Warman GSL Pumps for FGD

Warman Pumps – Engineered for a Cleaner Environment

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Excellent Engineering Solutions

WEIR MINERALS

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Weir Minerals products have a deserved reputatation for extended wear life and reliability, bringing the customer the lowest cost ownership.

Over a quarter century in FGD

Since the introduction of the first Flue Gas Desulphurisation systems in the 1970s for reducing power station emissions, Weir Minerals has led the world in the supply of more that 4000 specially designed FGD pumps.

In the beginning, the robust AH slurry pumps, fitted with replaceable rubber liners were a good match for the high head, low flow, corrosive slurry duties.

With the change in the duty conditions of the Absorber Recirculation pumps to lower heads and higher flowrates in the late 70s, Weir responded by developing the Warman L pump, which became an industry standard.

Weir has continually improved the performance of the Warman L pumps through the introduction of high efficiency impellers, improved pump liner rubber (R26), special alloys (A49 & A51) and high capacity bearing assemblies.

Designed for the latest FGD Technology

Recent trends in the technology of FGD systems have called for fewer numbers of large flowrate, low head pumps in order to optimise plant efficiencies.

Weir realised that modern absorber technology would require new and innovative pump designs. A world-wide study of customers' future requirements for Absorber Recycle pumps was compiled and a conclusive list of innovations to suit this new generation of pumps was established.

New High Performance Design

The results of this exercise culminated in the new high performance Warman GSL pump that combined the best features of the L pump (the benchmark for pumps worldwide) with the latest materials and hydraulic design developments.

Replaceable rubber liners, which have proven to give the best wear resistance and the ultimate in corrosion protection in the Warman AH and L pumps have been retained in the GSL pump.

The pumps are designed for either direct coupling to slow speed electric motors or directly driven through gearboxes.

Easy Maintenance and Durability

Major innovations are:

- the back pullout design, enabling the impeller, both front and back sideliners and the mechanical seal to be easily inspected or replaced without dismantling the pipework,
- a high efficiency alloy impeller which may be trimmed for direct coupled drive arrangements and
- oil lubricated, high capacity bearing assemblies.

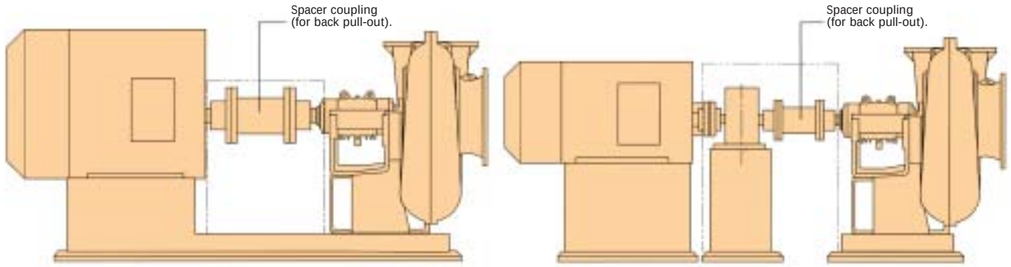
These features, including shafts of large diameters and short overhangs with minimum deflections, as required for mechanical seals, continue to underscore the longevity built into every Weir pump.

Designed for Latest FGD Technology

As world leader, Weir supports GSL pump customers through a network of manufacturing facilities on four continents and with Sales Offices, Licensees and Agents in 73 countries, providing superior products and support through professional customer service.

Strategic Manufacturing Centres

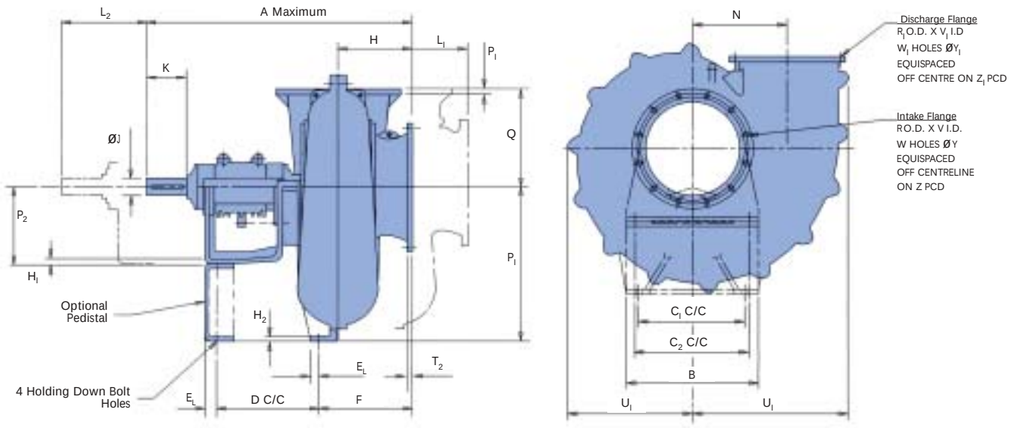
Drive Arrangements



Pump direct coupled to slow speed motor.

Pump coupled to motor through gearbox.

Outline Dimensions

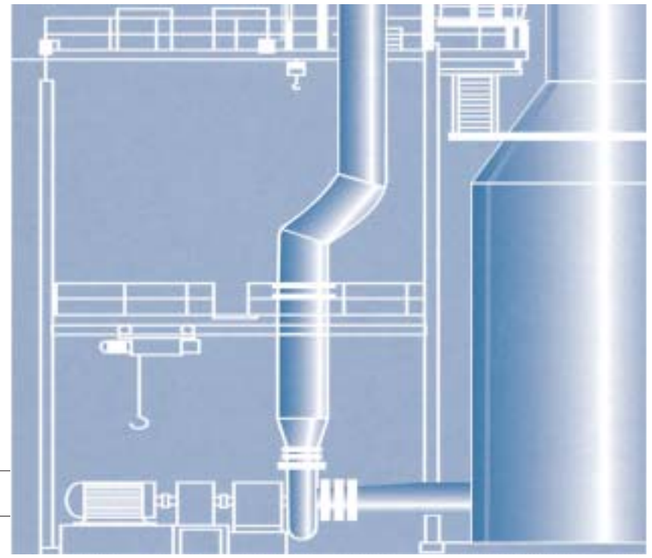


	Base Dimensions										Shaft					Holding Down Bolt Holes	Mass (kg)
Pump Size	A	B	C_1	C_2	D	E_1	E_2	F	H_1	H_2	øJ	K	Key	L_1	L_2		
600SY-GSL	1841	960	850	850	670	110	50	655	35	40	120.03 120.01	284	32x18	330	610	ø39	4575
700TY-GSL	2363	1300	1100	1100	875	130	75	835	40	45	150.04 150.01	355	36x20	375	720	ø51	7280
800TY-GSL	2383	1300	1100	1100	885	130	75	845	40	45	150.04 150.01	355	36x20	500	800	ø51	8300
1000TY-GSL	2570	1800	1600	1100	890	135	75	1025	40	50	150.04 150.01	355	36x20	470	930	ø60	12360

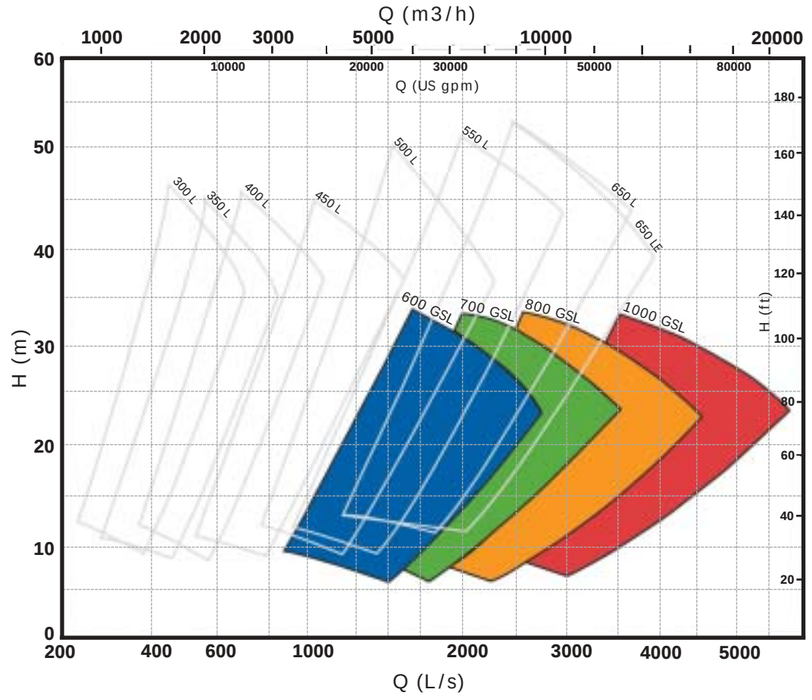
	Head Dimensions									Intake					Discharge				
Pump Size	M	N	P_1	P_2	Q	T_1	T_2	U_1	U_2	R	V	W	Y	Z	R_1	V_1	W_1	Y_1	Z_1
600SY-GSL	525	680	1050	500	675	45	40	901	1136	895	700	12	33	830	850	600	12	33	755
700TY-GSL	680	870	1290	700	830	55	48	1123	1402	1015	800	12	39	940	1020	700	12	39	925
800TY-GSL	670	930	1400	700	900	55	55	1218	1538	1170	900	12	45	1080	1140	800	12	45	1045
1000TY-GSL	825	1150	1700	700	1100	70	70	1445	1865	1530	1200	12	60	1420	1430	1000	12	60	1300

Drive Arrangements

800TY – GSL pump



Pump Selection Chart



Approximate clear water performance

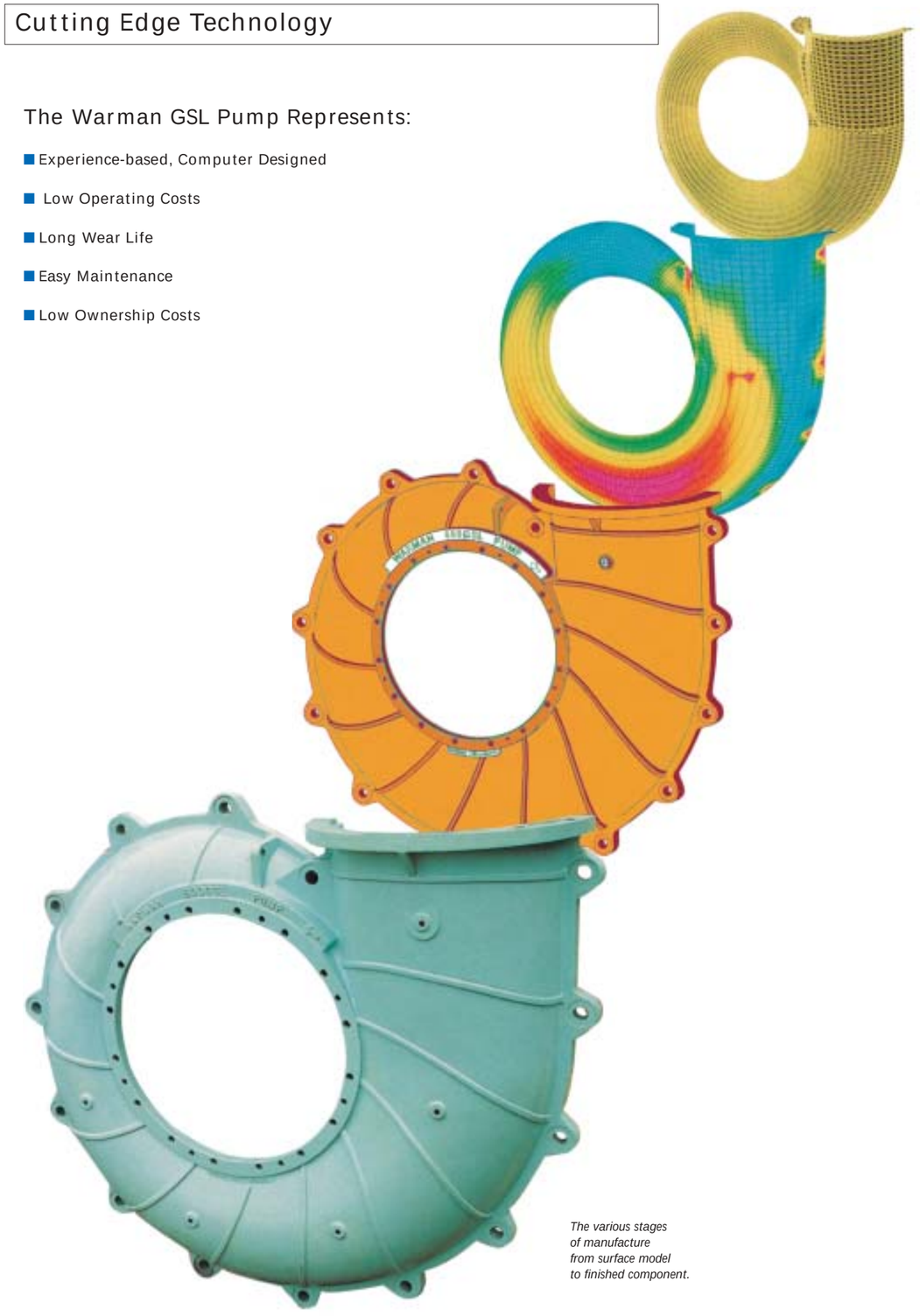
This chart is for preliminary selection only.

For specific recommendations contact your nearest Weir Warman office.

Cutting Edge Technology

The Warman GSL Pump Represents:

- Experience-based, Computer Designed
- Low Operating Costs
- Long Wear Life
- Easy Maintenance
- Low Ownership Costs



The various stages of manufacture from surface model to finished component.

Benefits of Warman GSL Pumps

Lower Ownership Costs Through

Low Running Costs

Electrical consumption is by far the largest component of running cost so initial efficiencies maintained by simple clearance adjustment is paramount in reducing ownership costs.

Easy Maintenance

Back pull out design allows all rotating and wearing components, including mechanical seal, to be inspected without disturbing the suction or discharge pipework.

Modular design bearing cartridge allows simple removal of the entire assembly for maintenance in a clean environment.

Split release collar fitted on bearing side of shaft sleeve. By removing the collar the axial load on the impeller thread is released, making impeller removal fast and simple.

Long Wear Life

Specifically designed for handling abrasive and corrosive conditions found in FGD applications, the GSL design fully utilises Warman's long experience in solids pumping and FGD with a design built to last.

Lower Corrosion in Impellars

Specially formulated high chromium irons developed in Warman's material technology laboratories, combined with optimum impeller vane designs minimise wear in the pumps.

Lower corrosion in Liners

Natural rubber liners are corrosion proof against acidic limestone/gypsum slurries – avoiding corrosion risks which can plague metal lined pumps, particularly when low pH slurries are left within the pumps when they are not operating.

Long Bearing and Mechanical Seal Life

A large diameter, very stiff shaft and short impeller overhang minimises shaft deflection and so provides excellent conditions for the mechanical seal.

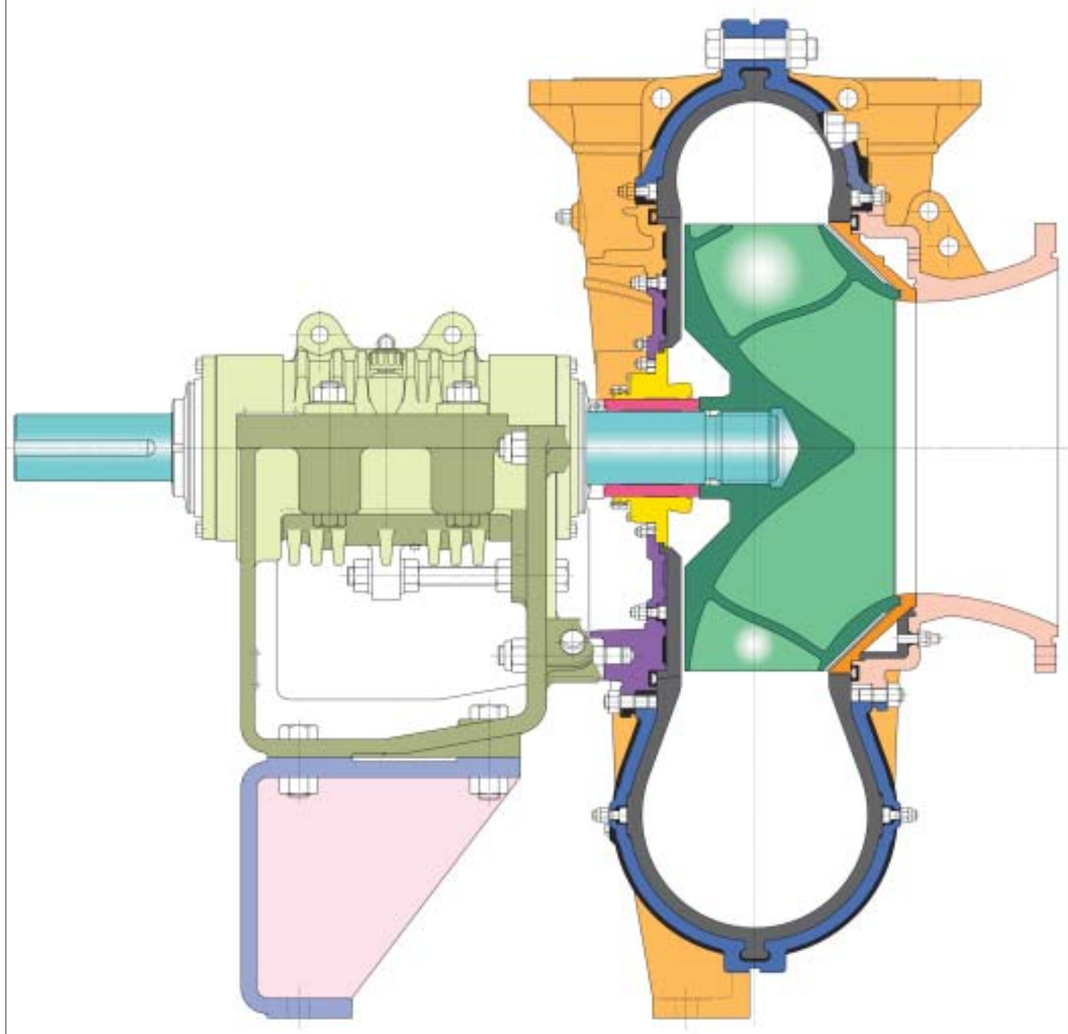
Fully protected oversized heavy duty oil lubricated roller and taper roller bearings carry all the radial and thrust loads with unusually high service factors.

Worldwide Technical Support

Wherever End Users, Constructors or Engineering Consultants are located Warman is nearby to provide full technical support throughout the project and thereafter.

Warman International has its own sales offices in most major countries, with dedicated FGD engineers strategically located worldwide and manufacturing facilities in four continents.

Cut-Away Diagram GSL Pump



MATERIALS OF CONSTRUCTION

Liners	Throatbrush	Impeller	Cover Plate & Frame Plate	Shaft Seal	Shaft
Natural Rubber (R26) Natural Rubber (R38) Natural Rubber (R66) Neoprene (S42)	Ultrachrome– A49 (A49) Ultrachrome – A51 (A51)	Ultrachrome– A49 (A49) Ultrachrome – A51 (A51)	SG Iron (D21)	CD – 4MCu (C26) Hastelloy C (N22)	Carbon Steel (E05) Carbon Steel (E22)

Note: The alpha-numeric code shown below each material is the applicable material code.