

SPV

Vertical Mixed-Flow Pump



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The **TORISHIMA** SPV is a vertical, mixed-flow pump suitable for a wide range of applications. Whatever process you operate; Power, Desalination, Petrochemical, LNG, Water Treatment or Supply, Drainage or general industries, the complete plant operation depends on the reliable performance of the main intake, cooling or seawater pumps. Torishima's reputation for providing reliable mixed flow pumps to operate in critical processes is second to none. With several thousand pumps operating worldwide you can count on Torishima pumps to be the driving force behind your pumping requirements.

Applications

Power

- Cooling Tower and Cooling Water Circulation

Desalination

- Seawater Intake
- Brine Recirculation / Blowdown
- Distillate

Petrochemical

- Seawater Intake
- Cooling Water
- Water Transfer

Drainage Applications

Water & Wastewater

- River water intake
- Water Transfer
- Waste or Storm Water Sump Drainage
- Irrigation Supply and Land Drainage
- Flood Control

Industries

- Cooling Water
- Fire and Service Water

Performance Range

Head : 3 to 100 m (10 to 330 ft)

Capacity : 600 to 81,600m³/h (2,600 to 360,000 USgpm)

Temperature : up to 80°C (176°F)

Size : 300 to 3,000mm (12" to 120")

Materials

Critical applications require pumps from a reliable manufacturer who has proven experience in a wide range of applications and materials. Torishima provides a wide range of expertise in material selection and has experience in manufacturing pumps from the following materials:

Pump Diffuser Casing & Impellers

- Duplex and Super Duplex Stainless Steel
- Stainless Steel
- Cast iron, Ductile Iron, Ni Resist Cast Iron
- Bronze, Aluminium Bronze

Shaft

- Duplex and Super Duplex Stainless Steel
- Stainless Steel
- Carbon Steel,

Discharge Bend and Rising Main

- Duplex and Super Duplex Stainless Steel
- Stainless Steel
- Cast Iron, Ni Resist Cast Iron
- Carbon Steel

Specific material grades are available on request.

Product Life Cycle Support

The mixed flow pumps are always operated under the most arduous conditions particularly for seawater intake and drainage applications. Unexpected operating conditions can occur on site, so it is important that the pump supplier understands the complete plant design. As a qualified plant supplier Torishima can provide a wide range of technical design services to support your mixed flow pumps through the product lifecycle.

Torishima Design Services

- Intake sump modelling
- Finite Element analysis
- 3D Flow Modelling
- Noise and Vibration Analysis
- Model Pump Testing
- Surge Analysis

Torishima Site Support

Torishima's site service capability backed by our design expertise ensures the best service for our customers. Our global team can provide network

- Installation & Commissioning
- Pump Performance Testing
- Overhaul
- Maintenance vendor management

Torishima - Research and Development

To provide reliable and energy efficient mixed-flow pumps, our experienced engineers are dedicated to

- Pump Hydraulic Development
- Pump Model Development and Testing
- Bearing design and development
- Computer aided model sump design
- Mechanical Seal Development



Reliable Design

Motor Support

Finite element design and proven experience are incorporated in the design of our motor support.

- Minimal vibration
- Optimum rigidity
- Suitable access for maintenance

Shaft Seal

Torishima sealing options are designed for

- Minimum maintenance
- Reduction in external flushing

Seals Available

- Gland packing
- Mechanical seal

Flushing plans

- Wide range available from self flushed (with no external piping) to recirculation via filtration, to API plans.

Shaft

Designed to ensure

- Low risk of vibration
- Maximum life
- Safe shaft critical speed throughout the operating ranges

Hydraulic Design

Impeller and diffuser designs are based on proven model designs and incorporate a wide range of pump specific speed(Ns) to provide

- Stable performance
- Lower power consumption
- Higher operating efficiency
- Lower NPSHr characteristics

Impeller designs available are

- Semi-open
- Closed

Diffuser designs available

- Cast Type
- Fabricated Type

Thrust Bearings Options

Bearing are designed to provides

- Low bearing temperature rise
- Maximum maintenance intervals
- Safe reverse running

Location

- Thrust by driver
- Thrust by pump mounted thrust bearing

Designs

- Antifriction (Grease and Oil)
- Tilting Pad type (Oil)

Cooling

- Air cooled
- Water cooled

Shaft Enclosing Tube

Is a standard execution on all pump designs and provides

- Extended bearing life.

Enclosing tube is available for

- Aggressive environments, where the shaft bearings require isolation from the pumped fluid
- Rotor pull out construction

Guide Bearing

Torishima has significant operating experience in applications where no pre-lubrication of the bearings is required. The method provides

- Simplified control and operation
- Less risk of pump failure
- Extended life of intermediate bearing
- Environmentally friendly

The options which are available at present are

- Ceramic
- Thermo Plastics
- Cutless rubber
- Carbon

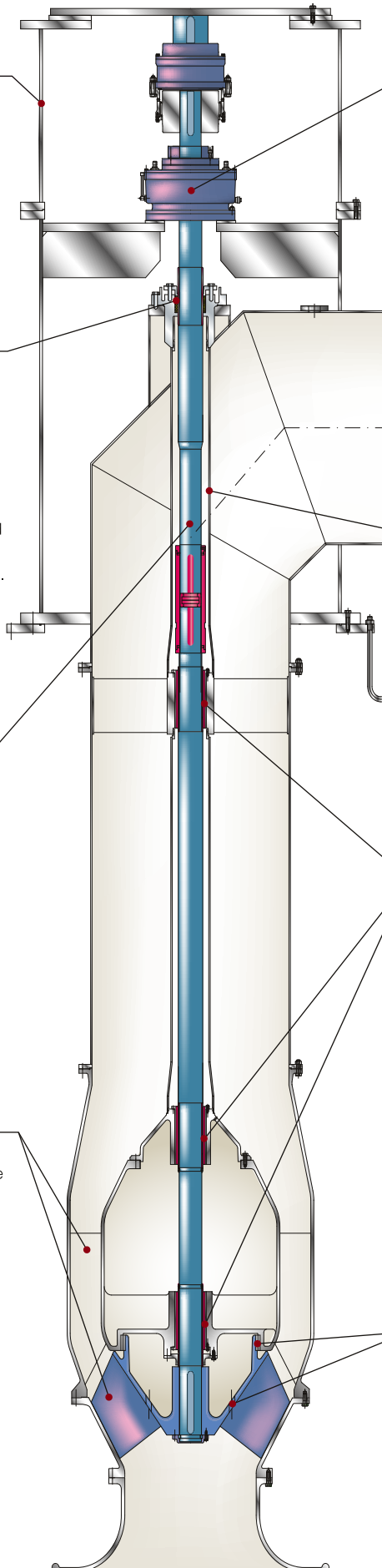
Thrust Balance

Dependant on the duty conditions, Torishima pumps incorporate a range of axial thrust compensation designs to provide

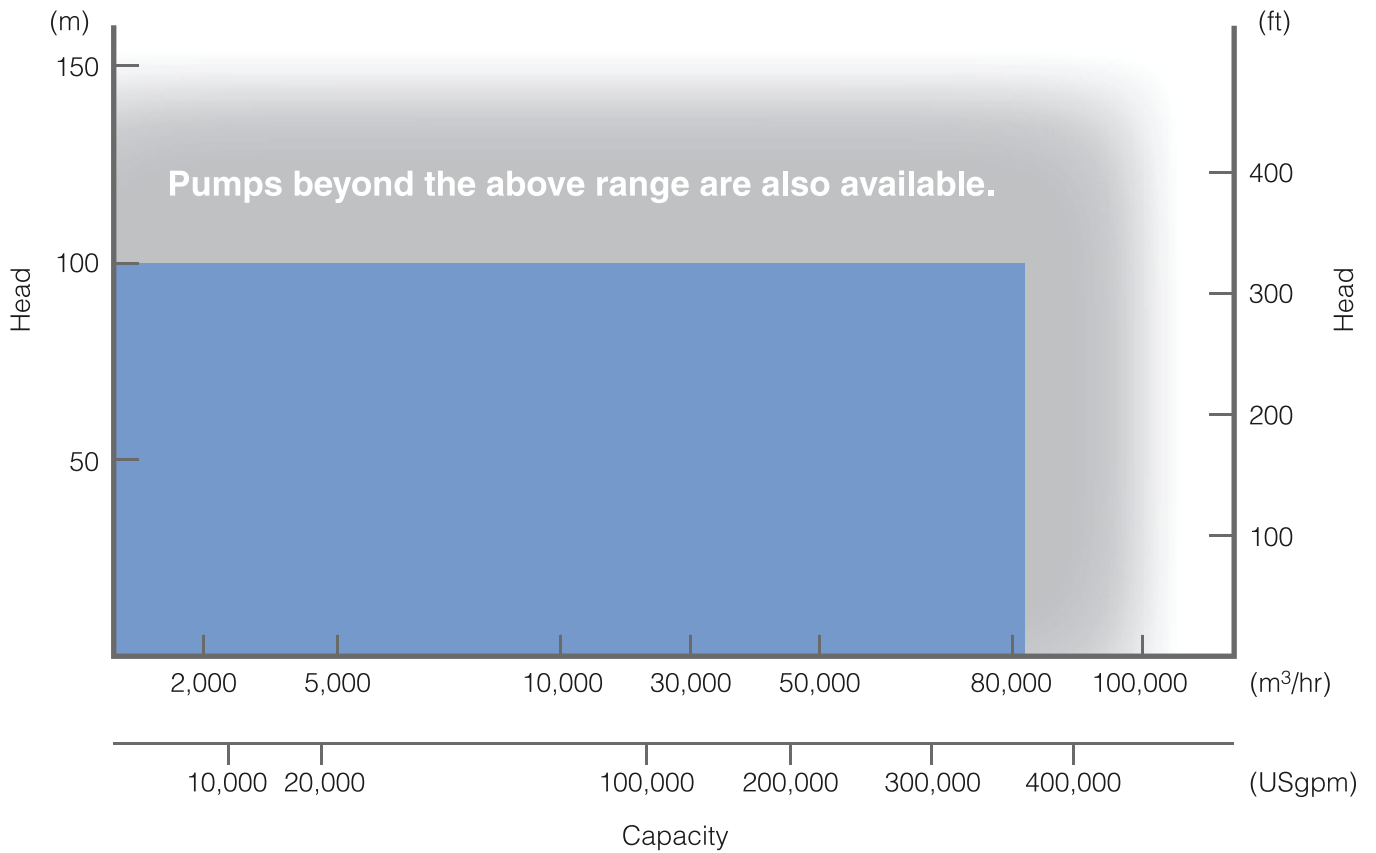
- Improved reliability
- Extended bearing life
- Lower thrust loads

Balance methods available are

- Back wear rings & Balance holes
- Back vane

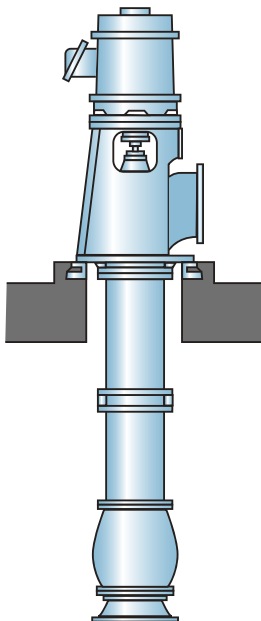


Performance Range

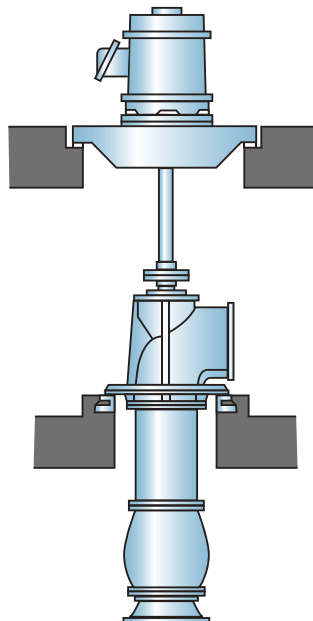


Type of Installation

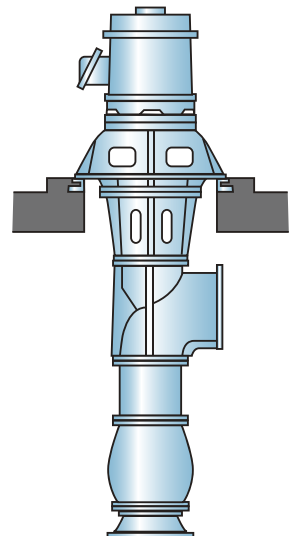
Discharge nozzle above floor



Two-floor installation



Discharge nozzle below floor



References



Dewatering pump
with adjustable vane
(Size:2,400mm, Driver:1,103kW)



Cooling water pump
for P.A.I. Shuaiba, Kuwait
(Size:1,400mm, Driver:1,500kW)



Various seawater pumps
in Al Taweela MSF
desalination plant,
Abu Dhabi, UAE



Vaporizing pumps in LNG Plant, Korea
(Size:1,000mm, Driver:650kW)



Brine recirculation pump for
Sabia MSF desalination plant, Kuwait
(Size:1,000mm, Driver:3,550kW)

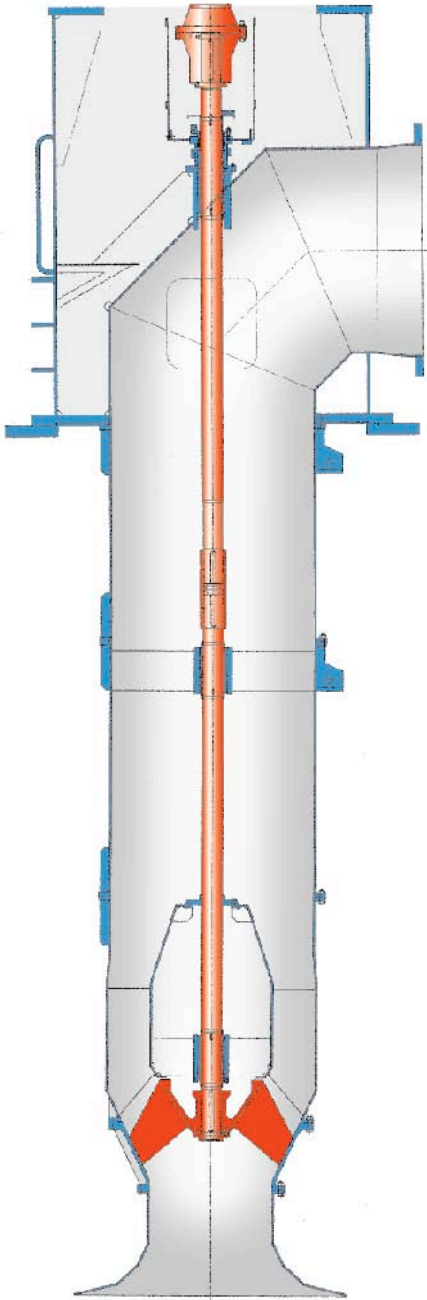


Circulating water pump for
Mesaieed A IWPP project, Qatar
(Size:1,500mm, Driver:1,650kW)

Options to meet the needs of Clients

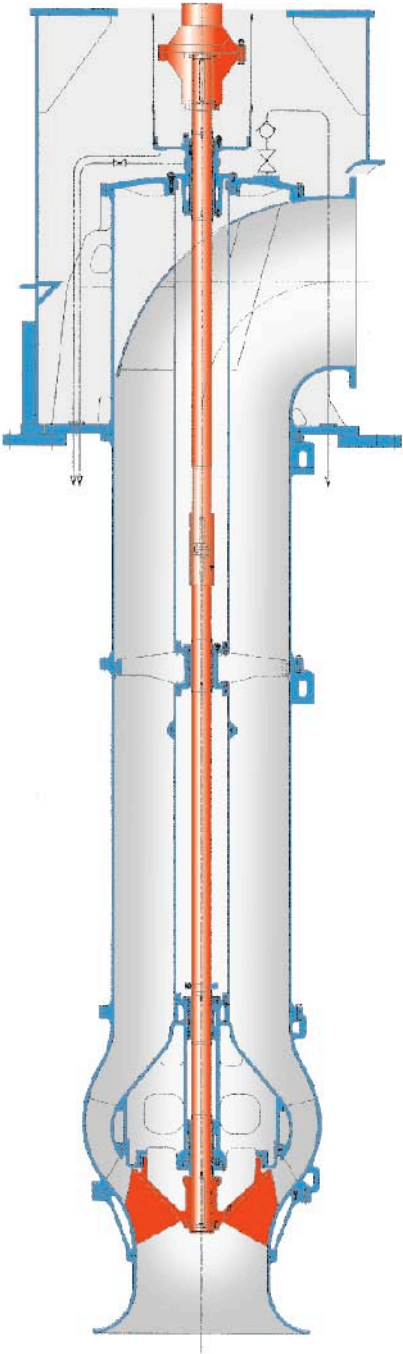
Fabricated design

- Fabricated main stational parts
- Reduced weight
- Reduced spare part costs
- Reduced capital cost



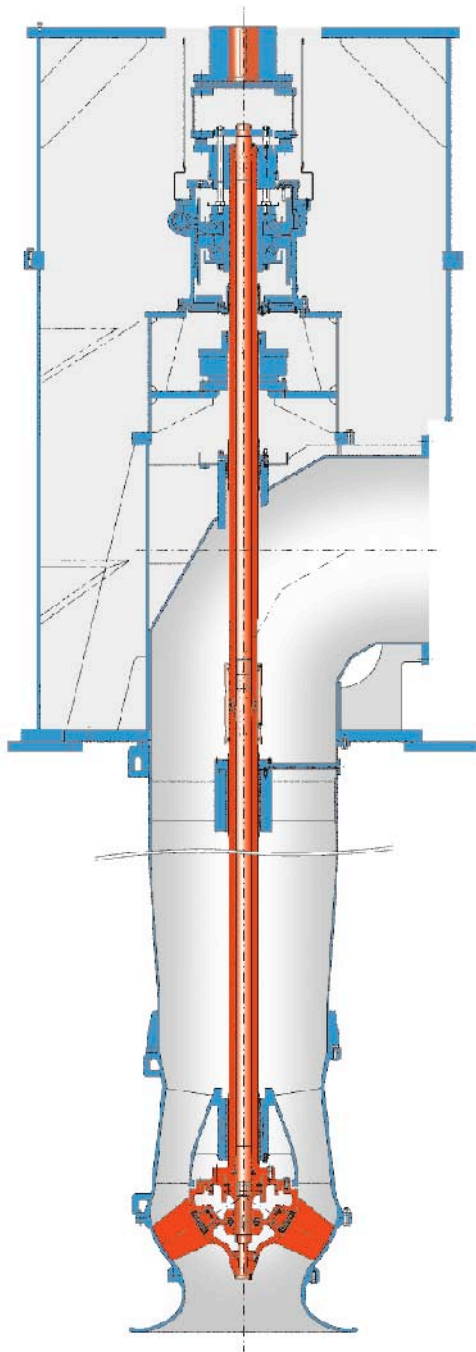
Rotor pull-out design

- Reduced maintenance cost
- Reduced maintenance time
- Elimination of standby pump, spare rotor can be held as spare parts



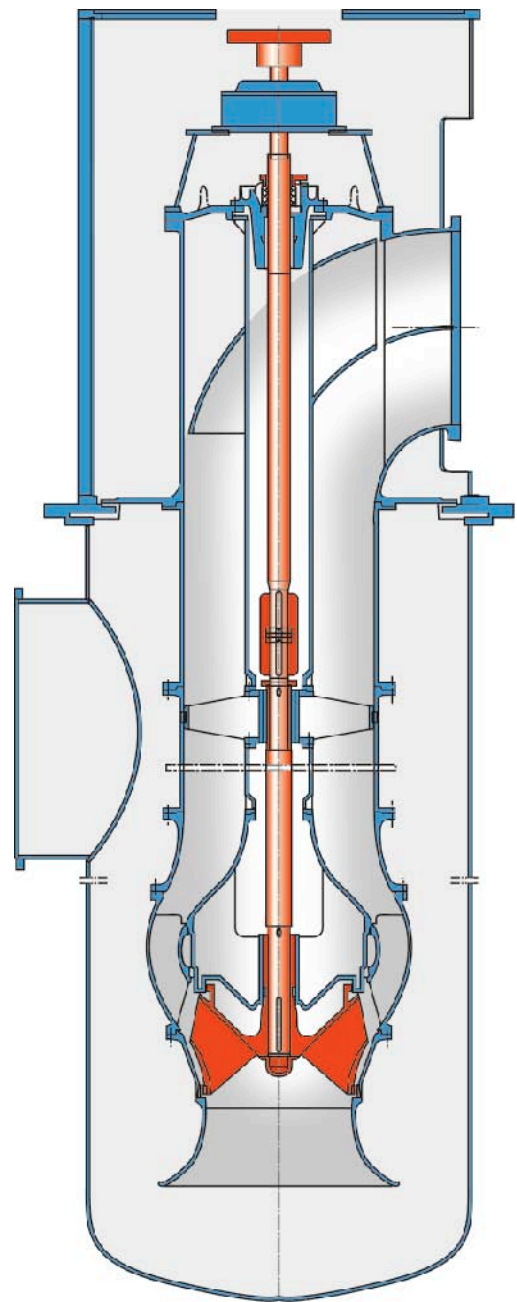
Adjustable vane

- High efficiency
- Energy cost saving

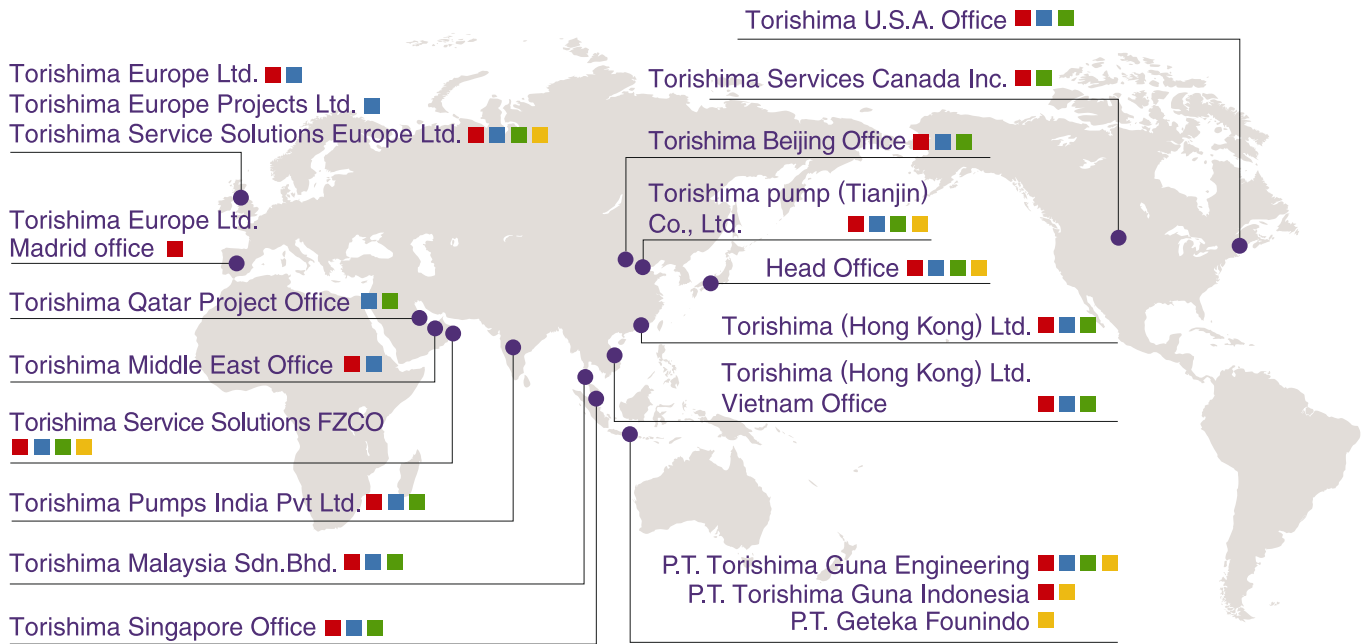


With barrel casing (SPTV)

- Low NPSH



Global Network



TORISHIMA PUMP MFG. CO., LTD.

HEADQUARTERS

1-1-8 Miyata-cho, Takatsuki-city, Osaka 569-8660 Japan
Tel : +81-72-690-2308 / Fax : +81-72-690-2329

KYUSHU TORISHIMA

9857-13, Ohaza Kawako, Wakagi-cho, Takeo-city, Saga 840-0813 Japan
Tel : +81-954-26-3081 / Fax : +81-954-26-3080

TORISHIMA CHINA

BEIJING

Rm707, Building 1, KUNSHA CENTER,
No.16 Xinyuanli, Chaoyang District, Beijing,
P.R.China PC:100027
Tel : +86-10-84682891 / Fax : +86-10-84682890

TIANJIN

No.9 Gaoxin Road, Wuqing Development Zone,
Tianjin, China P. R
Tel : +86-22-59695601 / Fax : +86-22-59695609

TORISHIMA HONG KONG

Unit A, 21/F., Tower A, Billion Centre, 1 Wang Kwong Road,
Kowloon Bay, Kowloon, Hong Kong
Tel : +852-2795-1838 / Fax : +852-2754-3293

TORISHIMA VIETNAM

No.76 Bui Thi Xuan Street, Hai Ba Trung District,
Hanoi, Socialist Republic of Vietnam
Tel : +84-4-943-7880 / Fax : +84-4-943-7876

TORISHIMA SINGAPORE

30 Ubi Grescent #01-02 Ubi Techpark, Singapore 408566
Tel : +65-6779-0123 / Fax : +65-6779-6900

TORISHIMA MALAYSIA

Lot 19, 1st Floor Bangunan Ipmuda Jalan 13/2 46200
Petaling Jaya Selangor, Malaysia
Tel : +60-3-7960-5771 / Fax : +60-3-7960-5772

TORISHIMA INDIA

Tower B 1106, Millennium Tower, Sector27
Guragon-122002, Haryana, India
Tel : +91-124-4728950 / Fax : +91-124-4728950

TORISHIMA INDONESIA

TORISHIMA GUNA ENGINEERING

Jalan Rawa Sumur Timur No.1
Pulogadung Industrial Estate,
P.O.Box 1160, Jakarta, Indonesia
Tel : +62-21-460-3963 / Fax : +62-21-460-3937

TORISHIMA GUNA INDONESIA

Jalan Rawa Sumur Timur No.1
Pulogadung Industrial Estate,
P.O.Box 1160, Jakarta, Indonesia
Tel : +62-21-460-3963 / Fax : +62-21-460-3937

GETEKA FOUNINDO

JL Pulo Ayang Kav. AA2 Pulogadung Industrial Estate,
P.O.Box 1160 JAT, Jakarta 13011 Indonesia
Tel : +62-21-460-3963 / Fax : +62-21-460-3937

TORISHIMA U.A.E.

MIDDLE EAST OFFICE

5th Floor Office No.503 Al Salmee Golden Tower
Electra Street, P.O.Box 53567, Abu Dhabi, U.A.E.
Tel : +971-2-674-3880 / Fax : +971-2-674-3881

TORISHIMA SERVICE SOLUTIONS

Room No.101.Commercial Bank of Dubai Building,
Al Quoz Industrial Area #3, P.O.Box 37603,
Dubai, U.A.E.
Tel : +971-4-330-6166 / Fax : +971-4-330-6163

TORISHIMA QATAR

Office No.11,1st Floor, West corner centre,
Salwa Road, P.O.Box 37027 Doha, Qatar
Tel : +974-4450-6915 / Fax : +974-4450-6916

TORISHIMA EUROPE

Sunnyside Works, Gartsherrie Rd,
Coatbridge, Scotland ML5 2DJ
Tel : +44-1236-443951 / Fax : +44-1236-702875

MADRID OFFICE

Avda, Fuente Nueva 12A Edif, Monterrey, 28703
San Sebastian de los Reyes, Madrid, Spain
Tel : +34-91-284-6900 / Fax : +34-91-284-6901

TORISHIMA EUROPE PROJECTS

Hartham Park, Corsham,
Wiltshire, England SN13 0RP
Tel : +44-1249-700-290

TORISHIMA SERVICE SOLUTIONS EUROPE

Sunnyside Works, Gartsherrie Rd,
Coatbridge, Scotland ML5 2DJ
Tel : +44-1236-442390 / Fax : +44-1236-702875

TORISHIMA U.S.A.

100 Grove Street, Suite 217,
Worcester MA 01605-0000 U.S.A.
Tel : +1-508-753-6600 / Fax : +1-508-753-8276

TORISHIMA SERVICES CANADA

2800-350, 7th Ave S.W.
Calgary, Alberta T2P 3N9
Tel : +1-403-705-1932