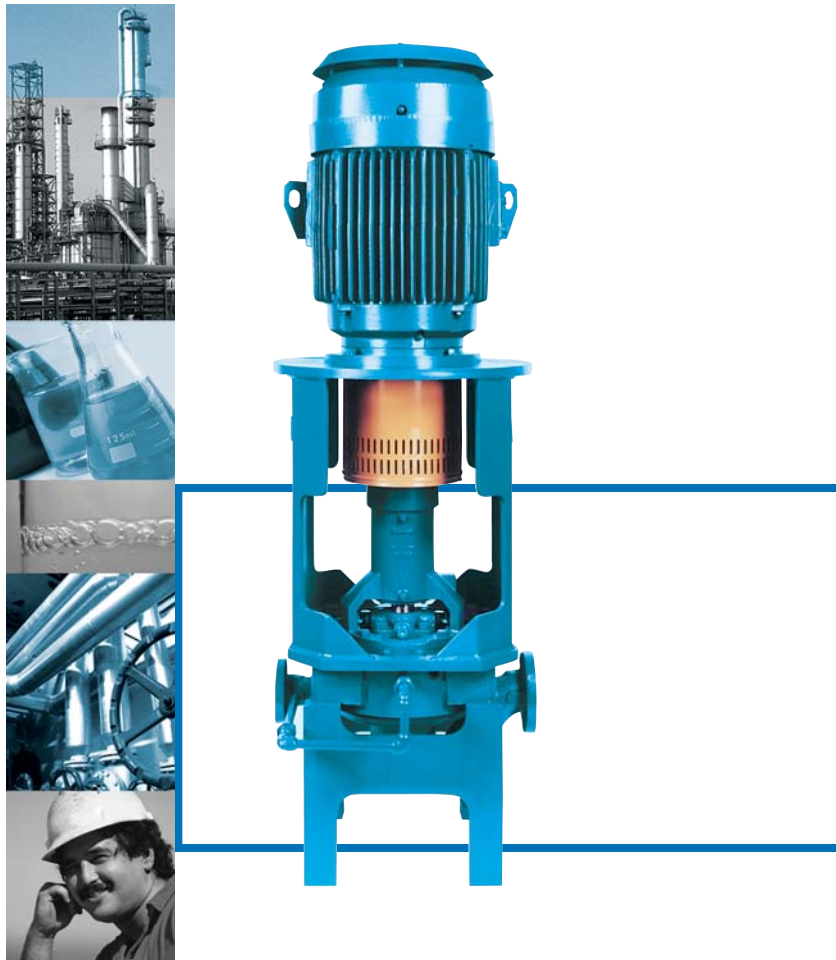


Goulds 3910

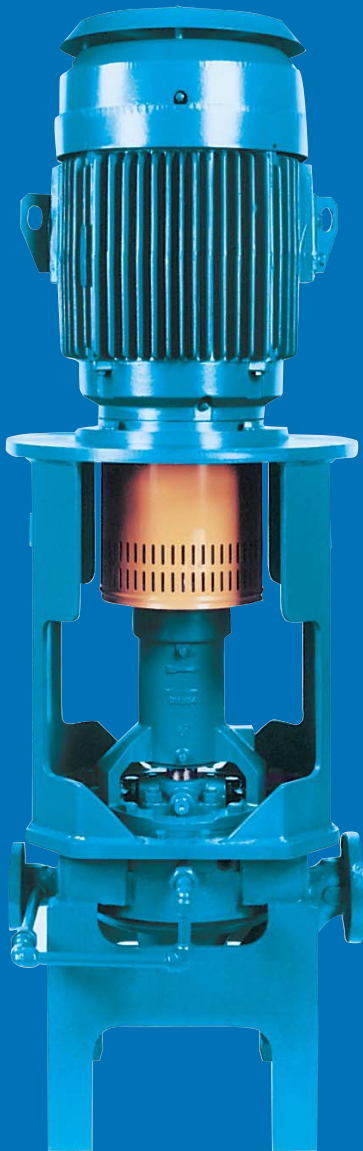
API-610 10th Edition/ISO 13709
Vertical In-Line Process Pumps with
Bearing Frame (API OH3)



motralec

4 rue Lavoisier . ZA Lavoisier . 95223 HERBLAY CEDEX
Tel. : 01.39.97.65.10 / Fax. : 01.39.97.68.48
Demande de prix / e-mail : service-commercial@motralec.com
www.motralec.com

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.



Goulds Model 3910

Vertical In-Line Pumps Designed to Meet the Demanding Process Requirements of API-610 10th Edition/ ISO 13709

- Capacities to 7500 GPM (1700 m³/h)
- Heads to 750 feet (229 m)
- Temperatures to 650° F (343° C)
- Pressures to 595 PSIG (41 bar)

Design Features

Back Pull-out for ease of maintenance.

Bearing Frame carries pump loads.

Framehook™ allows safe and easy removal of back pull-out assembly.

Standard Spacer Couplings can be used for all applications.

In-Line Design for space and cost savings.

Motor Support — Rugged fabricated steel, casing mounted, maintains positive shaft alignment. Available motor support. Unique frame-mounted motor support improves maintenance access.

Typical Applications

Refinery Units — Distillation, Flasher, CCU, Hydrotreater, MTBE, Alkylation, Reformer, Gas Plant, Isomerization

Petrochemical Plants — Olefins, BTX Recovery, Ethylene Glycol, Vinyl Chloride, Styrene, Phenol, Propylene Glycol, Alcohols, Ketones, Acids, Acrylonitrile, Anhydrides

Typical Services

Condensate, Stabilizer Feed, Reflux, Stripper Feed, Reactor Feed, Scrubber Circulation, Acid, Fractionator Reflux, Finishing Column Bottoms, Caustic, Stripper Overhead Product

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.

3910 Bearing Frame Design for Reliability

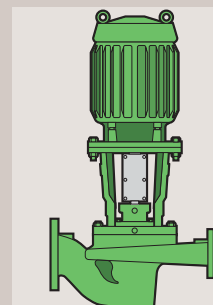


Goulds Model 3910 combines in-line and horizontal pump advantages...

- **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 Framehook™ for Safe and Simple Maintenance

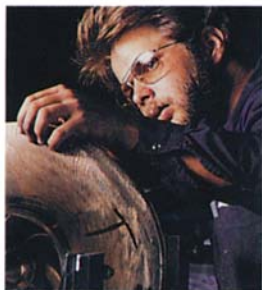
Now there's a safe and easy way to remove the back pull-out assembly for offsite maintenance... without removing the motor or disturbing suction and discharge piping.

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.



Field Service

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



Parts Availability

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



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.



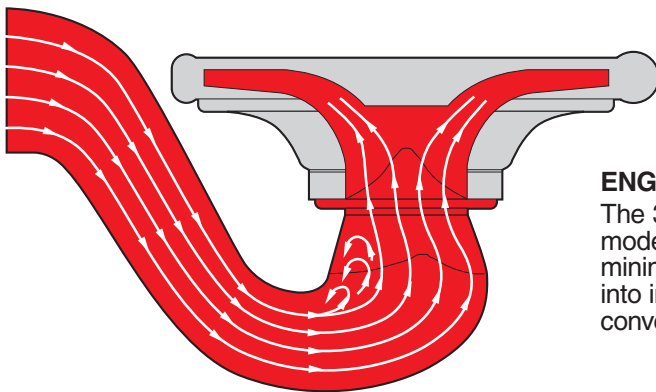
ROTATING ELEMENT

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



MULTIPLE IMPELLERS

Available with all pump sizes. Accommodates specific user operating requirements for trouble-free operation.

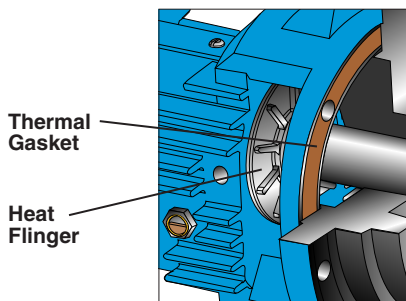


ENGINEERED IN-LINE SUCTION DESIGN

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.

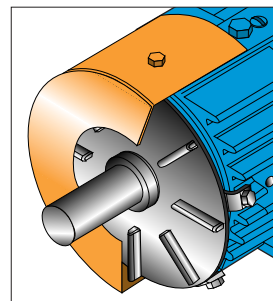
High Temperature Capability

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.



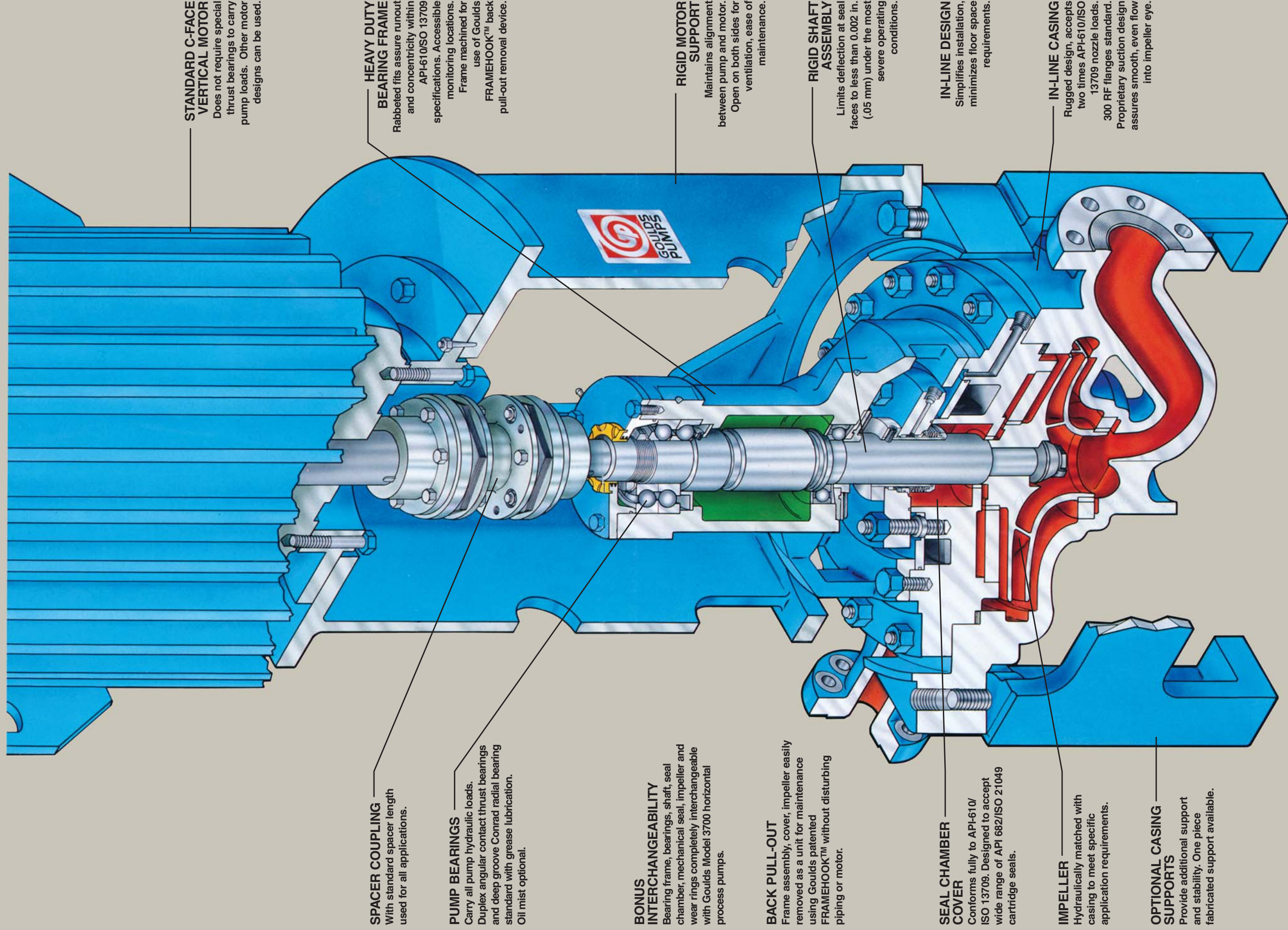
AIR COOLING

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



Model 3910 API-610 Bearing Frame In-Line Process Pumps

Design Features for a Wide Range of Refinery & Petrochemical Services



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/ISO 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.

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.

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

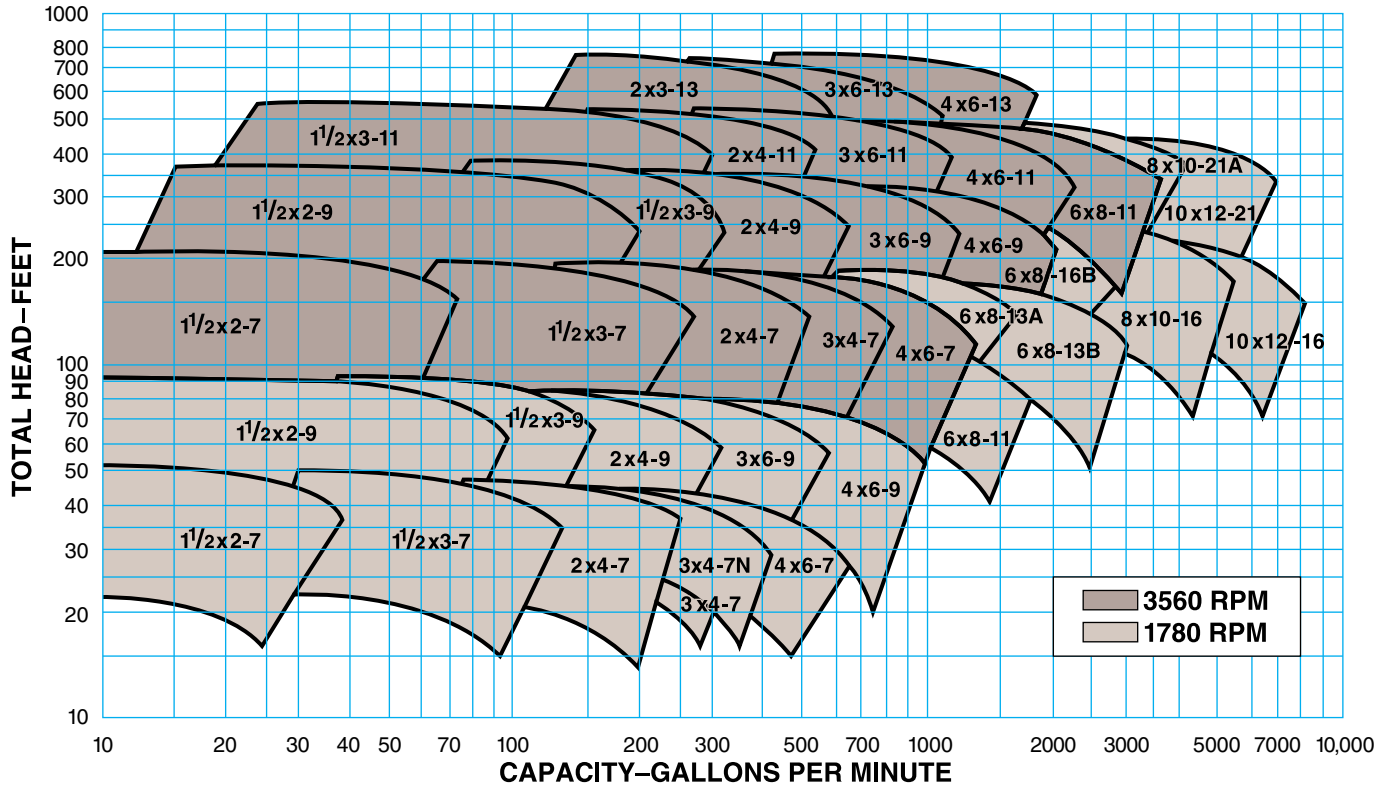
BACK PULL-OUT
Frame assembly, cover, impeller easily removed as a unit for maintenance using Goulds patented FRAMEHOOK™ without disturbing piping or motor.

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

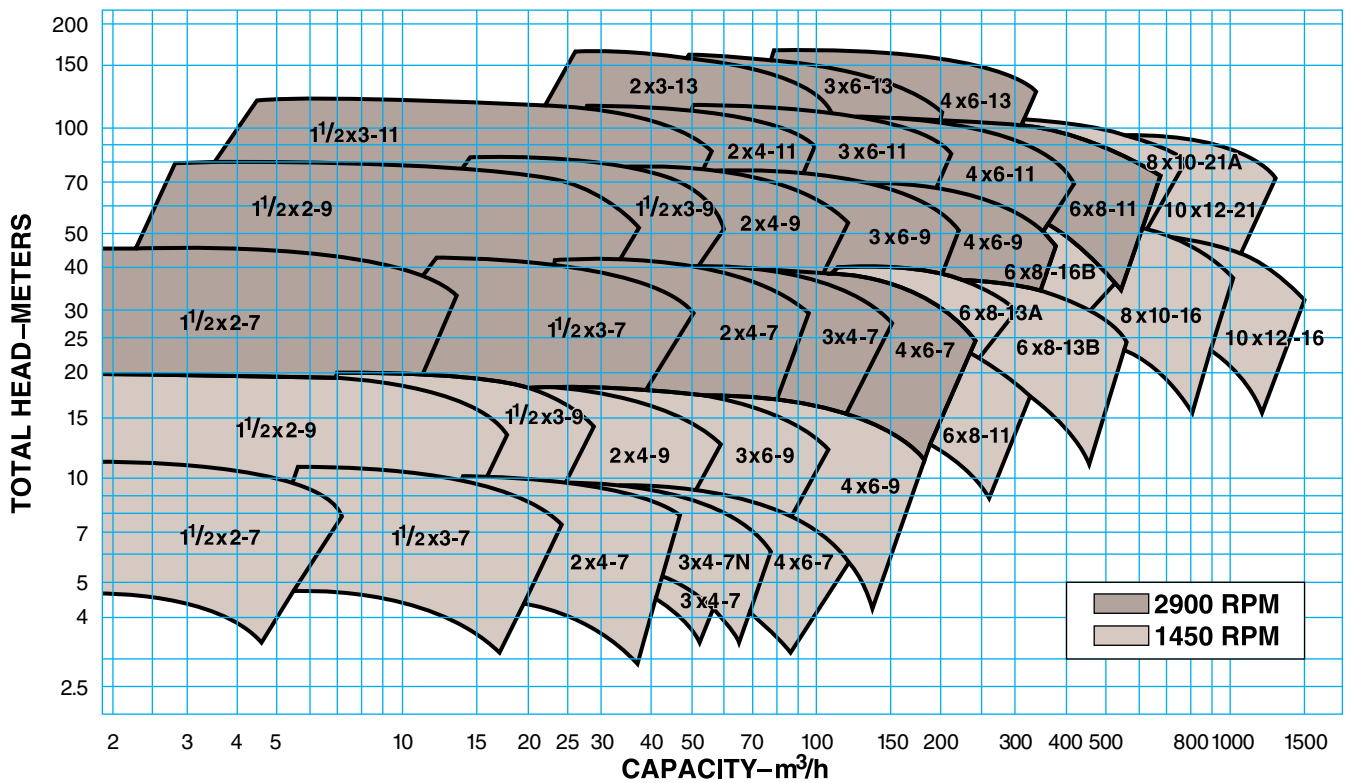
IMPELLER
Hydraulically matched with casing to meet specific application requirements.

OPTIONAL CASING SUPPORTS
Provide additional support and stability. One piece fabricated support available.

60 Hz Hydraulic Coverage Model 3910

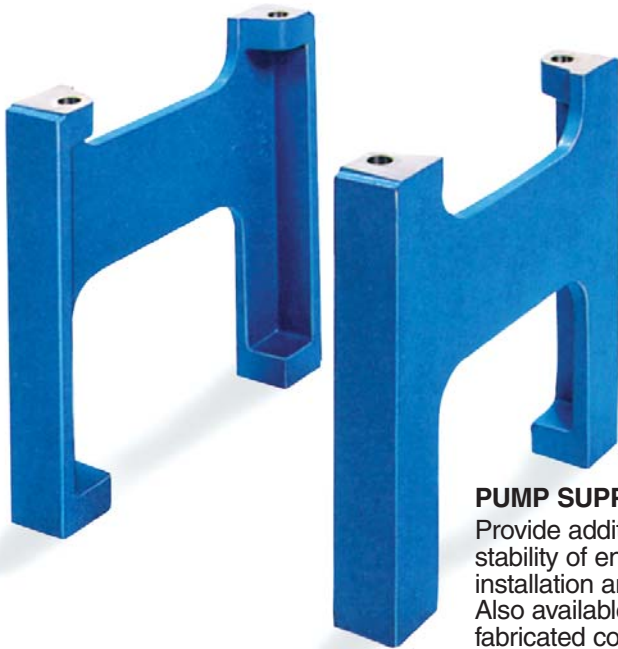


50 Hz Hydraulic Coverage Model 3910



Optional Features

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

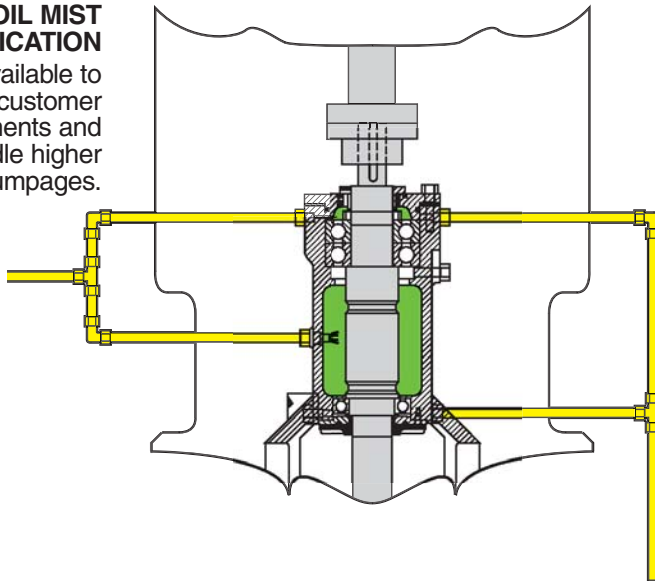


PUMP SUPPORTS

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

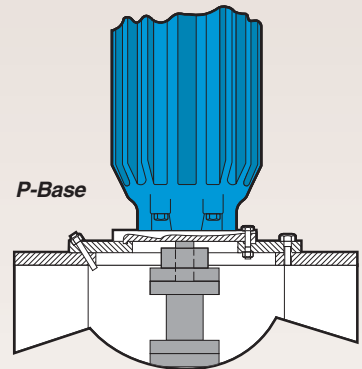
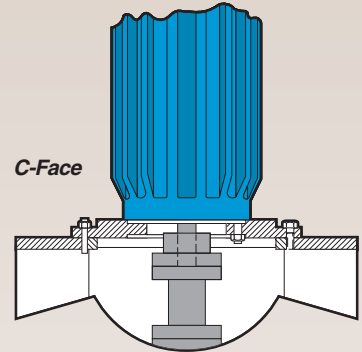
OIL MIST LUBRICATION

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

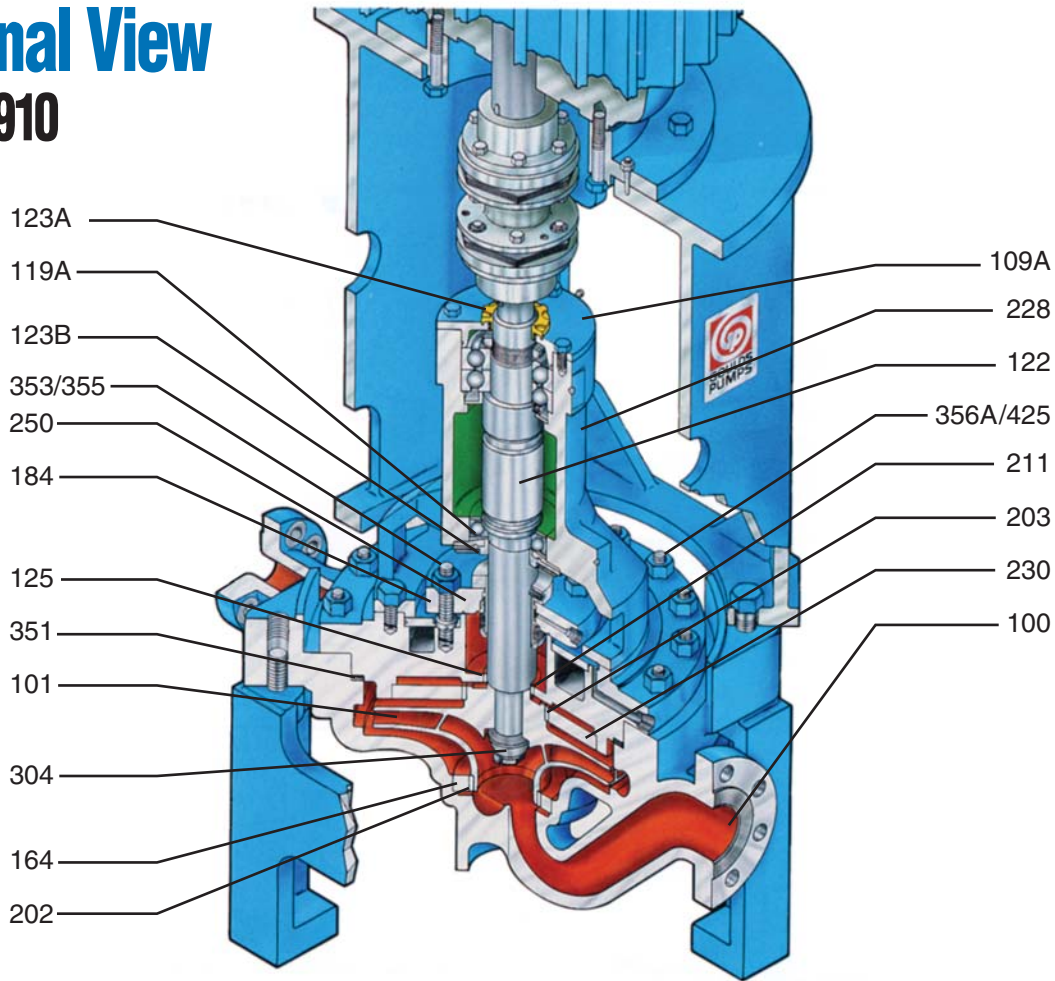
Goulds offers a complete range of in-plant NDE capabilities for casting and welded fabrication examination.

- 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 Model 3910



Parts List and Materials of Construction

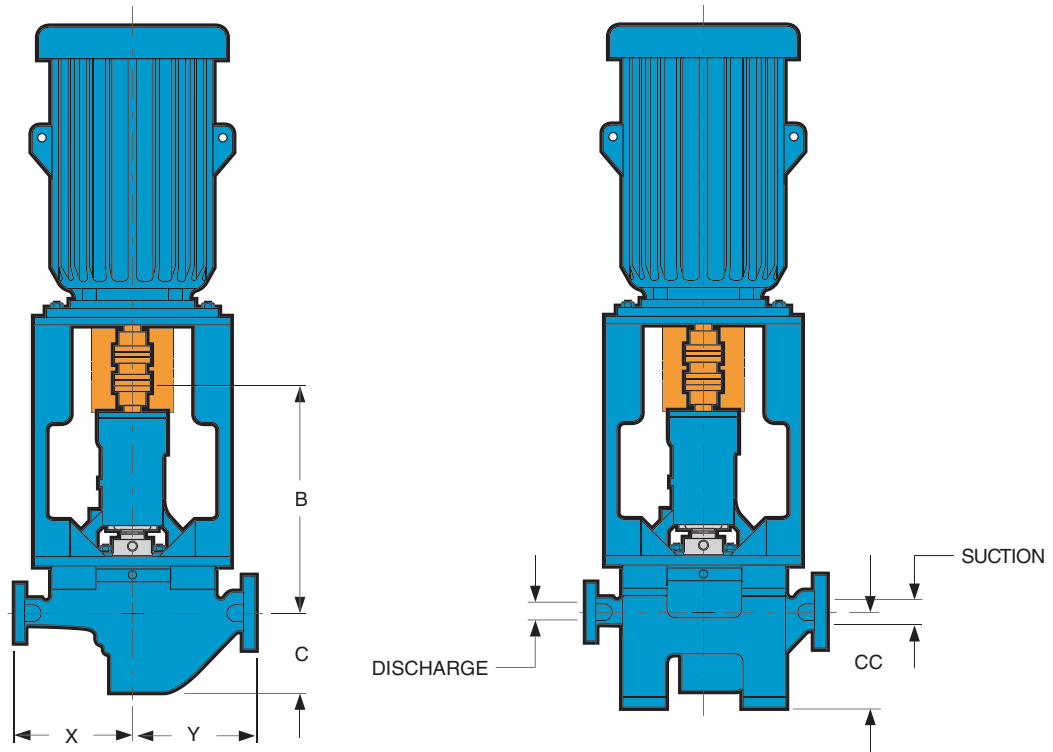
Item Number	Part Name	API-610 Material Classes				
		S-4	S-6	S-8	C-6	A-8
100	Casing	Carbon Steel			12% Chrome	316L SS
101	Impeller	Carbon Steel	12% Chrome	316L SS	12% Chrome	316L SS
109A	Bearing End Cover - Outboard	Carbon Steel				
114	Oil Ring	Bronze				
119A	Bearing End Cover - Inboard	Carbon Steel				
122	Shaft	AISI 4140 *		315L SS	410 SS	316 SS
123	Labyrinth Seal - Inboard	Bronze/Viton				
123A	Labyrinth Seal - Outboard	Bronze/Viton				
125	Throat Bushing	Cast Iron	410 SS	316L SS	410 SS	316L SS
164	Wear Ring - Casing	Cast Iron	12% Chrome	316L SS 12%	Chrome	316L SS
184	Seal Chamber Cover	Carbon Steel			12% Chrome	316L SS
202, 203	Wear Rings - Impeller	Cast Iron	12% Chrome	Nitronic 60	12% Chrome	Nitronic 60
228	Bearing Frame	Carbon Steel				
230	Wear Ring - Seal Chamber Cover	Cast Iron	12% Chrome	316L SS	12% Chrome	316L SS
304	Impeller Nut	Steel	316 SS			
351	Casing Gasket	Spiral Wound 316 SS				
353, 355	Gland Studs and Nuts	AISI 4140				
356A, 425	Casing Studs and Nuts	AISI 4140				

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

All other API materials of construction are available.

Dimensions Model 3910

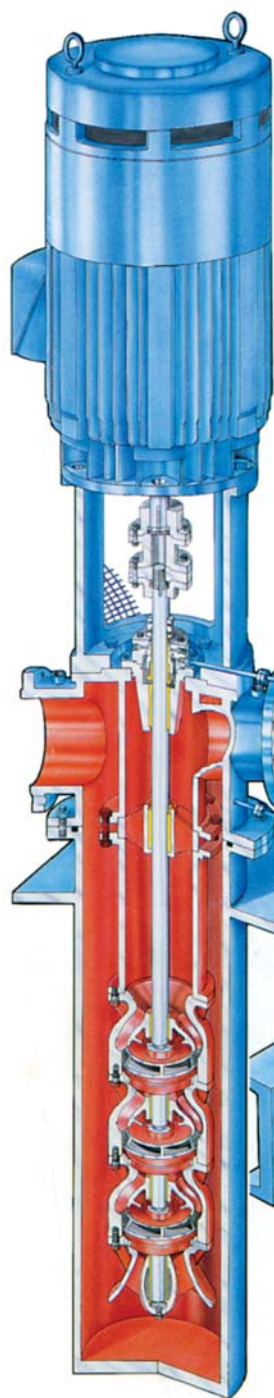
All dimensions in inches and (mm). Not to be used for construction.



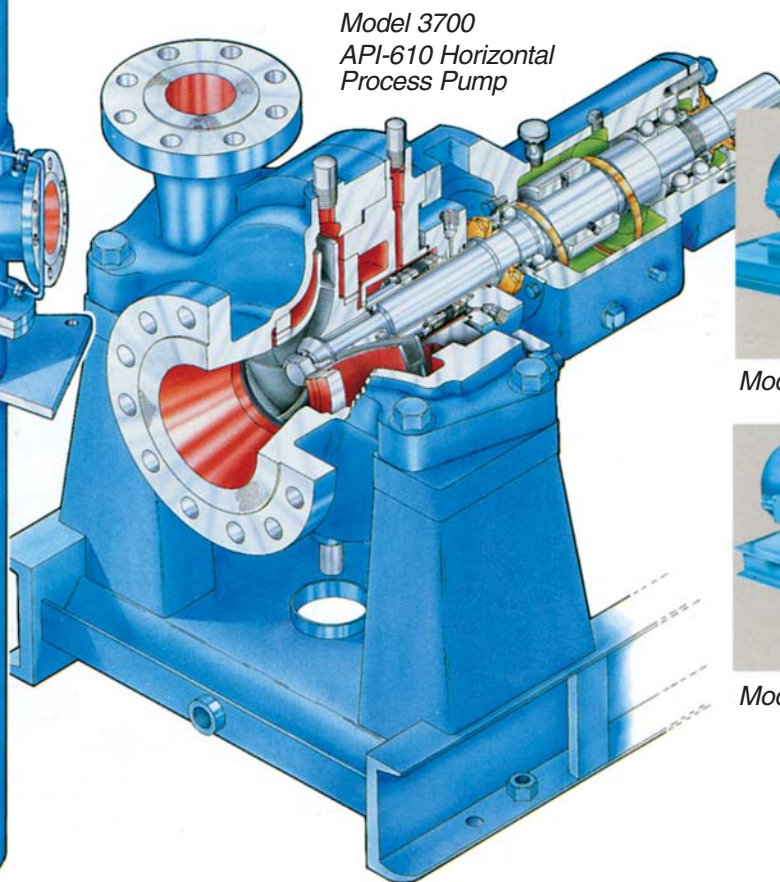
DIMENSIONS											
Pump Group	Pump Size	B		C		CC		X		Y	
		in.	mm.	in.	mm.	in.	mm.	in.	mm.	in.	mm.
SA	1 1/2x2-7	21.38	543	6.00	152	12.00	305	9.75	248	9.75	248
	1 1/2x3-7	21.78	553	7.06	179	12.00	305	9.25	235	10.25	260
	2x4-7	21.84	555	8.00	203	12.00	305	10.25	260	10.75	273
	3x4-7	21.97	558	8.25	210	12.00	305	10.50	267	12.50	318
	4x6-7	22.28	566	8.31	211	12.00	305	12.00	305	14.00	356
	1 1/2x2-9	21.41	544	6.62	168	12.00	305	10.50	267	10.50	267
1 1/2x3-9	21.44	545	7.88	200	12.00	305	11.00	279	11.50	292	
SX	2x4-9	24.00	610	8.50	216	12.00	305	10.75	273	12.25	311
	3x6-9	24.56	624	9.38	238	12.00	305	11.50	292	13.50	343
	4x6-9	24.28	617	10.31	262	12.00	305	14.50	368	15.50	394
	1 1/2x3-11	23.91	607	7.38	187	13.00	330	12.00	305	12.00	305
MX	2x4-11	26.85	682	9.12	232	13.00	330	11.50	292	12.50	318
	3x6-11	26.97	685	9.25	235	13.00	330	14.00	356	15.00	381
	4x6-11	27.04	687	10.94	278	13.00	330	13.25	337	16.75	425
	6x8-11	27.31	694	12.69	322	13.00	330	16.50	419	19.25	489
	2x3-13	27.06	687	8.94	227	15.75	400	13.25	337	13.75	349
	3x6-13	27.06	687	10.19	259	15.75	400	14.25	362	15.25	387
	4x6-13	27.19	691	11.56	294	15.75	400	15.50	394	19.50	495
	6x8-13a	27.41	696	14.44	367	15.75	400	18.50	470	20.50	521
6x8-13b	27.53	699	14.89	378	15.75	400	18.00	457	21.00	533	
LA	3x4-16	27.69	703	10.69	272	21.50	546	16.00	406	16.50	419
	4x6-16	28.19	716	12.19	310	21.50	546	17.25	438	18.75	476
	6x8-16a	28.31	719	12.75	324	21.50	546	20.25	514	22.25	565
	6x8-16b	28.41	722	16.44	418	21.50	546	19.50	495	23.00	584
XLX	8x10-16	28.75	730	17.35	441	21.50	546	22.75	578	26.75	679
	8x10-21a	33.69	856	16.62	422	23.00	584	28.50	724	31.00	787
	10x12-21	34.34	872	21.75	552	23.00	584	30.00	762	32.00	813

Goulds Pumps for Hydrocarbon Processing

The Goulds API and petrochemical pump lines offer reliability and extended MTBF. The Model 3700 API-610 (10th Edition), Model 3910 API-610 (10th Edition) horizontal process pump and Model 3620 API-610 (10th Edition) Double Suction Process pump feature a back pull-out power end. Goulds also offers the Model 3196 chemical process pump and the newly designed Model 3410, one of a series of double suction water pumps. Zero leakage is assured with the Model 3296 magnetic drive process pump. Vertical turbine pumps are available in any configuration including canned pumps for low NPSH, standard turbines, fire pumps and submersibles.



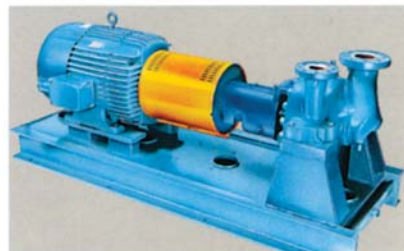
*Goulds Model VIC
API-610 Vertical
Turbine Pump*



*Model 3700
API-610 Horizontal
Process Pump*



Model 3700 End Suction



Model 3710 Top Suction

Goulds line of quality pumps for hydrocarbon processing includes (L to R): Models 3296, 3196, 3700, 3410, 3910, 3171 and VIC.

