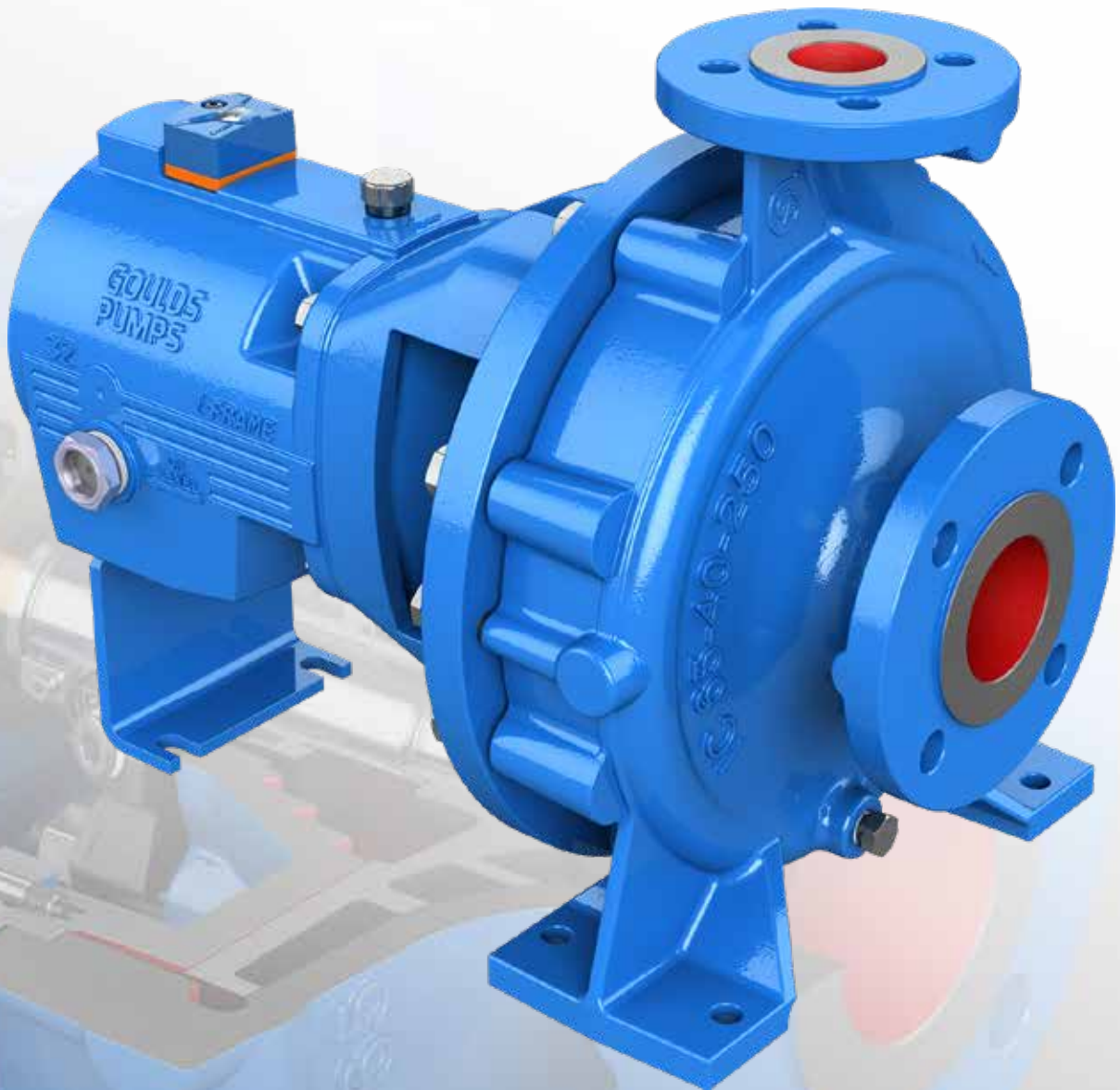


Goulds ICO i-FRAME[®] Series

ISO process pump with
i-ALERT[®]2 Intelligent Monitoring



ICO i-FRAME®

Worldwide Solutions for Process Pumping and Controls

Model ICO

Goulds Pumps IC family of ISO chemical process pumps is designed in accordance with ISO 5199 and ISO 2858, making it ideal for worldwide chemical or industrial process applications. The range includes the ICO pump which has the following features:

- 34 hydraulic sizes
- Flows up to 450 m³/hr (1980 GPM)
- Heads up to 160m (514 feet)
- Temperatures from -40°C to 280°C (-40°F to 530°F)
- Pressures up to 25 Bar (360 PSI)
- Available in a comprehensive range of materials for chemical and process applications that include Carbon Steel, 316SS, Duplex SS, Alloy 20, Hastelloy, Nickel and Titanium.

Goulds IC Family

The IC Series consists of multiple pump configurations, which have been engineered by ITT hydraulic specialists from Goulds Pumps, to meet both the pumping and environmental needs of customers in the process industry.

Included in the range is:

- IC – 16 Bar, mechanically sealed version for most process fluid pumping
- ICO – 16 Bar, Semi open impeller version for solids and fiber applications
- ICP – 25 Bar, centerline mounted for high pressure and high temperature applications
- ICB – compact, close coupled design for economical, space saving service
- ICM – magnetic drive, sealless arrangement for the handling of hazardous or sensitive liquids

Ease of Maintenance

- The modular design of 4 bearing frames maximizes the interchangeability of the 34 pumps sizes
- Back pullout design for safe and simple maintenance
- Complies with ISO 2858 for retrofit capability

Features

- Semi Open Impeller for improved solids handling
- ITT Goulds patented Cyclone Seal Chamber
- Suitable for mechanical seal or gland packing
- I-FRAME optimized Bearing Frame.
- Flanges drilled to DIN/ISO or ANSI
- Robust fabricated steel baseplate



Features

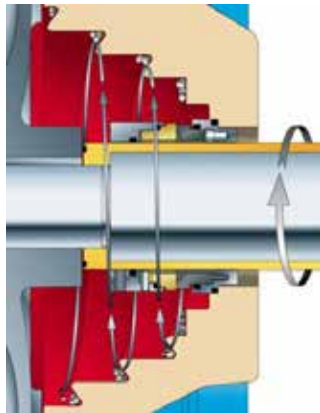
Semi Open Impeller

- Precision cast semi open impeller for handling liquids containing solids, fibers and dirt
- Standard back vanes or balance holes to reduce axial thrust and seal chamber pressures for extended bearing and seal life
- Key driven for maximum reliability; eliminates spinoffs due to reverse rotation during start up



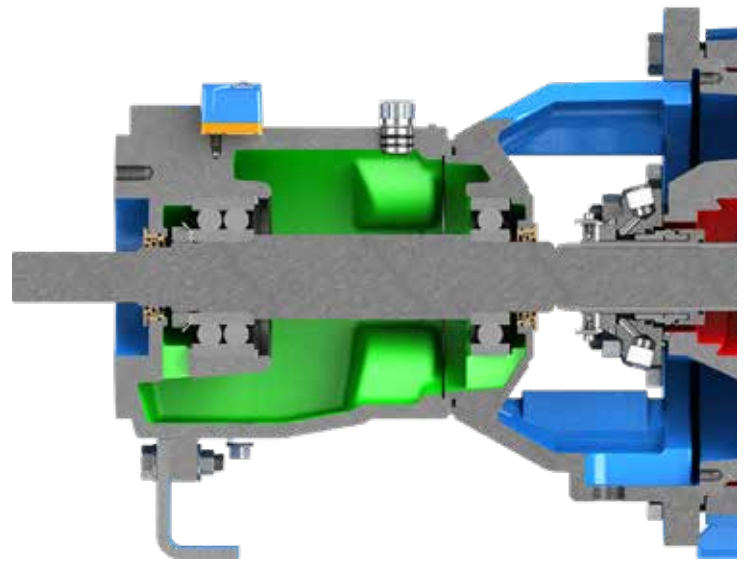
Cyclone Seal Chamber

- Self venting design eliminates vapor lock and simplifies start up
- Suitable for solids and vapors up to 10% without a flush
- Complies with ISO 3069 and can be fitted with an DIN 24960 L1K seals



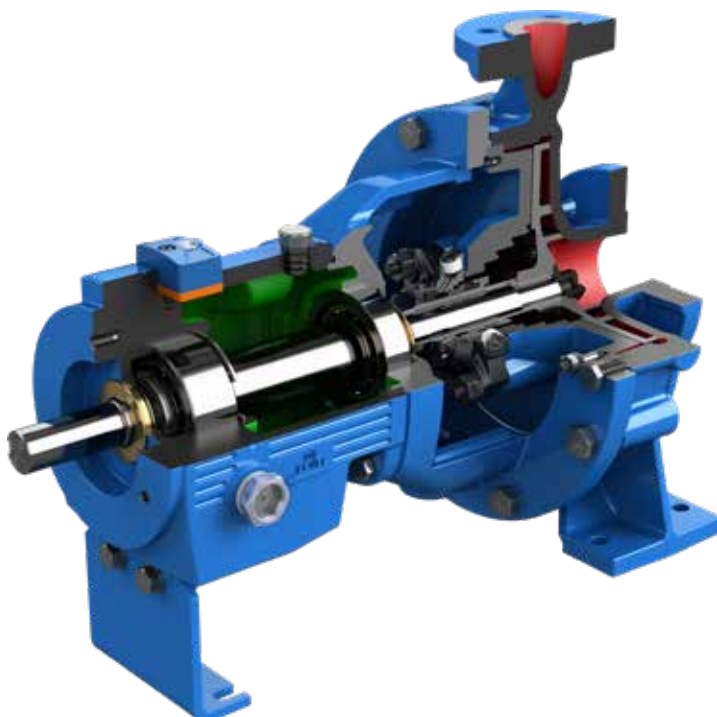
i-FRAME

- i-ALERT® condition monitor constantly measures temperature and vibration at the thrust bearing
- INPRO VBXX-D Hybrid labyrinth seals prevent oil contamination
- Heavy duty shaft and bearings designed to minimise shaft deflection at seal faces to less than 50µm
- Premium severe duty thrust bearings
- Large Bulls Eye sight glass.
- Optimized Sump Design with increased oil capacity, and geometry



Robust Baseplate Design

- Machined pump and motor pads for accurate alignment
- Suitable for grouted or ungrouted installations
- Earthing lugs
- Optional features
 - Drip pan with 1" drain connection
 - Vertical levelling screws
 - Motor adjustment screws



ICO i-FRAME® Process Pumps

i-ALERT®2 CONDITION MONITOR

Tracks vibration, temperature & run-time hours 24/7/365. Syncs data via Bluetooth® Smart phones and tablets.

See page 8 for more information

i-FRAME® POWER END

Designed for reliability and extended pump life, backed with a 5-year warranty.

INPRO VBXX-D HYBRID LABYRINTH SEALS

Prevents premature bearing failure caused by lubricant contamination or loss of oil. Stainless steel rotors for optimal performance in corrosive environments.

HEAVY DUTY SHAFT AND BEARINGS

Rigid shaft designed for minimum deflection at seal faces—less than 50 µm. Bearings sized for long life under tough operating conditions.

PREMIUM SEVERE-DUTY THRUST BEARINGS

Premium bearings using improved tolerance and cleaner steel provide reduced assembled runout and longer bearing life.

ONE - INCH BULL'S EYE SIGHT GLASS

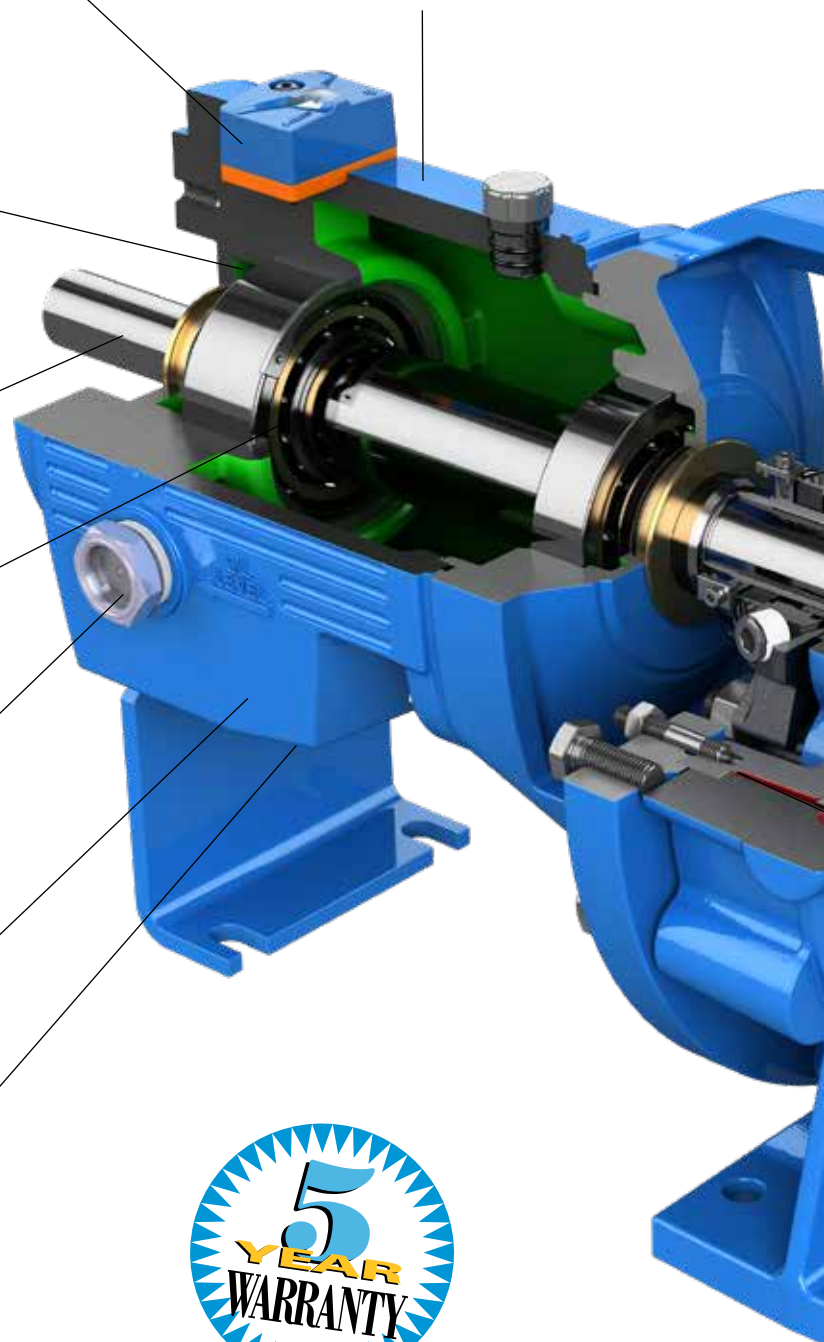
Assures proper oil level critical to bearing life. Can be mounted on either side of pump for installation flexibility.

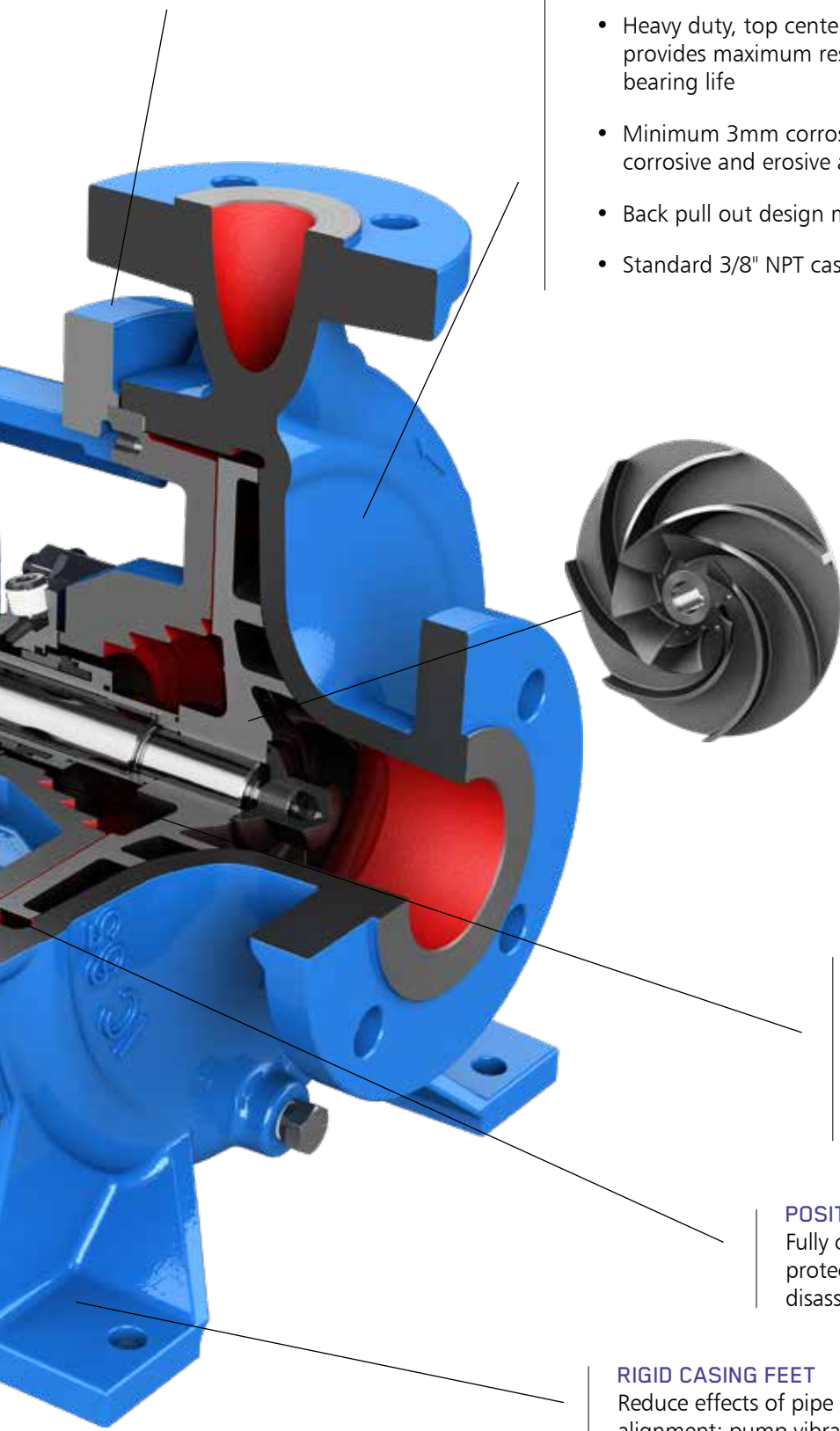
OPTIMIZED OIL SUMP DESIGN

Increased oil capacity provides better heat transfer for reduced oil temperature. Bearings run cooler and last longer. Contaminants directed away from bearings to magnetic drain plug.

MAGNETIC DRAIN PLUG

Standard magnetic drain plug helps protect bearings and prolong life.





DUCTILE IRON FRAME ADAPTER
Material strength equal to carbon steel for safety and reliability.

CASING

- Heavy duty, top centerline discharge casing with integral cast feet provides maximum resistance to pipe loads for improved seal and bearing life
- Minimum 3mm corrosion allowance maximizes pump life for corrosive and erosive applications
- Back pull out design makes maintenance activities safe and simple
- Standard 3/8" NPT casing drain for safe maintenance

IMPELLER

- Precision-cast semi open impeller for handling liquids containing solids, fibres and dirt
- Preferred by ISO 5199 for maximum mechanical seal life
- Standard back vanes or balance holes reduce axial thrust and seal chamber pressures for extended bearing and seal life
- Key driven for maximum reliability; eliminates spinoffs due to reverse rotation during start-up

SEALING FLEXIBILITY

Wide range of sealing arrangements available to meet service conditions. Engineered seal chambers improve lubrication and heat removal (cooling) of seal faces for extended seal life and pump uptime.

POSITIVE SEALING

Fully confined gasket at casing joint protects alignment fit from liquid, makes disassembly easier.

RIGID CASING FEET

Reduce effects of pipe loads on shaft alignment; pump vibration reduced.

Conforms to ISO 5199 and ISO 2858 for maximum reliability and ease of installation. Superior hydraulic design for maximum performance and extended mechanical reliability.

Goulds Patented i-FRAME® Power Ends

Extended Pump Life Through Intelligent Design

Goulds i-FRAME Power Ends are the result of close to 170 years of design experience, customer interaction, and continuous improvement. Customers get extended Mean Time Between Failure (MTBF) and lower life cycle costs (LCC) ... guaranteed!

1 Patented i-ALERT® Condition Monitor



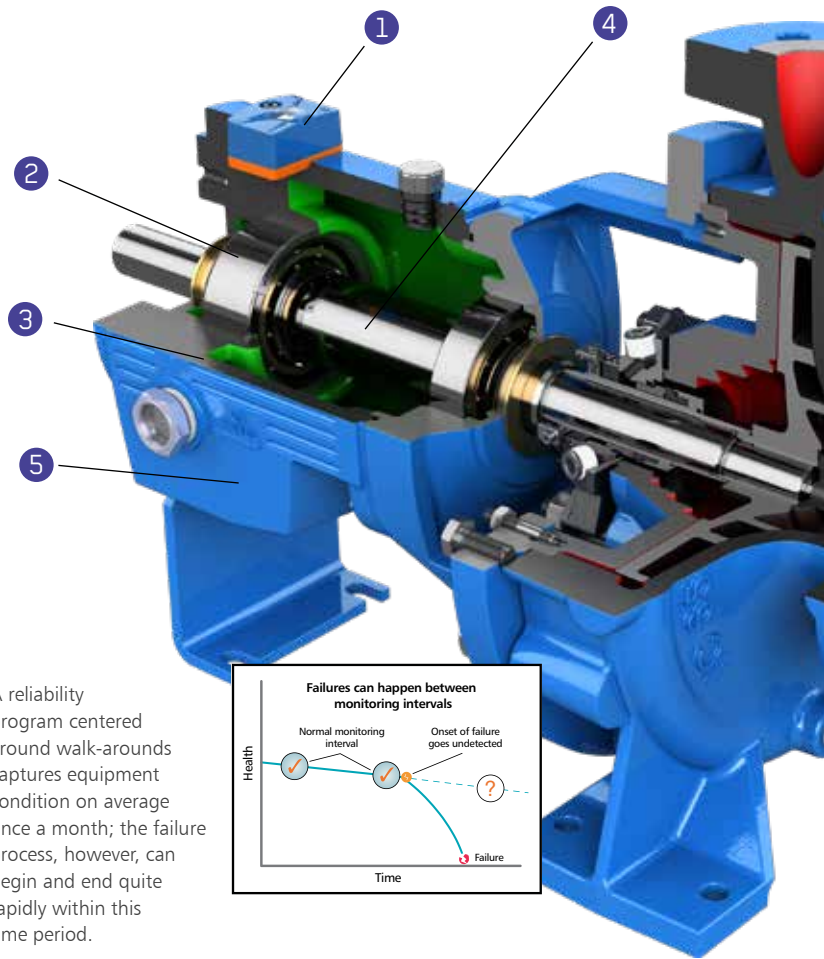
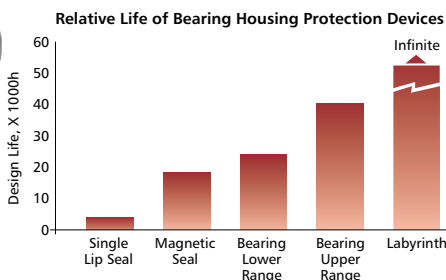
The heart of the i-FRAME, the i-ALERT condition monitor unit continuously measures vibration and temperature at the thrust bearing and automatically

indicates when pre-set levels of vibration and temperature have been exceeded, so that changes to the process or machine can be made before failure occurs. A visual indication of pump health makes walk-around inspections more efficient and accurate. The result is a more robust process to monitor and maintain all your ISO and ANSI pumps so that your plant profitability is maximized.

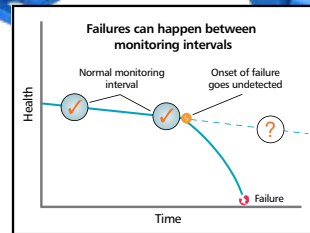
See page 8 for more information

2 INPRO VBXX-D Hybrid Bearing Isolators

Most bearings fail before reaching their potential life. They fail for a variety of reasons, including contamination of the lubricant. INPRO VBXX-D has long been considered the industry standard in bearing lubricant protection. The *i-FRAME* now improves upon that design by offering stainless steel rotors and bronze stators, for maximum protection against contaminants and the corrosive effects of seal leakage or environmental conditions. These seals are non-contacting and do not wear.

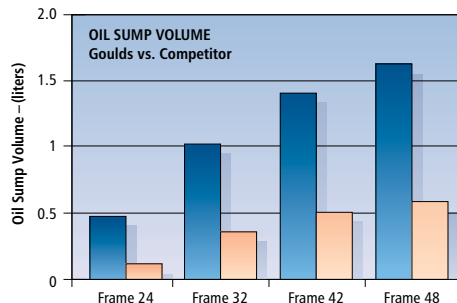


A reliability program centered around walk-arounds captures equipment condition on average once a month; the failure process, however, can begin and end quite rapidly within this time period.



3 Optimized Oil Sump Design

Internal sump geometry is optimized for longer bearing life. Sump size increased by 10%-20% results in better heat transfer and cooler bearings. Contoured design directs contaminants away from bearings, to the magnetic drain plug for safe removal.



Larger Means Cooler
 GOULDS
 Industry Average

4 Shaft and Bearings Engineered for Maximum Reliability

Every IC *i-FRAME* Power End is engineered and manufactured for optimal pump performance and increased MTBF.



Oversized shaft with double row thrust bearings provide increased L¹⁰ life by 40%.

| ISO 5199 Shaft Specification | Meets | Exceeds |
|------------------------------|-------|---------|
| Diameter Tolerance | | ✓ |
| Surface Finish | | ✓ |
| Runout | ✓ | |
| Deflection | | ✓ |

The rugged shaft and bearing combination maintains shaft deflection of less than 50 μm at all operating points. The result is longer seal and bearing life.

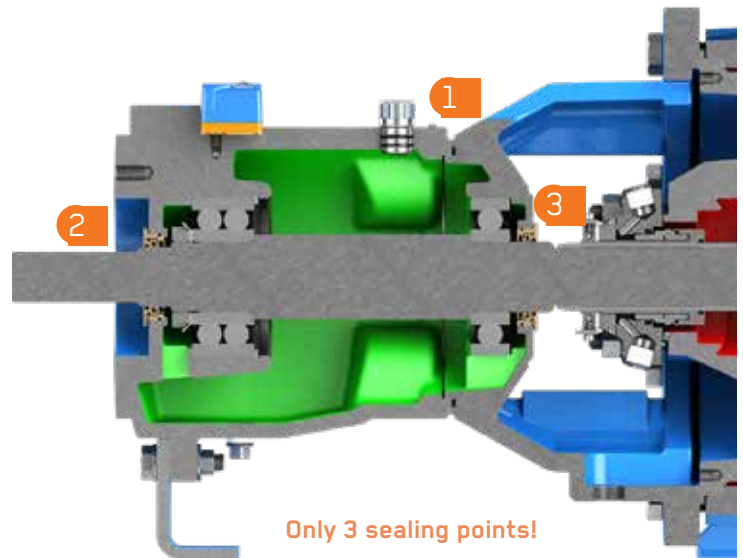
Premium severe-duty thrust bearings increase bearing life.

- High purity steels have fewer inclusions than standard steel – better grain structure and wear resistance.
- Heat treatment of bearing elements to SO stabilization levels provides superior thermal stability for increased service life.
- Bearing Balls are manufactured to at least one ISO grade above standard (ISO P5 for ring running accuracy and ISO P6 for dimensions). The result is reduced vibration and noise for improved shaft guidance.

5 Unique Two-Piece Power End Design

The IC power end is designed like no other pump power end in the market today. The unique two-piece design provides a more reliable sealing of the frame, better alignment of key components and reduced maintenance time and effort.

- Only one static o-ring is needed to seal the entire frame. No gaskets.
- No additional components such as separate bearing housings or bearing covers. Fewer parts means less stack-up tolerance issues. Maintenance and repair procedures are much easier compared to other process pumps.
- One precision machined fit pilots the two power end halves together. More reliable and repeatable alignment between the bearings, shaft, seal, impeller and casing.
- No dynamic elastomeric seals! Only non-contacting labyrinth oils seals with static o-rings. No dynamic seal components that could wear out and leak. Provides more reliable lubrication retention and a cleaner environment for the high performance bearings.



Our Guarantee

We are so confident that the *i-FRAME* is the most reliable Power End in the industry, that we are proud to offer a standard 5-year warranty on every ISO and ANSI *i-FRAME* Process Pump.



i-ALERT[®] Monitoring Solution

Sensor | App | Ai Platform

www.i-alert.com



What it Does:

Monitor

Tracks vibration, temperature & run-time hours 24/7/365.

Alarm

Takes high resolution data when an alarm condition occurs and stores it for later analysis.

Trend

Captures data every 1-60 minutes and has up to 170 days of hourly on-board storage.

Analyze

Diagnose machine faults with vibration tools
Fast Fourier Transform (FFT) & Time Wave Form Analysis.

Environment

Rated for any industrial environment. water & dust resistant.
Intrinsically Safe with a 3-year battery life (use dependent).

- ATEX Zone 0 AEx ia IIB Ga (Groups C & D)

Wireless

Sync data via Bluetooth Smart enabled smartphones and tablets.

Online Monitoring

Monitor and manage all of your i-ALERT enabled machines in one place - i-ALERT Ai Online Platform. This subscription service requires no software to download or dedicated hardware to run.

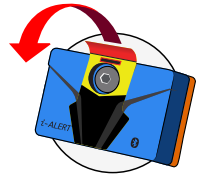


Spend less time collecting data and more time fixing problems. The i-ALERT mobile app has the ability to scan multiple i-ALERT2 sensors within range to quickly and safely inspect multiple machines.

How it Works:

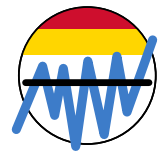
1. ACTIVATE

The i-ALERT2 devices are light activated by removing the sticker. The sensor begins wirelessly broadcasting once activated.



2. AUTO CONFIGURATION

The i-ALERT device averages the vibration over 25 hours of run-time and sets the alarm levels to 2 x average (0.1-1.5ips minimum). Temperature alarm default to 80°C (176°F)



OR

2. MANUAL CONFIGURATION

User manually sets the alarm thresholds via the i-ALERT mobile application.



3. Monitor

The i-ALERT2 sensor is configurable to check every 1-5 minutes. If two consecutive readings are above alarm threshold the i-ALERT device will go into alarm.



Dashboard

Simple, intuitive dashboard to track vibration, temperature, run-time & battery life.



Trending

Trend vibration, temperature, & kurtosis to monitor any changes in the equipment operation.



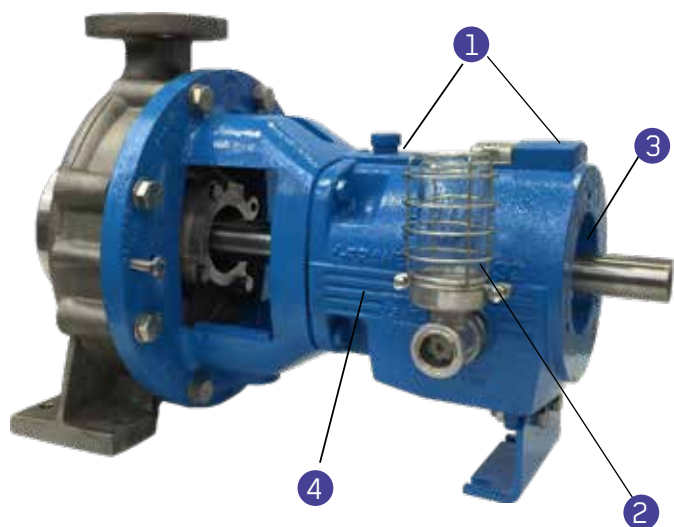
BOM

Load the as built of materials based on the pump serial number.

Construction Details/Standard Options

| | | | | | |
|-------------|--|----------|----------|----------|----------|
| | | 24 | 32 | 42 | 48 |
| Shaft | Diameter at Impeller | 19 | 28 | 38 | 48 |
| | Diameter in stuffing box/Seal Chamber | 33 | 43 | 53 | 65 |
| | Diameter between Bearings | 44 | 54 | 68 | 78 |
| | Diameter at Coupling | 24 | 32 | 42 | 48 |
| | Maximum shaft Deflection | 0.05 | | | |
| Bearings | Radial | 6307 C3 | 6309 C3 | 6311 C3 | 6313 C3 |
| | Thrust | 3307A C3 | 3309A C3 | 3311A C3 | 3313A C3 |
| | Bearing span | 105 | 170 | 143 | 246 |
| Power Limit | KW per 100 RPM | 0.75 | 2.2 | 4.4 | 9.8 |
| Temperature | Maximum Liquid Temperature Oil/Grease Lubrication without Cooling | 160°C | | | |
| | Maximum Liquid Temperature Oil/Grease Lubrication with High Temp. Option | 280°C | | | |
| Casing | Corrosion Allowance | 3 mm | | | |

Designed for Flexibility to Meet Customer Needs



Bearing Frame Options

- ① **GREASE LUBRICATION**
Fitted with grease fitting for regreasable bearings or sealed for grease for life bearings.
- ② **CONSTANT LEVEL OILER**
Preset for correct oil level. Oil reservoir decreases maintenance intervals.
- ③ **MAGNETIC OIL SEAL**
Optional Magnetic oil seals provide a sealed bearing housing for special applications. Requires addition of frame breather fitting.
- ④ **PROVISIONS FOR BEARING MONITORS**
Tapped connections for thermocouple and vibration sensing monitoring.

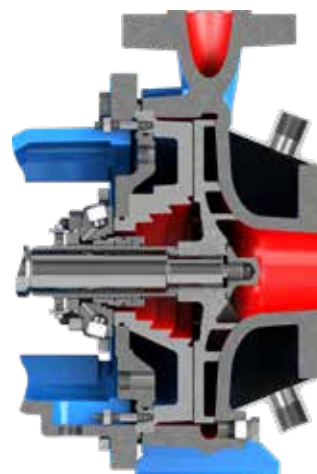
Bearing Frame Finned Cooler

Directly cools oil for lower bearing operating temperature. Requires minimal cooling water. Corrosion resistant construction. Recommended for temperatures over 180° C when using conventional oil.

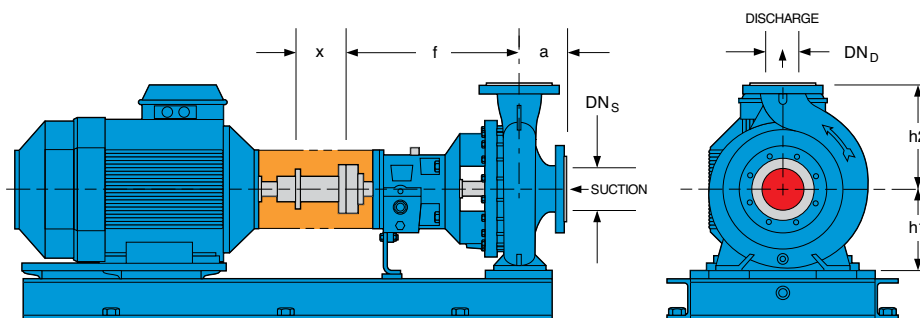


Jacketed Casing and Seal Chamber

For heating and cooling of product.



Dimensions



| DIMENSIONS | | | | | | | | | |
|-------------|-------|---------|--------|-----|-----|-----|-----|-----|-------------------|
| Pump size | Frame | Flanges | | a | f | h1 | h2 | X | Bare pump weights |
| | | Dns | DNd | | | | | | |
| 40-25-160 | 24 | 40 | 25 | 80 | 385 | 132 | 160 | 100 | 42 |
| 40-25-200 | 24 | 40 | 25 | 80 | 385 | 160 | 180 | 100 | 50 |
| 40-25-250 | 32 | 40 | 25 | 100 | 500 | 180 | 225 | 100 | 79 |
| 50-32-160 | 24 | 50 | 32 | 80 | 385 | 132 | 160 | 100 | 43 |
| 50-32-200 | 24 | 50 | 32 | 80 | 385 | 160 | 180 | 100 | 53 |
| 50-32-250 | 32 | 50 | 32 | 100 | 500 | 180 | 225 | 100 | 83 |
| 50-32-315 | 32 | 50(1) | 32(1) | 125 | 500 | 200 | 250 | 100 | 111 |
| 65-40-160 | 24 | 65 | 40 | 80 | 385 | 132 | 160 | 100 | 44 |
| 65-40-200 | 24 | 65 | 40 | 100 | 385 | 160 | 180 | 100 | 54 |
| 65-40-250 | 32 | 65 | 40 | 100 | 500 | 180 | 225 | 100 | 85 |
| 65-40-315 | 32 | 65(1) | 40(1) | 125 | 500 | 200 | 250 | 100 | 121 |
| 80-50-160 | 24 | 80 | 50 | 100 | 385 | 160 | 180 | 100 | 50 |
| 80-50-200 | 24 | 80 | 50 | 100 | 385 | 160 | 200 | 100 | 57 |
| 80-50-250 | 32 | 80 | 50 | 125 | 500 | 180 | 225 | 100 | 88 |
| 80-50-315 | 32 | 80(1) | 50(1) | 125 | 500 | 225 | 280 | 100 | 126 |
| 100-65-160 | 32 | 100 | 65 | 100 | 500 | 160 | 200 | 100 | 74 |
| 100-65-200 | 32 | 100 | 65 | 100 | 500 | 180 | 225 | 140 | 79 |
| 100-65-250 | 32 | 100 | 65 | 125 | 500 | 200 | 250 | 140 | 98 |
| 100-65-315 | 42 | 100(1) | 65(1) | 125 | 530 | 225 | 280 | 140 | 155 |
| 125-80-160 | 32 | 125 | 80 | 125 | 500 | 180 | 225 | 140 | 81 |
| 125-80-200 | 32 | 125 | 80 | 125 | 500 | 180 | 250 | 140 | 87 |
| 125-80-250 | 32 | 125 | 80 | 125 | 500 | 225 | 280 | 140 | 109 |
| 125-80-315 | 42 | 125(1) | 80(1) | 125 | 530 | 250 | 315 | 140 | 165 |
| 125-80-400 | 42 | 125 | 80 | 125 | 530 | 280 | 355 | 140 | 210 |
| 125-100-200 | 32 | 125 | 100 | 125 | 530 | 200 | 280 | 140 | 93 |
| 125-100-250 | 42 | 125 | 100 | 140 | 530 | 225 | 280 | 140 | 134 |
| 125-100-315 | 42 | 125(1) | 100(1) | 140 | 530 | 250 | 315 | 140 | 180 |
| 125-100-400 | 42 | 125 | 100 | 140 | 530 | 280 | 355 | 140 | 218 |
| 150-125-250 | 42 | 150 | 125 | 140 | 530 | 250 | 355 | 140 | 151 |
| 150-125-315 | 42 | 150 | 125 | 140 | 530 | 280 | 355 | 140 | 180 |
| 150-125-400 | 42 | 150 | 125 | 140 | 530 | 315 | 400 | 140 | 252 |
| 200-150-250 | 42 | 200 | 150 | 160 | 530 | 280 | 375 | 180 | 195 |
| 200-150-315 | 48 | 200 | 150 | 160 | 670 | 315 | 400 | 180 | 257 |
| 200-150-400 | 48 | 200 | 150 | 160 | 670 | 315 | 450 | 180 | 305 |

| Cast Material Standards | | |
|-------------------------|-----------|---------------------------|
| | Standards | |
| | DIN | ASTM |
| Cast Iron | 0.6025 | A48, Class 35 |
| | 0.7043 | A3695, Grade 60-40-18 |
| Carbon Steel | 1.0619 | A216 WCB |
| Stainless Steel | 1.4408 | A744 CF-8M |
| | 1.4404 | A744 CF-3M |
| Duplex SS | 1.4517 | Duplex SS - A995 CD4-McuN |
| Super Duplex | 1.4469 | A995 CD3MWCuN |
| Alloy 20 | 1.4527 | A744 CN-7M |
| Hastelloy C | 2.4686 | A 494 CW-2M |
| Hastelloy B | 2.481 | A 494N-1 2MV |
| Titanium | 3.7031 | B367 Grade 2 |

Dimension in mm

Dimensions subjected to change without notice

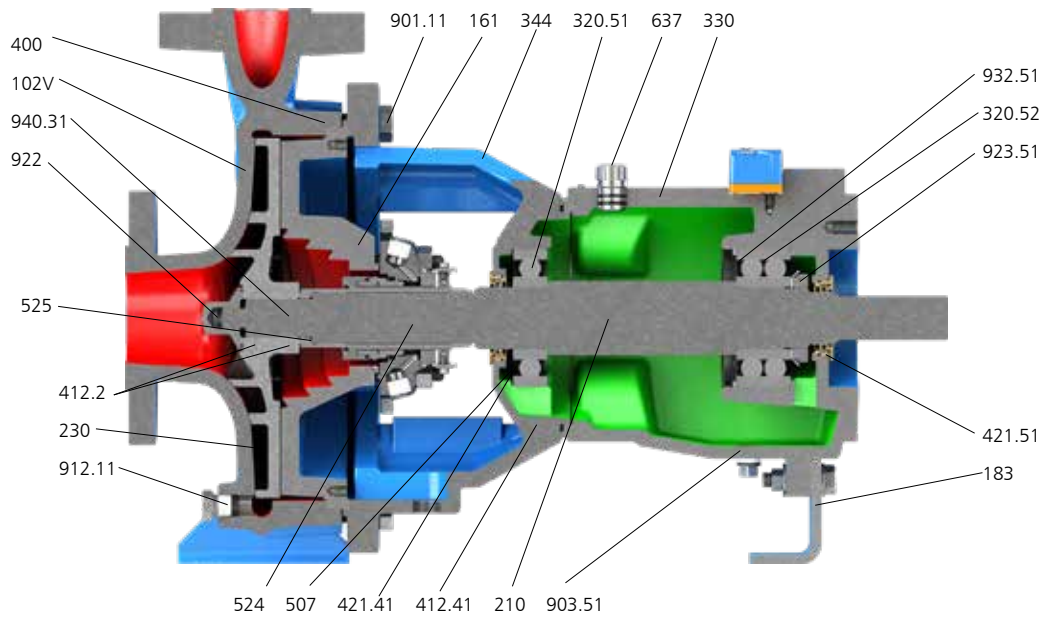
Note: Flange drilling in accordance with ISO 7005 PN 16 except where noted

(1)-Flanges drilled PN25

Detailed pump dimensions in accordance with ISO 2858/EN22858

Detailed baseplate dimensions in accordance with ISO 3661/EN23661

Parts List & Materials of Construction

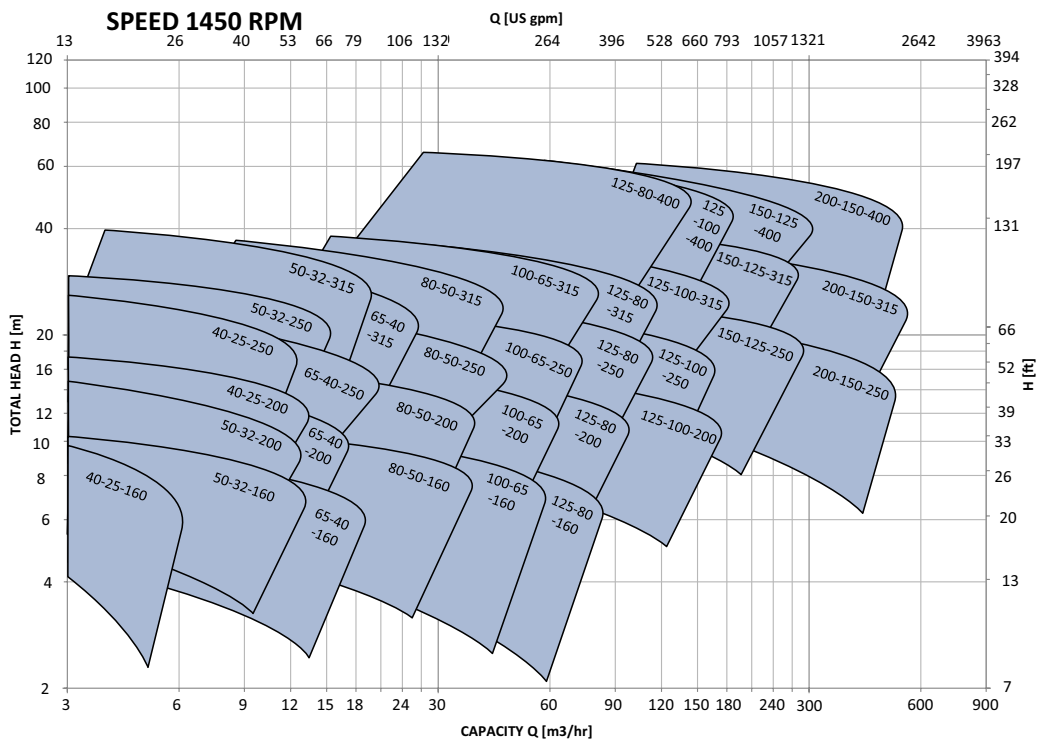
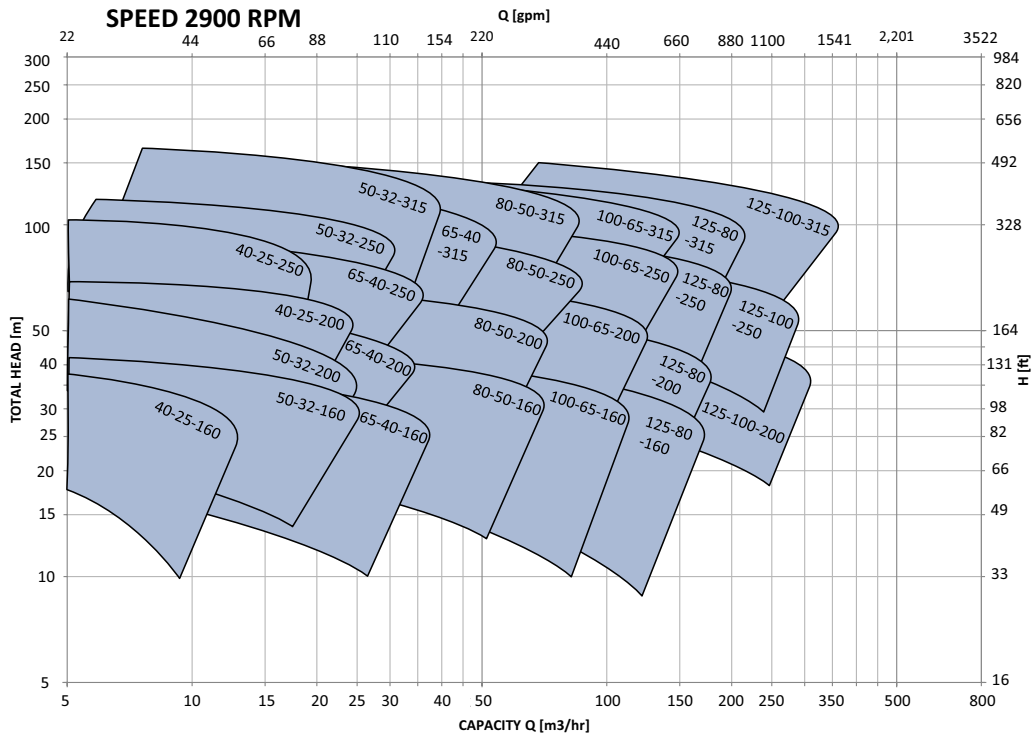


| Material | | | | | | | | | |
|-----------------------|-------------------------------------|---|--------|--------|----------|-----------|----------|--------|---------|
| Item Number | Part Name | CS/316SS | 316ss | Duplex | Alloy 20 | Hastelloy | Titanium | Nickel | Inconel |
| 102V | Casing | Carbon Steel | 316ss | Duplex | Alloy 20 | Hastelloy | Titanium | Nickel | Inconel |
| 161 | Seal Chamber | Ductile Iron | 316ss | Duplex | Alloy 20 | Hastelloy | Titanium | Nickel | Inconel |
| | Stuffing Box Cover | | | | | | | | |
| 183 | Support Foot | Carbon Steel | | | | | | | |
| 210 | Shaft | Stainless Steel | | | | | | | |
| 230 | Impeller | 316ss | 316ss | Duplex | Alloy 20 | Hastelloy | Titanium | Nickel | Inconel |
| 320.51 | Radial Bearing | Single Row, Ball Bearing | | | | | | | |
| 320.52 | Thrust Bearing | Double Row Angular Contact Ball Bearing | | | | | | | |
| 330 | Bearing Bracket | Cast Iron | | | | | | | |
| 344 | Lantern | Ductile Iron | | | | | | | |
| 400 | Case Gasket | Non Asbestos Aramid Fiber | | | | | | | |
| 412.21 | O-ring, Shaft Sleeve & Impeller Nut | PTFE | | | | | | | |
| 412.41 | O-ring, Bearing Bracket | NBR | | | | | | | |
| 421.41 | Oil Seal, Inboard | Bi-Metallic Labyrinth Seal (Steel & Bronze) | | | | | | | |
| 421.51 | Oil Seal, Outboard | Bi-Metallic Labyrinth Seal (Steel & Bronze) | | | | | | | |
| 524 | Shaft Sleeve | 316LSS | | Duplex | Alloy 20 | Hastelloy | Titanium | Nickel | Inconel |
| 525 | Shim | 304SS | | | | | | | |
| 637 | Oil Vent / Filler Plug | Steel | | | | | | | |
| 642 | Oil Level Sight Glass | Glass/Plastic | | | | | | | |
| 901.11 | Casing Bolts, Hex Cap Screw | Stainless Steel | | | | | | | |
| 901.12 | Support Foot Bolt | Carbon Steel | | | | | | | |
| | Hex Cap Screw | | | | | | | | |
| 901.31 | Lantern-Cover, Hex Cap Screw | Stainless Steel | | | | | | | |
| 901.41 | Brg Bracket-to-Lantern Bolts | Carbon Steel | | | | | | | |
| | Hex Cap Screw | | | | | | | | |
| 901.42 | Jacket Bolt | Stainless Steel | | | | | | | |
| 903.51 | Drain Plug | Carbon Steel | | | | | | | |
| 912.11 | Case Drain Plug | | 316SS | | Alloy 20 | Hastelloy | Titanium | Nickel | Inconel |
| 922 | Impeller Nut | | Duplex | | Alloy 20 | Hastelloy | Titanium | Nickel | Inconel |
| 923.51 | Bearing Lock Nut | Steel/Nylon | | | | | | | |
| 932.51 | Snap Ring | Carbon Steel | | | | | | | |
| 940.31 | Impeller Key | Carbon Steel | | | | | | | |
| Other Parts Not Shown | | | | | | | | | |
| 452 | Packing Gland | 316SS | | | | | | | |
| 458 | Lantern Ring | Glass Filled PTFE | | | | | | | |
| 461 | Packing | PTFE Impregnated | | | | | | | |

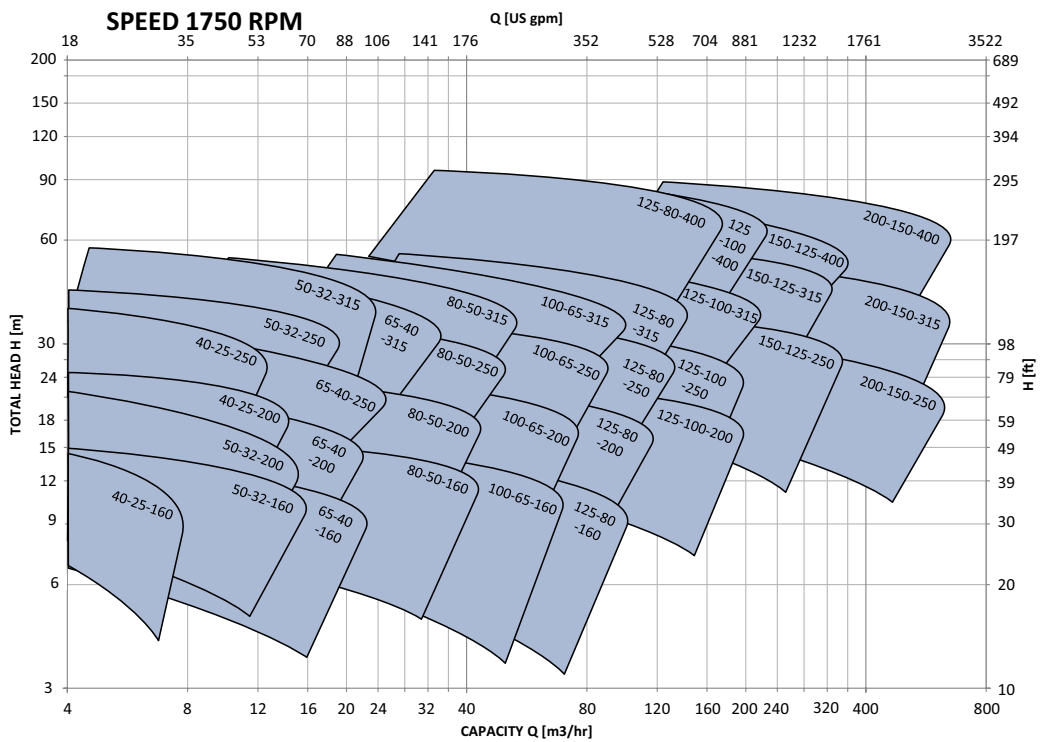
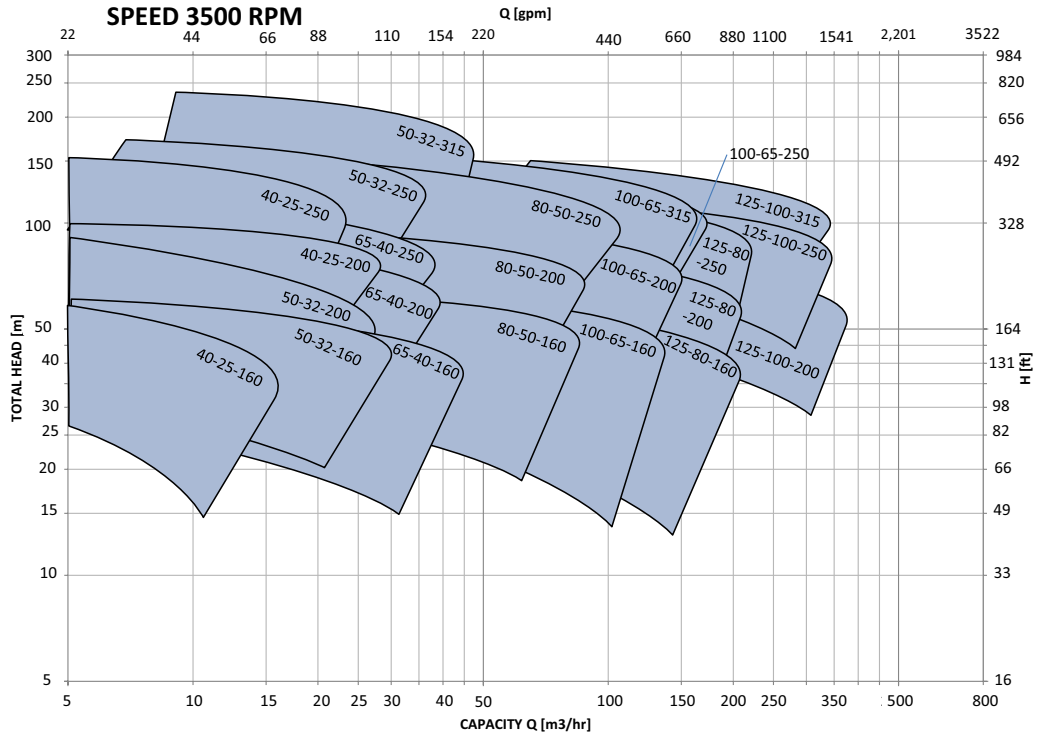
Other Alloys available: 316L, 317, 317L, Super Duplex etc...

Hydraulic Coverage

50Hz Performance



60Hz Performance



Notes

Locations



For more information Please Visit:
www.gouldspumps.com | www.ittproservices.com



— An ITT Brand

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Fax: 315.568.2418
www.gouldspumps.com

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