

### ULTRA HYGIENIC POSITIVE DISPLACEMENT PUMPS

The Jabsco ranges of 55 Series and Ultima pumps provide the highest standard of in-place cleanability (CIP), steam-sterilisability (SIP) & containment.

All pumps within these ranges utilise the well established rotary lobe pump principle. This positive displacement action combines smooth, gentle movement of fluid with the ability to handle soft solids, thin and viscous fluids.

The features of the pumps which enables them to meet the most stringent requirements of cleanliness and hygiene include:

- Self-draining pump head with vertical ports to eliminate retention of the product and cleaning agents for fast de-contamination and product changeover.
- Controlled compression gasket-type joints with no 'O' rings in product contact.
- Unique design of shaft seals provide the highest level of containment with total product draining and cavities.
- External rotor fixing with no nuts, bolts, screws

### Typical Applications

or splines in contact with the pumped fluid. Process engineers specify 55 Series and Ultima wherever a high quality positive displacement pump is required in the following industries:

- Biotechnology
- Sterile Pharmaceuticals
- Ultra-Hygienic Food Processing
- Separation Equipment
- Aseptic Manufacturing Facilities
- Sanitary / Hygienic Production



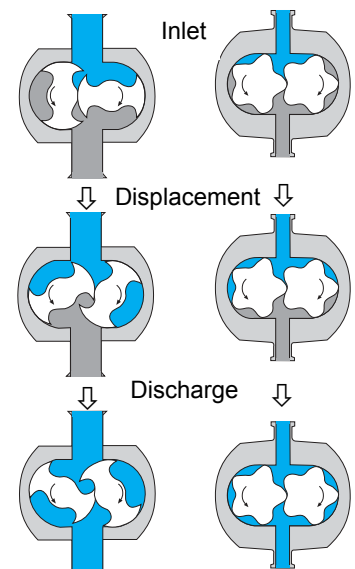
### Independent Certification

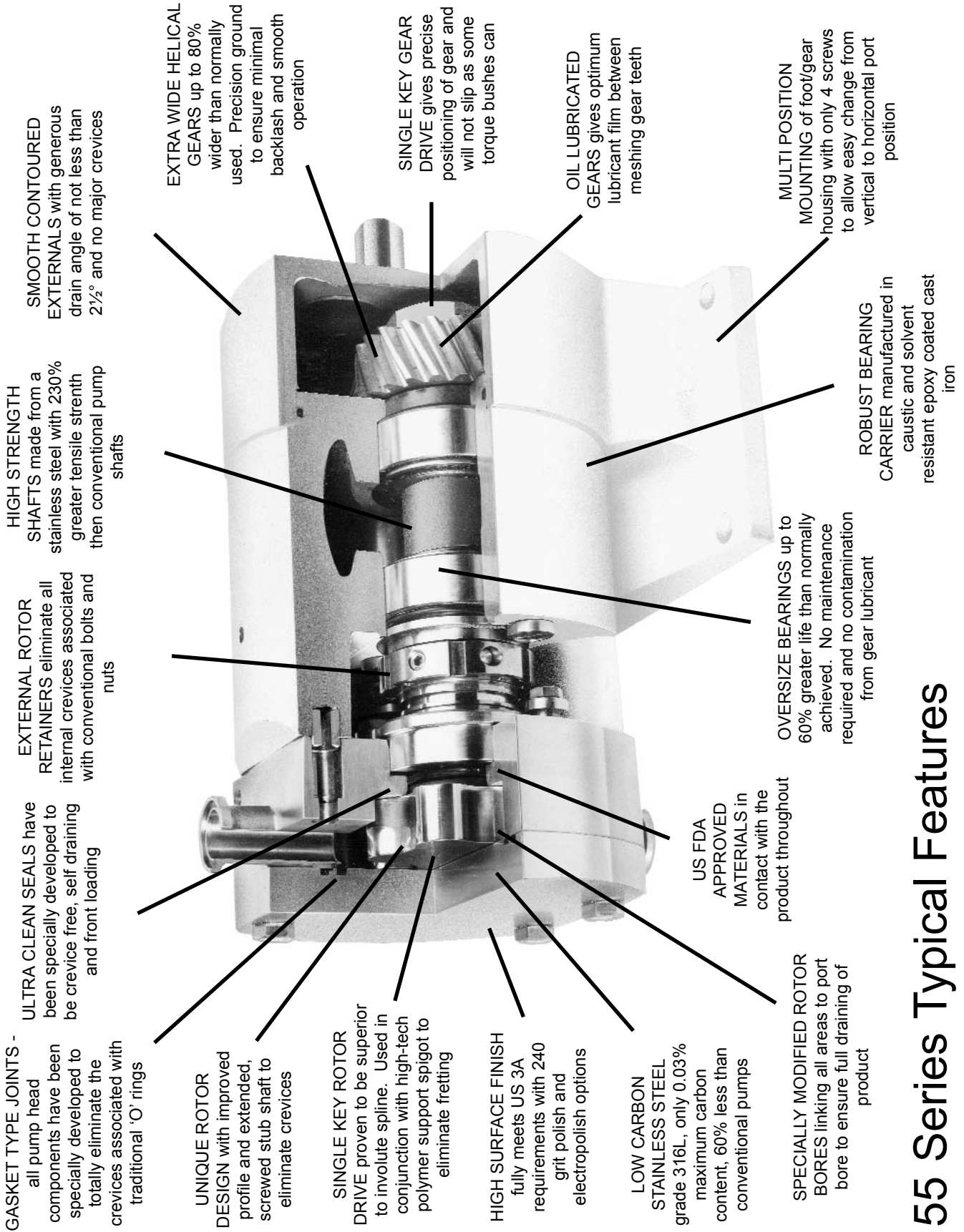
The 55 Series and Ultima Pumps are now certified by an independent laboratory to prove their cleanability (CIP), sterilisability (SIP) and resistance to ingress of bacteria.

The 55 Series pumps were submitted to TNO, The Netherlands Organisation for Applied Scientific Research and the Ultima range to Campden and Chorleywood Research Association and tested to EHEDG protocols which are the only internationally recognised tests able to prove the hygiene standards of pumps and other equipment.

Every element of these pumps including shaft seals, pump head and joints easily passed the tests first time with perfect results in every test. These pumps truly are "as clean as a straight piece of pipe". Copies of TNO Certificate No. 95-087 and C C F R A Certificate No. FH/REP/36539/1 and relevant test reports are available on request.

### Scimitar Rotor 5 Lobe Rotor





**GASKET TYPE JOINTS** - all pump head components have been specially developed to be crevice free, self draining and front loading

**ULTRA CLEAN SEALS** have been specially developed to be crevice free, self draining and front loading

**EXTERNAL ROTOR RETAINERS** eliminate all internal crevices associated with conventional bolts and nuts

**HIGH STRENGTH SHAFTS** made from a stainless steel with 230% greater tensile strength than conventional pump shafts

**SMOOTH CONTOURED EXTERNALS** with generous drain angle of not less than 2½° and no major crevices

**UNIQUE ROTOR DESIGN** with improved profile and extended, screwed stub shaft to eliminate crevices

**EXTRA WIDE HELICAL GEARS** up to 80% wider than normally used. Precision ground to ensure minimal backlash and smooth operation

**SINGLE KEY ROTOR DRIVE** proven to be superior to involute spline. Used in conjunction with high-tech polymer support spigot to eliminate fretting

**SINGLE KEY GEAR DRIVE** gives precise positioning of gear and will not slip as some torque bushes can

**HIGH SURFACE FINISH** fully meets US 3A requirements with 240 grit polish and electropolish options

**LOW CARBON STAINLESS STEEL** grade 316L, only 0.03% maximum carbon content, 60% less than conventional pumps

**US FDA APPROVED MATERIALS** in contact with the product throughout

**OVERSIZE BEARINGS** up to 60% greater life than normally achieved. No maintenance required and no contamination from gear lubricant

**ROBUST BEARING CARRIER** manufactured in caustic and solvent resistant epoxy coated cast iron

**MULTI POSITION MOUNTING** of foot/gear housing with only 4 screws to allow easy change from vertical to horizontal port position

**SPECIALY MODIFIED ROTOR BORES** linking all areas to port bore to ensure full draining of product

**OIL LUBRICATED GEARS** gives optimum lubricant film between meshing gear teeth

**ROBUST BEARING CARRIER** manufactured in caustic and solvent resistant epoxy coated cast iron

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# 55 Series Typical Features

## Specifications & Details of Construction

### MODEL RANGE

Every pump is carefully manufactured to well proven design specifications ensuring minimum product spoiling, maximum process reliability and most economical running.

The 55 Series consists of 3 sizes of pump with a flow range up to 67 lpm and the Ultima range has 6 pumps up to 670 lpm. The features which enable the range of pumps to meet the most stringent requirements of cleanliness include:

- **SELF DRAINING PUMP HEAD:** eliminates hold-up of the product and cleaning agents for fast de-contamination and product change-over.
- **CONTROLLED COMPRESSION GASKET JOINTS:** no O rings in contact with the product eliminates crevices which can harbour bacteria.
- **UNIQUE DESIGN OF SHAFT SEALS:** highest levels of containment with total product draining and no cavities.
- **EXTERNAL ROTOR FIXING:** no nuts, bolts, screws or splines in contact with the pumped fluid.

### DESIGN CHARACTERISTICS

The facing page gives details of the many features of the 55 Series which benefit the user in efficiency, reliability and ease of maintenance. The following page shows the Ultima pump which has some differences due to its larger size.

### APPROVALS

TNO Certification No. 95-087 (55 Series) and CCFRA Certificate FH/REP/36539/1 (Ultima) testing to the EHEDG protocols for:

- In-place cleanability
- In-line sterilisability
- Bacteria tightness
- FDA approved materials

### MATERIALS OF CONSTRUCTION

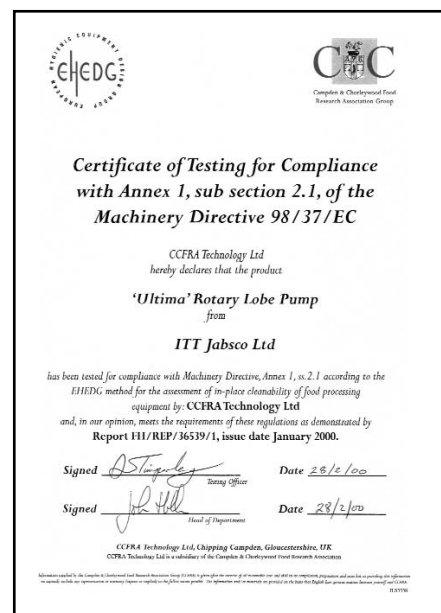
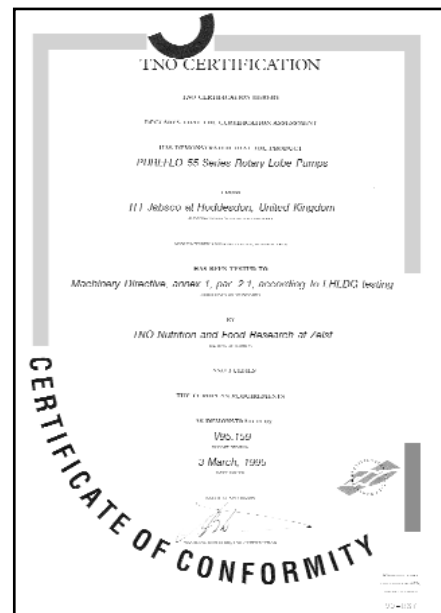
All metal parts which come into contact with the pumped fluid are made from 316L grade austenitic stainless steel.

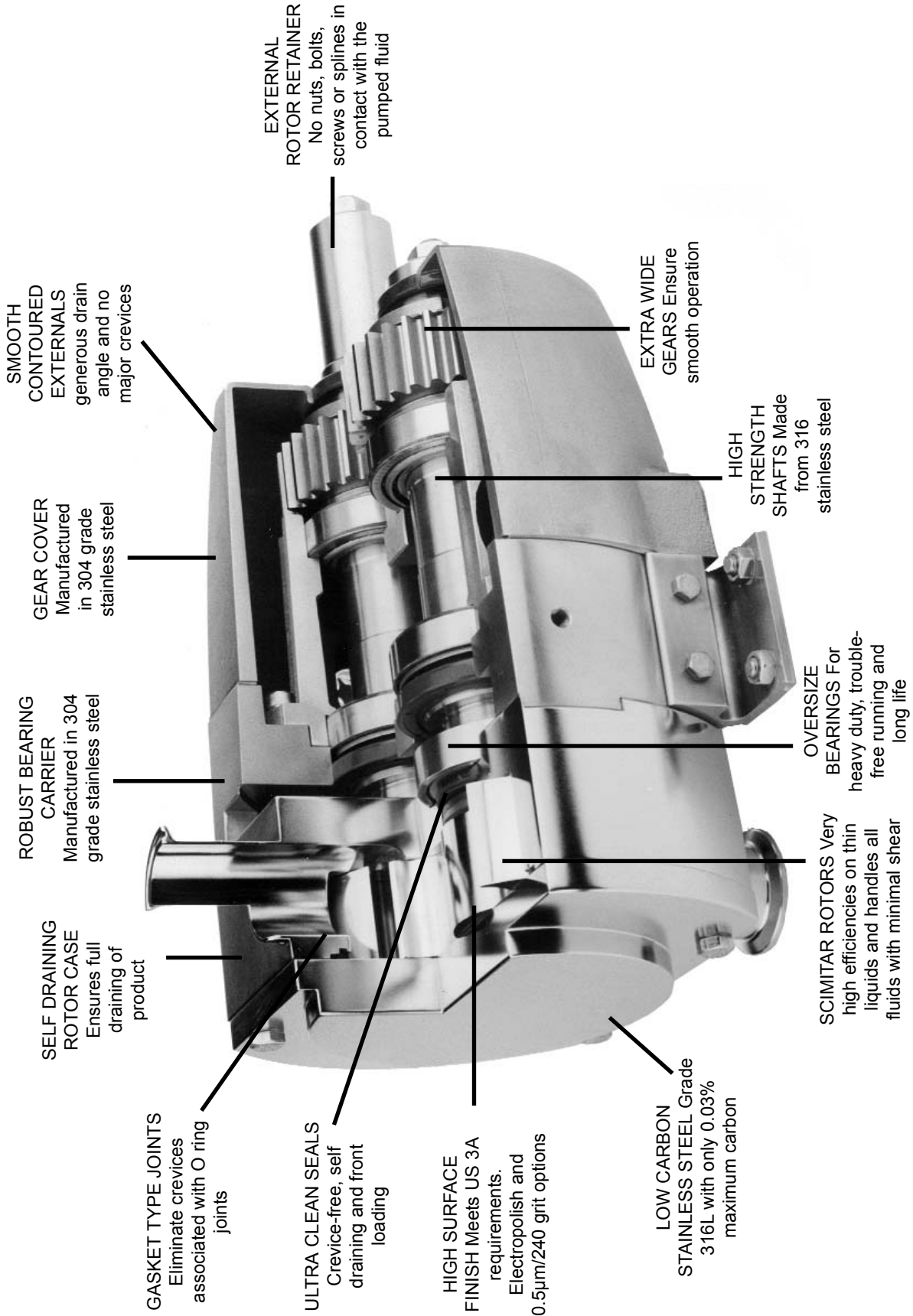
This gives the level of hygiene, chemical and corrosion resistance required by the pharmaceutical, bioprocess, food and chemical industries and meets or exceeds the following standards:

- USA – AISI 316L
- Europe – EN BS 10088-3 1.4404

### SURFACE FINISH

The standard finish for all fluid contact surfaces is 0.8µm. Options for electropolish (0.8µm / 32µ inch) and mechanical polish followed by electropolish to 0.5µm / 240 grit / 20µ inch are also available.





**SMOOTH  
CONTOURED  
EXTERNALS**  
generous drain  
angle and no  
major crevices

**GEAR COVER**  
Manufactured  
in 304 grade  
stainless steel

**ROBUST BEARING  
CARRIER**  
Manufactured in 304  
grade stainless steel

**SELF DRAINING  
ROTOR CASE**  
Ensures full  
draining of  
product

**GASKET TYPE JOINTS**  
Eliminate crevices  
associated with O ring  
joints

**ULTRA CLEAN SEALS**  
Crevice-free, self  
draining and front  
loading

**HIGH SURFACE  
FINISH** Meets US 3A  
requirements.  
Electropolish and  
0.5µm/240 grit options

**LOW CARBON  
STAINLESS STEEL Grade**  
316L with only 0.03%  
maximum carbon

**EXTERNAL  
ROTOR RETAINER**  
No nuts, bolts,  
screws or splines in  
contact with the  
pumped fluid

**EXTRA WIDE  
GEARS** Ensure  
smooth operation

**HIGH  
STRENGTH  
SHAFTS** Made  
from 316  
stainless steel

**OVERSIZE  
BEARINGS** For  
heavy duty, trouble-  
free running and  
long life

**SCIMITAR ROTORS** Very  
high efficiencies on thin  
liquids and handles all  
fluids with minimal shear

# Ultima Typical Features

## ELASTOMERS

Apart from the 316L stainless steel parts the only other materials in contact with the pumped fluid are sealing components which are selected to suit each individual application. Elastomer options available include:

- EDPM – Hygienic grade conforming to the requirements of the US FDA CFR Title 21 Section 177.2600. An economical choice for the majority of water based fluids with excellent resistance to hot water and steam.
- VITON (FPM) – Offers higher resistance to many solvents and chemicals even at elevated temperatures.
- PTFE / Perfluoroelastomer (Teflon / Kalrez) – these materials have outstanding chemical resistance.

## SEALS

55 Series and Ultima pumps have a unique, crevice-free and self-draining design of seal which has no metal or moving parts in contact with the pumped fluid. All seals are fully pressure balanced to provide:

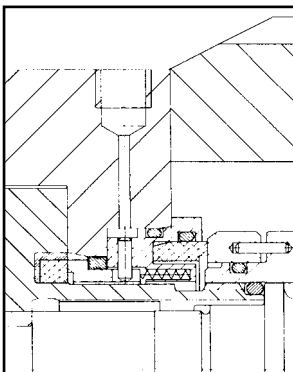
- Excellent sealing even at very low pressures.
- Long life at high pressures.

The design differs from conventional shaft seals in that the pumped fluid is on the outside of the seal and does not come into contact with the shaft. The design ensures:

- Good circulation of the product to avoid stagnant areas where bacteria can multiply.
- Good cooling of the seal faces.
- Maximum flow of cleaning fluids around the seal.

## SEAL JOINTS

The drawings opposite shows the specially designed joints around both the stationary and rotating seal faces. All seals are accessible from the front for easy inspection.



DOUBLE SEAL  
(55 Series shown)

## SINGLE SHAFT SEALS

Single shaft seals are available in two face material combinations:

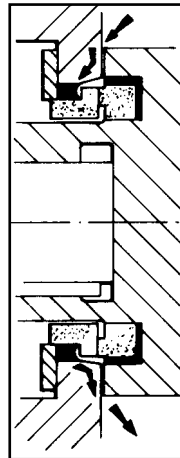
- **Carbon on silicon-carbide.**

Suitable for many clean fluids and viscosities up to 150 000 Cp.

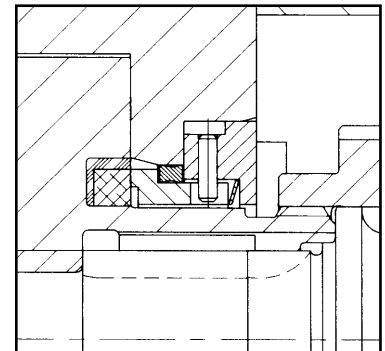
- **Silicon-carbide on silicon-carbide.**

Used when carbon is not acceptable i.e. for fluids which are:

- Abrasive
- Non-lubricating
- High Viscosity
- Change state in contact with air i.e. crystallize, form a film, dry out or precipitate solids.



FLUID FLOW  
AROUND SEAL  
AREA



SINGLE SEAL  
(55 Series shown)

## DOUBLE SHAFT SEALS

Double seals retain all the features of the single seals and provide a means of containing a fluid behind the primary seal. This allows the pump to be used for applications where the single seal is unsuitable. Features of the double seals include:

- Highly effective sealing of flushing fluids.
- Can be used with steam aseptic barrier.
- As easy to assemble and service as single seals.
- Share many common parts with single seals.

Double seals are also available in two face material combinations:

- **Carbon on silicon-carbide.**
- **Silicon-carbide on silicon-carbide**

## Rotor & Endcover Options

### 5 LOBE ROTORS (55 SERIES ONLY)

- Gentle, low pulsation pumping action.
- No contact between rotors or with pump case.
- Choice of clearances to optimise balance between efficiency, safe working pressure and temperature.

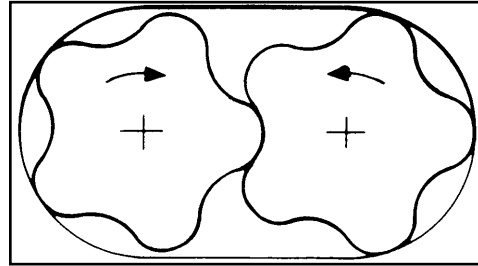
### SCIMITAR ROTORS

- Very high volumetric efficiencies on thin fluids.
- Handles viscous and thin fluids with minimal shear.

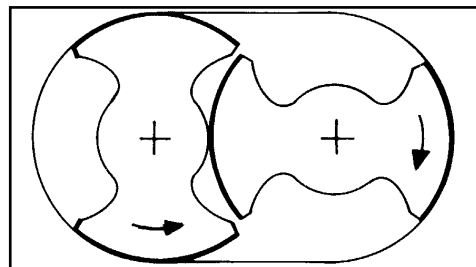
### ROTOR CASE

55 Series and Ultima pumps have a self-draining rotor case with vertical ports and rotors with external rotor fixing, this ensures:

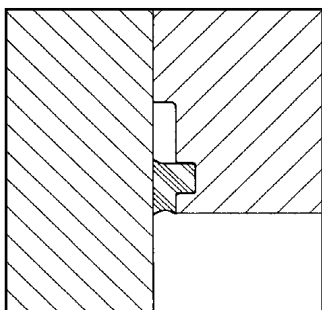
- No hold-up of product, low product damage and no contamination.
- Rotors easily removed.
- No bolts, screws or splines in fluid contact.



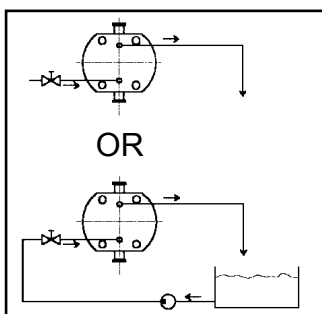
5 Lobe Rotors in Self-Draining Rotor Case



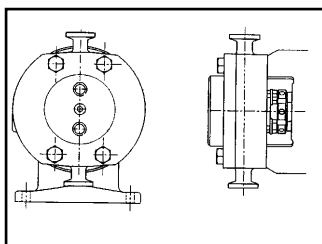
Scimitar Rotors in Self-draining Rotor Case



END COVER JOINT RING  
(Ultima shown)



BARRIER FLUID SYSTEM



JACKETED END COVER

### END COVER

Both pump ranges have special gasket type joint rings for sealing which are superior to O rings. This provides a far more hygienic pump. Features include:

- No crevices in the fluid contact area which can retain pumped fluid and harbour bacteria.
- Controlled compression of the elastomer.
- No moulding split lines in fluid contact.

### END COVER BARRIER OPTION

Pump models fitted with double seals may also be fitted with an end cover to accommodate an aseptic barrier of sterile liquid or steam.

Eliminates any possibility of bacteria getting into the pump after sterilization. Prevents the escape of pathogenic or hazardous products into the environment.

### JACKETED END COVER OPTION

Jacketed end cover allows hot water / steam or cold liquid to be piped to the pump to:

Maintain the product temperature or to heat the product prior to starting. Cold liquid can be piped through the pump to counteract any heating of the product within the pump. This is particularly useful on steam or hot water aseptic barrier applications.

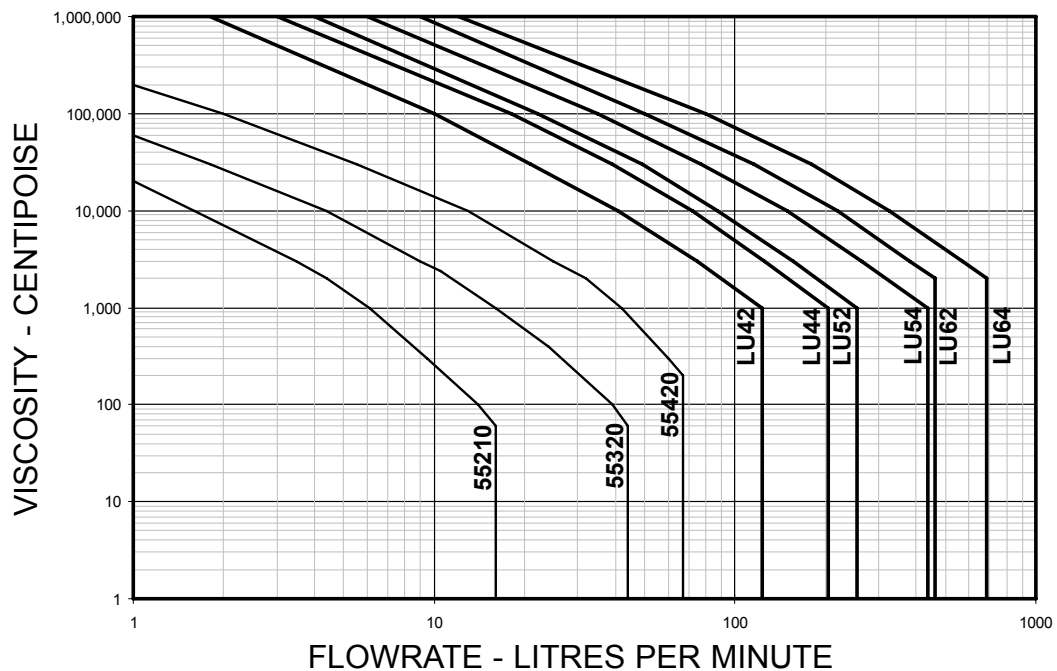
## Application Data

### RANGE OVERVIEW & OPTIONS AVAILABLE

PUMP SIZE		55210	55320	55420	LU42	LU44	LU52	LU54	LU62	LU64
Maximum flow ; litre / min		16	44	67	123	204	254	437	461	684
Maximum pressure; bar		14	0	20	15	8	15	8	15	8
Displacement, litre / 100 rev		1.05	2.93	6.7	12.3	20.4	26.5	45.5	64	95
Maximum speed; rpm		1500	1500	1000	1000	1000	1000	1000	720	720
Maximum soft particle size; mm		4	6	8	10	10	15	15	21	25
Weight; kg		8	19	26	23	25	38	41	70	75
Standard port size; mm (inch)		12 (½)	19 (¾)	25 (1)	25 (1)	38/40 (1½)	38/40 (1½)	50 (2)	65 (2½)	76/80 (3)
Seal Option Availability	Single SiC / SiC mechanical seal	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Single C/SiC mechanical seal	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Double mechanical seal, SiC / SiC front	✗	✓	✓	✓	✓	✓	✓	✓	✓
	Double mechanical seal, C/SiC front	✗	✓	✓	✓	✓	✓	✓	✓	✓
Rotor Option Availability	5-Lobe	✓	✓	✓	✗	✗	✗	✗	✗	✗
	Scimitar	✓	✓	✓	✓	✓	✓	✓	✓	✓
Other Options Availability	Plain end cover	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Jacketed end cover	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Sterile barrier end cover joint	✗	✓	✓	✓	✓	✓	✓	✓	✓
	Stainless steel bearing housing	✓	✓	✓	✓	✓	✓	✓	✓✓	✓✓
	Electro-polish to 0.8 micron	✓	✓	✓	✓	✓	✓	✓	✓	✓
Availability	Internal polish and electro-polish to 0.5 micron	✓	✓	✓	✓	✓	✓	✓	✓	✓
	EPDM elastomers	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Viton elastomers	✓	✓	✓	✓	✓	✓	✓	✓	✓
	PTFE / Kalrez elastomers	✓	✓	✓	✓	✓	✓	✓	✓	✓

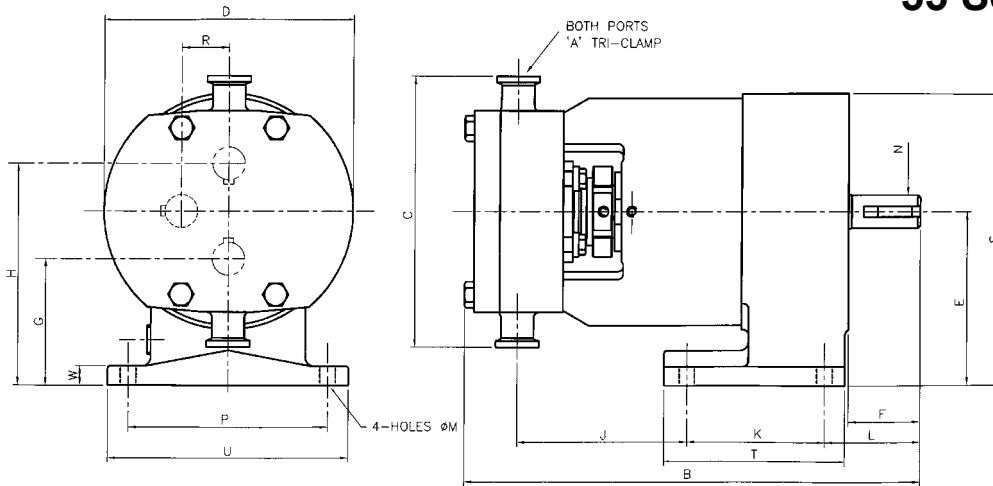
✗ denotes not available    ✓ denotes available    ✓✓ denotes fitted as standard

### PRELIMINARY SELECTION CURVES

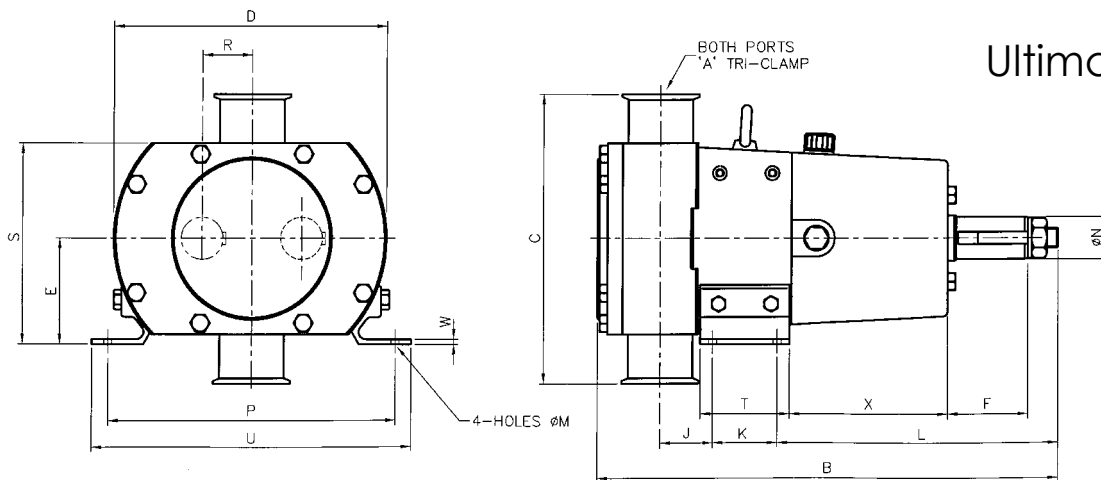


### Bareshaft Pump Dimensions

#### 55 Series



#### Ultima



MODEL	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	T	U	W	X	DRIVE KEY SIZE	Wt. Kg
55210	½"	191	132	114	80	33	59	101	66	60	41	7	14	90	20	135	76	109	10	0.8	5 x 5	7.9
55320	¾"	264	155	145	100	43	72	128	99	80	53	9	19	116	28	168	104	139	10	0.8	6 x 6	18.8
55420	1"	302	170	168	112	53	80	145	109	90	66	9	24	136	33	191	114	160	13	0.8	8 x 7	26.1
LU42	1"	285	223	194	71	38	38.5	103.5	37	32	173	9	24	200	32.5	136	49	216	5	87	8 x	23
LU44	1½"	301	223	194	71	38	38.5	103.5	47	32	173	9	24	200	32.5	136	49	216	5	87	8 x	25
LU52	1½"	386	249	248	83	73	-	-	48	42	247	9	38	228	40	161	62	249	5	116	10 x	38
LU54	2"	414	259	248	83	73	-	-	67	42	247	9	38	228	40	161	62	249	5	116	10 x	41
LU62	2½"	463	328	272	105	83	-	-	53	65	282	11	42	294	50	200	90	322	5	130	12 x	70
LU64	3"	492	328	272	105	83	-	-	61	65	282	11	42	294	50	200	90	322	5	130	12 x	75

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