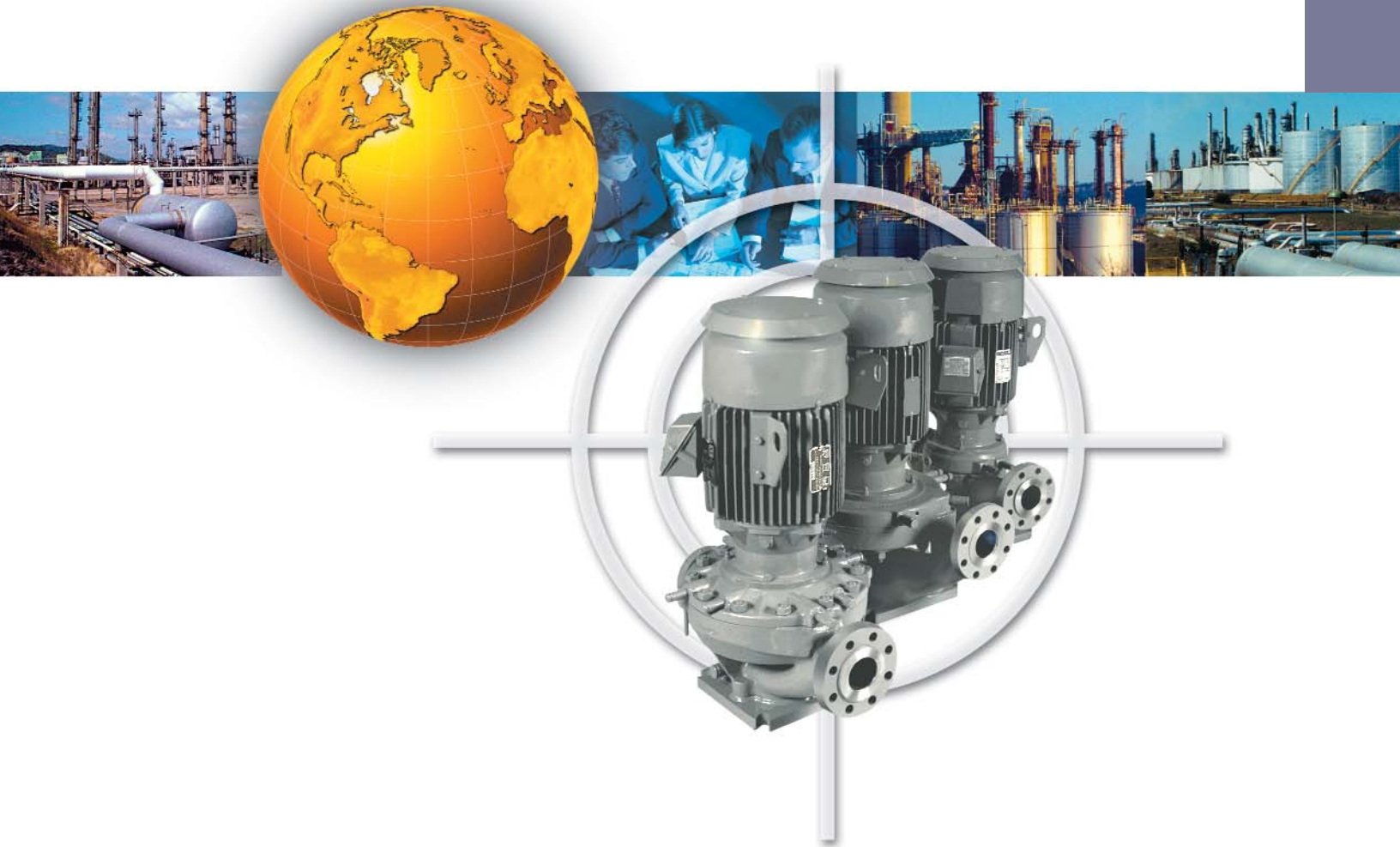


SUNDYNE®

Direct Drive API Pumps



Applications

PETROCHEMICALS AND PETROLEUM REFINING •

Charging transfer • Reactor feed •
Recycle • Make-up • Bottoming •
Pipelines

POWER GENERATION • Oil fired boilers
in primary feed and constant differential
services • Boiler feed, desuperheating
and condensate services • Fuel feed
pumps

INORGANIC CHEMICALS •

Inorganic acids • High pressure
wash • Boiler feed, condensate

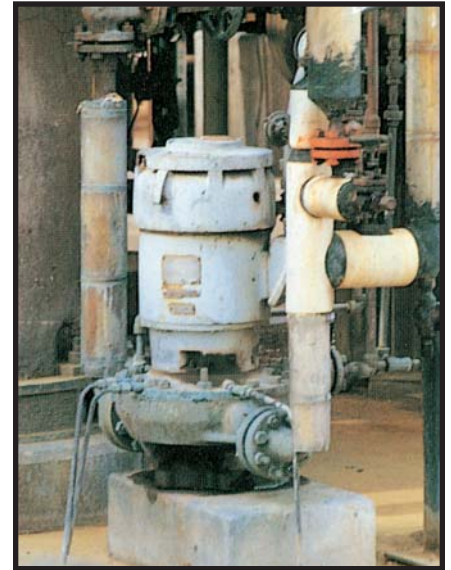
PAPER PROCESSING • Washdown and
cleaning services • High pressure shower
operations • Boiler feed and desuperheat-
ing services • Mechanical atomization of
spent sulfite liquor

FOOD PROCESSING, MINING, STEEL, SPRAY, DRYING PETROLEUM PRODUCTION •

Seal water, boiler feed, condensate •
High pressure systems • Vegetable oils •
Reverse Osmosis • Cryogenic services •
Steel mill descaling • Offshore platform
services • Oil field well injection



LMV-802 Pumps in Gulf Coast Refinery.



Sundyne LMV-801, Located in a
Petrochemical Plant in Hydrofluoric Acid
Service.

Sundyne Customer Support

- Expedite Program Four day delivery on most standard units
- Repair Kits Customized o-ring seal overhaul and seal replacement kits
- Spare Parts Emergency spares available from the factory or authorized overhaul and repair centers
- Conversion Program Unit performance changes via unique part interchangeability
- Gearbox Exchanges Full warranty rebuilt gearbox available in exchange for used one
- Video Tape Training Video tapes are available for in-house training
- Service Schools Free factory maintenance and operation training. On-site training also available
- On-Site Service Professional service engineers available for start-up and consultations
- Overhaul and Repair Full warranty units at a fraction of new cost

Innovators in Pump Technology



The Sundyne direct drive pumps feature a single stage centrifugal design for reliable service in API-610 and general industrial applications. These pumps are computer optimized to fit your exact design requirements.



The Sundyne diffuser design allows for continuous duty at the design flow and at low flows, and permits full curve protection using minimum driver sizes.

Open impeller design eliminates efficiency degradation and frequent adjustments. Installation and maintenance is simple and straightforward. Standard 8-12 week deliveries can often be expedited to 4 or 5 days.



Let us show you more!

- Multi-stage performance from a single-stage unit
- Small footprint
- Simple design
- Standard or engineered options
- World-wide support

Sundyne Corporation, a subsidiary of Hamilton-Sundstrand Corporation, is a leading high technology corporation having a reputation for excellence in both the aerospace and commercial industries.

Sundyne Corporation traces its origin to Sundstrand's Aviation Division, when this aerospace group was contracted by Boeing Aircraft to build a high pressure water injection pump to increase jet engine thrust during take-off. It was from this unique high speed, single-stage centrifugal pump that Sundstrand Fluid Handling (now Sundyne Corporation) got its start. In 1962, while working in cooperation with a major Gulf Coast chemical company, a derivative of this design was introduced to the hydrocarbon processing industry.

Sundyne's leadership in the marketplace is attributed to our continued dedication to research and development programs. CAD systems and computer sizing programs are utilized to provide our customers with state-of-the-art pump technology. With our experience in the aerospace industry, our quality control and testing procedures assure the finest workmanship, highest quality, and the most reliable products possible.

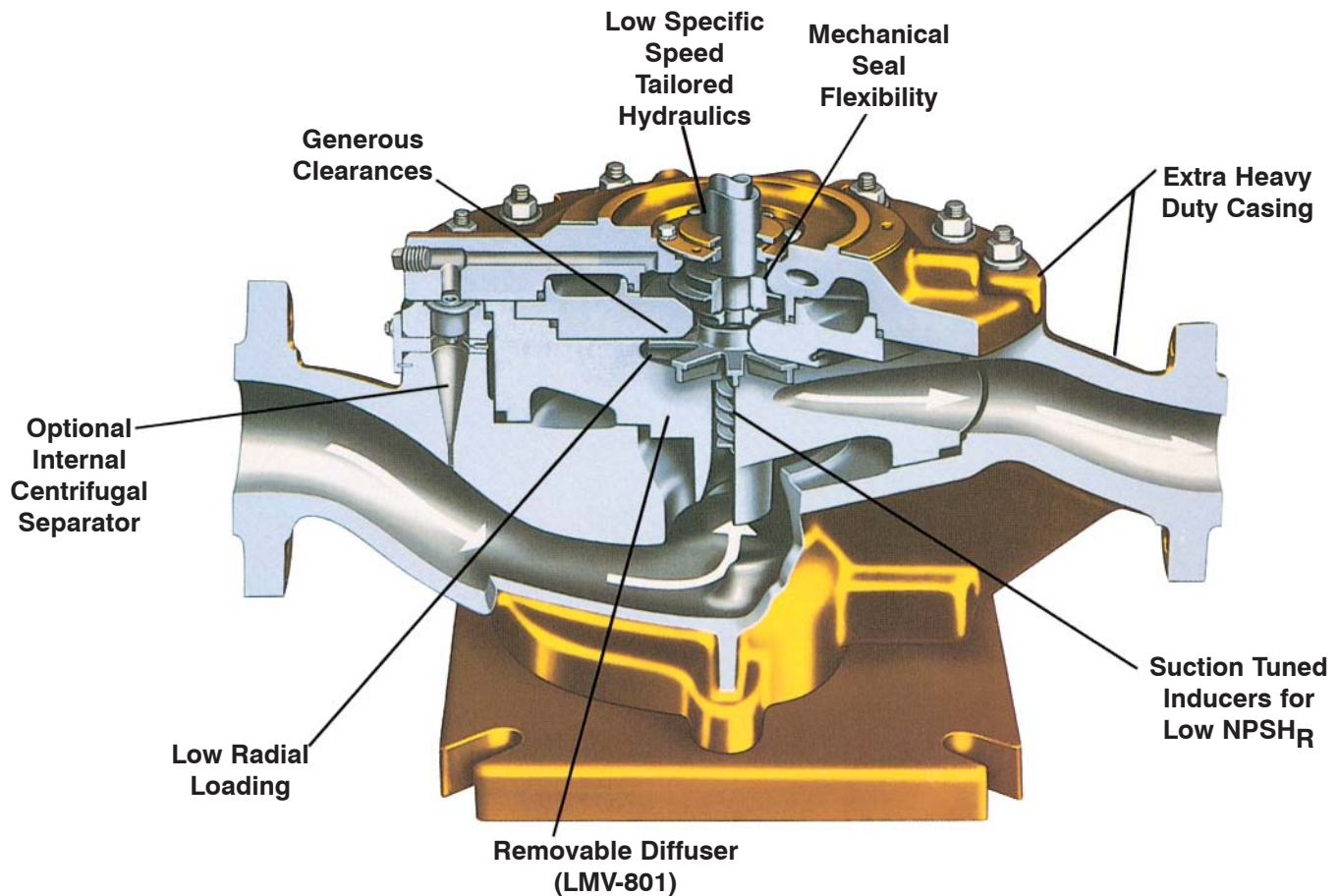
A full range of tests are available, including vibration analysis, metallurgical checks, casing radiography and more. Each pump and compressor is given a complete hydrostatic and performance test to assure quality and reliability.

Sundyne's after-sales service network stands ready to perform on-site problem solving consultation and service anywhere in the world. We back our products with quality Sundyne parts and because we know our customers operate around the clock, we maintain a 24-hour hotline to handle any emergency.

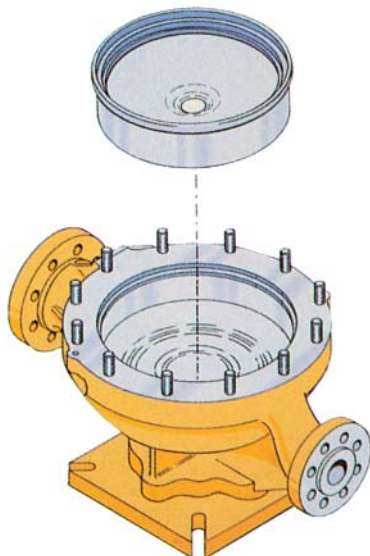
We remain committed to maintaining our technological leadership as a supplier of pumps and compressors. We are dedicated to providing reliable, economical units delivered on time, as well as after-service support to keep you on line.

Sundyne Technology Does Make A Difference!

Sundyne LMV-Series Direct Drive Pumps



The Sundyne LMV (Line-Mounted-Vertical) Direct Drive series API-610 centrifugal pumps combine in-line simplicity with Sundyne's exclusive engineered features. The result is exceptional reliability in tough service for both API-610 and general industrial applications.

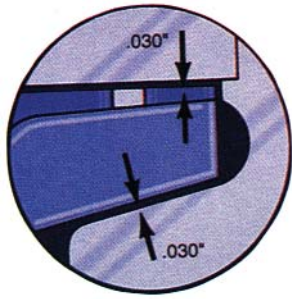


REMOVABLE DIFFUSER (LMV-801):

- Easily converted in the field
- Allows for rerating of pumps to different process conditions without costly machining

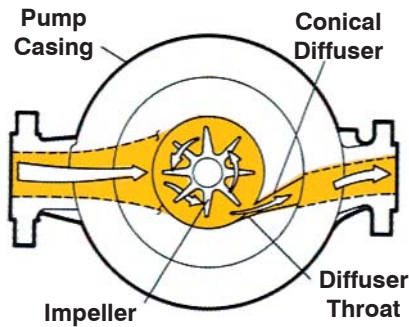
EXTRA HEAVY DUTY CASING:

- Suction pressures to **1000 psi**
- 300# and 600# flange models
- 900# flanges available on LMV-801



GENEROUS CLEARANCES

- **No wear rings.** Eliminates performance degradation and mechanical adjustments associated with wear ring designs. Maintains as-built efficiency.
- Open radial blade impeller design allows for **generous .030" (.076mm) nominal clearances.**
- **Dry running capability** can handle process upsets with double seals.
- No mechanical adjustment required.



LOW N_S TAILORED HYDRAULICS

- Partial emission hydraulics for optimum efficiency in **low specific speed (N_S)** applications.
- **Computer optimized** hardware to fit the exact design requirements.
- **Lower end-of-curve horsepower** requirements.
- **Maximized** efficiency.

LOW RADIAL LOADING

- **Shaft deflections** below .001" (0.025mm).
- Partial emission design reduces radial loading at low flows unlike volute designs.
- Maximizes seal life.

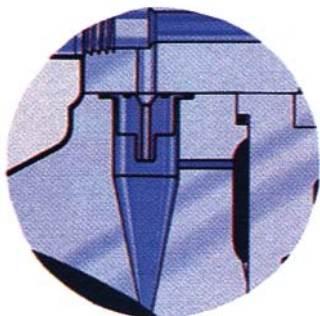


OPTIONAL INDUCERS FOR LOW NPSH

- **Superior $NPSH_R$** performance.
- Suction tuned design for cavitation free operation.
- High suction specific speed capability.

MECHANICAL SEAL FLEXIBILITY

- One seal housing accepts **single, double or tandem** seal arrangements.
- Easily converted in the field.
- Engineered seals available for unique applications.



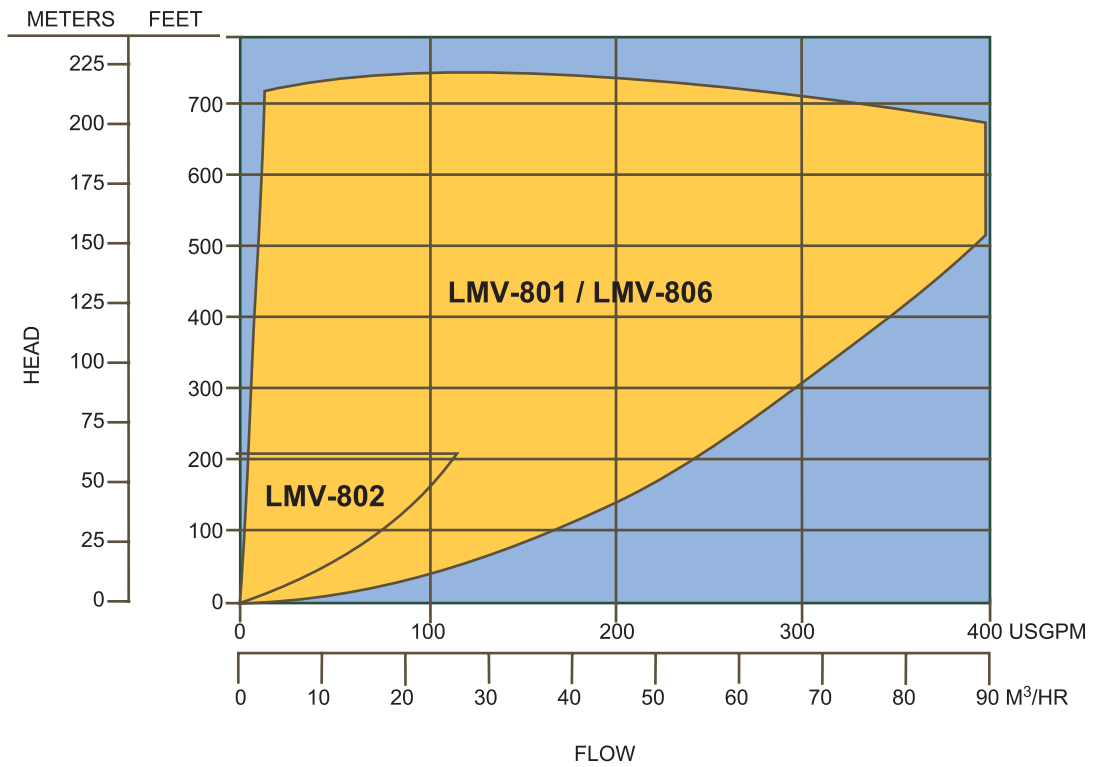
OPTIONAL CENTRIFUGAL SEPARATOR

- **Integral to pump case** for simplicity - no external piping.
- Provides clean flush for longer seal life

Performance

PERFORMANCE ENVELOPE Sundyne Direct Drive API Pumps (60 Hertz)

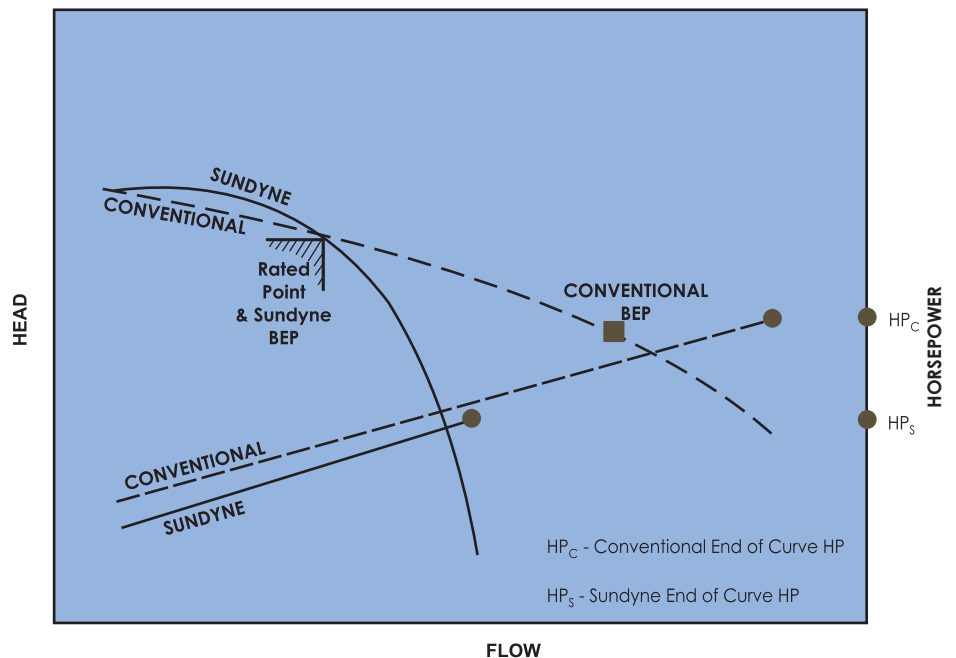
Rated point can be **computer selected** within the overall envelope



Computer Optimized Hydraulics

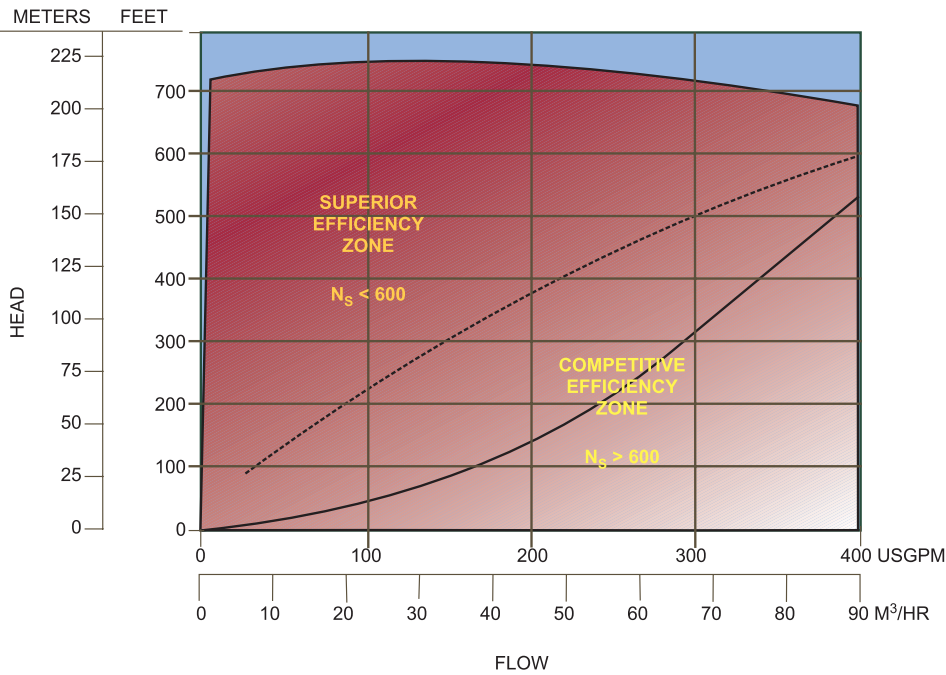
SUNDYNE CUSTOM TAILORED HYDRAULICS

Unlike conventional pumps, Sundyne custom tailored hydraulics sizes the B.E.P. (Best Efficiency Point) at your rated point, where you want it. This results in **optimum efficiency**, **minimum recirculation** and **minimum vibration**. An added benefit of the partial emission design is **reduced end-of-curve horsepower**, resulting in smaller drivers.



Superior Low Specific Speed Efficiency

PERFORMANCE ENVELOPE
(60 Hertz)



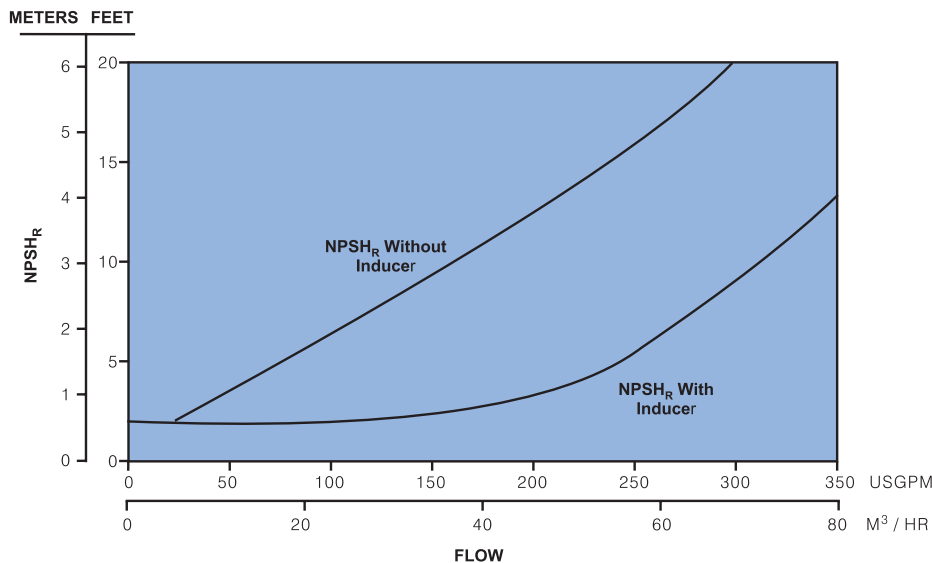
Specific speed (N_s) is a dimensionless parameter for pumps at the best efficiency point:

$$N_s = \frac{\text{RPM} \sqrt{\text{GPM}}}{(\text{Feet of Head})^{3/4}}$$

The Sundyne radial blade impeller combined with the partial emission diffuser provides **superior** single stage **efficiency** below N_s values of 600 (English) / 700 (Metric) when compared to conventional back-swept impeller hydraulics.

NPSH Advantages

NPSH_R CHARACTERISTICS
Sundyne Models LMV-801, 802 and 806



Sundyne **inducer** option **reduces** NPSH_R considerably and often eliminates the need for costly design requirements, such as elevated suction vessels and boost pumps.

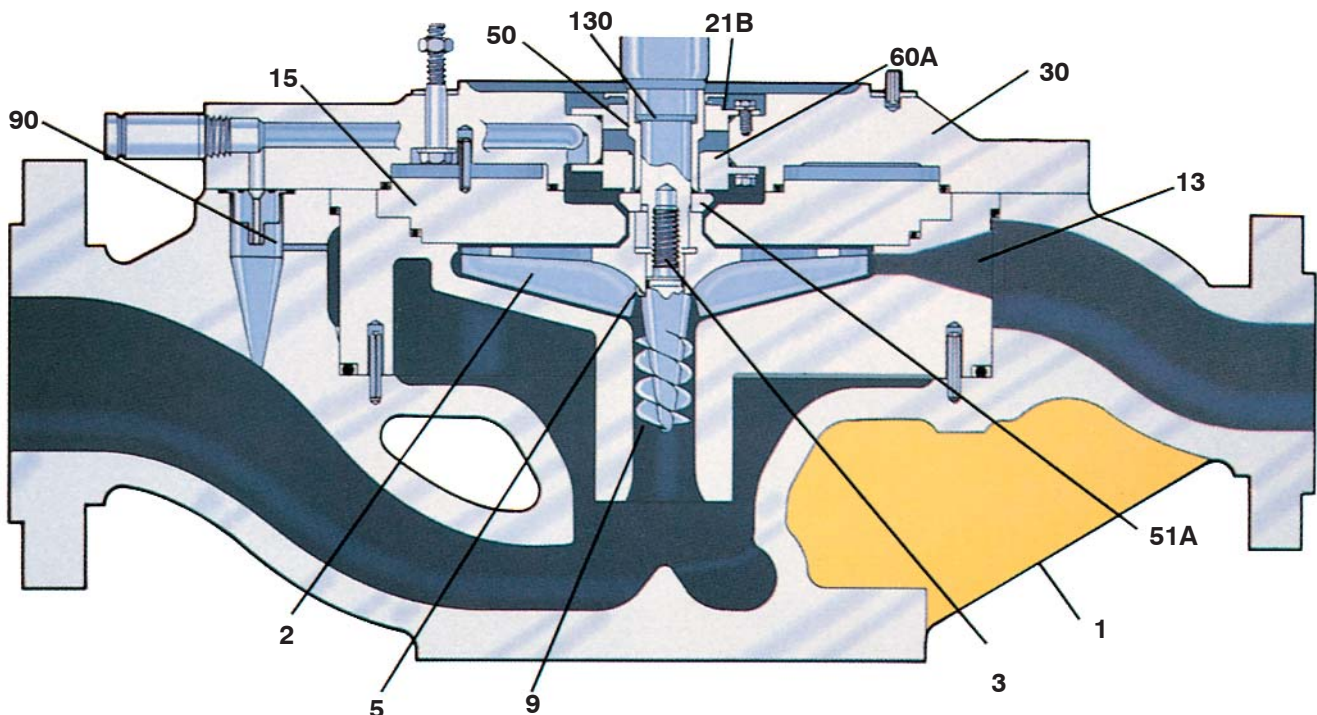
Materials of Construction¹

		Description: Carbon Steel 316 SS Fitted	All Carbon Steel (CS)	All 316 SS
API Equivalent:		S-6 ²	S-5 ³	A-8 ⁴
Pump Models:		801	All	All
Sundyne Build Code:		J	A	E
No.	Part Name			
1	Pump Case	CS	CS	316 SS
2	Impeller	316 SS	316 SS	316 SS
3	Impeller Bolt / Inducer Stud	316 SS	316 SS	316 SS
5	Impeller Tab Washer	316 SS	316 SS	316 SS
9	Inducer (Optional)	316 SS	316 SS	316 SS
13	Diffuser (801 only)	316 SS	CS	316 SS
15	Diffuser Cover (801 Only)	316 SS	CS	316 SS
21B	Throttle Bushing (Single Seal Only)	316 SS / Carbon Bushing	316 SS / Carbon Bushing	316 SS / Carbon Bushing
30	Seal Housing	CS	CS	316 SS
50	Shaft Sleeve	316 SS	316 SS	316 SS
51A	Seal Rotating Face	Tungsten Carbide ⁵	Tungsten Carbide ⁵	Tungsten Carbide ⁵
60A	Mechanical Seal	316 SS / Carbon	316 SS / Carbon	316 SS / Carbon
90	Separator Orifice	316 SS	316 SS	316 SS
130	Shaft	AISI 4140	AISI 4140	AISI 4140
---	O-Rings	Variety of Materials are available.		

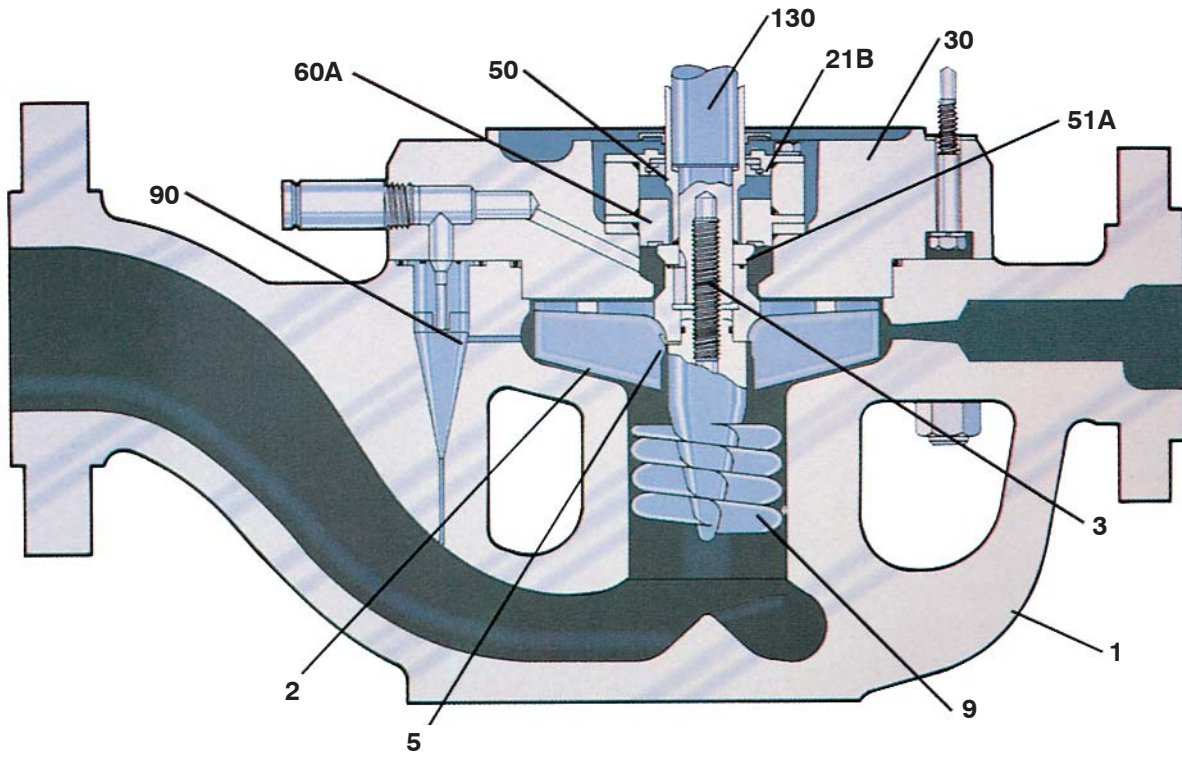
1. Common metallurgies are shown. All machineable alloys are available
2. Exceeds S-6, 316SS in lieu of 12% chrome.
3. Exceeds S-5, 316SS in lieu of 12% chrome and carbon steel.
4. AISI 4140 shaft in lieu of 316 SS
5. Other options available.

Specifications: CS - ASTM-A-216-Gr WCB
316SS - ASTM-A-351-Gr CF-8M

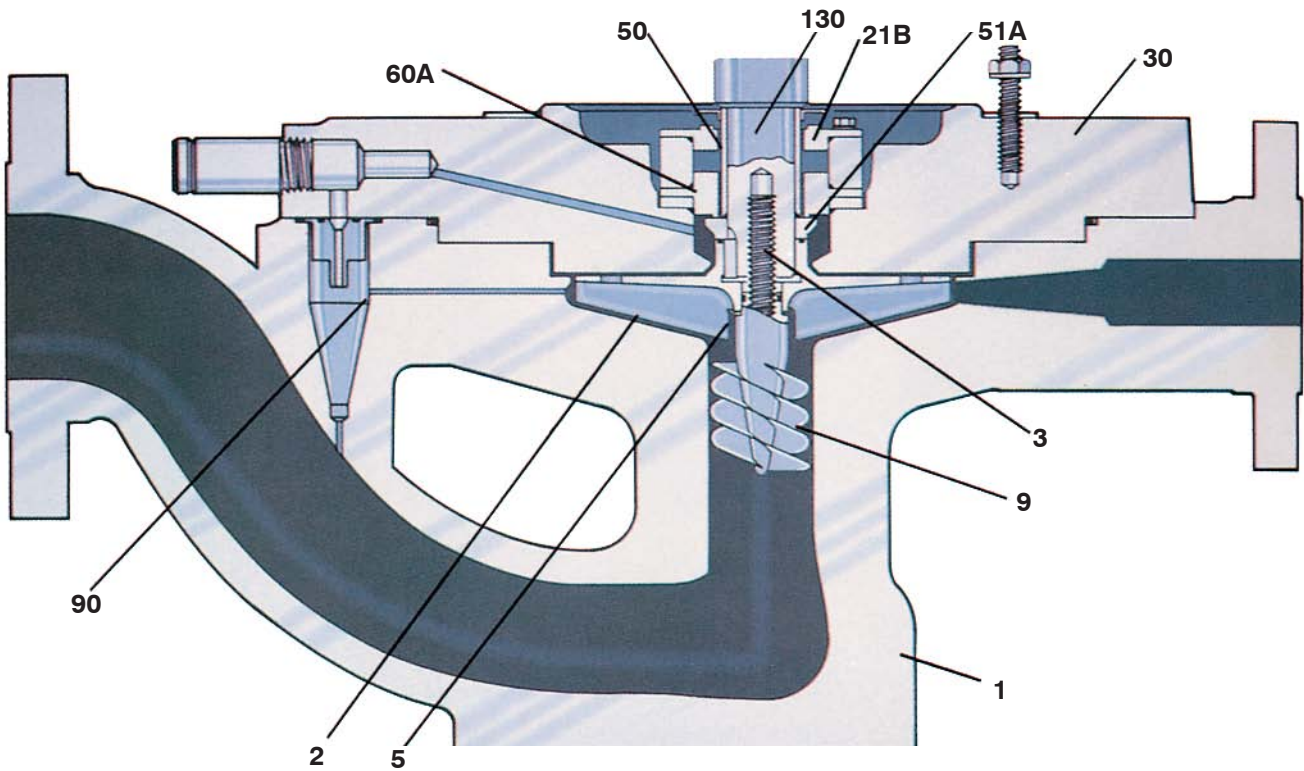
LMV-801



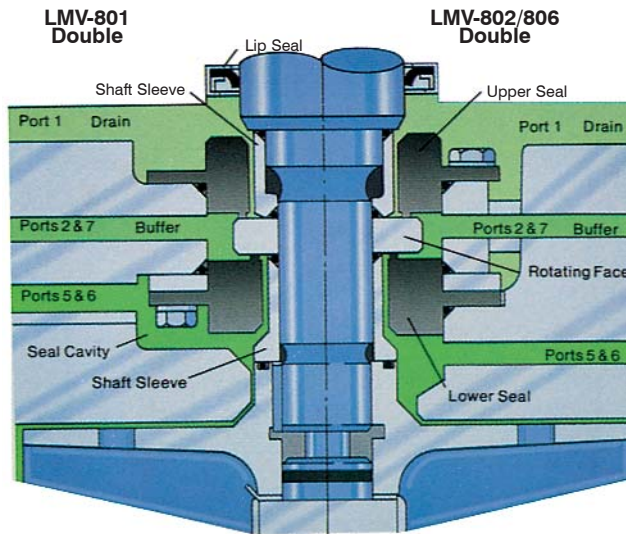
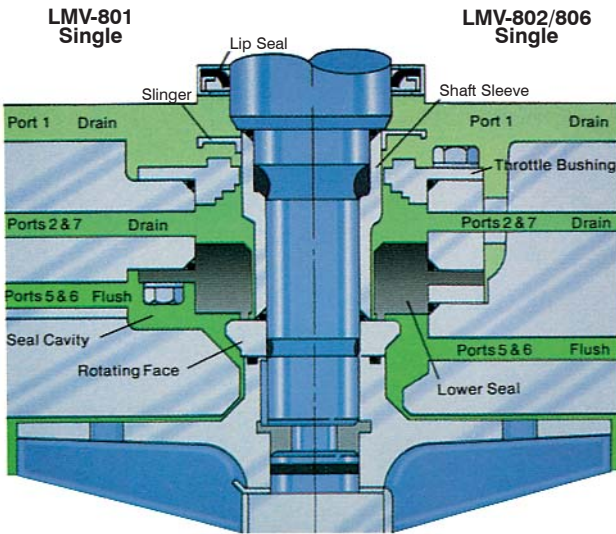
LMV-802



LMV-806



Mechanical Seals

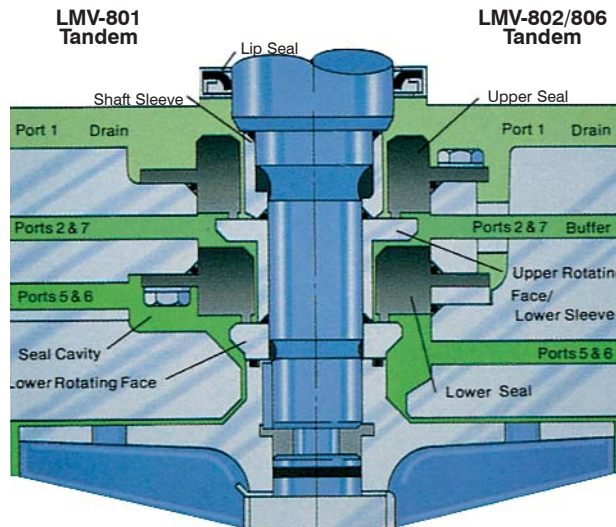


SINGLE SEAL

Standard seal used in most applications for non-abrasive or non-hazardous liquids. Bellows seals are also available for higher temperatures and abrasive liquids.

DOUBLE SEAL

Recommended when the pumped liquid contains abrasives, leakage could be hazardous, or when the pump is likely to run dry.

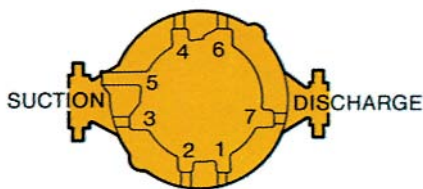


TANDEM SEAL

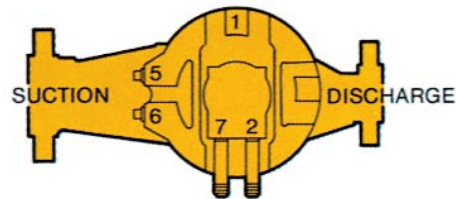
Used to accommodate quenching, automatic shutdown systems, and high pressure services. To eliminate the need for a buffer liquid, a film-riding gas seal may be placed in the upper position, thereby providing a secondary seal backup in event of main seal failure

Seal Housing

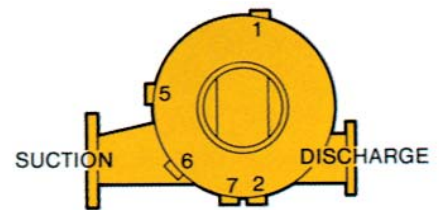
LMV-801
TOP VIEW (FROM MOTOR)



LMV-802
TOP VIEW (FROM MOTOR)



LMV-806
TOP VIEW (FROM MOTOR)



Port	Description
1	Seal drain (open to atmosphere)
2	Seal drain (single seal) or buffer fluid out (double or tandem seal)
3	Cooling in (normally plugged)
4	Cooling out (normally plugged)
5	Seal flush and/or vent
6	Seal flush and/or vent
7	Seal drain (single seal) or buffer fluid in (double or tandem seal)

Port	Description
1	Seal drain (open to atmosphere)
2	Seal drain (single seal) or buffer fluid in (double or tandem seal)
5	Seal flush and/or vent
6	Seal flush and/or vent
7	Seal drain (single seal) or buffer fluid out (double or tandem seal)

Port	Description
1	Seal drain (open to atmosphere)
2	Seal drain (single seal) or buffer fluid in (double or tandem seal)
5	Seal flush and/or vent
6	Seal flush and/or vent
7	Seal drain (single seal) or buffer fluid out (double or tandem seal)

(Impeller rotation is CCW on all models when viewed from driver side.)

Optional Features

API PLANS - Sundyne can provide most API-610 piping plans.

- Plan 11, 12, 21 & 23
- Plan 52, 53, and 54
- Plan 13
- Plan 61 and 62
- Plan 31, 32 and 41
- Plan J

METALLURGIES - All machineable alloys are available, for example:

- Carbon Steel
- 316SS
- 410 SS (LMV-802 and LMV-806 only)
- Alloy 20
- Sunmet B*
- Sunmet C**
- Monel
- Titanium

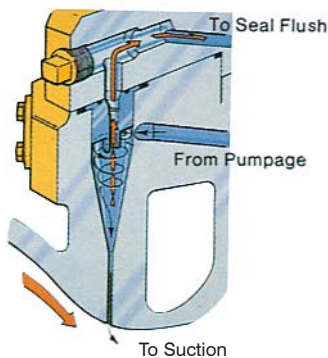
*Sunmet B - ASTM A494 Grade N-7M and is equivalent to Hastelloy B

**Sunmet C - ASTM A494 Grade CW2M and is equivalent to Hastelloy C.

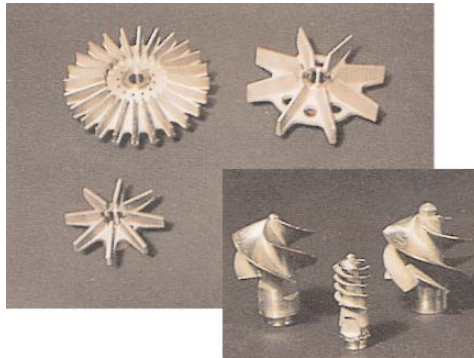
HYDRAULIC HARDWARE

- Z-Series, 24 blade high solidity impeller for rising curves (LMV-801/802)
- Concentric bowl, 8 blade open radial impeller for low specific speed (N_s).

INTERNAL SEPARATOR



INTERNAL SEPARATOR - Provides a convenient and efficient source of clean seal flush fluid from the pumped liquid. No external piping to leak.



INDUCER - Reduces NPSH required, thereby eliminating cavitation.

900 LB. RF or RJ FLANGES - For heavy duty service requirements.

TESTING - Sundyne can perform many special tests to meet your needs, for example:

- Performance Test - Standard
- Pump Case Hydrostatic Test - Standard
- NPSH Suppression Test - Optional
- Radiography Inspection - Optional
- Liquid Penetrant Inspection - Optional
- Mill Test Reports or Material Certificates - Optional
- Magnetic Particle Inspection - Optional
- Hardness Testing - Optional

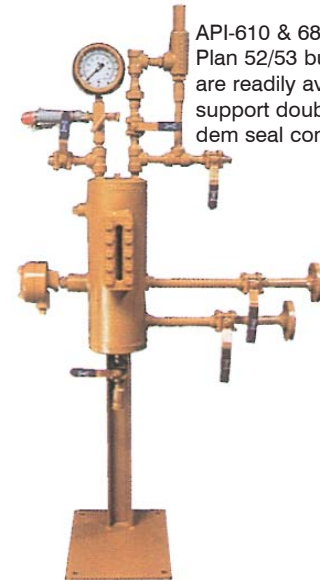
STATIC SEALS - Available in a wide variety of compounds, for example:

- Nitrile
- Fluorocarbon
- Ethylene Propylene
- Carbon Graphite
- Kalrez®
- Silicone

SEAL ARRANGEMENTS - Three configurations to meet your needs.

- Single
- Double
- Tandem

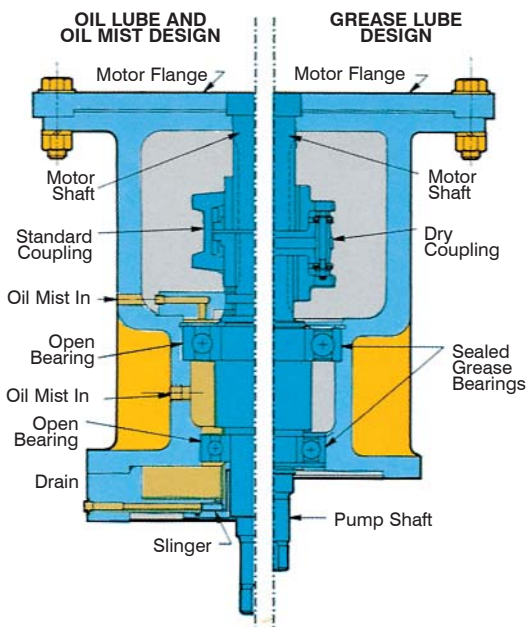
Engineered seals are also available.



API BUFFER PLAN



Sundyne Bearing Box

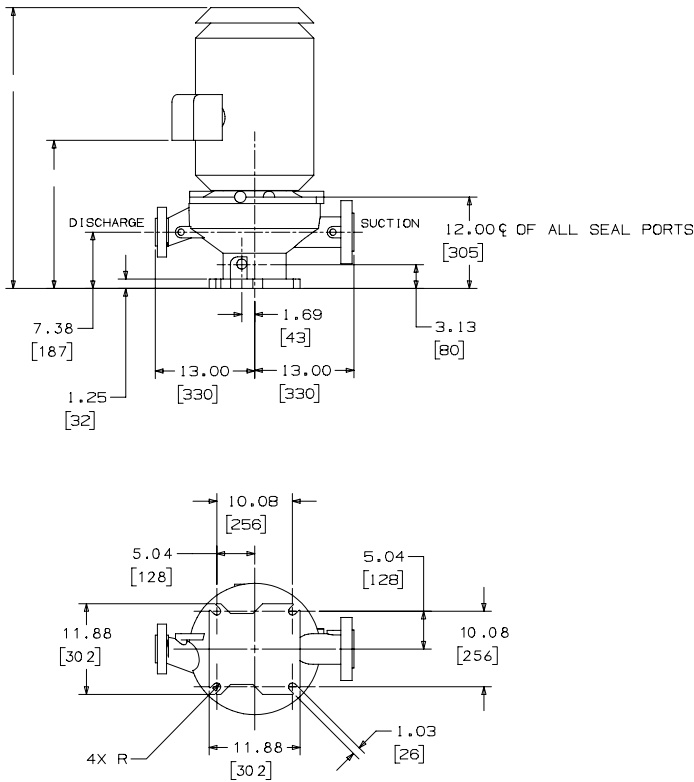


The bearing box may be bolted directly on top of the seal housing. This option provides added driver flexibility, such as the use of standard NEMA or IEC shaft electric motors and steam turbines. The unique piloted mounting flange eliminates the need to align the pump and motor, saving valuable installation and maintenance time. The housing has been designed to accommodate a broad range of couplings to suit your specific needs. The bearing box is available in three designs -- grease, oil mist (not available in Europe) and oil lubricated.

Dimensions

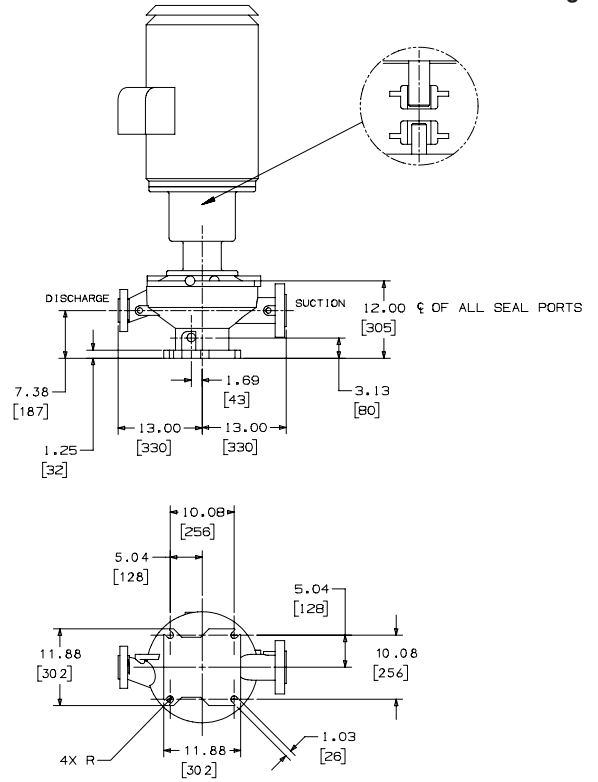
LMV-801

Direct Drive



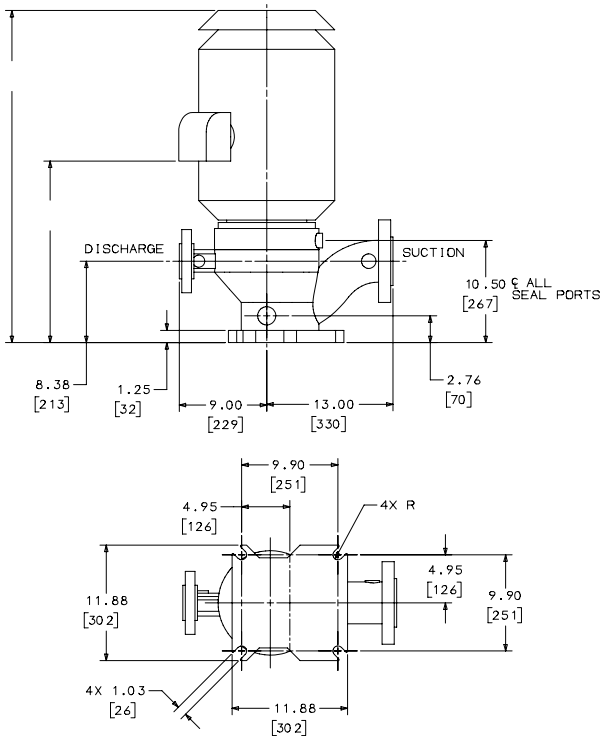
LMV-801

Coupled with Bearing Box



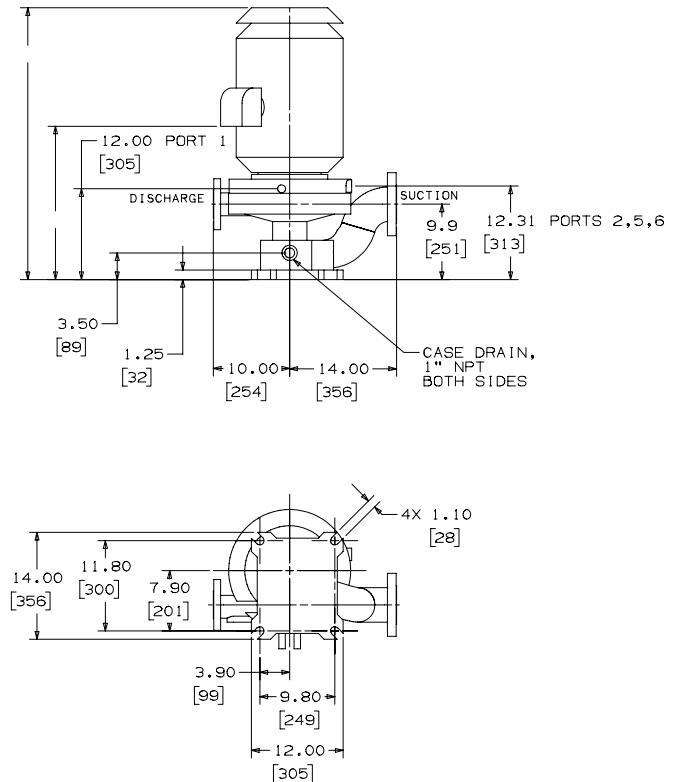
LMV-802

Direct Drive



LMV-806

Direct Drive



All models are available in coupled and bearing box design.

ALL DIMENSIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE.

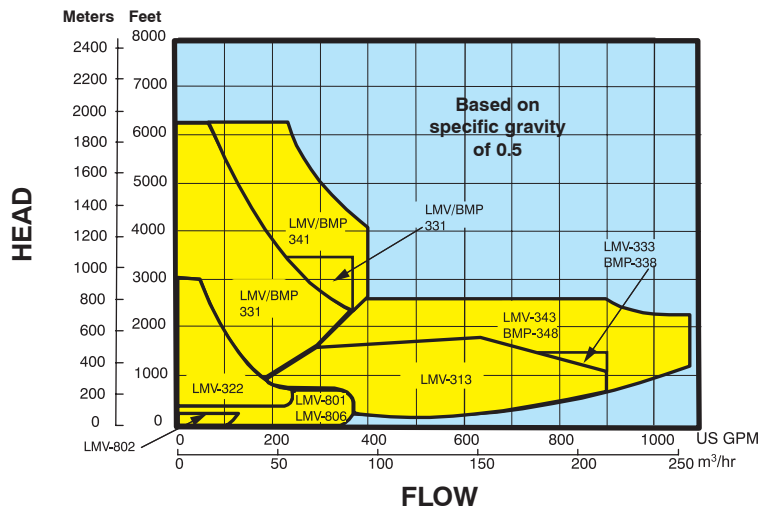
*Through 50 HP 13.7" (348) above 50 HP [] = mm

Specifications

SPECIFICATIONS -- SUNDYNE DIRECT DRIVE API PUMPS

	UNITS	LMV-801	LMV-802	LMV-806
Maximum Head (60 Hertz)	Feet	720	210	760
	Meters	219	64	232
Maximum Flow (60 Hertz)	US gpm	380	150	380
	m ³ /hr	86	34	86
Maximum Suction Pressure	psig	1000	600	557
	kg/cm ²	70	42	39
Maximum Case Working Pressure (Limited by Temperature, Material)	psig	2160	1440	710
	kg/cm ²	152	101	50
Temperature Range	°F	-200 to 650	-200 to 650	-40 to 350
	°C	-130 to 340	-130 to 340	-40 to 175
Standard Flange Rating	ANSI Class	600 lb.	600 lb.	300 lb.
Optional Flange Rating	ANSI Class	900 lb.	None	None
Hydro Test Pressure	psig	3350	2225	1200
	kg/cm ²	235	156	84
Standard Speed	rpm	3550/2960	3550/2960	3550/2960
Alternate Speed	rpm	1750/1450	1750/1450	1750/1450
Maximum Driver Size	hp	75	50	75
	kW	55	37	55
Maximum Pump Weight: Close Coupled Design	lbs.	470	195	450
	kg	214	88	205
Bearing Box Design	lbs.	660	385	640
	kg	300	174	291
Minimum Casing Thickness (as determined by bowl)	Inches	5/8	5/8	5/8
	mm	15.8	15.8	15.8
Corrosion Allowance	Inches	1/8	1/8	1/8
	mm	3.2	3.2	3.2
Impeller Axial Clearance	Inches	.03 - .07	.03 - .07	.03 - .07
	mm	.76 - 1.8	.76 - 1.8	.76 - 1.8
Shaft Dia. at Impeller: Thru 50 hp Driver	Inches	1	1	1
	mm	25.4	25.4	25.4
Thru 37 kW Driver	Inches	1.25	N/A	1.25
	mm	31.8	N/A	31.8
Shaft Sleeve OD/Mech. Seal Dia. Thru 50 hp	Inches	1.25	1.25	1.25
	mm	31.8	31.8	31.8
Thru 37 kW	Inches	1.50	N/A	1.50
	mm	38.1	N/A	38.1

Sundyne Pump Family



LMV-311 & 331



LMV-322



LMV-313 and 333



LMV-341



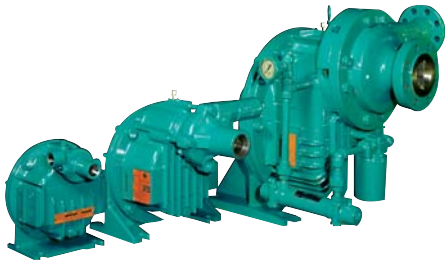
BMP-338

Pump Series	HZ	Flows To	Heads To	RPM	Max. Motor Power	Max. Case Working Pressure	Max. Suction Pressure	Temperature Range
LMV-802	60	150 gpm	210 feet	1750 and 3550	50 hp	1440 psig	600 psig	-200° to 650°F
	50	34 m ³ /hr	64 meters	1450 and 2960	37 kW	101 barg	42 barg	-130° to 340°C
LMV-806	60	380 gpm	760 feet	1750 and 3550	75 hp	710 psig	557 psig	-40° to 350°F
	50	86 m ³ /hr	232 meters	1450 and 2960	55 kW	50 barg	39 barg	-40° to 175°C
LMV-801	60	380 gpm	720 feet	1750 and 3550	75 hp	2160 psig	1000 psig	-200° to 650°F
	50	86 m ³ /hr	219 meters	1450 and 2960	55 kW	152 barg	70 barg	-130° to 340°C
LMV-322	60	230 gpm	3000 feet	6000 to 17,100	50 hp	1440 psig	450 psig	-200° to 650°F
	50	52 m ³ /hr	915 meters	5000 to 14,200	37 kW	101 barg	32 barg	-130° to 340°C
LMV/BMP-311	60	400 gpm	6300 feet	5800 to 24,700	200hp	2160 psig	1000 psig	-200° to 650°F
	50	91 m ³ /hr	1921 meters	4800 to 23,700	150 kW	152 barg	70 barg	-130° to 340°C
LMV/BMP-331	60	400 gpm	6300 feet	10,100 to 24,900	350 hp	2160 psig	1000 psig	-200° to 650°F
	50	91 m ³ /hr	1921 meters	9400 to 23,800	250 kW	152 barg	70 barg	-130° to 340°C
LMV/BMP-341	60	400 gpm	6300 feet	9916 to 24,700	400 hp	2160 psig	1000 psig	-200° to 650°F
	50	91m ³ /hr	1921 meters	9853 to 25,000	315 kW	152 barg	70 barg	-130° to 340°C
LMV/313	60	1040 gpm	1790 feet	5800 to 12,200	200 hp	1440 psig	500 psig	-200° to 650°F
	50	236 m ³ /hr	546 meters	4800 to 12,800	150 kW	101 barg	35 barg	-130° to 340°C
LMV-333	60	1000 gpm	3000 feet	9500 to 14,700	350 hp	1440 psig	500 psig	-200° to 650°F
	50	227 m ³ /hr	915 meters	8800 to 12,900	250 kW	101 barg	35 barg	-130° to 340°C
LMV-343	60	1000 gpm	3000 feet	8445 to 16,450	400 hp	1440 psig	500 psig	-200° to 650°F
	50	227 m ³ /hr	915 meters	8347 to 16,236	315 kW	101 barg	35 barg	-130° to 340°C
BMP-338	60	1100 gpm	2800 feet	9500 to 14,700	350 hp	1440 psig	500 psig	-200° to 650°F
	50	250 m ³ /hr	854 meters	8800 to 12,900	250 kW	101 barg	35 barg	-130° to 340°C
BMP-348	60	1100 gpm	2800 feet	8445 to 16,450	400 hp	1440 psig	500 psig	-200° to 650°
	50	250 m ³ /hr	854 meters	8347 to 16,236	315 kW	101 barg	35 barg	-130° to 340°C

Other Products

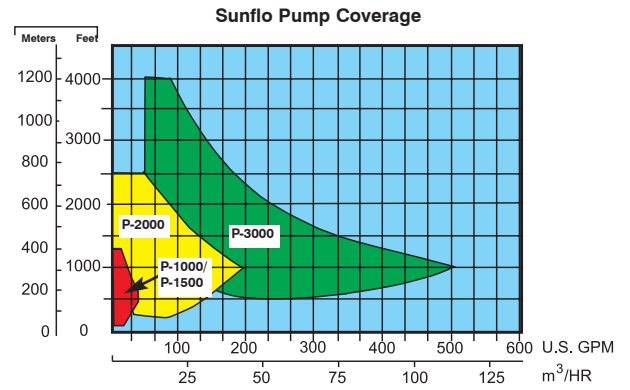
Sunflo

High pressure medium duty pumps



P-1000, P-1500, P-2000, P-3000

Non-API
high performance,
single stage
pumps



Sealless

The world's most comprehensive sealless pump range



Sundyne
Canned
Motor Pump
(SCMP)



ANSIMAG
Non-Metallic
Magnet Drive

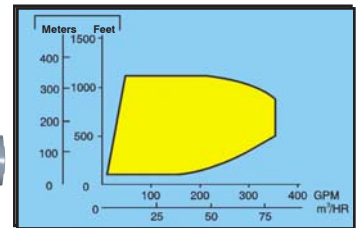


HMD/Kontro
Metallic Magnet
Drive

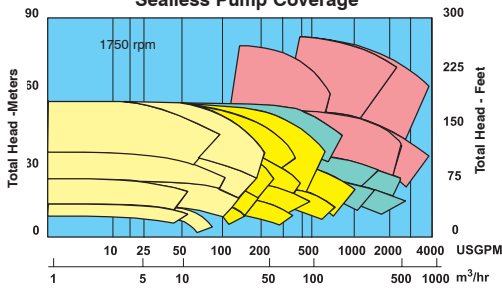


VIP-801
API 610/685
Canned Motor Pump

VIP Pump Coverage



Sealless Pump Coverage

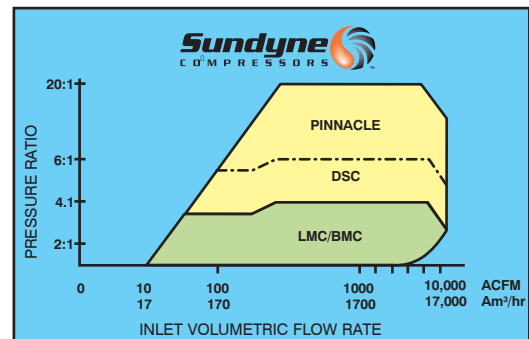


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