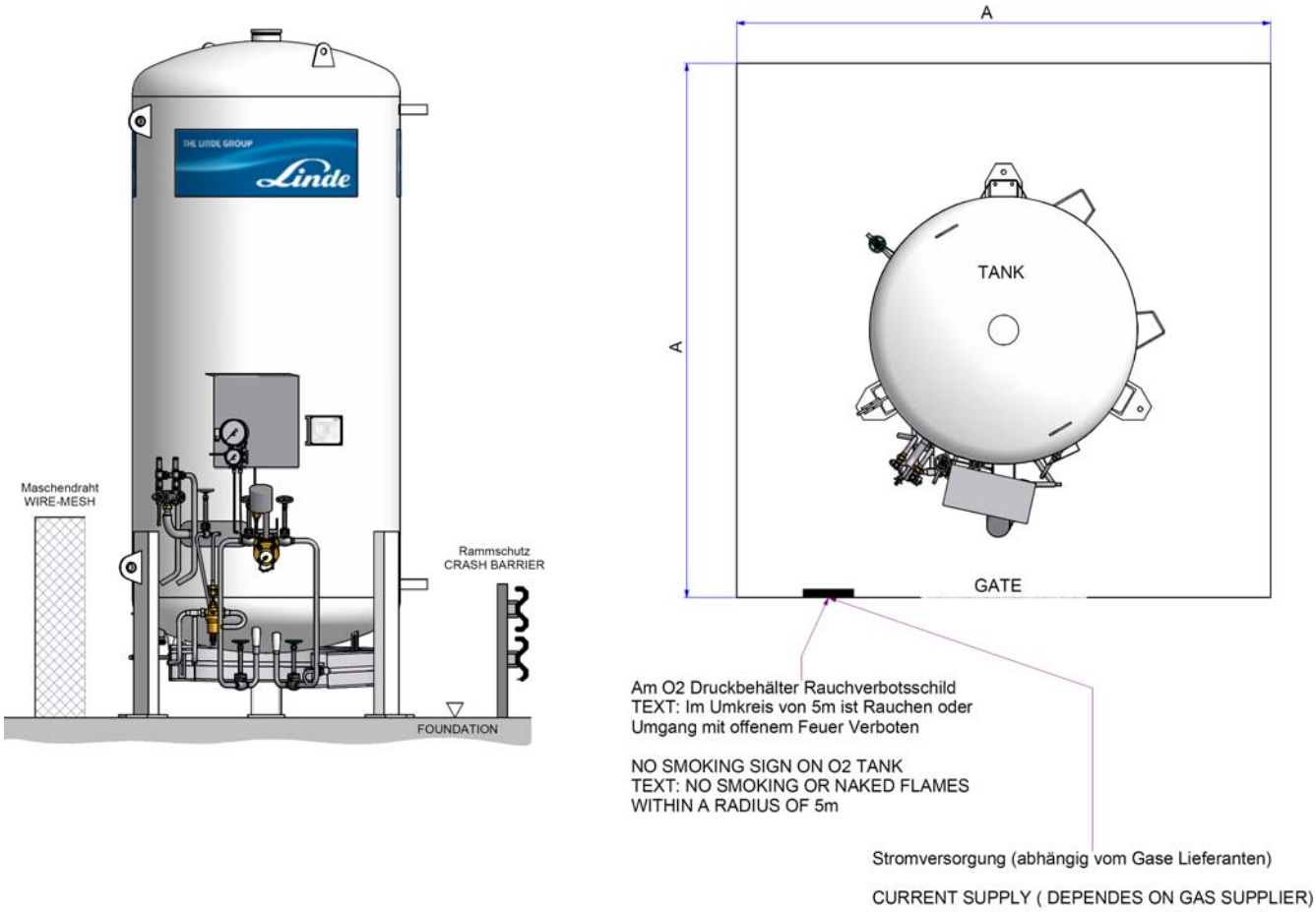
Maximale horizontale Beschleunigungen sind für die folgenden Tank-Typen zulässig.
MAXIMUM HORIZONTAL ACCELLERATIONS ARE ALLOWABLE FOR FOLLOWING TANK-TYPES.

	Tank-Type	T...V30	T...V60	T...V110	T...V200	T...V300	T...V490	T...V610	T18V800
Max. hor. Beschleunigung/ MAX. HOR. ACCELERATION	a_{max} [m/s²]	2,68	3,79	2,68	5,33	2,49	2,68	1,38	2,17

5. Vorschlag zur Aufstellung einer Drucktankanlage/ PROPOSAL FOR TANK ASSEMBLY

Diese Aufstellung und alle weiteren Maßnahmen im Rahmen der Errichtung und Inbetriebnahme der Drucktankanlage liegen im Verantwortungsbereich des Betreibers. Die Forderungen/ Bestimmungen der zuständigen Genehmigungs-/ und Aufsichtsbehörden sind zu beachten. Im Umkreis von 5 m dürfen sich keine Kelleröffnungen befinden, Kanaleinläufe müssen mit einem Flüssigkeitsverschluss ausgerüstet sein.

The Provider is responsible for the erection, commissioning and all relating measures. The requirements of the competent supervisory authorities / regulatory authorities have to be observed. No basement openings permitted within a radius of 5 m, drain inlets must be provided with a liquid seal.

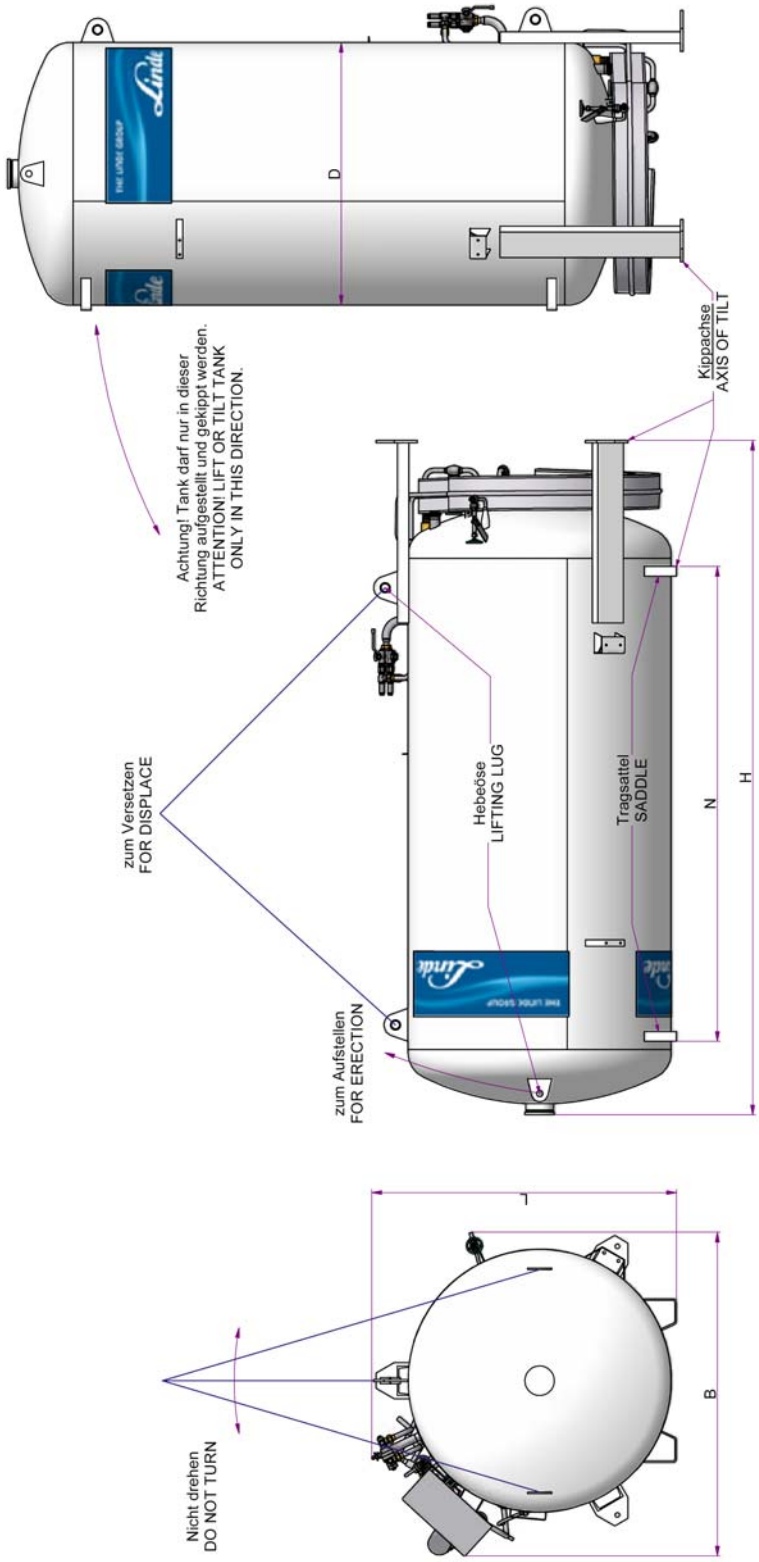


	T...V30	T...V60	T...V110	T...V200	T...V300	T...V490	T...V610	T18V800
A [m]	~2,5	~2,5	~3,0	~3,0	~3,5	~3,5	~4,0	~4,0

6. Transport und Aufstellung/ TRANSPORT AND ERECTION

(a) Baugröße: T .. V30, T.. V60, T.. V110
TANK SIZE: T .. V30, T.. V60, T.. V110

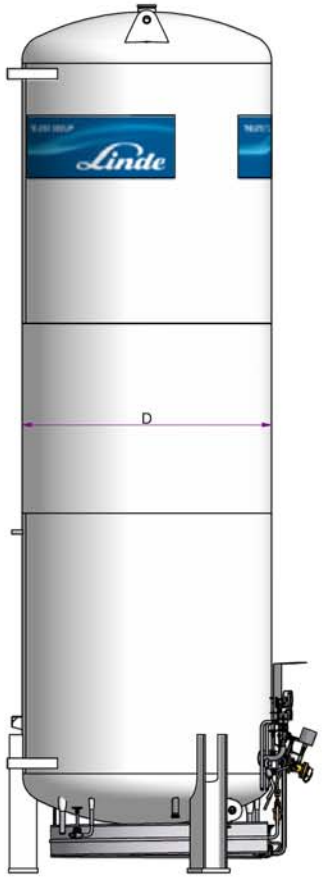
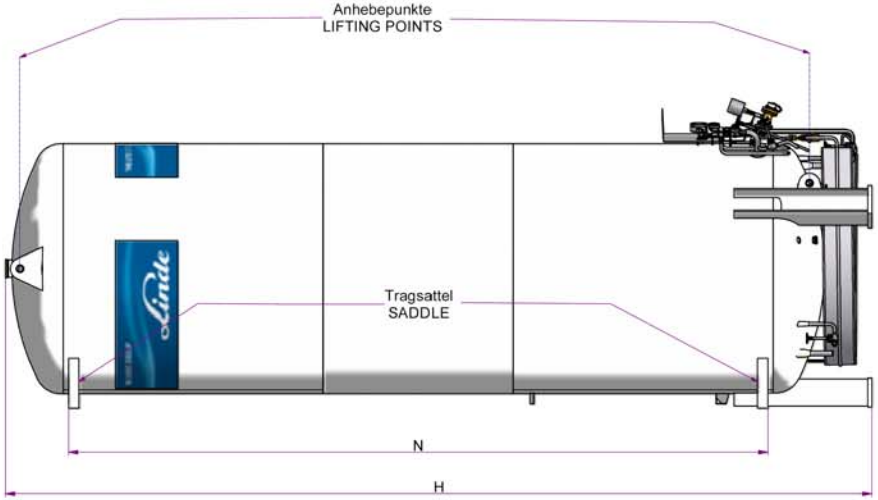
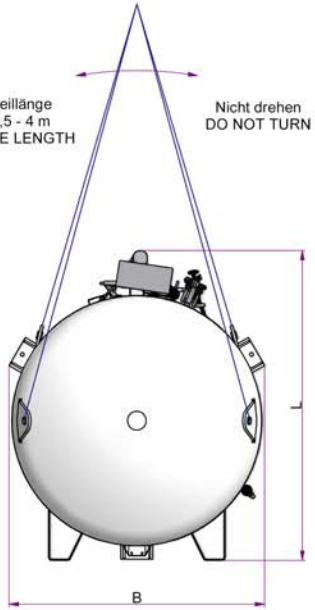
[mm]			T...V30	T...V60	T...V110
		B	2.090	2.090	2.380
	Mit/ WITH SAA	L	1.870	1.870	2.230
	Ohne/ WITHOUT SAA	L	-	-	-
		N	2.900	5.900	6.000
		D	1.608	1.604	2.000
		H	4.119	7.120	7.346
Leermasse DEAD MASS ±10%		18 bar	2.510	4.910	5.940
		36 bar	2.600	5.220	7.180
		22 bar	2.510	4.910	6.300



Datenblatt LITS F2
DATASHEET LITS F2

(b) Baugröße: T... V200, T... V300, T... V490, T... V610, T18V800
TANK SIZE: T... V200, T... V300, T... V490, T... V610, T18V800

[mm]			T...V200	T...V300	T...V490	T...V610	T18V800
		B	2.400	2.400	3.000	3.000	3.000
Mit/ WITH SAA		L	3.030	3.030	3.650	3.540	3.540
Ohne/ WITHOUT SAA		L	2.880	2.880	3.490	3.430	3.430
		N	6.520	9.900	9.780	12.380	16.300
		D	2.400	2.400	3.000	3.000	3.000
		H	8.328	11.509	11.514	14.114	18.030
Leermasse DEAD MASS	±10%	18 bar	9.840	13.920	19.300	23.370	29.650
		36 bar	12.310	17.090	24.570	30.260	-
		22 bar	10.250	14.500	20.500	-	-



Achtung! Tank darf nur in dieser Richtung aufgestellt werden (2 Kräne)
ATTENTION! LIFT TANK ONLY IN THIS DIRECTION (2 CRANES)