

用于太阳能发电的 **VEY** 熔盐泵
**VEY Molten Salt Pump for
Concentrated Solar Power**



主要应用

VEY 是立式混流式泵型，适用于大流量，中等及高扬程的工况。它具有成熟完整的水力设计。并在设计时综合考虑了高效率，低浸没深度及低必需汽蚀余量等特性。

VEY 泵型主要应用于：

- 槽式太阳能光热电站的冷、热熔盐循环泵
- 塔式太阳能光热电站的高压冷熔盐泵
- 塔式太阳能光热电站的热熔盐循环泵
- 塔式太阳能光热电站的调温熔盐泵
- 槽式、塔式太阳能光热电站的化盐泵和排盐泵

熔盐延长了运行时间

今天，熔盐由于其高比热容被更多的应用于太阳能光热电厂的热储能，或作为主要传热介质。当一个太阳能光热电厂采用了熔盐储热，它就能在太阳下山后继续发电。这样就能将发电时间延长到 6~15 小时。

现在实际广泛的采用安装在储罐上的立式泵方式，因为这样可以简化熔盐系统。它节省了泵坑、隔离阀、液位仪表和辅助加热器。这种设计同样减少了热损失并允许系统直接将盐排放到罐中。

Molten Salts Extending the Operation Period

Molten salts are increasingly used today in CSP plants for heat storage or as primary Heat Transfer Fluid (HTF) due to their high specific heat capacity. When a thermal storage reservoir using molten salts is integrated into a CSP plant, electricity can be generated even after the sun goes down, with an extended operation period of up to 6-15 hours.

Vertical pumps mounted in tanks are preferred nowadays to simplify the molten salt system. This eliminates the pump sumps, isolating valves, level instrumentation and associated heaters. It also reduces heat losses and allows the system to drain directly into the tanks.

Main Applications

The VEY is a vertical mixed flow pump with high capacity and medium to high head. Its design includes hydraulics from proven ranges. This pump has been engineered to balance high efficiency, low submergence and Net Positive Suction Head Required (NPSHr) considerations.

The VEY is used as:

- Cold and hot molten salt circulation pumps in parabolic trough Concentrated Solar Power (CSP)
- High pressure cold molten salt feed pumps in central tower CSP
- Hot molten salt circulation pumps in central tower CSP
- Cold molten salt attemperation pumps in central tower CSP
- Cold molten salt melting and drainage pumps in parabolic trough and central tower CSP





特征及优点

- 1 优秀的吸入口设计提供更低浸没深度
- 2 第一级叶轮
 - 诱导轮或高吸入比转速叶轮设计有效降低必需汽蚀余量
- 3 特殊的滑动轴承
 - 提供更好的轴对中，对热膨胀有更好的适应
- 4 主密封使用喉部衬套设计
 - 保证微量泄漏回流至熔盐罐
- 5 辅助挡液环密封
 - 防止熔盐泄漏到大气
- 6 高效的热隔绝
 - 冷热部件之间有效的热隔离
- 7 易于拆除的级间联轴器
- 8 为热膨胀所做的特殊设计
 - 扩展磨损环区域
 - 设计间隙时考虑所有相关膨胀

Features and Benefits

- 1 **Engineered suction design for optimized submergence**
- 2 **First stage impeller**
 - Inducer or high Suction Specific Speed (Nss) impeller for reduced NPSHr
- 3 **Engineered bearing bushings**
 - Better shaft alignment and adaptation to the thermal expansion
- 4 **Main shaft sealing by throttle bushing**
 - Permanent leak-off recirculation to the molten salt tank
- 5 **Auxiliary shaft sealing deflector**
 - Prevents leakage of molten salt to the atmosphere
- 6 **Efficient thermal barrier**
 - Heat barrier between hot/cold sections
- 7 **Muff coupling to ease dismantling**
- 8 **Special design to allow thermal expansions**
 - Extended wear ring zone
 - Clearances calculated considering all the relative expansions

专为您的需求设计

- 进行稳定状态和待机下的热变形有限元分析
- 完成结构模态固有频率有限元分析，以便在所有运行速度下识别 / 避免结构共振情况
- 进行横向和扭转转子动态分析，以确保在整个速度范围内的安全运行

Engineered to Your Needs

- Thermal distortion Finite Element Analysis (FEA) at steady state and stand-by conditions are performed
- Structural modal natural frequency FEA are completed in order to identify / avoid structural resonance conditions at all the running speeds
- Lateral and torsional rotor-dynamic analysis are carried out to ensure safe behavior throughout the complete speed range

VEY 熔盐泵

VEY Molten Salt Pump



石油及天然气
Oil and gas



烃加工工业
Hydrocarbon
processing



电力
Power
generation



纸浆和造纸
Pulp and
paper



通用工业
General
industry



化学工艺
Chemical
process
industry

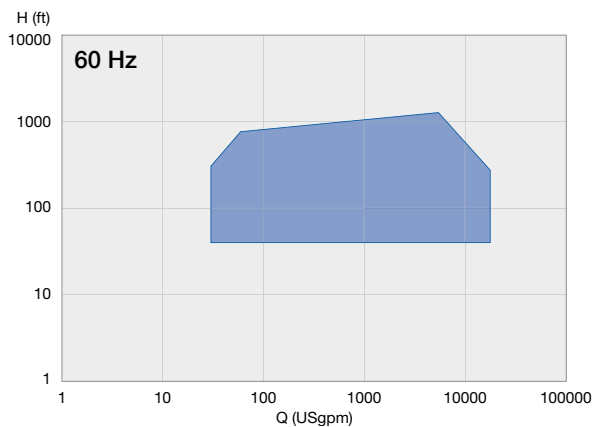
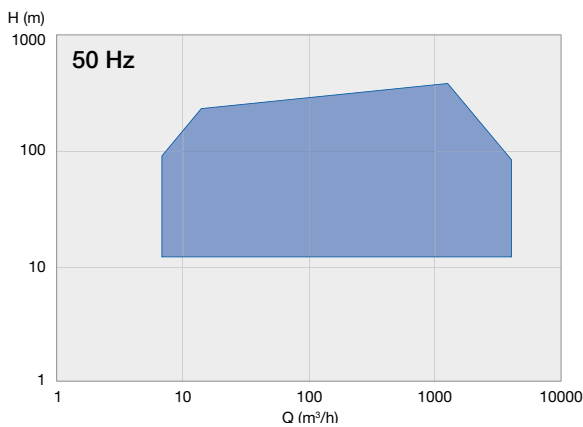


水与污水
Water and
wastewater

运行数据 / Operating data

50 Hz	泵壳 / Pump bowls	60 Hz
达 / up to 914 mm		达 / up to 36 in
达 / up to 4,000 m ³ /h	流量 / Capacities	达 / up to 17,600 USgpm
达 / up to 380 m	扬程 / Heads	达 / up to 1,250 ft
达 / up to 100 bar	压力 / Pressures	达 / up to 1,450 psi
达 / up to 600°C	温度 / Temperatures	达 / up to 1,100°F

性能范围 / Performance ranges



材料 / Materials

泵部件 / Pump part	材料 / Material
泵壳 Bowl	高温碳钢, 铬钢, 高温不锈钢 HT carbon steel, chrome steel, HT stainless steel
叶轮 Impeller	高温碳钢, 铬钢, 高温不锈钢 HT carbon steel, chrome steel, HT stainless steel
轴 Shaft	高温铬钢, 高温不锈钢 HT chrome steel, HT stainless steel
排出管及排出室 Column and discharge head	高温碳钢, 高温不锈钢 HT carbon steel, HT stainless steel

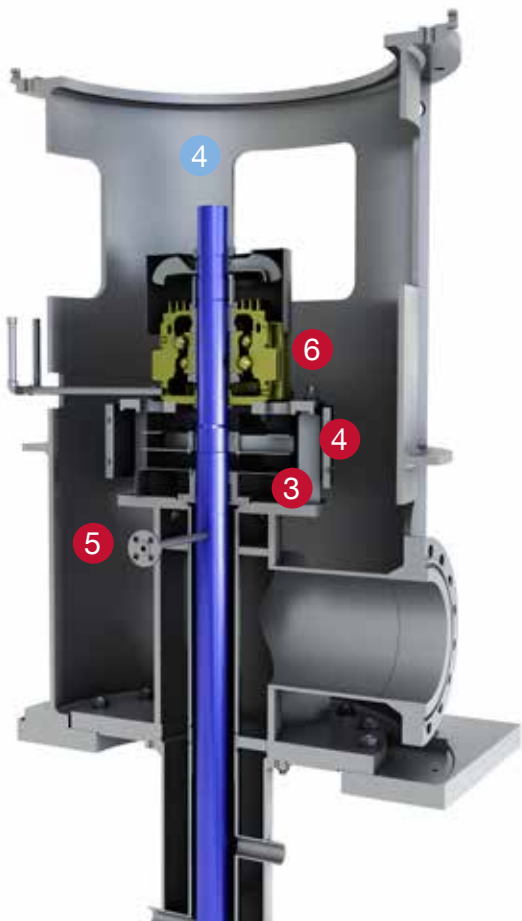


标准设计

- ① 入口诱导轮设计提供低必需汽蚀余量
- ② 所有叶轮的壳体带有排净孔
- ③ 有效的隔热防止热损失
- ④ 轴上自带的风扇 / 散热器有效降低温度, 保护和增加泵轴承使用寿命
- ⑤ 氮气 / 空气的急冷保护接口允许储罐氮封
- ⑥ 止推轴承位于泵内

Design Standards

- ① Suction inducer for very low NPSHr
- ② All the impellers and bowls are provided with draining holes
- ③ Efficient heat shield to limit the heat loss
- ④ Shaft fans/radiators to reduce temperature, protect and increase lifetime of the pump bearings
- ⑤ Nitrogen/air quench connection to allow tank blanketing
- ⑥ Thrust bearing located in the pump



可选设计

- ① 粗网孔的吸入口过滤罩
- ② 为降低必需汽蚀余量的高吸入比转速的首级叶轮
- ③ 泵滑动轴承下的可互换轴套
- ④ 止推轴承位于电机内

Design Options

- ① Wide mesh suction strainer
- ② High Nss mixed flow first stage impeller for reduced NPSHr
- ③ Interchangeable sleeves under the line shaft bearings
- ④ Thrust bearing located in the motor

苏州苏尔寿泵业有限公司
苏州新区建林路 433 号
总机 +86 (0) 512 8187 3888
传真 +86 (0) 512 8187 3591
邮编 215151

Sulzer Pumps Suzhou Ltd.
No.433, Jianlin Road, Suzhou New District,
Suzhou 215151
Tel. +86 (0) 512 8187 3888
Fax +86 (0) 512 8187 3591

北京分公司
北京市建国门内大街 7 号光华长安大厦
1 座 1003/1005 室
电话 +86 (0) 10 6510 1777/1781
传真 +86 (0) 10 6518 5011
邮编 100005

Beijing Branch
Room 1003/1005, Tower 1,
No.7, Bright China Chang An Building,
Jian Guo Men Nei Dajie,
Beijing, China 100005
Tel. +86 (0) 10 6510 1777/1781
Fax +86 (0) 10 6518 5011

苏尔寿泵业上海技术服务中心
上海市浦东新区合庆镇
东川公路 5587 号
电话 +86 (0) 21 5897 3801
传真 +86 (0) 21 5897 3803/3605
邮编 201201

Shanghai Service Center
No.5578, Dongchuan Road,
Heqing Pudong New Area
Shanghai, China 201201
Tel. +86 (0) 21 5897 3801
Fax +86 (0) 21 5897 3803/3

大连苏尔寿泵及压缩机有限公司
大连市双 D 港双 D7 街 6 号
总机 +86 (0) 411 8758 1888
传真 +86 (0) 411 8758 1878-8738
邮编 116600

Sulzer (Dalian) Pumps & Compressors Ltd.
No.6 DD 7th Street, DD Port
Dalian 116600
Tel. +86 (0) 411 8758 1888
Fax +86 (0) 411 8758 1878-8738

上海分公司
上海市浦东新区福山路 388 号宏嘉
大厦 2102-2014 室
电话 +86 (0) 21 6888 2900
传真 +86 (0) 21 5882 6708
邮编 200122

Shanghai Branch
Room 02-04, Hong Jia Tower,
No.388 Fu Shan Road,
Pu Dong New District,
Shanghai, PRC 200122
Tel. +86 (0) 21 6888 2900
Fax +86 (0) 21 5882 6708

成都技术服务中心
四川省彭州市石化基地炼厂南路
与经一路交汇处
电话 +86 (0)28 8385 9009
邮编 611930

Chengdu Service Center
The Intersection of Refinery South Road
and Jingyi Road, Petrochemical Base,
Pengzhou, Sichuan, China 611930
Tel. +86 (0)28 8385 9009

www.sulzer.com

广州办事处
广州市天河区华庭路 4 号富力天河商务
大厦 1006 室
电话 +86 (0) 20 8310 7466
传真 +86 (0) 20 8310 5626
邮编 510610

Guangzhou Office
Room 1006, Fuli Tianhe Business Macsion,
No. 4 Huating Road, Tianhe District,
Guangzhou, PRC 510610
Tel. +86 (0) 20 3810 7466
Fax +86 (0) 20 3810 5626