DL VERTICAL
Multi-Stage Pump

Applications
Used for water supply: water filter and transport in water works, boosting of main pipeline, boosting in high-rise building.

For industrial boosting: process flow water system, cleaning system, high-pressure washing system, fire fighting system.

For industrial liquid conveying: cooling and air-condition system, feed water for boiler and condensing system, machine-associated purpose, acids and alkali.

For water treatment: ultra-filtration system, reverse osmosis system, distillation system, separator and swimming pools.

For irrigation: farmland irrigation, spray irrigation and dripping irrigation.

Operating conditions
Thin, clean, non-explosive liquid containing no solid granules or fibres.
Liquid temperature:

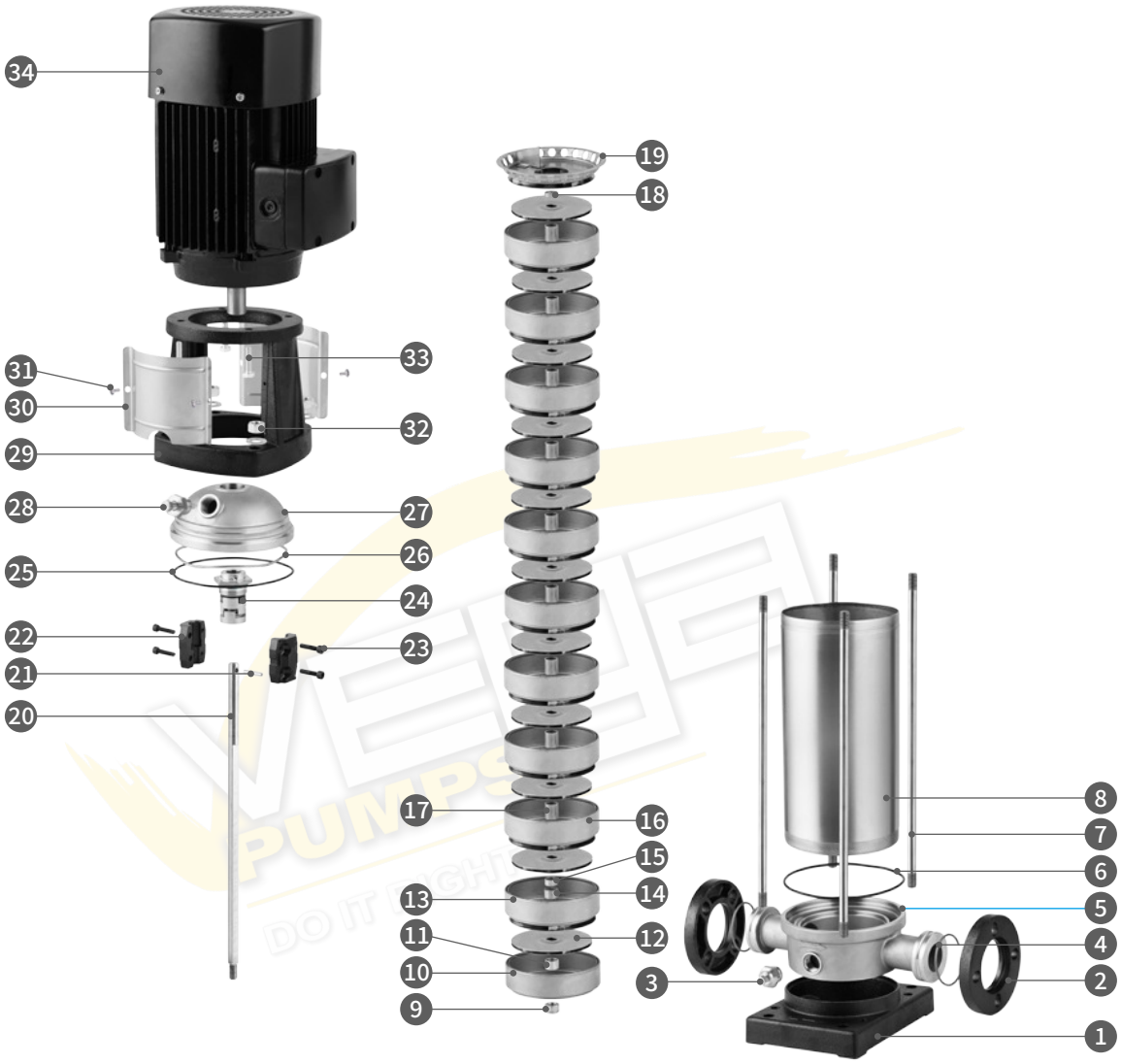
Normal type: -15 to +110 0C.

Motor
2-pole induction motor
Aluminium alloy motor case
Insulation class F
Protection IP55
Continuous duty

Technical features

Performance Range Head:	up-to 250m
Flow:	1 - 90 m3/h
Power:	0.37 to 45 kW
Liquid Temperature Limits:	-15 to +110 0C
Working Pressure:	20-26 Bar

PUMP PARTS



NO.	Description	NO.	Description	NO.	Description	NO.	Description
1	Base plate	10	Inducer	19	Top diffuser	28	Air valve
2	Flange	11	First impeller cover	20	Shaft	29	Motor bracket
3	Drainage nut	12	Impeller	21	Latch/Shaft pin	30	Coupling guard
4	Flange circlip	13	Support diffuser	22	Coupling	31	Screws
5	Inlet and outlet chamber	14	TC sleeve	23	Allen bolt	32	Hexagon nut
6	O ring	15	Impeller sleeve M	24	Mechanical seal	33	Hexagon screw
7	Stay bolt	16	Diffuser	25	O ring	34	Motor/E1/E2/E3
8	Cylinder	17	Impeller sleeve L	26	Corrugated spring		
9	Lock nut	18	Impeller sleeve S	27	Pump cover		

Model number descriptions - Nomenclature

DL32~DL90

DL 32 -50 -2

- -2: Minor diameter impeller number
- -50: Stage number x 10
- 32: Rated Flow :32 m3/h
- DL: Vertical multi-stage centrifugal pump

SYMBOLS

DL1 ~DL20

DL 12 -50

- -50: Stage number x 10
- 12: Rated Flow :12 m3/h
- DL: Vertical multi-stage centrifugal pump

Performance data

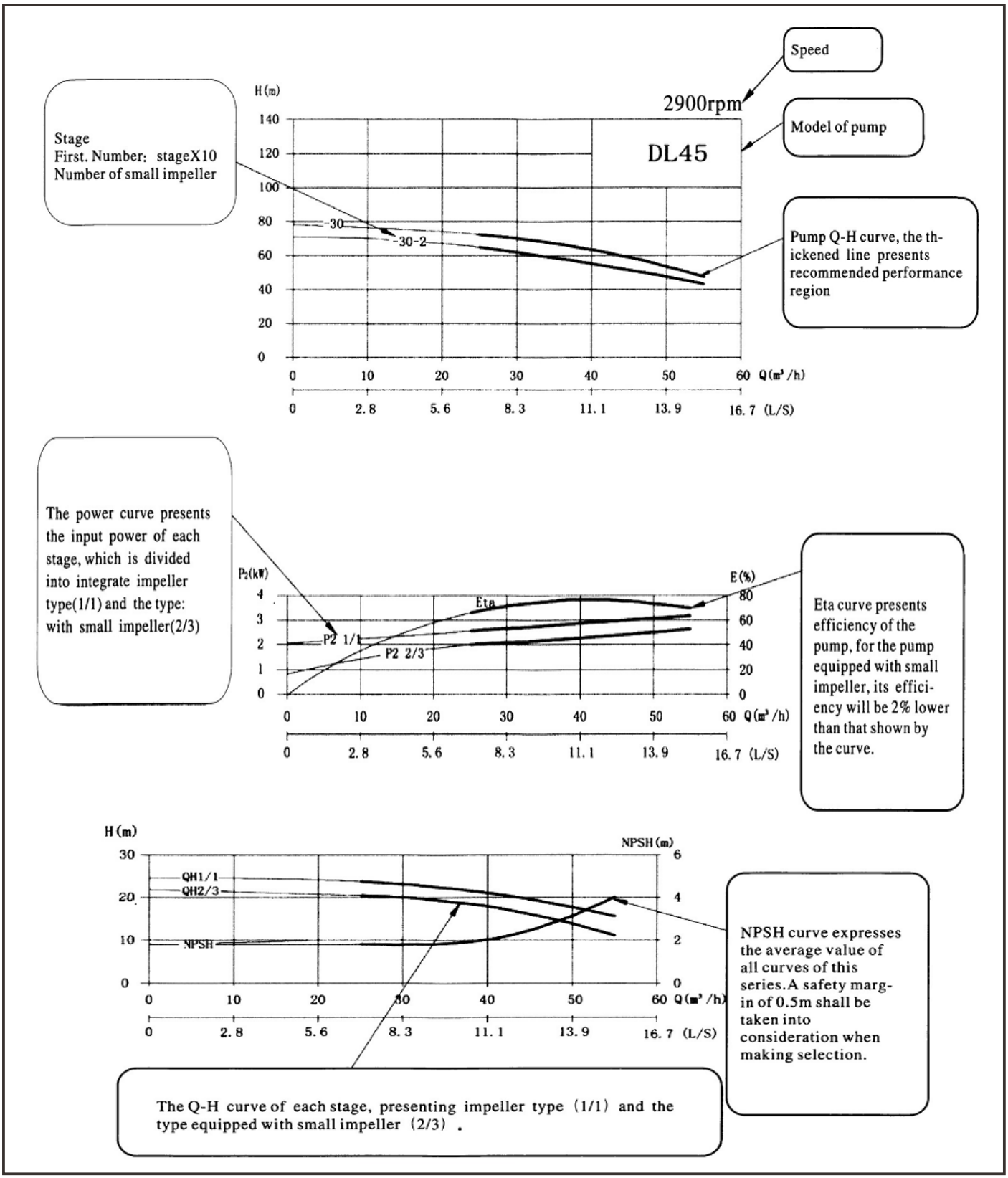
		RANGE										
		DL1	DL3	DL5	DL8	DL12	DL16	DL20	DL32	DL45	DL64	DL90
RATED FLOW	(m^3/h)	1	3	5	8	12	16	20	32	45	64	90
FLOW LIMITATION	(m^3/h)	0.6-2.0	1.2-4.0	3-8	5-12	7-16	8-22	10-28	16-40	25-55	30-80	50-120
MAX. OPERATING PRESSURE	(bar)	25	25	25	25	25	25	25	30	30	30	30
MOTOR POWER	(kW)	0.37 - 1.5	0.37 - 2.2	0.37 - 4	0.75 - 7.5	1.5 - 11	2.2 - 15	2.2 - 18.5	1.5 - 30	3.0 - 45	4.0 - 45	5.5 - 45
LIQUID TEMPERATURE	(°C)	-15 to +110										
MAXIMUM EFFICIENCY	(%)	48	57	62	69	63	69	70	76	78	76	75
NOMINAL DIAM. OF FLANGE		DN25 (1")	DN25 (1")	DN32 (1¼")	DN40 (1½")	DN40 (1½")	DN50 (2")	DN50 (2")	DN65 (2½")	DN80 (3")	DN80 (3")	DN100 (4")

This data was obtained using a 2 pole, 50Hz standard motor at 2900rpm. Water temperature: 20°C. Performance limits are according to ISO 2548. Specifiation for standard class C pumps & GB3216-2005 specification for standard class 2 pumps.

To avoid overload and damage, the pump should be operated within these performance ranges.

PERFORMANCE CURVE

Descriptions - Explanations



This data was obtained at 2900rpm. Curve tolerance conforms with ISO9006. Water was air free, at 20°C, kinematic velosity of 1mm²/sec. The performance range is indicated by the thickened part on the curve. This performance range will prevent overloading and overheating.

SUCTION HEAD
Measurement

When the pump is operated under the following conditions, it is necessary to measure the suction pressure:

- High liquid temperature
- Actual capacity is clearly more than the rated capacity
- Suction head is too high
- Suction pipe is too long
- Bad suction conditions

If the pump suction pressure is lower than the steam pressure of the transported liquid, vapour may occur. To avoid this ensure that there is minimum pressure at the pump's suction end.

Maximum Suction Head can be calculated as follows:

$H = P_b \times 10.2 - NPSH - H_f - H_v - H_s$

P_b	Atmospheric pressure (bar). In a closed system, this represents system pressure.
NPSH	Net Positive Suction Head (m). Refer to performance curve.
H_f	Loss of suction pump (m)
H_v	Vapour Pressure (m)
H_s	Safety allowance (min. = 0.5m head)

If H is a positive value, the pump can be operated with the maximum suction head.
If H is a negative value, a minimum suction pressure
(of positive "H"m head) is required.

An example where fresh water is being transported:

P_b:	1bar
Pump model:	DL3, 50Hz
Flow:	Q=2m³/h
NPSH:	1.5m (see pump's curve)
H_f:	3m
Liquid temperature:	80°C
H_v:	4.8 (see figure alongside)

$H = P_b \times 10.2 - NPSH - H_f - H_v - H_s$
$H = 1 \times 10.2 - 1.5 - 3 - 4.8 - 0.5 = 0.4m$

This means that the pump can be operated at a maximum suction head of 0.4m.

