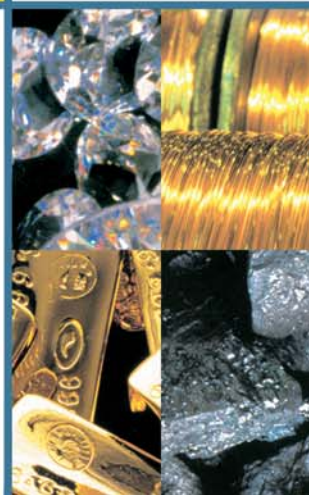




Ultra Heavy Duty Slurry Pump

Ultra Heavy Duty Slurry Pump

 **Team Warman**
THE TOTAL SLURRY SOLUTION



Product Range

Product Range

The True Ultra Heavy Duty Slurry Pump

Warman Ultra Heavy Duty Horizontal Slurry Pumps

Designed for the continuous pumping of highly abrasive, high density slurries with minimal maintenance requirements, the Warman horizontal centrifugal pumps will maintain high efficiencies over the wear life of its components.

Warman rubber and metal lined pumps feature casings which are radially split into two halves. Minimum casing bolts reduce maintenance and minimise downtime.

Moulded impellers and loose liners are available in various elastomers. Loose metal liners and impellers are also available in abrasive resistant alloys and various corrosion resistant metals.

Both metal or rubber liners and impellers, or a combination of both, are interchangeable within the same pump to facilitate use in various applications. Outline dimensions are common to both metal and rubber pumps allowing interchangeability without pipeline or civils rework being necessary.

A removable cartridge type grease lubricated bearing assembly can be replaced with the pump base in-situ, facilitating easy maintenance. Extra heavy duty and oil lubricated bearing assemblies are available on request.

Pumps are available with an optional centrifugal shaft seal which eliminates the need for gland sealing water. This reduces costs, eliminates product dilution and is suitable where suction conditions permit. For intermittent duties, the unique Warman Dyna Seal eliminates leakages whilst the pump is stationary.

Configurations of metal and rubber lined pumps of the same frame size use the same base, bearing assembly, stuffing box and shaft sleeve, reducing stockholding to a minimum.

Polyurethane, stainless steel, ceramic and various hard wearing alloys are available on request.

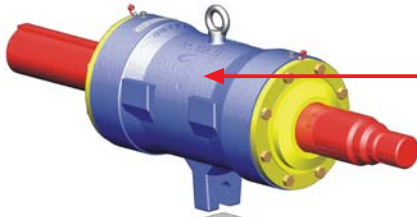
Typical Applications

-  Chemical Process
-  Heavy Minerals
-  Paper and Pulp
-  Mill Discharge
-  Sugar Beet
-  Slag Granulation
-  Bottom Boiler and Fly Ash
-  Cyclone Feed
-  Power Utilities



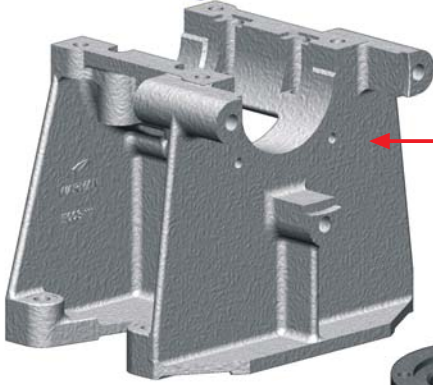
Ultra Heavy Duty Slurry Pump

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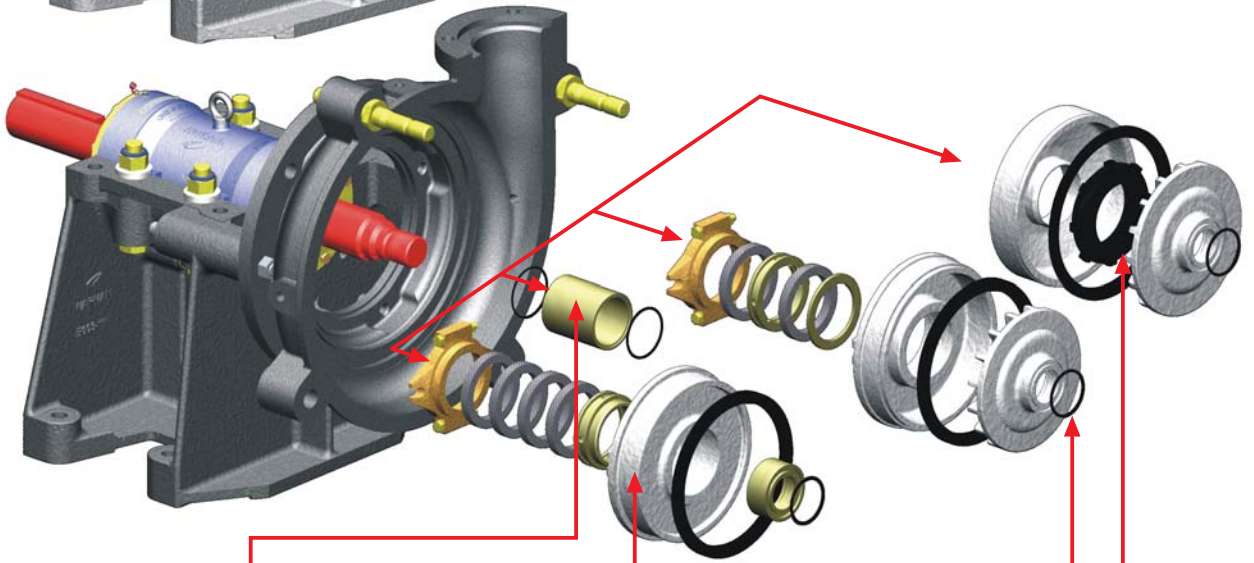
Bearing Cartridge Assembly

A large diameter shaft with a short overhang minimises deflection and vibration. Heavy duty taper roller bearings are housed in a removable bearing cartridge. Interchangeable, extra heavy duty cartridge assemblies are also available on request.



Pump Base

A one piece casting cradles the bearing cartridge assembly. A minimum number of through bolts hold the pump casing to the frame. A simple single point impeller adjustment facility is provided in a convenient position below the bearing cartridge, minimising contamination from media pumped.



Shaft Sleeve

Various options available from standard to hardened sleeves with O-Ring seals at both ends protects the shaft. A slip fit allows the sleeve to be removed and installed quickly. Various types of materials are available to cater for different duty requirements.

Gland Seal

A packed gland type seal is available and can be fitted with ultra-low, low or full flow flush seal water arrangements.

Expeller Seal

Suitable for most slurry pumping applications providing a major advantage where no gland service water is required. Not suitable for series pumping applications, or applications with high suction head.

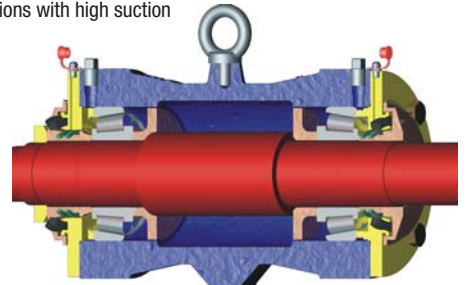
Warman Dyna Seal

An integral part of the standard expeller arrangement with the added advantage of not requiring greasing, packing replacement or gland adjustment.

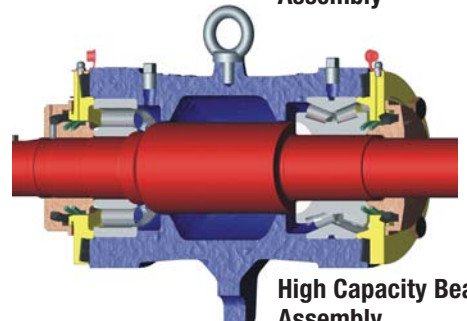
Bearing Assembly Options

A modified heavy duty bearing option is available for the entire range of Warman pumps. This is ideal where extreme axial loads or high power requirements are needed.

STANDARD FRAME		HIGH CAPACITY	
Frame	KW Absorbed	Frame	KW Absorbed
C	30	CC	55
D	60	DD	110
E	120	EE	225
F	260	FF	425
G	600	GG	900



Standard Bearing Assembly

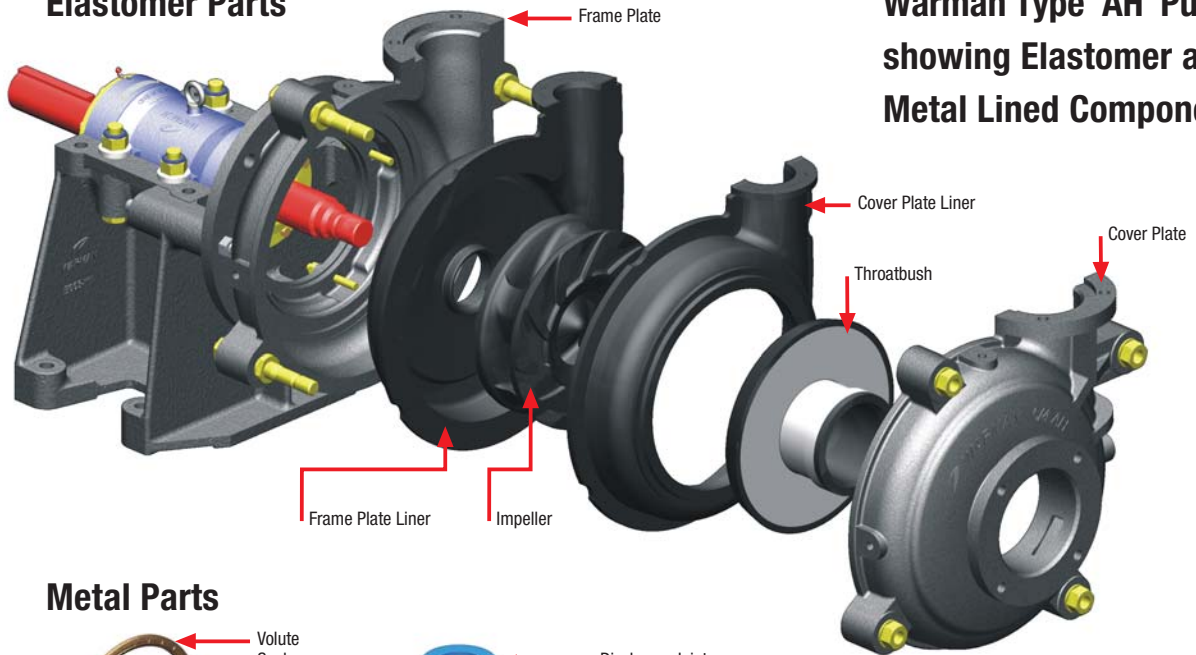


High Capacity Bearing Assembly

Fully Interchangeable Pump

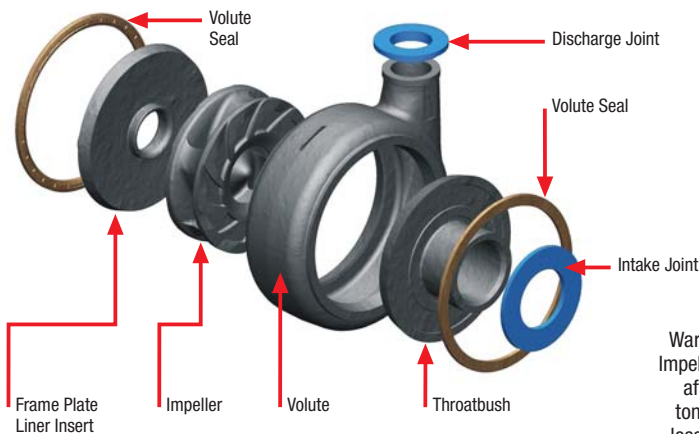
Fully Interchangeable Pump

Elastomer Parts



Warman Type AH Pump showing Elastomer and Metal Lined Component

Metal Parts



Warman Standard Impellers - new and after five million tonnes - and at a loss of only 5% in efficiency from beginning to end



Maintained High Efficiency Advantages Over Normal Pumping

Impellers

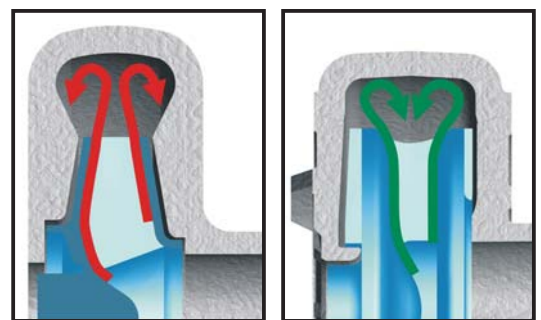
Standard Warman impellers are designed to produce an optimum balance between wear life and lifetime efficiency. Correct design ensures maximum wear life with a minimum total energy cost over the full service life of the pump.

With this in mind, engineers need to consider total energy and operating costs over the full service life of the impeller when evaluating alternative pump models.

Impeller efficiency in its new condition is not normally a true indication of the overall power consumption.

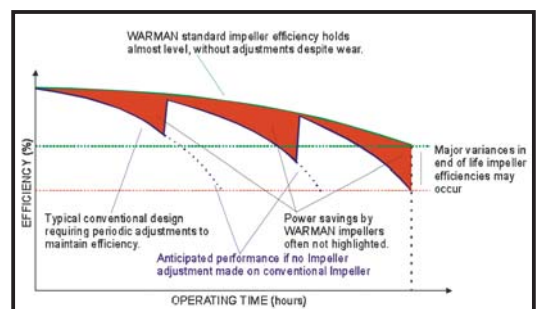
Outward spiral of slurry in conventional pumps causes serious circulation and consequent wear at the close impeller clearances.

The pump-out vanes and concave impeller vane of a Warman pump forces the slurry to form a double inward spiral. This results in uniform wear, a greater utilisation of wearing parts, an increased shaft seal life and sustained high efficiency through the life of the components.



Conventional design

Warman design



Graphical performance representation of a standard Warman Impeller

Shaft Sealing

Shaft Sealing

Expeller Seal — Metal

This seal is suitable for most slurry pumping applications. It provides the major advantage that no gland water is required. An expeller running in a ring of the same material and working with the vanes on the back face of the impeller ensures a leak proof seal. A grease lubricated packed gland with neck and lantern rings prevents leakage when the pump is stationary. The inlet head influences the effectiveness of the expeller seal and under normal operating conditions this type of seal is completely leak proof.

Expeller Seal — Elastomer

It provides the major advantage that no gland water is required. This type of seal is the same as the centrifugal metal seal apart from the following two items: the expeller ring in this seal is made of moulded elastomer and special synthetic rubber lip seals are used in place of the packed gland. This type of seal is generally used with pumps which are fitted with rubber liners.

Warman Dyna Seal

Unique to the Warman range of slurry pumps this unique seal eliminates sliding abrasion present in all other types of seal arrangements, whilst providing a positive seal. By changing certain components the seal can be retrofitted to existing pumps.

Gland Seal — Full Flow

With this type of seal, a conventional stuffing box replaces the expeller ring. A lantern restrictor and rings of packing are used. This sealing method is used when the inlet conditions are not suitable for the centrifugal expeller seal. Clean water at a pressure of at least 35 to 50 kPa above discharge pressure is required.

Frame Size	A	B	C, CC, CAM & CCAM	D, DD, DAM & DDAM	E, EE, EAM & EEAM	F & FF	FAM, FFAM, G & GAM	H
Litres/Second	0,15	0,25	0,35	0,55	0,70	1,20	1,60	2,10

Gland water requirements for full flow gland

Gland Seal — Low Flow

This type of seal is utilised where only small quantities of gland water can be allowed to mix with and dilute the fluid being pumped. Clean water pressure of at least 35 to 50 kPa above discharge pressure is required.

Frame Size	A	B	C, CC, CAM & CCAM	D, DD, DAM & DDAM	E, EE, EAM & EEAM	F & FF	FAM, FFAM, G & GAM	H
Litres/Second	0,06	0,09	0,11	0,15	0,20	0,26	0,40	0,60

Gland water requirements for low flow gland

Gland Seal — Ultra Low Flow

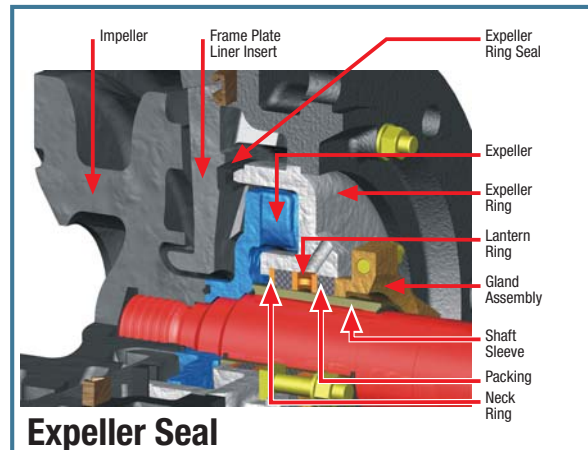
This type of seal is used where only very small quantities of gland water can be allowed to mix with and dilute the fluid being pumped. Clean water pressure of at least 35 to 50 kPa above discharge pressure is required.

Frame Size	A	B	C, CC, CAM & CCAM	D, DD, DAM & DDAM	E, EE, EAM & EEAM	F & FF	FAM, FFAM, G & GAM	H
Litres/Second	0,02	0,03	0,04	0,05	0,06	0,09	0,14	0,20

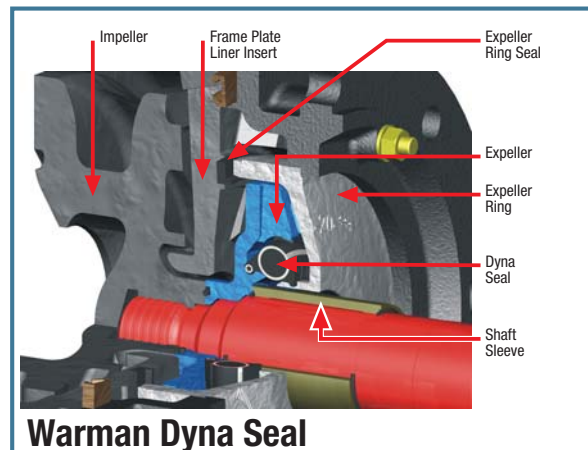
Gland water requirements for ultra low full flow gland

Mechanical Seals

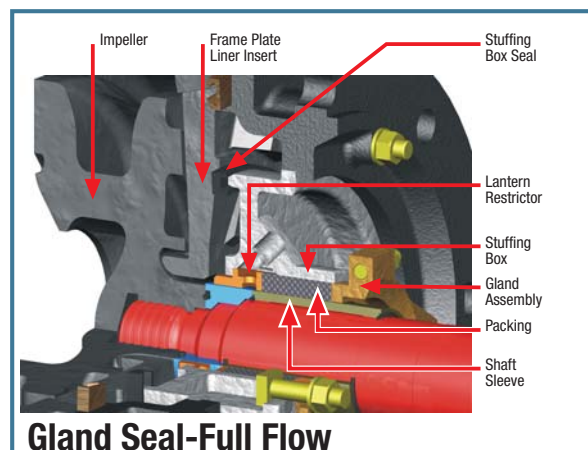
Mechanical seals, although not standard, can be supplied for the range of Warman pumps. These can be fitted on request and to clients' specification. See separate brochure.



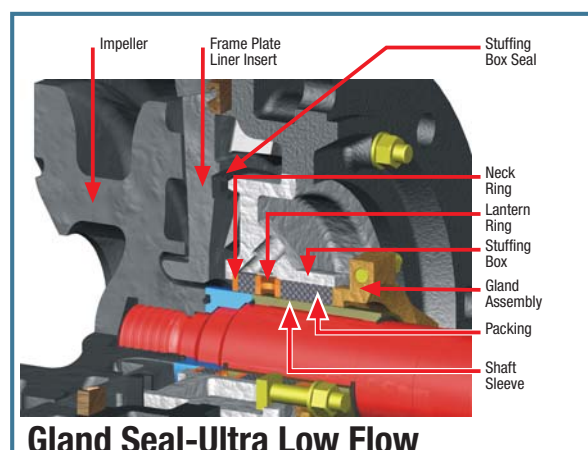
Expeller Seal



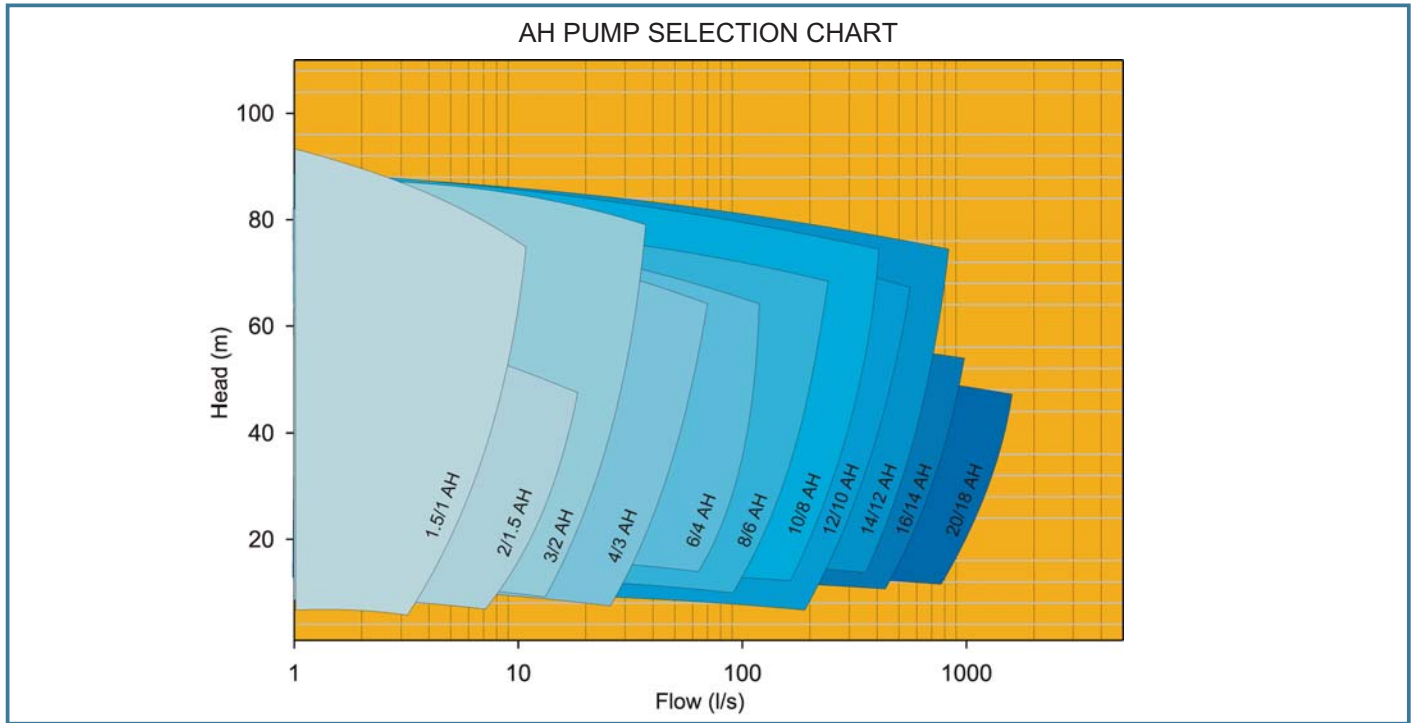
Warman Dyna Seal



Gland Seal-Full Flow



Gland Seal-Ultra Low Flow



The selection chart should be used as a basic guide only.

It indicates the range and quantity of flow and head available from Warman pumps with standard impellers. It can also, however, be used to obtain a preliminary pump selection providing the user is able to estimate the quantity of slurry to be pumped and the developed head required.

Materials of Construction

	LINERS	IMPELLERS	CASING	BASE	EXPELLER	EXPELLER RING	SHAFT SLEEVE	SEALS
Standard	Chrome Alloy Natural Rubber	Chrome Alloy Natural Rubber	SG Iron	SG Iron	Chrome Alloy or SG Iron	Chrome Alloy or SG Iron	SG Iron	Rubber and Nitrile
Options	Ferralium Hastelloy C 316 SS W151 Polyurethane Neoprene Butyl Viton Nitrile EPDM Hypalon	Ferralium Hastelloy C 316 SS W151 Polyurethane Neoprene Butyl Nitrile Hypalon	SG Iron Various grades	MS Fabricated Cast Iron	NI Resist Ferralium Hastelloy C Polyurethane 316 SS W151	NI Resist Ferralium Hastelloy C 316 SS Rubber W151 Polyurethane Neoprene Butyl Nitrile	EN56C Ferralium Hastelloy C Titanium 316 SS 304 SS	Ceramic Stellite Chrome Oxide Nordel Neoprene Viton

Product Versatility

Unlike other units on the market, the Warman range of pumps provides total versatility when it comes to materials of selection, interchangeability of components and variations to extend the life of components. Wear and overall reliability will be limited to the weakest part of the pump. The flexible design of these pump units combined with the appropriate selection of material of construction ensure the lowest operating costs.



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