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Love Each Other

VERTICAL MULTISTAGE CENTRIFUGAL PUMPS

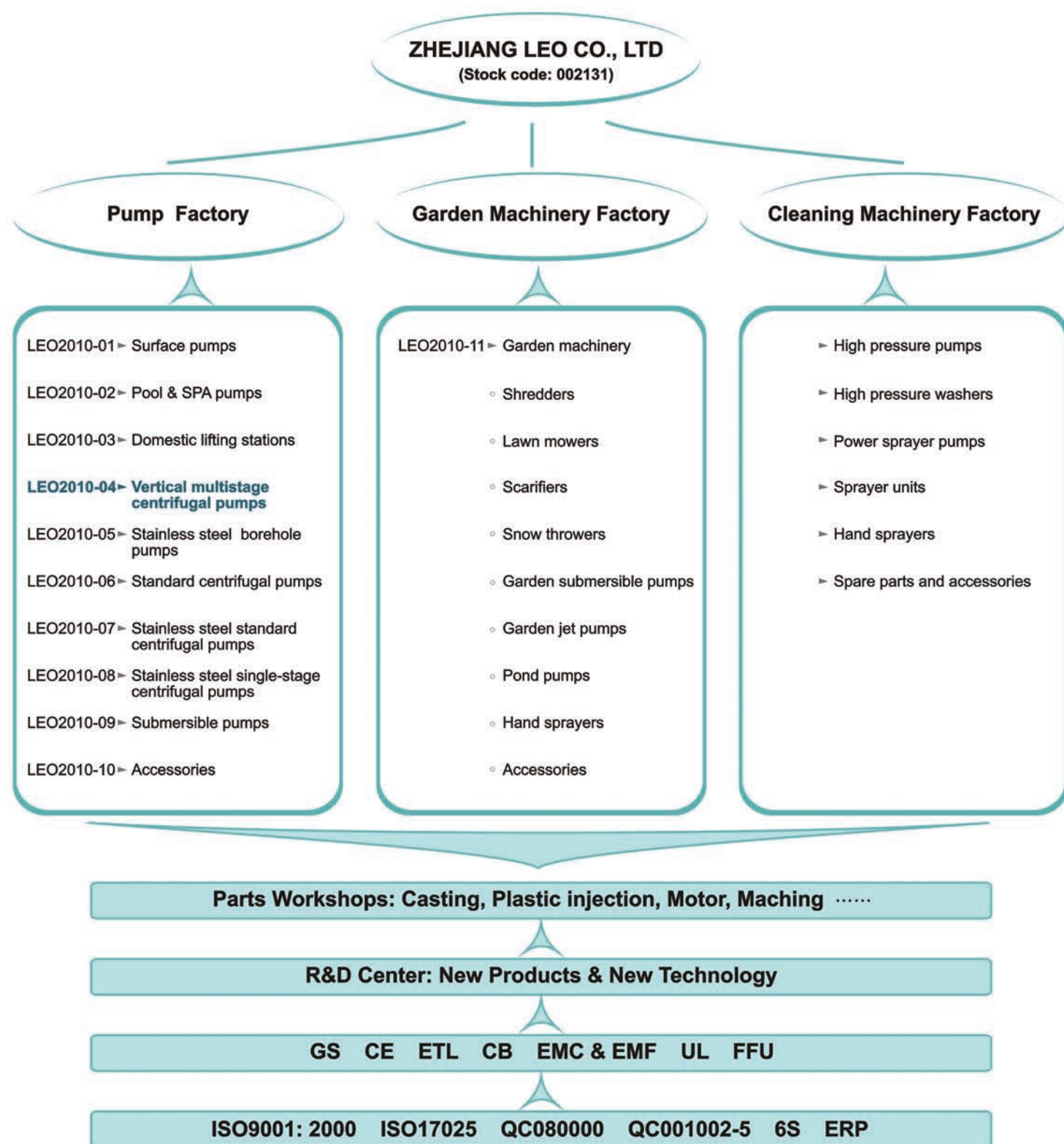
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COMPANY PROFILE



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APPLICATIONS

LVR(S) series, vertical multistage centrifugal pump, is suitable for transferring liquids of low viscosity, non-inflammable and non-explosive, not containing solid particles or fibers.

- Water supply: water supply & drainage for high-rise buildings, filtration and transfer at waterworks, pressure boosting in main pipe
- Industry: Washing and cleaning systems, boiler feeding, cooling water circulation, water treatment systems, auxiliary system, support equipment
- Water treatment: ultra-filtration systems, reverse-osmosis systems, distillation systems, separators, swimming pools
- Agricultural irrigation: sprinkler irrigation, drip-feed irrigation
- Food & beverage industry
- Fire-fighting system

FEATURES

- Compact, nice appearance, efficient, low noise, reliable seal, easy to use and maintain

OPERATING CONDITIONS

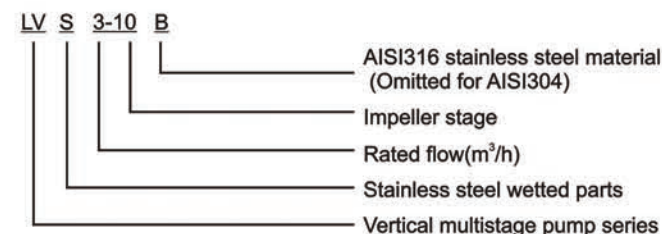
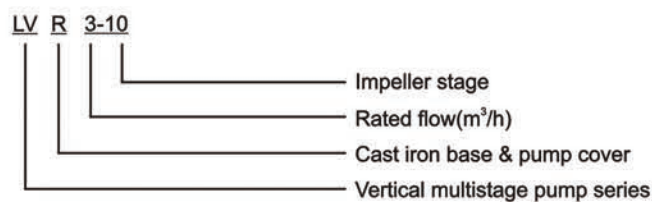
Low viscosity, non-inflammable and non-explosive liquids not containing solid particles or fibers. The liquids must not chemically attack the pump materials. When pumping liquids with a density or viscosity is higher than that of water, a motor with a higher output power rating shall be used.

- Liquid temperature: $-15^{\circ}\text{C} \sim +120^{\circ}\text{C}$
- Flow ranges: $0.4 \sim 28 \text{ m}^3/\text{h}$
- pH: $3 \sim 9$
- Max. ambient temperature: $+40^{\circ}\text{C}$
- Max. operation pressure: 25bar
- Altitude: up to 1000m

MOTOR

- Totally enclosed & fan-cooled motor
 - Protection class: IP 55
 - Standard voltage: 50Hz
- | | |
|--|--------------------|
| | 1X220-230/240V |
| | 3X200-220/346-380V |
| | 3X220-240/380-415V |
| | 3X380-415V |

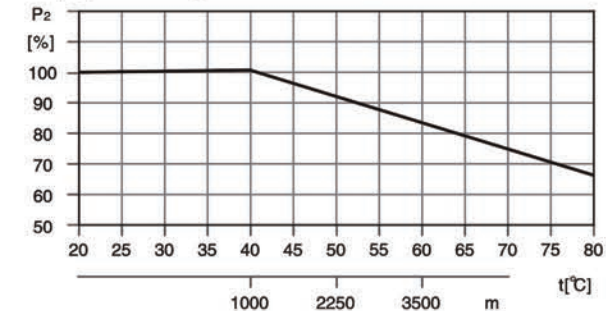
IDENTIFICATION CODES



AMBIENT TEMPERATURE

Max. ambient temperature: $+40^{\circ}\text{C}$. Ambient temperature above 40°C or installation at altitude of more than 1000 meters above sea level require the use of an oversize motor. Because of low air density and poor cooling effects, the motor output power P_2 will be decreased. See the picture.

In such cases, it may be necessary to use a motor with a higher output power rating.



For example, when the pump is installed at altitude of more than 3500 meters above seal level, P_2 will be decreased to 88%. When the ambient temperature is 70°C , P_2 will be decreased to 78%.

MINIMUM INLET PRESSURE-NPSH

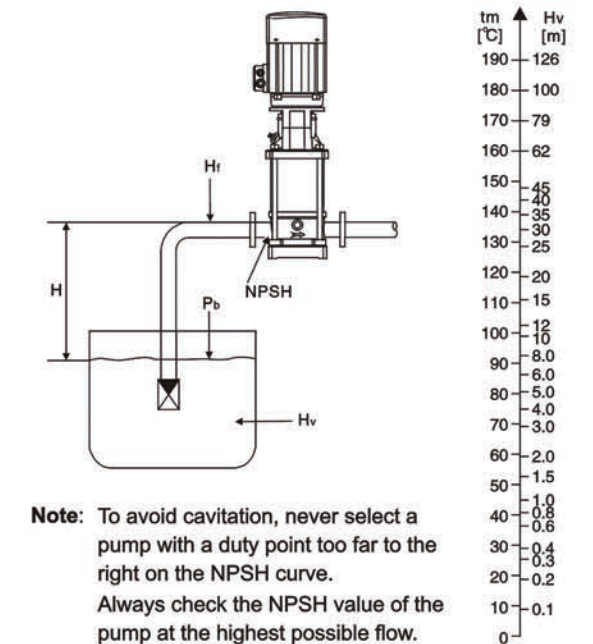
Calculation of the inlet pressure "H" is recommended in these situations:

- The liquid temperature is high.
- The flow is significantly higher than the rated flow.
- Water is drawn from depths.
- Water is drawn through long pipes.
- Inlet conditions are poor.

To avoid cavitation, make sure that there is a minimum pressure on the suction side of the pump. The maximum suction lift "H" in meters head can be calculated as follows:

H	= $P_b \times 10.2 - \text{NPSH} - H_f - H_v - H_s$
P_b	= Barometric pressure in bar. (Barometric pressure can be set to 1 bar). In closed systems, P_b indicates the system pressure in bar.
NPSH	= Net Positive Suction Head in meters head. (To be read from the NPSH curve at the highest flow the pump will be delivering.)
H_f	= Friction loss in suction pipe in meters head. (At the highest flow the pump will be delivering.)
H_v	= Vapor pressure in meters head. (To be read from the vapor pressure scale. " H_v " depends on the liquid temperature "tm")
H_s	= Safety margin=minimum 0.5 meters head.

If the "H" calculated is positive, the pump can operate at a suction lift of maximum "H" meters head.
If the "H" calculated is negative, an inlet pressure of minimum "H" meters head is required.



Note: To avoid cavitation, never select a pump with a duty point too far to the right on the NPSH curve. Always check the NPSH value of the pump at the highest possible flow.

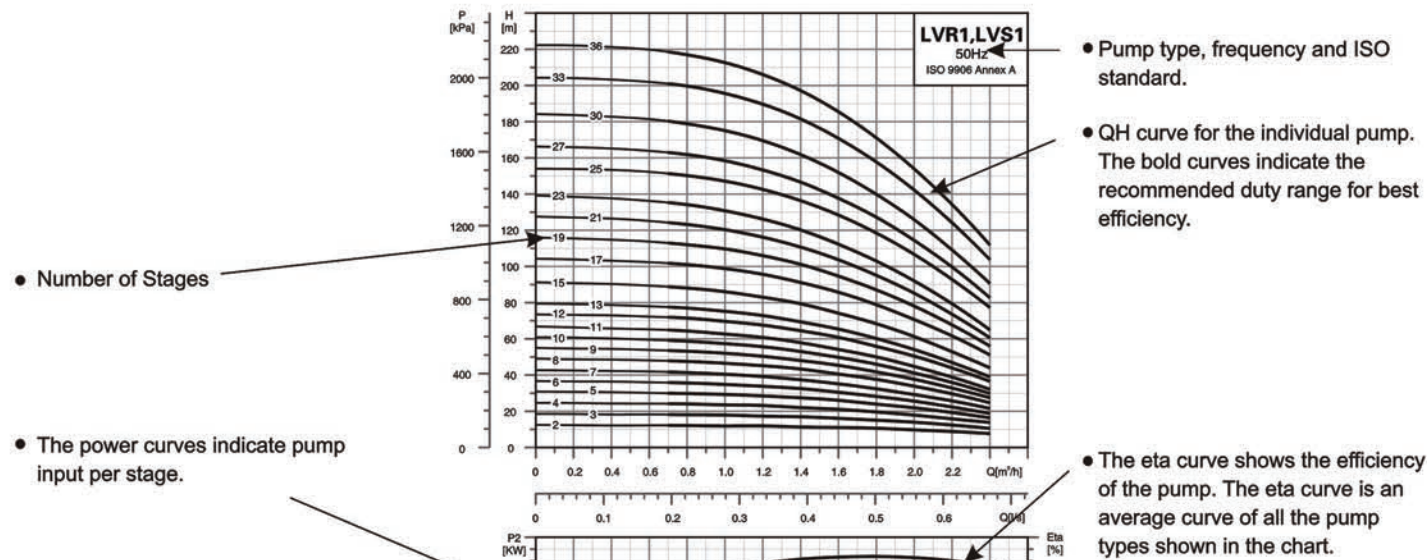
MAXIMUM INLET PRESSURE

The following table shows the maximum permissible inlet pressure. However, the current inlet pressure + the pressure against a closed valve must always be lower than the Max. permissible operating pressure.

If the maximum permissible operating pressure is exceeded, the bearing in the motor may be damaged and the life of the shaft seal reduced.

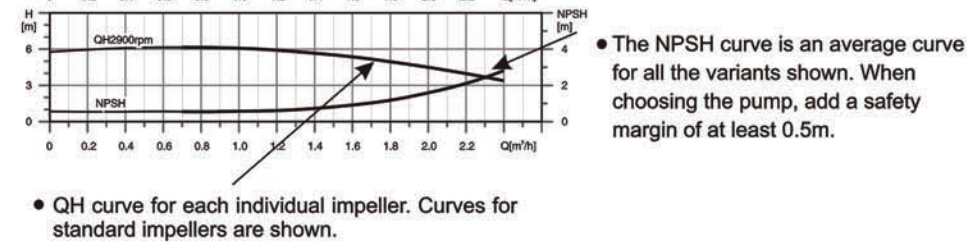
Pump Type	Maximum Inlet Pressure
LVR1,LVS1	10[bar]
LVR3,LVS3	
3-2 → 3-29	10[bar]
3-31 → 3-26	15[bar]
LVR5,LVS5	
5-2 → 5-16	10[bar]
5-18 → 5-29	15[bar]
LVR10,LVS10	
10-1 → 10-6	8[bar]
10-7 → 10-22	10[bar]
LVR15,LVS15	
15-1 → 15-3	8[bar]
15-4 → 15-17	10[bar]
LVR20,LVS20	
20-1 → 20-3	8[bar]
20-4 → 20-17	10[bar]

HOW TO READ THE CURVE CHARTS



GUIDELINES TO PERFORMANCE CURVES

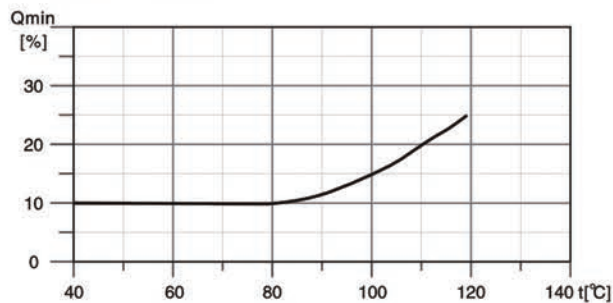
- Tolerances to ISO 9906, Annex A.
- Measurements have been made with airless water at a temperature of 20°C and kinematic viscosity of 1mm²/s.
- To avoid overheating of the motor, the pump should not be used against a high head for a long time.



MINIMUM FLOW RATE

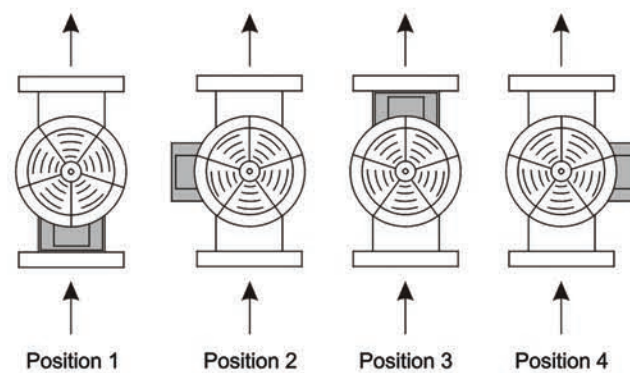
Due to the risk of overheating, the pump should not be used at a flow below the minimum flow rate. The curve below shows the minimum flow rate as a percentage of the nominal flow rate in relation to the liquid temperature.

Air cooling apparatus



Note: The outlet valve must be opened when the pump is in operation.

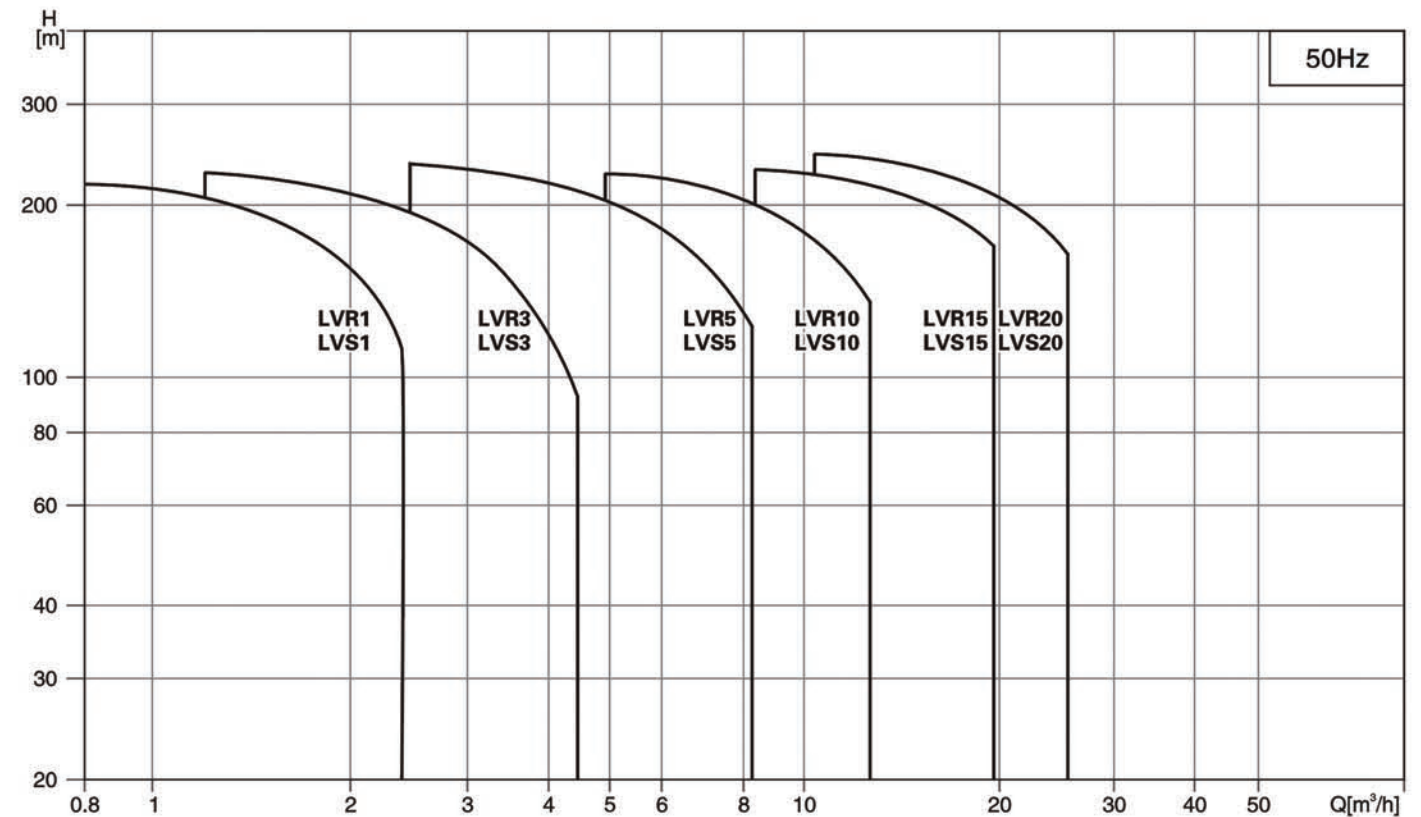
TERMINAL BOX POSITIONS (Note: set to position 1 before delivery)



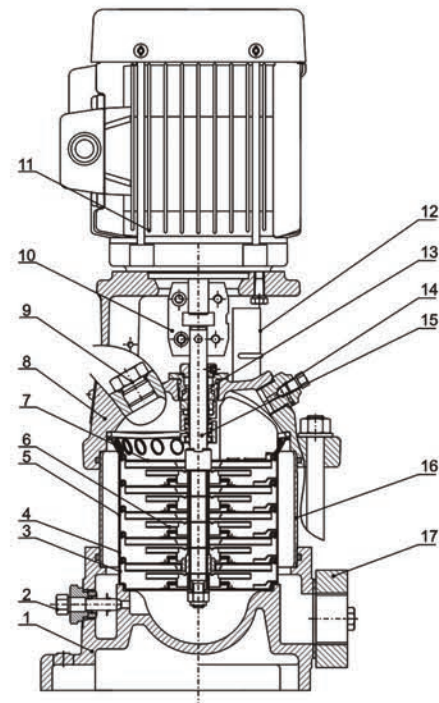
PRODUCT RANGE

MODEL	LVR(S)1		LVR(S)3		LVR(S)5		LVR(S)10		LVR(S)15		LVR(S)20	
	LVR1	LVS1	LVR3	LVS3	LVR5	LVS5	LVR10	LVS10	LVR15	LVS15	LVR20	LVS20
Rated flow [m ³ /h]	1.0		3.0		5.0		10		15		20	
Flow range[m ³ /h]	0.6~2.4		1.2~4.5		2.5~8.5		5~13		8~23		10.5~29	
Max. pressure [bar]	16	25	16	25	16	25	25	25	25	25	25	25
Motor power [kW]	0.37~2.2		0.37~3.0		0.37~4.0		0.37~7.5		1.1~15		1.1~18.5	
Temperature Range[°C]	-20 ~ +120(Note: Both the Max. permissible pressure and liquid temperature range refer to the pump capacity.)											
Max. pump efficiency [%]	45		55		60		65		70		72	
Pipe connection												
Oval flange	•		•		•							
DIN flange		•		•		•		•		•		•
Inlet/Outlet	G1	32	G1	32	G1	32	42	42	65	65	65	65

SCOPE OF PERFORMANCE-LVR,LVS

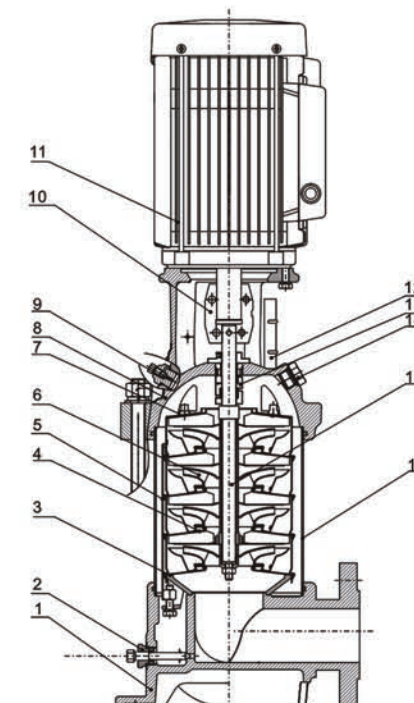


CROSS SECTION



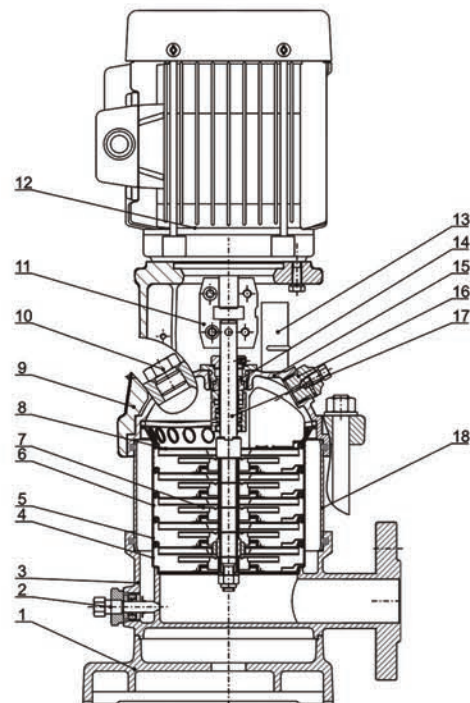
MODEL: LVR1(3,5)

Part	Material	
1	Base	HT200
2	Drainage plug assembly	AISI304
3	Primary diffuser	AISI304
4	Diffuser with bearing	AISI304
5	Medium diffuser	AISI304
6	Impeller	AISI304
7	Final diffuser	AISI304
8	Motor base	HT200
9	Filling plug	AISI304
10	Coupling	Iron based powder metallurgy
11	Motor	
12	Guarding plate	AISI304
13	Cartridge seal	
14	Vent plug assembly	AISI304
15	Pump shaft	AISI304
16	Pump barrel	AISI304
17	Oval flange	HT200



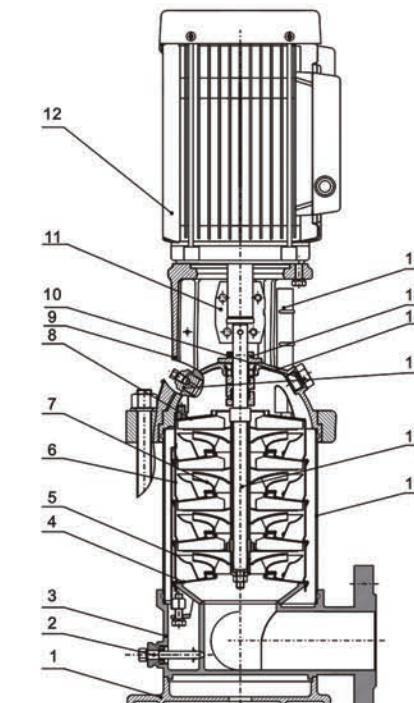
MODEL: LVR10(15,20)

Part	Material	
1	Base	HT200
2	Drainage plug assembly	AISI304
3	Primary diffuser	AISI304
4	Diffuser with bearing	AISI304
5	Medium diffuser	AISI304
6	Impeller	AISI304
7	Final diffuser	AISI304
8	Motor base	HT200
9	Filling plug	AISI304
10	Coupling	Iron based powder metallurgy
11	Motor	
12	Guarding plate	AISI304
13	Cartridge seal	
14	Vent plug assembly	AISI304
15	Pump shaft	AISI304
16	Pump barrel	AISI304



MODEL: LVS1(3,5)

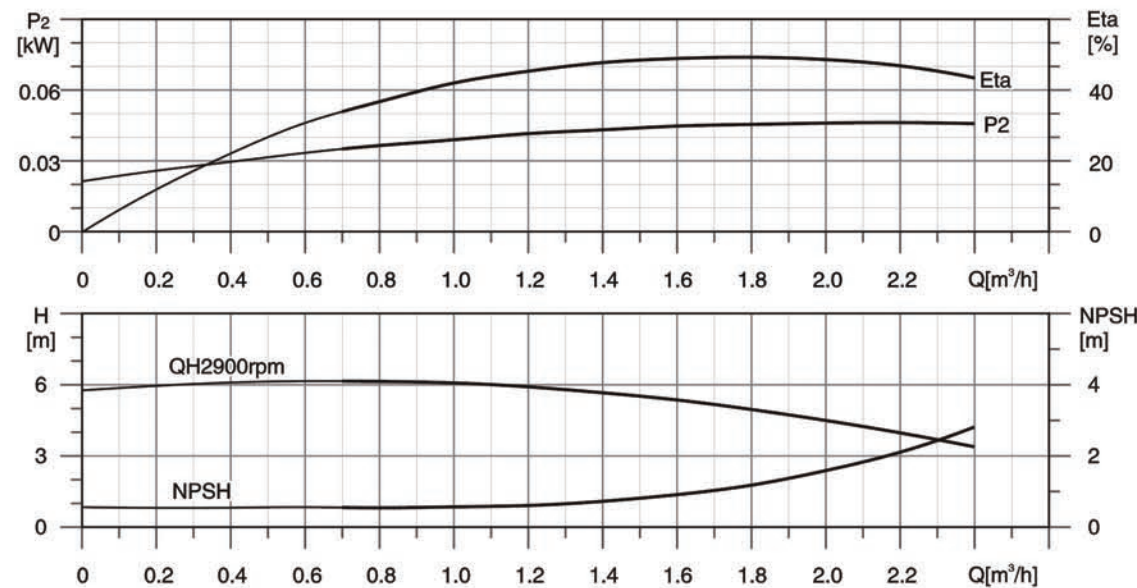
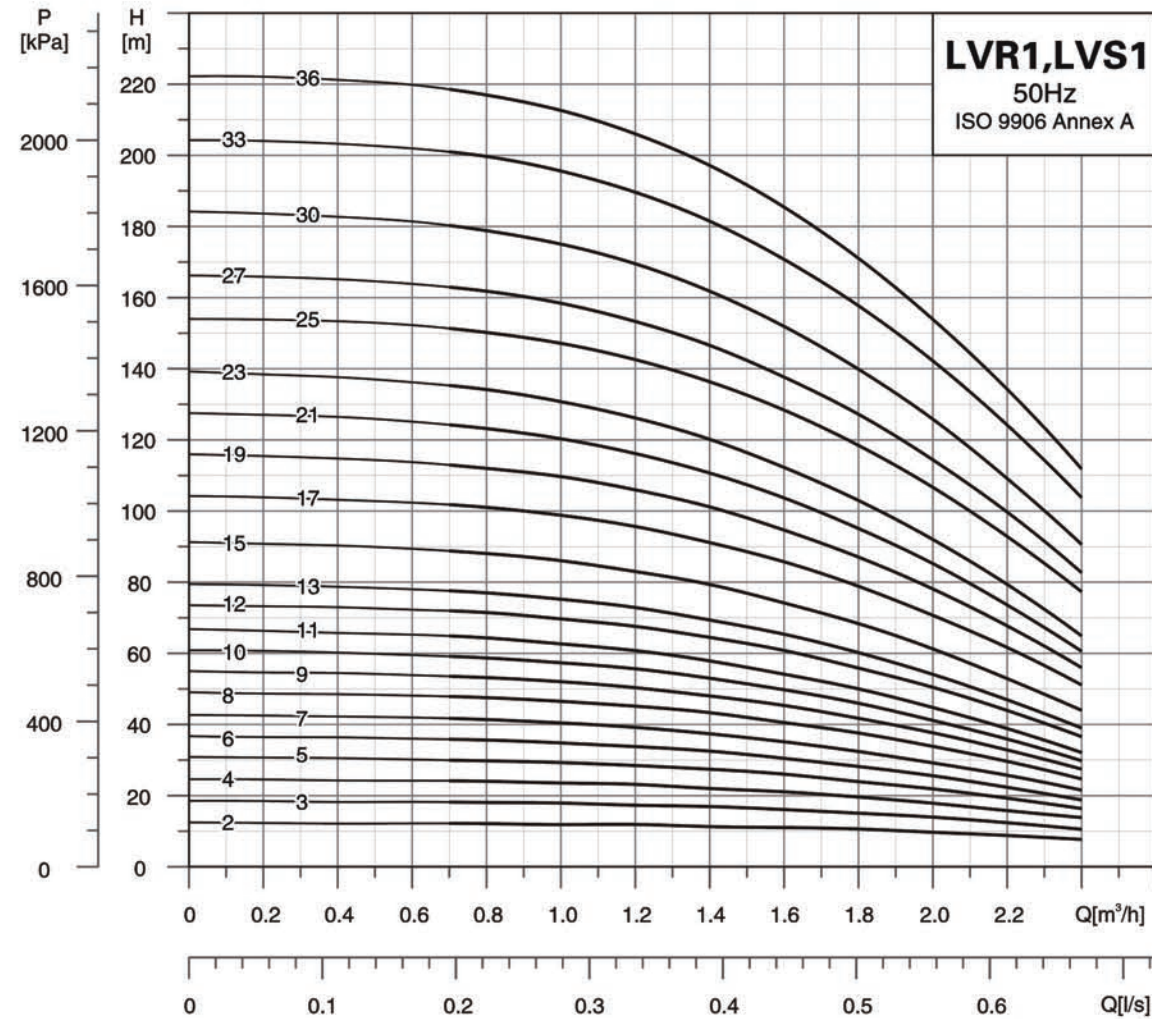
Part	Material	Optional Material	
1	Base plate	HT200	
2	Drainage plug assembly	AISI304	AISI316
3	Chasis	ZG304	ZG316
4	Primary diffuser	AISI304	AISI316
5	Diffuser with bearing	AISI304	AISI316
6	Medium diffuser	AISI304	AISI316
7	Impeller	AISI304	AISI316
8	Final diffuser	AISI304	AISI316
9	Motor base	HT200	
10	Filling plug	AISI304	AISI316
11	Coupling	Iron based powder metallurgy	
12	Motor		
13	Guarding plate	AISI304	
14	Cartridge seal		
15	Pump cover	ZG304	ZG316
16	Vent plug assembly	AISI304	AISI316
17	Pump shaft	AISI304	AISI316
18	Pump barrel	AISI304	AISI316



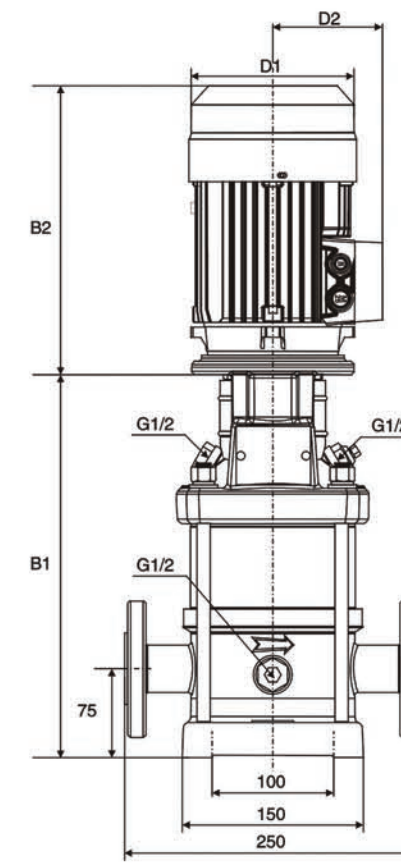
MODEL: LVS10(15,20)

Part	Material	Optional Material	
1	Base plate	HT200	
2	Drainage plug assembly	AISI304	AISI316
3	Chasis	ZG304	ZG316
4	Primary diffuser	AISI304	AISI316
5	Diffuser with bearing	AISI304	AISI316
6	Medium diffuser	AISI304	AISI316
7	Impeller	AISI304	AISI316
8	Final diffuser	AISI304	AISI316
9	Motor base	HT200	
10	Filling plug	AISI304	AISI316
11	Coupling	Iron based powder metallurgy	
12	Motor		
13	Guarding plate	AISI304	
14	Cartridge seal		
15	Pump cover	ZG304	AISI316
16	Vent plug assembly	AISI304	AISI316
17	Pump shaft	AISI304	AISI316
18	Pump barrel	AISI304	AISI316

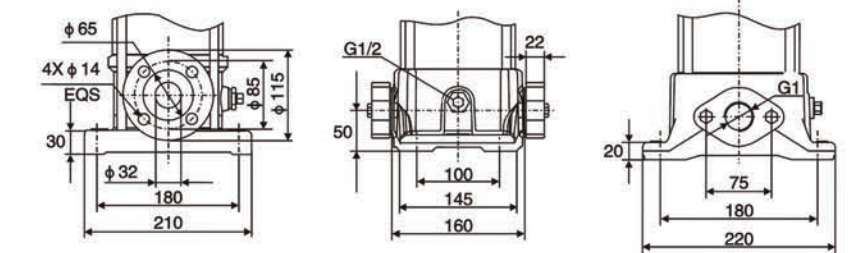
HYDRAULIC PERFORMANCE CURVES



DIMENSION DRAWING

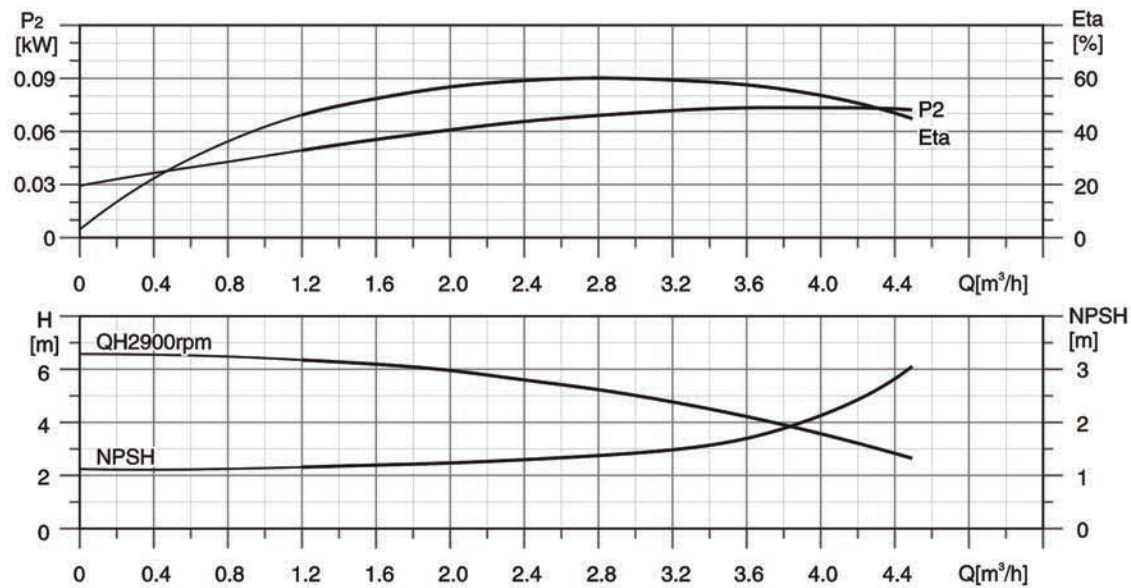
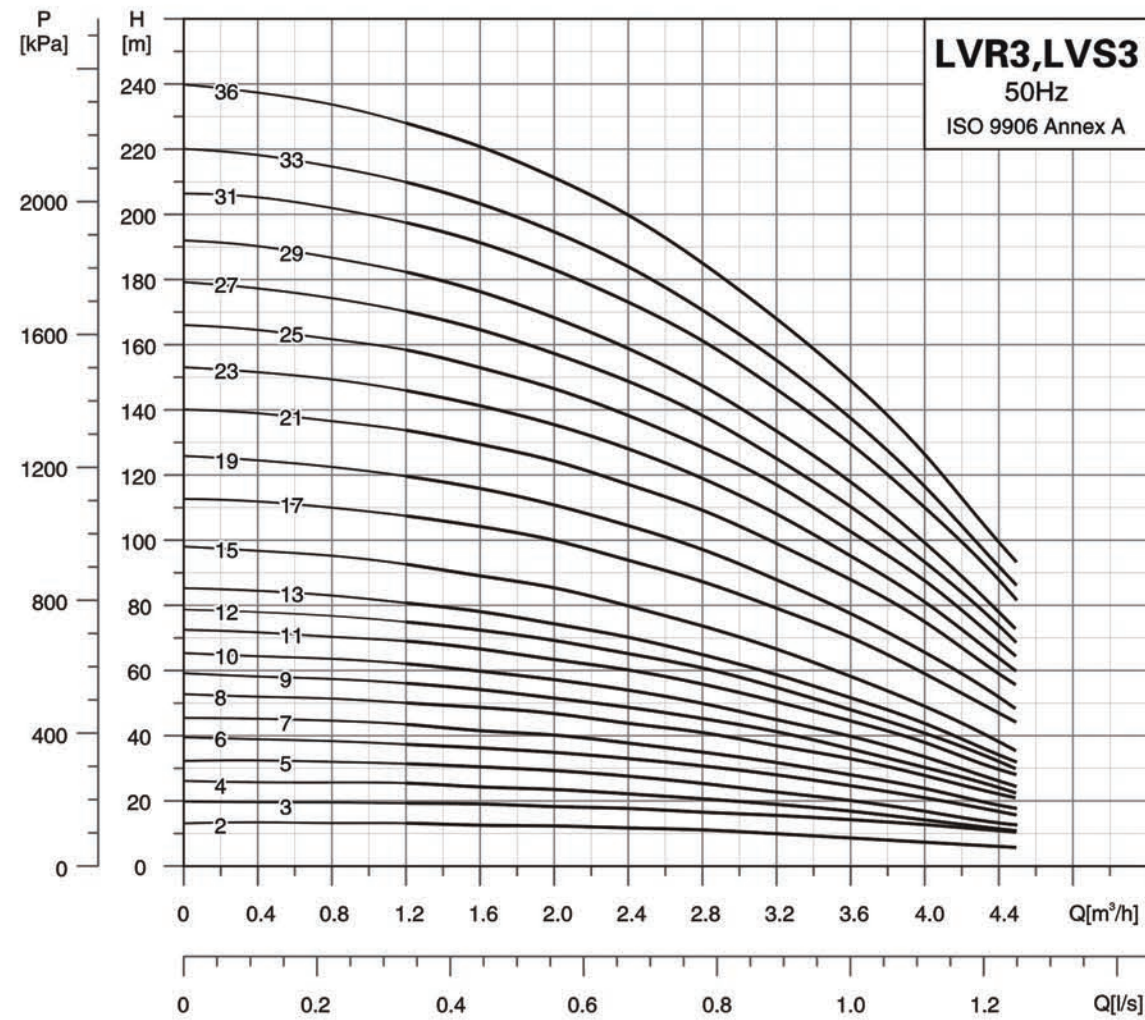


MODEL	OVAL FLANGE(LVR)		DIN FLANGE(LVS)		D1	D2
	B1	B1+B2	B1	B1+B2		
1-2	238	468	264	494	136	109
1-3	256	486	282	512	136	109
1-4	274	504	300	530	136	109
1-5	292	522	318	548	136	109
1-6	310	540	336	566	136	109
1-7	328	558	354	584	136	109
1-8	346	576	372	602	136	109
1-9	364	594	390	620	136	109
1-10	382	612	408	638	136	109
1-11	400	630	426	656	136	109
1-12	422	672	448	698	155	124
1-13	440	690	466	716	155	124
1-15	476	726	502	752	155	124
1-17	512	762	538	788	155	124
1-19	548	798	574	824	155	124
1-21	584	834	610	860	155	124
1-23	620	870	646	896	155	124
1-25	672	982	698	1008	175	137
1-27	708	1018	734	1044	175	137
1-30	762	1072	788	1098	175	137
1-33	816	1126	842	1152	175	137
1-36	870	1180	896	1206	175	137

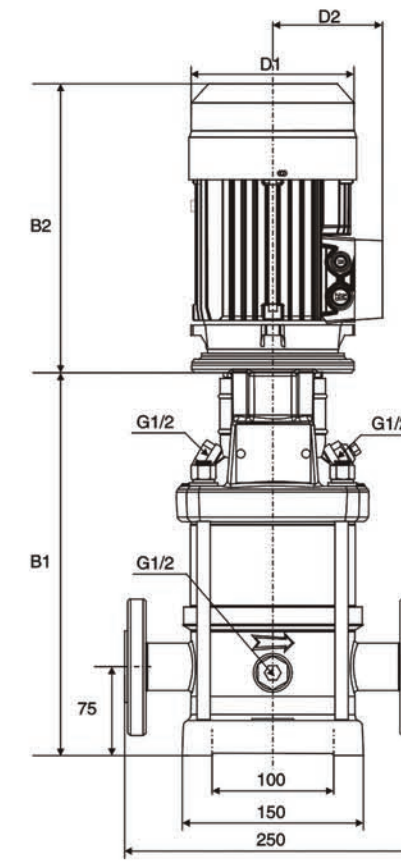


MODEL	POWER [kW]	Q[m³/h]	0.4	0.6	0.8	1.0	1.2	1.4	1.6	1.8	2.0
1-2	0.37	H(m)	12	12	12	12	12	11.5	11	10.5	10
1-3	0.37		18	18	18	18	17.5	17	16	15	14
1-4	0.37		24.5	24	24	23.5	22.5	22	21	19.5	18
1-5	0.37		30.5	30	30	29.5	28.5	27.5	26	24	22
1-6	0.37		36.5	36	35.5	35	34	32.5	30.5	28	25.5
1-7	0.37		42	42	41.5	41	39	37.5	35	32.5	30
1-8	0.55		48.5	48	47.5	46.5	45	43.5	40.5	37.5	34
1-9	0.55		54.5	54	53	52	50.5	48	45.5	41.5	37.5
1-10	0.55		60	59.5	58.5	57.5	55.5	53	50	46	41
1-11	0.55		65.5	65	64.5	62.5	61	58	54	50	45
1-12	0.75		73	72.5	71.5	69.5	67.5	64.5	61	55	50.5
1-13	0.75		78.5	78	77	75	73	69.5	65.5	60	54
1-15	0.75	90.5	90	88	86	83	79.5	74	68.5	61	
1-17	1.1	103	102.5	101	99	95.5	91	85	79	70.5	
1-19	1.1	115	114	112	109.5	106	101	94.5	87	78	
1-21	1.1	126.5	125	123	120.5	116	110.5	103.5	95	85	
1-23	1.1	137.5	136	134	131	126	120	112.5	103.5	92	
1-25	1.5	153.5	152.5	150	147	142.5	136.5	128.5	118.5	106.5	
1-27	1.5	165	164	162	158.5	153.5	146.5	137.5	127	114.5	
1-30	1.5	182.5	181.5	178	175	169.5	162	152	140	126	
1-33	2.2	203	202	199.5	195.5	189.5	181.5	170.5	157.5	142	
1-36	2.2	221	220	217	212.5	206	197	185.5	171	154	

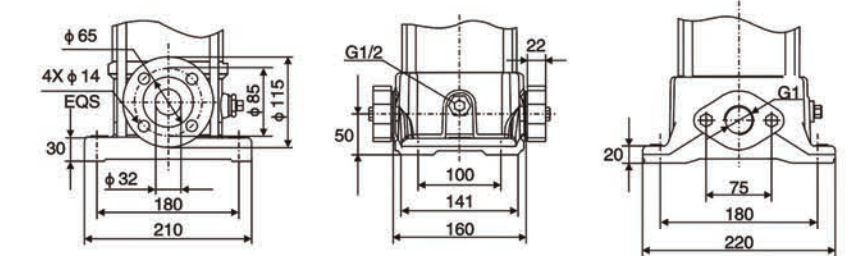
HYDRAULIC PERFORMANCE CURVES



DIMENSION DRAWING

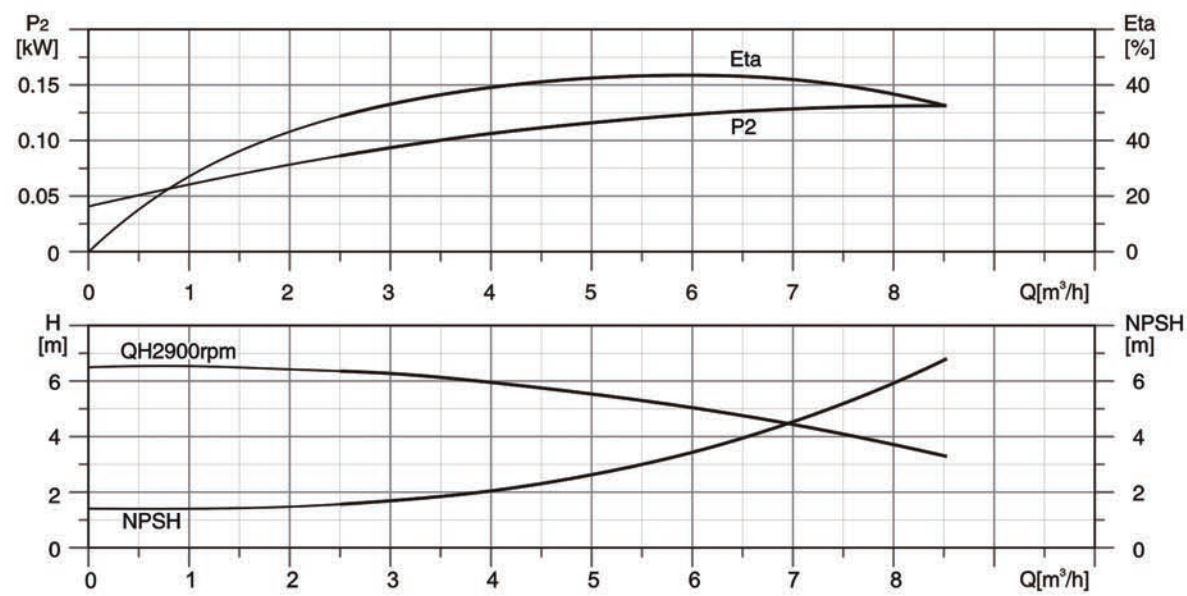
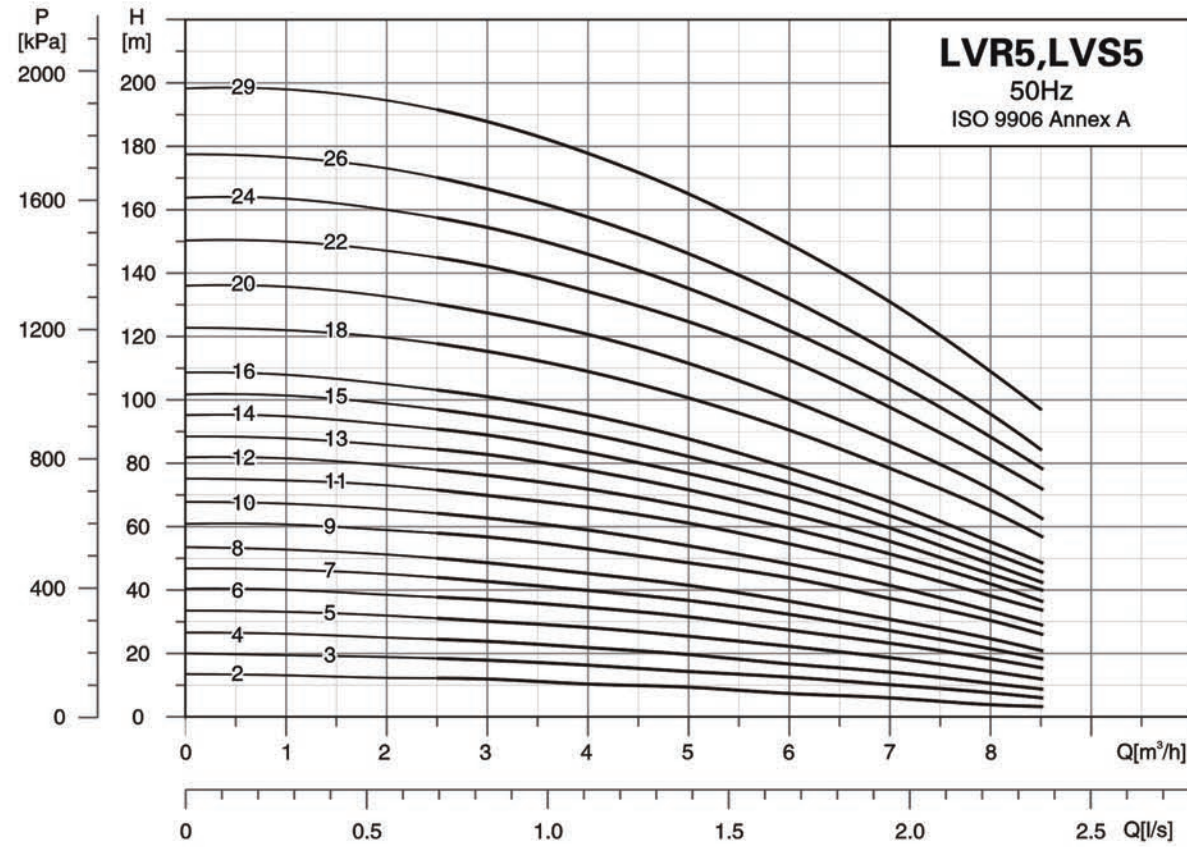


MODEL	OVAL FLANGE(LVR)		DIN FLANGE(LVS)		D1	D2
	B1	B1+B2	B1	B1+B2		
3-2	238	468	264	494	136	109
3-3	256	486	282	512	136	109
3-4	274	504	300	530	136	109
3-5	292	522	318	548	136	109
3-6	310	540	336	566	136	109
3-7	328	558	354	584	136	109
3-8	350	600	376	626	155	124
3-9	368	618	394	644	155	124
3-10	386	636	412	662	155	124
3-11	404	654	430	680	155	124
3-12	422	672	448	698	155	124
3-13	440	690	466	716	155	124
3-15	476	726	502	752	155	124
3-17	528	838	554	864	175	137
3-19	564	874	590	900	175	137
3-21	600	910	626	936	175	137
3-23	636	946	662	972	175	137
3-25	672	982	698	1008	175	137
3-27	708	1018	734	1044	175	137
3-29	744	1054	770	1080	175	137
3-31	784	1114	810	1140	195	151
3-33	820	1150	846	1176	195	151
3-36	874	1204	900	1230	195	151

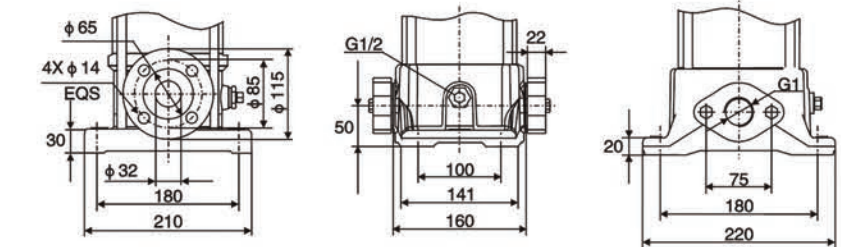
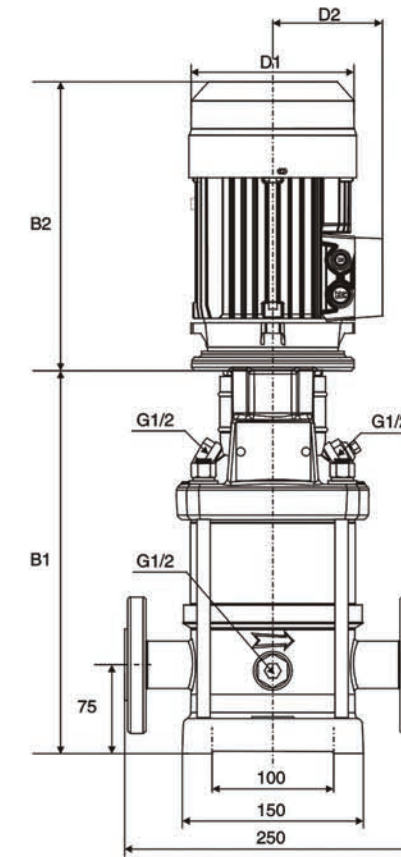


MODEL	POWER [kW]	Q[m³/h]	1.2	1.6	2.0	2.4	2.8	3.2	3.6	4.0
3-2	0.37	H(m)	13	12.5	12.5	11.5	11	10	8.5	7.5
3-3	0.37		19.5	19	18.5	17.5	16.5	15.5	14	12.5
3-4	0.37		25.5	24.5	23.5	22	20.5	17.5	17	14
3-5	0.37		31.5	31	29.5	27.5	25.5	22.5	20	17
3-6	0.55		37.5	36	35	33	30.5	28	24.5	21
3-7	0.55		43.5	40.5	40	37.5	35	31	28	24
3-8	0.75		51	48.5	47	44	41	37	33	28
3-9	0.75		56	54	51.5	48.5	45.5	40.5	36	30.5
3-10	0.75		62	60	57	54	50	45	40	33.5
3-11	1.1		69	66.5	63.5	60	56	50.5	44.5	38
3-12	1.1		75	72.5	69	65	61	55	48	41
3-13	1.1		80.7	78	74.5	70	65	58.5	51.5	44
3-15	1.1		92.5	89	85.5	80	73.5	66.5	58	49
3-17	1.5		107.5	104	100	94	87.5	79	70	59
3-19	1.5		119.5	116	111	104.5	97	88	77.5	65.5
3-21	2.2		133.5	129.5	124.5	117	109	99	88	75
3-23	2.2		146	141.5	135.5	128	119	108	95	81
3-25	2.2		158.5	153	146.5	138	128.5	117	102.5	87.5
3-27	2.2		170	164.5	157.5	148.5	138.5	125	110.5	93.5
3-29	2.2		182.5	176.5	168.5	159	147.5	133.5	118	100
3-31	3.0		197.5	191.5	183	173	161	146.5	128.5	110
3-33	3.0		210	203	194.5	194	170	155	137.5	116.5
3-36	3.0		228	221	211	200	185	168	149	126.5

HYDRAULIC PERFORMANCE CURVES



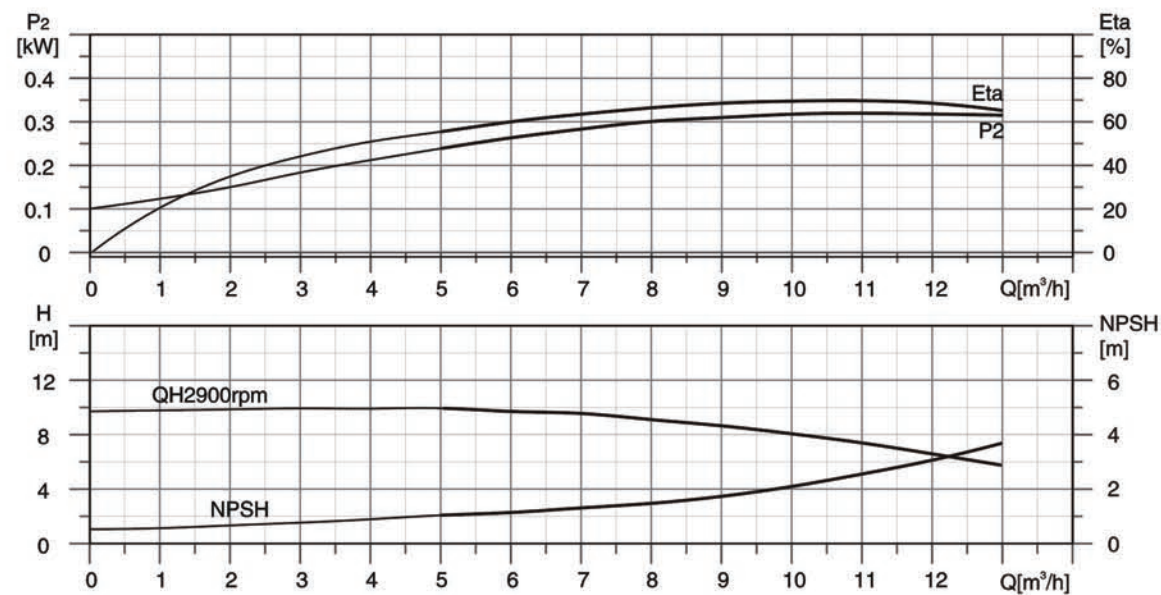
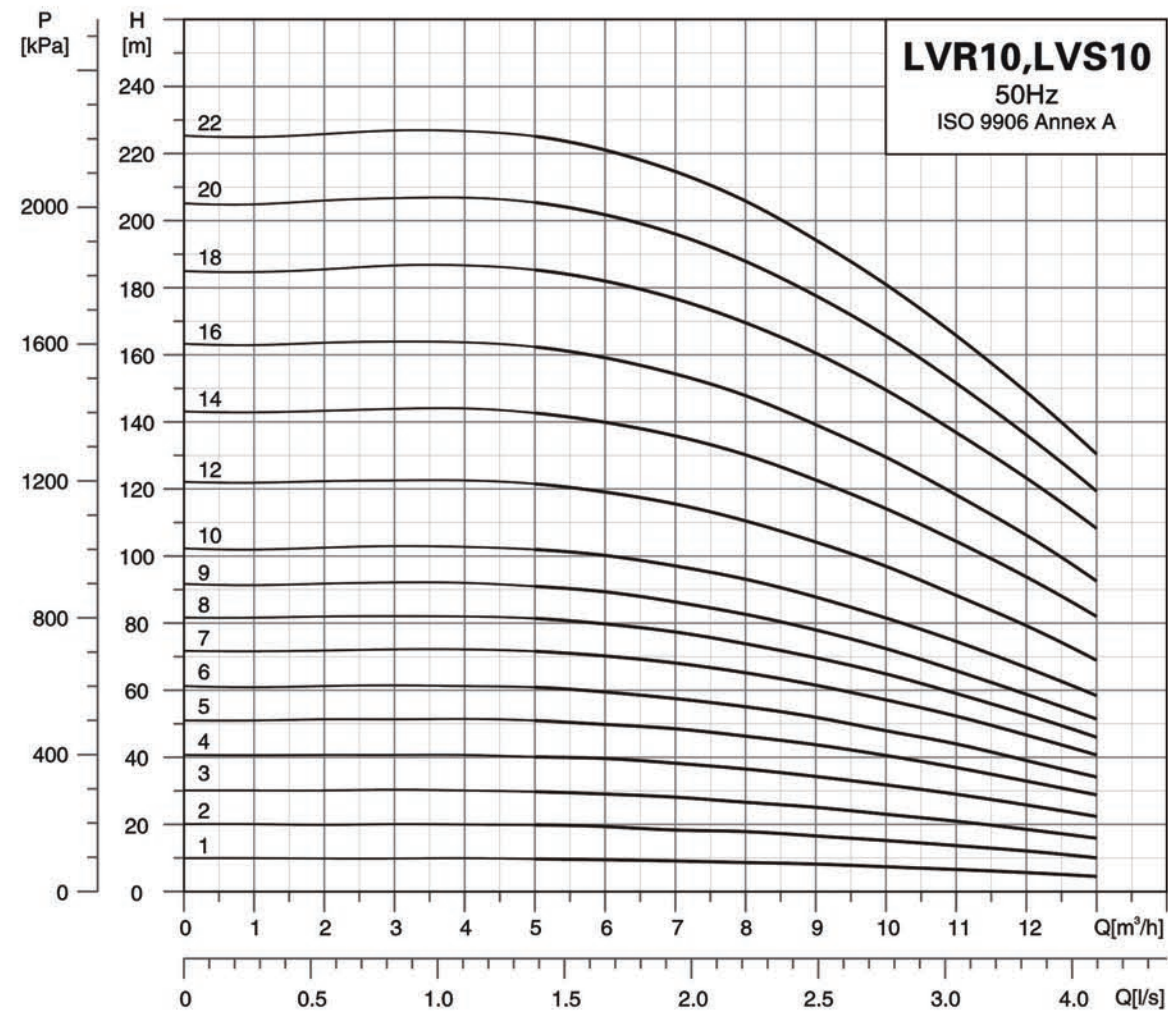
DIMENSION DRAWING



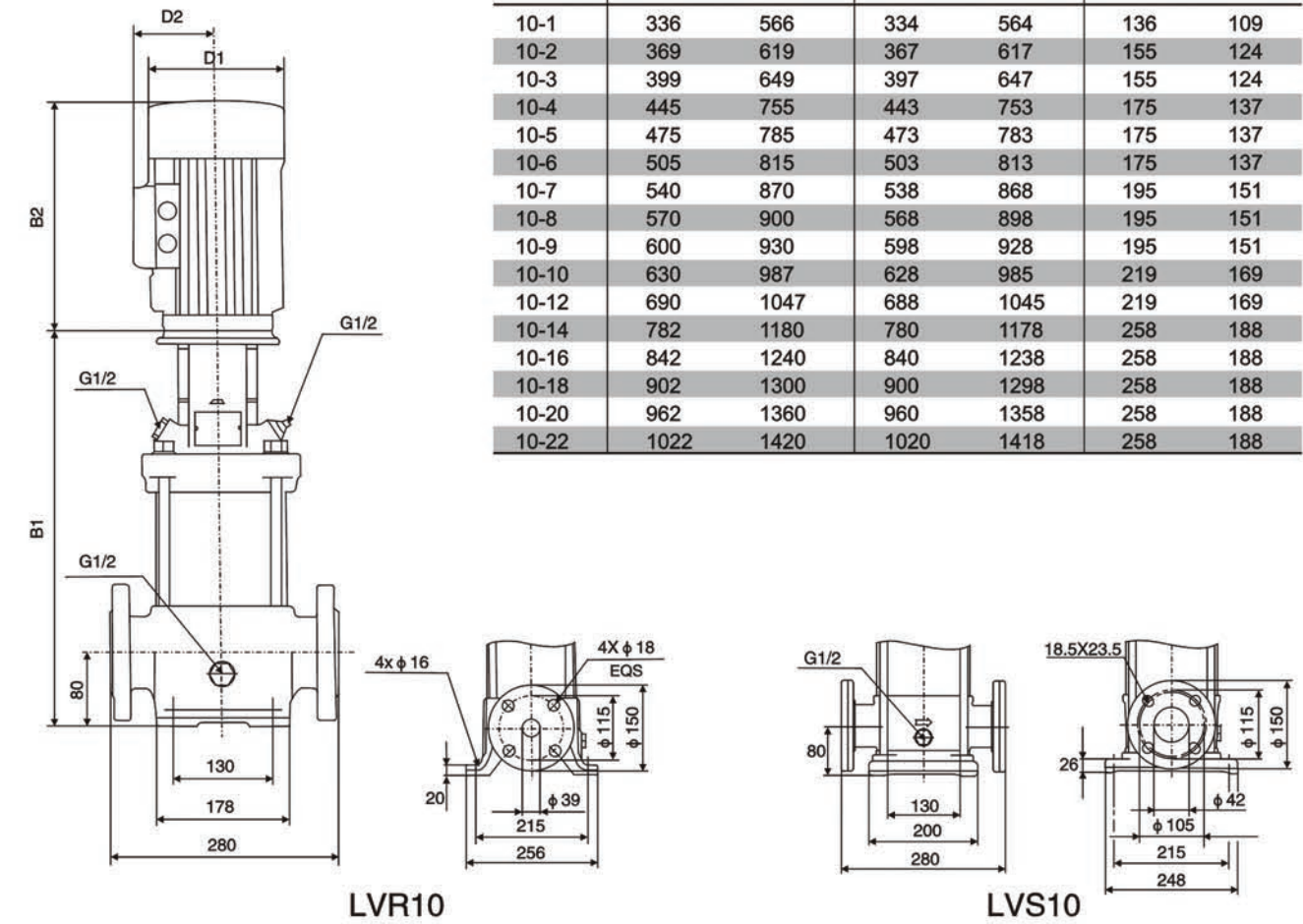
MODEL	OVAL FLANGE(LVR)		DIN FLANGE(LVS)		D1	D2
	B1	B1+B2	B1	B1+B2		
5-2	256	486	282	512	136	109
5-3	283	513	309	539	136	109
5-4	310	540	336	566	136	109
5-5	341	591	367	617	155	124
5-6	368	618	394	644	155	124
5-7	395	645	421	671	155	124
5-8	422	672	448	698	155	124
5-9	465	775	491	801	175	137
5-10	492	802	518	828	175	137
5-11	519	829	545	855	175	137
5-12	546	856	572	882	175	137
5-13	573	883	599	909	175	137
5-14	600	910	626	936	175	137
5-15	627	937	653	963	175	137
5-16	654	964	680	990	175	137
5-18	712	1042	738	1068	195	151
5-20	766	1096	792	1122	195	151
5-22	820	1177	846	1203	219	169
5-24	874	1231	900	1257	219	169
5-26	928	1285	954	1311	219	169
5-29	1009	1366	1035	1392	219	169

MODEL	POWER [kW]	Q[m³/h]	1	2	3	4	5	6	7
5-2	0.37		13	12.5	12	10.5	9.5	7.5	6
5-3	0.55		19.5	19	18	16.5	14.5	12.5	10
5-4	0.55		26	25	24	22	19.5	16.5	14
5-5	0.75		33	32	30	28	22.5	22	18.5
5-6	1.1		40	38.5	37	34.5	31.5	27.5	23
5-7	1.1		46.5	45	42.5	40	36.5	32.5	27
5-8	1.1		53	51	48.5	45	41.5	36.5	31
5-9	1.5		60.5	59	56.5	53	48.5	44	37.5
5-10	1.5		67	65.5	62.5	59	54	48	41.5
5-11	2.2		74.5	73	70	66	61	54.5	47
5-12	2.2		81.5	79.5	76	72	66.5	59.5	51.5
5-13	2.2		88	85.5	82.5	78	71.5	64	55.5
5-14	2.2		95	92.5	89	83.5	77	69	60
5-15	2.2		101.5	99	95	89.5	82	74	63.5
5-16	2.2		108	105	101	95.5	87.5	78.5	68
5-18	3.0		122	119.5	115.5	109	100.5	90.5	78.5
5-20	3.0		135.5	132.5	127.5	120.5	111.5	100	87
5-22	4.0		150	147	142	134	124.5	112.5	97.5
5-24	4.0		163.5	160	154.5	146	135	122	106.5
5-26	4.0		176.5	173	166.5	157.5	146	132	115
5-29	4.0		198.5	194.5	188	178	165	149	131

HYDRAULIC PERFORMANCE CURVES



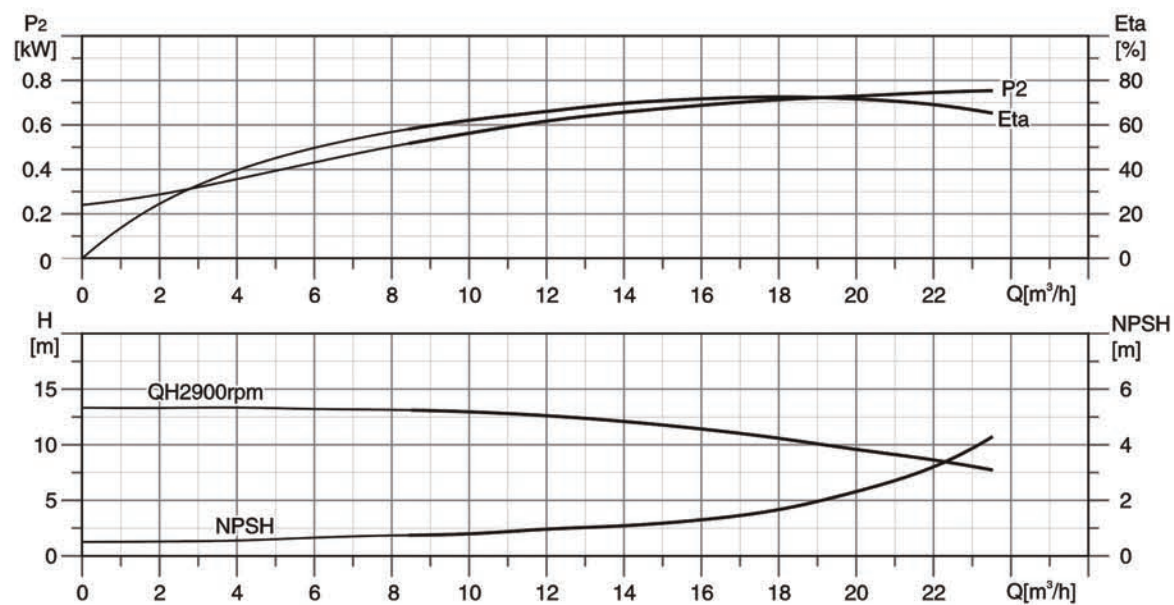
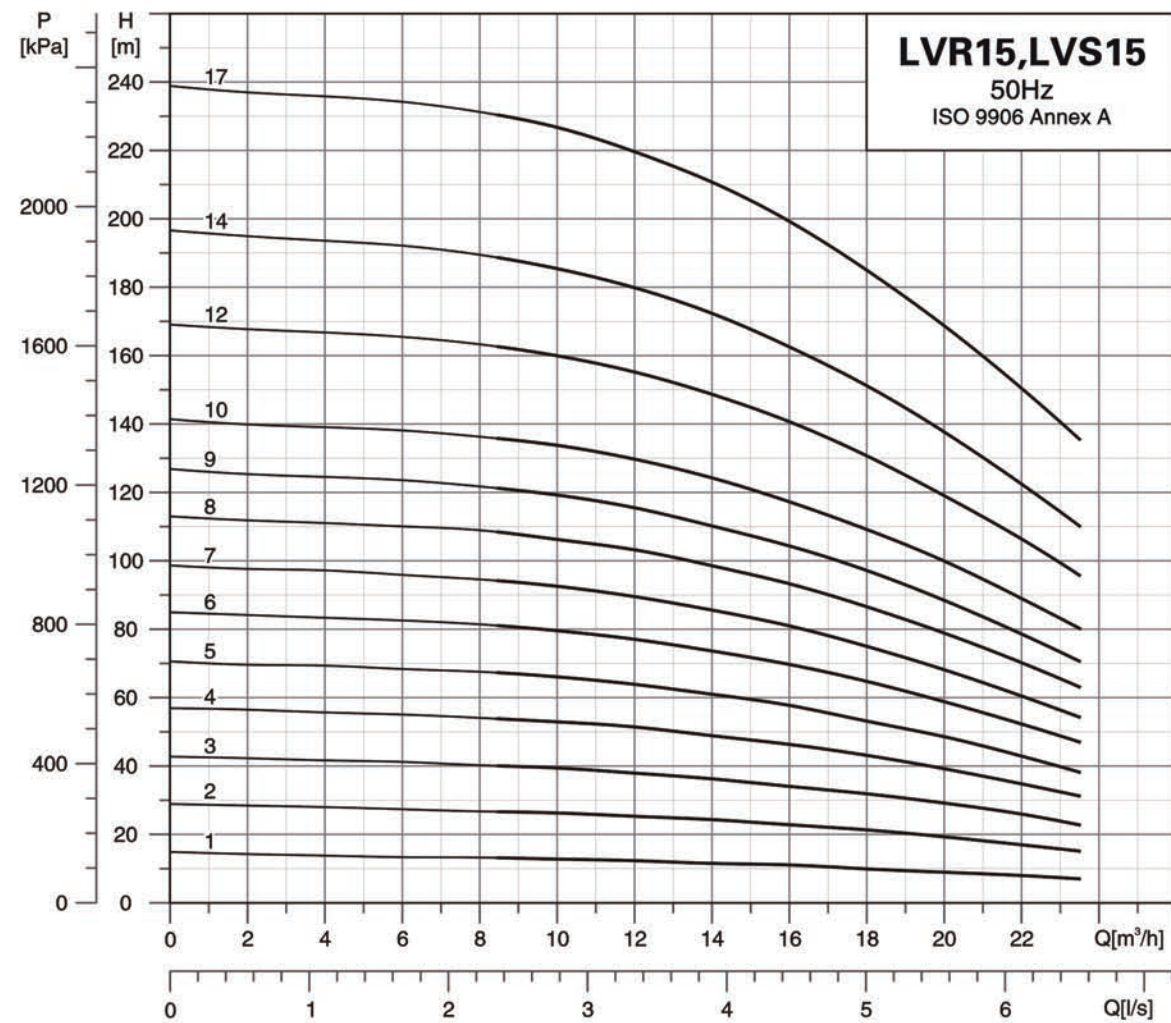
DIMENSION DRAWING



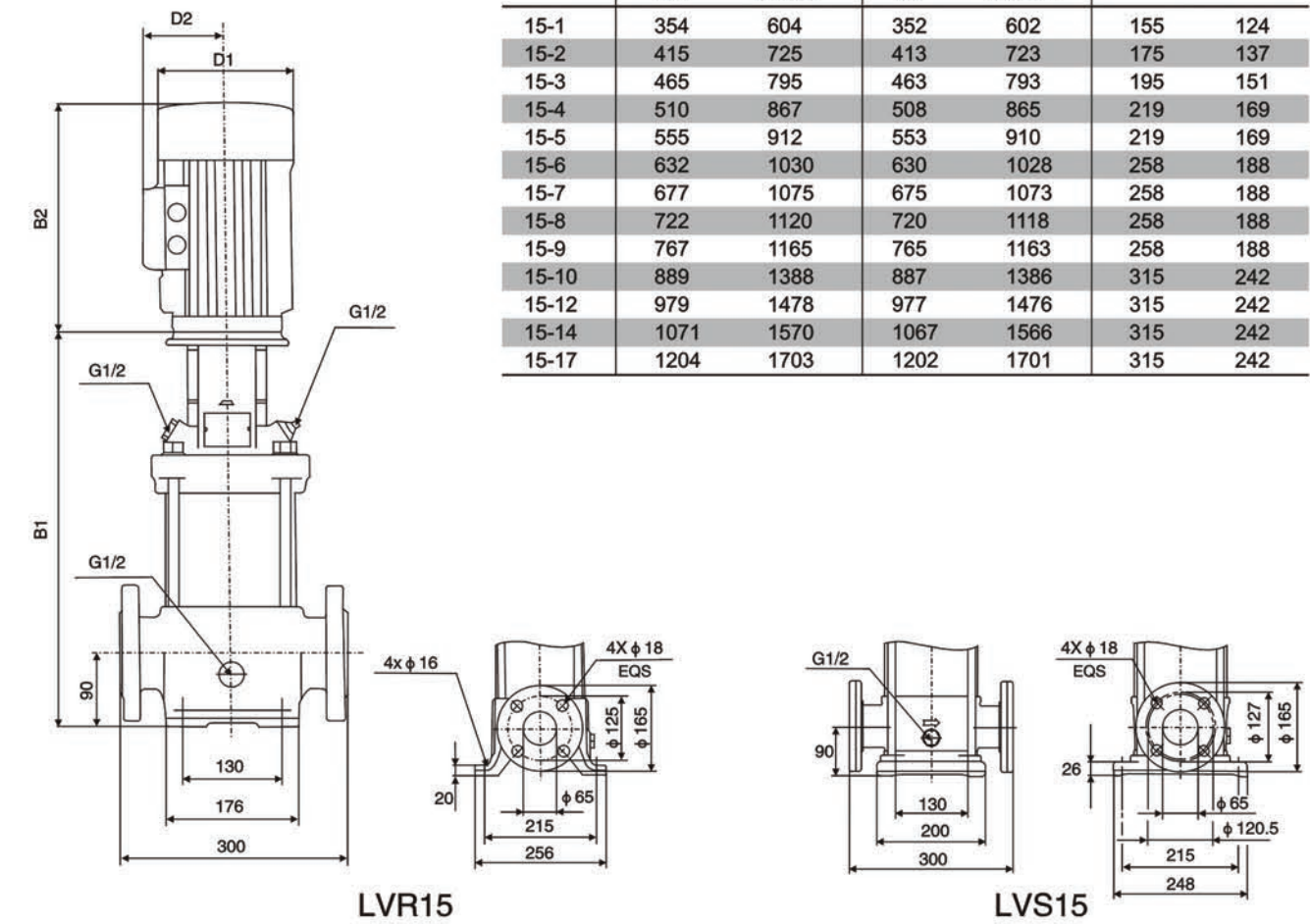
MODEL	DIN FLANGE(LVR)		DIN FLANGE(LVS)		D1	D2
	B1	B1+B2	B1	B1+B2		
10-1	336	566	334	564	136	109
10-2	369	619	367	617	155	124
10-3	399	649	397	647	155	124
10-4	445	755	443	753	175	137
10-5	475	785	473	783	175	137
10-6	505	815	503	813	175	137
10-7	540	870	538	868	195	151
10-8	570	900	568	898	195	151
10-9	600	930	598	928	195	151
10-10	630	987	628	985	219	169
10-12	690	1047	688	1045	219	169
10-14	782	1180	780	1178	258	188
10-16	842	1240	840	1238	258	188
10-18	902	1300	900	1298	258	188
10-20	962	1360	960	1358	258	188
10-22	1022	1420	1020	1418	258	188

MODEL	POWER [kW]	Q[m³/h]	2	4	6	8	10	12
10-1	0.37	H(m)	10	10	9.5	8.5	7.5	5.5
10-2	0.75		20	20	19.5	18	15	12
10-3	1.1		30	30	29	26.5	23	18.5
10-4	1.5		40.5	40.5	40	36.5	32	26
10-5	2.2		51.5	51.5	50	46.5	40.5	33
10-6	2.2		61	61	59.5	55	48	39
10-7	3.0		72	72	70	65	57	46.5
10-8	3.0		82	82	80	74	65	53
10-9	3.0		92	92	89.5	82.5	72.5	59
10-10	4.0		102.5	102.5	100.2	93	81.5	66.5
10-12	4.0		122.5	122.5	119	110.5	97	79
10-14	5.5		143.5	144	140	130	114	94
10-16	5.5		163.5	163.5	159	148	129.5	106
10-18	7.5		185.5	186.5	182	169.5	149.5	123.5
10-20	7.5		206	204	201.5	188	165.6	136
10-22	7.5		226	226.5	221	206	181	147

HYDRAULIC PERFORMANCE CURVES



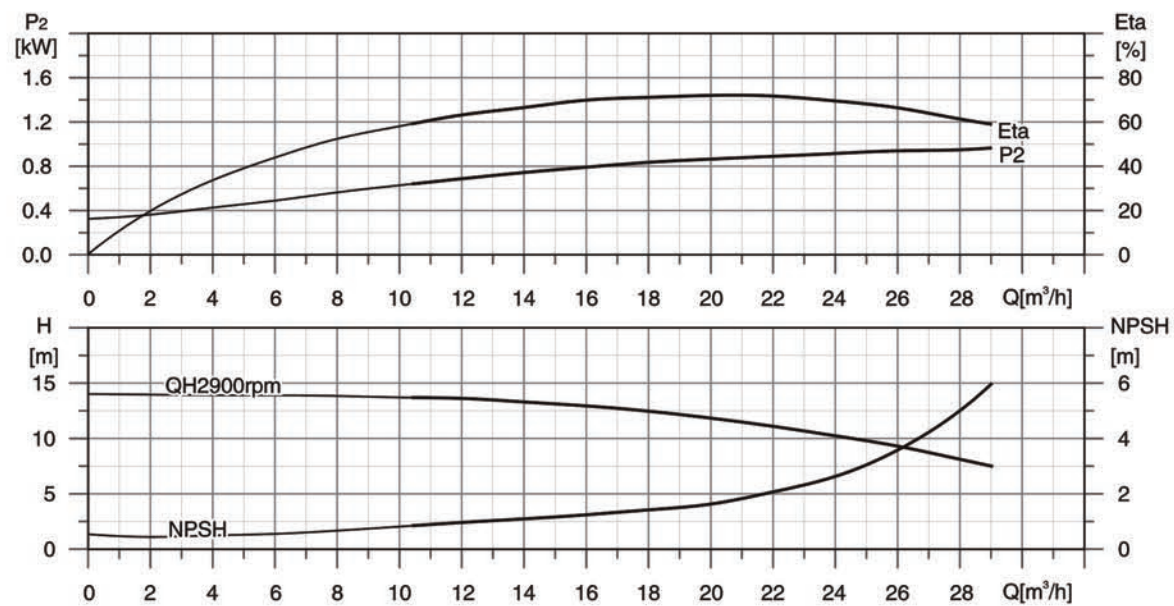
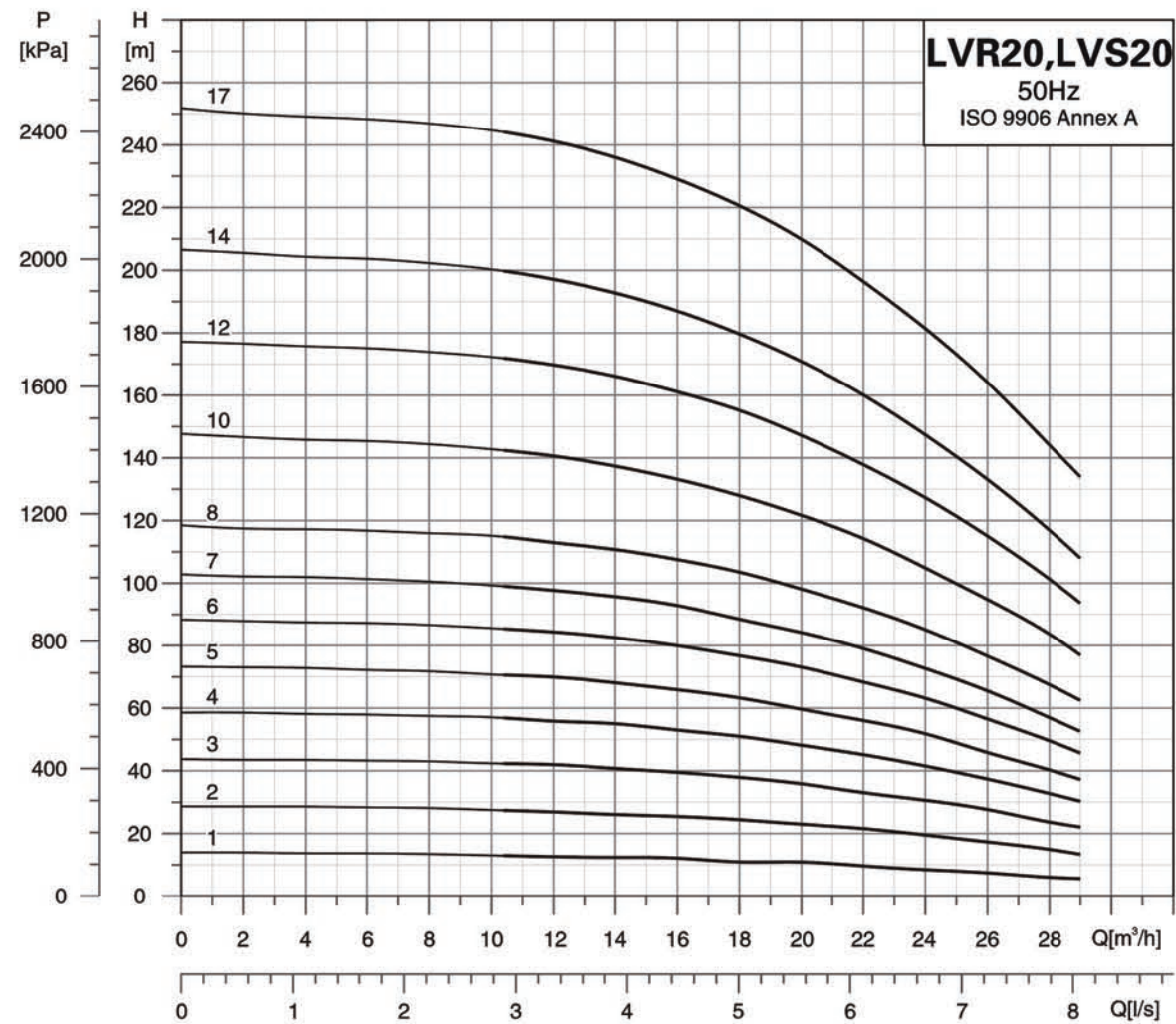
DIMENSION DRAWING



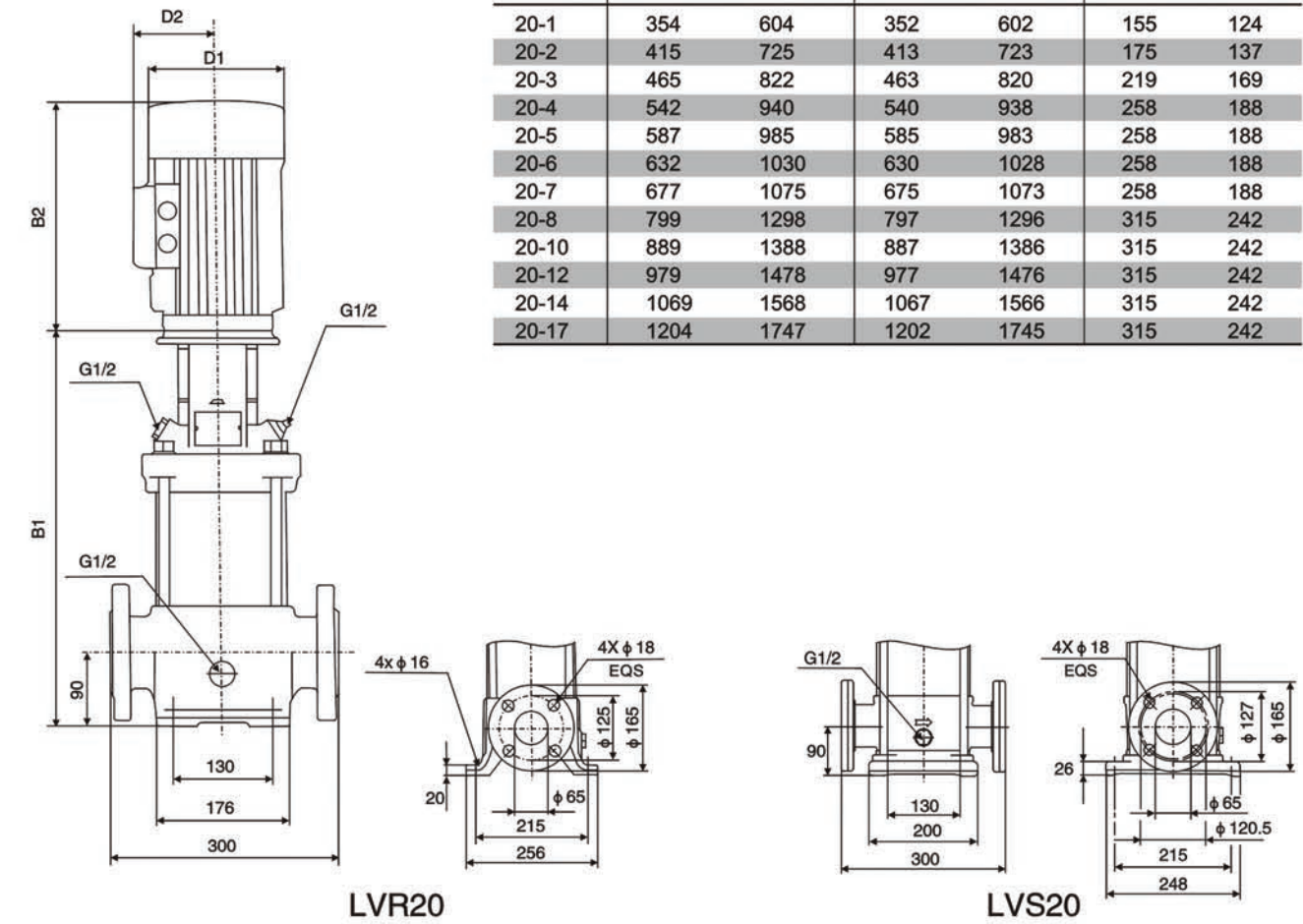
MODEL	DIN FLANGE(LVR)		DIN FLANGE(LVS)		D1	D2
	B1	B1+B2	B1	B1+B2		
15-1	354	604	352	602	155	124
15-2	415	725	413	723	175	137
15-3	465	795	463	793	195	151
15-4	510	867	508	865	219	169
15-5	555	912	553	910	219	169
15-6	632	1030	630	1028	258	188
15-7	677	1075	675	1073	258	188
15-8	722	1120	720	1118	258	188
15-9	767	1165	765	1163	258	188
15-10	889	1388	887	1386	315	242
15-12	979	1478	977	1476	315	242
15-14	1071	1570	1067	1566	315	242
15-17	1204	1703	1202	1701	315	242

MODEL	POWER [kW]	Q[m³/h]	3	6	9	12	15	18	21
15-1	1.1	H(m)	15	13.5	13	12.5	11	10	9
15-2	2.2		28	27.5	26	25.5	23	21.5	18
15-3	3.0		42	41	40	38	36	32	28
15-4	4.0		58	55	55	51.5	48	43	38
15-5	4.0		70	68.5	66	64	60	53	48
15-6	5.5		83	82.5	80	77	72	64.5	58
15-7	5.5		98	96	94	89.5	84	75	65
15-8	7.5		112	110	108	103	97	86.5	75
15-9	7.5		125	123.5	120	115.5	108	97	84
15-10	11.0		140	138	136	129.5	120	109	95
15-12	11.0		168	165.5	162	155	145	130.5	114
15-14	11.0		194	192	188	180	168	151	130
15-17	15.0		237	234	230	219.5	208	185	160

HYDRAULIC PERFORMANCE CURVES



DIMENSION DRAWING



MODEL	DIN FLANGE(LVR)		DIN FLANGE(LVS)		D1	D2
	B1	B1+B2	B1	B1+B2		
20-1	354	604	352	602	155	124
20-2	415	725	413	723	175	137
20-3	465	822	463	820	219	169
20-4	542	940	540	938	258	188
20-5	587	985	585	983	258	188
20-6	632	1030	630	1028	258	188
20-7	677	1075	675	1073	258	188
20-8	799	1298	797	1296	315	242
20-10	889	1388	887	1386	315	242
20-12	979	1478	977	1476	315	242
20-14	1069	1568	1067	1566	315	242
20-17	1204	1747	1202	1745	315	242

MODEL	POWER [kW]	Q [m ³ /h]	4	8	12	16	20	24	28
20-1	1.1	H(m)	13.5	13	13	12.5	11.5	9	6.5
20-2	2.2		28.5	28	27	25.5	23	19.5	15
20-3	4.0		43.5	43	42	39.5	36	30.5	23.5
20-4	5.5		58	57.5	56	53	48	41.5	32.5
20-5	5.5		73	72	70	66	59.5	52	40.5
20-6	7.5		87.5	83.5	84.5	80	73	62	49.5
20-7	7.5		102	100.5	97.5	93	84	72.5	57
20-8	11.0		117	116	113	107.5	98	85	67.5
20-10	11.0		146	144.5	140.5	132	121.5	105	83.5
20-12	15.0		175.5	174	169.5	161	147	127.5	101.5
20-14	15.0		204.5	202.5	197	187	171	147.5	117
20-17	18.5		249	247	241	229	210	181.5	144

