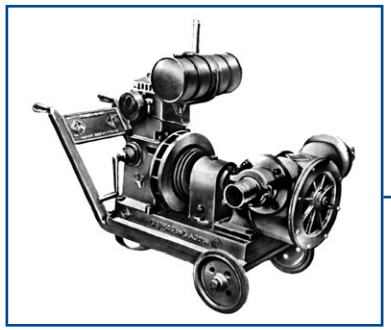
# GARBARINO®

## Company Presentation

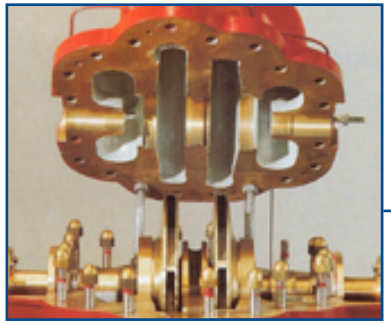
# Company History

*Founded in 1932 by Paolo Garbarino*

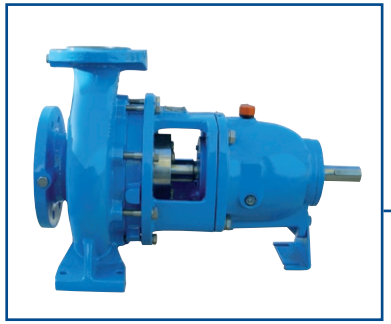


**1932**
Wine Industry field

**60's**
Marine field



**50's**
Italian Navy Supplier



**80's**
Industrial field

# Location in Italy


## Acqui Terme (AL), Piedmont

- HEADQUARTERS
- 2 WORKSHOPS

# Company Features

Tailor Made products

High quality standards

Long experience

High flexibility

Technical consultancy

After sales

Warehouse - Spare parts

Materials

# Quality Standards

## ISO 9001:2015
by RINA

## ISO 14001:2015
by RINA

## AQAP 2110
by the Italian Ministry of Defence since 1987

## Classification societies:
RINA, ABS, BV, LR, DNV GL, NKK, RS, RRR

# Markets: marine&offshore, navy and industry

## Marine&Offshore

supplier of major shipyards in Europe and Asia,ship owners worldwide, world market leader in cruise shipbuilding

## Navy

official supplier of the Italian Navy since 1950, supplier of several foreign navies

## Industry

pumps specifically manufactured for industrial applications and different type of plants

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# Marine&Offshore

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# Shipyards References

FINCANTIERI

MEYER TURKU SHIPYARD 1737

BAKU SHIPYARD

CSIC

intermarine

DAMEN

stx Offshore & Shipbuilding

Boustead Naval Shipyard Sdn. Bhd

T. MARIOTTI

REMONTOWA

SAMSUNG HEAVY INDUSTRIES

Keppel Offshore & Marine

ROSETTI MARINO

SELAH Shipbuilding Industry Inc.

HYUNDAI MIPO DOCKYARD

sembcorp

CHANTIERS DE L'ATLANTIQUE

Lamprell

HYUNDAI HEAVY INDUSTRIES CO.,LTD.

ST Engineering Marine

NAVAL GROUP

NPCC

MITSUBISHI HEAVY INDUSTRIES

PAL INDONESIA

Navantia

CSSC

ESTALEIRO AtlânticoSul

# Vessels Type

- CRUISE VESSELS
- MEGA YACHTS
- WORK BOATS:

  Tug boats,

  Supply vessels,

  AHTS,

  Oceanographic/ research vessels.
- GENERAL CARGO SHIPS
- CONTAINER CARRIERS
- BULK CARRIERS
- OIL TANKERS/OBO's
- FERRIES, RO-RO / PAX
- OFFSHORE:

  Semi-Sub platforms,

  Drilling platforms,

  Drilling ships,

  FPSO's
- LPG / LNG
- CHEMICAL/PRODUCT CARRIERS
- OTHERS:

  Floating Docks,

  Floating Power Stations,

  Heavy Bulk Cargo Barges,

  Pipe laying vessels

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# Cruise References

ACCOR
ADORA CRUISES
AIDA
ĀMAN
AZAMARA CLUB CRUISES
Carnival
Costa
CUNARD
CRYSTAL CRUISES

Disney Cruise Line
Four Seasons Yachts
Holland America Line
MSC Crociere
NCL Norwegian Cruise Line
Oceania Cruises
P&O Cruises
PONANT Yacht Cruises & Expeditions

Princess Cruises
Regent Seven Seas Cruises
SEABOURN
SILVERSEA
The Ritz-Carlton Yacht Collection
TUI Cruises
VIKING
Virgin Voyages

# Marine and Naval Applications

- Main and auxiliaries cooling
- Ballast service
- Bilge service
- Deck water sealing
- Sludge
- Sewage transfer
- Main engine lub oil system
- Lub oil, fuel oil, waste oil transfer
- Boiler feed
- Economizer circulation
- Fire fighting & general services
- Fresh water system
- AC chilled water circulation
- HT/LT circulation
- Grey / Black water handling
- Water chilling
- Scrubber system
- Ballast water treatment

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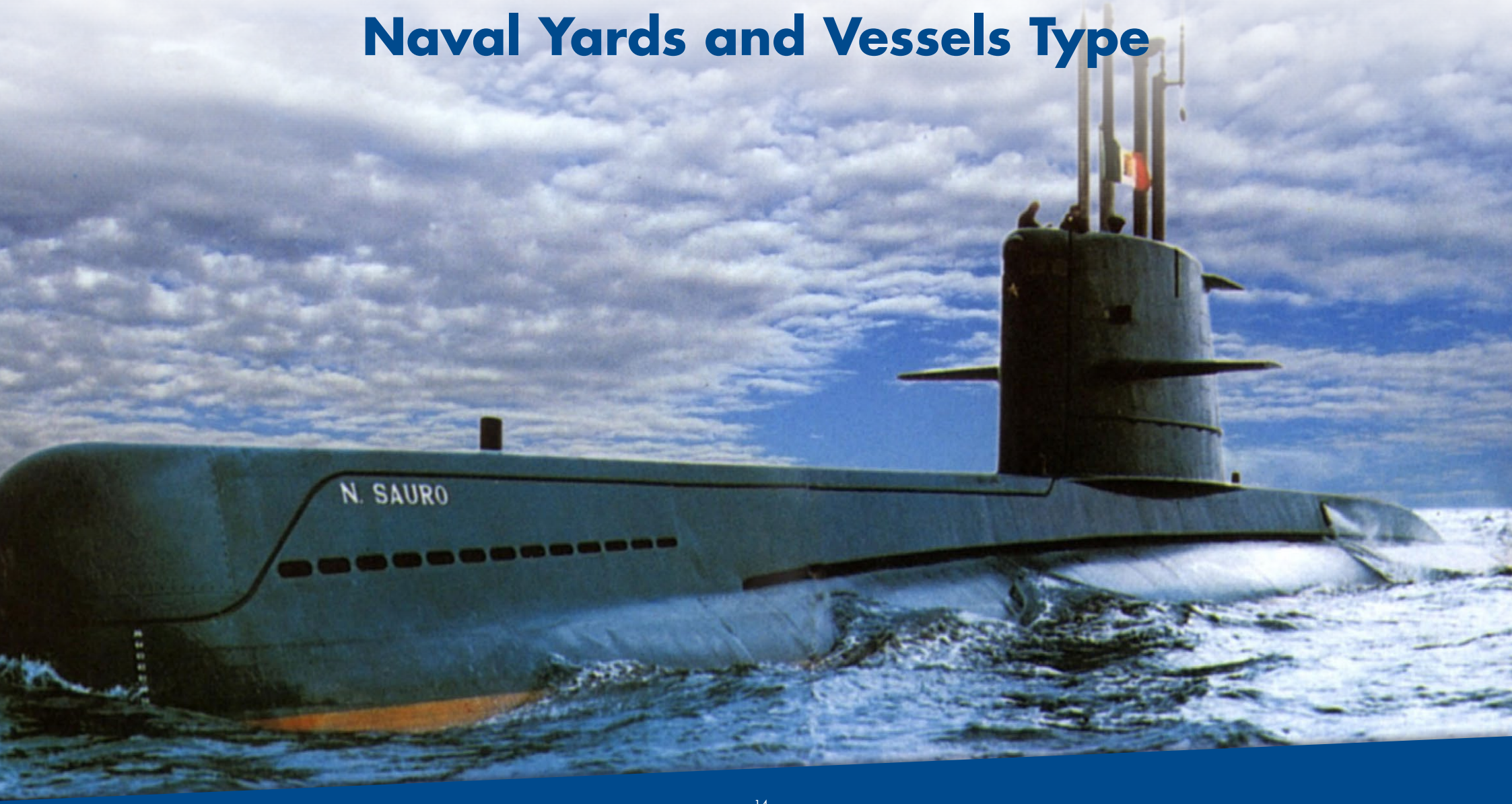
# Navy

# Naval Quality Standards

- NATO AQAP-2110
- Military Standards MIL STD:
- Mechanical Vibrations MIL STD 167-1
- Airborne Sound MIL STD 740 1
- Structure borne vibrations  MIL STD 740 2
- Shock Test MIL  S 901 D
- Non magnetic executions

# Naval Yards and Vessels Type



# Naval Yards

- Fincantieri - Italy
- Intermarine - Italy
- NAVAL Group - France
- Chantiers de l'Atlantique - France
- Chantiers Piriou - France
- CMN – France
- Navantia - Spain
- Umoe Mandal Shipyard - Norway
- Schelde Naval Shipbuilding - Holland
- Elefsis Shipyard - Greece
- Remontowa Shipbuilding - Poland
- Boustead Naval Shipyard - Malaysia
- Hyundai Heavy Industries - Korea
- ST Marine - Singapore
- PT Pal - Indonesia
- Arsenal de Marinha do Rio de Janeiro - Brazil

# Vessels Type

- Aircraft Carriers
- Submarines
- Frigates
- Mine Hunters
- Corvettes
- Destroyers
- Patrol Boats
- Oceanographic vessels
- Training vessels

# Naval References

## Europe:


• Italian Navy


• French Navy


• Spanish Navy


• Finnish Navy


• Royal Norwegian Navy


• Royal Netherlands Navy


• Belgium Navy


• Russian Navy


• Hellenic Navy


• Polish Navy


• Bulgarian Navy

## Asia:


• Iraqi Navy


• Qatari Navy


• U.A.E. Navy


• Royal Navy of Oman


• Bangladesh Navy


• Republic of China Navy


• Philippine Navy


• Royal Thai Navy


• Royal Malaysian Navy


• Singapore Navy


• Indonesian Navy

# Naval References

## Africa:

- Algerian Navy

- Royal Moroccan Navy

- Libyan Navy

- Nigerian Navy

- Angolan Navy

- South African Navy

## America:

- Mexican Navy

- Colombian Navy

- Venezuelan Navy

- Ecuadorian Navy

- Peruvian Navy

- Brazilian Navy

# Industry

# Industrial Plants

- Desalination plants
- Power plants
- Sewage, water treatments
- Paper industries
- Sugar industries
- Processing plants: up-stream applications
- Chemical and petrochemical plants
- Pharmaceutical industries
- Steelworks
- Refineries
- Painting plants
- Acrylic fibers production plants

# Industrial Applications

- Cooling service
- Sea water service
- Acid and alkaline liquids with suspended solids transfer
- Hydrocarbons transfer
- Condensate and gaseous fluids transfer
- Drain service
- Reverse osmosis
- Boiler feed
- Chemical services
- Air conditioning, air cooling, chilled water services
- Oil&gas upstream various services
- Screen wash system service

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# Industrial References

ABB

AIR LIQUIDE

ALSTOM

ArcelorMittal

CERN

Enel

Eni

PERTAMINA

Maire Tecnimont

METITO

MITSUBISHI

ORASCOM CONSTRUCTION

GASCO

PETRONAS

Eni Saipem

ارامكو السعودية Saudi Aramco

الشركة السعودية للكهرباء Saudi Electricity Company

سابك sabic

سوناطراك Sonatrach

suez environnement Degrémont

TECHINT

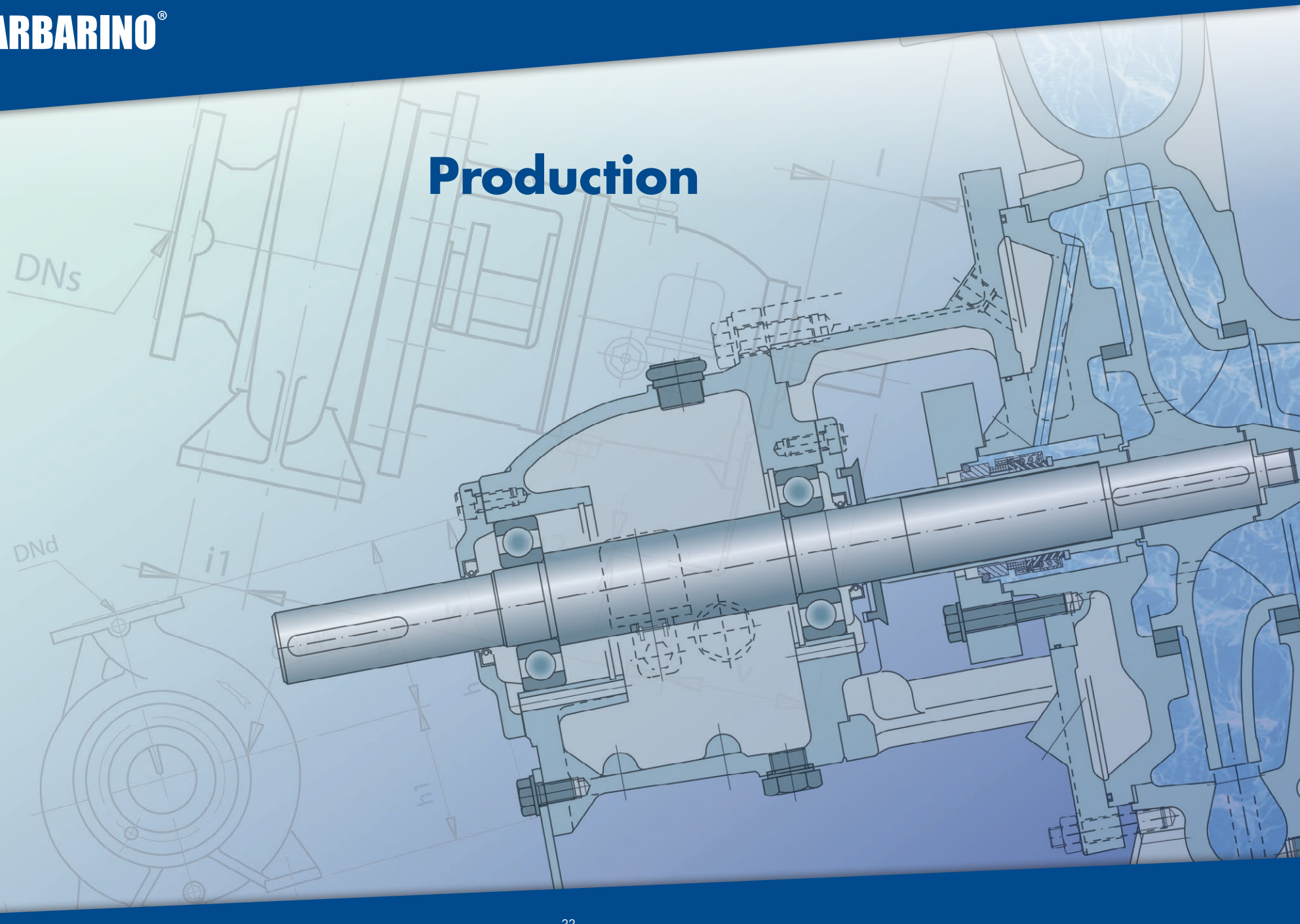
Technip

TECNICAS REUNIDAS

VEOLIA WATER Solutions & Technologies

GARBARINO®

# Production



# Products

## CENTRIFUGAL PUMPS

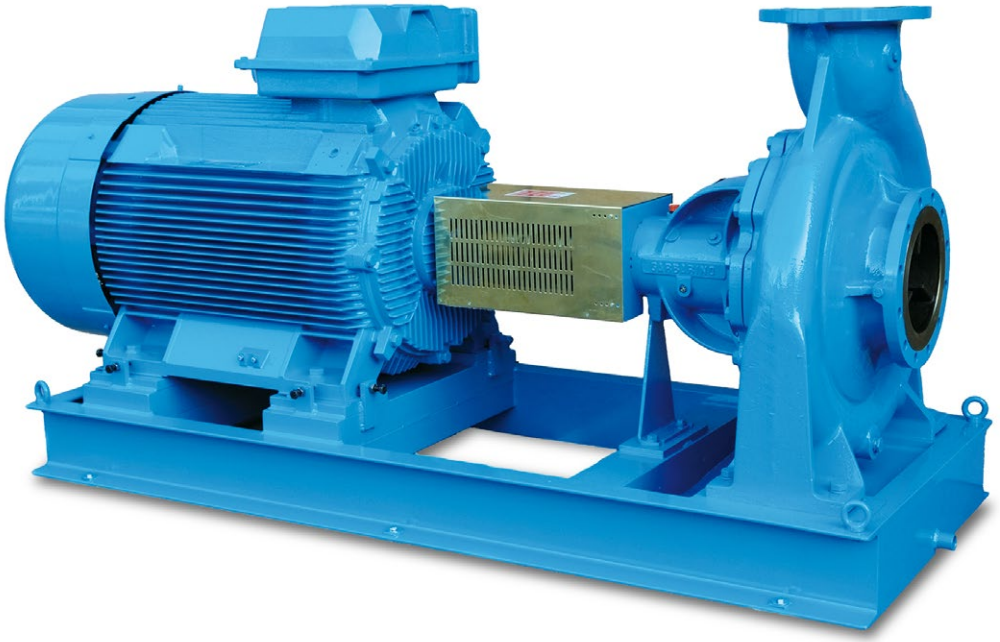
| | |
|---|---|
| **MU** | pumps according to EN 733 |
| **MU-L** | vertical in line pumps |
| **MU-LDS** | vertical in line double suction pumps |
| **VS** | vertically suspended line-shaft pumps |
| **MCA** | recessed impeller torque flow pumps |
| **CN** | chemical pumps according to ISO 2858-5199 |
| **ZN** | diathermic oil circulation pumps |
| **BT** | side channel pumps |
| **G** | multistage pumps |
| **GH** | multistage high pressure pumps |
| **MM** | fire fighting naval pumps |
| **MPF** | portable diesel engine fire pumps |
| **VL** | main engine lubrication pumps |
| **AD** | self-priming pumps with open impeller |

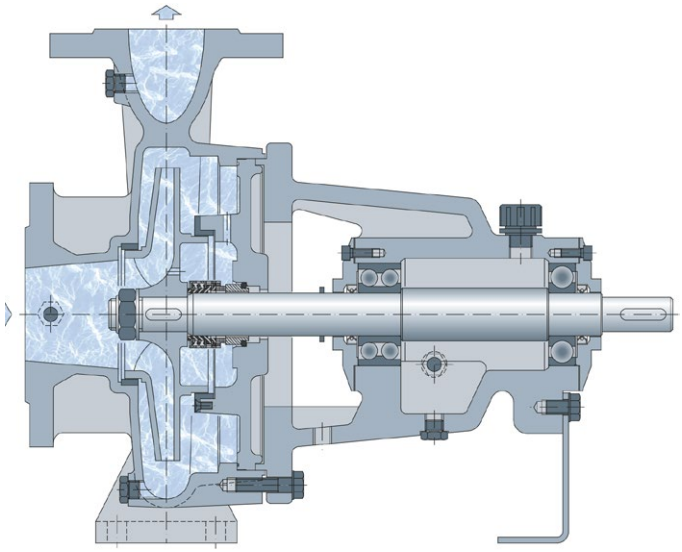
## POSITIVE DISPLACEMENT PUMPS

| | |
|---|---|
| **P** | hollow oscillating disk pumps |
| **IN** | gears pumps |
| **SWL** | piston pumps |

# Horizontal pump (according to EN 733)

- Self-priming by liquid ring or air ejector
- Disassembly back pull out system
- Oil Lubrication
- Bare shaft and close-coupled executions
- Exchangeable components
- Easy-replaceable wear rings

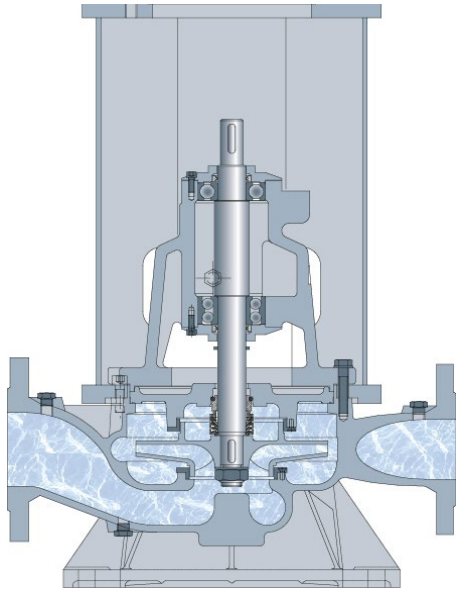




| | | |
|---|---|---|
| ND | mm | 25÷300 |
| Q | $m^3/h$ | ≤ 2500 |
| H | m | ≤ 120 |
| n | rpm | ≤ 3500 |
| t | °C | ≤ 200 |

# Vertical in line pump

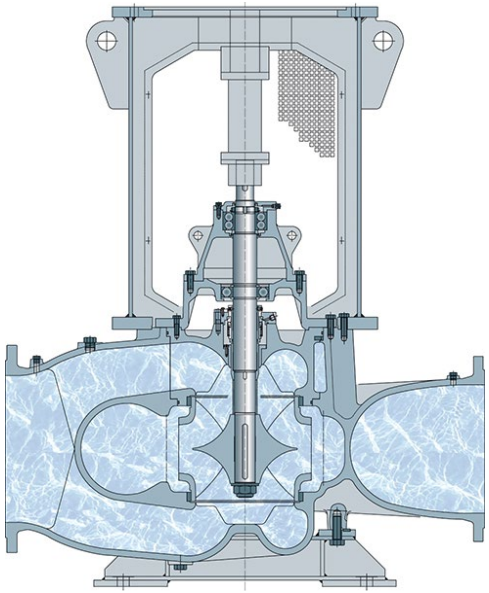
- Space saving configuration
- Higher structural stiffness: baseplate casted with casing
- Self-priming by liquid ring or air ejector
- Disassembly back pull out system flexible coupling with spacer
- Grease Lubrication
- Bare shaft and close-coupled executions
- Exchangeable components



| | | |
|---|---|---|
| ND | mm | 25÷300 |
| Q | $m^3/h$ | ≤ 1700 |
| H | m | ≤ 120 |
| n | rpm | ≤ 3500 |
| t | °C | ≤ 120 |

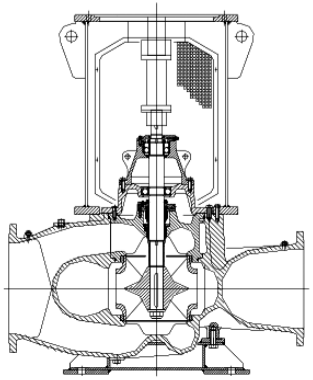
# In line double suction pump

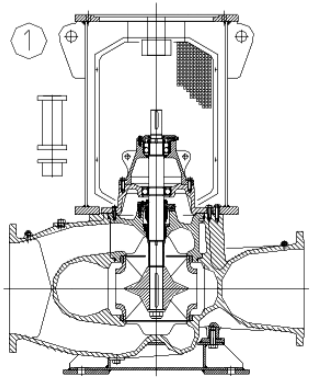
- Low NPSH and no axial thrust
- Double volute casing and double suction impeller
- Double volute for minimum radial load on impeller
- Back pull out for internal part without motors and pipes removing

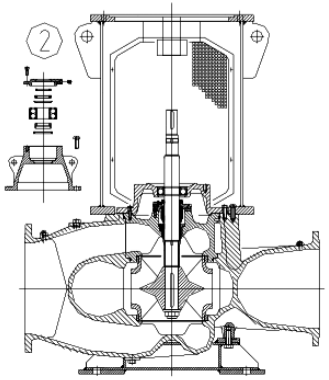


| | | |
|---|---|---|
| ND | mm | 250÷450 |
| Q | $m^3/h$ | ≤ 3500 |
| H | m | ≤ 50 |
| n | rpm | ≤ 1780 |
| t | °C | ≤ 60 |

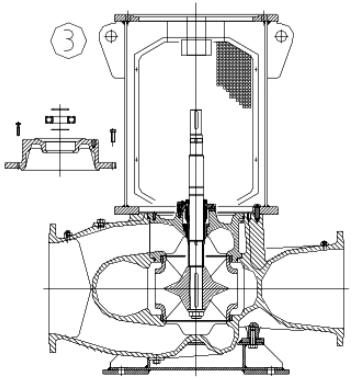
# Back pull-out system

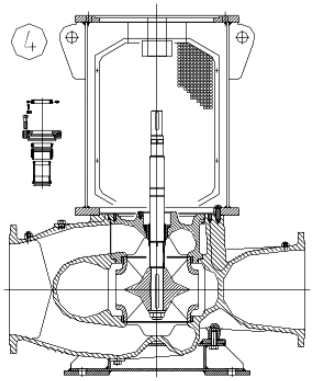




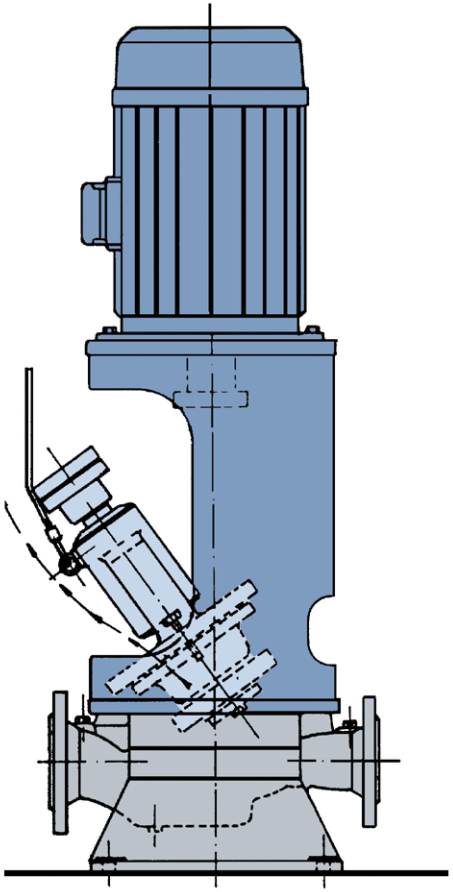




MU-LDS sequence

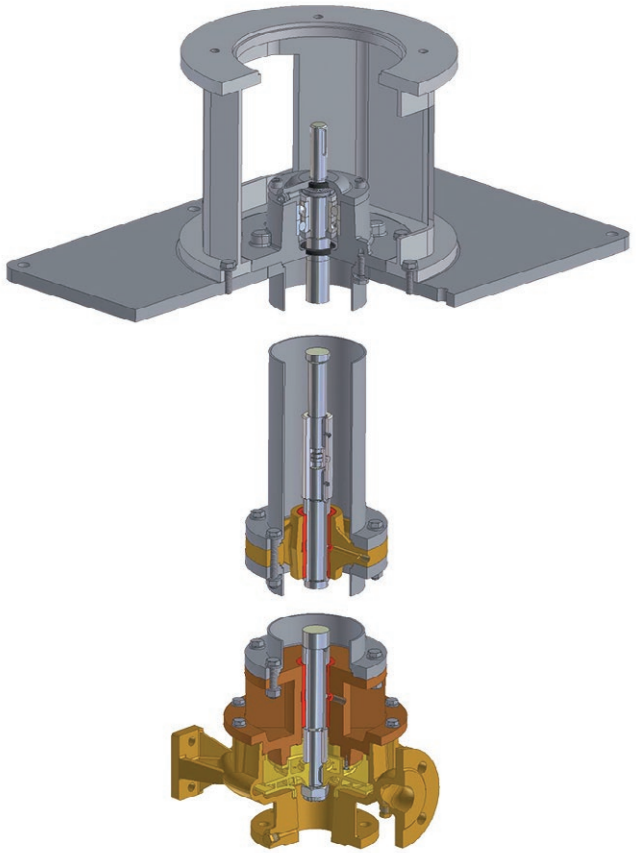


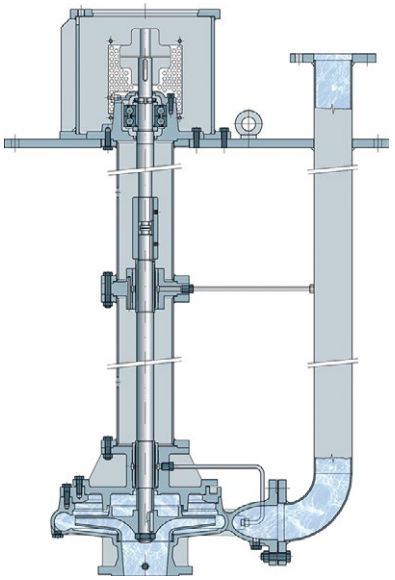

MU-L



# Vertically suspended line-shaft pump

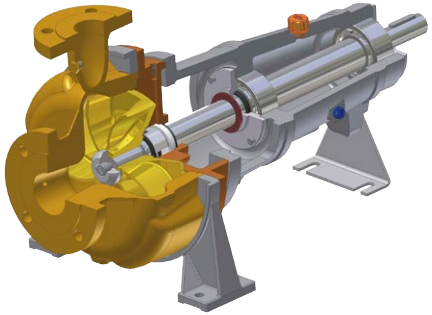


bare shaft version

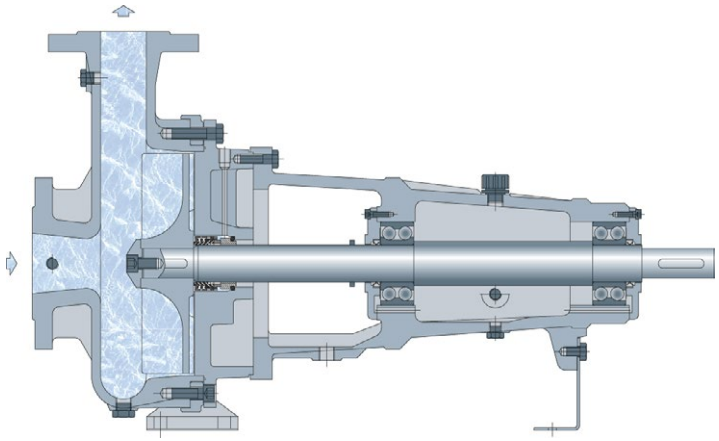


| | | | |
|---|---|---|---|
| ND | mm | | 32÷350 |
| Q | $m^3/h$ | ≤ | 1200 |
| H | m | ≤ | 80 |
| n | rpm | ≤ | 3500 |
| t | °C | ≤ | 90 |

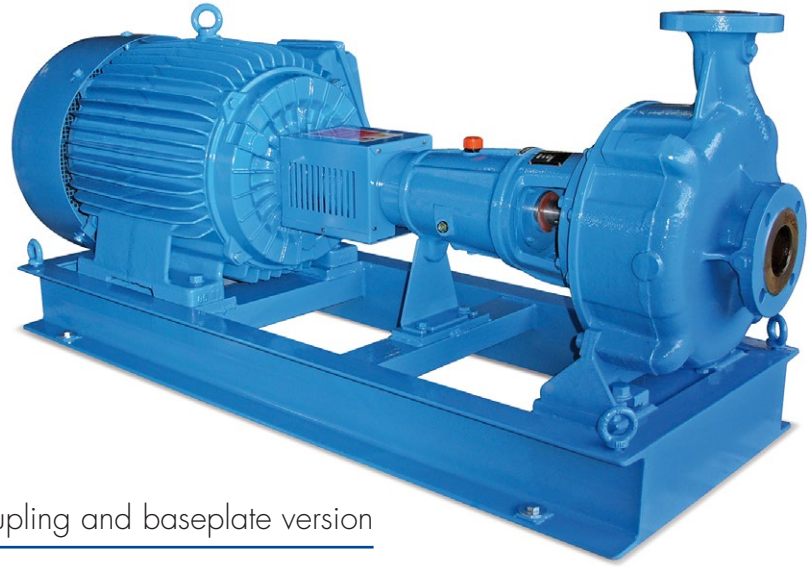
# Recessed impeller torque flow pump



bare shaft version



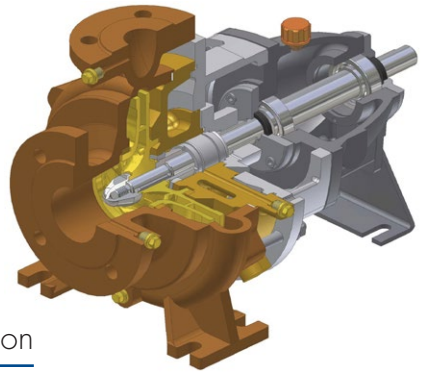
| | | |
|---|---|---|
| ND | mm | 32÷150 |
| Q | $m^3/h$ | ≤ 500 |
| H | m | ≤ 80 |
| n | rpm | ≤ 3500 |
| t | °C | ≤ 150 |



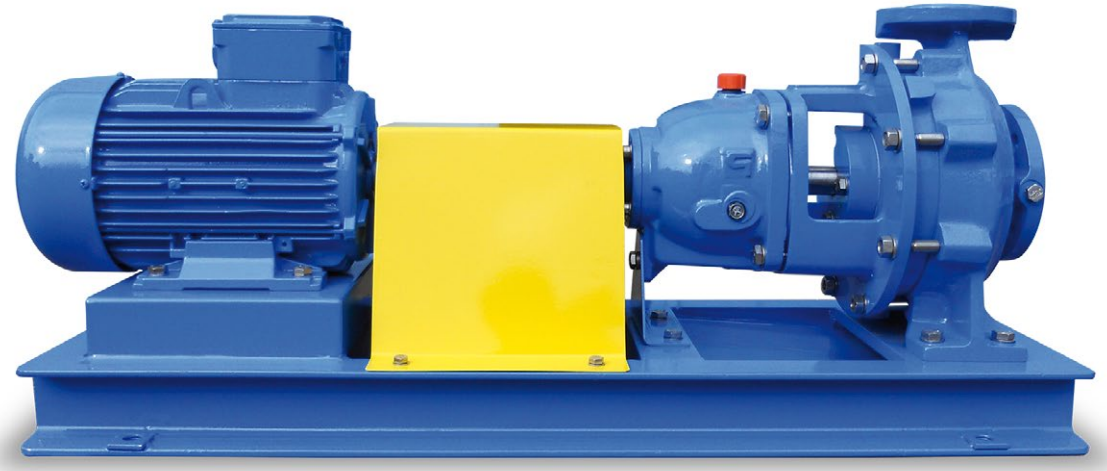
coupling and baseplate version

# Chemical pump

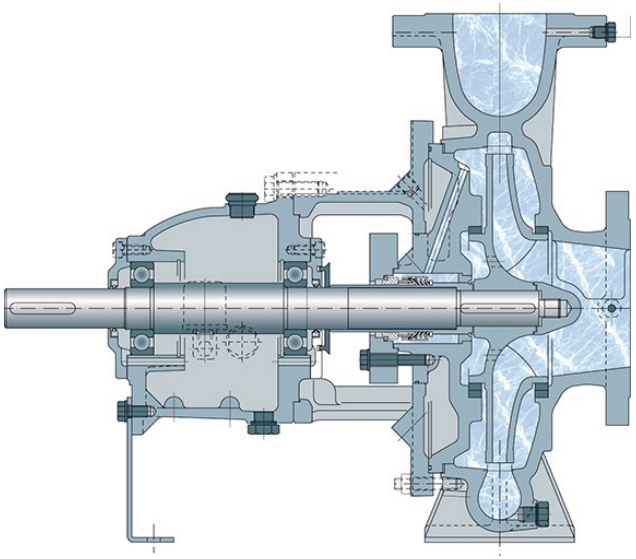
according to ISO 2858-5199



bare shaft version

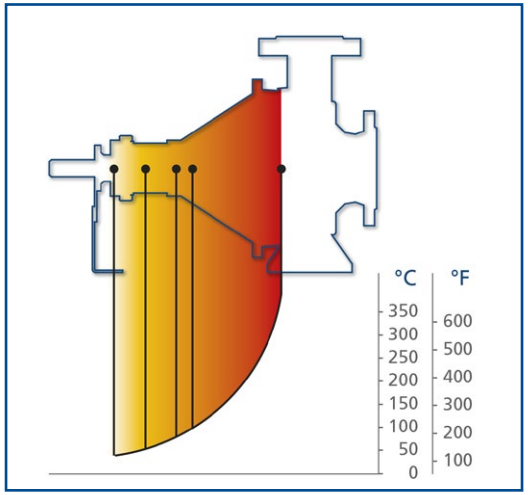


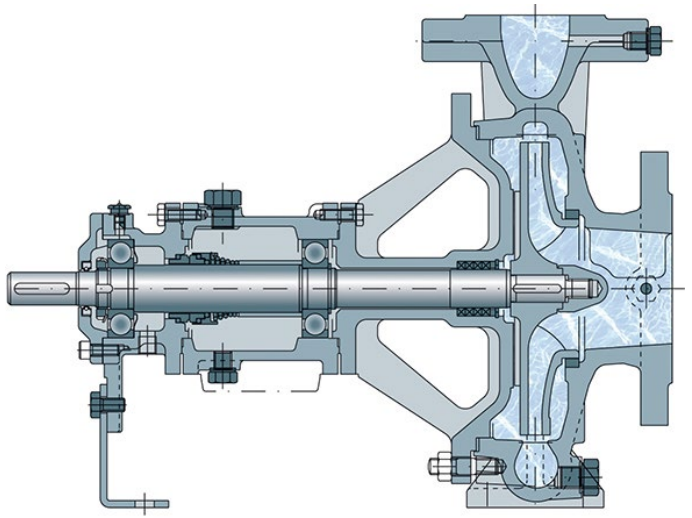
coupling and baseplate version



| | | |
|---|---|---|
| ND | mm | 25÷150 |
| Q | $m^3/h$ | ≤ 400 |
| H | m | ≤ 150 |
| n | rpm | ≤ 3500 |
| t | °C | ≤ 350 |

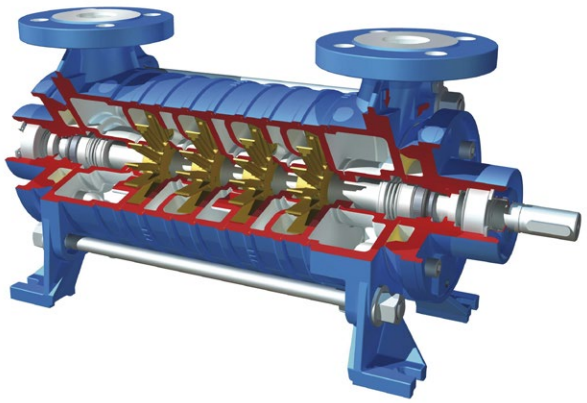
# Diathermic oil circulation pump



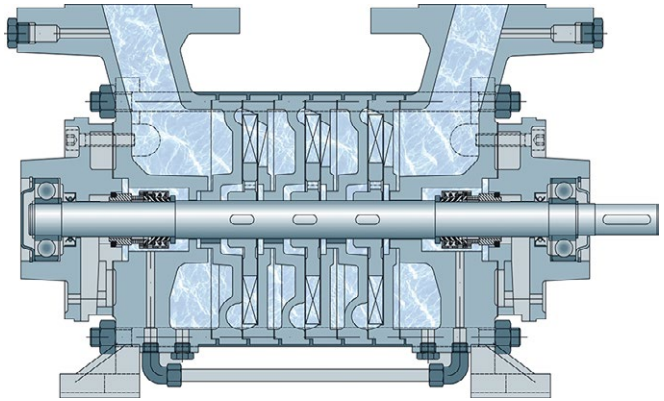



| | | |
|---|---|---|
| ND | mm | 32÷100 |
| Q | $m^3/h$ | ≤ 350 |
| H | m | ≤ 100 |
| n | rpm | ≤ 3000 |
| t | °C | ≤ 350 |

# Side channel pump

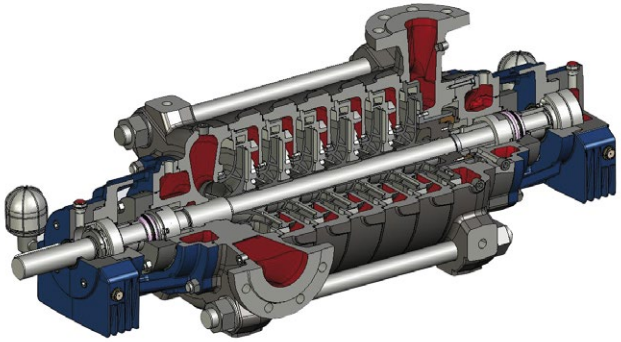


bare shaft version

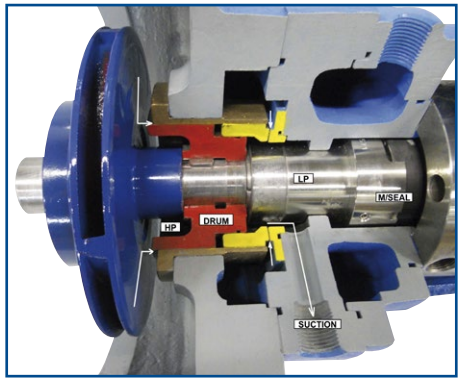


| | | |
|---|---|---|
| ND | mm | 20÷65 |
| Q | $m^3/h$ | ≤ 40 |
| H | m | ≤ 300 |
| n | rpm | ≤ 1750 |
| t | °C | ≤ 160 |

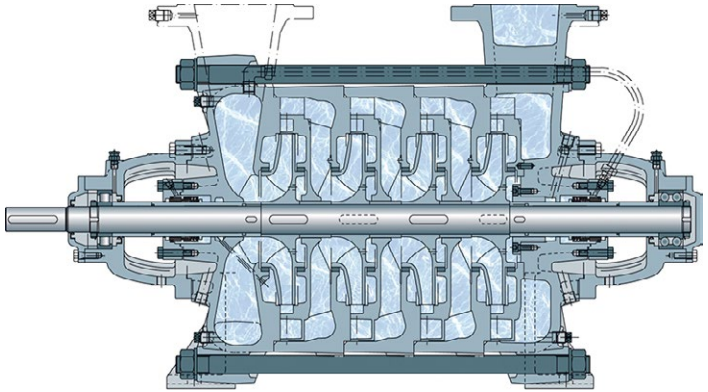
# Multistage high pressure pump



bare shaft version (GH)



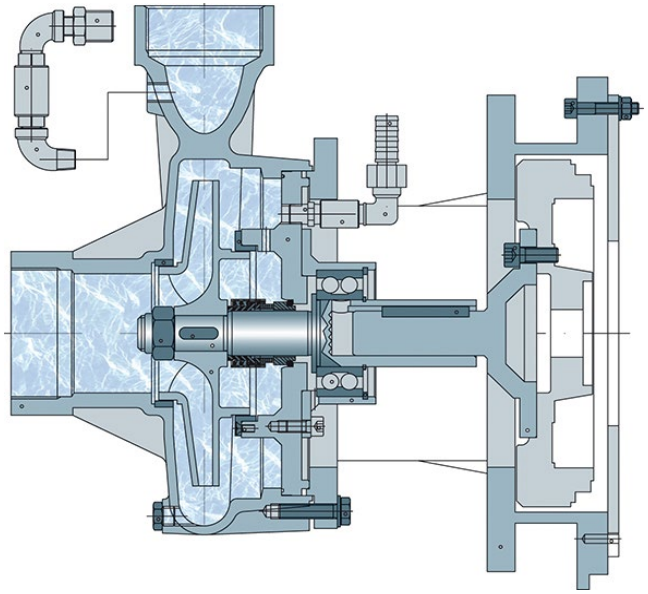

patented throttling device in order to reduce the recirculation flow from balancing drum to suction



coupling and baseplate version

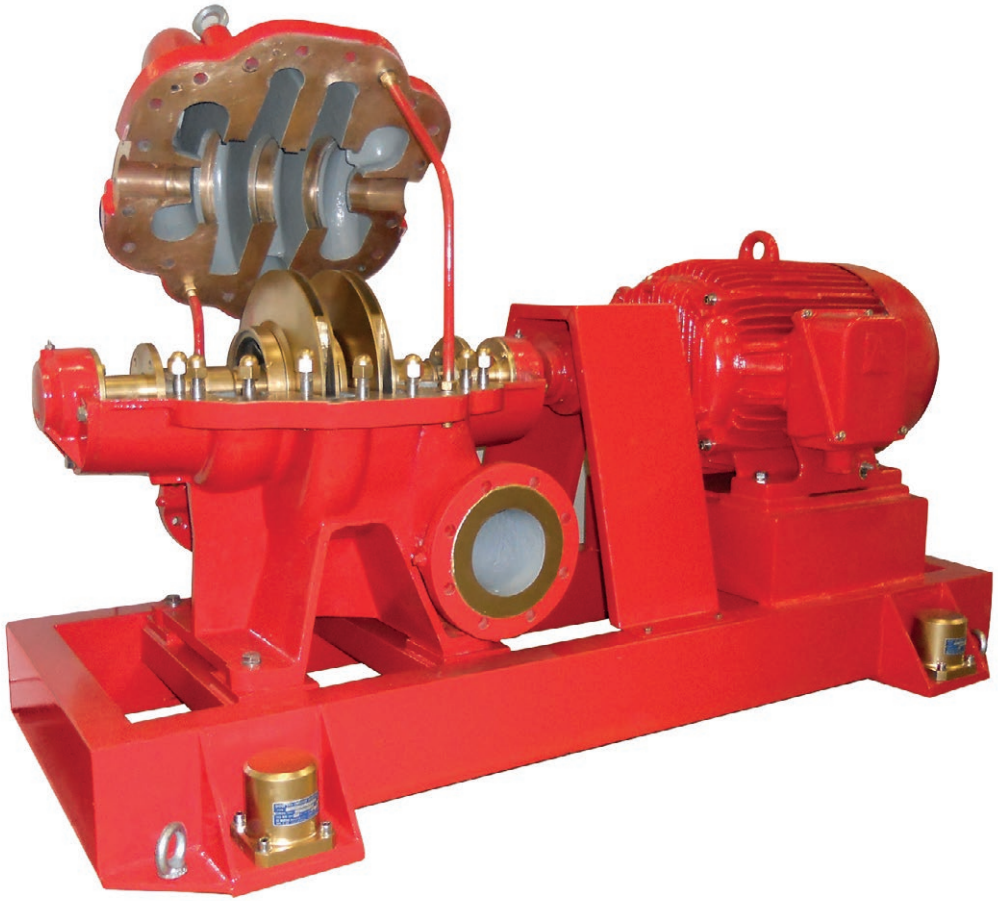
| | | |
|---|---|---|
| ND | mm | 32÷200 |
| Q | $m^3/h$ | ≤ 600 |
| H | m | ≤ 850 |
| n | rpm | ≤ 3500 |
| t | °C | ≤ 200 |

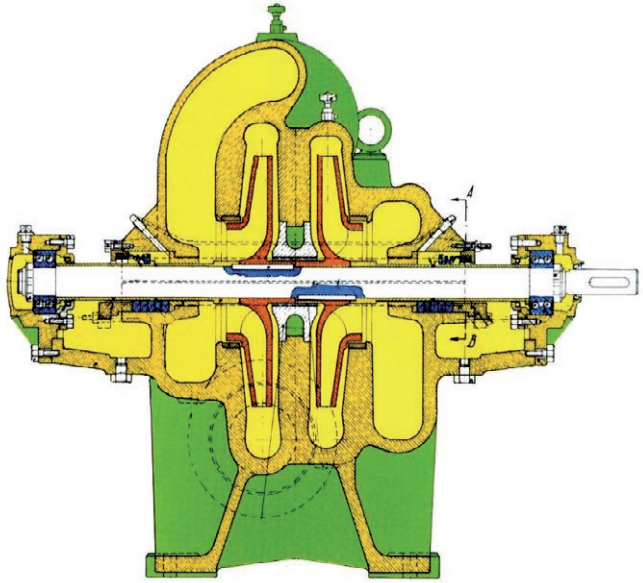
# Portable fire pump



| | | |
|---|---|---|
| ND | mm | 70/UNI 810 |
| Q | $m^3/h$ | ≤ 45-100 |
| H | m | ≤ 80-30 |
| n | rpm | 3600 |
| t | °C | ≤ // |

# Fire fighting naval pump

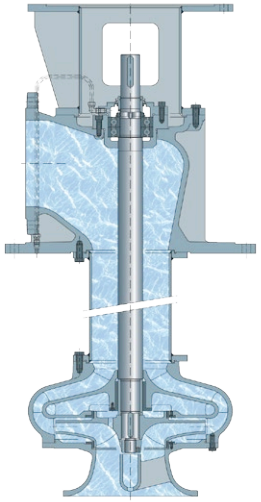




| | | |
|---|---|---|
| ND | mm | 100÷125 |
| Q | $m^3/h$ | ≤ 65+130 |
| H | m | ≤ 100 |
| n | rpm | ≤ 1750 |
| t | °C | ≤ 160 |

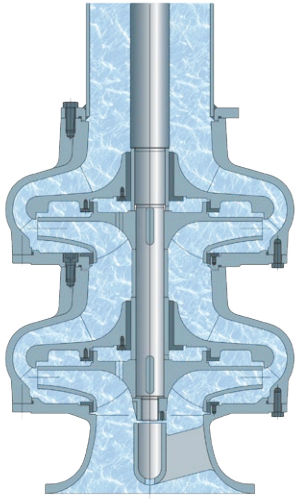
# Main engine lubrication pump

Single stage



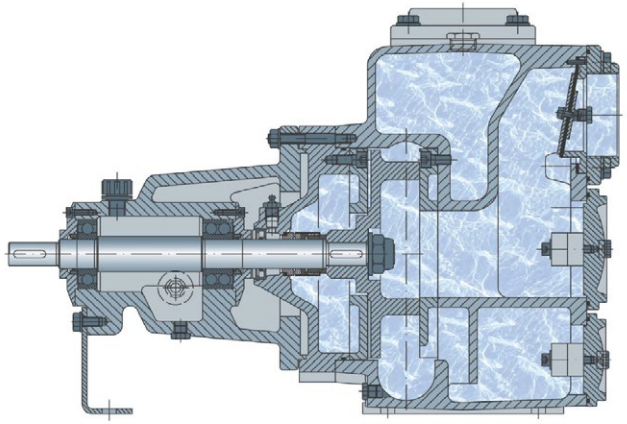
| | | | |
|---|---|---|---|
| ND | mm | | 250 |
| Q | $m^3/h$ | ≤ | 550 |
| H | m | ≤ | 75 |
| n | rpm | ≤ | 1750 |
| t | °C | ≤ | 100 |

Double stage



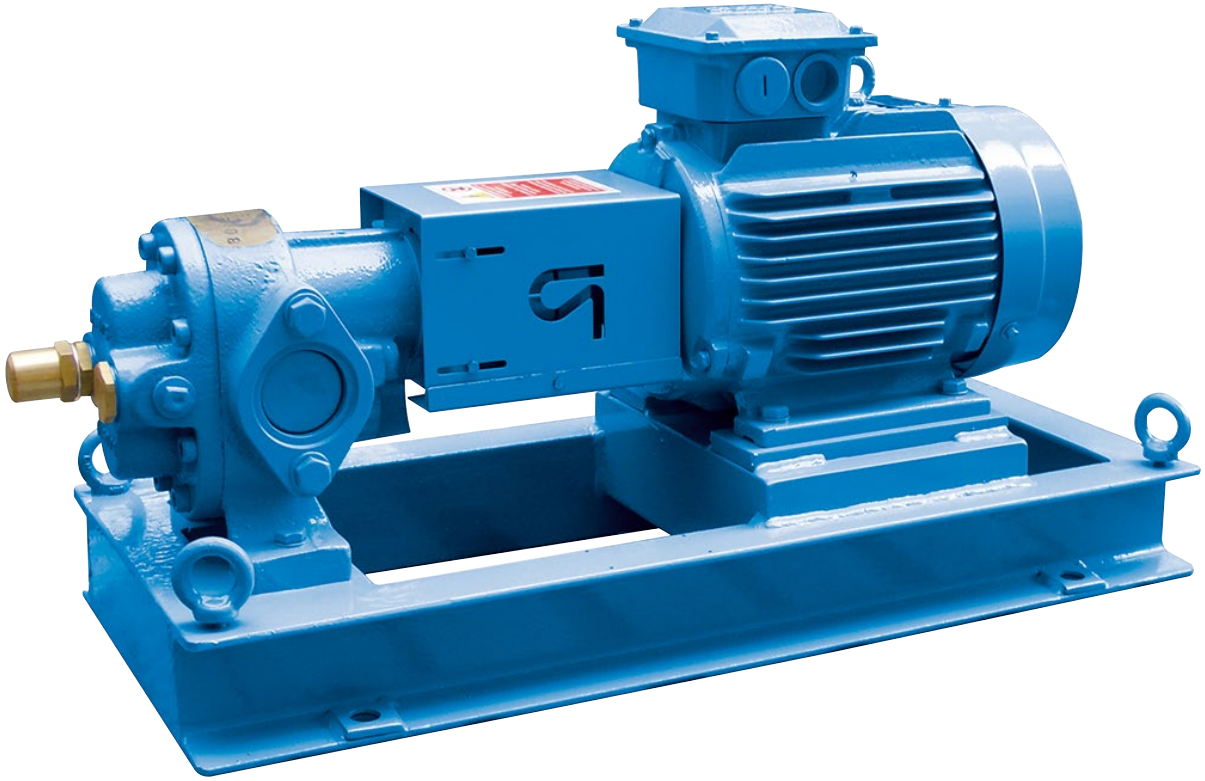
| | | | |
|---|---|---|---|
| ND | mm | | 250 |
| Q | $m^3/h$ | ≤ | 550 |
| H | m | ≤ | 75 |
| n | rpm | ≤ | 1750 |
| t | °C | ≤ | 100 |

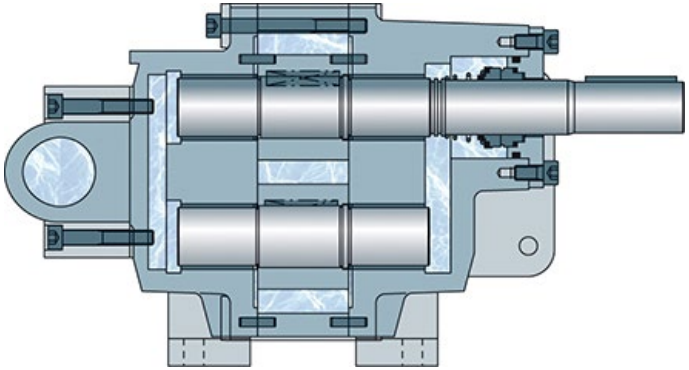
# Self-priming pumps with open impeller



| | | |
|---|---|---|
| ND | mm | 1½”- 3” |
| Q | m3/h | ≤ 120 |
| H | m | ≤ 80 |
| n | rpm | ≤ 1750 |
| t | °C | ≤ 90 |

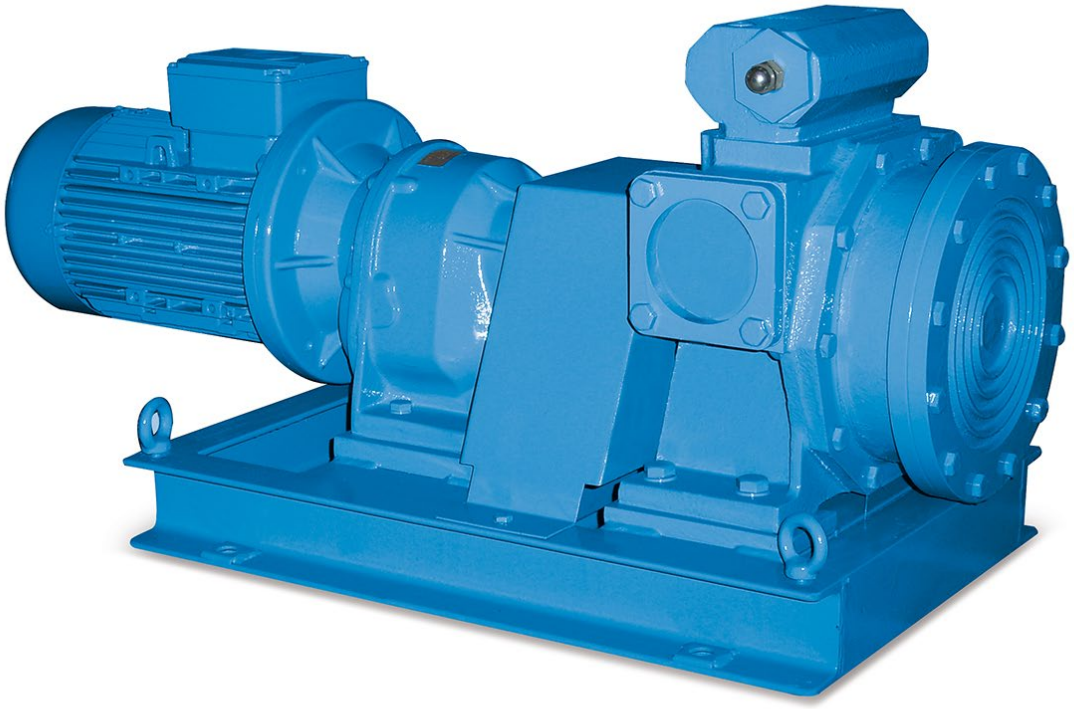
# Gears pump

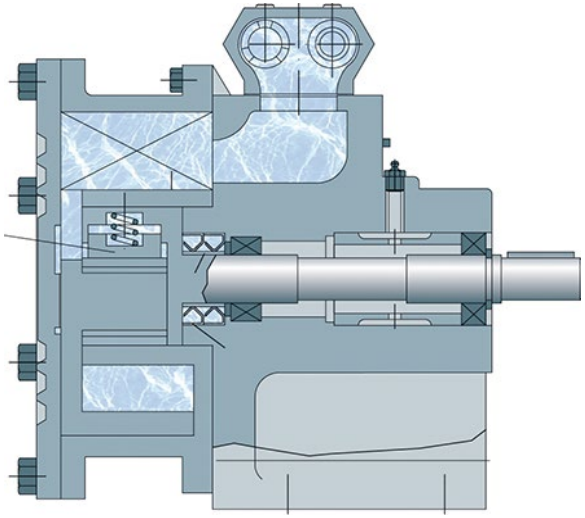




| | | |
|---|---|---|
| ND | mm | 1/2”÷125 |
| Q | $m^3/h$ | ≤ 120 |
| H | m | ≤ 100 |
| n | rpm | ≤ 1750 |
| t | °C | ≤ 250 |

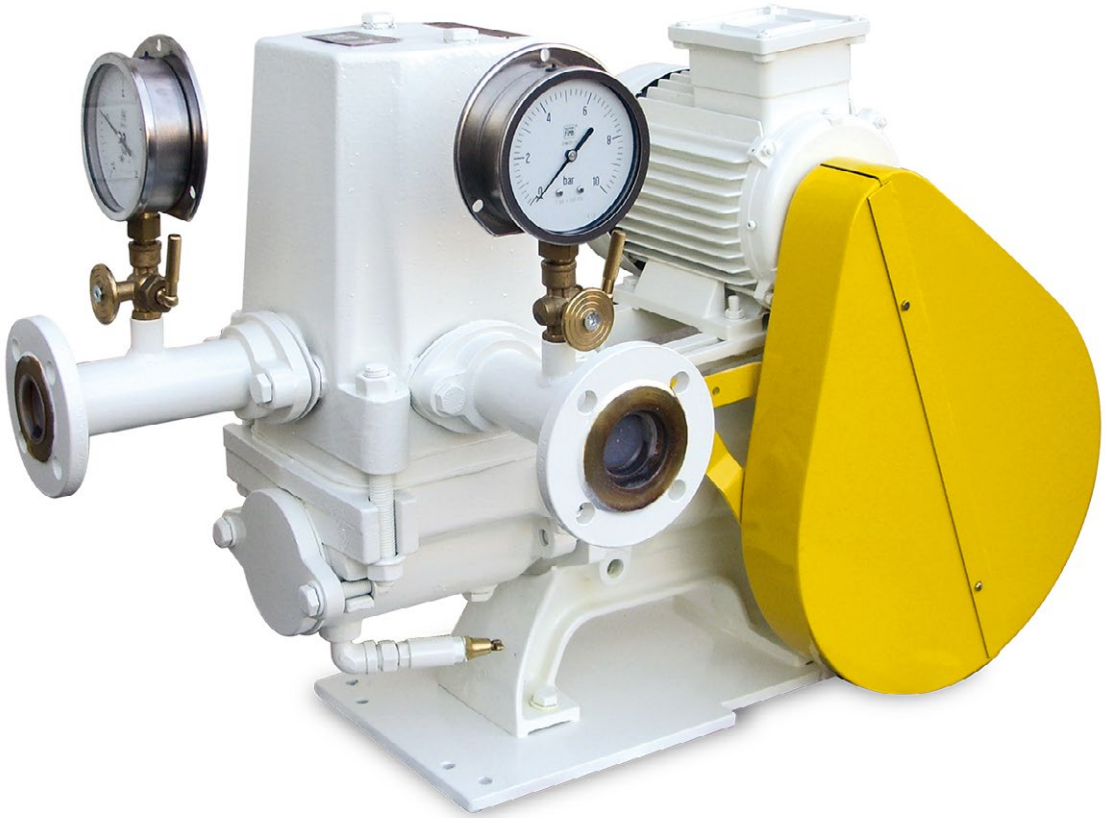
# Hollow oscillating disk pump

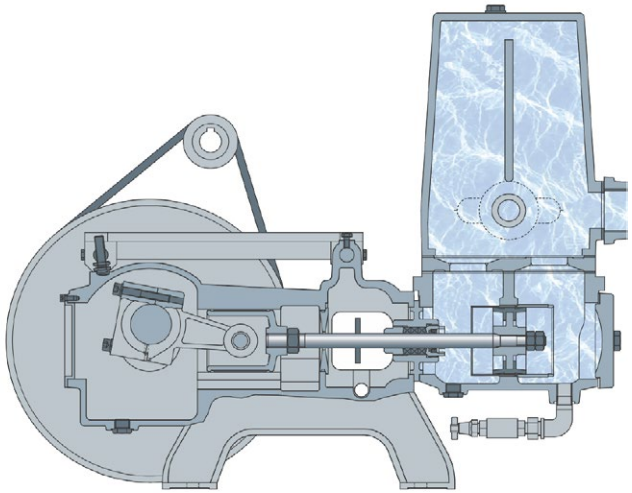




| | | | |
|---|---|---|---|
| ND | mm | | 25÷100 |
| Q | $m^3/h$ | ≤ | 80 |
| H | m | ≤ | 80 |
| n | rpm | ≤ | 350 |
| t | °C | ≤ | 160 |

# Piston pump



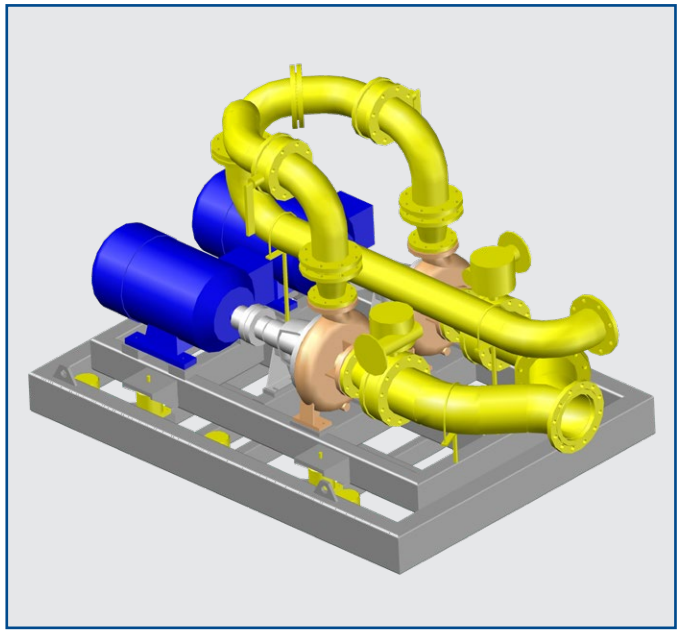


| | | | |
|---|---|---|---|
| ND | | = | G 1” 1/2 |
| Q | $m^3/h$ | ≤ | 5 |
| H | m | ≤ | 45 |
| n | rpm | ≤ | 1450/1750 |
| t | °C | ≤ | 60 |

# Quality Tests and Procedures

- Hydrostatic pressure testing to avoid leakage (1,5 nominal pressure - 30 mins minimum)
- Performance test at 3 working points:
  - *contractual working point*
  - *50% contractual working point*
  - *120% contractual working point*
- Bearings temperature control
- Vibration test (according to ISO 10816-1)
- Structural noise
- Wear components hardness test
- Chemical analysis/mechanical properties for casing, impeller and shaft
- Impeller balancing
- Shaft ultrasonic examination
- Magnetic particle examination
- Penetrant dye examination
- RX examination on welding piping
- Strip down test
- Motor test certificate
- Painting/Packing check
- Final documentation review

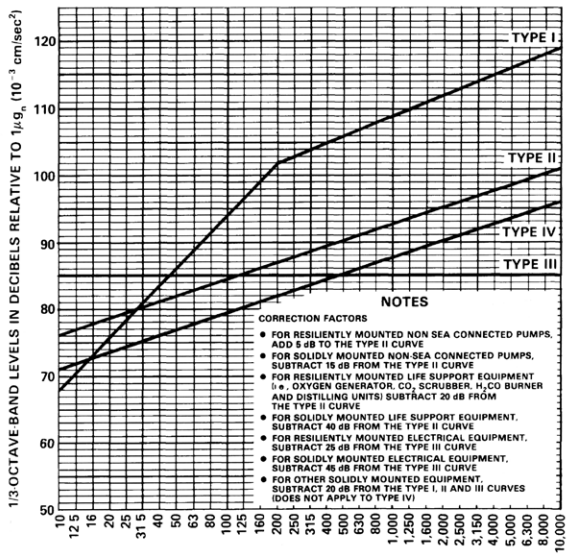
# Modules



*Air Conditioning Chilled - Water Module - Pump type MU 100-315*

# Vibration, Airborne, Structurborne Noise Testing

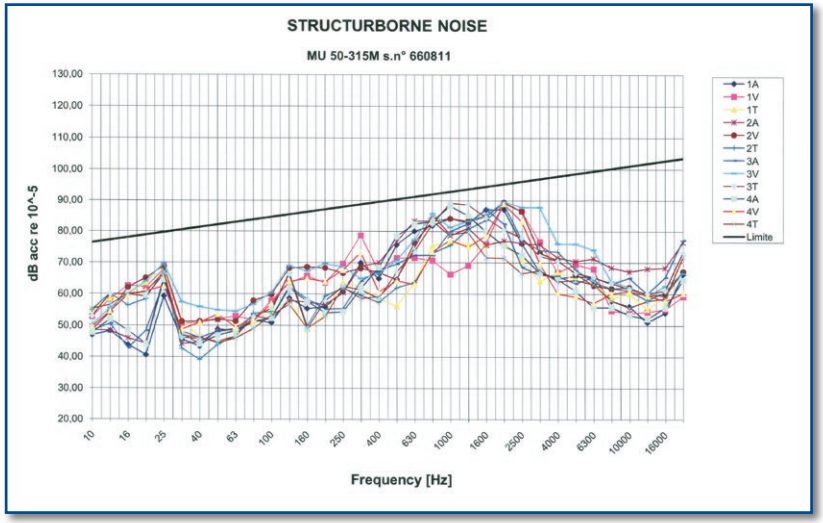
MIL-STD-740-2(SH)
30 December 1986




SH 131830

FIGURE 2. Structureborne vibratory acceleration acceptance criteria.






GARBARINO®

# Materials

# Materials

- Cast Iron (Grey Cast Iron G25, Nodular Cast Iron GS400 and GS600, Ni-Resist Cast Iron)
- Bronze (Tin Bronze B10 And BZN4, Nickel-Aluminium Bronze ASTM B148-C95800)
- Martensitic Stainless Steel (AISI 410 – 420), Austenitic Stainless
- Steel (AISI 304, AISI 304 L, AISI 316 L, AISI 317 L)
- Duplex and Superduplex (ASTM A890 GR. 4a, 5a, CD4MCU)
- Special Alloys (Monel, Hastelloy, Alloy 20, Incoloy 825)

*Any other material combination can be supplied.*

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# Pompe Garbarino S.p.A.

## 90 years of experience

## High quality standards

## Easy maintenance

## Customer oriented

thanks for your attention

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