Vacuum pumps for waste disposal vehicles

SL 2100, SL 2700, SL 3100

Pressure range: **150 mbar to 1.5 bar** (overpressure)
Suction volume flow: **1010 to 3080 m³/h**

CONSTRUCTION

Sterling SIHI liquid ring vacuum pumps are displacement pumps of uncomplicated and robust construction with the following particular features:

- handling of all gases and vapours
- robust operating behaviour
- insensitive to entrained liquids
- low noise level, nearly free from vibration
- direct drive or belt drive
- very little wear because of regular dirt drain (out of the pump) and application of steel as construction material
- symmetrical design therefore optionally clockwise or anticlockwise operation by easy shifting of the shaft
- no lubricant in the working chamber
- compact design, small size
- option for internal evaporation cooling, thereby omission of additional external cooling for the operating liquid
- wide effective speed range from 800 to 1600 rpm
- weight-saving construction
- leak proof shaft seal, optionally: Special seal with radial shaft seal ring and gland packing ring or mechanical seal with bellows.

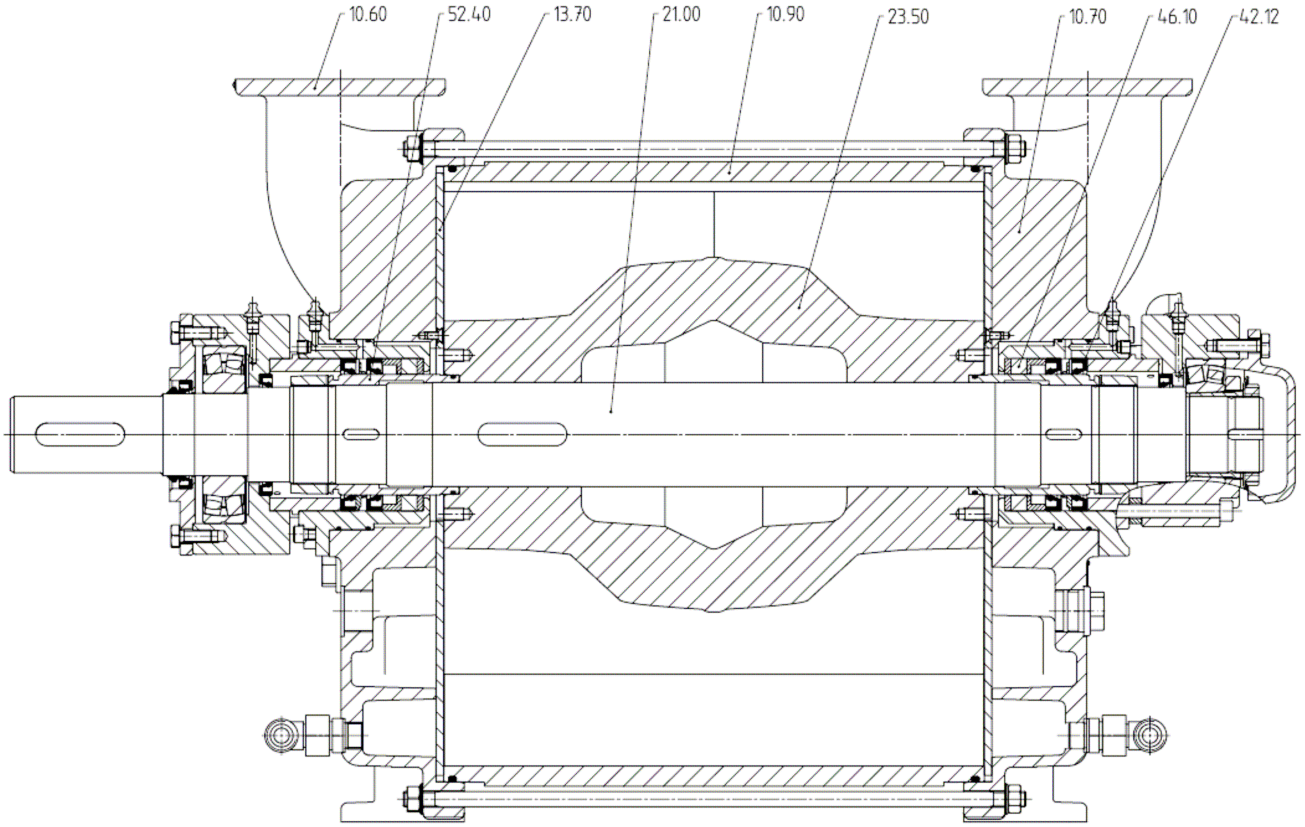
GENERAL TECHNICAL DATA

Pump type		unit	SL 2100	SL 2700	SL 3100
Suction volume flow (at 400 mbar, 1600 rpm and with water vapour saturated air)		m^3/h	2190	2700	3080
Speed	min / max	rpm	1000 / 1600		
Power absorption (at 400 mbar and 1600 rpm)		kW	68	84	94
Power absorption (at 0.5 bar (overpressure) and 1600 rpm)		kW	76	87	103
Moment of inertial of the rotating pump parts and of the water filling (without coupling or pulley)		kg · m²	2.6	3.05	3.5
Sound pressure level (distance 7 m, 200 mbar / 0.5 bar (overpressure)		dB (A)	65 / 67	66 / 68	67 / 69
Max. gas temperature	dry saturated	°C °C	160 80		
Service liquid temperature	min / max	°C	10 / 60		
Liquid volume of the pump (up to shaft mid)		litre	25	30	34
Min. suction pressure at vacuum operation		mbar	150		
Min. admissible pulley of diameter in vacuum operation		mm	236		300
Max. compression pressure in compressor operation		bar (overpressure)	1.5		
Min. admissible pulley of diameter in compressor operation	0.5 bar 1.0 bar 1.5 bar	mm	236 236 300	236 300 350	300 300 400

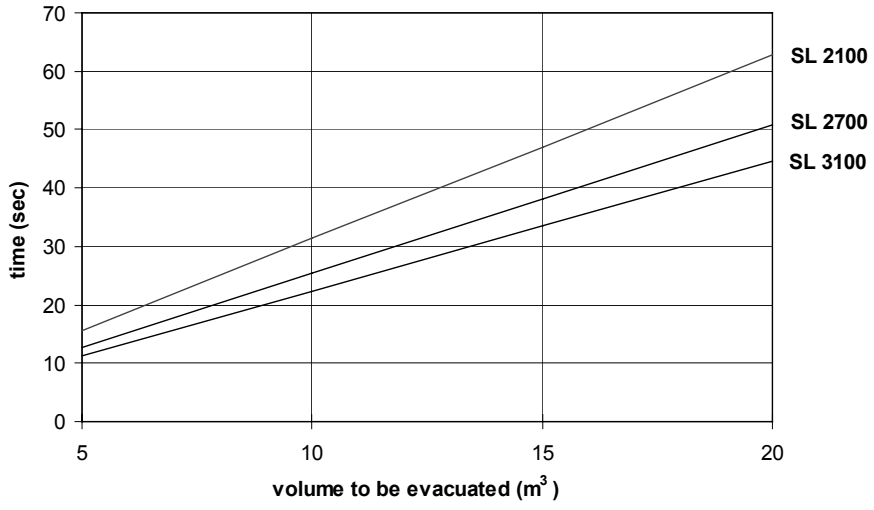
Material design

Item	COMPONENTS	Construction type special seal SL **053** 0B 1	Construction type mechanical seal SL .... **BHE** 0B 1
10.60, 10.70	Vacuum casing	0.6025	
10.90	Central body	1.0038	
13.70	Guide disc	1.4301	
23.50	Vane wheel impeller	0.7043	
21.00	Shaft	1.0503	
52.40	Shaft sleeve	1.4021 (with protective coat against wear)	
42.12, 46.10	Shaft sealing	GORE / Viton-RWDR	-
43.30	Mechanical seal	-	Cr cast / Carbon / Viton

Sectional drawing SL 2100, SL 2700, SL 3100



Evacuation times (from atmosphere to 150 mbar)



Note:
These evacuation times are standard values. The real duration depends on the tightness of the entire system.

Suction volume flow and power absorption SL 2100, SL 2700, SL 3100

The tables show the operating data of the liquid ring vacuum pump under catalogue conditions (pumping gas: water vapour saturated air at 20 °C, service liquid water at 20 °C).

SL 2100		power absorption in kW					
		vacuum operation (p_2 = 1013 mbar)			compressor operation (p_1 = 0 bar)		
speed rpm	suction volume flow m³/h	200 mbar kW	400 mbar kW	600 mbar kW	0.5 bar kW	1.0 bar kW	1.5 bar kW
1600	2190	72	68	64	76	93	110
1400	1930	55	52	48	58	72	
1200	1660	41	38	35	44	58	
1000	1370	30	28	25	32	44	
800	1010	23	20	18	24		

SL 2700		power absorption in kW					
		vacuum operation (p_2 = 1013 mbar)			compressor operation (p_1 = 0 bar)		
speed rpm	suction volume flow m³/h	200 mbar kW	400 mbar kW	600 mbar kW	0.5 bar kW	1.0 bar kW	1.5 bar kW
1600	2700	86	84	83	87	110	136
1400	2400	66	63	62	70	85	
1200	2080	49	47	43	53	66	
1000	1720	36	33	31	38	50	
800	1350	26	24	21	27		

SL 3100		power absorption in kW					
		vacuum operation (p_2 = 1013 mbar)			compressor operation (p_1 = 0 bar)		
speed rpm	suction volume flow m³/h	200 mbar kW	400 mbar kW	600 mbar kW	0.5 bar kW	1.0 bar kW	1.5 bar kW
1600	3080	95	94	93	103	122	145
1400	2700	72	71	70	79	96	
1200	2320	54	51	49	60	74	
1000	1910	39	36	35	43	56	
800	1360	28	26	24	30		

According to the installation and operating conditions (evaporation cooling, speed, pressures, temperatures) there can be variations in the specifications.

Service liquid flow

During operation the pump must continuously be supplied with water out of the separator, in order to eliminate the heat resulting from the gas compression and to replenish the liquid ring, because part of the liquid is leaving the pump together with the gas.
There are two possibilities for the cooling of the service liquid:
a) air / water cooler with circulating pump
b) internal evaporation cooling

A level switch in the separator releases an alarm, if the service liquid level falls below the minimum (about 1/5 of the separator volume), then the circulating pump is switched on.

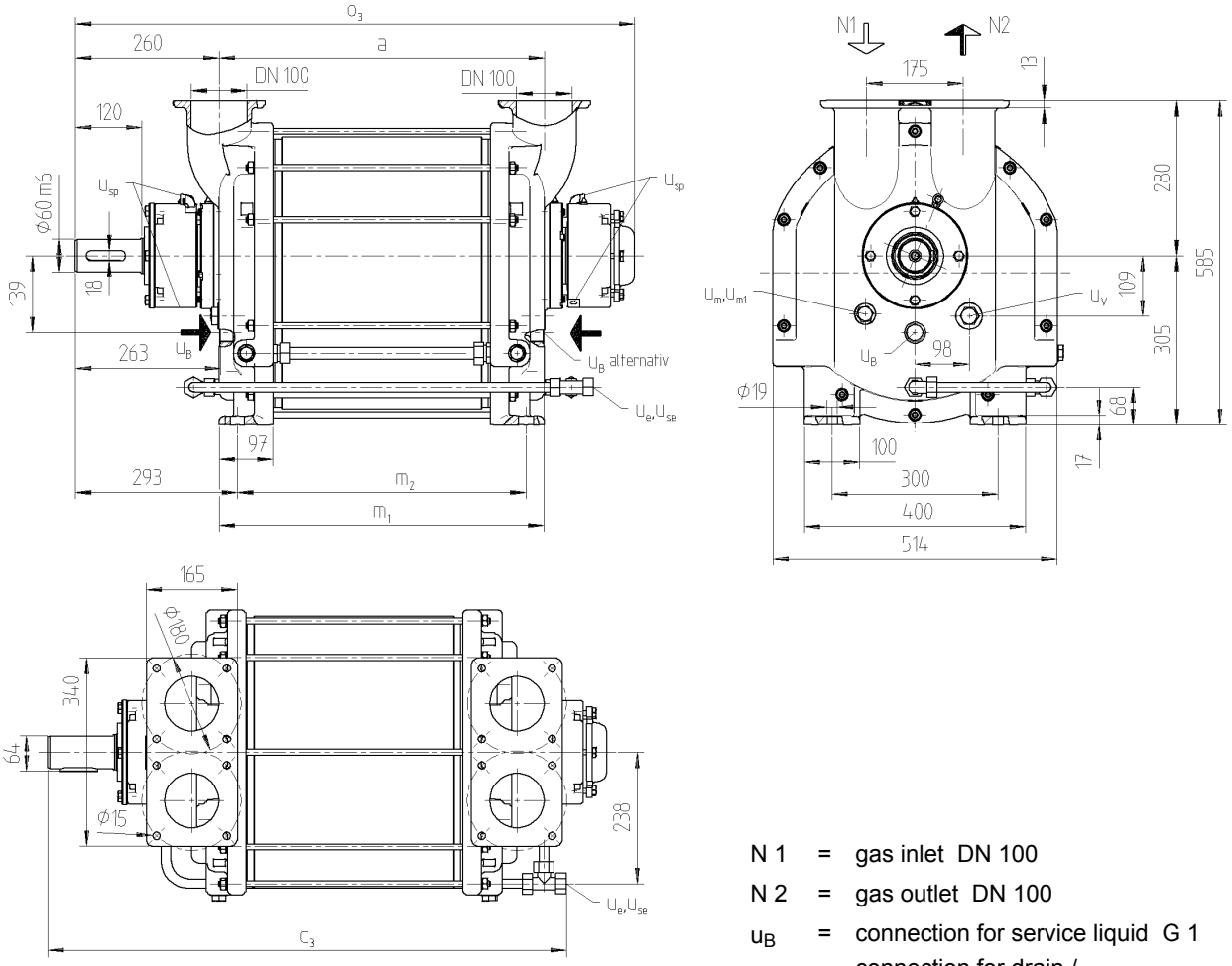
pump:	speed rpm	Service liquid flow in m³/h					
		vacuum operation (p_2 = 1013 mbar)			compressor operation (p_1 = 0 bar)		
		200 mbar	400 mbar	600 mbar	0.5 bar	1.0 bar	1.5 bar
SL 2100	800 ... 1600	4.1	3.4	2.7	2.9	4.6	6.0
SL 2700							
SL 3100							

Service liquid flow dependent on the suction/compression pressure.

The indicated values refer to standard applications where the service liquid is supplied under compression pressure p_2 (atmospheric pressure in case of vacuum operation).

In case of circulating liquid operation when using a liquid pump the values must not be lower than the indicated values.

Dimensions SL 2100, SL 2700, SL 3100



	a [mm]	g [mm]	m 1 [mm]	m 2 [mm]	o 3 [mm]	q 3 [mm]	approx. weight [kg]
SL 2100	463	459	462	396	886	809	315
SL 2700	533	529	532	466	956	879	335
SL 3100	588	584	587	521	1011	934	365

N 1 = gas inlet DN 100

N 2 = gas outlet DN 100

u_B = connection for service liquid G 1

$u_{e,se}$ = connection for drain / dirt drain 18 x 1 (Ermeto)

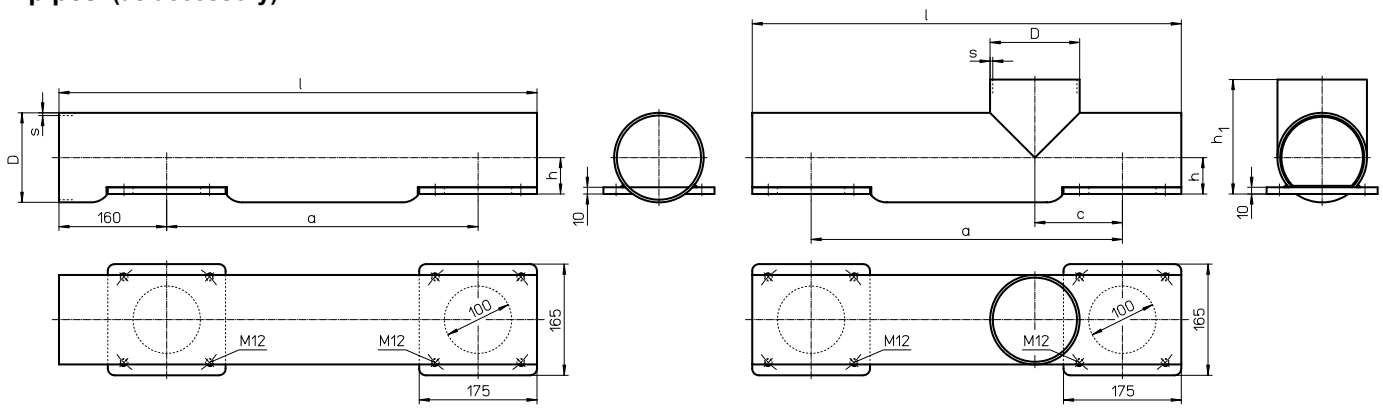
u_m = connection for pressure gauge G 1

u_{m1} = connection for drainage valve or liquid level sensor G 1

u_{sp} = connection for flushing gas G ¼

u_v = connection for evaporation cooling G 1¼

Y-pipes (as accessory)

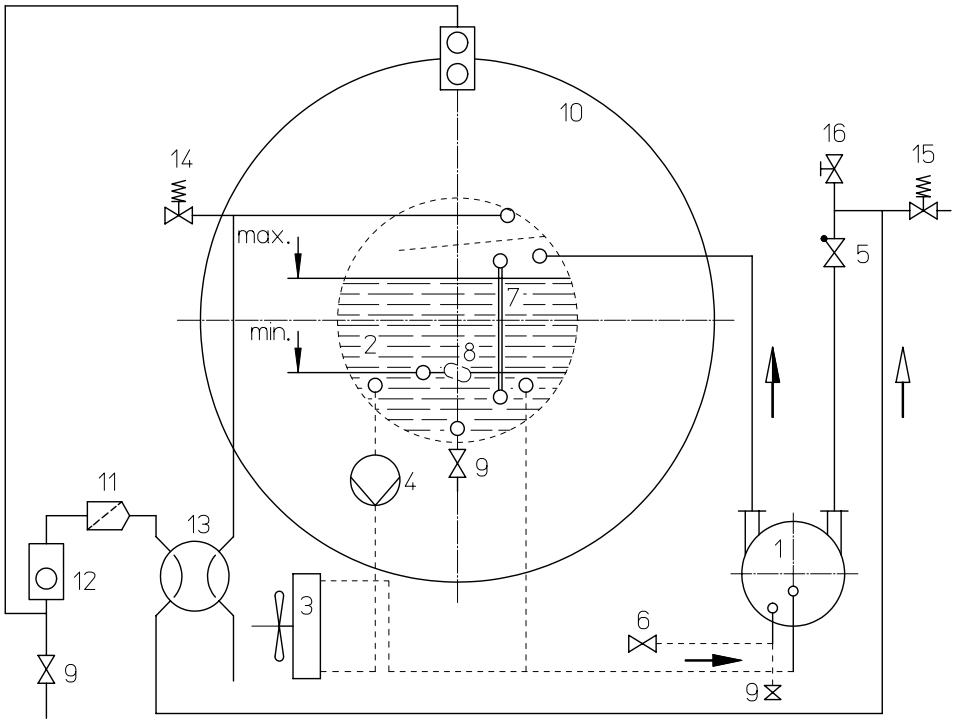


	D [mm]	a [mm]	h [mm]	l [mm]	s [mm]	approx. weight [kg]
SL 2100	133	463	54	710	4	12
SL 2700		533		780		13
SL 3100	159	588	72	835	4.5	18

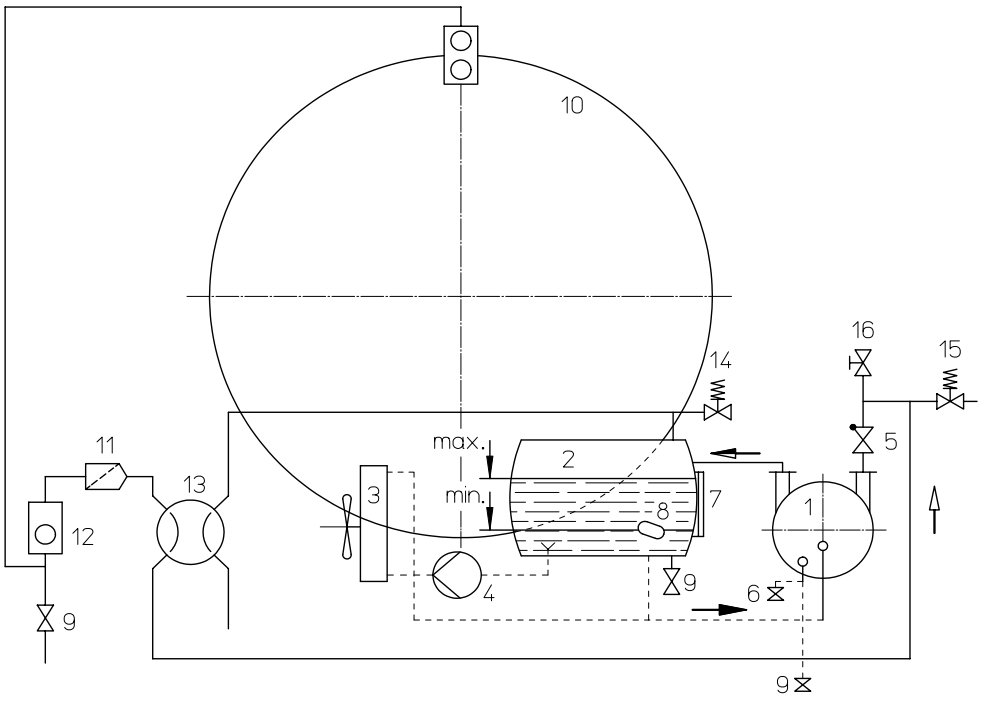
	D [mm]	a [mm]	c [mm]	h [mm]	h 1 [mm]	l [mm]	s [mm]	approx. weight [kg]
SL 2100	133	463	130	54	170	638	4	13
SL 2700		533	150			708		14
SL 3100	159	588	180	72	195	763	4.5	20

(Including each 8 studs M12 x 25, 8 hexagonal nuts M12 and 2 flat gaskets DN 100)

Circuit diagram - waste disposal vehicle with fixed suction tank



Circuit diagram - waste disposal vehicle with tiltable suction tank



1 liquid ring vacuum pump
2 separator
3 water / air cooler
4 circulating pump
5 non-return valve
6 dirt drain
7 liquid level
8 low level switch for water
9 drain
10 suction tank
11 strainer
12 prevention against liquid inflow into the suction line (with floating ball)
13 4-way cock
14 safety valve
15 vacuum limiting valve

Data regarding the pump size - order notes

range + size	bearings + direction of rotation	shaft seal	materials	casing sealing
	B• two antifriction bearings E• two antifriction bearings and evaporation cooling •O anticlockwise pump •N clockwise pump	053 special sealing BHE mechanical seal	0B Main parts of cast iron, without non-ferrous metal	1 O-ring sealing
SL B 2100 SL B 2700 SL B 3100	BO, BN, EO, EN	053, BHE	0B	1

Example for ordering:

The construction size SL B 2700 with anticlockwise rotating and special sealing has the complete order number: **SL B 2700 BO 053 0B 1**

Accessories

Recommended accessories			SL 2100	SL 2700	SL 3100
Y-pipe (incl. seals and screws) 1.0254	horizontal pipe connection	DN 100	20 044 481	20 044 482	20 044 483
	vertical pipe connection	DN 100	20 045 275	20 045 276	20 045 277
Non-return valve		DN 100 DN 125 DN 150	on request		
Vacuum ventilation valve		G 1¼ 2,5 kg	43 030 841		
		G 1½ 3,0 kg		43 029 810	
1.4021		G 2 3,5 kg			43 026 652
Safety valve		DN 40 DN 50 DN 65	on request		
Liquid separator	recommended min. water supply		300 l	400 l	500 l
Three- and four-way valves with safety hand lever		DN 125 DN 150	on request		
Maintenance accessories	grease gun		on request		
	grease cartridge	400 g	on request		
	filter bag 300 / 290mm	(for hanging up into a water bucket)	43 025 692		
	packing worm		on request		
	sealing compound	310 ml	43 016 381		

Any changes in the interest of the technical development are reserved.