



Goulds 3640 *i-FRAME*®

API 610 11th Edition / ISO 13709 2nd Edition

API BB2 Two-Stage, Between-Bearing, Radially Split



ITT

ENGINEERED FOR LIFE

3640 *i-FRAME*®

A Leader in API Engineered Pump Package Solutions...

Proven API Leadership

ITT Goulds Pumps is a proven leader in API Pumps

- Over 20,000 units installed
 - Over 17,000 OH2 / OH3s
 - Over 3,000 BB1 / BB2 / BB3 pumps
- 40+ years of API expertise
- Participating member on API 610 and API 682 committees

Family of API Pumps

ITT Goulds Pumps has a family of proven API pumps:

- Overhung pumps
- Single and two-stage between-bearing
- Multistage between-bearing pumps – axially split
- Barrel multistage - radially split
- Vertical, double casing pumps
- Specialty pumps

Global Coverage

ITT Goulds Pumps has the global coverage needed to serve multi-national companies in any region.

Industry Leading Hydraulic Coverage

- We offer extensive coverage to meet your process needs.
- Better hydraulic fits can mean improved efficiency and long-term reliability and parts life.

8000 HP / 6000 kW Testing Capability

- Our expanded test facility can test your pump in the most demanding conditions.
- Testing at rated speeds is critical to assess the impact of dynamic conditions including vibration.

API Engineering Expertise

- We are experts in packaging engineered pumps that meet your demanding applications – with true conformance to the latest API specifications.
- We have extensive experience in nearly every type of driver, bearing, seal, piping configuration, nozzle configuration, flange and baseplate design to meet your application needs.
- ITT is a world leader in technology and engineering including hydraulics, materials science, mechanical design and fluid dynamics.

Broad Applications

- Petroleum refining, production and distribution
- Petrochemical and demanding chemical processing
- High temperature applications including boiler circulation
- General industrial requiring high temperature or high pressures



3640 i-FRAME[®]

High Temperature and Pressure Process Pumps that Meet or Exceed API 610 11th Edition / ISO 13709 2nd Edition

Safety, reliability and versatility are the key words for our 2 stage, centerline mounted, between-bearing (BB2) API 610 process pump.

Safety and Reliability

We provide engineered solutions with true conformance to the latest API specifications including the stringent emissions containment per API 682.

The result is a safe and rugged between-bearing API process pump designed for a minimum 20-year life.

Versatility

- Capacity to 7,500 GPM (1700 m³/h)
- Total Dynamic Head to 2,500 feet (760 m)
- Temperature to 850° F (455° C)
- Pressure to 1,130 psig (75 bar)

Materials: Available in a wide range of materials including all API 610 constructions and custom application needs.

Engineered Hydraulics: Dense hydraulic coverage to better match your process for efficiency and reliability. Custom hydraulics are available.

Engineered Packaging with a wide range of drivers, seals, piping, nozzle configurations, flanges, base plates, and QC testing.

Applications

- **Refinery:** Process feed, reflux, splitter bottoms, high-pressure process transfer
- **Boiler Feed Booster**



i-FRAME[™] Bearing Housing Features

- This modern i-FRAME[™] Ball/Ball design bearing housing comes standard on all Goulds between-bearing pumps. A revolutionary oil capture and delivery system provides consistent lubrication to lower bearing temperatures and optimize bearing life.
- See the difference
 - Patent Pending Oil Filter Assembly removes debris and moisture
 - Optimized Housing Design Lowers bearing temperatures up to 6.7+ °C (20+ °F)
 - i-ALERT2 Machine Health Monitor identifies potential problems before they become costly failures
 - Instrumentation provisions as standard



Goulds Model 3640 between-bearings radially split process pumps are designed for smooth, reliable operation, and meet the toughest specification requirements of API 610 / ISO 13709 to assure extended service life.

Bearings & Bearing Housings

To get superior MTBF you need two things: Optimum pump hydraulics and a robust pump structure. The new i-FRAME housings delivers on the second point by providing a premium robust housing with unique new and improved features that raises the bar on what you can expect from your pump's long term performance. These i-FRAME bearing housings include the new patented one piece design bearing housing for the ball-ball bearing arrangement, as well as the patent pending split bearing housing for the sleeve-ball and sleeve-tilt pad bearing arrangement.

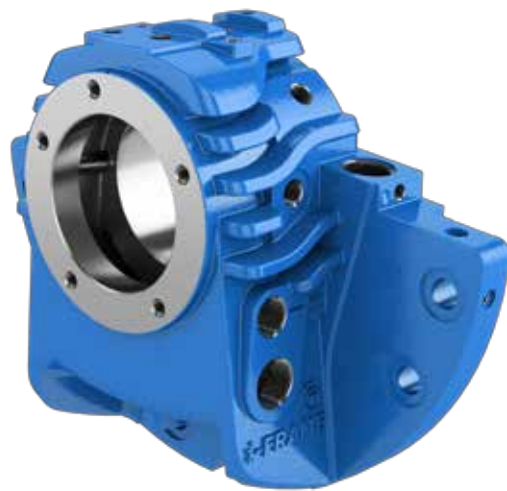
The housings are cast and machined out of ASTM A216 Grade WCB carbon steel. Three unique bearing arrangements are available:

- Ball/Ball (New Orders Only)
 - Deep Groove Ball Bearing on the Drive End (DE) to handle radial loads
 - Duplex 40° Angular Contact Bearing Set on the Non- Drive End (NDE) to handle radial and axial loads. Bearing set is supplied with a light clearance

All ball/ball bearing housings feature a full 180° bearing saddle bolted to the casing positioned with precision dowels for accurate, repeatable alignment. The 180° bearing saddle is optimized for stiffness and rigidity of connection between the pump casing and housing along with increased bolt diameters. This provides significantly increased stiffness compared to the previous design generation, resulting in reduced vibration.

The bearing housing exterior includes distinctive cooling fins placed in a CFD/FEA optimized pattern to aid in heat dissipation.

The i-FRAME bearing housings have enhanced air cooling with axial fans and achieves metal and oil temperature reductions of up to 30° F from previous design without the need for cooling water. All shaft ends on the NDE side come standard with a guarded extension to accept a fan for ease of field retrofit, so if your process needs change the fan can be fitted without the need for expensive pump disassembly.



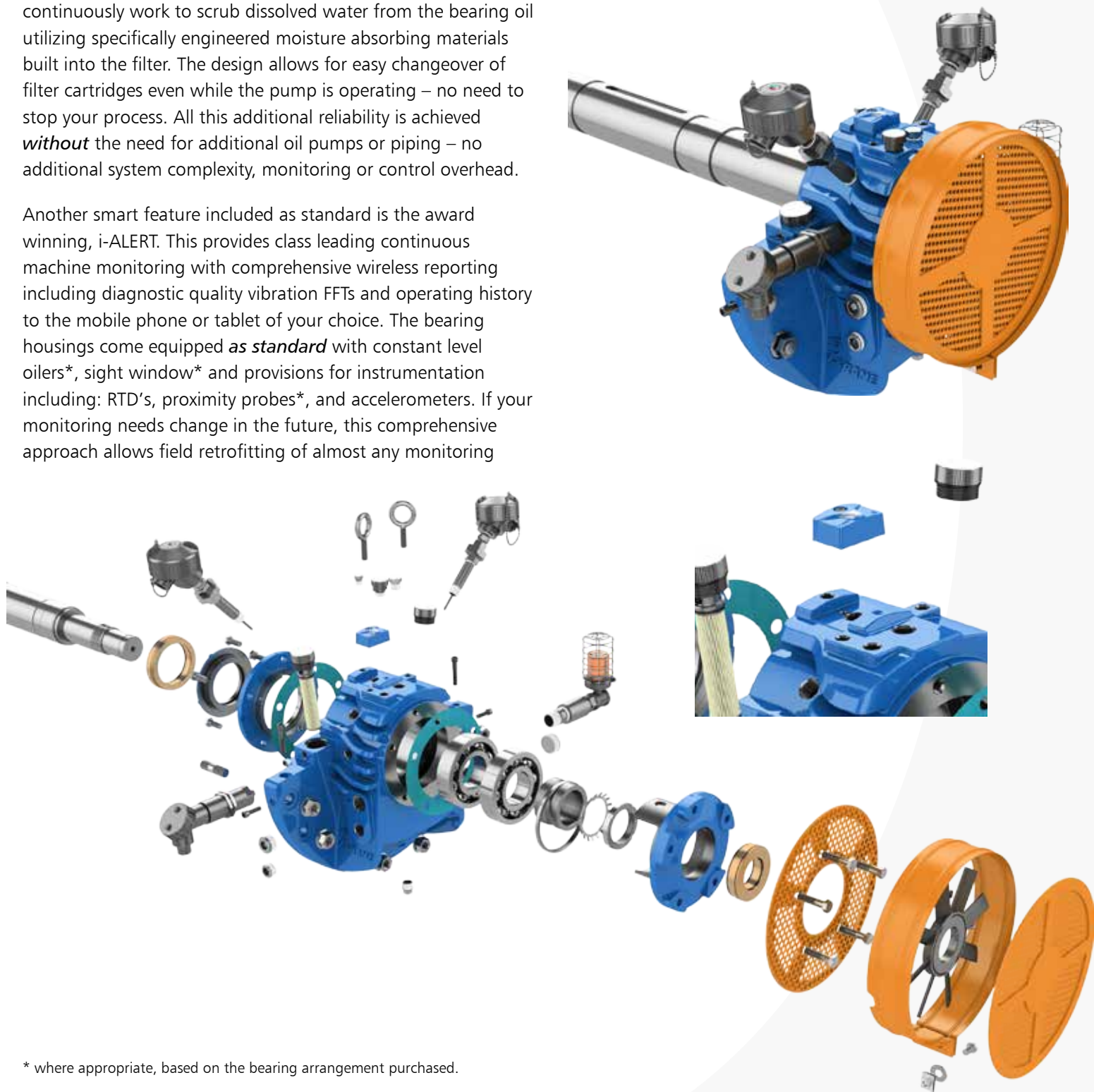
Bearing housing put through rigorous testing.

Bearing oil contamination by wind-blown sand and dust together with atmospheric moisture are major contributors to bearings failing well before their design life. In an industry first, all self-contained bearing housings include a cartridge filter assembly that will help safeguard the bearing oil from debris contamination. The patent pending filter cartridge will also continuously work to scrub dissolved water from the bearing oil utilizing specifically engineered moisture absorbing materials built into the filter. The design allows for easy changeover of filter cartridges even while the pump is operating – no need to stop your process. All this additional reliability is achieved **without** the need for additional oil pumps or piping – no additional system complexity, monitoring or control overhead.

Another smart feature included as standard is the award winning, i-ALERT. This provides class leading continuous machine monitoring with comprehensive wireless reporting including diagnostic quality vibration FFTs and operating history to the mobile phone or tablet of your choice. The bearing housings come equipped **as standard** with constant level oilers*, sight window* and provisions for instrumentation including: RTD's, proximity probes*, and accelerometers. If your monitoring needs change in the future, this comprehensive approach allows field retrofitting of almost any monitoring

scheme without replacing your bearing housings or relying on ad-hoc instrument mounting.

It is important to note these new i-FRAME bearing housings are not interchangeable with the previous design. For other features, see the Standard Product Configuration under the Application and Selection Guide section.



* where appropriate, based on the bearing arrangement purchased.

3640 (API BB2)

API 610 11th Edition / ISO 13709 2nd Edition

API BB2 Two-Stage, Between-Bearing, Radially Split

HEAVY DUTY SHAFT

Minimum shaft deflection for extended seal bearing life. Sized to meet deflection and rotor dynamics requirements of API 610 / ISO 13709.

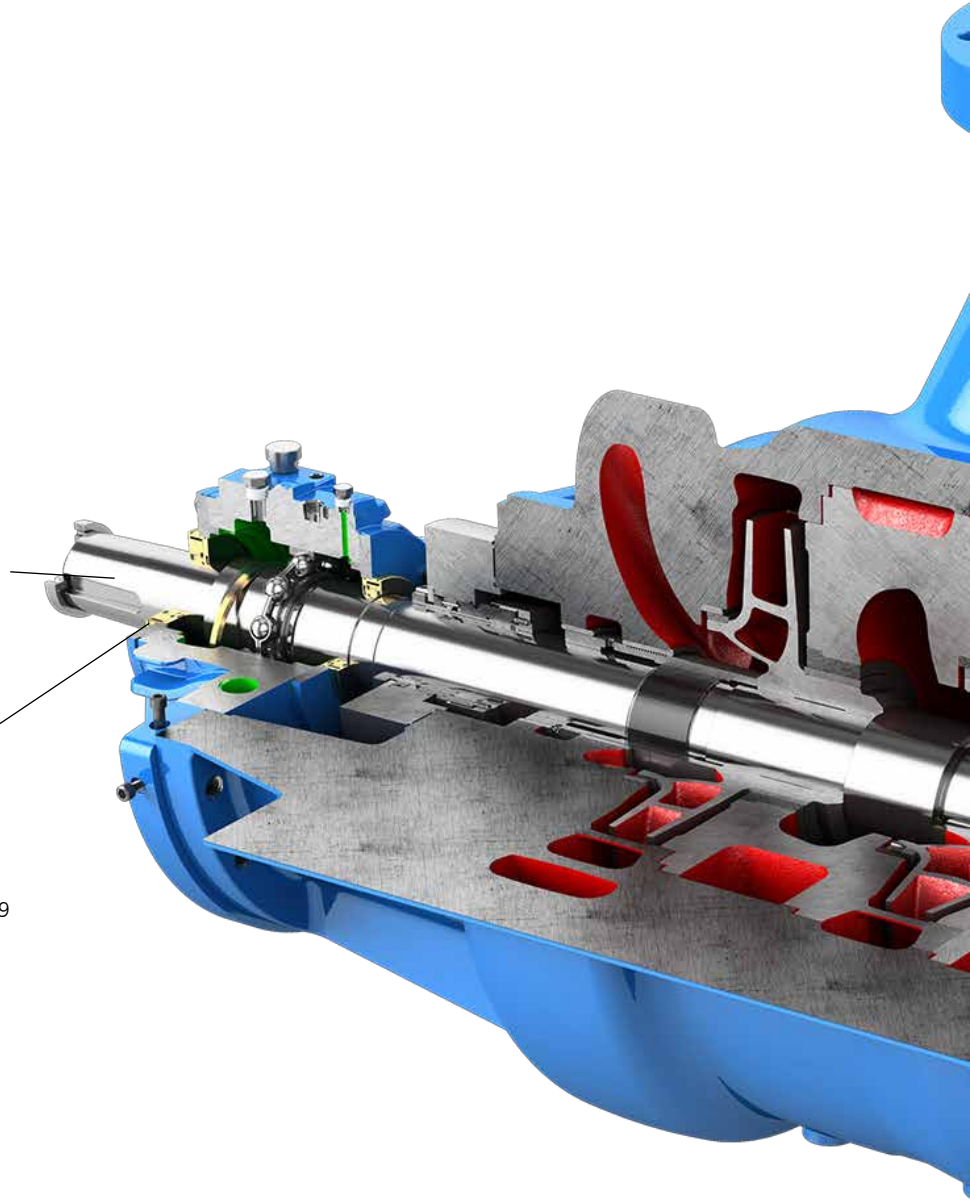
RENEWABLE WEAR RINGS

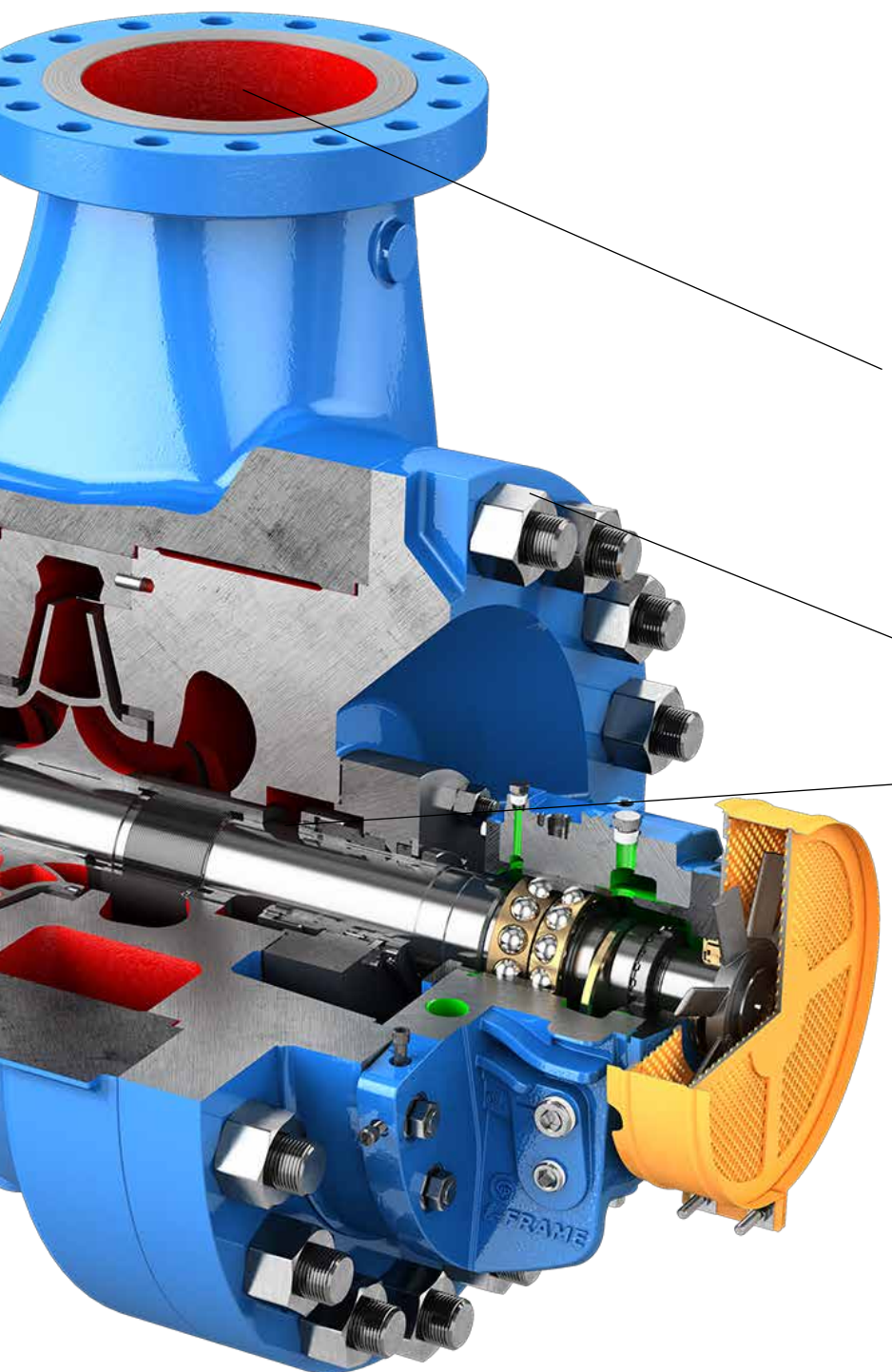
API 610 / ISO 13709 running clearances. Positively locked.

HEAVY DUTY RADIAL BEARING STANDARD

CENTERLINE MOUNTED CASING

Heavy duty mounting extensions accept API 610 / ISO 13709 nozzle loads and maintain pump alignment under extreme service conditions.





CLASS 300 RF FLANGES STANDARD

Other classes and facings optional.

RADIALLY SPLIT CASING

Designed specifically for high pressure / high temperature services. Fully confined controlled compression gaskets assure leak-proof sealing.

CASING HEAD ON OUTBOARD END

Allows removal of rotor without disturbing suction and discharge piping.

ENLARGED SEAL CHAMBERS

Conform to API 610 / ISO 13709 dimensional requirements. Allows use of wide range of API 682 / ISO 21049 cartridge mechanical seals to meet specific service conditions.

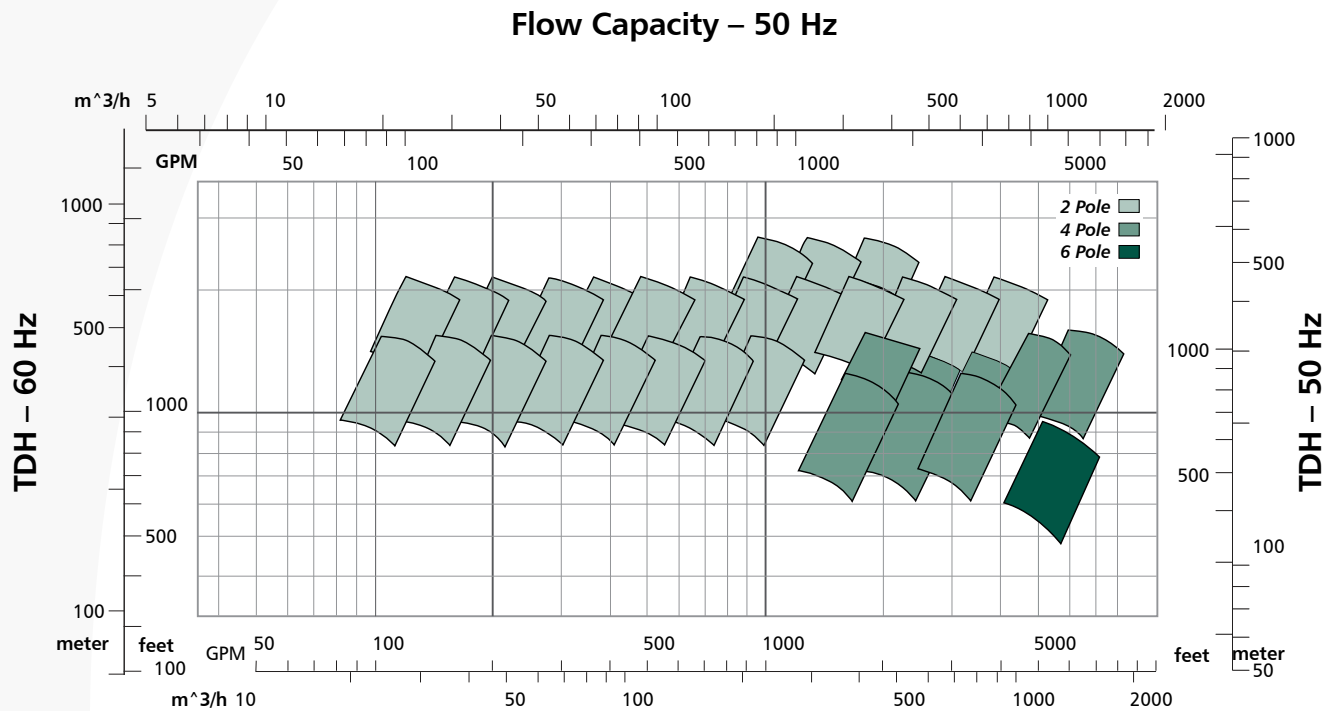
HEAVY DUTY THRUST BEARING

Duplex 40° angular contact standard. Ring oil lubricated. Other bearing configurations available to meet specific service requirements.

OPPOSED IMPELLERS ARRANGEMENT

Reduced axial forces for maximum bearing life. Impellers are driven by individual keys and positioned on shaft by dual locknuts. Staggered impeller vane tips for reduced pressure pulsations at vane passing frequency. Double suction first stage impeller available as an option. Single suction impeller is standard.

Hydraulic Coverage



Note: Hydraulics above represent 80% to 110% of best efficiency point (BEP).

PRO Services® Engineered Upgrade

Example of our PRO Services® Engineered upgrade capability. The following two-stage API BB2 Model 3640 was upgraded from an old edition of API 610 to the latest (11th) edition of API.



Original Pump



10th Edition Upgrade

A Leader in API Engineered Pump Package Solutions

API Family of Pumps

Model 3700
OH-2



Model 3910
OH-3

Model 3620
3640
BB-2



Model 3610
BB-1



API Type	Goulds Model	Capacity GPM (M ³ /Hour)	TDH Feet (Meters)	Temperature °F (°C)	Pressure PSIG (kg/cm ²)
OH-2	3700	8500 (1930)	1200 (360)	800 (425)	870 (60)
OH-3	3910	6000 (1360)	750 (230)	650 (340)	600 (42)
BB-1	3610	50000 (11355)	700 (215)	300 (150)	300 (21)
BB-2	3640	7500 (1700)	2500 (760)	850 (455)	1130 (75)
BB-2	3620	20000 (4540)	1500 (455)	850 (455)	1000 (70)
BB-3	3600	8500 (1930)	9000 (2740)	400 (205)	4000 (275)
BB-5	7200CB	4000 (910)	9000 (2740)	800 (425)	4000 (275)
VS4	API 3171	3180 (720)	525 (160)	450 (232)	750 (50)
VS1	VIT	70000 (14760)	3500 (1060)	500 (260)	2500 (175)
VS6	VIC	70000 (14760)	3500 (1060)	500 (260)	2500 (175)



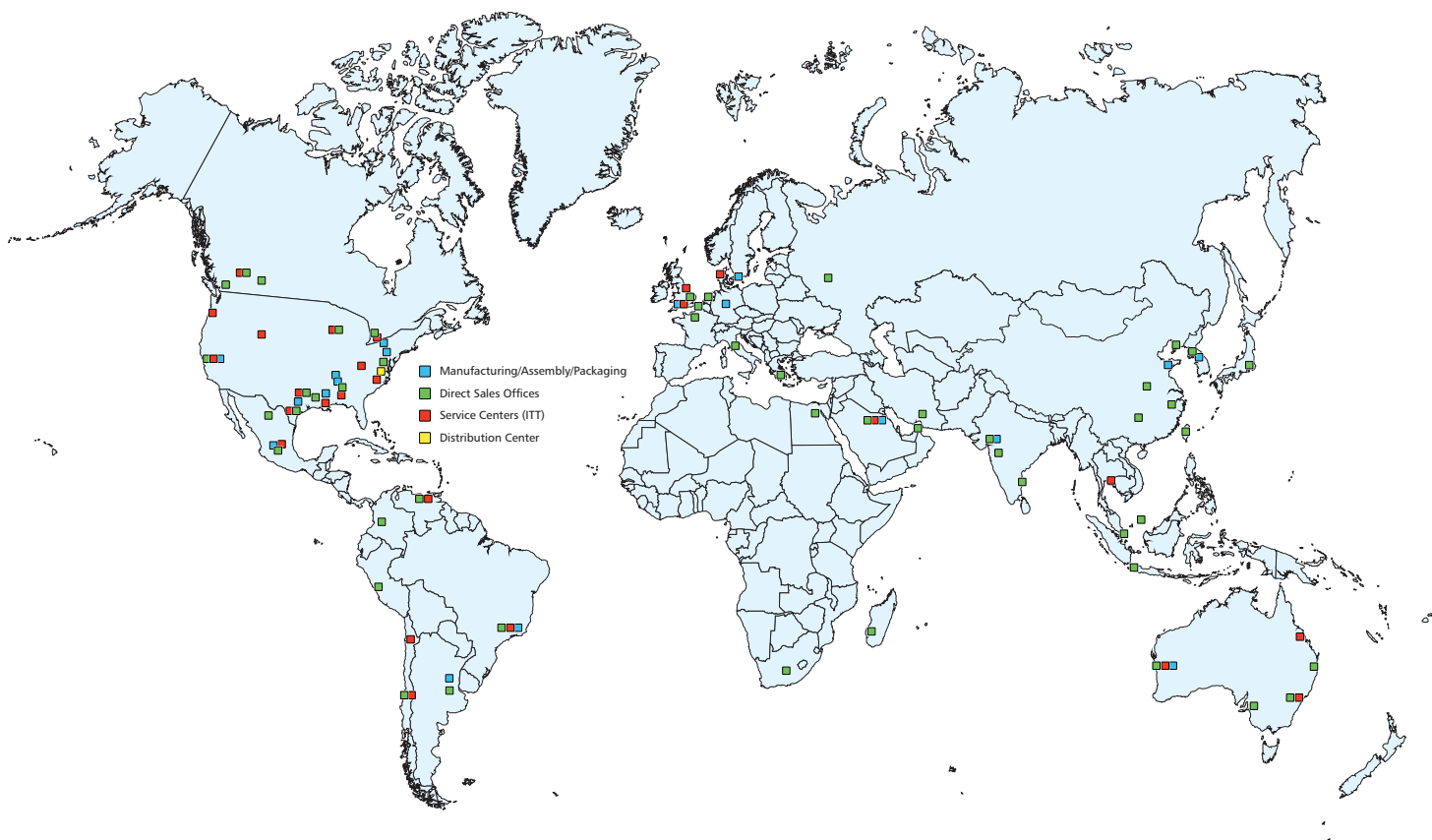
Model 3600
BB-3



Model 7200CB
BB-5

Notes

Wherever you are, we're there too.



PRO services

Reliability has no quitting time.

Building on over 160 years of Goulds Pumps experience, PRO Services provides an array of services focused on reducing equipment total cost of ownership (TCO) and increasing plant output, including predictive monitoring, maintenance contracts, field service, engineered upgrades, inventory management, and overhauls for pumps and other rotating equipment.

Your Total Solution For Equipment Life Cycle Optimization

