TLDB 立式筒袋泵

Vertical Can Pumps

JINGUANG PUMPS

TLDB立式筒袋泵

API610/ASME/AD Type TLDB

立式筒袋泵执行

AD(压力容器)规范
API610(第六版)
ASME(美国工程师学会)
Ⅷ(压力容器)+ Ⅸ(焊接和钎焊质量合格条件)

工作参数

规　格	(DN)	40－200mm
流　量	(Q)	－800m³/h
扬　程	(H)	－800m
工作压力	(P)	－10.0MPa
工作温度	(T)	−180－ +180℃

适用范围

输送清洁的或稍有污染的低温的或高温的，化学中性或有腐蚀性的液体。

- 精炼厂
- 石油化工厂
- 发电厂
- 低温工程
- 管线加压
- 海上采油平台
- 液化气工程

结　构

立式筒袋泵为多级，径向剖分式，叶轮的型式为单吸径向式，并配有单级壳体。首级叶轮一般是吸入式叶轮。轴向力由向心推力球轴承承受。压差较大的情况下，由平衡鼓装置平衡轴向力。外壳仅承受入口压力，外壳的长度以及泵的安装深度取决于对NPSH汽蚀性能的要求。泵若安装在容器上或者与管道法兰连接，可不装外壳(TLDB型式，参见第四页结构选择部分)。轴承箱体中的向心力推力球轴承依靠润滑油进行润滑，带有独立的内循环自动润滑系统。流体动力径向滑动轴承位于泵的入口端。泵在一定安装深度的情况下，泵轴带有中间支承，其支承用液体润滑。轴封采用的型式有：单端面机械密封，串联式机械密封，并带有冷却、冲洗或密封液系统。

吸入管和排出管的位置在安装法兰的上部，互成180°角，但其它的布局方式也是可以的。

法兰标准按照DIN或GB执行。辅助管路的连接螺纹用G或Rc/R。电动机通过挠性联轴器(加长或不加长联轴器)驱动泵运转。电动机的安装型式为V1。

从驱动端方向看，泵逆时针旋转。

Vertical can pumps according to

AD-requirements
API610 (6th edition)
ASME-code Ⅷ + Ⅸ

Operating data

Sizes	DN	40 up to 200mm
Capacities	Q	up to 800m³/h
Heads	H	up to 800m
Operating pressures	P	up to 10.0MPa
Operating temperatures	t	-180℃up to +180℃

Application ranges

For pumping clean or slightly polluted, cold or hot, chemically neutral or aggressive liquids.

- in refineries
- in chemical and petrochemical plants
- in energy plants
- in cryogenic engineering
- in pipelines
- in offshore industry
- in transport to liquefied gas

Design

Multistage, radially split, vertical can pumps with stage casings and single-suction, radial impellers. Impeller 1st stage is always a suction impeller, inducer is possible. Balance of axial thrust by antifriction bearings, in case of higher diff pressure axial thrust is compensated by a balance piston/liner. The can is only subject to suction pressure, the installation depth and the length of the can depend on NPSH conditions. Same design without can is possible for installation in existing vessels or for installation with flanged connection (see design alternatives, p.4). The bearings n the motor lantern are oil-lubricated antifriction bearings with rotstion-indepenpent automatic lubrication by internal oil circulation. A hydro-dynamic radial plain bearing is on the suction side of the pump. In case of extreme installation depths with liquid-lubricated intermediate bearing. Shaft sealed by packed stuffing box or mechanical seal (single, double or tandem seals).Connections for cooling, flushing or sealing liquid.

Suction and discharge branches are arranged at 180° (inline) above the mounting flange. Other branch positions are possible.

Flanges according to DIN or GB, auxiliary connections have GRC/R threads. Drive by flanged motor (design V1) via flexible coupling (spacer or non-spacer coupling).

Direction of rotation anticlock-wise seen from driven end.

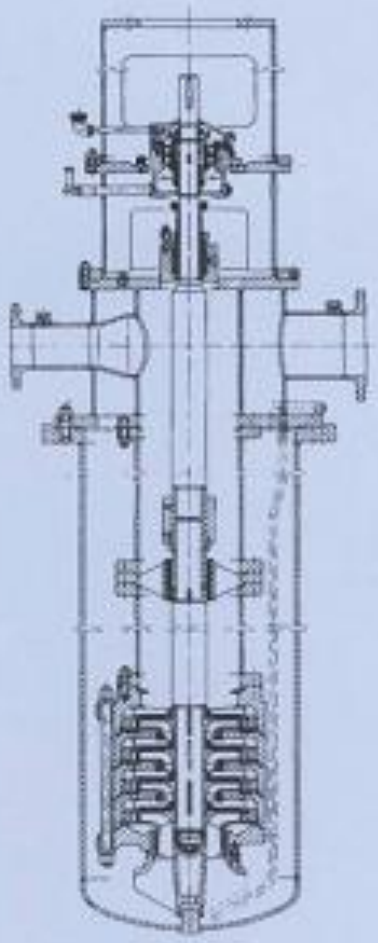
结构特征、优点、经济效益

结 构 特 征	优 点	经 济 效 益
设计执行API610标准(第六版)	保证并满足流程工业设计和维修标准的要求	可靠性高和互换性好
立式筒袋泵	叶轮的位置在泵的最下端，可运行在对汽蚀性能要求苛刻的情况下仅需一处轴封 立式结构占据的空间小	安全可靠
水力部件 每种规格有相应的几组叶轮和导叶 首级叶轮为吸入式叶轮 高压差时产生的轴向力由平衡鼓装置平衡	适于在不同的条件下运行 性能稳定，效率高 NPSHR值低 具有很低的NPSHR值 轴封仅仅承受吸入压力 平衡鼓装置还起到中间支承的作用	合理地选择泵的性能可使能量消耗最少 装置花费少 可满足最小的安装深度 泵具有很高的可靠性和适用性 轴封寿命长
可更换的易损件 叶轮和中段壳体的密封环轴封	当叶轮，中段壳体的密封环和轴封损坏时，叶轮，中段壳体和轴仍可继续使用	可大大的节约修理和备件的费用
轴 承 向心推力球轴承依靠自动的内循环装置对其进行油润滑泵吸入口处装有流体动力轴承	刚性轴，同轴度高 向心推力球轴承使用寿命长 润滑可靠 轴承的旋转件和非旋转件在运行时无接触	轴封使用寿命长 运行成本低 保养维修简单 可靠性高 不易损坏
轴的尺寸计算精确 遇有中间轴承时，轴是分段的，并采用接轴器连接	轴封处挠度<0.05mm $n_k > n_{max}$ 轴联接安全可靠	填料密封和机械密封使用寿命长 具有高的可靠和适用性
轴封箱体尺寸计算合理	箱体对于填料密封和机械密封(单，串联)均可安装	互换性好 改换轴封型式费用少

Design Features-Advantages-Economic Benefits

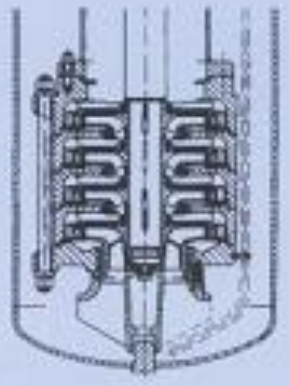
Design features	Advantages	Economic considerations
Design to API610 (6th edition)	ensures design and maintenance standards required by the process industry	high reliability and interchangeability
Vertical can pump	low situated impeller eye allows operating even under unfavourable suction conditions only one shaft seal is necessary low space requirements by vertical design	low investment costs for plants high reliability
Hydraulics several impeller and diffuser sets for every size 1st stage always with special suction impeller in case of high diff. pressuree axial thrust compensated by balance piston	optimum compliance with various operating conditions, high efficiencies over the capacity range low NPSHR values extremely low NPSHR values shaft seal only subject to suction pressre balance piston has effect of an intermediate bearing	low energy costs due to careful pump selection low costs for plants low installation depths possible high reliability and availability of the pump long rated life of shaft seals
Interchangeable wear parts impeller and casing wear rings shaft sleeve	when casing and impeller rings and shaft seal are worn, casing parts, impeller and shaft can be reused	considerable saving of repair and spare part costs
Bearings oil-lubricated antifriction bearings with rotation-independent automatic lubrication by internal oil circulation hydrodynamical radial plain bearing at suction side of pump	strong, precisely aligned shaft long rated life of antifriction bearings safe lubrication low number of components reliable lubrication no touching of bearing components	long rated life of shaft seals low operating costs simple maintenance high reliability low wear
Amply dimensioned shaft in case of an intermediate bearing the shaft is split and sleeve-coupled	**deflection at shaft seal** < 0.05mm reliable, rotation-independent shaft connection	long rated life of packing and mechanical seals high reliability and availability
Well dimensioned shaft seal housing	packed stuffing boxes and mechanical seals of all types can be installed (single, tandem seals)	increased interchangeability low costs for conversion of seal

结构选择
Design alternatives

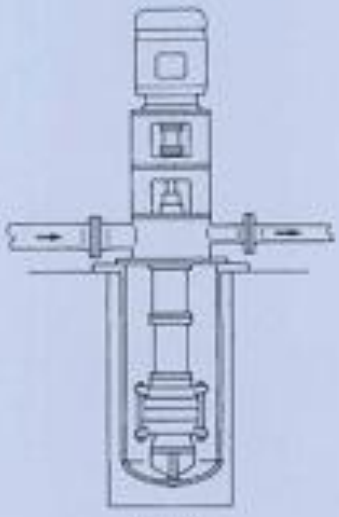


不带平衡鼓
without hydraulical balance piston

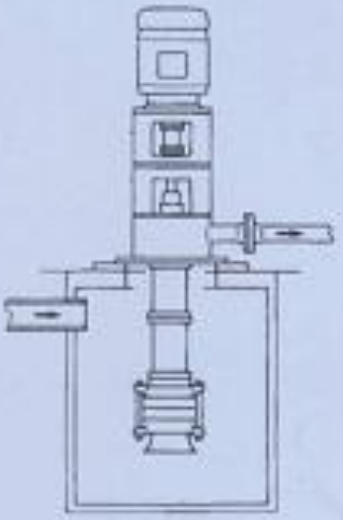
带有中间支承和套筒联接器
intermediate bearing with split and sleeve coupled shaft



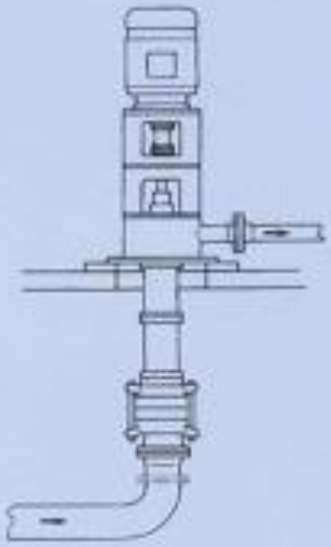
带附加的叶轮（诱导轮）
with additional impeller (inducer)



标准结构
standard design (TLDB)



安装在容器上
installation in existing vessels (TLDA)



带法兰连接
with flanged connection (TLDB)

结构特征
Design Features

Thrust bearing

- with oil-lubricated antifriction bearings
- safe, rotation-independent lubrication by oil circulation
- long rated life of bearings

向心推力球轴承

- 轴承依靠润滑油润滑
- 润滑油在轴承箱体内自动循环进行润滑，安全可靠
- 轴承使用寿命长

Stuffing box housing

- with heat barrier and long cooling zone
- cooling/heating chambers easily accessible

填料箱体

- 有热栅和很长的冷却区
- 冷却或加热空腔连接方便

Large nozzles

- low velocities
- low noise level
- high forces and moments admissible

排出口径大

- 流速低
- 噪音小
- 能承受较大的力和力矩

Large column pipes

- low friction losses
- high rigidity of column pipe
- vibration-free running of pump

圆柱管直径大

- 摩擦损失小
- 圆柱管刚性好
- 泵运行时没有振动

Different hydraulics for every pump size:

- high efficiency over the capacity range
- low energy input

每种规格都有几组不同的水力部件

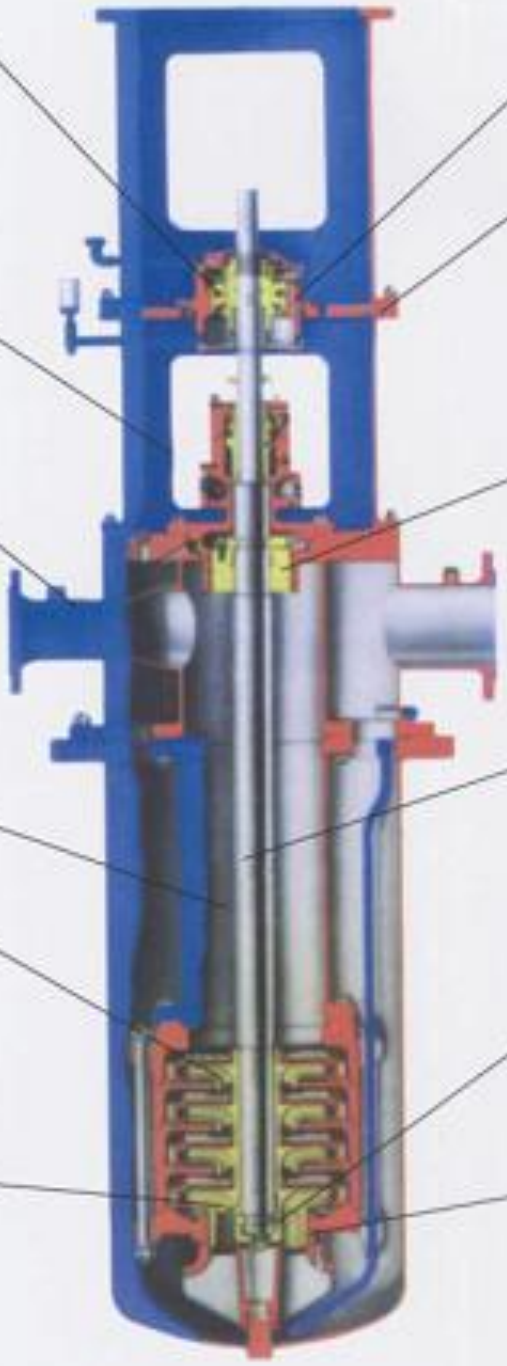
- 流量范围大，效率高
- 配带功率小

1st stage always with special suction impeller

- low NPSHR values
- inducer possible

第一级叶轮为吸入式叶轮

- NPSH值低
- 还可配装诱导轮



TLDB立式筒袋泵

结构特征
Design Features

轴承箱体

- 更换机械密封时，箱体拆卸容易

Bearing housing

- can easily be removed when change of mechanical seal is necessary

轴封

- 可配装填料密封或机械密封
- 普通的机械密封(单端面、双端面、串联式机械密封)均可安装
- 更换机械密封方便

Shaft seal

- packed stuffing box or mechanical seal
- installation of all usual mechanical seals (single, double or tandem seals)
- mechanical seal easily exchangeable

平衡轴向力装置

- 平衡鼓装置平衡轴向力可靠
- 轴封仅仅承受吸入压力
- 平衡鼓装置还起到中间支承的作用，大大延长了轴封的寿命。

Balance piston

- reliable balance of axial thrust
- shaft seal only subject to suction pressure
- has the effect of an intermediate bearing and increases life of shaft seal

刚性轴

- n临界 > n运行
- 轴封处挠度 < 0.05mm
- 两轴承间的距离大是合理的

Strong shaft

- $n_{critical} > n_{operation}$
- deflection at shaft seal < 0.05mm
- large distance between bearings possible

叶轮采用半环定位

- 同轴度好
- 叶轮在轴向存在游隙，所以温度变化不会引起轴变形

Impeller fixation by split ring

- very good concentricity
- impellers have axial play, therefore no deformation of shaft at changing temperatures

流体动力轴承

- 运行时没有振动
- 轴承的磨损轻

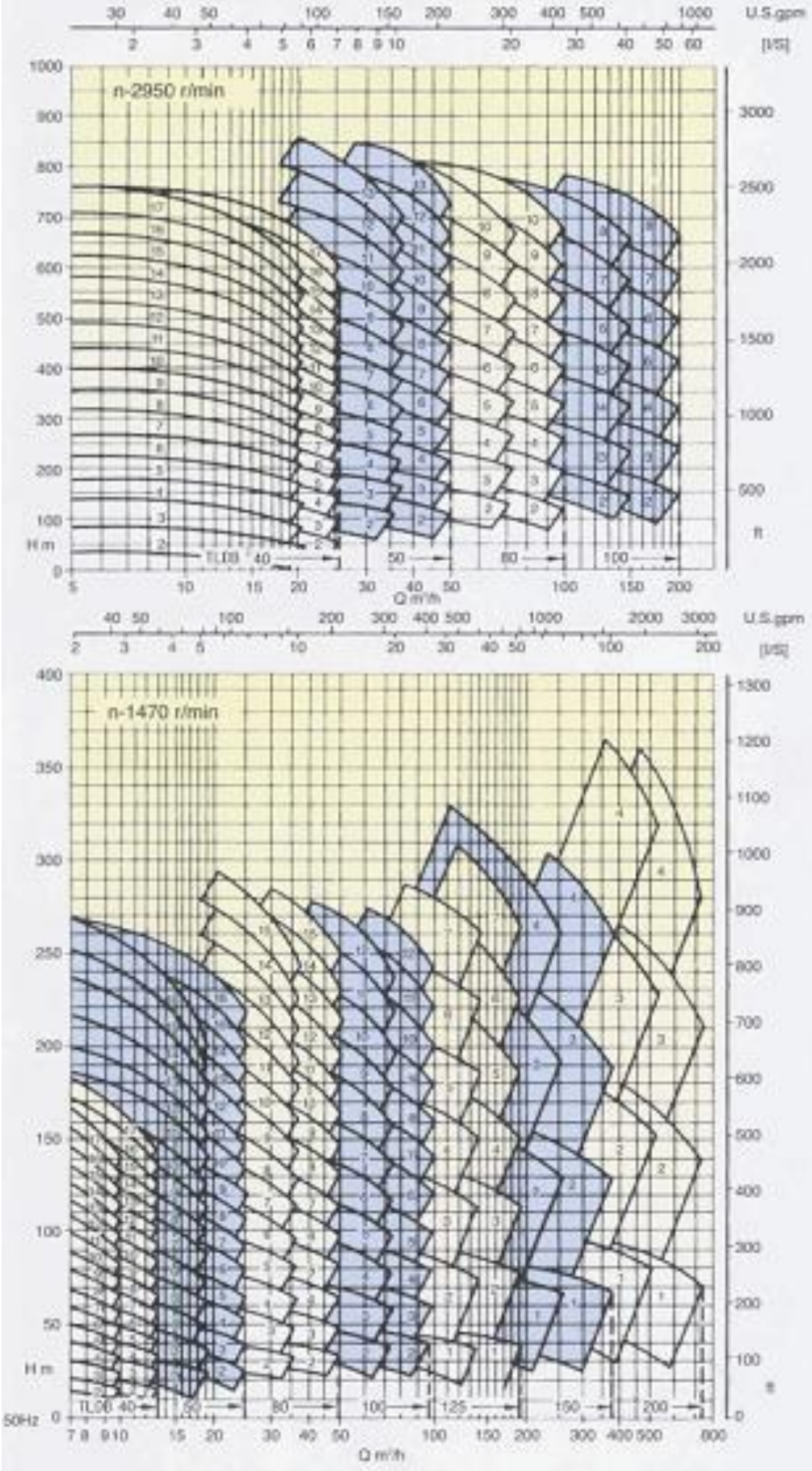
Hydrodynamical plain bearing

- vibration-free running
- low bearing wear

TLDB立式筒袋泵

性能范围(50Hz)

Performance Range (50Hz)



技术参数表

Table of Standard Performance

型 号 Size	电机功率 Motor power N (kW)
TLDB40	2.2~45
TLDB50	11~132
TLDB80	11~132
TLDB100	11~280
TLDB125	11~280
TLDB150	55~160
TLDB200	55~160

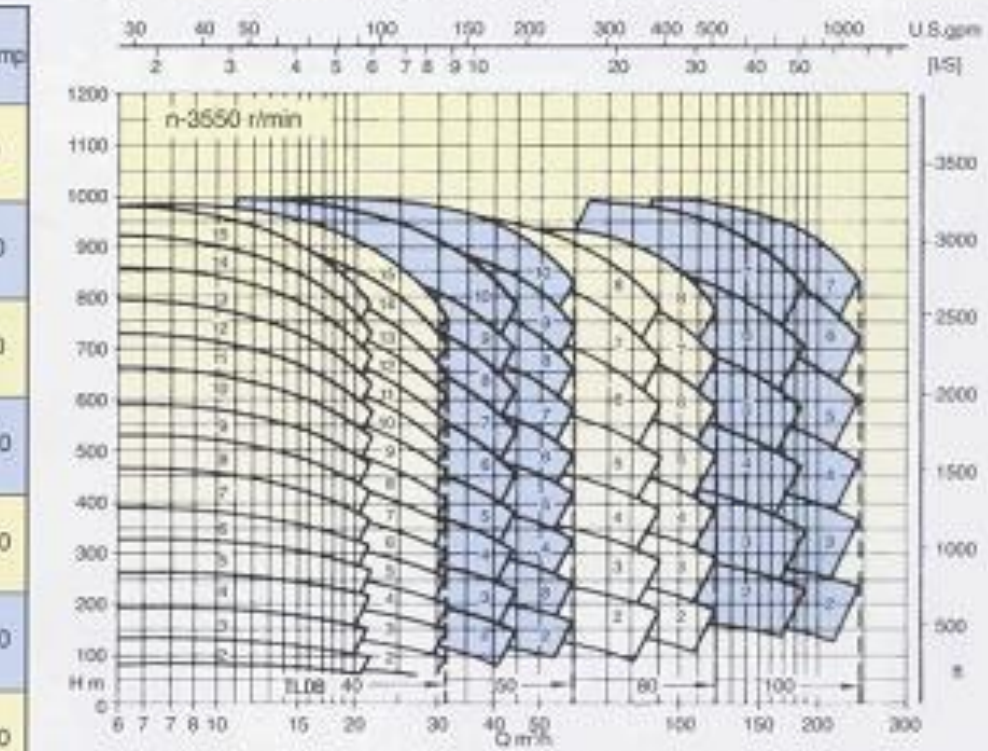
注：

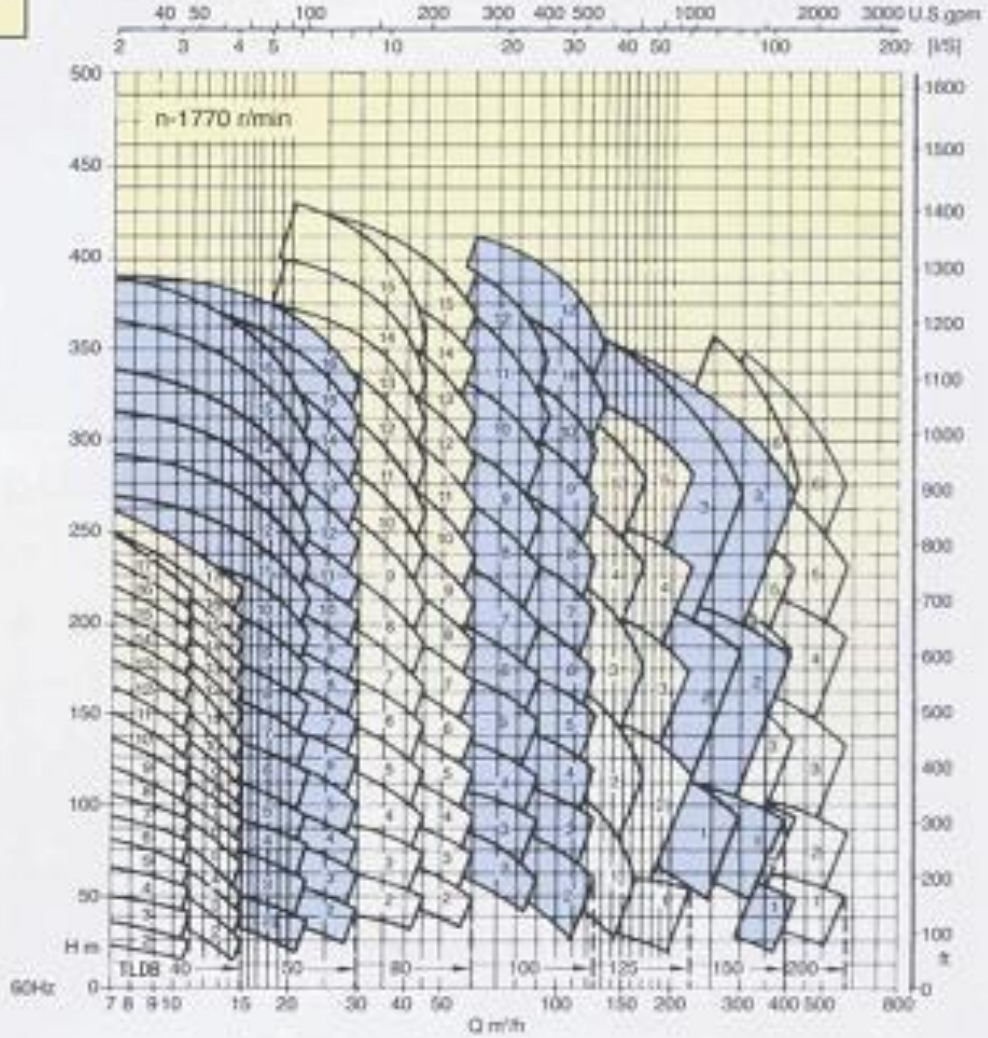
1. 计算轴功率时，应根据制造厂的性能曲线进行计算；或者与制造厂联系。
2. 选用TLDB150、TLDB200之前应与制造厂联系，以取得一些指导。
3. 买方如对泵的汽蚀性能有要求，应在合同中填写装置汽蚀余量，不应填写泵的汽蚀余量，以防造成不必要的麻烦和增加采购成本。
4. 泵的基本材料有两种：1Cr18Ni9和16MnR，如有更高的耐腐蚀性要求，请与制造厂联系。

TLDB立式筒袋泵

法兰 flange		泵重量 Weight of Pump W (kg)
入口 inlet	出口 outlet	
DIN2635 DN80	DIN2637 DN40	600~700
DIN2635 DN100	DIN2637 DN50	798~1460
DIN2635 DN150	DIN2637 DN80	785~2500
DIN2635 DN150	DIN2637 DN100	1320~2590
DIN2635 DN200	DIN2637 DN125	2100~3940
GB9115.10-88 DN300	GB9115.11-88 DN150	2700~5100
GB9115.10-88 DN400	GB9115.11-88 DN200	3800~6500

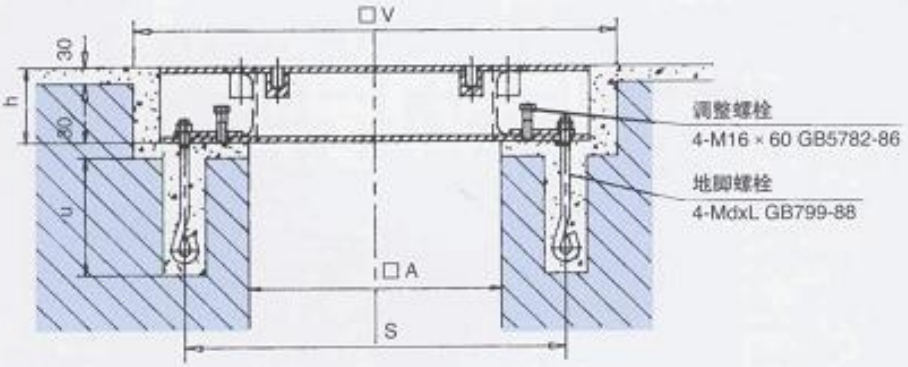
性能范围(60Hz)
Performance Range (60Hz)





TLDB立式筒袋泵

基础尺寸
Foundation Dimensions



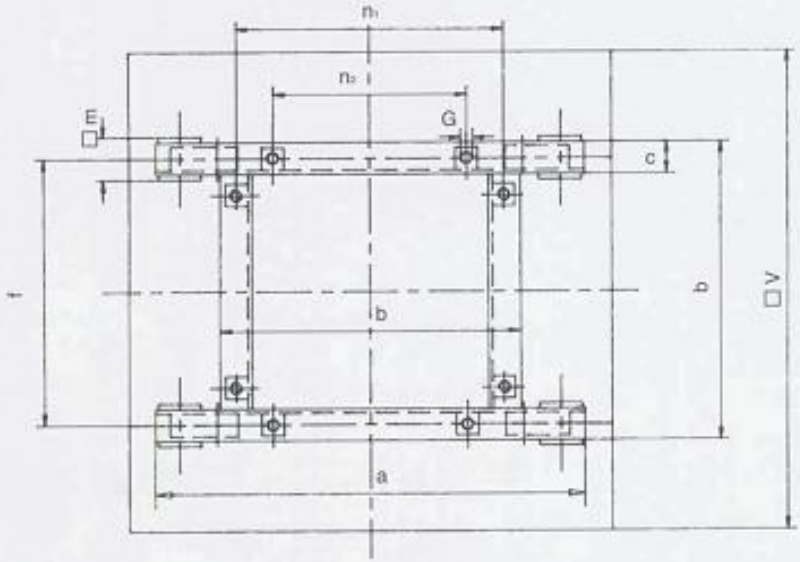


表1

型 号 Size	尺 寸 Dimensions t>0℃													
	a	b	c	h	n_1	n_2	G	□A	S	f	□m	u	□v	MdXL
TLDB40	800	560	60	140	500	360	M24	470	700	500	70	370	900	M24 × 400
TLDB50	850	620	60	140	560	380	M24	520	750	560	70	370	950	M24 × 400
TLDB80	920	700	65	160	640	400	M24	580	820	640	85	370	1020	M24 × 400
TLDB100	1000	750	65	160	680	450	M24	630	900	680	100	370	1100	M24 × 400
TLDB125	1150	900	75	200	840	500	M30	790	1050	840	100	370	1250	M24 × 400
TLDB150	1300	1000	75	200	940	500	M30	900	1200	940	100	370	1400	M24 × 400
TLDB200	1400	1100	75	200	1040	600	M30	1000	1300	1040	100	370	1500	M24 × 400

表2

型 号 Size	尺 寸 Dimensions t<0℃													
	a	b	c	h	n_1	n_2	G	□A	S	f	□m	u	□v	MdXL
TLDB40	1000	750	65	160	680	450	M24	630	900	680	100	370	1100	M24 × 400
TLDB50	1150	900	75	200	840	500	M24	790	1050	840	100	370	1250	M24 × 400
TLDB80	1300	1000	75	200	940	500	M24	900	1200	940	100	370	1400	M24 × 400
TLDB100	1400	1100	75	200	1040	600	M24	1000	1300	1040	100	370	1500	M24 × 400
TLDB125	1500	1200	75	200	1140	700	M30	1100	1400	1140	100	370	1600	M24 × 400
TLDB150	1600	1300	75	200	1240	800	M30	1200	1500	1240	100	370	1700	M24 × 400
TLDB200	1700	1400	75	200	1340	900	M30	1300	1600	1340	100	370	1800	M24 × 400

外形尺寸
Dimensions

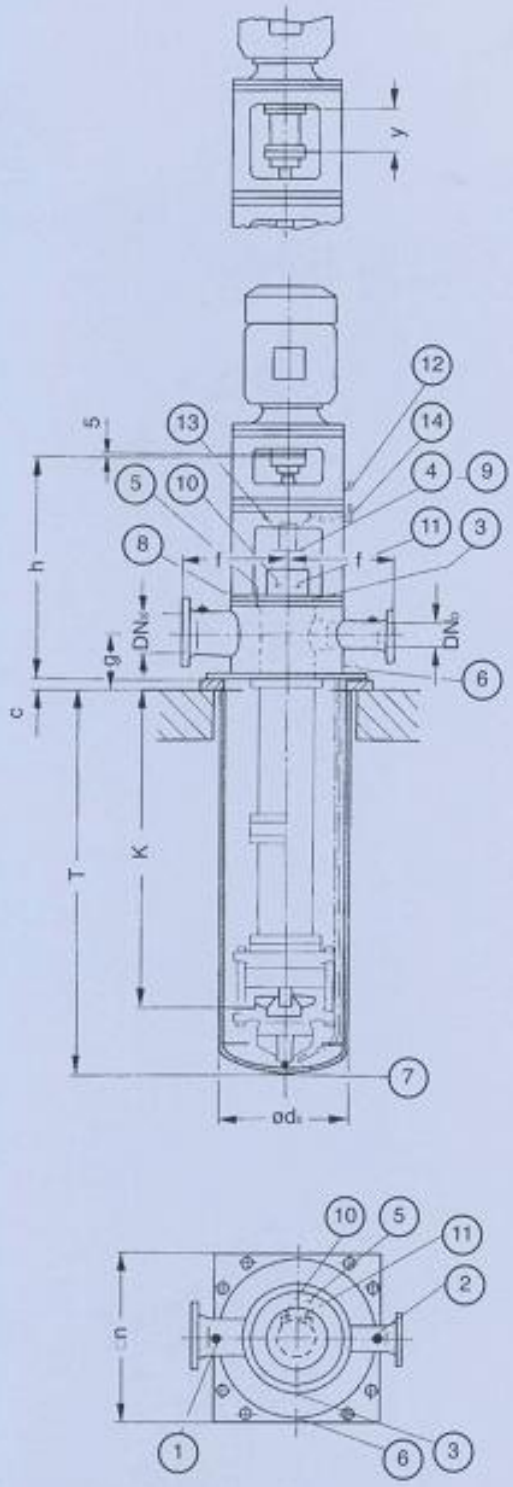
从驱动端方向看，泵为逆时针旋转。标注的尺寸以毫米为单位。
Direction of rotation anti-clockwise seen from driven end.
Dimensions in mm (not binding)

1.进口压力表（TLDB150）
2.出口压力表
3.平衡鼓压力表
4.密封冲洗
5.排气
6.泵体排液管
7.外壳排液
8.泵排泄
9.冲洗
10.冷却水入口
11.冷却水出口
12.恒位油杯
13.排油
14.液位计

1. measuring-suction side (onlyTLDB150)
2. measuring-discharge side
3. measuring-balance piston
4. sealing/flushing
5. vent
6. drain-opump
7. drain-can
8. leakage drain
9. flushing
10. cooling water-inlet
11. cooling water-outlet
12. oil-filling
13. oil drain
14. oil level indicator

TLDB立式筒袋泵

各种设计结构
Various technical designs



Ⓐ=带平衡装置 nmax=1750 r/min
Ⓑ=带平衡装置 n=2950 r/min
Ⓒ=带平衡装置 n=3550 r/min

Ⓐ with balance piston nmax=1750 r/min
Ⓑ with balance piston n=2950 r/min
Ⓒ with balance piston n=3550 r/min

	公称通径 Branch		安装尺寸 Installation dimensions			级 数 Number of stages			泵尺寸 Pump dimensions					
	DN_2	DN_3	$ød_1$	K	T	Ⓐ	Ⓑ	Ⓒ	c	f	g	h	n	y
TLDB40	80	40	406	535	755	2-9	2-9	2-9	45	325	190	834	560	180
				760	980	2-14	2-14	2-14						
				985	1205	2-27	2-17	2-15						
				1210	1430									
				1435	1655									
				1660	1880									
				1885	2105									
				2110	2330		-	-						
				2335	2555									
				2560	2780									
TLDB50	100	50	457	608	858	2-8	2-8	2-8	35	375	207	900	620	180
				828	1078	2-12	2-12	2-10						
				1048	1298	2-13	2-13							
				1268	1518									
				1488	1738	2-16								
				1708	1958									
				1928	2178									
				2148	2398									
				2368	2618									
TLDB80	150	80	508	515	785	2-6	2-6	2-6	45	400	250	1020	700	250
				775	1045	2-10	2-10	2-8						
				1035	1305	2-14								
				1295	1565	2-15								
				1555	1825									
				1815	2085									
				2075	2345									
				2335	2605									
TLDB100	150	100	558	555	855	2-5	2-5	2-5	45	450	250	1040	750	250
				795	1095	2-8	2-8	2-7						
				1035	1335	2-11								
				1275	1575									
				1515	1815									
				1755	2055									
				1995	2295									
				2235	2535									
				2475	2775		-	-						
TLDB125	200	125	711	650	1000	1-4	-	-	55	550	310	1260	900	250
				980	1330	1-7								
				1310	1660									
				1640	1990									
				1970	2320									
				2300	2650									
				2630	2980									
				2960	3310									
TLDB150	300	150	813	815	1240	1-4	-	-	50	600	365	1440	1000	300
				1095	1520									
				1375	1800									
				1655	2080									
				1935	2360									
				2215	2640									
				2495	2920									
				2775	3200									
				3055	3480									
				3335	3760									
TLDB200	400	200	914	725	1275	1-4	-	-	50	650	445	1685	1100	300
				1115	1615	1-6								
				1455	1955	1-7								
				1795	2295									
				2135	2635									
				2475	2975									
				2815	3315									
				3155	3655									