

 **GOULDS PUMPS**

# Goulds 3910

API-610 11th Edition / ISO 13709 2<sup>nd</sup> Edition  
API OH3 Overhung, Vertical In-Line with Bearing Frame



**avrorarm.ru**  
**+7 (495) 956-62-18**



**ITT**

ENGINEERED FOR LIFE

# Goulds 3910



Goulds Model 3910  
Provides the benefits of an in-line pump ...low installation costs and space savings... without compromising reliability, maintainability, safety or hydraulic performance.

Designed to Handle High-Temperature and High-Pressure Services of the Pulp & Paper Industries

- Capacities to 6,000 GPM (1360 m<sup>3</sup>/h)
- Heads to 750 feet (230 m)
- Temperatures to 650°F (340°C)
- Pressures from full vacuum to 600 PSIG (42 bar)

## Design Features

Extended Pump Life

- **Hydraulic Coverage** – Line designed for full 50 / 60 Hz performance.
- **Back Pull-out Construction** – Spacer type coupling allows one-craft maintenance.
- **Centerline Supported** – High temperature stability.
- **Labyrinth Seals** – Eliminate loss of lubricant, prevent lubricant contamination for maximum bearing life.
- **Maximum Interchangeability** – Power end and impellers completely interchangeable with Goulds Model 3180.
- **International Design** – Metric fasteners and fittings used throughout.

## Services

Condensate, digester recirculation, reflux, stripper feed, reactor feed, scrubber circulation, acid, fractionator reflux, finishing column bottoms, caustic, stripper overhead product

# Goulds 3910

## Goulds Model 3910 for Refinery Services

### The 3910 offers inherent in-line advantages:

- **Lower Installation Costs** — No heavy foundation required.
- **Minimum Floorspace** — Ideal for retrofitting and debottlenecking.
- **Shaft-to-Shaft Alignment** — Maintained during changes in nozzle loads or operating conditions (thermal cycling).
- **In-Line Suction and Discharge** — Simplifies piping design and construction. Goulds 3910 is designed to meet the demanding requirements of the Hydrocarbon Processing Industries.



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## 3910 Bearing Frame Design for Reliability

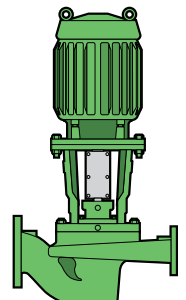
### Goulds Model 3910 combines in-line and horizontal pump advantages...

- **Positive Shaft Alignment** — Extended seal and bearing life and reduced vibration.
- **Proven Shaft Stiffness** — Reduced deflection for extended seal life.
- **Standard Mechanical Seals**
- **Standard Flexible Couplings**
- **Simplified Maintenance** — Use of Goulds Framehook™ allows safe and easy maintenance.
- **Standard Vertical Motors** — Power end absorbs all pump hydraulic loads.



### Bearing Frame Design Eliminates Rigid Coupled In-Line Problems:

- Eliminates product lubricated bushings that wear and increase shaft deflection.
- Complex rigid coupling assembly and shaft alignment procedures not required.
- Special motor designs not required.



# Goulds 3910

## Goulds Framehook™ for Safe and Simple Maintenance

Now there's a safe and easy way to remove the back pull-out assembly for offsite maintenance... without removing the motor or disturbing suction and discharge piping.

Goulds Framehook™ facilitates removal (and installation) of the back pull-out. Maintenance personnel can now remove a heavy assembly safely and in minimum time.

- 1 After removing the casing stud nuts, coupling spacer and any flush or seal piping, position Framehook™ using suitable lifting capability.
- 2 With Framehook™ bolted in place, separate the assembly from the casing by using the jacking bolts.
- 3 Lift assembly clear of casing studs.
- 4 Tilt the unit using threaded adjustment rod for easy removal through opening in motor support.
- 5 The entire back pull-out assembly ready for offsite maintenance.



## Goulds Value Added Service



### Repair and Overhaul

Goulds PRO Service Centers repair all types of rotating equipment. Each facility has special diagnostic equipment to facilitate preventive maintenance.



### Parts Availability

Goulds Distribution Centers are strategically located worldwide, and are committed to the ready availability of repair parts.



### Field Service

A staff of highly specialized installation, training and commissioning engineers is available to insure each project's successful completion and start-up.



### Factory Support

Goulds offers the most advanced training program including product training and maintenance schools. In addition to sales offices around the world, Goulds can provide additional support for special requirements.

# Design Features for Optimum Reliability

Goulds Model 3910 utilizes proven design features to ensure reliable performance.

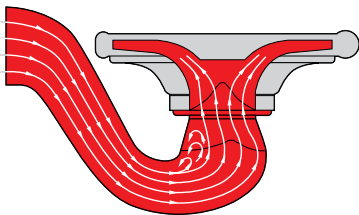
## Rotating Element

Shaft and bearings are same as used with Goulds Model 3700 horizontal process pump. Proven design preferred for toughest services.



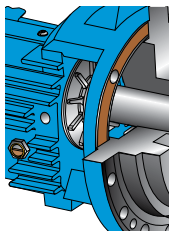
## Engineered in-line Suction Design

The 3910 suction design is the result of extensive model and full-scale testing. NPSH requirements are minimized. Design assures streamlined, even flow into impeller eye; reduces losses encountered in conventional suction designs.



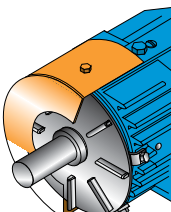
## High Temperature Capability

For high temperature applications, these options are available.



### Heat Flinger and Thermal Barrier

Thermal gasket creates heat barrier between seal chamber and bearing frame. Heat flinger dissipates shaft-conducted heat and circulates air to reduce heat build-up.



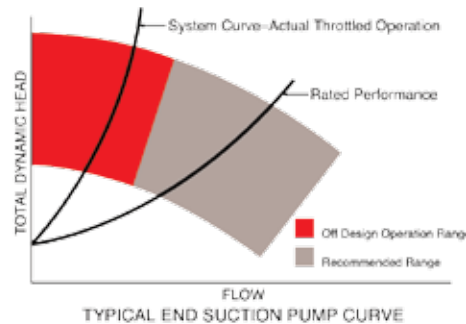
### Air Cooling

High capacity fan and shroud mounted on power end effectively reduce bearing frame temperature for cooler running bearings without using cooling water.

## Optional 3910LF Design for Low-Flow Services

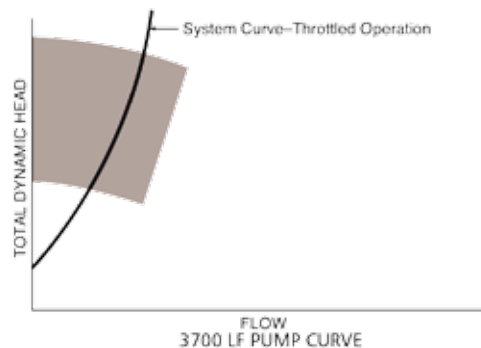
### Not All Pumps are Designed for Low Flows

Many users throttle pumps to attain low flow rates - yet create bearing and seal issues. The traditional enclosed impeller passage ways would be too small to properly manufacture at these low flow rates.



### 3910LF Low Flow Solution - Fully API compliant

The 3910LF semi-open radial vane Barske type impeller eliminates these enclosed impeller limitations. The unique circular volute casing eliminates competitor diffusers thus reducing the pump size, footprint and lifetime costs.





# Goulds 3910 (API OH3)

API-610 11th Edition / ISO 13709 2nd Edition

API OH3 Overhung, Vertical In-Line with Bearing Frame

## SPACER COUPLING

With standard spacer length used for all applications.

## PUMP BEARINGS

Carry all pump hydraulic loads. Duplex angular contact thrust bearings and deep groove Conrad radial bearing standard with grease lubrication. Oil mist optional.

## MODEL 3700 INTERCHANGEABILITY

Bearing frame, bearings, shaft, seal chamber, mechanical seal, impeller and wear rings completely interchangeable with Goulds Model 3700 horizontal process pumps.

## BACK PULL-OUT

Frame assembly, cover, impeller easily removed as a unit for maintenance using Goulds patented FRAMEHOOK™ without disturbing piping or motor.

## SEAL CHAMBER COVER

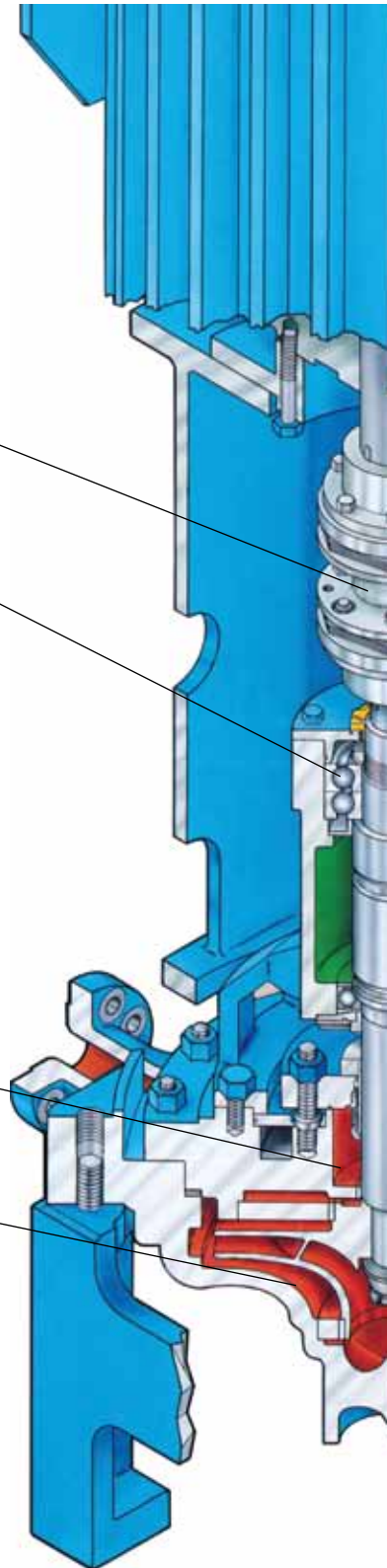
Conforms fully to API-610/ISO 13709. Designed to accept wide range of API 682/ISO 21049 cartridge seals.

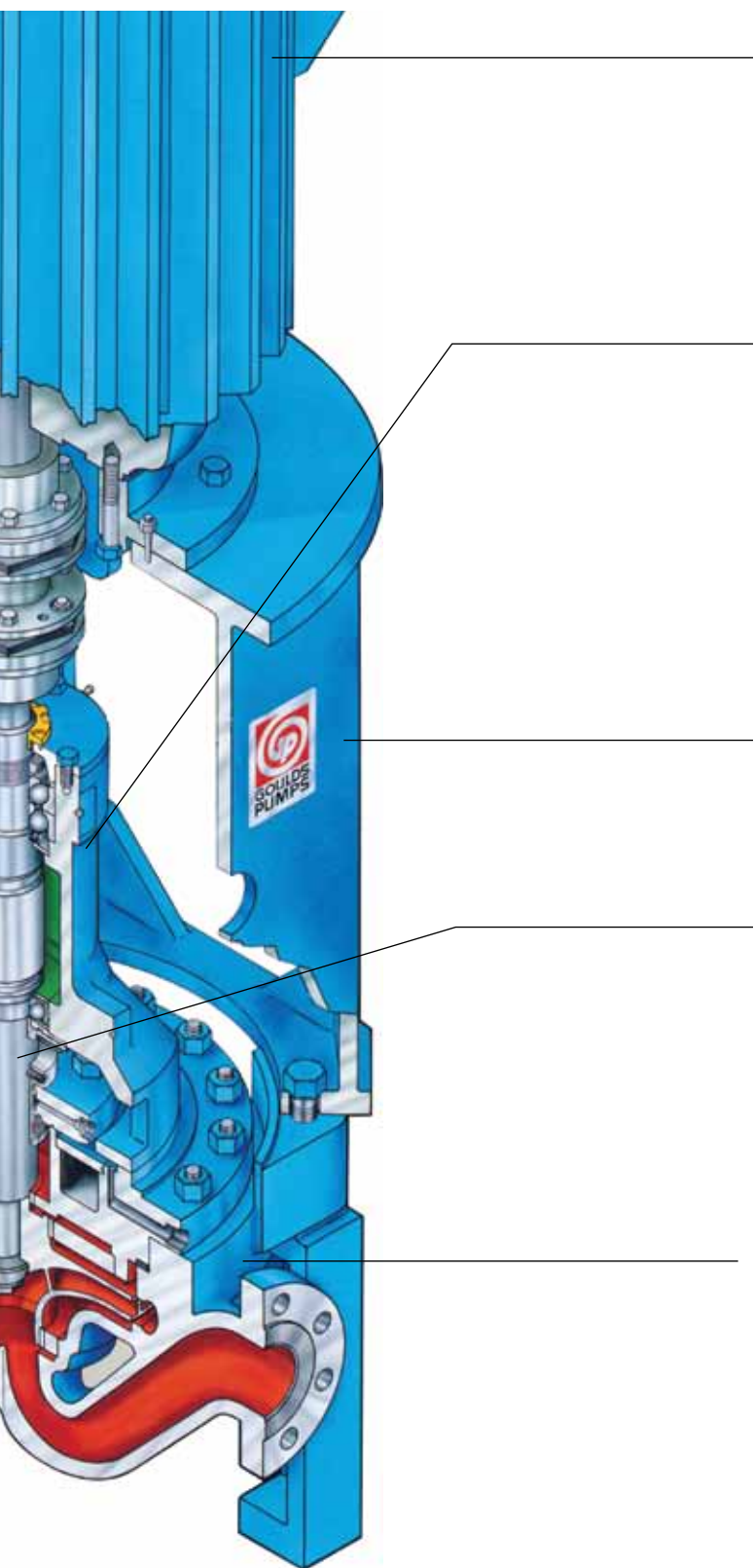
## IMPELLER

Impeller balanced to stringent ISO 1940 Grade 1.0 (exceeds API minimum). 3910LF low flow pumps utilize a semi-open impeller, they do not utilize impeller or casing wear rings.

## OPTIONAL CASING SUPPORTS

Provide additional support and stability. One piece fabricated support available.





#### STANDARD C-FACE VERTICAL MOTOR

Does not require special thrust bearings to carry pump loads. Other motor designs can be used.

#### HEAVY DUTY BEARING FRAME

Rabbeted fits assure runout and concentricity within API-610/SO 13709 specifications. Accessible monitoring locations. Frame machined for use of Goulds FRAMEHOOK™ back pull-out removal device.

#### RIGID MOTOR SUPPORT

Maintains alignment between pump and motor. Open on both sides for ventilation, ease of maintenance.

#### RIGID SHAFT ASSEMBLY

Limits deflection at seal faces to less than 0.002 in. (.05 mm) under the most severe operating conditions.

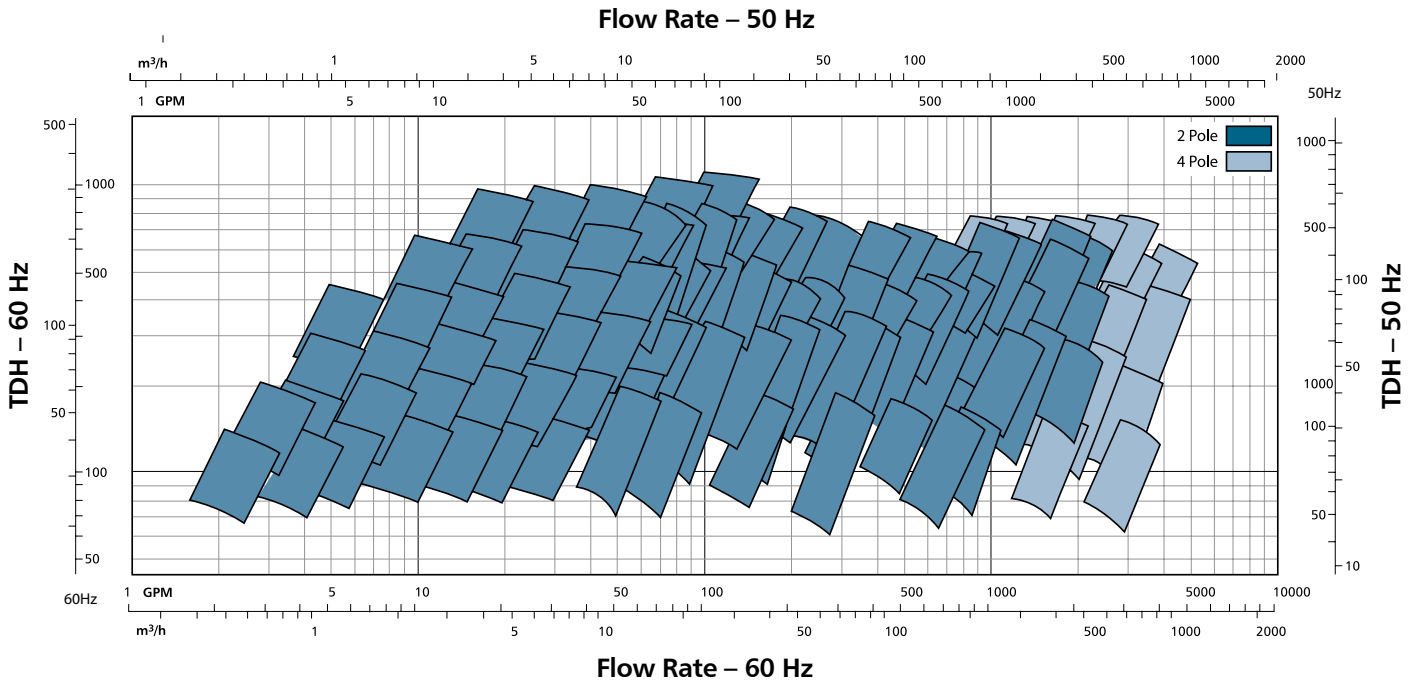
#### IN-LINE DESIGN

Simplifies installation, minimizes floor space requirements.

#### IN-LINE CASING

Rugged design, accepts two times API-610/ISO 13709 nozzle loads. 300 RF flanges standard. Proprietary suction design assures smooth, even flow into impeller eye.

# Hydraulic Coverage



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



This ITT Goulds customer saved space as well as foundation and baseplates costs with seven Model 3910s. Many applications benefit from the inline piping as well.



# Optional Features

Goulds offers users a range of options to meet specific plant and process requirements.

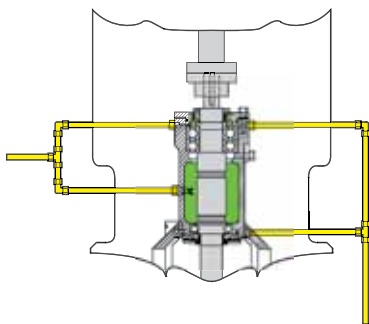
## Pump Supports

Provide additional support and stability of entire unit during installation and maintenance. Also available in one-piece fabricated construction.



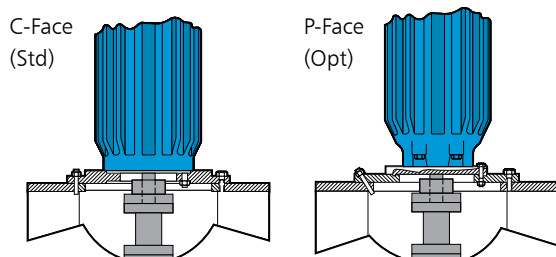
## Oil Mist Lubrication

Pure oil mist available to meet customer requirements and to handle higher temperature pumpages.



## Choice of Motors

The 3910 power end absorbs all hydraulic loads, and allows use of standard C-Face motors. However, the 3910 will readily accept P-Base motors.



## Reliability Enhancement Capabilities

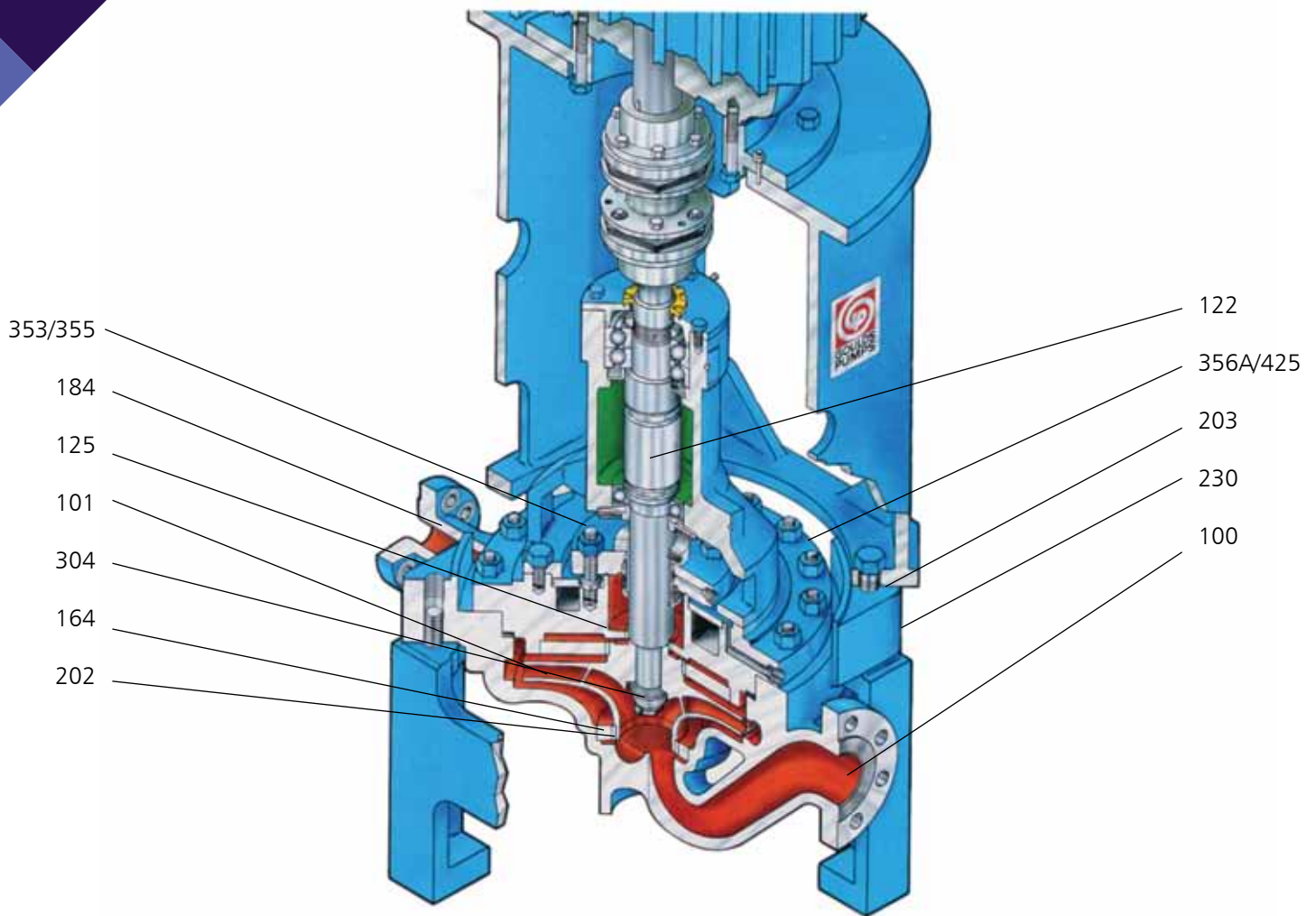
Goulds offers a complete range of in-plant NDE capabilities for casting and welded fabrication examination.

- Magnetic Particle Examination
- Liquid Penetrant Examination
- Weld Hardness Testing
- Positive Material Identification



Model 3910 impellers are dynamic balanced to API-610/ISO 13709 requirements as standard. Unique user requirements for balancing can also be accomplished.

# Sectional View

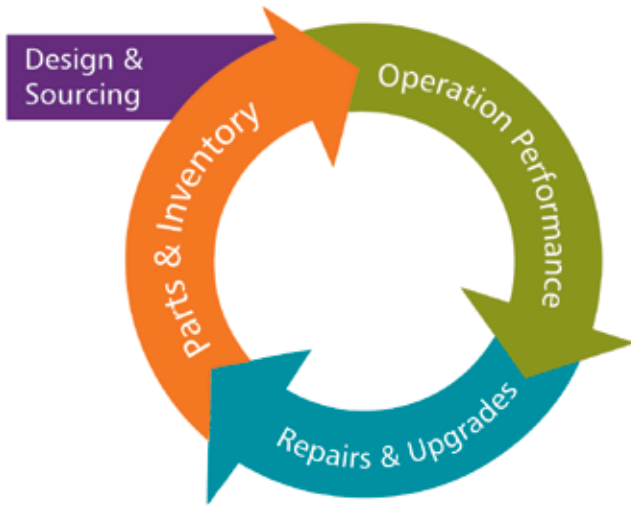


## Parts List and Materials of Construction

Item	Part Name	S-4	S-6	S-8	C-6	A-8	D-1	D-2
<b>100</b>	Casing	Carbon Steel			12% Chrome	316L SS	Duplex SS	S. Duplex SS
<b>101</b>	Impeller	Carbon Steel	12% Chrome	316L SS	12% Chrome	316L SS	Duplex SS	S. Duplex SS
<b>122</b>	Shaft	ANSI 4140 *		316L SS	410 SS	316L SS	Duplex SS	S. Duplex SS
<b>125</b>	Throat Bushing	Cast Iron	410 SS	316L SS	410 SS	316L SS	Duplex SS	S. Duplex SS
<b>164, 230</b>	Wear Ring - Casing **	Cast Iron	12% Chrome	316L SS	12% Chrome	316L SS	Duplex SS	S. Duplex SS
<b>202, 203</b>	Wear Ring - Impeller **	Cast Iron	12% Chrome	Nitronic 60	12% Chrome	Nitronic 60	Duplex SS	S. Duplex SS
<b>184</b>	Seal Chamber Cover	Carbon Steel			12% Chrome	316 SS	Duplex SS	S. Duplex SS
<b>304</b>	Impeller Nut	Steel	316 SS				Duplex SS	S. Duplex SS
<b>356A, 425</b>	Casing Studs / Nuts	ANSI 4140						

\* 410 SS on S-6 when temperature exceeds 350°F (175°C)

\* Not utilized on 3700LF low flow pumps.



## Reliability has no quitting time.

**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.



PRO Services provides OEM parts for Goulds Pumps, Bornemann Pumps, AC, Morris, Goynes, CB, HVC, UXN and ROV in a timely manner to meet end user requirements. Significant levels of inventory and quick response capability provides the necessary programs to meet all repair needs.

PRO Services provides programs of reliability services, energy assessments, asset management and training. These can be deployed as stand-alone or integrated solutions, tailored to the needs of your company.

PRO Services provides an array of repairs and upgrades services to extend equipment life. PRO Services helps customers develop effective maintenance and asset management programs to lower maintenance costs, improve uptime, reduce inventory costs and extend equipment life.



Original pump



10th Edition Upgrade

Shown is an example of ITT's Engineered upgrade capability. OH2 Model 3700 upgrade from an old edition to API 10th edition.

# 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 <sup>3</sup> /Hour)	TDH Feet (Meters)	Temperature °F (°C)	Pressure PSIG (kg/cm <sup>2</sup> )
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



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