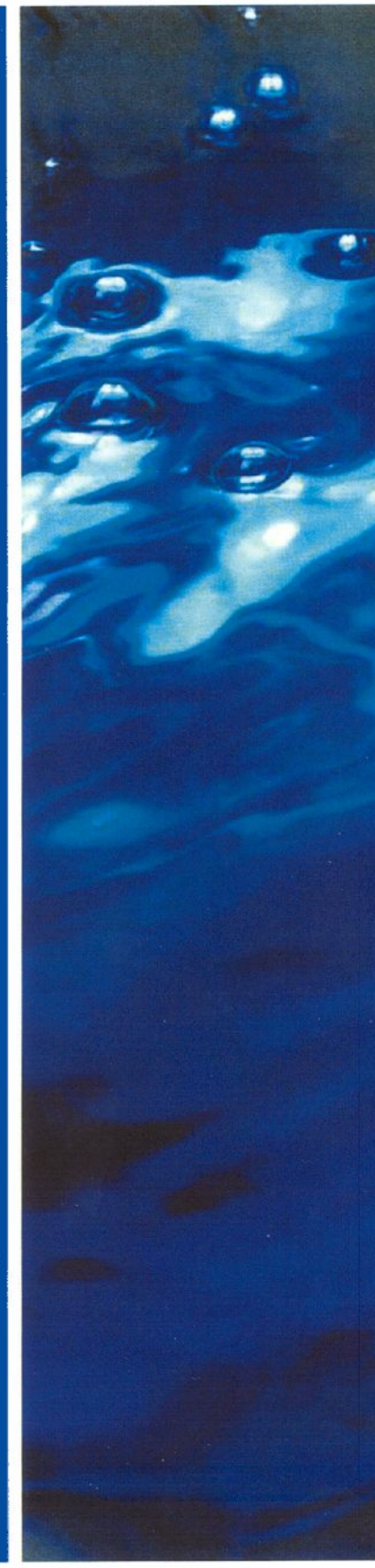
VERDER

HOSE PUMPS

Safety, Operation & Maintenance Manual
(Product Range VF5 - VF80)

Version 2



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Disclaimer of Warranty and Limitations of Liability

This pump is warranted against defects in workmanship and material under normal use (rental use excluded) for two years from date of purchase. This is to the extent that VERDER will at its option replace, repair or refund, in full, the purchase price of the instrument of any part thereof manufactured by VERDER, which in our opinion is defective. Also provided the instrument has been operated in strict accordance with this manual, and has not been subjected to tampering, abuse or exposed to highly corrosive and/or unspecified explosive conditions.

This warranty does not cover the conditions arising as follows:

- Failure of VERDER manufactured parts or components including hose, due to normal wear / damage or failure, that in VERDER's judgement arises from misuse
- Failure to implement the necessary safety procedures for use in the European Community of a pump within an explosive atmosphere as laid down in latest EC Atex directive from 1st July 2003
- Failure to disclose the (intended or unauthorized) use of a pump within a known explosive atmosphere

VERDER MAKES NO WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING, WITHOUT LIMITATION, ANY WARRANTIES OF FITNESS OR MERCHANTABILITY, EXCEPT AS EXPRESSLY SET FORTH ABOVE. VERDER SHALL NOT BE LIABLE FOR ANY INJURIES, LOSSES OR DAMAGES INCLUDING, BUT NOT LIMITED TO ANY PERSONAL INJURIES, ANTICIPATED OR LOST PROFITS, INCIDENTAL DAMAGES, CONSEQUENTIAL DAMAGES, COSTS, TIME CHARGES, OR OTHER DAMAGES OR LOSSES, IN CONNECTION WITH THE INSTRUMENT, ITS USE OR ANY REPLACEMENT PARTS THEREFORE

This warranty is voided if the customer fails to follow any and all instructions, warnings or cautions in this VERDERFLEX Hose Pump Safety, Operation and Maintenance Manual. VERDER has made every effort to illustrate and describe the product(s) in this manual. Such illustrations and descriptions are, however, for the sole purpose of identification and do not express or imply a warranty that the products are merchantable or fit for a particular purpose, or that the products will necessarily conform to the illustration or descriptions

If a manufacturing defect is found, VERDER will replace or repair the instrument or replace any defective part thereof without charge. However, VERDERS obligation hereunder does not include the cost of transportation of the instrument to VERDER or its return to the customer; these costs must be borne by the customer. VERDER assumes no responsibility for damage in transit, any claims for such damage should be presented to the carrier by the purchaser. In addition, instead of replacing or repairing the instrument as aforesaid, VERDER may, at its sole option, take back the defective instrument and reimburse the customer for the purchase price in full settlement of any and all potential claims related to the purchase or use of the VERDERFLEX hose pump

CHAPTER 1: Introduction

The VERDER Group are process technology specialists with offices in Austria, Belgium, the Czech Republic, France, Germany, The Netherlands, Norway, Poland, Romania, and the UK. A network of distributor agents worldwide supports this. The Group's headquarters are in The Netherlands with over 400 staff are employed around the world

VERDERS in-house designers and application engineers have developed a new generation of products, the VERDERFLEX range of hose pumps, which are manufactured by VERDER's own production team. These hose pumps are flagship products for the VERDER Group and as such, VERDER is fulfilling its responsibilities and commitment to the fullest safety of customers using these pumps by providing this Safety, Operation and Maintenance Manual. Full product training and documentation is available, and VERDER takes no responsibility for malfunction of the pump caused by ignorance of the operating procedures; if your operators do not read and understand this manual, they are not considered by VERDER to be qualified to assemble, install, operate or maintain this equipment. As any pump is no more or no less than one component part of an overall process system, it is essential for the successful completion of your total process for the pump to be working to its fullest potential, and for the operator to be fully conversant with the operating principles of a hose pump in general and a VERDERFLEX in particular

VERDER markets all products wherever possible under its own brand, and strives to maintain quality standards based upon ISO 9000 standards

It has always been VERDER policy to supply its documentation in a number of languages and software options, and your VERDER distributor will be able to organize this for you

VERDER recognizes its responsibilities to its customers around the world, and will always seek to meet or exceed their expectations. Customer comments and feedback are always warmly welcomed and input to the development of procedures and products, is common. Should you have any issues on which to comment, please return your comments to your local VERDER distributor who will then forward them for action to VERDER.

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CHAPTER 2: Safety Issues

2.1 Safety Alert Symbol



The symbol shown above is used to identify topics of primary safety concern and call attention to instructions concerning your personal safety. Watch for this symbol, it involves important safety precautions, and means " ATTENTION! BECOME ALERT! YOUR PERSONAL SAFETY IS INVOLVED!"
Read the message that follows and be alert to the possibility of personal injury or death

2.2 Signal Words

Signal words designate a degree or level of hazard seriousness. They are used in this manual in accordance with ANSI Z535.4-1991 and are defined as follows:



- Indicates an imminently hazardous situation, which, if not avoided, will result in death or serious injury. This signal word is limited to the most extreme situations



- Indicates a potentially hazardous situation, which, if not avoided, could result in death or serious injury.



- Indicates a potentially hazardous situation, which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices. It may also be used for property damage-only accidents.

2.3 Safety First

- The information in this manual is essential for the safe operation and servicing of VERDERFLEX pumps. This manual must be read and understood in particular all of section 6 for operation in normal and explosive atmospheres, before operating or servicing such pumps
- The employer shall instruct each employee in the recognition and avoidance of unsafe conditions and the regulations applicable to his work environment to control or eliminate any hazards or other exposure likely to cause injury
- It is understood that safety rules within individual companies vary. If a conflict exists between the material contained in this manual and the rules of a using company, the more stringent rules should take precedence
- This manual should be kept available to operating and maintenance personnel. Additional copies of this manual may be acquired free of charge from VERDER via your distributor
- Safety suggestions from users will be given the most serious consideration. This is especially true of advice for minimising problems associated with safety misuse, which cannot be identified in advance during the production of the pump unit. Comments and recommendations should be submitted to VERDER via your distributor.
- Throughout this manual these safety instructions are repeated, together with other safety notes and tips. The relevant information will act as a guideline for you in operating the pump; alternative courses of action are also described should you be unable for any reason to follow those procedures initially given for any procedure. You are advised to follow these guidelines to achieve maximum efficiency

2.4 Pump Safety Features

The VERDERFLEX has a number of in-built features, which have been designed specifically to ensure your safety during operation and maintenance of the unit:

- Disaster proof design – the casing will contain any spillage preventing leaks and contamination of product
- Low and high level controls for automatic cut out (optional);
- Lubricant drain ensures that used lubricant drains away fully;
- Use of food grade, top quality VERDERLUBE lubricant;
- Use of taper locks for easy handling, and
- Designed for safe and easy assembly and maintenance

Safety instructions and guidance are divided into operational safety, maintenance safety and safety advice for assembly, installation and commissioning, with each category having its own rules and philosophy. This section covers operational functions that are reasonably foreseeable. Many warnings and admonitions are included in this manual; unfortunately there are too many to incorporate into “on unit” labels. For this reason it is essential that the manual be treated as part of the product and made mandatory reading for personnel associated with the product and system

2.5 Operational Safety



- Always isolate the power supply before working on the pump



- Never place hands or other parts of the body inside or near any part of the pump when it is in operation or when the power is not totally isolated



- When the pump is running, you should not touch the pump and should maintain an adequate safe distance around it
- Do not climb onto the pump or connecting pipe work

Maintain a clean environment around the pump. The VERDER pump is manufactured from cast iron, and therefore the flanges and casings etc may have sharp edges - slipping or falling against the pump may cause serious injury

Wear safety clothing (hats, gloves boots, etc) when operating or working on the pump or in its immediate vicinity.

2.6 Maintenance Safety



- Always isolate the power supply before working on the pump



- Always follow the safety procedures for handling the product being pumped
- If the hose has ruptured, the lubricant may be contaminated with product – care must be taken to handle the mixture appropriately
- Do not stand near the pump while the hose is being removed – if the hose is expelled too quickly, it could cause serious injury
- Never try to install a hose without the front cover in place
- Never remove the front cover when the hose is still in position
- When removing the front cover of the VF50 - 80, lifting equipment should be used to support the weight. Always use lifting equipment safely in accordance with the manufacturer's recommendations. The pump is provided with a lifting eye, which can be fitted into the threaded hole of the front cover, (located by removing the top left of centre front cover fastening bolt) to assist with lifting. Take care not to drop the front cover as this is likely to cause serious injury
- Do not stand in the immediate vicinity of the pump when operating with the inspection cover removed; follow safety procedures for operation of pump with inspection cover off
- Care should be taken to support the weight of the rotor shoe whilst the bolt is being removed – similarly care should be taken not to drop the shoe after removal from the pump rotor
- Extreme care must be taken when removing the rotor. When the rotor comes away from the pump shaft, it will tend to swing out on the lifting equipment, potentially causing serious injury - stand well clear

2.6.1 Long Coupled Assemblies



- Do not strike the pump shaft, the inner race or the bearings
- Once installed, the bearings are greased for life; do not lubricate after installation

2.7 Assembly, Installation and Commissioning

- A qualified electrician should be consulted on operations where there may be risk of electrical hazard



- Always isolate the power supply before working on the pump
- Check compatibility of the hose material with the product being pumped
- Check compatibility of the lubricant with the product being pumped
- Do not over grease the front cover O-ring. If the grease contaminates the VERDERLUBE, the performance of the hose may be affected
- At all times the pump must be between one third and one half full with VERDERLUBE lubricant
- Check all nuts and bolts are tightened to the required torque settings in `Parts List`



YOU ARE ADVISED TO FOLLOW AND COMPLY WITH THE SAFETY INSTRUCTIONS FROM VERDER FULLY – IF YOU DO NOT, YOU RUN THE RISK OF SERIOUS OR FATAL INJURY TO THE OPERATOR. IF YOU DO NOT UNDERSTAND ANY ITEMS, THEN YOU SHOULD NOT PROCEED UNTIL YOU HAVE CLARIFIED THE POINTS WITH YOUR DISTRIBUTOR.

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CHAPTER 3: Theory of the Pump

3.1 Working Principles

The pump is simple by design in its construction and operation. The medium to be pumped does not come into contact with any moving parts and is totally contained within a robust, heavy-duty hose, which consists of an inner layer, two - six reinforcement layers and an outer layer. A rotating shoe passes along the length of the hose, compressing it totally closed. This motion forces the contents of the hose directly in front of the rotating shoe to move forward along the length of the hose in a 'positive displacement', peristaltic movement. In the wake of the shoe's compressing action, the natural elasticity of the nylon reinforced rubber forces the hose to open and regain its round profile, creating suction pressure, which recharges the pump

3.2 Features of a Hose Pump

- Dry running - the pump will run dry without damage
- The hose effectively forms an integral part of the suction & discharge lines, connected externally by flange or hose-tail connectors ensuring zero leakage
- Self priming - the pump will prime itself to 95% vacuum (equivalent to a suction lift of 9.5m of water)
- High solids content handling - the pump is capable of handling media with a high proportion of solids and with large particle sizes
- Viscous liquids - pumps are capable of dealing with fluids up to 47,000 mPas (cPs)
- High differential pressures: the pump is capable of continuously running at pressures up to 15 bar / 220 PSI
- Few moving parts - there are no valves or joints, reducing the possibility of malfunction
- Low maintenance - the main wearing part in the pump is the hose, which can be replaced quickly, easily and inexpensively
- Non shearing - delicate media can be pumped effectively with little or no damage

3.3 Advantages of VERDERFLEX

- Compact, close coupled design, or robust long coupled option
- Rigid housing design for heat dissipation and accurate hose compression
- Quick fit flange design clamps and seals in one easy movement to speed hose replacement
- Drainage channels in the casing enable complete removal of all lubricant prior to maintenance
- Filler tube on rear of housing to prevent damage
- Taper lock bush in rotor enables various gearbox / motor drives to be fitted
- Hose construction provides for more efficient lubrication and longer life

Conforms to and is certified to EHEDG Standards and so can be used within the intermediate processes of the food & drinks industry, pharmaceutical industry and other hygienic related applications

The pump has the following features in addition to the ones already mentioned which are applicable for use within these industries:

- No moving parts in contact with the product
- Hygienic Stainless Steel Port Flanges & Integral hose inserts certified to EHEDG standards
- Meets the EHEDG specifications for CIP (Clean In Place) pumps. This means it can be cleaned without having to dismantle it
- Food grade hose

3.4 Product Range

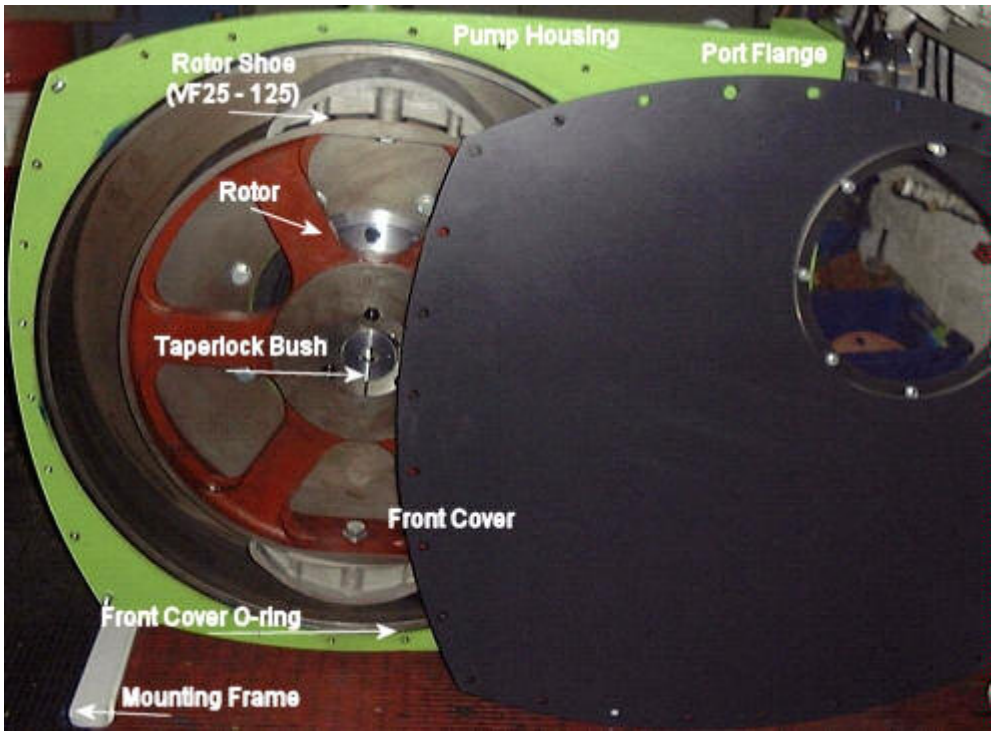
The VERDERFLEX pumps are sized and named according to the internal bore diameter of the hose. The range starts with the 5mm & 10mm diameters of the VF10 unit, and incorporates a total of 10 models, up to the 125mm diameter VF125 (please note that this manual refers to the VF10 - VF80 range only)

All pumps are capable of operating up to 15 bar / 220 PSI with a pumping capacity of up to 80 m3/hr / 360 GPM (for a single unit). Closed-coupled versions are compactly designed and offer great size, weight and cost advantages; the long coupled versions are robust and flexible in drive selection

3.5 Pump Construction

As indicated in Figure 1, the VERDERFLEX pump unit is one of the most simple, yet most robust designs of its type, with very few actual moving parts:

Figure 1



The pump housing is terminated with DIN PN16 flanged connections (optional ANSI / JIS and hose-tails (hose barbs) on VF10 and VF15 units). Within the housing is a rotor and two rotor shoes. This assembly is rotated, causing the shoes to compress the reinforced hose, which displaces liquid to generate the pumping action.

The housing provides support for the hose whilst under compression from the shoe / rotor assembly. A flange / insert mechanism is used to retain the hose position within the housing. The flange uses a split collet design to clamp and seal the hose in the casing. The rotor runs in a lubricant bath, which is filled either through the inspection cover or via a pipe at the rear of the housing. Overall the unit is designed to enable simple assembly and maintenance

The pumps can be coupled to the drive gearbox motor unit in 2 different ways; either close coupled (direct) or long coupled. The following is a brief description of the 2 variants.

Close-coupled design

The gearbox/motor unit is directly attached to, and supported by, a flange mounting at the rear of the housing (Figure 2). The rotor and shoe assembly is fastened to the gearbox output shaft via a taper lock bush

Figure 2



Long coupled design

A bearing housing assembly is directly attached to, and supported by a flange mounting at the rear of the housing (Figure 3). The rotor/shoe assembly is fastened to the bearing housing assembly output shaft via a taper lock coupling. The gearbox/motor unit is supported by a base plate, which forms an integral part of the frame, and is attached to the bearing housing assembly-input shaft via a coupling.

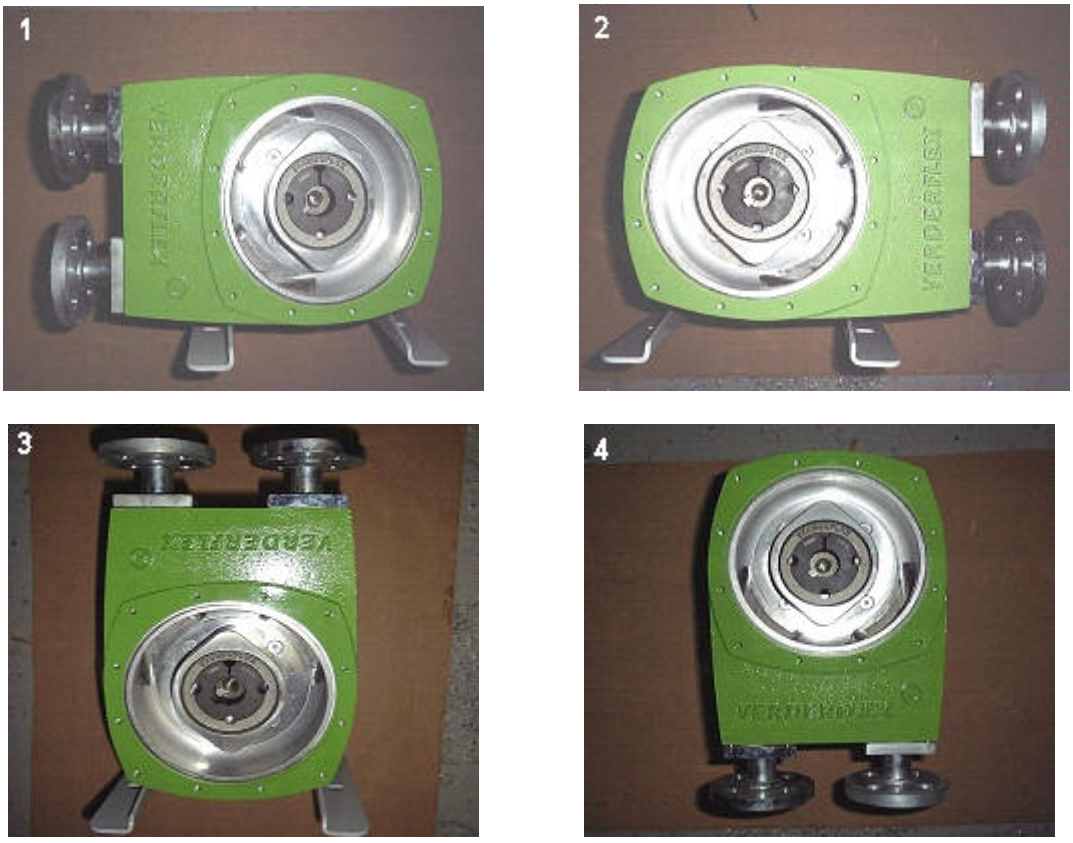
Figure 3



Mounting Options

The assembled housing is mounted on a support frame in any one of four positions (as indicated in Figure 4). A change in direction of rotation can give the option of using both flange connections as either suction or discharge ports

Figure 4



3.6 Limitations of the Pump

VERDER is strongly committed to the belief that the customer must always be given as much information as possible in order to make the best possible pump selection. For this reason the list below contains details of the few VERDERFLEX limitations:

- Hoses are available in Natural Rubber; Nitrile Buna rubber; EPDM rubber & CSM (Hypalon Ò). This selection is suitable for the majority of applications, but there remain some products, which are not compatible with the hose material;
- Hose pumps often appear bulky and large in size when compared to other positive displacement pumps with moderate flow rates;
- When compressing the hose, the overall volume of the sliding shoe causes the volume of the suction line to be transferred to the discharge line, temporarily stopping the flow in both the suction and discharge lines;
- Pulsation dampeners are needed occasionally as an accessory if:
    - the lines are hammering;
    - lines are smaller than size of pump
    - the process is hammering;
    - lines are long
    - severe pulsation is noticed;
    - product as a high SG
- The capacity of the pump may drop below nominal due to high impulse losses on the suction or discharge side:
    - The maximum impulse loss possible on the suction side is 40 kPa/6 PSI;
    - The maximum impulse loss possible on the discharge side is 750 - 1200 kPa/105 - 170 PSI, dependent on the pump type

3.7 Pump Selection

Pumps can be used to deliver higher capacities and are recommended for intermittent use only to enable the dissipation of heat, which is generated by high speed and pressures. The actual capacity of the pump depends upon the speed at which the rotor revolves. The pump's speed and consequent output achieved will depend on many factors:

- Is the medium being pumped aggressive, abrasive, viscous or shear sensitive?
- What type of use is required for the pump, all day every day or short, periodic use?
- Is the system a high or low-pressure system?
- Is the medium being pumped at a high or low temperature?
- What is the solid content - percentage of solids, shape and size of particles?

All these factors should be taken into consideration when selecting the pump size and speed of operation. If you have any reservations, do not hesitate to contact your local VERDER distributor, who will be more than pleased to offer professional, expert advice and recommendations to ensure you get the optimum pump for your application

3.8 VERDERFLEX Hose

To complement the hose pump, VERDER has developed the VERDERFLEX hose for continuous operation. Tests have shown that these hoses have significantly greater serviceable life in comparison to materials used in competitors' hoses, and are able to achieve a 95% vacuum (equivalent to a suction lift of 9.5m)

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CHAPTER 4: Safety, Operation and Maintenance Instructions

4.1 General – tools and facilities

Care should be taken at all times to ensure that any tools are used safely for the purpose for which they are designed and in accordance with the manufacturer's instructions. Ideally the pump should be installed using a drive, with facilities to inch the pump along and which is able to operate in reverse. Any maintenance work will require a complete set of metric spanners, a socket set and torque wrench; you should check your fastener kit to ensure you have all the correct sizes available



Specialist lifting equipment will be required for several of the procedures below (large size pumps only: VF25 - VF80). The lifting equipment to be used should be checked for suitability for the task and capability of lifting the combined weight of the pump components. Always follow the manufacturer's instructions for safe operation of lifting equipment (See Appendix C for guidance)

Pump sizes & weights

Pump Size	***Weight CC kg***	***Typical CC Built Weight kg***
VF25	73	110
VF32	106	160
VF40	196	250
VF50	240	320
VF65	750	975
VF80	850	1100
VF100	2000	2350
VF125	2800	3150

4.2 Assembly

VERDERFLEX hose pumps are sold around the world and are designed to be transported in a compact flat-pack, ready to be assembled in the destination country. Under normal circumstances your VERDER distributor will assemble the pump, but should this not be the case for any reason, you should follow the following procedures:

4.2.1 Preparation



- Prepare the workspace in which the pump is to be built, ensuring there is a clean and level work surface with sufficient room for not only the pump, but also to allow you sufficient access to the pump and fit pipe work, etc
- Carefully open the packaging and check for completeness by ensuring all the parts listed are present (see the exploded view drawings and parts list at the back of this manual); remove all the loose components and set them out on a workbench. It is recommended that the fastener kit is sorted into piles of like items and kept in a safe place to avoid losing parts or using an incorrect part
- If the pump casing or any parts are found to be damaged / wrong spec or missing, then you should record the appropriate serial number from the casing ident. plate and/ or the quality check seal on the packaging, and inform VERDER Ltd

4.2.2 Close/Long Coupled Pump Unit Assembly

- Carefully disassemble the box sides to leave a pallet, on which the pump should be assembled ready for onward transport

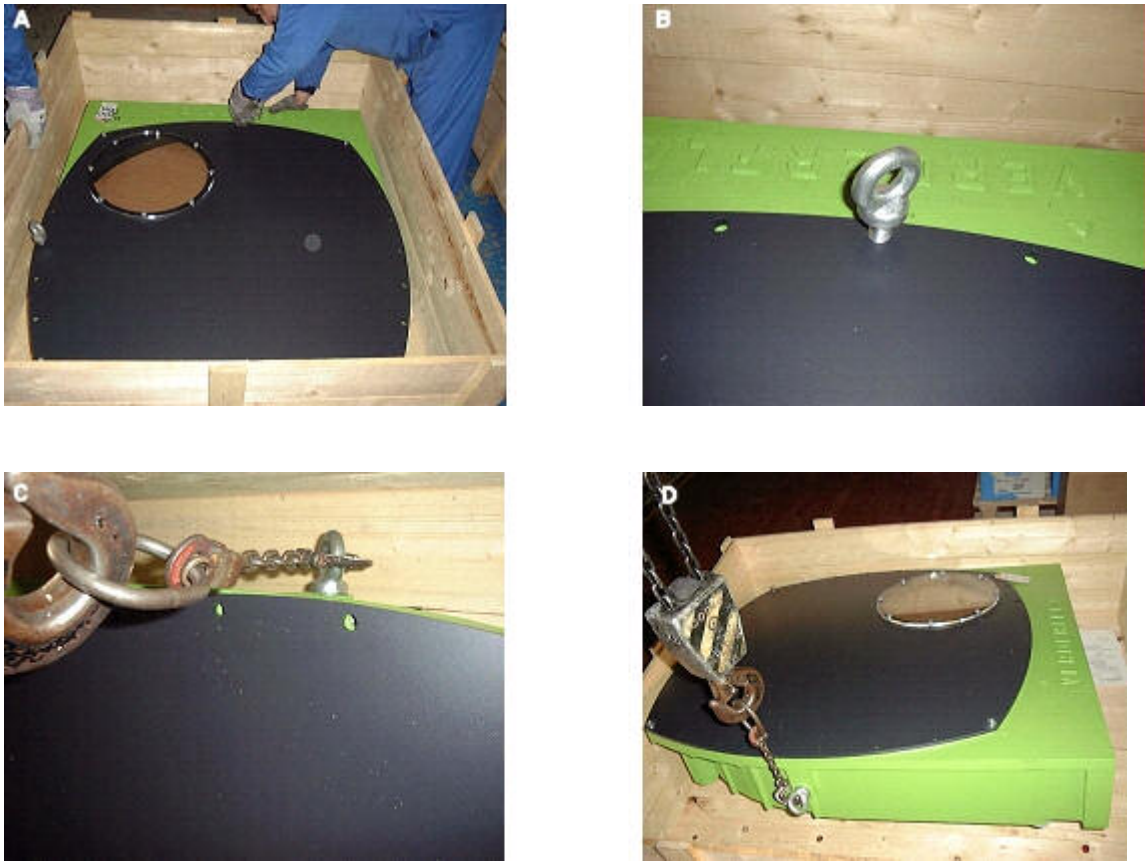


- Fit the lifting eye to the pump housing and lift until it is supported in the vertical position



- Completely remove 3 of the four bolts (VF10 - VF40) or nuts from the studs (VF50 - VF80) leaving the 1 remaining nut or bolt loosely in place to retain the front cover in position

Figure 5a



A - Preparing for front cover lift by fitting lifting eye bolts
B - Lifting eye bolt fitted into 1 of 2 available tapped front cover bolt holes
C- Utilising 1 of 2 available pump case tappings to use a lifting eye bolt
D- Casing assembly being lifted to the vertical position with the eyebolts at the top end to assist front cover removal and prevent damage to the studs

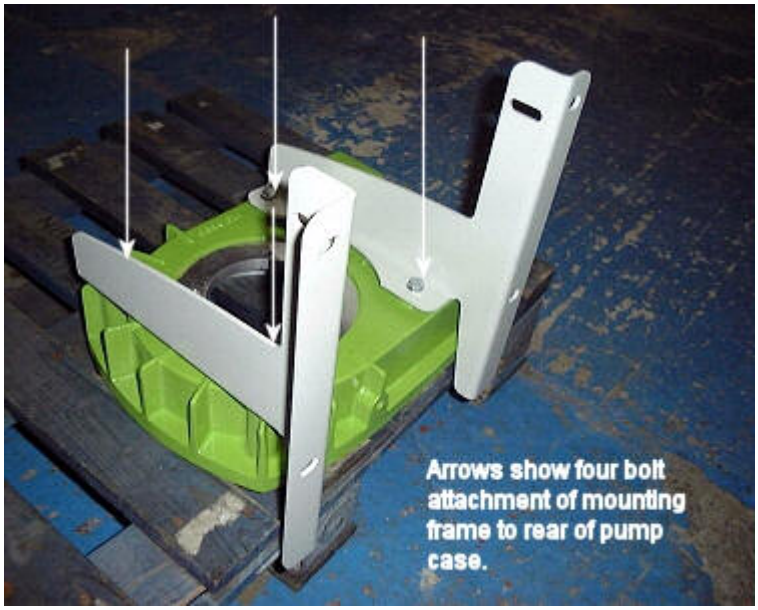
- Lift off front cover by utilizing case lifting eye and placing in threaded lifting hole (Fig.5).
- Remove the drive flange gasket

- Remove the rotor from the housing with the use of suitable lifting equipment
- Remove any remaining spares from the housing

CAUTION

- Using the lifting eye and suitable lifting equipment position the housing onto the edge of the pallet, with the front facing down, as shown in Figure 6

Figure 6



- Lift the side support frames into position, ensuring that the foot section of the frames have the fixing holes on the outside, and bolt to the pump housing. Do not fully tighten at this stage
- Present the cross-members to the support frames (VF25 –80 only) and bolt into position, tightening evenly at the same time as the frame/pump housing bolts. Refer to the torque settings in " Parts List "

Note: With long coupled pumps the base plate replaces the cross-member

Long Coupled Mounting Frame Assembly

On VF10 to VF50 LC pumps, a mounting frame adaptor kit is needed to convert the close-coupled frame into a long coupled frame and yet maintain the current long coupled footprint. The centre floor-mounting hole becomes redundant but can be used for additional fixing. The assemblies are simple bolt on parts of which an example is shown in figure 7a / 7b below

Figure 7a

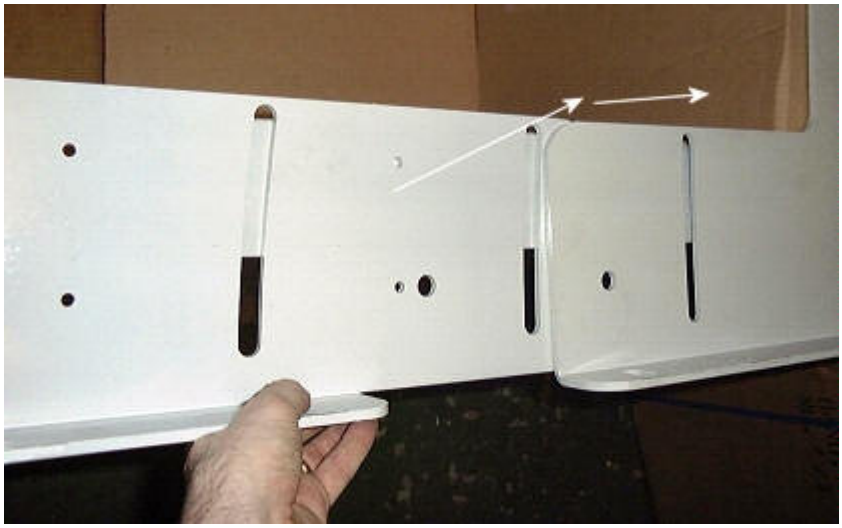


Figure 7b

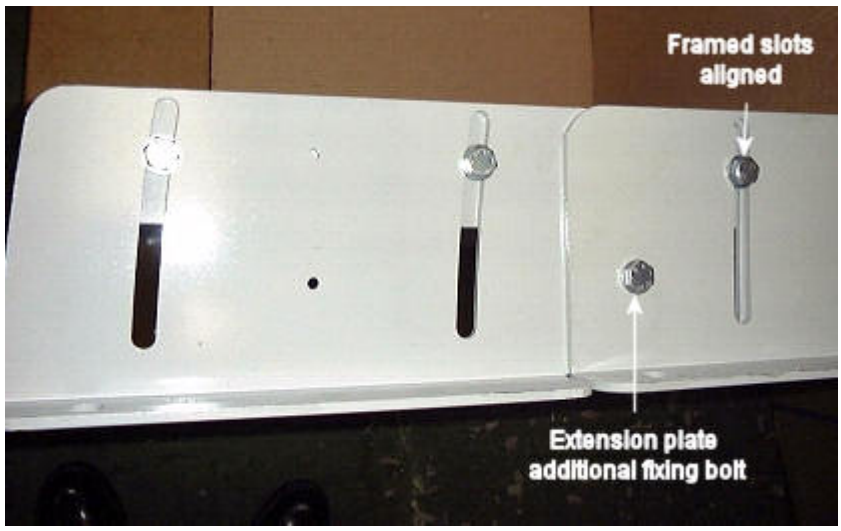


Figure 7b shows the extension plate in place and the slots aligned to accept the base plate mounting bolts.

CAUTION

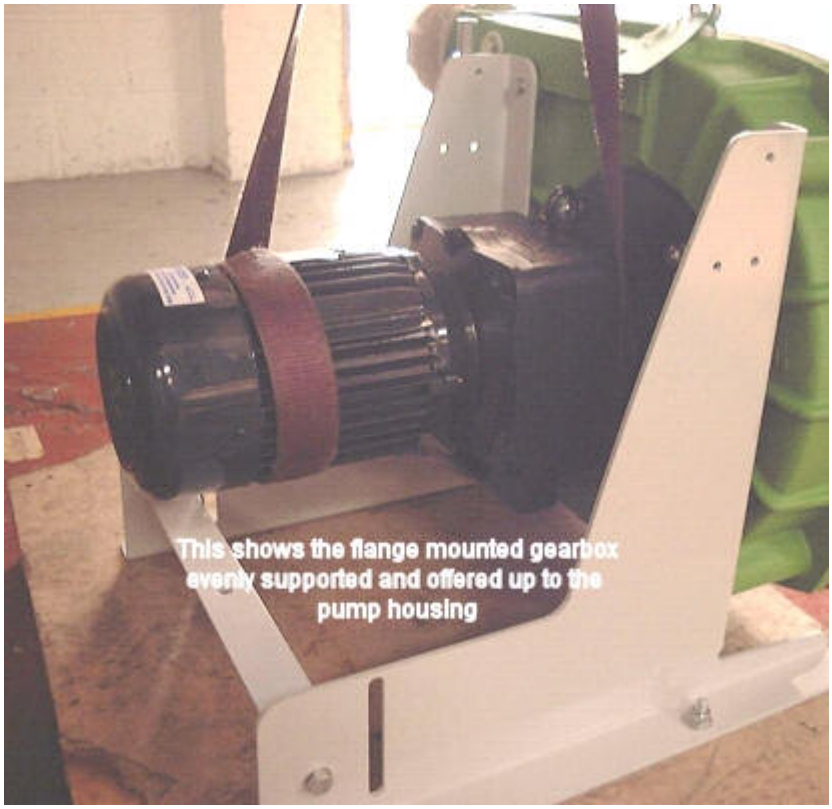
- Lift the pump upright to stand on its frame using the lifting eye provided and the appropriate lifting equipment
- The flange should be coated with a thin protective film of anticorrosion treatment, this does not need to be removed before fitting the gasket. (if the pump has been cleaned during preparation then a light film of grease or gasket sealant should be applied)

Mounting the gearbox

Close-coupled assembly

- Using the appropriate lifting equipment, to ensure the correct lining up of the gear motor unit to the housing flange it is important to ensure that the gear motor unit is in the correct position on the sling, both horizontally and in relation to the fixing holes

Figure 8



- Once the gear motor unit and the pump housing flanges are lined up correctly the fixing bolts and washers are pushed into position. The bolts are positioned so that the bolt head is situated inside the pump housing

Note: The washer under the bolt head should be replaced with a copper or nylon washer if a vacuum unit is to be applied

- Fit the 4 nuts and washers on to the bolts and tighten the nuts evenly to the required torque settings in Appendix D

Rotor Assembly

- Take note of measurement across the NARROW part of the shoe (VF10/15 only)to ensure correct rotor setting in accordance with the table on page 26
- Take the rotor shoes and tap the split dowels into position, then loosely bolt the shoe onto the rotor

Note:
[1]This does not apply to VF10 and VF15 pumps as the rotor's design incorporates the shoe profile.
[2]The VF80 does not have a split location dowel but instead has 2 bolts

Figure 9



- Check the shimming table, to ascertain the correct number of shims for each shoe to produce the required flow at the required pressure, at the speed the pump is to operate
- Insert the required number of shims under each shoe and tighten the bolts to the correct torque setting in "Parts List", ensuring that the shoes and shims remain aligned correctly with the rotor See Figure 09

Note: The shims must be inserted from the front edge of the rotor to enable shims to be removed without taking the shoe off the rotor

- Clean up the output shaft and key with a piece of suitable emery cloth to ensure the rotor slides on to the shaft with relative ease
- Loosen the Allen bolts in the taper lock bush fitted to the rotor. Remove one of the Allen bolts and insert it in to the jacking position, then slowly rotate the screw clockwise to release the bush slightly from the rotor, but do not remove the bush fully from the rotor

Figure 10



- Position the rotor at the front of the pump, with the use of the appropriate lifting equipment, so that the taper lock screws are facing forward, away from the pump. Locate the rotor on to the output shaft and push the rotor on to the shaft ensuring that the shaft key remains in position, and tighten See Figure 10

Note: The taper lock bush is a standard Fenner part, which can be changed to fit different diameter output shafts

- To ensure the rotor shoes are centred on the hose, once the pump is running it is necessary to locate the rotor correctly on the output shaft. The distance required between the rotor and the front cover is set out below:

Rotor Distance Set Dimension Table

Dimensions	***VF10***	***VF15***	***VF25***	***VF32***	***VF40***	***VF50***	***VF65***	***VF80***
(mm)	4.0	4.0	12.0	11.0	11.5	11.0	18.5	21.5
(inches)	5/32	5/32	1/2	15/32	15/32	15/32	11/16	13/16

Note: Depending on the model of pump that is being assembled you can either use two metal engineering rules or a long metal straight edge and an engineering rule, to set the rotor distance correctly (see fig.11)

Figure 11

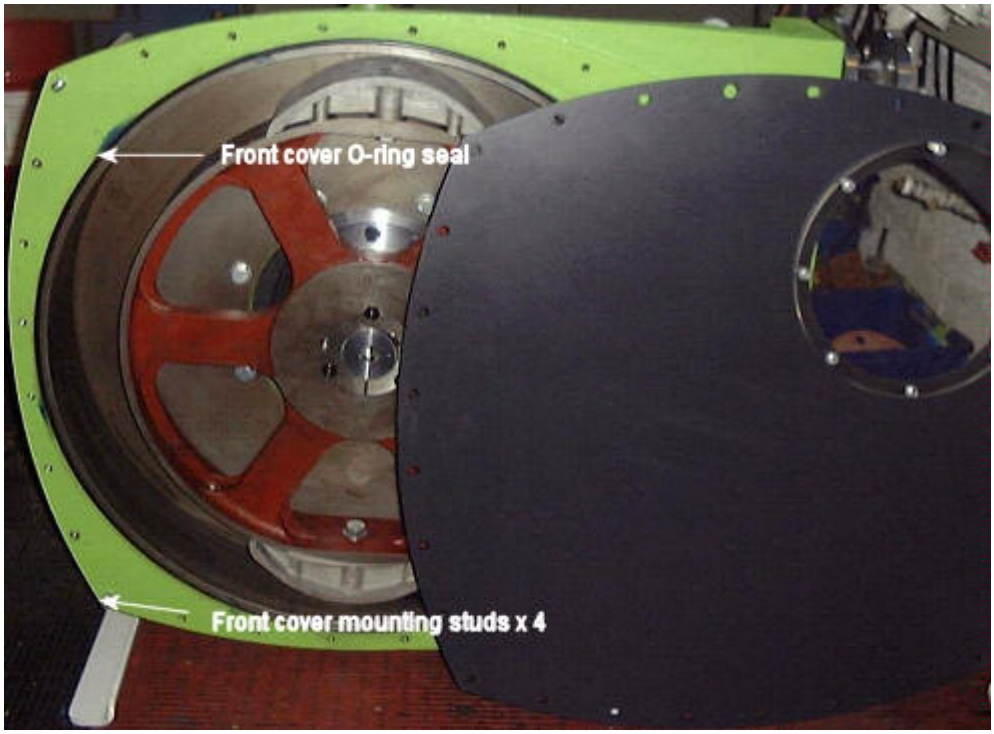


- Align the first rule/straight edge against the machined front of the pump housing, then take the other rule and hold it perpendicular from the outer edge of the rotor (not the shoe) and the first rule/straight edge (see Figure 11). With the use of a soft-faced hammer, tap the rotor/bush on to the shaft until it is positioned correctly to give you the required setting distance (see table on page 26)

TIP

- When the taper lock is tightened up it tends to pull the rotor forward, therefore you need to take this into consideration when setting the distance
- When the correct distance has been achieved insert the Allen bolt back into the fixing position and tighten the Allen bolts to the correct toque setting
- Re-measure the setting distance to ensure the rotor has not moved in excess during the tightening of the taper lock bolts
- Lightly grease the O-ring groove on the machined front of the pump housing - not the total machined face - and place the front cover O-ring in position (the grease is simply to keep the O-ring in position during assembly)

Figure 12



CAUTION

- Lift the front cover into position onto the 4 corner studs (shown in Fig 12), with the use of the lifting eye and appropriate lifting tackle, and hand tighten the four corner nuts (removed earlier). Hand tighten the rest of the front cover bolts, remove the lifting equipment and replace the lifting eye with the remaining front cover bolt. Work around the front cover tightening all the bolts evenly (in a criss-cross sequence) to the required torque setting in “Parts List”

Drain & Filler Plugs

- Line the thread of the breather tube with PTFE tape and tighten into position to give a leak free seal

Figure 13



- Fit the two drain plugs (Fig.13) with the nylon washers and tighten into position to the required torque setting in Parts List

Figure 14



Arrows show long coupled drive (floor mounted gearbox fittings)

4.3 Installation



Prepare the workspace in which the pump is to be installed, ensuring there is a clean and level work surface with sufficient room for not only the pump, but also to allow you sufficient access to the pump for maintenance purposes and fit pipe work, etc

Lift the pump & gearbox assembly using the appropriate lifting equipment referring to the weights table (chapter 4.1) and eyebolt-lifting guide (page 81)!



The power supply and control panel should be installed. If the pump is to be operated remotely, a separate control panel with STOP and START facilities should be installed near the pump, but at least 3 metres / 9 feet distance from the pump

Pipe work should:

- Be as short and direct as possible;
- Be oversized, especially the suction line;
- Be aligned correctly, free from stress and securely anchored;
- Include a short, removable section adjacent to the port flanges to allow easy access when changing hoses, ideally this should be a flexible non-reinforced hose;
- Include suction and discharge valves (if a discharge valve is fitted, a high pressure safety device will also need to be installed to prevent excess pressure building up when discharge valve is closed with pump running);
- Include drainage taps to allow safe removal of product;
- Include a minimum number of turns and long radius elbows where change of direction is necessary;
- Not be undersized

To install the VERDER hose pump, follow the procedures below:



Lift the pump into position and bolt to foundations securely, ensuring that the pump and drive assembly is supported to enable a balanced, vertical lift



Only a qualified electrician should carry out this task

- Connect the motor to the power supply, following the manufacturer's instructions. Pay attention to the direction of rotation of the pump when wiring the motor
- If not already fitted, install the hose following the procedure described in Section 4.6 on 'Hose Installation'
- To improve hose positioning on installation & removal, the incorporation of an additional facility in the form of a forward/reverse and inch control.



Check compatibility of the hose material with the product being pumped – this should have been verified by your distributor

- If not already shimmed, shim the pump according to the operating pressure required, following the procedure described in Section 4.6 on ‘Shim Installation’;
- Check the level of lubricant;

At all times the pump housing needs to be between one third to one half filled with VERDERLUBE lubricant (this can be verified by use of an external lube level plug fitted to later models*)



Check compatibility of the lubricant with the product being pumped; VERDERLUBE is a specially formulated food grade lubricant containing glycerine. In most cases this is a very stable compound, but can react when mixed with certain types of substance.
Do not use VERDERLUBE with nitrogenous compounds, concentrated acids or strong oxidizing agents

If you are unsure of the chemical compatibility of your product with VERDERLUBE, your VERDER distributor will offer advice and if necessary, supply an alternative such as VERDERSIL, a silicone oil based lubricant

4.4 Commissioning



Check all nuts and bolts are tightened to the required torque settings in `Parts List`



- Before connecting the pump to pipe work, run the pump dry for 10 - 20 revolutions in both directions to ensure that the hose is secured properly. Stop the pump immediately if there are any leaks or other problems
- Connect the pipe work and tighten all fasteners securely
- Close all drainage taps and open all valves



- Start the pump running for 10 - 20 revolutions. Stop the pump immediately if there are any leaks or other problems



- Test pump for leaks and back flow at operating pressure and correct flow rate, as it may be necessary to adjust shimming

4.5 Operation

The pump should only ever be used for the purpose for which it is sold.

For normal continuous operation the pump speed should not exceed the speeds in the following table, unless expressly advised by your VERDER distributor:

VF10	VF15	VF25	VF32	VF40	VF50	VF65	VF80
75rpm	75rpm	100rpm	90rpm	75rpm	60rpm	50rpm	40rpm



Operating pressure should not be altered to operate outside the tolerances recommended by your VERDER distributor



When the pump is running, you should not touch the pump and should maintain an adequate safe distance from the pump



Do not climb onto / on the pump or connecting pipe-work



Never place hands or other parts of the body inside or near any part of the pump when it is in operation or when the power is not totally isolated



Maintain a clean environment around the pump. The VERDER pump is manufactured from cast iron, flanges etc and therefore may have sharp edges - slipping or falling against the pump may cause serious injury



Wear safety clothing (hats, gloves, boots, etc) when operating or working on the pump or in its immediate vicinity

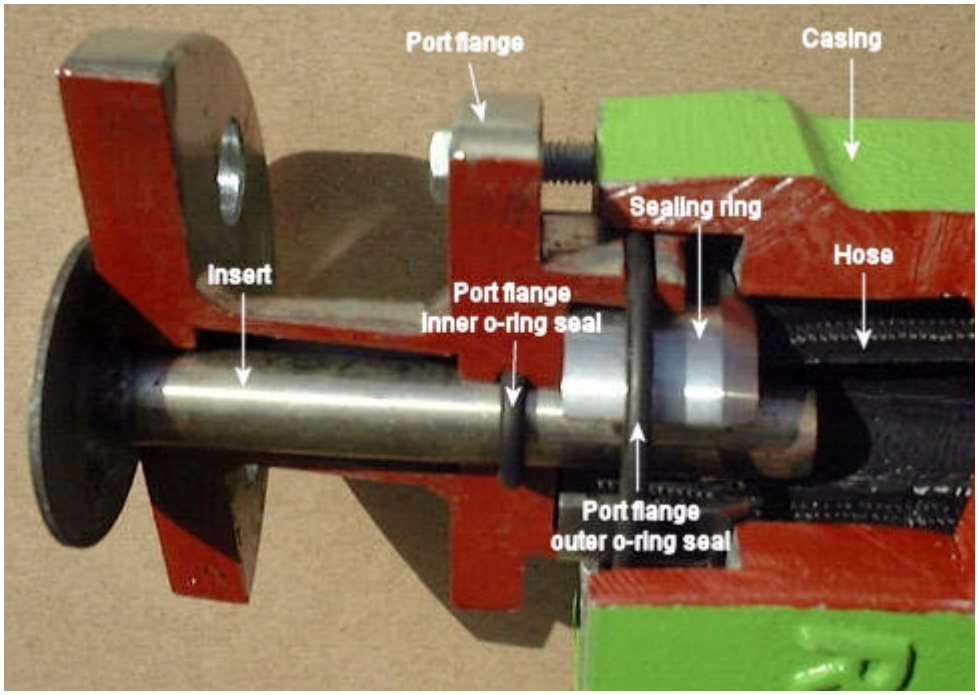
4.6 Maintenance

It is good practice to wash down the external surfaces of the pump prior to carrying out any maintenance operations. This will prevent the interior of the pump being contaminated with dirt or debris

4.6.1 Hose - Removal and Installation

This procedure involves removal and reinstallation of the port flange assembly - installation of the port flange assembly automatically clamps the hose to the insert and seals the flange with the pump housing. You should study the sectional photo figure 15 below in detail

Figure 15



4.6.2 Hose Removal

CAUTION

- Stop the pump drive and isolate electrical supply
- Close Inlet and then Outlet valves on pump piping
- If fitted, drain the remaining product from the inlet and outlet pipeline drain taps being aware that there will be some internal pressure and taking care to handle the product appropriately

CAUTION

Always follow the safety procedures for handling and disposal of the product being pumped

Loosen the lubricant drain plug, and slowly let the lubricant drain into a container for re-use or disposal (lubricant should not be re-used if it is contaminated with the product). Replace the drain plug when all lubricant has drained from the pump housing; check the condition of the sealing washer

CAUTION

If the hose has ruptured, the lubricant may be contaminated with the product - care must be taken to handle the mixture appropriately. It is not advised to re-use the lubricant once the pump has run for 24 hours

- Remove the section of piping immediately connected to both inlet and outlet port flanges to allow access. Place a container below the port flange to catch any remaining lubricant that may be still in the pump
- The inlet port flange is held in place with four bolts, which should be loosened and removed, in a criss-cross formation
- Pull out the port flange assembly and remove the insert and clamp rings (see fig 16 below).

Figure 16



- Clean all parts and check the insert and O-rings for wear or other damage. Replace sealing rings every 2nd or 3rd hose change (supplied as a ‘ Flange sealing kit’ including O Rings)
- Repeat the above step for the outlet port flange
- Reconnect the power to the drive and slowly inch the drive forward a short distance. Check the hose is completely free at both ends, then continue to inch the drive forward slowly to expel the hose

WARNING

Do not stand near the pump during this operation. If the hose is expelled too quickly it could cause serious injury

- Inspect the pump for any spillage of product. It is recommended that the pump housing should be cleaned, typically using a water jet, following hose removal, particularly if:
  (a) leakage has occurred; or
  (b) the product is aggressive / corrosive;

- Inspect hose for wear and damage and maintain a record of its condition and hours of operation

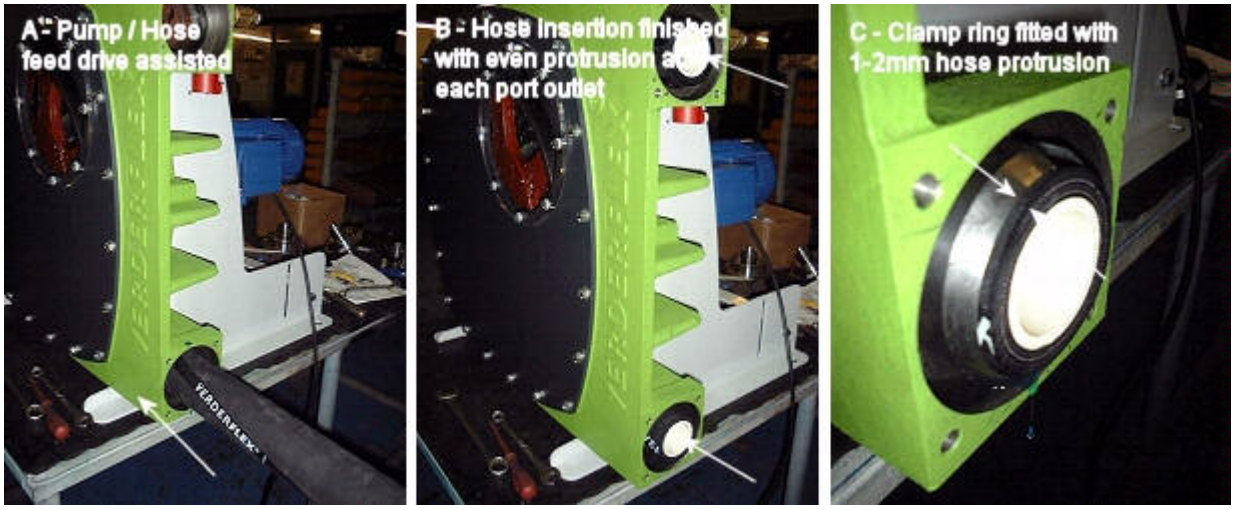
4.6.3 Hose Installation

CAUTION

Never try to install a hose without the front cover in place

- Rest one end of the hose in the mouth of the inlet port (the hose should be fed into the pump in the direction of normal operation) and rub lubricant along the outer wall of the hose, feeding it into the pump housing as each length of hose is lubricated. Once the hose reaches the rotor, the drive can be inched forward to feed in the remainder of the hose. Continue to lubricate the full length of the hose as it is fed into the pump
- The hose should be inched forward until there is sufficient hose protruding from the inlet port to be able to fit the sealing ring, with the outer edge of the sealing ring positioned 1 to 2mm inboard of the end of the hose. If the hose passes this point the drive should be reversed and inched back into the correct position

Figure 17



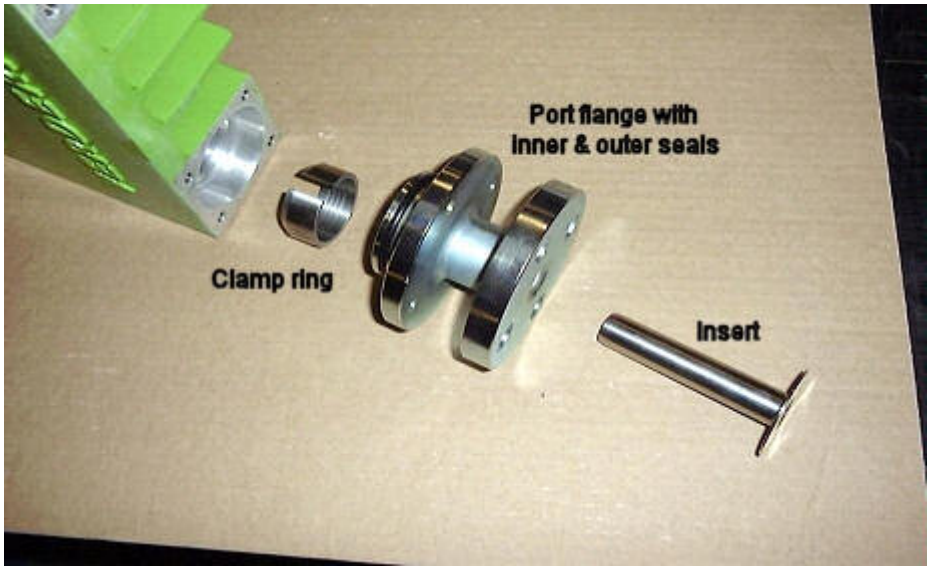
TIP

- For accurate positioning of the hose it may be possible to manually rotate the rotor by isolating power first then removing the cooling fan cover and turning the fan by hand. This is not always possible with the larger pumps
- Fit the sealing ring, long tapered edge first, over the hose

Note: The sealing ring of the VF10 - 40 is tapered on one edge only and is fitted toward the pump! The VF50 - 80 is tapered on both edges. The end of the sealing ring should be 1 to 2mm inboard of the end of the hose (see fig 17)

- Place the sealing ring over the hose and then the port flange, hand tighten the four bolts into the pump housing:-

Figure 18



- Position the insert in the port flange and gently ease into the hose;

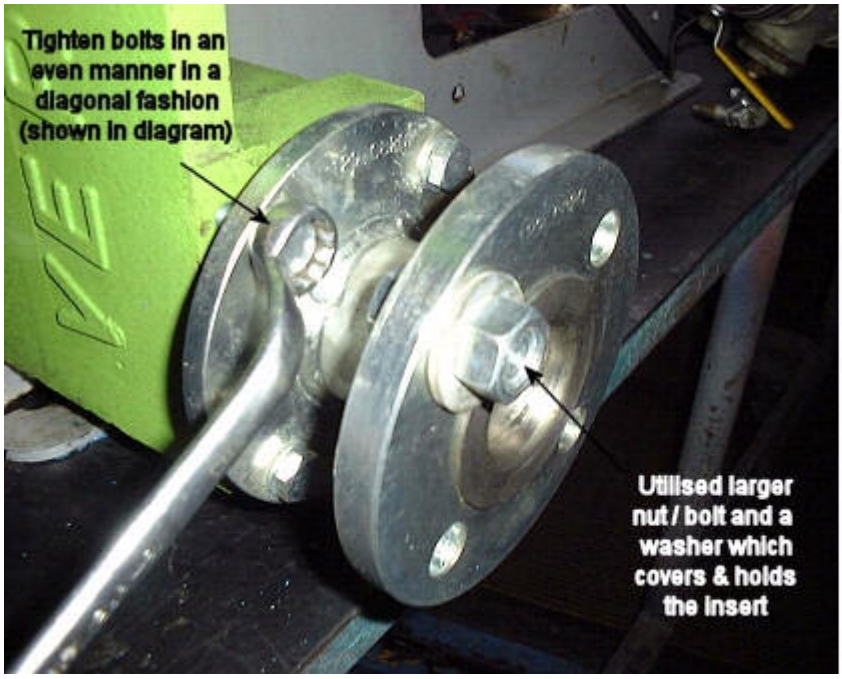
TIP

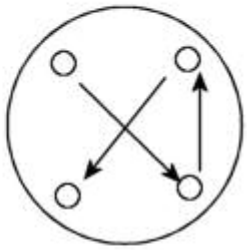
Use a small amount of lubricant if necessary on the insert and inner part of hose.

- The port flange bolts must be tightened up evenly - it is important the flange is presented evenly to the pump housing, otherwise the sealing ring will not clamp the hose correctly. The first bolt should be tightened for two turns, followed by two turns for the bolt diagonally opposite - repeat this for the bolts on the other diagonal (see Fig.19)
- After all four bolts have been tightened for two turns, tap or clamp the insert into the port flange using mole grips, bolt /nut and washer the size of the output flange (see fig 18) or by bolting all of the customer flange to the port flange to maintain its position. It is important these two tasks are co-ordinated otherwise the assembly will not seal correctly. Repeat this procedure until all bolts are tightened to the required torque settings in `Parts List'

- Because of the use of helicoil inserts on VF10 & VF15 Aluminium casings, care should be taken when tightening the steel port flange bolts so as to avoid accidental stripping of the thread

Figure 19

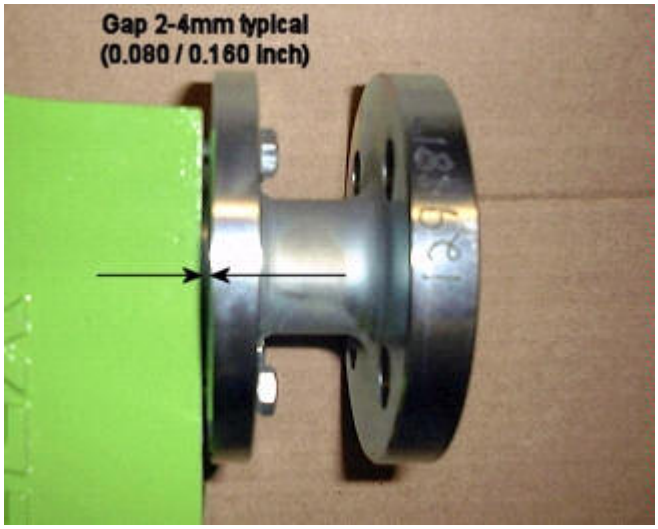




Typical tightening sequence

Note: With the four bolts tightened up to the correct torque loading there should be a gap between the port flange and the casing of typically 2-6mm, as shown in Figure 20. It must be noted that the relationship between correct torque and finish gap can vary due to component tolerances. The effort to reach the torque should not override this as the torque figure is a maximum figure and not the minimum requirement. The important factor is to achieve sufficient clamping of the hose. Do not over tighten to bring the port flange flush against the casing as this will result in the bolts shearing

Figure 20



- When the inlet port flange is fitted, it may be necessary to inch the drive to rotate the pump in the forward direction or to slow run the pump to stretch/elongate the hose sufficiently enough to feed the hose through the outlet flange to be able to fit the sealing ring in the correct position, or to slow run the pump to stretch/elongate the hose
- It is normal for the hose to be initially under tension, as after approx. 7 days the hose will stretch.
- Once the hose is in the correct position, fit the sealing ring and fit the outlet port flange, repeating the procedure for fitting the inlet port flange and insert
- Check the drain plugs are tightened correctly, then fill the pump housing with the recommended amount of lubricant - refer to Section 4.7 on 'Lubrication': check for any leakage. (VF10 -15 will need to be filled through filler/ breather tube; for larger pumps it may be quicker and easier to fill the lubricant through the inspection cover)
- Operate the drive forward for 10 - 20 revolutions to check the hose is securely clamped in the inlet port flange assembly. It is recommended that a container is placed below the inlet to catch the lubricant just in case the hose de-couples
- When satisfied, repeat with the drive in reverse for 10 - 20 revolutions to check the hose is securely clamped in the outlet port flange
- When satisfied, check the pump is shimmed to the required level - refer to the shimming table in Appendix A or alternatively to the section on 'Shimming the Rotor shoes - Removal and Installation'

Hose storage and shelf life

Shelf life for hoses is approximately two years for NR and NBR hoses, and approximately four years for EPDM hoses. The hoses should be stored flat in a cool, dark location and should not come in contact with any ultra-violet lighting, otherwise the product will be aged artificially

4.6.4 Inspection Cover Removal



Isolate power supply:

- Undo inspection cover bolts - take care to support the weight of the inspection cover whilst removing the bolts
- Remove inspection cover and O Ring; take care when lifting the inspection cover

Inspection Cover Installation

- Clean the inspection cover with a non-scratching cloth
- Check the inspection cover O Ring for damage and replace as required.
- Installation is opposite of removal process with particular attention paid to using the torque reference in the `Parts List' to avoid damage and in particular cracking around the bolt holes.

The new inspection window is larger as it incorporates a machined groove to accept an O-ring seal this design retains the original bolt configuration to enable it to retrofit existing pumps. The seal sits proud of the surface and seals against the inside and the casing when tightened

Installation:
As the new assembly has a machined o-ring groove it is susceptible to damage due to over tightening therefore the instruction below must be followed:

- Clean the inspection cover with a non-scratching cloth as previous
- Position the window taking care to ensure the o ring seal is sat in the groove all the way around before tightening.
- Tighten the bolt by HAND, until the plastic washer becomes trapped by the bolt head. Then observe the relevant torque of 2Nm, if a torque wrench is not available then once the washer is trapped the bolt head should be turned only ½ a turn more to tighten. The result in either method is that you will see a witness mark through the plastic cover in the o-ring groove area in respect of the seal turning from grey to black. This signifies the o-ring has created a seal and does NOT require further tightening (see fig 21 below)

Figure 21



Front Cover Removal



Never remove front cover when the hose is still in position. The hose must be removed following the procedures in the section on 'Hose Removal'

- If necessary fit the lifting eye to the front cover by removing the top left of centre fastening bolt and screwing the eye in to the threads provided, then fit the appropriate lifting equipment
- Remove the front cover bolts and remove the front cover. Remove the front cover bolts and the four nuts from the studs, and remove the front cover



Note: Take extreme care when lifting and removing the front cover

- Remove front cover O-ring

When removing the front cover, lifting equipment should be used to support the weight. Always use lifting equipment safely in accordance with the manufacturer's recommendations. The pump is provided with a lifting eye, which can be fitted into the threaded holes of the front cover (located in the top left of centre of the front cover underneath the bolts) to assist with lifting. Take care not to drop the front cover as this is likely to cause serious injury



Removing the inspection cover will make it easier to manipulate the front cover; you should use lifting equipment - follow the manufacturer's instructions for safe operation of lifting equipment

4.6.5 Front Cover Installation

- Check the front cover O-ring for signs of damage and correct size. Lightly grease the O-ring groove on the pump housing and fit the O-ring in to position

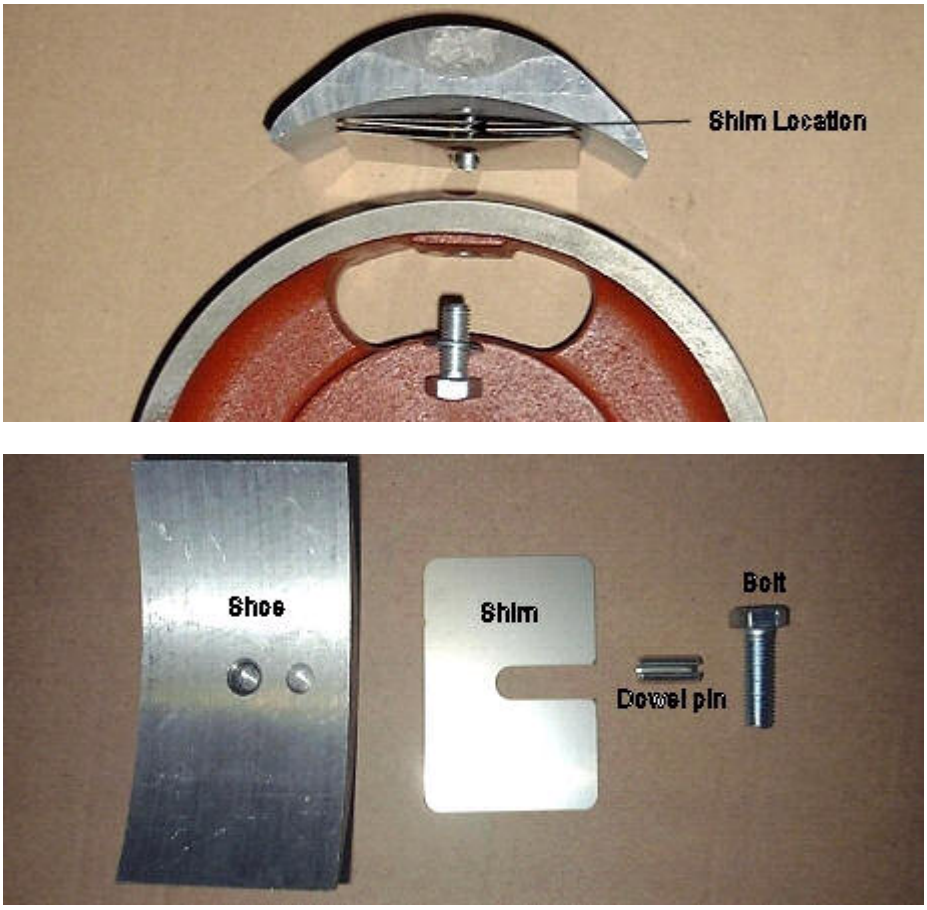
Note: Do not over grease the front cover O-Ring groove

- Installation of the front cover is the opposite of the removal procedure

4.6.6 Shimming the Rotor Shoe

The purpose of the shims is to achieve the required operating pressure & prevent back-flow or slip at the minimum operating speed. Additional shims will increase the degree of compression of the hose. You should study the photos (Figure 22) in detail

Figure 22 - Rotor Shoe Assembly & Component identification



4.6.7 Shim Removal

DANGER

Isolate power supply

- Follow the procedure for the removal of the inspection cover
- If power is not available, remove the motor cover to gain access to the cooling fan & shaft, if the fan is too tight to turn, then it may be removed to enable the rotor to be turned via the shaft by using a strap wrench or special wrench
- Alternatively reconnect the power supply and inch the drive forward until the rotor shoe is positioned over the open inspection hole

WARNING

Do not stand within the immediate vicinity of the pump when operating with the inspection cover removed; follow safety procedures for operation of pump with inspection cover off

- Loosen the rotor shoe bolt(s), remove the shims and retighten rotor shoe bolt(s); the shims are slotted to enable their removal without completely removing the bolt(s)
- Reconnect power supply and inch drive forward until the second rotor shoe is positioned over open inspection hole



Do not stand within 3 metres / 9 feet of the pump when operating with the inspection cover removed; follow safety procedures for operation of pump with inspection cover off

- Loosen the rotor shoe bolt(s), remove the shims and retighten rotor shoe bolt(s); the shims are slotted to enable their removal without completely removing the bolt(s)

4.6.8 Shim Installation



- Take care to always isolate power before approaching or working on pump when inspection cover is removed
- Installation is opposite of removal process.

Note: When tightening the rotor shoe bolt(s) ensure that the shims and the shoe remain correctly aligned and are parallel to the rotor. Failure to do this will cause damage to the hose, resulting in a detrimental effect on the life of the hose

4.6.9 Rotor Shoe Removal



Isolate power supply

- Follow instructions for the removal of the inspection cover
- Reconnect the power supply and inch the drive forward until the rotor shoe is positioned over the open inspection hole
- Loosen the rotor shoe bolt(s), remove the shims



Care should be taken to support the weight of the rotor shoe whilst the bolt is being removed - similarly care should be taken not to drop the shoe after removal from the pump housing

- Remove rotor shoe bolt and lift shoe out of pump house

4.6.10 Rotor Shoe Installation (VF25 – VF80)

- Check the rotor shoe contact surfaces for any signs of damage and replace as required. Any wear or roughened surface will seriously affect the performance of the pump. And also reduce the life of the hose
- The installation of the rotor shoe is the opposite of the removal procedure

Before considering replacement of damaged shoes, any sharp edges and damage to non contact areas can be blended out with fine emery / sandpaper

4.6.11 Rotor Removal

- First remove the hose



Isolate power supply

- Remove the front cover
- Secure the rotor with the appropriate lifting equipment and support the weight. Follow manufacturer's instructions for safe operation of lifting equipment
- Loosen the two rotor bolts (Allen) from the taper lock bush and remove one of them. Insert this bolt in to the jacking position and start to turn clock-wise. When the rotor starts freeing from the taper lock, and the bush's clamping force on the shaft is released, stop turning the bolt. This should now allow you to slide the rotor along the drive shaft towards you. If it does not slide freely then it may be necessary to turn the jacking bolt again



Ensure that the weight of the rotor is being supported at all times during this procedure

- Remove the bush and rotor off the shaft in one piece, and place on a suitable surface



If the bush is difficult to remove from the shaft, prise open the bush once the rotor is released



Take care when removing rotor! As it comes away from the pump shaft, it will tend to swing out on the lifting equipment, potentially causing serious injury - stand well clear

4.6.12 Rotor Installation

Installation is opposite of removal process but you should refer to Section 4.2 on 'Assembly' as a further guideline

Bearing Housing

4.6.13 Pump Shaft and Bearings Removal (Long Coupled Versions only)

- Follow procedures for the removal of the hose, front cover and rotor
- Before starting this procedure it is recommended that you purchase a complete set of replacement parts (a bearing assembly - seal kit; drive shaft; Key kit and bearing kit)



Isolate power supply

- Remove the coupling guard and disconnect the coupling from the input shaft of the pump
- Remove bearing assembly from pump housing (it may be necessary to remove the gear motor)
- Remove Allen bolts, sealing plate and sealing plate O-ring
- Remove front lip seal
- Secure pump shaft with lifting equipment and support weight. Follow manufacturer's instructions for safe operation of lifting equipment
- Remove front roller bearing
- Carefully lift the pump shaft out from the bearing housing
- Remove the ball bearing
- Remove the front lip seal
- Clean the bearing housing

4.6.14 Pump Shaft and Bearings Installation

- Installation is opposite of removal procedure
- Grease both bearings thoroughly prior to installation. Half fill the bearing house with grease after installing the ball bearing; install the shaft with the roller bearing in position. Take care when tapping the bearing home to ensure the inner race and bearings are not damaged



(1) Do not strike the pump shaft or inner race or the bearings
(2) Once installed, the bearings are greased for life do not lubricate after installation

4.7 Drive Selection

- Your VERDER distributor will be pleased to select a suitable drive to best fulfil the needs of the duty you require
- You should ensure that the drive selected is sufficiently powerful to overcome the starting torque requirements of the pump at the pressure at which it is shimmed to operate - refer to the starting torque settings that follow:

Starting Torque at	*VF10*	*VF15*	*VF25*	*VF32*	*VF40*	*VF50*	*VF65*	*VF80*
0 bar Nm	55	75	115	210	320	620	1150	2000
5 bar Nm	55	75	120	210	320	620	1150	2000
7.5 bar Nm	55	75	120	210	320	810	1810	3100
10 bar Nm	55	75	140	250	400	1100	2300	4000
15 bar Nm	55	75	160	300	480	1300	2800	5000

4.8 Lubrication

The standard lubricant is VERDERLUBE, a specially formulated food grade lubricant, which is designed to reduce the friction between hose and rotor shoe, thus reducing the wear and tear on the hose and on the shoes. The lubricant is food grade standard, blue in colour and can be used at temperatures ranging from -40°C up to 100°C (-40°F up to 210°F)

It is vital that lubricant levels are monitored at all times - an increase in levels of lubricant will indicate hose failure. If this occurs, the product will be contained within the pump housing, but performance will deteriorate and eventually cause product contamination. It is recommended that you fit a hose burst detection unit

The pump must always be filled with the correct amount of lubricant see in table below:

Pump Size	*Capacity in Litres*	*Capacity in U.S. Gallons*
VF10	0.25	0.07
VF15	0.5	0.13
VF25	2	0.53
VF32	2.5	0.7
VF40	5	1.3
VF50	10	2.6
VF65	25	6.6
VF80	35	9.24

Note: If level plug is fitted to front cover this can be removed temporarily and used to gauge correct fill level.

The safety data sheet for VERDERLUBE is contained in Appendix B - you should consult your VERDER distributor on any queries



At all times the pump housing needs to be one half to one third filled with VERDERLUBE lubricant



Check compatibility of the lubricant with the product being pumped; VERDERLUBE is a specially formulated food grade lubricant containing glycerine. In most cases this is a very stable compound, but can react when mixed with certain types of substance.
Do not use VERDERLUBE with nitrogenous compounds, concentrated acids or strong oxidizing agents
If you are unsure of the chemical compatibility of your product with VERDERLUBE, your VERDER distributor will offer advice and if necessary, supply an alternative lubricant such as VERDERSIL

4.9 Fault Finding

Problem	*Cause*	*Corrective Action*
Abnormally high pump temperature	Non-standard lubricant	Consult VERDER distributor to obtain correct lubricant
	Low lubricant level	See lubrication chart, add required amount
	Product temperature too high	Consult VERDER distributor regarding maximum temperature
	Internal friction on hose caused by blocked suction or bad suction characteristics	Check pipe-work/valves for blockages; check that the suction pipe-work is as short and as large in diameter as feasible; consult VERDER distributor for advice
	Over shimming of the pump	Check & remove excess shims
	High pump speed	Reduce speed to a minimum; consult VERDER distributor for advice on recommended pump speeds
Low capacity/pressure	Suction/discharge valve closed	Open suction/discharge valve
	Under shimming of the pump	Check & add required shims
	Hose failure	Replace hose
	Blocked suction/no product	Check suction pipe-work for blockages and product; remove any product
	Poor pump selection	Consult VERDER distributor to check pump selection
	Suction line too long, pump speed too high, suction line bore too small.	Consult VERDER distributor for advice
	Hose failure	Consult VERDER distributor for advice
	High product viscosity	Use vacuum on housing
Pump and pipe-work vibrating	Suction/discharge lines not secured properly	Check and secure suction/discharge lines
	High pump speed, long suction/discharge lines, high product specific gravity, or a combination of them all	Reduce pump speed, shorten suction/discharge line wherever possible; consult VERDER distributor
	Under-sized suction /discharge diameter	Increase suction/discharge pipe-work diameter
Hose pulled in to pump housing	Insufficient lubricant in the casing	Check lubrication chart and add the required amount of lubrication
	Inlet pressure too high	Reduce the inlet pressure
	Blocked hose	Check the hose and remove any blockages
	Large particles in the product	Mount sieve/filter in suction line to avoid particles entering the hose

4.9.1 Service / Replacement

Item	*Related Sub Components*	*Recommended Change*
	Sealing Rings (Flange sealing Kit)	Every 2nd Hose Change
Port	Inner Port Flange O Rings	Every Hose change
Flanges	Outer Port Flange O Rings	
	Insert Gasket (VF100 & 125 Only)	Every Insert Change
Front Cover	Front Cover O Ring	Every Removal
	Inspection window O Ring	Every 12 Months
Gearbox	Top up / replenish with recommended OEP Gear oil	Check Every Hose Change & Replace every 12 months
	Drive Gasket	Every Gearbox Removal
Lubricant	Flush out casing and refill	Every 6 Months or hose change, whichever soonest.
Gearbox & Bearing Housing	Front Shaft seal	Replace if pump has overrun after hose burst and not protected by a pressure switch or seal face shows signs or has been exposed to chemical attack, otherwise replace every 12 months

4.9.2 External Checks

Leaks	Port Flanges ; Front Cover ; Rear drive ; Inspection Window
Cracks	Inspection Window
Security	Breather Tube ; VFOCS Hose Burst ; Level sensors & wiring
Running Temperature	Check from below centre of front cover surface, this maybe hot, as it is dependent on pump media/discharge pressure/installation / line restrictions and ambient temperature etc.
Check Tighten	Front Cover / Port Flanges / Mtg. Frame Bolts & Drain plugs. Inner Port flange ring of bolts (VF100/125 Only)
Pressures	Check /ensure discharge pressure is maintained, if not, check for line blockages / closed valves or hose damage.
Pump Lubricant	Check Casing level : If over-full, check hose for leakage/burst, then drain / replenish. If Low check for suction line leaks & other abnormal causes of lubricant loss first, and if none then top up where necessary. If there is no evidence of noise or lubricant loss, then top up with
Gearbox	recommended OEP oil where necessary. If the gearbox is running noisily, this may mean the bearings are dry. Check pump and gearbox lubricant is not escaping through a worn shaft seal onto the floor via drive flange joints. Check the motor for worn shaft bearings (this may need removal from the gear-case to run and check it separately) Ensure rear drive bolts do not turn, if they do then the rotor should be removed to gain access to the nuts inside to re tighten. Check security of Terminal Box and associated mains wiring for damage Lifting eyes check for security and replace if damaged/corroded

NB* Please note it is strongly advised that the recommendations above of regular service schedules & external checks stated must be carried out to help support the pumps operation and long life, and to reduce the high cost of major component failure. If there are no customer maintenance schedules then please contact UK Service/Repair (+44) 113 2220 282 or your local distributor workshop for service details!

CHAPTER 5

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CHAPTER 5: Accessories and Options

T 5. Accessories and Options

The VFOCS hose burst pressure (recommended on applications of 2 bar+) switch can be mounted either onto the filler/breather tube or direct to the back of the casing depending on the pump size (see Fig.23 below)

Figure 23





Fitting Instruction:

There are two types of installation, one is mounting to the filler/breather tube and affects the VF10 to VF25 inclusive, as the switch body can interfere with the mounting frame. The other is a direct mounting onto the rear case, which covers the rest of the pump range from VF32 upwards

Filler /Breather tube mounting:

Remove the plastic plug from the standard filler tube, then fit the brass compression fitting to the filler tube using the pipe nut and collar and tighten the nut, so as to crimp the fitting onto the pipe (tighten the nut until the fitting does not rotate and then a further ½ a turn, to avoid over-tightening!)

This allows a ½" male to ¼" female reducer to be fitted which allows either the VFOCS pressure switch or the optional tee piece and vent tube (see additional notes below) to be fitted first & then the VFOCS switch to complete the assembly

Direct case mounting:

The ¼" bsp female reducer for the pump is simply fitted and this allows either the VFOCS pressure switch or the optional tee piece and vent to be fitted first & then the VFOCS switch to complete the assembly

Vent Kit:

TBA



When fitting the pipe unions it is advisable to use PTFE tape to improve sealing, also two wrenches must be used when tightening multiple fittings, this is important particularly when tightening onto the filler/breather tube as it can strain & cause damage to the tube and its joints!

5.1 Accessories and Options

There are a number of accessories available to complement the VERDER hose pumps, all of which are available through your local VERDER distributor:

Pulsation Dampener
A pulsing delivery is often common with hose pumps, which can lead to increased pipe losses or heavy pulsation in the pipeline; pulsation is equally undesirable for the successful execution of the process

A flexible bellow is installed and impinged on one side by compressed air or gas. Should pulsation occur, the bellows increase their capacity and compress the air or gas. Hence the peak pressure is not diverted into the pipeline or system, but is absorbed by the dampener. There are three different types of dampener available:

- Manual adjustment dampener
- Automatically adjusted dampener
- Preset dampener (mostly used for high pressures where a normal air network would fail to deliver sufficient pressure)
- Flexible Hose

Your VERDER distributor will be able to advise you further by referring to the separate sales literature available. It should be noted that whilst pulsation dampers will reduce the size of the pulse (typically by approx. 90%), they will therefore not totally eliminate pulsation.

Hygienic Hose Connections
A range of stainless steel connections is available to replace the port flange; fittings include a Tri Clamp, RJT ; IDF and DIN 11851. In addition port flanges are available in stainless steel to suit DIN, ANSI and JIS with stainless steel, polypropylene or PVDF inserts

Cleaning in Place
The specially developed VERDER Hygienic Pump offers full cleaning in place (CIP) and is ideal for applications in the food industry, where the elimination of bacterial growth is essential - details of this pump are available from your local VERDER distributor

Special Coatings
Pump components can be coated in a variety of specialist materials to offer higher levels of chemical resistance or wear. Please ask your VERDER distributor for details on an individual basis

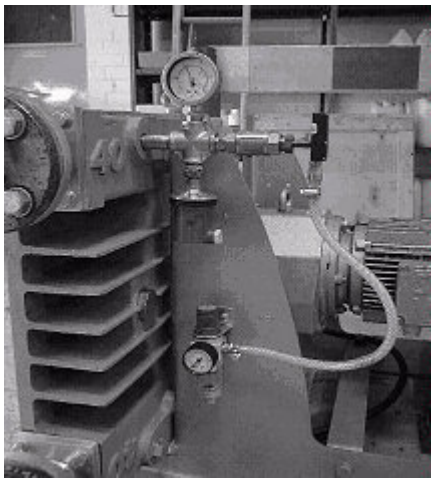
Hose Failure Detection
One of the VERDER's many advantages is the exceptional lifetime of the hoses. Normal wear does take its toll on the hose and in time it will need to be exchanged for a new one. Throughout the hose's lifetime, it is essential that any possible failure is noticed in sufficient time to prevent leakage into and damage to the pump housing and unit. Loss of flow can also be monitored as a pre-failure indicator.

To prevent this, VERDER has developed a capacitive sensor to be screwed into the fill pipe. If a hose does rupture, the liquid leaking into the housing will cause the fluid level to rise. Where the level in the filler tube reaches the height of the sensor, an alarm sounds and either the motor shuts down or the valves close automatically

Vacuum Equipment
When pumping highly viscous liquids, it may be necessary to create a vacuum inside the pump housing to help the hose to regain its natural round profile, assisting suction capabilities and ensuring the maximum flow rate

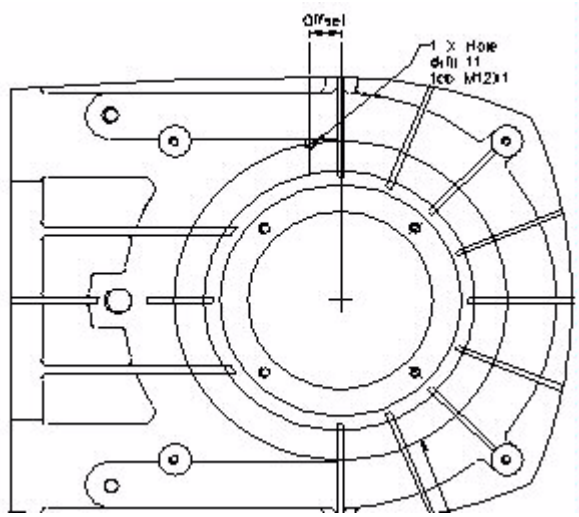
VERDER recommends the installation of a vacuum assist system for the VF25 - VF80 using an electric or a pneumatic air-driven vacuum pump. The installation consists of a small vacuum pump mounted on the pump frame, which evacuates the pump housing - the lowest pressure of the pump must match the suction pressure of the hose pump. It is advised that a lowest pressure possible manometer be installed at the suction side

Figure 24



CAUTION
When the vacuum assist unit has been installed, pulsation can still occur as it has no impact on pulsation. If this also influences the efficiency of the flow adversely, VERDER recommends the installation of a pulsation dampener (see above)

RPM Sensor



VERDER Sensor installation PCD's

Pump Model	***Recommended PCD***	***Offsets***
VF10	Ø 110 (Front Cover)	14mm
VF15	Ø 195 (Rear Casing)	23mm
VF25	Ø 240 (Rear Casing)	27mm
VF32	Ø 300 (Rear Casing)	33mm
VF40	Ø 415 (Rear Casing)	41mm
VF50	Ø 537 (Rear Casing)	54mm
VF65	Ø 720 (Rear Casing)	48mm
VF80	Ø 850 (Rear Casing)	56mm
VF100	Ø 1000 (Rear Casing)	91mm
VF125	Ø 1230 (Rear Casing)	114mm

Note: Offset is related to the rib positions on the casing, but the front cover inspection window is best utilized for the VF10 & VF15 where the cover should be tapped and locked from the outside as there is no running clearance inside the pump! Siting of the hole must be at the top of the pump in relation to its final installation position to avoid excess contact with the lubricant and its contaminants during operation!
The rotor rim/central boss or shoe should be drilled and tapped to accommodate the interrupter, which can typically be a small bolt for example. This should be used in the final sensor setting, in respect of measuring the amount of protrusion required through the case/cover to sense the bolt head during rotation, in line with the sensors pick up range.



On close-coupled pumps fitted with a vacuum unit, it may be necessary to fit a second or double lip seal to the gear motor output shaft (to prevent the oil being sucked from the gear into the pump housing) together with a retaining plate (to stop the lip seal being sucked out)

Future Developments
VERDER's in-house team of engineers are continuously striving to develop the hose pump and its application to new areas; naturally this covers the development of accessories and complementary versions of the hose pump to achieve maximum efficiency and performance. Feedback from operators and customers is always welcomed therefore, and any comments or queries concerning your particular application should be forwarded to your local VERDER distributor, who will then forward them to VERDER.

CHAPTER 6

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CHAPTER 6: Risk Assessment & Preventative measures

Pump Build & Operational Safety:

6.1 Normal Operation Risk & Preventative Measures:

Normal Operation	***Foreseeable Malfunction***	***Rare Malfunction***	***Preventative Measures***
Pressure too high in casing Blocked Pump Pressure in tube during its replacement			Do not exceed the maximum working pressure of 16 bar. Install a suitable safety valve in the discharge line in order to prevent over-pressurization. This must be in turn checked on a regular basis. Do not work on a running pump near to filler tube / inspection window. When dismantling pump isolate power and relieve
	Tube rupture causing hazardous medium to spray out	N/A	
Incorrect Assembly			Observe correct build procedure as per operator/build/ maint. manual.
Exceed recommended temperatures	Tube rupture causing hazardous medium to spray out	N/A	Ensure lubricant level/shimming is correct, also temp. monitoring equipment can be fitted to front cover.
Polypropylene Insert Use	Distortion at high Operating temperatures	N/A	Check operational spec and use alternative stainless steel of PVDF inserts
Excessive noise	Personal Injury	N/A	Observe safety regulations governing work in close proximity & the wearing of appropriate ear protection
Product chemical reaction	Potentially Explosive	N/A	Carry out product handling measures during installation / operation to ensure operator safety.
Drive Spec to pump assembly			Check to ensure an explosion proof motor is fitted to a flat pack pump assembly if it is to be used in an explosive environment.

Rotating Coupling	Personal Injury	N/A	All flat packed long coupled assemblies to carry guarding advice or have guards installed during build.
Hazardous medium in pump casing after tube burst	Personal Injury	N/A	Safety precautions to be observed in the form of isolating power before dismantling. Inspection window & front cover, a special tool is always required to remove it.
Pump operational safety precautions	Personal Injury	N/A	Always use eye & hand protection during pump dismantling
Construction materials not resistant to pumped media	Adverse chemical reaction, heat build up, personal injury	N/A	Ensure sub components Other than hose is compatible with media being pumped
Verderlube Pump lubricant not resistant to pumped media	Adverse chemical reactions to glycerine based products with strong acids and oxidising agents, with risk of explosion	N/A	Ensure Verderlube lubricant is compatible with media being pumped, if not then Verdersil MUST be used!

6.2 Explosive Operation Risk & Preventative Measures:

Normal Operation	***Ignition Foreseeable Malfunction***	***Hazard Rare Malfunction***	***Assessment Prevention measures***	***Ignition Protection***
Bearings		N/A	All bearings are sealed for life or greased. Drive spec capability is in excess of radial loads applied during pump operation	Instruction manual & constructional safety `c`
	Bearing failure or loss of lubrication	N/A	The bearing housings need to be examined for signs of overheating, abnormal noise or discolouration on a daily basis. Alternatively, continuous temp. monitoring can be fitted and set to trip the drive power at 10k above normal running temp.	Instruction manual or control of ignition source `b` if monitoring is fitted

Frictional heat of moving parts inside the gearbox		N/A	The moving parts inside the gearbox are submersed in oil / grease which acts as a lubricant, spark quenching agent & coolant	Liquid immersion `k`
	Unacceptable loss of oil from gearbox	N/A	A level plug is provided on the gearbox. The oil level has to be checked for low level and signs of contamination	Instruction Manual
Guarding	Mechanical contact	N/A	Ensure secure and aligned correctly, use brass plate	Non sparking + Instruction manual
	Dust deposits on gearbox	N/A	Guarding or regular cleaning is needed to prevent deposits deeper than 5mm accumulating	Instruction Manual
Static Discharge	Hose Failure		The hose inside the casing is covered and / or submersed in oil which acts as a lubricant, spark quenching agent and coolant	Liquid Immersion `k`
	Liquid transfer through pump outlets	N/A	Metal parts are supplementary bonded to provide an electrically conductive path less 100 Ohm. This also is particular to pvdf & polypropylene inserts	National standards for electrostatic requirements plus user instruction
	Rubbing / cleaning of plastic inspection window		Supplementary bonding may be required, also clean in place where possible using non nylon cloth.	National stds for electrostatic use+ manual. Discharge of component before refit if Removed for cleaning.

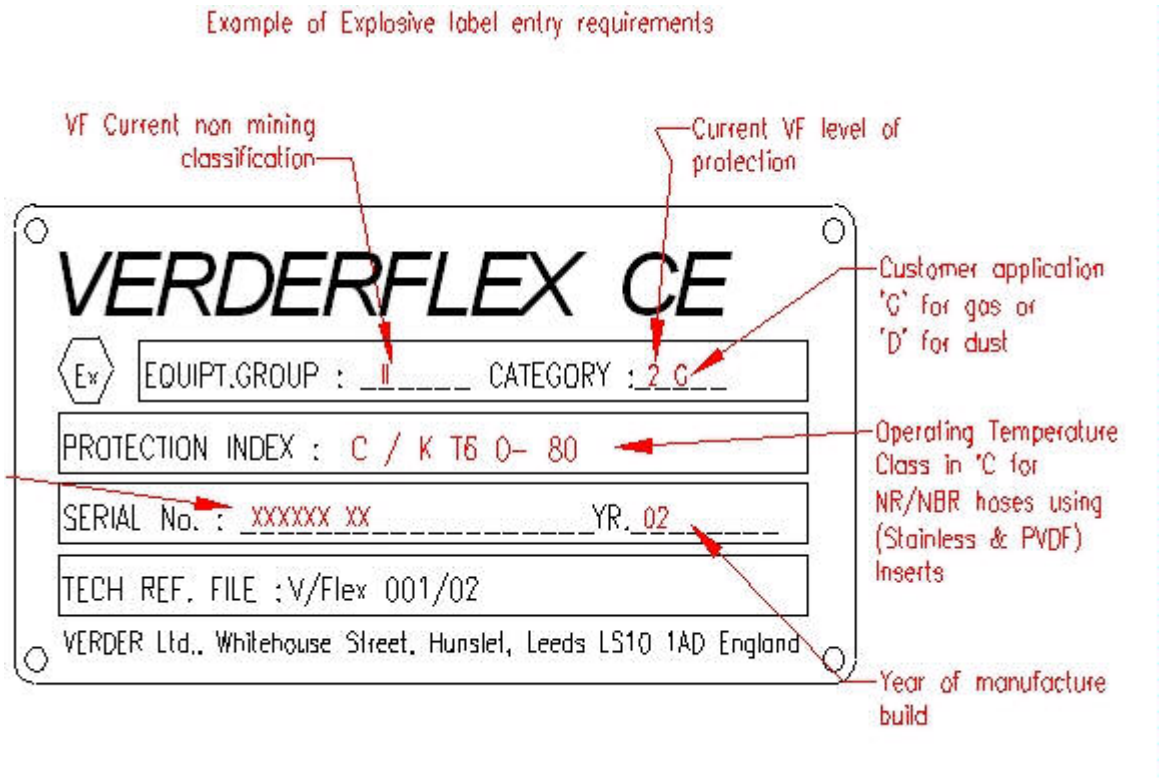
Static Discharge	Overfilling & discharge of pump media through filler tube		Earth clamp can be fitted or an optional level sensor fitted. Alternatively an optional burst pressure sensor can be fitted both of which shut down the drive motor.	Instruction Manual Control of ignition source `b` if second option fitted
Pump operation in an explosive atmosphere	H&S in an explosive environment	N/A	Ensure during pump operation a warning triangle with black letters `Ex' on a yellow background is displayed at points on entry to work area	EN 13463-1
Frictional heat of moving parts inside the casing	Risk of sparking	N/A	The moving parts inside the casing are covered and / or submersed in oil which acts as a lubricant, spark quenching agent and coolant	Liquid Immersion `k`
	Unacceptable loss of lubricant from casing through leaks or suction	N/A	A level plug is/can be provided on the front cover. The oil level and sealing joints have to be checked weekly. Alternatively, a low level sensor can be fitted and set BELOW normal operating level, taking into account level fluctuations.	Instruction manual or control of ignition source `b` if monitoring is fitted
Front Cover	High surface temperature	N/A	As above plus ensure shimming is correct and pump does not run dry for long periods	
Change in duty by reduction of rpm	OverTemp	N/A	Add forced fan cooling or thermistors	Contact drive manufacturer To control ignition source

Optional Hose burst pressure sensor	Explosion risk from spark	N/A	Current Huba 625 sensor must not be used for explosive operation. An alternative Exd / EExd component should be used	Instruction manual plus control of ignition source `b` if option used
Mechanical coupling	Mechanical slippage / breakage	N/A	Carry out routine maintenance to check for security	Instruction manual
Closed liquid internal circuit	Excess temperature	N/A	Fit temp. probe to front cover or continuous temp. monitoring can be fitted and set to trip the drive power at 10k above normal running temp.	Instruction manual and control of ignition source `b` if monitoring is fitted
Closed valve condition	Excess temperature and pressure	N/A	Carry out routine maintenance checks to ensure controlled temp & gauge pressures	Instruction manual
Electrical Vac Assist	Explosion risk	N/A	Elect. Option has IP54 motor so an air operated unit is recommended, ensure internal spool valve on Piab is of brass construction	Instruction manual plus control of ignition source `b` if non sparking option is used.

Glossary of terms:

Safety `c` - refers to the integral from standard constructional design
Ignition source `b`- refers to protection incorporated to control an ignition source
Liquid Immersion `K` - refers to protection of ignition due to use of spark quenching agent
Eexd / Exd – refers to explosion proof electrical components with flameproof protection
EN 13463-1 - European norm standards for Non Electrical equipment in explosive atmospheres

6.3 Explosion Proof Labelling:



Note: This label is only fitted onto pumps supplied as Atex compliant at time of order
Note: As operating temperature is governed by type of hose and insert used, here are some other examples of temperature indication:
T5 (0 – 100) - (EPDM Hose with Stainless / PVDF Inserts)
T6 (0 – 40) - (Any Hose fitted with Polypropylene Inserts)

Note: Future development to overcome higher protection requirements and the event of rare malfunctions may allow the product to be marketed to Equipment group II category 1,this will form a sound basis for further/future categorizing to cater for the mining industry.
Therefore guidelines are according to current initial specification and as such may be subject to amendment.

6.4 Pump & Hose: Storage during Plant shutdowns / on site storage

1. Introduction

VERDERFLEX pumps are designed for continuous use, however, there may be instances when pumps are withdrawn from use and stored for periods of more than 2 weeks. We recommend certain pre-storage actions and precautions be taken whilst pumps and their components are not in use. Similarly, hoses and lubricants may be held as stock to service working pumps and their recommended storage conditions are advised.

2 Pre-Storage Actions

- The hose should be removed from the pump and the lubricant drained out of the pump casing.
- The pump casing should be washed out and allowed to dry and any external build up of product removed.
- The gearbox should be drained and re-filled with oil in accordance with the manufacturers recommendations.

3 Storage Conditions

- Pumps should be stored in a dry environment. Depending on these conditions, it may be advisable to place a moisture-absorbing product, such as Silica gel, inside the pump's casing or to coat the pump's inner surfaces with moisture-repelling oil, whilst the pump is stored.
- Gearboxes may require intermittent attention (such as periodic rotation) as indicated by the gearbox manufacturer's recommendations.
- Hoses should be stored as supplied in their wrapper and should be stored away from direct sunlight and at room temperature.
- Lubricants should be stored under normal warehouse conditions with their caps securely fastened.
- It is recommended that lubricant containers be inverted every month and shaken before use in pump!

4 Shelf Life

Item	***Recommended Shelf Life***
Pump assembly	No shelf life providing pump stored in a dry atmosphere
Natural Rubber (NR), Nitrile Buna Rubber (NBR) and Hypalon (CSM) hoses	18 months from date of supply
EPDM hoses	3 years from date of supply
VERDERLUBE Lubricant	1 year from date of supply
VERDERSIL Lubricant	3 years from date of supply
Gearbox and Motor	In accordance with manufacturer's recommendations

For further information, please contact your local VERDERFLEX distributor or contact the VERDERFLEX team directly on verderflex@verder.co.uk

6.5 Other Information:

Warranty Registration

Your VERDER distributor will have completed a warranty card on your behalf, which is returned to VERDER for registration on VERDER's warranty scheme. Please ensure that the distributor has the following details from your initial and any subsequent orders for pump(s) and / or spares:

- pump / spares make and type
- serial number
- application
- media to be pumped
- pressure
- temperature
- capacity
- suction
- motor size
- date of order and delivery
- VERDER reference

Full completion of this card is essential for you to be covered by VERDER's outstanding warranty schemes. Please be aware of the declaration that you undertake to use only VERDER spare parts - this is an essential part of the warranty scheme and is legally binding. The card will also act as a record of your dealings with VERDER

This information will similarly be required if and when you should need to order spare parts from your local VERDER distributor

Should you have cause to return the pump for any reason, please ensure that you inform the local distributor as fully as possible of the details of the problem; the distributor has the necessary documentation for completion of the warranty application to VERDER and is aware that this has to be completed in full before VERDER can examine the application

Complaints Procedure
VERDER takes its responsibilities to its customers extremely seriously and prides itself on its comprehensive complaint procedures. Should you be dissatisfied with your VERDER pump(s) or with any aspect of the service you have received, then please contact your local VERDER distributor in the first instance to discuss the matter fully

The distributor will then take the matter up with VERDER, acknowledging his actions to the customer and indicating a time scale by which he will reply. You will receive a response from the distributor with VERDER's initial comments and proposed plan of any further action. If you feel that your complaint has still not been resolved satisfactorily, you should contact VERDER Ltd directly at the address given at the end of this chapter

VERDER Group Literature
VERDER supplies its range of Group literature and product documentation in a number of languages and variety of software packages - please advise your VERDER distributor if you are interested in receiving other information on VERDER, indicating in which languages / format

VERDER and its distributors undertake to conduct all its dealings with you as comprehensively, courteously and promptly as possible. Customer care is one of VERDER's top priorities
Distributor Contact Details:

VERDER Contact Details

VERDER Ltd
Whitehouse Street
Leeds LS10 1AD
ENGLAND, UK
Tel: (+44) 113 222 0279
Fax: (+44) 113 222 0291
Email: verderflex@verder.co.uk

the

VERDERFLEX advantage

- Specially designed hose construction to postpone fatigue, resulting in longer service life of the hose
- Close coupled drive design or robust long coupled option with bearing cartridge
- Rigid pump housing design for heat dispersion and strength
- Simplified hose connection for easier maintenance and disaster proof pump design
- Channels for complete drainage prior to maintenance



The principle of the peristaltic hose pump is based on alternating contraction and relaxation of the hose forcing the contents through, operating in a similar way to our throat and intestines.

A smooth wall, flexible hose is fitted in the pump casing and is rolled and completely squeezed by two shoes on the rotor inside the pump casing. The rotation action moves the product through the hose at a constant rate of displacement without slip, making the pump suitable for high dosing applications and pressure ratings up to 230 PSI / 16 bar. The hose restitution after the squeeze produces an almost full vacuum that draws the product in the hose, so very viscous liquids are pumped without problems using the VERDERFLEX hose pump. The pump casing is half-filled with a specially designed VERDERLUBE, to lubricate and cool the pump to lengthen service life of the hose. Since the product only comes in contact with the hose and not with any rotating parts, the hose pump is very suitable for abrasive and corrosive applications.

VERDERFLEX®
Industrial hose pumps

Solutions in Pumping technology

SMART SERIES



Verder has worked hard to create a design which meets the requirements of its customers, the VERDERFLEX SMART series is a reliable, flexible, low pressure peristaltic pump. The actual design is the result of research carried out over recent years.

- The illuminated central display is easy to read from all angles and its menu has been designed so that it is simple and logical to navigate.
- As there is no pump head beside the display it can be operated by left and right handed people and the buttons have been made large enough to be operated even with gloves.
- The position of the pump head allows in-line, “kink free” pumping.
- The all-terrain water protected design (IP55) means it is capable of withstanding harsh environments yet is also suitable for laboratory applications.

Canadian VERDERFLEX Distributors

ProMinent Fluid Controls Ltd.
Toll-Free: 1-888-709-9933
Guelph ON (519) 836-5692
Calgary AB: (403) 291-4616
Montreal PQ: (450) 663-1905
eMail: sales@prominent.ca
www.prominent.ca

Experts in Chem-Feed and Water Treatment

ProMinent®

make your mining materials handling

EASY to swallow



works fine in the mine








The large experience within the VERDERFLEX group of peristaltic pumps in the Mining and Mineral processing industry includes:

- Copper thickener sludge
- Lead thickener under flow & sampling lead slurry
- Zinc sampling & thickener under flows
- Silver, sampling silver slurry
- Gold, processing with hydrochloric acid
- Nickel, processing nickel slurry
- Cobalt, processing with ammonia and sulphuric acid
- Uranium, Uranium slurry
- Magnesium and lime slurry for processing
- Thickened silica slurry
- Coal, drainage water with coal
- Diamond waste
- Liquid explosives
- Mine tailings
- and much more...

The VERDERFLEX product group consists of a well-balanced high quality range of industrial hose pumps for heavy-duty applications. As with all series of VERDERFLEX pumps, current emphasis is on reduced downtime with minimal maintenance, easy operation and continuous quality improvement.

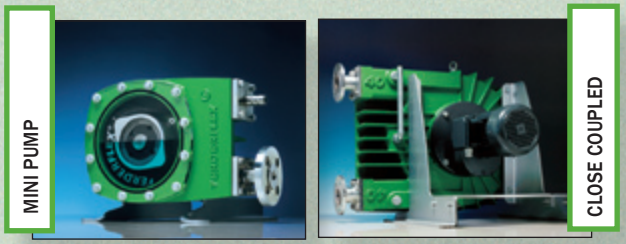
The VERDERFLEX pump range consists of:

Mini pumps:	VF10 and VF15
Small heavy-duty pumps:	VF25, VF32, VF40 and VF50
Medium heavy-duty pumps:	VF65 and VF80
Large heavy-duty pumps:	VF100 and VF125

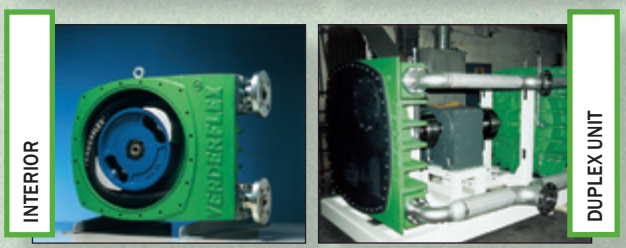
Materials of construction:

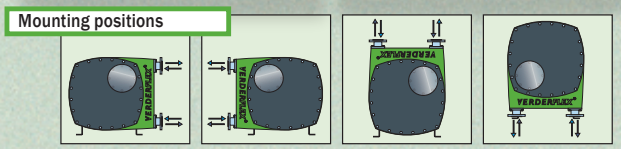
Pump housing	Cast iron (aluminum optional for mini pumps)
Rotor	Cast iron (aluminum optional for mini pumps)
Rotor shoes	Aluminum (stainless steel as option)
Inserts	Stainless steel, PP, PVDF
Flanges	Mild Steel ANSI 150 Option Hose Barbs VF10 & VF15
Base plate	Carbon steel
Bearing cartridge	Cast iron with high tensile steel shaft.
Lubricant	Specially designed mixture (silicone-based oil as option)
Hose	NR, NBR, EPDM and Hypalon

VERDERFLEX®









bring an end to your hose woes

The hose is the heart and soul of a peristaltic pump. The successful use of hose pumps in a number of industrial fields led VERDERFLEX to develop a hose with a special construction.





VERDERFLEX hose is technically superior

- VERDERFLEX hose has many more reinforcements
- the rubber is pressed into the reinforcing fibres, which traps the rubber for greater strength
- the more fibres, the better the load distribution and reduces the load per fibre
- VERDERFLEX hoses are not extruded, they are hand made and meet stringent manufacturing tolerances

Hoses in some peristaltic pumps could fail due to fatigue between the rubber layers and the reinforcement. However, VERDERFLEX successfully developed a hose designed to postpone fatigue within its construction, resulting in extremely long service life of the hose.

Choose a hose selection that is suitable with corrosive chemicals, highly abrasive slurries, inorganic products, etc....

VERDERFLEX NR (Natural Rubber)
VERDERFLEX NBR (Nitrile Rubber)
VERDERFLEX EPDM
VERDERFLEX Hypalon

VERDERFLEX hoses can also be used with your existing non-VERDERFLEX peristaltic pump. Call us for compatibility and application choices. End your hose woes!

Appendix A

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Appendix A

VERDERLUBE Safety Data Sheet

VERDERLUBE is the lubricant / coolant used with the VERDERFLEX ® range of and other peristaltic or hose pumps

WARNING !
Used lubricant may become contaminated with pumped product, also verify precautions and advice against relevant product information

1 Identification of the Substance/Preparation and of the Company/Undertaking

1.1 Identification of Substance or Preparation

Product Name	VERDERLUBE
Chemical Identification	Glycerine based blend
CAS Number	
Preparation	
Use	
Food Grade	
Pump Lubricant / Coolant	

1.2 Company Identification

Producer /Supplier

VERDER LIMITED
WHITEHOUSE STREET
HUNSLET
LEEDS LS10 1AD
GREAT BRITAIN

Phone Number +44 (0)113 222 0279
Fax Number +44 (0)113 244 0291

Emergency Telephone Number
For advice on this product telephone +44 (0)113 222 0279

2 Composition / Information on Ingredients

This product contains no substances classified as hazardous to health in concentrations that should be taken into account according to EC directive 91/155/EC

Main constituent may cause irritation to eyes and skin.
Irritating to respiratory system in the form of a mist.

3 Hazards Identification

This product is not classified as hazardous according to EC directive 91/155/EC

WARNING !

- May cause irritation to eyes and skin.
- Irritating to respiratory system in the form of a mist.
- Contact with hot product may cause burns.
- Product is a lubricant and in the event of untreated spillage, can cause external surfaces to become slippery when wet

4 First Aid Measures

Used lubricant may become contaminated with pumped product, also verify precautions and advice against relevant product information

4.1 Ingestion

Give 500 ml of Water to drink
DO NOT INDUCE VOMITING
Except as a deliberated act, the ingestion of large amounts of product is unlikely. If this should occur, do not induce vomiting, obtain medical advice.

4.2 Inhalation

If inhalation of fumes from overheated material causes irritation to the nose or throat, or coughing, remove to fresh air. Obtain medical advice if any symptoms persist.

4.3 Skin Contact

Wash thoroughly with mild soap and water as soon as reasonably practical. Remove heavily contaminated clothing and wash underlying skin

4.4 Eye Contact

Wash eye thoroughly with copious amounts of water, ensuring eyelids are held open. Obtain medical advice if any pain or redness develops or persists.

5 Fire Fighting Measures

Used lubricant may become contaminated with pumped product, also verify precautions and advice against relevant product information

5.1 Extinguishing Media

Alcohol resistant foam, dry powder or water fog

5.2 Extinguishing Media To Avoid

Do not use water jets

5.3 Unusual Fire and Explosion Hazards

Avoid spraying directly into storage containers because of danger of boil over

5.4 Special Protective Equipment for Fire fighters

Protective clothing and approved breathing apparatus when in close proximity of fire
During burning, poisonous acrolein may be found

6 Accidental Release Measures

Used lubricant may become contaminated with pumped product, also verify precautions and advice against relevant appropriate product information

6.1 Personal Protection

Wear goggles and gloves. If spillage has occurred in a confined space, ensure sufficient ventilation and check that a safe, breathable atmosphere is present before entry.

6.2 Environmental Precautions

Protect drains from spills and prevent entry of product. Treated effluent may be biodegradable. Recover cleaning water for later treatment.

6.3 Methods for Cleaning Up

Contain and recover liquid, soak up with absorbent material (sand, peat, etc.) or contain and shovel into drums or containers. Remove residue by spraying with water

7 Handling and Storage

Used lubricant may become contaminated with pumped product, also verify precautions and advice against relevant product information

7.1 Handling

Contact with hot product causes burns.
Avoid contact with eyes. If splashing is likely to occur wear a full visor or chemical goggles to appropriate local national standards.
Avoid frequent or prolonged skin contact with fresh or used product.
Wash hands thoroughly after use.

7.2 Storage

Store under cover away from moisture and sources of ignition. Do not overheat in storage.
The lubricant/coolant is hygroscopic; keep the container tightly closed

8 Exposure Controls / Personal Protection

Used lubricant may become contaminated with pumped product, also verify precautions and advice against relevant product information

8.1 Personal Protection

Hand Protection	PVC or Rubber Gloves
Eye Protection	Chemical goggles
Respiratory Protection	Respiratory protection is unnecessary, providing concentration of vapour, mists or fumes is adequately controlled.

8.2 Occupational Exposure Limits

Ensure good ventilation.
Threshold limit Not tested

9 Physical and Chemical Properties

Form:	Viscous liquid
Colour:	Blue, Translucent may be supplied to special order
Odour:	Odourless
Solidification point	-40°C / -40°F approx.
Flash point	177°C / 350°F approx. (COC: ISO 2592)
Boiling Point	290°C / 554°F
Solubility in water	Miscible (at 20°C)
Vapour pessure	(20°C / 68°F) <0.01 mbar (100°C / 210°F) <1mbar
Viscosity	700 mPas approx. at 20°C / 68°F
pH value	7 approx.
Auto ignition temperature	400°C / 750°F approx.
Explosion limits	not established
Density (20°C/68°F)	1245 kg/m3 approx.
Behaviour with water at 20°C	Hygroscopic

10 Stability and Reactivity

Used lubricant may become contaminated with pumped product, also verify precautions and advice against relevant product information

10.1 Conditions to Avoid

Preparation is stable and unlikely to react in a hazardous manner under normal conditions of use.
No special precautions other than good housekeeping of chemicals.
Hazardous polymerisation reactions are unlikely to occur.
This material is combustible.

10.2 Materials to Avoid

Avoid contact with strong oxidizing agents, nitrogenous compounds and strong acids : risk of violent and or explosive reactions with pure compounds.

10.3 Hazardous Decomposition Products

During burning, poisonous acrolein may be found – very toxic by inhalation.
Incomplete combustion / thermal decomposition will generate smoke, carbon dioxide and hazardous gases, including carbon monoxide.

11 Toxicological Information

Used lubricant may become contaminated with pumped product, also verify precautions and advice against relevant product information

11.1 Toxicity Data

General purpose food grade lubricant /coolant
LD50 oral (rat)12600 mg/kg (not harmful) *

11.2 Significant Data with Possible Relevance to Human Health

- Eyes - Unlikely to cause more than transient stinging or redness if accidental eye contact occurs
- Skin - Unlikely to cause harm to the skin
- Ingestion - Unlikely to cause harm if accidentally swallowed in small doses, although larger quantities should be avoided
- Inhalation - At ambient temperatures this product will be unlikely to present an inhalation hazard

12 Ecological Information

Used lubricant may become contaminated with pumped product, also verify precautions and advice against relevant product information

12.1 Mobility

Spillage may penetrate the soil; unused preparation is food grade and is inherently harmless.

12.2 Persistence and Degradability

This preparation is inherently biodegradable.

12.3 Bio Accumulative Potential

There is no evidence to suggest that bioaccumulation will occur.

12.4 Aquatic Toxicity

VERDERLUBE is miscible in water. It is not considered harmful in low concentrations.

Water pollution reactors	gO2 /g
BOD5:	0,87 (NEN 3235-5.4)
BOD1:	1.16 (NEN 3235-5.3)
Fish: goldfish	LC50 (24h):>5000 mg/1 (modified ASTM D1345)

The aquatic toxicity (TLm96) is >1000mg/1, which is defined by NIOSH as an insignificant hazard

13 Disposal Considerations

Used lubricant may become contaminated with pumped product, also verify precautions and advice against relevant product information

13.1 Waste Disposal Method(s)

Where possible, arrange for unused product to be recycled.
Disposal of preparation should be via an authorized person/licensed waste disposal contractor in accordance with local regulations.
Incineration may be carried out under controlled conditions provided that local regulations are met.
Dispose of preparation and container carefully and responsibly. Do not dispose of preparation near ponds, ditches, down drains onto soil.

14 Transport Information

Not classified as dangerous for transport (RID/ADR-ADNE-IATA-IMDG-MARPOL-ICAO)

15 Regulatory Information

Classification Classification not required

16 Other Information

Employees of the VERDER group have not experienced any harmful effect during normal handling and production.
VERDERLUBE and VERDERFLEX are registered trademarks.

The information contained in this sheet is based on our knowledge of the preparation at its delivery date and that the information contained herein is current as of the date of this data sheet. Since the use of this information, and of these opinions and the conditions of use of this preparation is not within the control of VERDER Limited, it is the user's obligation to determine the conditions of safe use of the preparation.



The information contained in this sheet is based on our knowledge of the product at its delivery date

Appendix B

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Appendix B

VERDERSIL is an alternative lubricant / coolant used with the VERDERFLEX ® range of and other peristaltic or hose pumps

WARNING!
Used lubricant may become contaminated with pumped product, also verify precautions and advice against relevant product information

1. Identification of the Substance/Preparation and of the Company/Undertaking

1.1 Identification of Substance or Preparation

Product Name	VERDERSIL
Chemical Identification	Silicone fluid (Polydimethyl siloxane 350 CPS)
CAS Number	Preparation
Use	Pump Lubricant / Coolant

1.2 Company Identification

Producer /Supplier

VERDER LIMITED
WHITEHOUSE STREET
HUNSLET
LEEDS LS10 1AD
GREAT BRITAIN

Phone Number	+44 (0)113 222 0279
Fax Number	+44 (0)113 222 0291

Emergency Telephone Number
For advice on this product telephone +44 (0)113 222 0279

2. Composition / Information on Ingredients

This product, Polydimethyl siloxane, contains no substances classified as hazardous to health in concentrations that should be taken into account according to EC directive 91/155/EC

Main constituent may cause irritation to eyes and skin.
Irritating to respiratory system in the form of a mist.

3. Hazards Identification

This product is not classified as hazardous according to EC directive 91/155/EC

WARNING !

- May cause irritation to eyes and skin.
- Irritating to respiratory system in the form of a mist.
- Contact with hot product may cause burns.
- Product is a lubricant and in the event of untreated spillage, can cause external surfaces to become slippery when wet

4. First Aid Measures

Used lubricant may become contaminated with pumped product, also verify precautions and advice against relevant product information

4.1 Ingestion

No first aid should be required but should any symptoms persist, seek medical advice.

4.2 Inhalation

No first aid should be required but should any symptoms persist, seek medical advice.

4.3 Skin Contact

Wash thoroughly with mild soap and water as soon as reasonably practical. Remove heavily contaminated clothing and wash underlying skin

4.4 Eye Contact

Wash eyes thoroughly with copious amounts of water for 10 minutes, ensuring eyelids are held open. Obtain medical advice if any pain or redness develops or persists.

5. Fire Fighting Measures

Used lubricant may become contaminated with pumped product, also verify precautions and advice against relevant product information

5.1 Extinguishing Media

Carbon dioxide, foam, dry powder or water spray
Water can be used to cool fire-exposed containers

5.2 Extinguishing Media To Avoid

None known

5.3 Unusual Fire and Explosion Hazards

None known

5.4 Special Protective Equipment for Fire fighters

A self-contained respirator and protective clothing should be worn. Keep containers cool with water spray until well after the fire is out. Determine the need to evacuate or isolate any area in accordance with local emergency plans.

Hazardous combustion products include Silica, Carbon Oxides and traces of incompletely burned carbon compounds may form. Formaldehyde may also be found

6. Accidental Release Measures

Used lubricant may become contaminated with pumped product, also verify precautions and advice against relevant appropriate product information

6.1 Personal Protection

Wear goggles and gloves. If spillage has occurred in a confined space, ensure sufficient ventilation and check that a safe, breathable atmosphere is present before entry.

6.2 Environmental Precautions

Protect drains from spills and prevent entry of product into drains, ditches or watercourses by using sand, earth or other barriers.

6.3 Methods for Cleaning Up

Determine the need to evacuate or isolate the area in accordance with local emergency plan. Very large spills should be contained by bunding or similar methods. Contain and recover liquid, soak up with absorbent material (sand, peat, etc.) or contain and shovel into drums or containers.

Small spillages may be washed to drains with detergent and water.

Caution : Spilled product will produce an extremely slippery surface

7. Handling and Storage

Used lubricant may become contaminated with pumped product, also verify precautions and advice against relevant product information

7.1 Handling

Contact with hot product causes burns.
Avoid contact with eyes. If splashing is likely to occur wear a full visor or chemical goggles to appropriate local national standards.
Avoid frequent or prolonged skin contact with fresh or used product.
Wash hands thoroughly after use.

7.2 Storage

Store under cover away from moisture, sources of ignition or oxidizing agents. Do not overheat in storage.

8. Exposure Controls / Personal Protection

Used lubricant may become contaminated with pumped product, also verify precautions and advice against relevant product information

8.1 Personal Protection

Hand Protection	Gloves
Eye Protection	Safety glasses should be worn
Respiratory Protection	Respiratory protection is unnecessary, providing concentration of vapour, mists or fumes is adequately controlled.

8.2 Occupational Exposure Limits

Ensure good ventilation.
No known assigned exposure limits

9. Physical and Chemical Properties

Form:	Viscous liquid
Colour:	Colourless
Odour:	Odourless
Solidification point	< -45°C / <-60°F approx.
Flash point	121°C / 250°F approx. (Closed cup)
Boiling Point	>200°C / >390°F
Solubility in water	0 g/litre at 20°C
Viscosity	350 mPas approx. at 20°C / 68°F
Auto ignition temperature	>200°C / >390°F
Explosion limits	Not explosive
Density (20°C/68°F)	970 kg/m3 approx.

10. Stability and Reactivity

Used lubricant may become contaminated with pumped product, also verify precautions and advice against relevant product information

10.1 Conditions to Avoid

Preparation is stable and unlikely to react in a hazardous manner under normal conditions of use. No special precautions other than good housekeeping of chemicals.

10.2 Materials to Avoid

Can react with strong oxidizing agents

10.3 Hazardous Decomposition Products

Silica may be formed during burning

11. Toxicological Information

Used lubricant may become contaminated with pumped product, also verify precautions and advice against relevant product information

11.1 Toxicity Data

Generally non-toxic lubricant /coolant
LD50 oral (rat) >5000 mg/kg (not harmful)

11.2 Significant Data with Possible Relevance to Human Health

- Eyes - Unlikely to cause more than transient stinging or redness if accidental eye contact occurs
- Skin - Unlikely to cause harm to the skin
- Ingestion - Unlikely to cause harm if accidentally swallowed in small doses, although larger quantities should be avoided
- Inhalation - At ambient temperatures this product will be unlikely to present an inhalation hazard

Note product may emit formaldehyde vapours at temperatures above 150°C/300°F in the presence of air. Formaldehyde vapour is harmful by inhalation and irritating to the eyes and respiratory system at breathing concentrations of less than 1 part per million (1ppm)

12. Ecological Information

Used lubricant may become contaminated with pumped product, also verify precautions and advice against relevant product information

12.1 Mobility

Spillage may penetrate the soil; unused preparation is food grade and is inherently harmless.

12.2 Persistence and Degradability

This preparation is not biodegradable.

12.3 Bio Accumulative Potential

There is no evidence to suggest that bioaccumulation will occur.

12.4 Aquatic Toxicity

VERDERSIL has low aquatic toxicity.

13. Disposal Considerations

Used lubricant may become contaminated with pumped product, also verify precautions and advice against relevant product information

13.1 Waste Disposal Method(s)

Where possible, arrange for unused product to be recycled.
Disposal of preparation should be via an authorized person/licensed waste disposal contractor in accordance with local regulations.
Incineration may be carried out under controlled conditions provided that local regulations are met.
Dispose of preparation and container carefully and responsibly. Do not dispose of preparation near ponds, ditches, down drains onto soil.

14. Transport Information

Not classified as dangerous for transport (RID/ADR-ADNE-IATA-IMDG-MARPOL-ICAO)

15. Regulatory Information

Classification Classification not required

16. Other Information

Employees of the VERDER group have not experienced any harmful effect during normal handling and production.
VERDERLUBE and VERDERFLEX are registered trademarks.

The information contained in this sheet is based on our knowledge of the preparation at its delivery date and that the information contained herein is current as of the date of this data sheet. Since the use of this information, and of these opinions and the conditions of use of this preparation is not within the control of VERDER Limited, it is the user's obligation to determine the conditions of safe use of the preparation.



The information contained in this sheet is based on our knowledge of the product at its delivery date.

Appendix C

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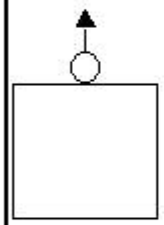
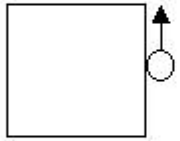
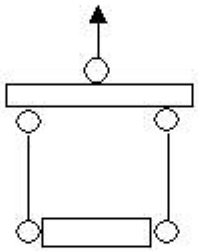
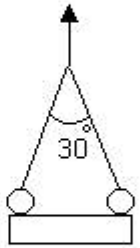
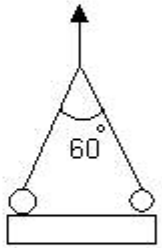
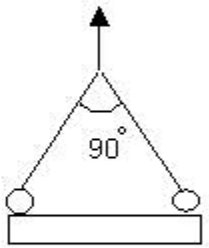
Appendix C

Appendix C - Guidance for Correct Lifting using EyeBolts

Lifting Applications for metric threaded EyeBolts

(Extract below is from standard AS1418.1 which encompasses and is more arduous than BS 4278 British Standards other references : ANSI/ASME B18.15 ; DIN 580)

	Single Eyebolt		Pair of EyeBolts			
Nominal size of Eyebolt	Axial (Vertical Lift) 	Trunnion-Type Mounting 	Perpendicular 	Included Angle 30° 	Included Angle 60° 	Included Angle 90° 
M10	250kg	60kg	120kg	310kg	200kg	120kg
M12	400kg	100kg	200kg	500kg	320kg	200kg
M16	800kg	200kg	400kg	1000kg	640kg	400kg
M20	1600kg	400kg	800kg	2000kg	1280kg	800kg
Reduction Factor for single EyeBolt Load x factor	1	0.25	0.25	0.63	0.4	0.25

Note* The Included Angle referred to above should NOT exceed 90 °

The load should be supported evenly and lifted on a level surface

VERDERFLEX®

CERTIFICATE OF CONFORMITY
EUROPEAN MACHINERY DIRECTIVE
CE MARK

Leeds, England
January 16, 2003.

We,

VERDER LTD,
Whitehouse Street, Hunslet
LEEDS LS10 1AD
ENGLAND

Part of the

European VERDER Group
Utrechtseweg 4a
P.O. Box 1,
NL-3450 AA VLEUTEN.
The Netherlands

Hereby declare that the following VERDERFLEX products

VF10, VF15, VF25, VF32, VF40, VF50, VF65. VF80, VF100 and VF125

Comply with European Community Machinery Directive 98/37/EC Issued 22 June 1998 and the associated harmonized standards.
Directive 89/392/EEC
Directive 91/368/EEC article 1
Directive 93/44/EEC
Directive 93/68/EEC article 6



D.S.Brown
Product Manager, Verderflex

VERDERFLEX®

Operating Protocol for VERDERFLEX Black NBR Food Grade Hose

VERDERFLEX Black NBR Food Grade hoses are suitable for conveying oily and fatty foods in peristaltic pumps

CLEANING PROTOCOL

VERDERFLEX Black NBR food grade hoses should be cleaned with the following protocol –

First flush		**2% Nitric Acid (HNO_3) solution for up to 3 minutes at up to 50°C**
Second flush		**2% Caustic soda (NaOH) solution for up to 20 minutes at up to 100°C**
	or	**5% Caustic soda (NaOH) solution for up to 5 minutes at up to 100°C**
	or	**20% Caustic soda (NaOH) solution for up to 20 minutes at ambient**
Final flush		**Flush with clean water to remove all traces of cleaning solutions**

Under no circumstances should VERDERFLEX Black NBR food grade hoses be cleaned with Sodium Hypochlorite (NaOCl) based cleaning solutions or the above concentrations, exposure durations or temperatures be exceeded.

EHEDG APPROVAL

VERDERFLEX Black NBR food grade hoses can be used with suitably specified VERDERFLEX pumps to form an EHEDG accredited hygienic pumping system. To comply with this certification both the approved particle velocity must be maintained during the cleaning cycle and the appropriate hygienic port flanges fitted. Should a pump to this specification be required, it should be agreed with your local VERDERFLEX distributor before the pump is supplied.

FOOD GRADE APPROVAL

All VERDERFLEX Black NBR food grade hoses' inner liners are certified as compliant to FDA – CFR 21 Parts 170 to 189 – Item 177.2600

HOSE DESCRIPTION

All VERDERFLEX Black NBR Food Grade hoses consist of a smooth black inner food grade liner bonded to a non-food grade outer. The inner liner is a taste-free and odour-less.

VERDER LIMITED
Whitehouse Street
Leeds
LS10 1AD
United Kingdom
Tel +44 113 222 0250
Fax +44 113 246 5649

www.verder.com

HOSE INSTALLATION

All VERDERFLEX Black NBR Food Grade hoses must be installed in accordance with the procedures defined in the VERDERFLEX Safety, Operating and Maintenance manual.

IDENTIFICATION

VERDERFLEX Black NBR Food Grade hoses can be identified by

- **a) Both an external Yellow Coding / Identification tape and an additional white longitudinal stripe**
- **b) On supply as a spare part, they will have their ends sealed with Aluminium foil**

PUMP INSTALLATION

VERDERFLEX pumps using VERDERFLEX Black NBR Food Grade hoses must be installed in accordance with recommendations made by the pump's supplier. In particular, special care must be given to the suction and discharge line conditions and that the hose is shimmed in accordance with VERDERFLEX's recommendations. Should there be any doubt about any installation details, these must be discussed with the pumps' supplier.

VERDERFLEX BLACK NBR FOOD GRADE HOSE PART NUMBERS

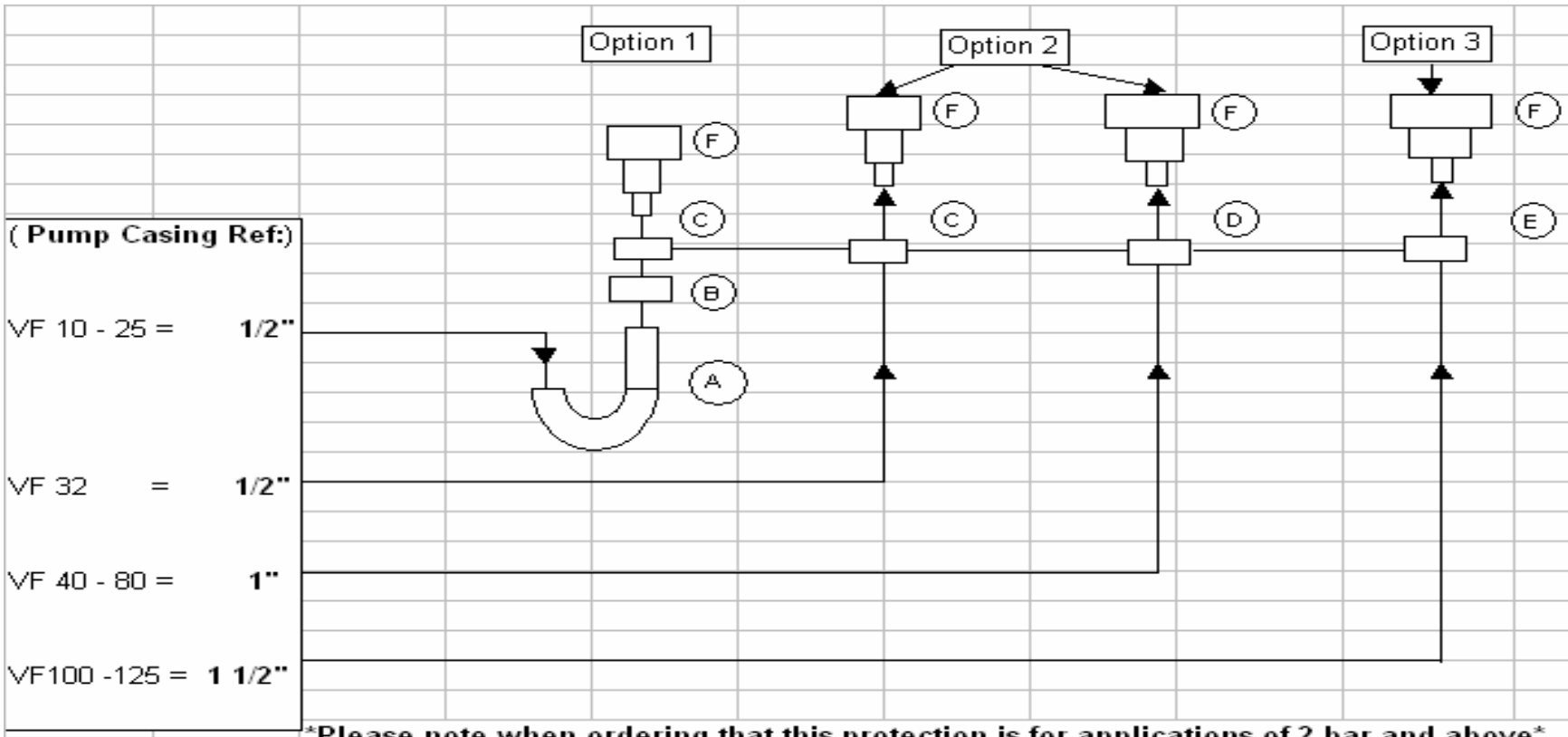
Pump Size	Part Number
VF10	129.2021
VF15	129.2022
VF25	129.2023
VF32	129.2024
VF40	129.2025
VF50	129.2026
VF65	129.2027
VF80	129.2028

VERDERLUBE

The associated VERDERLUBE lubricant is also a food-grade product and is made from food-grade constituents. A separate product datasheet is available on request.

VERDER LIMITED
Whitehouse Street
Leeds
LS10 1AD
United Kingdom
Tel +44 113 222 0250
Fax +44 113 246 5649

www.verder.com



Please note when ordering that this protection is for applications of 2 bar and above

Reference	Option 1 129.0714	QTY.	Part No.	VF 10 - 25
A	Standard Filler Tube 1/2"BSP X 15mm Compression outlet	0	Supplied	✓
B	15mm Compression x 1/2"BSP Female outlet	1	129.0701	✓
C	1/2"BSP Male X 1/4"BSP Female Reducer Bush	1	129.0692	✓
F	Pressure switch Huba 625.9540R400	1	129.0691	✓

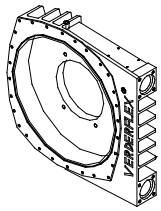
Reference	Option 2 129.0715	QTY.	Part No.	VF32 -80
C	1/2"BSP Male X 1/4"BSP Female Reducer Bush	1	129.0692	✓
D	1"BSP Male X 1/4"BSP Female Reducer Bush	1	129.0693	✓
F	Pressure switch Huba 625.9540R400	1	129.0691	✓

Reference	Option 3 129.0717	QTY.	Part No.	VF100 -125
E	1 1/2"BSP Male X 1/4"BSP Female Reducer Bush	1	129.0702	✓
F	Pressure switch Huba 625.9540R400	1	129.0691	✓

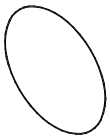
VERDERFLEX

VF10 & VF5 Spare Components

Ref	Description	Part No.	No-Off
2	Casing	129.0092	1



59	Front Cover O-ring	129.0075	1



(158mm∅ x 3mm approx)

49	Clear Front Cover	129.0039.P	1
	Optional Metal Cover	129.0039.M	
54	Low Pressure Rotor	129.1117.3	1
	High Pressure Rotor	129.1117	

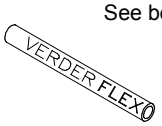


Taper Lock Bush

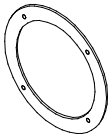
50	Type 1610 (25mm Bore)	129.1265	1
	Type 1610 (30mm Bore)	129.0063	1



36			
	VF5 Hose	See Page 3	
	VF10 Hose	See below	1



NR (black)	129.0001	
NBR (black)	129.0512	
EPDM (black)	129.0010	
CSM (black)	129.2010	
NBRF (black)	129.2021	
15 Drive Gasket	129.0479	1



21/22	VF10/15		
	Filler Tube & Cap	129.0759	1



26/30	Port Flange O Ring (Inner)	129.1398.F	10 / Pack
	Hosetail Port Flange O Ring(Inner)	129.1398.H	
32	Port Flange O Ring Pack (Outer)	129.1430	10 / Pack



Ref	Description	Part No.	No-Off

Flange Sealing Kits – *Containing:*

129.2031 - (To Suit all VF10 Port Flanges)

32	Port Flange O-ring (outer) (44 x 3.5)	2



-	Port Flange O Ring (inner (15.5 x 3.5)	2



26/30	Port Flange O-ring (inner) (12 x 3.0)	2



20	Sealing Ring	2



Port Flange Assembly



Flange

24	Flanged DIN/PN16	129.0884 MS or SS
	Flanged ANSI 150lb	129.1334 MS or SS
29	Flanged JIS	129.1021 MS or SS
31	One Piece Hosetail	129.1892
	Tri Clamp	129.1282.SS

Inserts



Flange

25	Flanged St. St.	129.1408.SF
	Flanged Polyprop.	129.1408.PF
	Flanged PVDF	129.1408.VF

Verderlube - VF10 Standard Quantity



½ litre Verderlube	129.1418
½ litre Verdersil	129.1372

VF10 Fastener Kits (See Detail Next Page)
Rated: '.P'=Plated = '.S' =Stainless

VF10 Std.Mounting Frame Fastener Kit	129.0900.1P
VF10 Port Flange Ass'y Fastener Kit	129.0900.3P
VF10 Casing Ass'y Fastener Kit	129.0900.4P
VF10 Long Couple Mounting Frame Fastener Kit	129.0900.5P

VERDERFLEX

VF10 Fastener Kit Breakdown

VF10 Mounting Frame Assembly Fastener Kit – 129.0900.1P

Ref	Part	Torque	Use	Quantity
10	M6 Washer		Mounting Frame to Pump Case	4
11	M6 x 16 Bolt	6Nm (4.3ft/lb)	Mounting Frame to Pump Case	4

VF10 Port Flange Assembly Fastener Kit – 129.0900.3P

Ref	Part	Torque	Use	Quantity
28	M6 Washer		Port Flange To Pump Case	8
27	M6 X 30 Bolt	8Nm (5.8ft/lb)	Port Flange To Pump Case	8

VF10 Casing Assembly Fastener Kit – 129.0900.4P

Ref	Part	Torque	Use	Quantity
17	M6 X 40 Csk Bolt	6Nm (4.3ft/lb)	Drive To Gearbox Connection	4
16	M6 Washer		Drive To Gearbox Connection	8
18	M6 Nylon Insert Nut		Drive To Gearbox Connection	4
40	M6 X 16 Bolt	3Nm (2.2ft/lb)	Front Cover To Pump Case	12
39	M6 X 3 Nylon Washer		Front Cover To Pump Case	12
34	3/8" BSP Plug	22Nm (15.9ft/lb)	Drain Plug	2
35	M16 Nylon Washer		Drain Plug	2

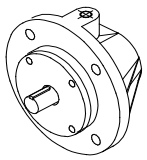
VF10 Mounting Frame Assembly Fastener Kit – 129.0900.5P

Ref	Part	Torque	Use	Quantity
10	M6 Washer		Mounting Frame to Pump Case	4
11	M6 x 16 Bolt	6Nm (4.3ft/lb)	Mounting Frame to Pump Case	4
06	M8 x 25 Bolt	10Nm (7.2ft/lb)	Long Coupled Only – Baseplate	6
08	M8 Nylon Insert Nut		Long Coupled Only – Baseplate	6
07	M8 Washer		Long Coupled Only – Baseplate	12
	M8 x 24 Dowel Pin		Long Coupled Only – Baseplate	4

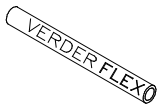
VERDERFLEX

VF10 Spare Components

Ref	Description	Part No.	No-Off



19b	Bearing Housing Assembly	129.0780	1
	Bearing House Bearing Kit	129.1460	1 Pack of 2
	Bearing House Shaft Key Kit	129.1470	1
	Bearing House Shaft	129.0554	1
	Seal Plate	129.0566	1
33	Close Coupled Mounting Frame Mild Steel	129.1314.MC	1
	Close Coupled Mounting Frame Stainless Steel	129.1314.SC	1
9/13	Long Coupled Extension Frame Mild Steel	129.1314.MA	1
36	VF5 Hose	See below	1

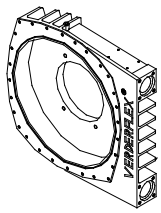


NR (black)	129.2060
NBR (black)	129.2062
EPDM (black)	129.2061
CSM (black)	129.2064
NBRF (black)	129.2063

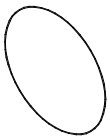
VERDERFLEX

VF15 Spare Components

Ref	Description	Part No.	No-Off
2	Casing	129.0093	1

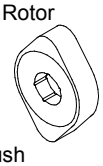


59	Front Cover O-ring	129.0076	1



(247mm∅ x 3.5mm approx)

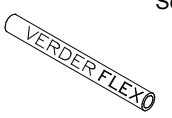
49	Clear Front Cover	129.0040.P	1
	Optional Metal Cover	129.0040.M	
54	Low Pressure Rotor	129.1369.3	1
	High Pressure Rotor	129.1369	



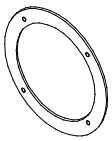
	Taper Lock Bush		
50	Type 1610 (30mm Bore)	129.0063	1
	Type 1610 (35mm Bore)	129.0063/35	1



36	Hose	See below	1



	NR (black)	129.0002	1
	NBR (black)	129.0513	
	EPDM (black)	129.0011	
	CSM (black)	129.2011	
	NBR (white)	129.0522	
15	Drive Gasket	129.0480	1



21/22	Filler Tube	129.0759	1



26/30	Port Flange O Ring (Inner)	129.1399.F	10 / Pack
Hosetail	Port Flange O Ring (Inner)	129.1399.H	
32	Port Flange O Ring (Outer)	129.1431	10 / Pack



Ref	Description	Part No.	No-Off

Flange Sealing Kits – *Containing:*

129.2032 -(To Suit all VF15 Port Flanges)

32	Port Flange O-ring (outer) (51 x 3.0)	2



	Port Flange O Ring (inner) (19 x 3)	2



26/30	Port Flange O-ring (inner) (17 x 3.0)	2



20	Sealing Ring	2



Port Flange Assembly



Flange

24	Flanged PN16	129.0885 MS or SS
	Flanged ANSI 150lb	129.1335 MS or SS
	Flanged JIS	129.1022 MS or SS
29	One Piece Hosetail	129.1893 MS or SS
	Tri Clamp	129.1286.SS

Inserts



Flange

25	Flanged St. St.	129.1409.SF
	Flanged Polyprop.	129.1409.PF
	Flanged PVDF	129.1409.VF

Verderlube - VF15 Standard Quantity



½ litre Verderlube	129.1418
½ litre Verdersil	129.1372

VF15 Fastener Kits (See Detail Next Page)

Rated: P= Plated , S = Stainless

VF15 Close Couple Mounting Frame Fastener Kit	129.0901.1P
VF15 Port Flange Ass'y Fastener Kit	129.0901.3P
VF15 Casing Ass'y Fastener Kit	129.0901.4P
VF15 Long Coupled Mountg Frame Fast'r Kit	129.0901.5P

VERDERFLEX

VF15 Fastener Kit Breakdown

VF15 Mounting Frame Assembly Fastener Kit – 129.0901.1P

Ref	Part	Torque	Use	Quantity
10	M8 Washer		Mounting Frame to Pump Case	4
11	M8 x 16 Bolt	14Nm (10.8ft/lb)	Mounting Frame to Pump Case	4

VF15 Port Flange Assembly Fastener Kit – 129.0901.3P

Ref	Part	Torque	Use	Quantity
28	M6 Washer		Port Flange To Pump Case Connection	8
27	M6 X 30 Bolt	6Nm (4.3ft/lb)	Port Flange To Pump Case Connection	8

VF15 Casing Assembly Fastener Kit – 129.0901.4P

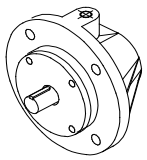
Ref	Part	Torque	Use	Quantity
17	M8 X 45 Bolt	14Nm (10.8ft/lb)	Drive To Gearbox Connection	4
16	M8 Washer		Drive To Gearbox Connection	8
18	M8 Nylon Insert Nut		Drive To Gearbox Connection	4
40	M6 X 16 Bolt	3Nm (2.2ft/lb)	Front Cover To Pump Case Connection	12
39	Nylon Washer		Front Cover To Pump Case Connection	12
34	3/8” BSP Plug	22Nm (15.8ft/lb)	Drain Plug	2
35	M16 Nylon Washer		Drain Plug	2
03	M10 Eye Bolt		Lifting Point on Casing	1

VF15 Mounting Frame Assembly Fastener Kit – 129.0901.5P

Ref	Part	Torque	Use	Quantity
10	M8 Washer		Mounting Frame to Pump Case	4
11	M8 x 16 Bolt	14Nm (10.8ft/lb)	Mounting Frame to Pump Case	4
06	M8 x 25 Bolt	14Nm (10.8ft/lb)	Long Coupled Only – Base plate	6
08	M8 Nylon Insert Nut		Long Coupled Only – Base plate	6
07	M8 Washer		Long Coupled Only – Base plate	12
	M8 x 24 Dowel Pin		Long Coupled Only – Base plate	4

VERDERFLEX

VF15 Spare Components

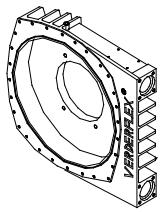
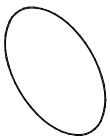
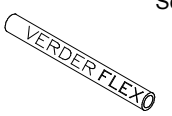
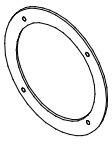


Ref	Description	Part No.	No-Off	
19b	Bearing Housing Assembly	129.0781	1	
	Bearing House O Ring Kit	129.1441	1	Pack of 2
	Bearing House Lip Seal Kit	129.1451	1	Pack of 2
	Bearing House Bearing Kit	129.1461	1	Pack of 2
	Bearing House Shaft Key Kit	129.1471	1	
	Bearing House Shaft	129.0555	1	
	Seal Plate	129.0567	1	
33	Close Coupled Mounting Frame Mild Steel	129.1315.MC	1	
	Close Coupled Mounting Frame Stainless Steel	129.1315.SC	1	
9/13	Long Coupled Extension Frame Mild Steel	129.1315.MA	1	

VERDERFLEX

VF20 Spare Components

Note* VF15 Parts references with exception of rotor
Size & hose related items i.e P/Flanges; Sealing rings etc.

Ref	Description	Part No.	No-Off
2	Casing	129.0093	1
			
59	Front Cover O-ring	129.0076	1
			
	(247mm∅ x 3.5mm approx)		
49	Clear Front Cover	129.0040.P	1
	Optional Metal Cover	129.0040.M	
54	Low Pressure Rotor	129.1370	1
			
	Taper Lock Bush		
50	Type 1610 (30mm Bore)	129.0063	1
	Type 1610 (35mm Bore)	129.0063/35	1
			
36	Hose	See below	1
			
	NR (black)	129.2070	1
	NBR (black)	129.2072	
	EPDM (black)	129.2073	
	CSM (black)	129.2074	
	NBR (white)	129.2075	
15	Drive Gasket	129.0480	1
			
21/22	Filler Tube	129.0759	1
			
26/30	Port Flange O Ring (Inner)	129.1399.F	10 / Pack
32	Port Flange O Ring (Outer)	129.1431	10 / Pack

Ref	Description	Part No.	No-Off

Flange Sealing Kits – *Containing:*

129.3032

32	Port Flange	2
	O-ring (outer) (51 x 3.0)	
		
	Port Flange O Ring (inner) (21.8 x 3.5)	2
		
20	Sealing Ring	2
		

Port Flange Assembly



Flange

24	Flanged PN16	129.2885 MS or SS
	Flanged ANSI 150lb	129.2335 MS or SS
	Flanged JIS	129.2022 MS or SS
29	One Piece Hosetail	129.2893 MS or SS
	Tri Clamp	129.2186.SS

Inserts



Flange

25	Flanged St. St.	129.2409.SF
	Flanged Polyprop.	129.2409.PF
	Flanged PVDF	129.2409.VF

Verderlube - VF15 Standard Quantity



½ litre Verderlube	129.1418
½ litre Verdersil	129.1372

VF15 Fastener Kits (See Detail Next Page)
Rated: P= Plated , S = Stainless

VF15 Close Couple Mounting Frame Fastener Kit	129.0901.1P
VF15 Port Flange Ass'y Fastener Kit	129.0901.3P
VF15 Casing Ass'y Fastener Kit	129.0901.4P
VF15 Long Coupled Mountg Frame Fast'r Kit	129.0901.5P

VERDERFLEX

VF20 Fastener Kit Breakdown

VF15 Mounting Frame Assembly Fastener Kit – 129.0901.1P

Ref	Part	Torque	Use	Quantity
10	M8 Washer		Mounting Frame to Pump Case	4
11	M8 x 16 Bolt	14Nm (10.8ft/lb)	Mounting Frame to Pump Case	4

VF15 Port Flange Assembly Fastener Kit – 129.0901.3P

Ref	Part	Torque	Use	Quantity
28	M6 Washer		Port Flange To Pump Case Connection	8
27	M6 X 30 Bolt	6Nm (4.3ft/lb)	Port Flange To Pump Case Connection	8

VF15 Casing Assembly Fastener Kit – 129.0901.4P

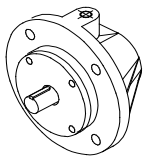
Ref	Part	Torque	Use	Quantity
17	M8 X 45 Bolt	14Nm (10.8ft/lb)	Drive To Gearbox Connection	4
16	M8 Washer		Drive To Gearbox Connection	8
18	M8 Nylon Insert Nut		Drive To Gearbox Connection	4
40	M6 X 16 Bolt	3Nm (2.2ft/lb)	Front Cover To Pump Case Connection	12
39	Nylon Washer		Front Cover To Pump Case Connection	12
34	3/8” BSP Plug	22Nm (15.8ft/lb)	Drain Plug	2
35	M16 Nylon Washer		Drain Plug	2
03	M10 Eye Bolt		Lifting Point on Casing	1

VF15 Mounting Frame Assembly Fastener Kit – 129.0901.5P

Ref	Part	Torque	Use	Quantity
10	M8 Washer		Mounting Frame to Pump Case	4
11	M8 x 16 Bolt	14Nm (10.8ft/lb)	Mounting Frame to Pump Case	4
06	M8 x 25 Bolt	14Nm (10.8ft/lb)	Long Coupled Only – Base plate	6
08	M8 Nylon Insert Nut		Long Coupled Only – Base plate	6
07	M8 Washer		Long Coupled Only – Base plate	12
	M8 x 24 Dowel Pin		Long Coupled Only – Base plate	4

VERDERFLEX

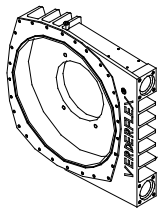
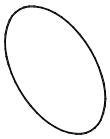
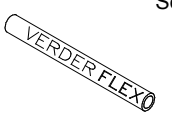
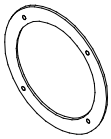
VF20 Spare Components



Ref	Description	Part No.	No-Off	
19b	Bearing Housing Assembly	129.0781	1	
	Bearing House O Ring Kit	129.1441	1	Pack of 2
	Bearing House Lip Seal Kit	129.1451	1	Pack of 2
	Bearing House Bearing Kit	129.1461	1	Pack of 2
	Bearing House Shaft Key Kit	129.1471	1	
	Bearing House Shaft	129.0555	1	
	Seal Plate	129.0567	1	
33	Close Coupled Mounting Frame Mild Steel	129.1315.MC	1	
	Close Coupled Mounting Frame Stainless Steel	129.1315.SC	1	
9/13	Long Coupled Extension Frame Mild Steel	129.1315.MA	1	

VERDERFLEX

VF25 Spare Components

Ref	Description	Part No.	No-Off
2	Casing	129.1194	1
			
59	Front Cover O-ring	129.0077	1
			
	330mm∅ x 3.5mm approx)		
49	Front Cover (12 Holes)	129.1141	1
54	Rotor MK 3	129.0049	1
			
58	Rotor Shoe Assembly		1
			
	Aluminium	129.1356.A	
	Stainless Steel	129.1356.S	
	Other _____	-	
57	Shim (pack of 14)	129.1387.M	1
			
	Taper Lock Bush		
50	Type 1610 (30mm Bore)	129.0063	1
	Type 1610 (35mm Bore)	129.0063/35	1
			
36	Hose	See below	1
			
	NR (black)	129.0003	
	NBR (black)	129.0514	
	EPDM (black)	129.0012	
	CSM (black)	129.2012	
	NBRF(black)	129.2023	
15	Drive Gasket	129.0481	1
			
21/22	Filler Tube + Cap	129.0760	1
26/30	Port Flange O Ring Pack (Inner)	129.1400	10 / Pack
32	Port Flange O Ring Pack (Outer) 	129.1432	10 / Pack
43	MkII Insp. Cover & O Ring	129.1223	1
44	MkII Insp. Cover O Ring	129.1229	1

Ref	Description	Part No.	No-Off

Flange Sealing Kits 129.1033– *Containing:*

32	Port Flange O-ring (outer) (75 x 3.5) 	2
26/30	Port Flange O-ring (inner) (24.5 x 3.0) 	2
20	Sealing Ring 	2

Port Flange Assembly– *Containing:*

Flanged Port Flanges 2



24	Flanged PN16	129.0886 MS or SS
	Flanged ANSI 150lb	129.1336 MS or SS
	Flanged JIS	129.1023 MS or SS
	Tri Clamp	129.1290.SS

Inserts Pair – *Containing*

Flanged Inserts **2**



Flanged

25		
	Flanged St. St.	129.1410.S
	Flanged Polyprop.	129.1410.P
	Flanged PVDF	129.1410.V

VF25 Fastener Kits (See Detail Next Page)
Rated : P = Plated , SS = Stainless

VF25 Close Coupled Mounting Frame Fastener Kit	129.0902.1P
VF25 Rotor Shoe Ass'y Fastener Kit	129.0902.2P
VF25 Port Flange Ass'y Fastener Kit	129.0902.3P
VF25 Casing Ass'y Fastener Kit	129.0902.4P
VF25 Long Coupled Mounting Frame Kit	129.0902.5P
VF25 Long Coupled Extension Kit	129.1902.5P

Verderlube - VF25 Standard Quantity



2 x 1 litres	Verderlube	Order 2 x 129.1419
2 x 1 litres	Verdersil	Order 2 x 129.1373

VERDERFLEX

VF25 Fastener Kit Breakdown

VF25 Mounting Frame Assembly Fastener Kit – 129.0902.1P

Ref	Part	Torque	Use	Quantity
10	M10 Washer		Mounting Frame to Pump Case	4
11	M10 x 25 Bolt	26Nm (18.7ft/lb)	Mounting Frame to Pump Case	4
06	M10 x 30 Bolt	26Nm (18.7ft/lb)	Crossmember to Support Frame	2
08	M10 Nylon Insert Nut		Crossmember to Support Frame	2
07	M10 Washer		Crossmember to Support Frame	4

VF25 Rotor Shoe Assembly Fastener Kit – 129.0902.2P

Ref	Part	Torque	Use	Quantity
38	M10 Washer		Rotor Shoe Fastening	2
37	M10 x 30 Bolt	20Nm (14.4ft/lb)	Rotor Shoe Fastening	2
55	M8 x 20 Split Dowel Pin		Rotor Shoe Fastening	2

VF25 Port Flange Assembly Fastener Kit – 129.0902.3P

Ref	Part	Torque	Use	Quantity
28	M8 Washer		Port Flange To Pump Case Connection	8
27	M8 X 30 Bolt	24Nm (17.3ft/lb)	Port Flange To Pump Case Connection	8

VF25 Casing Assembly Fastener Kit – 129.0902.4P

Ref	Part	Torque	Use	Quantity
17	M10 X 50 Bolt	26Nm (18.7ft/lb)	Drive To Gearbox Connection	4
16	M10 Washer		Drive To Gearbox Connection	8
18	M10 Nylon Insert Nut		Drive To Gearbox Connection	4
40	M8 X 16 Bolt	24Nm (17.3ft/lb)	Front Cover To Pump Case Connection	8
39	M8 Washer		Front Cover To Pump Case Connection	12
41	M6 x 3 Nylon Washer		Inspection Cover To Front Cover	8
34	1/2" BSP Plug	50Nm (36ft/lb)	Drain Plug	2
35	M20 Nylon Washer		Drain Plug	2
48	M8 x 30 Stud		Front Cover to Pump Case	4
42	M6 x 20 Bolt	3Nm (2.2ft/lb)	Inspection Cover to Front Cover	8
47	M8 Full Nut	14Nm (10.8ft/lb)	Front Cover To Pump Case Connection	4
03	M12 Eye Bolt		Lifting Point on Casing	1

VF25 Mounting Frame Assembly Fastener Kit – 129.0902.5P

Ref	Part	Torque	Use	Quantity
10	M10 Washer		Mounting Frame to Pump Case	4
11	M10 x 25 Bolt	26Nm (18.7ft/lb)	Mounting Frame to Pump Case	4
06	M10 x 30 Bolt	26Nm (18.7ft/lb)	Long Coupled Only – Baseplate	4
08	M10 Nylon Insert Nut		Long Coupled Only – Baseplate	4
07	M10 Washer		Long Coupled Only – Baseplate	8
	M8 x 24 Dowel Pin		Long Coupled Only – Baseplate	4

VF25 Extension Frame Assembly Fastener Kit – 129.1902.5P

Ref	Part	Torque	Use	Quantity
10	M10 Washer		Mtg Frame to Ext. Frame/Base Plate	12
	M8 x 24 Dowel Pins		Mtg Frame to Ext. Frame/Base Plate	4
06	M10 x 30 Bolt	26Nm (18.7ft/lb)	Mtg Frame to Ext. Frame/Base Plate	6
08	M10 Nylon Insert Nut		Mtg Frame to Ext. Frame/Base Plate	6

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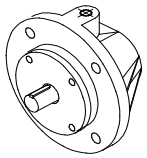
VF25 Spare Components

Ref	Description	Part No.	No-Off	
				
19b	Bearing Housing Assembly	129.0782	1	
	Bearing House O Ring Kit	129.1442	1	Pack of 2
	Bearing House Lip Seal Kit	129.1452	1	Pack of 2
	Bearing House Bearing Kit	129.1462	1	Pack of 2
	Bearing House Shaft Key Kit	129.1472	1	
	Bearing House Shaft	129.0160	1	
	Seal Plate	129.0172	1	
33/14	Close Coupled Mounting Frame Mild Steel	129.1316.MC	1	
	Close Coupled Mounting Frame Stainless Steel	129.1316.SC	1	
9/13	Long Coupled Extension Frame Mild Steel	129.1316.MA	1	

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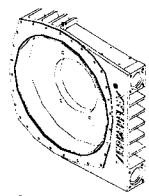
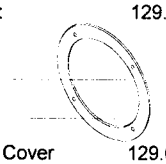
VF32 Spare Components

Ref	Description	Part No.	No-Off
2	Casing	129.1195	1
			
59	Front Cover O-ring	129.0078	1
	(405mm∅ x 3.5mm approx)		
49	Front Cover (12 Holes)	129.1142	1
54	Rotor MK 3	129.0050	1
			
58	Rotor Shoe Assembly		1
			
	Aluminium	129.1357.A	
	Stainless Steel	129.1357.S	
	Other _____	-	
57	Shim (pack of 12)	129.1388.M1	
			
50	Taper Lock Bush Type 2012 (40mm Bore)	129.0064	1
36	Hose	See below	1
	NR (black)	129.0004	
	NBR (black)	129.0515	
	EPDM (black)	129.0013	
	CSM (black)	129.2013	
	NBRF (black)	129.2024	
15	Drive Gasket	129.0482	1
			
43	Inspection Cover	129.0224.P	1
	MkII Insp'n Cover & O Ring	129.1224	
44	Inspection Cover (Gasket)	129.0230	1
	MkII Insp. Cover O Ring	129.1230	
21/22	Filler Tube	129.0760	1
26/30	Port Flange O Ring Pack (Inner)	129.1401	10 / Pack
32	Port Flange O Ring Pack (Inner)	129.1433	10 / Pack

Ref	Description	Part No.	No-Off

Flange Sealing Kits – *Containing:*

129.1034

32	Port Flange O-ring (outer) (83 x 3.5)	2
26/30	Port Flange O-ring (inner) (31.5 x 3.0)	2
20	Sealing Ring	2

Port Flange Assembly– *Containing:*

Flanged Port Flanges 2



24

Flanged PN16	129.0887 MS or SS
Flanged ANSI 150lb	129.1337 MS or SS
Flanged JIS	129.1024 MS or SS
Tri Clamp	129.1294.SS

Inserts Pair – *Containing*

Flanged Inserts 2



25

Flanged

Flanged St. St.	129.1411.S
Flanged Polyprop	129.1411.P
Flanged PVDF	129.1411.V

VF32 Fastener Kits (See Detail Next Page)
Rated : .P = Plated / .S = Stainless

VF32 Close Coupled Mounting Frame Fastener Kit	129.0903.1P
VF32 Rotor Shoe Ass'y Fastener Pack	129.0903.2P
VF32 Port Flange Ass'y Fastener Pack	129.0903.3P
VF32 Casing Ass'y Fastener Pack	129.0903.4P
VF32 Long Coupled Mounting Frame Kit	129.0903.5P
VF32 Long Coupled Extension Frame Kit	129.1903.5P

Verderlube - VF32 Standard Quantity



2.5 litre	Verderlube	129.2379
2.5 litre	Verdersil	129.2505

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VF32 Fastener Kit Breakdown

VF32 Mounting Frame Assembly Fastener Kit – 129.0903.1P

Ref	Part	Torque	Use	Quantity
10	M10 Washer		Mounting Frame to Pump Case	4
11	M10 x 25 Bolt	34Nm(24.5ft/lb)	Mounting Frame to Pump Case	4
06	M10 x 30 Bolt	26Nm(18.7ft/lb)	Crossmembers to Support Frame	2
08	M10 Nylon Insert Nut		Crossmembers to Support Frame	2
07	M10 Washer		Crossmembers to Support Frame	4

VF32 Rotor Shoe Assembly Fastener Kit – 129.0903.2P

Ref	Part	Torque	Use	Quantity
38	M12 Washer		Rotor Shoe Fastening	2
37	M12 x 35 Bolt	22Nm (15.8ft/lb)	Rotor Shoe Fastening	2
55	M8 x 20 Split Dowel Pin		Rotor Shoe Fastening	2

VF32 Port Flange Assembly Fastener Kit – 129.0903.3P

Ref	Part	Torque	Use	Quantity
28	M10 Washer		Port Flange To Pump Case Connection	8
27	M10 X 30 Bolt	24Nm (17.3ft/lb)	Port Flange To Pump Case Connection	8

VF32 Casing Assembly Fastener Kit – 129.0903.4P

Ref	Part	Torque	Use	Quantity
17	M12 X 55 Bolt	50Nm (36ft/lb)	Drive To Gearbox Connection	4
16	M12 Washer		Drive To Gearbox Connection	8
18	M12 Nylon Insert Nut		Drive To Gearbox Connection	4
40	M10 X 20 Bolt	24Nm(17.3ft/lb)	Front Cover To Pump Case Connection	8
39	M10 Washer		Front Cover To Pump Case Connection	12
41	M6 x 3 Nylon Washer		Inspection Cover to Front Cover	8
34	1/2" BSP Plug	50Nm (36ft/lb)	Drain Plug	2
35	M20 Nylon Washer		Drain Plug	2
48	M10 x 30 Stud		Front Cover to Pump Case Connection	4
42	M6 x 20 Bolt	5Nm (3.6ft/lb)	Inspection Cover to Front Cover	8
47	M10 Full Nut	26Nm(18.7ft/lb)	Front Cover To Pump Case Connection	4
03	M12 Eye Bolt		Lifting Point on Casing	1

VF32 Mounting Frame Assembly Fastener Kit – 129.0903.5P

Ref	Part	Torque	Use	Quantity
10	M10 Washer		Mounting Frame to Pump Case	4
11	M10 x 25 Bolt	34Nm(24.5ft/lb)	Mounting Frame to Pump Case	4
06	M10 x 30 Bolt	26Nm(18.7ft/lb)	Long Coupled Only – Baseplate	4
08	M10 Nylon Insert Nut		Long Coupled Only – Baseplate	4
07	M10 Washer		Long Coupled Only – Baseplate	8
	M8 x 24 Dowel Pin		Long Coupled Only – Baseplate	4

VF32 Extension Frame Assembly Fastener Kit – 129.1903.5P

Ref	Part	Torque	Use	Quantity
10	M10 Washer		Mtg Frame to Ext. Frame/Base plate	12
	M8 x 24 Dowel Pins		Mtg Frame to Ext. Frame/Base plate	4
06	M10 x 30 Bolt	26Nm(24.5ft/lb)	Mtg Frame to Ext. Frame/Base plate	6
08	M10 Nylon Insert Nut		Mtg Frame to Ext. Frame/Base plate	6

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VF32 Spare Components

Ref	Description	Part No.	No-Off	
19b	Bearing Housing Assembly	129.0783	1	
	Bearing House O Ring Kit	129.1443	1	Pack of 2
	Bearing House Lip Seal Kit	129.1453	1	Pack of 2
	Bearing House Bearing Kit	129.1463	1	Pack of 2
	Bearing House Shaft Key Kit	129.1473	1	
	Bearing House Shaft	129.0161	1	
	Seal Plate	129.0173	1	
33/14	Close Coupled Mounting Frame Mild Steel	129.1317.MC	1	
	Close Coupled Mounting Frame Stainless Steel	129.1317.SC	1	
9/13	Long Coupled Mounting Frame Mild Steel	129.1317.ML	1	
9/13	Long Coupled Extension Frame Mild Steel	129.1317.MA	1	

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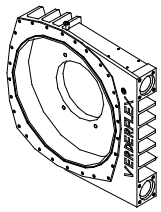
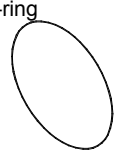
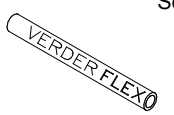
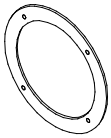
VF40 Spare Components

Ref	Description	Part No.	No-Off
2	Casing	129.1196	1
			
59	Front Cover O-ring	129.0079	1
	 (507mm∅ x 5mm approx)		
49	Front Cover (20 hole)	129.1143	1
54	Rotor	129.0466	1
			
58	Rotor Shoe Assembly		1
			
	Aluminium	129.1358.A	
	Stainless Steel	129.1358.S	
	Other _____	-	
57	Shim (pack of 20)	129.1389.M	1
			
	Taper Lock Bush		
50	Type 2517 (40mm Bore)	129.0065	1
	Type 2517 (42mm Bore)	129.0065/42	1
	Type 2517 (50mm Bore)	129.0065/50	1
			
36	Hose	See below	1
			
	NR (black)	129.1005	
	NBR (black)	129.1516	
	EPDM (black)	129.1014	
	CSM (black)	129.2014	
	NBRF(black)	129.2025	
15	Drive Gasket	129.0483	1
			
21/22	Filler Tube	129.0761	1
43	Inspection Cover	129.0225.P	
43	MkII Insp. Cover & O Ring	129.1225	
44	Inspection Cover (Gasket)	129.0231	1
45	Insp. Cover O Ring	129.1231	
26/30	Port Flange O Ring Pack (Inner)	129.1402	10 / Pack
32	Port Flange O Ring Pack (Outer) 	129.1434	10 / Pack

Ref	Description	Part No.	No-Off

Flange Sealing Kits 129.2035 – *Containing:*

32	Port Flange O-ring (outer) (91 X 4.0) 	2
26/30	Port Flange O-ring (inner) (40 X 4.0) 	2
20	Sealing Ring 	2

Port Flange Assembly– *Containing:*

Flanged Port Flanges 2



24	Flanged PN16	129.0888 MS or SS
	Flanged ANSI 150lb	129.1338.MS or SS
	Flanged JIS	129.1025 MS or SS
	Tri Clamp	129.1298.SS

Inserts Pair – *Containing*

Flanged Inserts **2**



Flanged

25		
	Flanged St. St.	129.1412.S
	Flanged Polyprop.	129.1412.P
	Flanged PVDF	129.1412.V

VF40 Fastener Kits (See Detail Next Page)
Rated : P = Plated , SS = Stainless

VF40 Close Coupled Mounting Frame Fastener Kit	129.0904.1P
VF40 Rotor Shoe Ass'y Fastener Kit	129.0904.2P
VF40 Port Flange Ass'y Fastener Kit	129.0904.3P
VF40 Casing Ass'y Fastener Kit	129.0904.4P
VF40 Long Coupled Frame Fastener Kit	129.0904.5P
VF40 Long Coupled Extension Frame Kit	129.1904.5P

Verderlube - VF40 Standard Quantity



2 x 2.5 litres	Verderlube	Order 2 x 129.2379
2 x 2.5 litres	Verdersil	Order 2 x 129.2505