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Issue 2, August 2005

Information Required For Us To Provide A Pump Quotation

MDM Pumps Ltd specialises in tailor-made hygienic pumps, vent valves and strainers, for the pharmaceutical, brewery, soft drinks and food industries. All our products are built to last and are fully cleanable in place: liquid-contact surfaces are smooth and crevice-free, with minimum 3mm radii. We manufacture products using components machined from solid stainless steel 316L¹ bar - without using castings, pressings or spinings² - and use FDA-compliant seals.

If you are pumping products such as sewage, river water, sea water or petrochemicals, then you do not need a pump to such a high specification as this.

¹Apart from the motor, all metal parts are stainless steel to the USA standard [AISI 316L](#) except for those in the mechanical seal, which are typically stainless steel [316](#), and the FSB/cowl rails and cowl sheet (where supplied), which are stainless steel [304](#). Low ferrite stainless steel 316L (1.4435) is available on request. Note that whereas 'CR' liquid ring pumps are manufactured from stainless steel 316L, 'CS' liquid ring pumps are manufactured from stainless steel 316.

²We no longer use castings, pressings or spinings for H, CH, D or GP pumps, vent valves or strainers because cast steel is vulnerable to porosity and surface pitting which makes it less satisfactory, and pressed or spun components are generally thinner which results in a shorter life. Note that where a repeat of an old-style cowl is supplied for a D or GP pump, this may include a spinning. Each of our impellers is machined from a single billet (back plates for closed impellers are separate components).

See 'Our Standard Offering' and 'Options' documents.

To provide a quotation, we need:

Minimum Information Required³

1. **Contact Details**
2. **Type of Pump**
3. **Flow**
4. **Differential Head**

Product Information⁴

5. **Description Of Product**
6. **Density / Specific Gravity Of Product**
7. **Viscosity Of Product**
8. **Temperature(s) Of Product**

Further Information Required⁵

9. **Internal Surface Finish**
10. **Pipework Size**
11. **Connections (Size and Type)**
12. **Drain Requirements**
13. **Mounting**
14. **Motor Specification**
15. **Location and Ambient Conditions**
16. **Documentation and Standards**
17. **NPSHA (Net Positive Suction Head Available)**
18. **Seals**
19. **Maximum Noise Level**
20. **Performance Characteristic**

The remainder of this document discusses the above items in more detail and lists any assumptions we are likely to make.

³To provide you with a quotation – even a budget quotation – we need to have the information in this section.

⁴The information listed in this section is also essential if we are to provide you with a quotation. However, if you are not able to provide us with this information, we shall assume that the product to be pumped is as water at 22°C.

⁵If you are unable to provide us with the information in this section, we shall make appropriate assumptions on your behalf.

Minimum Information Required

1. Contact Details

Please provide us with your preferred contact details.

Unless you tell us otherwise, we assume that the pump will be used in a country where English is the official language.

Equipment in Ireland and The Netherlands will only be supported if it is ordered through our distributor in the country in question. For this reason, if equipment is required for one of these countries, then a quotation should be obtained from our distributor, not directly from MDM Pumps Ltd.

2. Type of Pump

Centrifugal Pumps

MDM Pumps Ltd manufactures, assembles and tests three types of centrifugal pump:

- i) Flooded suction pump. E.g. delivery pump, transfer pump;
- ii) Air Separator ('AS') pump: For handling liquid-air mixtures without air locking (a centrifugal pump cannot pump air). E.g. for scavenging tanks or unloading road tankers.
- iii) Air Separator pump with self-priming ('SP') reservoir: Only required if the suction line will be empty at start-up. E.g. when the liquid level is below the inlet of the pump.

Unless you inform us that the pump is for a scavenging or road tanker unloading duty then we will assume you require a flooded suction centrifugal pump.

Liquid Ring Pumps

MDM Pumps Ltd also assembles and tests liquid ring pumps using parts manufactured in the EU. These self-priming pumps have been designed to handle a wide range of liquids including liquids containing air bubbles and foam. See 'Liquid Ring Pumps Versus Centrifugal Air Separator Pumps' document.

Strainers and Vent Valves

MDM Pumps Ltd also manufactures strainers, air escape ('AE') vent valves and air pass ('AP') vent valves.

3. Flow

If you specify two different flows, please identify whether this is because the flow is approximate or whether the pump is to operate at both flows.

Unless otherwise specified, the term 'gallons' will be taken to mean [UK gallons](#).

4. Differential Head

Differential Head = Discharge (Outlet) Head – Suction (Inlet) Head

If you give us separate suction and discharge head (or pressure) figures, please give us the 'worst case'. I.e. the *minimum* suction head available and the *maximum* discharge head required. You must tell us if the suction pressure is less than 0 gauge.

If you give us a single head (or pressure) figure, we will take this to be the *differential* head (or pressure) required.

If you specify two different head figures, please identify whether this is because the head is approximate or whether the pump is to operate at both heads.

If you have specified two different flows and two different heads, we shall assume that the *lower* head is required at the *higher* flow and the *higher* head at the *lower* flow, unless you tell us otherwise.

What is 'Differential Head'?

We cannot tell you what discharge head a pump will provide unless you tell us the suction head (the head at the pump inlet). Think of a pump as 'adding' head to your system. For example, imagine a pump that 'adds' 20m head. If the head at the pump inlet is 5m then the discharge head will be 25m. The amount of head that the pump 'adds' to the system is called the 'differential head'. So, what we need to know is not what discharge head you require, but how much head would you like the pump to add to your system.

Differential Pressure

Differential Pressure = Discharge Pressure – Suction Pressure

If you give us pressure figures, we calculate the corresponding head figures for you, provided that you let us know the density (specific gravity) of the liquid (see 6 below).

Product Information

5. Description Of Product

Please tell us:

- The name of the product;
- If the product contains any caustic (acidic or alkaline) chemicals.
- If the product contains salt (sodium chloride = NaCl) or any other chlorine compound.

Don't forget to consider what chemicals will be used during a CIP (Cleaning In Place) process. Possibilities include hypochlorite (OCl-) and dichloromethane (methylene chloride) solvent.

WARNING: chlorine compounds corrode stainless steel.

- If the product might crystallise or leave deposits when exposed to the atmosphere.
Examples include sugar solution/syrup, certain types of oil, concentrated citric acid or concentrated hydroxide (OH-) solution.
- If the product might contain any solids. If so:
 - i) Are the particles deformable?
 - ii) Are the particles abrasive?
 - iii) Please state the maximum size of particles.
 - iv) Please state the density of the individual particles or confirm that the density you have given for the product to be pumped takes into account the particles.
- The *maximum* concentrations (percentages, weight for weight, or molarities) of any mixtures, solid suspensions, or solutions (e.g. "Solution of 5% glycol in water"). For sugar solutions/syrups the percentage concentration of sugar, weight for weight, is known as the °Brix.
Bear in mind that, although a liquid may contain an average of, say, 10% solids, if those solids settle at the bottom of the tank, at some point the liquid passing through the pump may contain a much higher percentage of solids.
- If the product is dangerous (flammable, toxic, corrosive or oxidising).
- If the product has a boiling point that is lower than water.
- The minimum specific heat capacity of the product, if an ATEX certificate will be required.

The specific heat capacity is the energy (in kJ) required to increase the temperature of 1kg of the liquid by 1 °C (1K). We will assume a specific heat capacity equal to that of water at 22 °C, ie. 4.2 kJ/kgK, unless you tell us otherwise.

Note: If the product is for CIP (Cleaning In Place).

If you do not provide a product description or simply say that the product is 'caustic', then we will assume a solution of potassium hydroxide (KOH) or sodium hydroxide (NaOH) in water at a concentration of 2%. If you simply say that the product is 'acidic' then we will assume phosphoric acid (H₃PO₄) at a concentration of 2%.

6. Density / Specific Gravity Of Product

We shall assume a product density equal to that of water at 22 °C, ie. 998 kg/m³ (0.998 g/cm³, kg/l or kg/dm³; s.g. 1.0), unless you tell us otherwise.

7. Viscosity Of Product

We shall assume a viscosity equal to that of water at 22 °C, ie. 1 cP, unless you tell us otherwise.

If more than one temperature or a range of temperatures has been provided (see 8 below), please be sure to tell us the *maximum* viscosity (usually the viscosity at the lower temperature).

8. Temperature(s) Of Product

You must tell us if the maximum temperature of the product if this is over 40 °C.

Further Information Required

9. Internal Surface Finish (Wetted Metal Parts)

What internal surface finish do you require? Do you require the wetted metal parts to be electropolished or passivated?

10. Pipework Size

Please tell us the diameter (e.g. 1") of both your suction and your discharge pipework. Unless you tell us otherwise, we will assume 16 s.w. gauge for pipe diameters up to and including 4".

11. Connections (Size and Type)

What connections type do you require and what sizes would you prefer for the suction (inlet) and discharge (outlet)?

12. Drain Requirements

Do you want the pump to be fitted with a drain? If so, do you require a simple drain fitting or do you want us to weld a drain valve directly into the pump casing? What drain orientation do you require and what should the size and type of the connection be?

13. Mounting

Where a pump-and-motor unit is to be cleaned with a high-pressure hose, we recommend that the motor be protected by a cowl.

If there is a risk of an alloy motor being splashed by a caustic (acidic or alkaline) liquid, or a liquid containing a chlorine compound such as salt then we recommend that the motor be protected by a cowl.

If you are requesting a replacement or standby for an existing pump, and would like to use the existing cowl, be sure to request that the new pump be 'suitable for existing cowl'.

Do you require an acoustic ('AK') cowl for reduced noise?

14. Motor Specification

What prime mover do you require: electric, petrol, diesel or air?

If there is a risk of a motor being splashed by a caustic (acidic or alkaline) liquid, or a liquid containing a chlorine compound such as salt then, if you do not want a cowl, you should request a motor with a cast-iron frame.

Do you require an EFF1 motor, for example to qualify for *The Enhanced Capital Allowance Scheme (ECA) For Energy-efficient Products*?

Do you require the pump to be operated with a VSD (Variable Speed/Frequency Drive)? If so, unless you request otherwise, we will assume that an inverter will be supplied by others.

Is the operation intermittent? If so, what will the maximum number of stop-starts per hour be? If the operating cycle is regular, tell us the how long the pump will be run for and how long it will be stopped for during each cycle. All this information is particularly important if you will require an ATEX certificate. We will assume that the operation is continuous, unless you tell us otherwise.

We can supply a pump kit (bare-shaft pump) if required, so that you can fit the motor yourself.

15. Location and Ambient Conditions

What are the ambient conditions?

Is the pump to be used indoors or outdoors?

Is the pump to be used in any special environment? For severe climatic conditions special protective measure are recommended. Examples of such conditions include hot, high altitude, wet, humid, extremely dusty, aggressive industrial atmosphere or coastal climate. Please advise us if the pump is to be used in a potentially explosive atmosphere.

Unless you tell us otherwise, we will assume:

- the atmosphere is:
 - 0°C to 40°C;
 - non-hazardous (e.g. not potentially explosive);
 - non-humid;
 - non-saline;
 - not dusty.
- the pump will be located 0 to 1000m above sea level;

- the pump is to be used indoors.

If the ambient temperature or altitude is higher, then cooling of the motor becomes less effective and the maximum power at which the motor can be operated is reduced.

16. Documentation and Standards

Do you need any documentation or want us to comply with any special standards? See 'Pump Standards' document.

17. NPSHA (Net Positive Suction Head Available)

NPSHA is important for applications such as CIP, WFI and wort.

Unless you tell us otherwise, we will assume that your system will provide sufficient NPSHA to prevent the pump from *cavitating* (i.e. when the liquid vaporises inside the pump).

If the temperature of the liquid being pumped is greater than 40°C or if the suction pressure is less than 0 gauge, then you must either tell us the minimum plant NPSHA or both the maximum temperature of the liquid and the minimum plant suction head¹ at that temperature.

Note: NPSHA and suction head are not the same thing. When giving values please be sure which information you are giving. If in doubt, please ask for assistance.

Plant NPSHA = Plant Suction Head¹ - Vapour Head²

¹After taking into account the atmospheric pressure (i.e. it must be an absolute value) and also the pressure losses in the suction pipework.

²Vapour pressure of product, converted into metres head of liquid.

18. Seals

We will recommend the mechanical seal that we believe is most appropriate for your requirements, *based on the information you supply to us.*

Will you require a *low pressure flush arrangement* (also known as a 'quench')? You should consider this if there is the possibility of the product crystallising or leaving deposits when exposed to the atmosphere.

Will you require a *high pressure flush arrangement*? This is recommended if you wish to pump a dangerous (e.g. flammable, toxic, corrosive or oxidising) or abrasive product.

19. Maximum Noise Level

Is there a maximum allowable noise level? Unless you tell us otherwise, we will assume that any maximum noise level you state corresponds to the noise level at the duty flow, and, for pumps operated at variable speeds, at the operating frequency needed to achieve the duty point.

20. Performance Characteristic

Please let us know if you have a special requirement for a steep or flat characteristic pump curve.

If a pump has a flat characteristic, then the pump can operate over a wide range of flows without a significant change in the differential pressure it provides. Conversely, if a pump has a steep characteristic, the differential pressure provided by the pump will vary significantly over a range of flows.

How To Obtain Information About An Existing MDM Pump

To provide you with a spares quotation or other information about an existing product manufactured by *MDM Pumps Ltd*, we need to know the serial number. *Without the serial number, the information we can provide is very limited.* It is stamped in two places:

- 1) On the top of the pump, between the clamp ring and the motor. **Every pump has a serial number.** At first glance it may appear that your pump does not have one, but if you look carefully you will find it. Sometimes a pump has been disassembled and then rebuilt with the number on the side or on the bottom.
- 2) On the standard MDM name plate, located on the motor or the cowl.

If the serial number on the cowl is different from that on the pump itself, then the number on the pump will be the most reliable, since the cowl may have been taken from another pump.

The serial number is typically of the form:

yyXpp-An

'yyXpp' is the MDM reference number for the order, where 'yy' is the last two digits of the year of manufacture (e.g. '98' for 1998), 'X' is a capital letter and 'pp' are two further digits.

'An' is the pump sequence number (i.e. A1 to A9) for that order.

For example, if an order was placed in 1998 for three pumps, then the MDM order reference number might be something like 98Q27, and the pump serial numbers would be 98Q27-A1, 98Q27-A2 and 98Q27-A3.

Technical Information

UK Gallons

1 UK gallon (10lb water at 22°C) = 4.5461 litres (dm³)

1 m³ = 219.97 UK gallons

$1\text{m}^3 \approx 220\text{ UK gallons}$

USA Gallons

1 USA gallon (231 cubic inches) = 3.7854 litres (dm³)

1 m³ = 264.17 USA gallons

$1\text{ UK gallon} \approx 1.2\text{ USA gallons}$

AISI 316L is equivalent to:

United Kingdom:	<i>BS 1449 : Part 2 : 1975</i>	<i>316S12</i>
	<i>BS 970 : Part 4 : 1970</i>	"
France:	<i>AFNOR</i>	<i>Z2CND17-12</i>
Germany:	<i>Deutsche Stoff No.</i>	<i>1.4404</i>
Italy:	<i>U.N.I.</i>	<i>X2CrNiMo1713</i>
Japan:	<i>J.I.S.</i>	<i>SUS 33</i>
Sweden:	<i>S.I.S.</i>	<i>2353</i>

AISI 316 is equivalent to:

United Kingdom:	<i>BS 1449 : Part 2 : 1975</i>	<i>316S16</i>
	<i>BS 970 : Part 4 : 1970</i>	"
France:	<i>AFNOR</i>	<i>Z6CND17-11</i>
Germany:	<i>Deutsche Stoff No.</i>	<i>1.4401</i>
Italy:	<i>U.N.I.</i>	<i>X5CrNiMo1713</i>
Japan:	<i>J.I.S.</i>	<i>SUS 32</i>
Sweden:	<i>S.I.S.</i>	<i>2343</i>

AISI 304 is equivalent to:

United Kingdom:	<i>BS 1449 : Part 2 : 1975</i>	<i>304S15</i>
	<i>BS 970 : Part 4 : 1970</i>	"
France:	<i>AFNOR</i>	<i>Z6CN18-09</i>
Germany:	<i>Deutsche Stoff No.</i>	<i>1.4301</i>
Italy:	<i>U.N.I.</i>	<i>X5CrNi1810</i>
Japan:	<i>J.I.S.</i>	<i>SUS 27</i>
Sweden:	<i>S.I.S.</i>	<i>2332</i>