

VERDERFLEX[®]



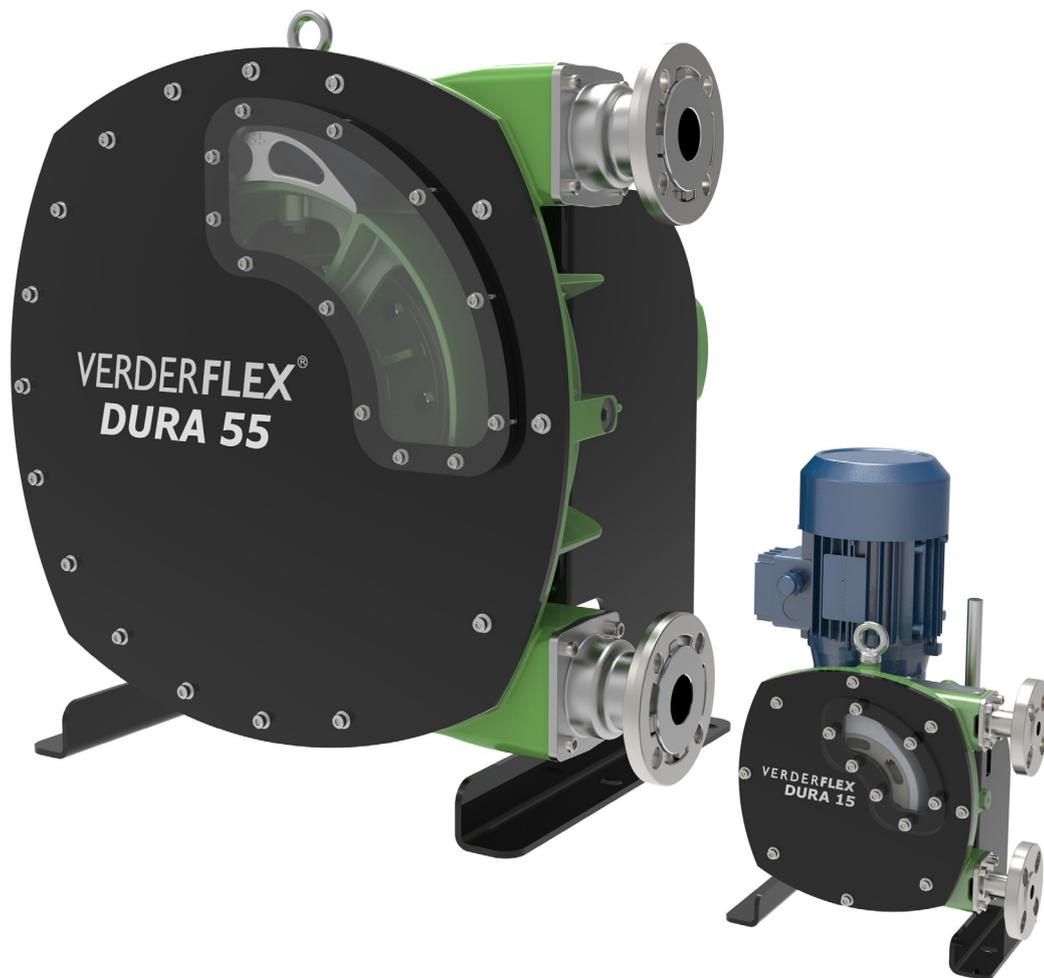
Peristaltic Industrial Hose Pump

ATEX Instruction Manual

Dura 05-55

Version 1.0v-07/2019

Print-No. 01



VERDER
passion for pumps

Version 1.0v-07/2019
Print-No. 01

ATEX Instruction Manual Dura 05-55



The information in this document is essential for the safe operation and maintenance of Verderflex® industrial range of pumps in ATEX environment. This document must be read and understood thoroughly prior to installation of unit, electrical connection and commissioning.

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1 About this Document

This manual is a guideline for qualified users for the safe operation and maintenance of Verderflex® pumps working in ATEX environments. This is a supplementary document to the operating manual. The operating manual must be read and understood both by the installing personnel and the responsible trained personnel / operators prior to following additional guidelines in this ATEX instruction manual.

Instructions in this manual should be read in conjunction with instructions and guidelines in motor and gearbox operating manuals and ATEX guidelines.

1.1 Target Groups

Target Groups	Duty
Operating Company	<ul style="list-style-type: none"> ▶ Keep this manual available at the operating site of the pump. ▶ Ensure that personnel read and follow the instructions in this manual and any other applicable documents, especially all safety instructions and warnings. ▶ Observe any additional rules and regulations referring to the system.
Qualified personnel, fitter	<ul style="list-style-type: none"> ▶ Read, observe and follow this manual and the other applicable documents, especially all safety instructions and warnings.

Table 1 Target Groups

1.2 Warnings and Symbols Used in the Manual

Warning	Risk Level	Consequences of disregard
 DANGER	Immediate risk	Death, serious bodily harm
 WARNING	Potential acute risk	Death, serious bodily harm
 CAUTION	Potential hazardous situation	Potential damage to the pump
Note	For information	Possible incorrect use/maintenance of pump

Table 2 Warnings Used in the Manual

Symbol	Meaning
	Safety warning sign in accordance with DIN 4844 - W9 <ul style="list-style-type: none"> ▶ Take note of all information highlighted by the safety warning sign and follow the instructions to avoid injury or death.
▶	Instruction
1., 2.,	Multiple-step instructions
□	Checklist
→	Cross-reference
	Information

Table 3 Symbols Used in the Manual

2 Safety

 The manufacturer does not accept any liability for damage resulting from disregard of this documentation.

2.1 Intended Use

- ▶ Only use the pump to handle compatible fluids as recommended by the manufacturer (→ 5 Limitations for use in ATEX Environment).
- ▶ Adhere to the operating limits.
- ▶ Consult the manufacturer regarding any other use of the pump.
- ▶ Pumps delivered without a motor must be fitted with a motor in accordance with the provisions of EC Machinery Directive 2006/42/EC.

Prevention of obvious misuse (examples)

- ▶ Note the operating limits of the pump with regard to temperature, pressure, flow rate and motor speed (→ 5 Limitations for use in ATEX Environment).
- ▶ Do not operate the pump with any inlet/outlet valves closed
- ▶ Only install the pump as recommended in this manual. For example, the following are not allowed:
 - Installing the pump without proper support.
 - Installation in the immediate vicinity of extreme hot or cold sources.

2.2 General Safety Instructions

 Observe the following regulations before carrying out any work.

2.2.1 Product Safety

- These operating instructions contain fundamental information which must be complied with during installation, operation and maintenance. Therefore this operating manual must be read and understood both by the installing personnel and the responsible trained personnel / operators prior to installation and commissioning, and it must always be kept easily accessible within the operating premises of the machine.
Not only must the general safety instructions laid down in this chapter on “Safety” be complied with, but also the safety instructions outlined under specific headings.
- Operate the pump only if it and all associated systems are in good functional condition.
- Only use the pump as intended, fully aware of safety and risk factors involved and the instructions in this manual.
- Keep this manual and all other applicable documents complete, legible and accessible to personnel at all times.
- Refrain from any procedure or action that would pose a risk to personnel or third parties.
- In the event of any safety-relevant faults, shut down the pump immediately and have the malfunction corrected by qualified personnel.
- The installation of the pump must comply with the requirements of installation given in this manual and any local, national or regional health and safety regulations.

2.2.2 Obligation of the Operating Company

Safety-conscious operation

- Ensure that the following safety aspects are observed and monitored:
 - Adherence to intended use
 - Statutory or other safety and accident-prevention regulations
 - Safety regulations governing the handling of hazardous substances if applicable
 - Applicable standards and guidelines in the country where the pump is operated
- Make personal protective equipment available pertinent to operation of the pump.

Qualified personnel

- Ensure that all personnel tasked with work on the pump have read and understood this manual and all other applicable documents, including the safety, maintenance and repair information, prior to use or installation of the pump.
- Organize responsibilities, areas of competence and the supervision of personnel.
- Have all work carried out by specialist technicians only.
- Ensure that trainee personnel are under the supervision of specialist technicians at all times when working with the pump.

Safety equipment

Provide the following safety equipment and verify its functionality:

- For hot, cold and moving parts: safety guarding should be provided by the operating company.
- For potential build up of electrostatic charge: ensure appropriate grounding if and when required.

Warranty

The warranty is void if the customer fails to follow any Instruction, Warning or Caution in this document. Verder has made every effort to illustrate and describe the product in this document. 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.

Obtain the manufacturer's approval prior to carrying out any modifications, repairs or alterations during the warranty period. Only use genuine parts or parts that have been approved by the manufacturer.

For further details regarding warranty, refer to terms and conditions.

2.2.3 Obligation of Personnel



It is imperative that the instructions contained in this manual are complied with by the operating personnel at all times.

- ▶ Pump and associated components:
 - Do not lean or step on them or use as climbing aid
 - Do not use them to support boards, ramps or beams
 - Do not use them as a fixing point for winches or supports
 - Do not de-ice using gas burners or similar tools
- ▶ Do not remove the safety guarding for hot, cold or moving parts during operation.
- ▶ Reinstall the safety equipment on the pump as required by regulations after any repair / maintenance work on the pump.

2.3 Specific Hazards

2.3.1 Hazardous Pumped Liquids

Follow the statutory safety regulations when handling hazardous pumped liquids (e.g. hot, flammable, poisonous or potentially harmful).

Use appropriate Personal Protective Equipment when carrying out any work on the pump.

2.3.2 Lubricants

Ensure that the lubricant and pumped liquid are compatible with each other. This is a precautionary measure in case of accidental hose burst whereby the pumped liquid comes in contact with the lubricant. (→ Refer datasheet for lubricant to ensure compatibility and also refer section 5.10 for specific lubricant limitations)

2.3.3 Sharp Edges

Pump parts, such as the shims and impellers, can be sharp

- Use protective gloves when carrying out any work on the pump

2.3.4 ATEX Environment

Failure to implement the necessary safety procedures and failure to disclose the intended use of a pump within an explosive atmosphere as laid down in latest EC Atex Directive 2014/34/EU will void all warranty for the product. (Refer warranty terms and conditions for more details).

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 if the customer fails to follow any Instruction, Warning or Caution in this document.

3 ATEX Introduction

i ATEX assessment for the Dura 05-55 pumps are based on Equipment group II category 2, Ref BS EN 13463-1:2009 and in compliance with EU ATEX Directive 2014/34/EU, commonly referred to as the ATEX (“Atmosphères explosibles”) “product” directive, applicable from 20 April 2016, which replaces the previous Directive 94/9/EC.

Verder strongly recommends the user to ensure the ATEX rated equipment is installed and operated in accordance with ATEX “workplace” Directive 1999/92/EC. Any associated equipment installed or used within an Explosive environment should be rated to appropriate ATEX standard.

3.1 ATEX Name Plate

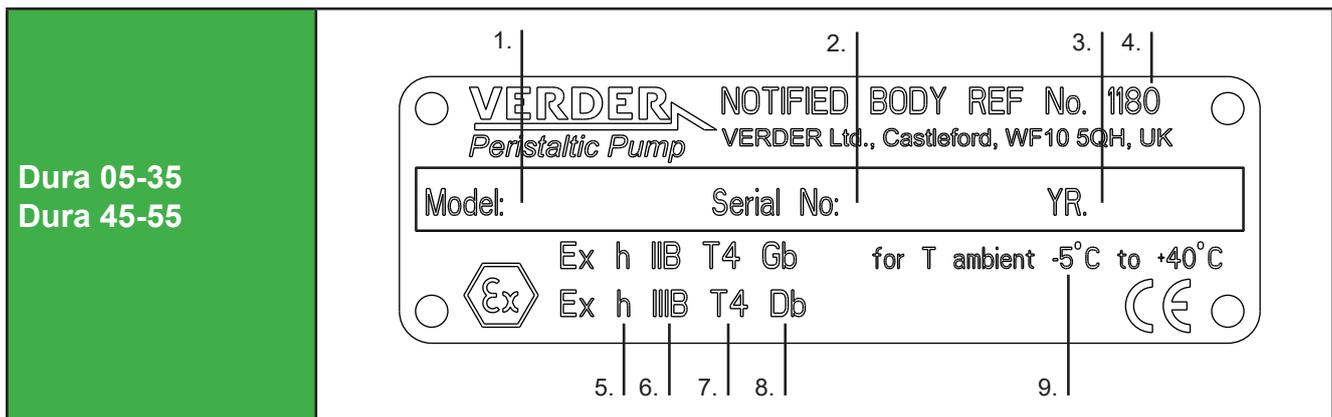


Figure 1 ATEX Name Plate

- | | |
|------------------------------------|------------------------------|
| 1. Pump Type | 6. Gas Group |
| 2. Serial Number | 7. Temperature Class |
| 3. Year of Manufacture | 8. ATEX Category: |
| 4. Technical File Reference Number | 'G' for Gas |
| 5. Ignition Protection | 'D' for Dust |
| | 9. Ambient Temperature Range |

4 ATEX Specification

1. The ATEX code consists of the group, category, ignition protection marking and temperature class.
2. ATEX rating of Verderflex Dura pumps is to the following standard which is explained below:

EX h IIB T4 Gb / Db for T ambient -5°C to 40°C

Item	Example	Explanation
Ignition Protection	h	Non-Electrical Equipment meeting the requirements of EN ISO 80079-36:2016 is marked with "h".
Gas Group	IIB	Gas Group II - Ethylene
Temperature Class	T4	Maximum surface temperature < 135 °C
ATEX Category	Gb/Db	Equipment Protection level: Gb: Gas zone 1 Db: Dust zone 21
Ambient Temperature Range *	for T ambient -5°C to 40°C	Maximum ambient temperature for operating the pump -5°C to 40°C

Table 4 ATEX Classification

*The ambient temperature range depends on the pump type. (→ refer to 3.1 ATEX Name Plate)

4.1 Gas Group

 Gases are classified according to type of hazardous environment and ignitability of the gas/air mixture as defined in EN/IEC 60079-21-1.

Gas Group	I	Mines
	II	Surface above ground with gas hazard
	III	Surface above ground with dust hazard
Gas Sub Group	A	Less easily ignited gases e.g. propane
	B	Easily ignited gases e.g. ethylene
	C	Most easily ignited e.g. hydrogen or acetylene

Table 5 Gas Group Classification

4.2 ATEX Category

 Zones are decided by the site based on a risk assessment of the likelihood of a potentially explosive atmosphere being present.

Gas Zone	ATEX Category	
Zone 0	Ga	Explosive atmosphere present continuously or for long periods, frequently
Zone 1	Gb	Explosive atmosphere is likely to occur under normal conditions, occasionally
Zone 2	Gc	Explosive atmosphere is unlikely to occur under normal conditions, short periods

Table 6 ATEX Category - Gas Zone

Dust Zone	ATEX Category	
Zone 20	Da	Explosive atmosphere present continuously or for long periods, frequently
Zone 21	Db	Explosive atmosphere is likely to occur under normal conditions, occasionally
Zone 22	Dc	Explosive atmosphere is unlikely to occur under normal conditions, short periods

Table 7 ATEX Category - Dust Zone

4.3 Temperature Class

 The Temperature Class rating of T1, T2, T3, T4, T5 or T6 for gases, indicates the classification for the maximum surface temperature for the device and therefore the the distance to the potential ignition temperature for a particular gas.

T Class	Maximum Surface Temperature
T1	450°C
T2	300°C
T3	200°C
T4	135°C
T5	100°C
T6	85°C

Table 8 Temperature Classification

4.4 Ignition Protection (h)

 In environments with an explosive atmosphere, ignition protection categories serve to prevent ignition by not reaching high temperatures. The ignition protection categories are distinguished according to the type and function of the equipment and the probability an explosive atmosphere will occur.

The ignition hazard assessment identifies sources of ignition and these can then be dealt with in turn, through compliance with EN ISO 80079, (→ refer to “Ignition Hazard Assessment” document provided as part of the ATEX pack for full details of compliance).

Ignition Hazard		Measures Applied to Prevent the Ignition Source Becoming Effective		
Potential Ignition Source	Description / Basic Cause (which causes originate which ignition hazard)	Reason for Assessment	Description of the Measure Applied	Basis Citation of Standard Technical Rules
Hot Surface	– Losses dissipate into heat.	The pump has a maximum temperature during normal operational conditions.	<ul style="list-style-type: none"> ▶ Maximum temperature achieved during testing. ▶ HP rotor and maximum rated pressure applied. ▶ Test results recorded . ▶ Limitations on medium temperature and Maximum permitted pump speed. 	EN 80079-36:2016 6.2 EN 80079-36:2016 8.2 EN 80079-36:2016 10
	– Over speed – Excess pressure - discharge – Operating outside of specified environmental conditions	Exceeding operating temperature.	<ul style="list-style-type: none"> ▶ Comply with specifications. 	EN 80079-36:2016 10 EN 80079-37:2016 5
	– Bearing wear	Exceeding operating temperature.	<ul style="list-style-type: none"> ▶ Bearing life far in excess of the design parameters. ▶ Maintenance procedure to check. 	EN 80079-36:2016 10 EN 80079-37:2016 5
	– Excess pressure - suction			
	– Low/ poor lubricant – Seal failure leading to bearing wear from lubricant loss	Exceeding operating temperature. Premature hose failure.	<ul style="list-style-type: none"> ▶ Maintenance and installation instructions. ▶ Requirement to use motor overload relay. ▶ Motor supplied with PTCs. ▶ Factor of safety on surface temperature limit allows for substantial temperature rise. 	EN 80079-36:2016 10 EN 80079-37:2016 5 EN 80079-37:2016 6
	– Swelling of hose in the presence of particular solvents	May cause over temperature	<ul style="list-style-type: none"> ▶ The manufacture’s instructions list of solvents which are known to be compatible. ▶ Requirement to use motor protection relay. ▶ Motors supplied with PTCs. 	EN 80079-36:2016 10
Mechanical Sparks	– External impact, mechanical failure	Potential impact from other source, falling object, been struck by moving object.	<ul style="list-style-type: none"> ▶ Material of manufacture is cast iron having less than 125J impact energy 	EN 80079-36:2016 6.4.2.2
Flames, Hot Gases			<ul style="list-style-type: none"> ▶ No flaming parts 	

Table 9 Ignition Protection (continued)

Ignition Hazard		Measures Applied to Prevent the Ignition Source Becoming Effective		
Potential Ignition Source	Description / Basic Cause (which causes originate which ignition hazard)	Reason for Assessment	Description of the Measure Applied	Basis Citation of Standard Technical Rules
Electrical Equipment	– Electric motor inside the assembly	Electrical equipment is a possible ignition source	▶ Only electrical equipment with certification of conformity is used	IEC 60079 series
Stray Electrical, Currents and Cathodic Corrosion Protection			▶ No stray currents or cathodic corrosion	
Static Electricity	– Static build up generating spark	Hose	▶ Static dissipative	EN 80079-36:2016 6.7.5
	– Static build up generating spark	Plastic window, potential risk during cleaning a static build up may occur. No charging during normal operation.	▶ Apply Cat 3 restrictions, if Cat 2 needed then change material of the window. EN13463-1:2009, 6.7.3	
Lightning	– Lightning strike		▶ End user to assess and protect equipment accordingly	EN 80079-36:2016 10
Electromagnetic Waves			▶ Not relevant	
Ionising Radiation	– Use in radioactive area		▶ Not relevant, not approved for use in radioactive area	EN 80079-36:2016 10
High Frequency Radiation			▶ Not relevant	
Ultrasonics			▶ Not relevant	
Adiabatic Compression			▶ Not relevant	
Mechanical strength	– Impact	Potential impact from other source, falling object, been struck by moving object.	▶ Main housing cast iron, no aluminium or similar to the external, plastic window front mounted but of a thickness to withstand impacts up to 7Nm see tests	EN 80079-36:2016 8.3.1
	– Hose burst	Pressure in casing too high. Occluded pump discharge	▶ Use the Verder recommended ATEX rated hose burst sensor	EN 80079-36:2016 10 EN 80079-37:2016 5 EN 80079-37:2016 6
	– Housing vent blocked	Pressure in casing too high.	▶ Clean regularly	EN 80079-36:2016 10
	– Dust collection on horizontal surfaces	May cause over temperature.	▶ Unlikely on pump casing because of its geometry ▶ Regular maintenance to help ensure all surfaces remain clean	EN 80079-36:2016 10

Table 9 Ignition Protection (continued)

Ignition Hazard		Measures Applied to Prevent the Ignition Source Becoming Effective		
Potential Ignition Source	Description / Basic Cause (which causes originate which ignition hazard)	Reason for Assessment	Description of the Measure Applied	Basis Citation of Standard Technical Rules
Mechanical strength	– Rotor failure	Rotor failure causing over temperature in motor	<ul style="list-style-type: none"> ▶ Requirement to use motor protection relay. ▶ Motors supplied with PTCs. 	EN 80079-36:2016 10
Chemical Reaction	– Pump materials incompatible with pumped media	Hose burst exposing casing to media	<ul style="list-style-type: none"> ▶ End user/ sales applications engineer to ensure awareness of pump construction and compatibility of hose material with pumped media. 	EN 80079-36:2016 10

Table 9 Ignition Protection

5 Limitations for use in ATEX Environment

5.1 Speed Limitations

Pump Type	Maximum output RPM	Minimum output RPM
D5, D7, D10, D15, D25 and D35	60 RPM	-
D5, D7, D10, D15 and D35	-	12.5 RPM
D25	-	16.7 RPM
D45	79RPM @ 5 Bar 59RPM @ 10 Bar 38RPM @ 16 Bar	12.5 RPM
D55	47RPM @ 5 Bar 38RPM @ 10 Bar 38RPM @ 16 Bar	12.5 RPM

Table 10 Dura 05-55 - Maximum /Minimum Output

5.2 Maximum Pressure

Pump Type	Maximum Discharge Pressure BAR
D5 and D7	8 BAR
D10 and D15	12 BAR
D25 and D35	16 BAR
D45 and D55	16 BAR

Table 11 Dura 05-55 - Maximum Pressure

5.3 Maximum Temperature

Pump Type	Maximum Medium Temperature	Maximum Ambient Temperature
D05-55	40°C	40°C

Table 12 Dura 05-55 - Maximum Temperature

5.4 Lightning Strike

 End user to take provision that pump will be protected against lightning strikes.

5.5 Ionising Radiation

 Pump is not approved for use in radioactive area. Standard, background radiation is permissible (< 50,000 Bq) Motor Protection.

5.6 Motor Protection

1. Motor must have PTCs fitted and correctly installed.
2. Motor must be protected by motor overload relays or equivalent.
3. Motor must be protected in event of overload condition.
4. 'Ex' motors for vertical mounting (shaft down) should be equipped with a Drip Cover (Impact Canopy) over the Fan Cowl.

5.7 Pumped Media

 The ATEX certification is only valid when pumping media that is approved by Verder. Using the pump with media that is not approved by Verder will make this certification void.

5.8 Hose Material Limitation

 The following hoses can be used on ATEX pumps (when applicable):

- NBR - Nitrile Rubber
- NBR(F) - Nitrile Rubber (food grade)
- EPDM - Ethylene Propylene Diene Monomer
- NR - Natural Rubber

 The following hoses cannot be used on ATEX pumps:

- CSM - Chlorosulfonated polyethylene

5.9 Limitation for Inserts that can be used

 The following inserts are suitable for use in an ATEX environment:

- Stainless steel

 The following inserts cannot be used on ATEX pumps:

- PP - Polypropylene
- PVDF - Polyvinylidene fluoride

5 Limitations for use in ATEX Environment (continued)

5.10 Lubricant Limitation

-  The following lubricants are approved for use on Verder ATEX Dura pumps:
- Verderlube blue
 - Verderlube clear

DANGER

Danger of explosion due to incompatible liquids

Verderlube is glycerine based lubricant and therefore cannot be used in applications that involve strong oxidizers.

- ▶ It is incompatible with hydrogen peroxide, potassium permanganate, nitric acid + sulfuric acid, perchloric acid + lead oxide, acetic anhydride, aniline + nitrobenzene, Ca(OCl)2, CrO3, F2 + PbO, KMnO4, K2O2, AgClO4 and NaH.
- ▶ It reacts with acetic acid, potassium peroxide, sodium peroxide, hydrochloric acid, (HClO4 + PbO) and Na2O2. Contact with potassium chlorate may be explosive.

Ensure Verderlube is not used as lubricant in applications that involve the above chemicals to avoid accidental mixture with pumped media in case of accidental hose burst.

-  The following lubricant cannot be used on ATEX pumps:

- Verdersil

6 Installation of Associated Components

CAUTION

Before installing the pump, always check the identification plate of the pump.

The ATEX classification must correspond with the conditions of the working environment.

6.1 Installing the Motor

1. Make sure the motor is suitable for use in a potentially explosive environment.
2. Make sure that the motor is properly connected to the power supply. Refer to the motor manual for the appropriate instructions.

WARNING

Earth connection

- ▶ The power supply must include an earth connection.

6.2 Installing the Gearbox

1. Make sure the gearbox is suitable for use in a potentially explosive environment.
2. Refer to the documentation of the gearbox for specific product information about operating in a potentially explosive environment.

6.3 Hose Burst Detection Kit

It is essential to use ATEX rated hose burst detection sensors to detect a potentially dangerous situation in time.

WARNING

Use similar of higher ATEX rated devices with pump

- ▶ Only use sensors that are approved by ATEX standards! The classification should be similar or higher than that of the pump.

6.4 Non-Standard Pump Orientations

-  There may be cases where the lubricant level cannot be visually monitored through the inspection window such as when the pump is fitted with metal inspection windows.

In these cases the customer should ensure that the pumps are installed with appropriated ATEX rated hose burst detection kit for additional protection (→ refer to section 6.3).

6.5 Grounding the Pump

-  The pump should be grounded before operation. This can be done either through motor earth wiring or alternately by grounding through the base frame.

7 Operation and Maintenance

Refer "Operation and maintenance manual" for instructions on use and maintenance of the pump units.

8 Periodic Inspection

1. Carry out the periodic inspections as given in the operating manual of the pump
2. In case of operating the pump in a potentially explosive environment, periodically inspect pump for:
 - Fluid leakage
 - Lubricant level
 - Hose burst detector
 - Surface temperatures
 - Dust deposits (if any)
 - Bearings

9 Ordering Spare Parts



For trouble-free replacement in the event of faults, we recommend keeping spare parts available on site.

The following information is mandatory when ordering spares for ATEX rated pump:

- If pump is ATEX rated, clearly mention that at the time of ordering
- Indicate the ATEX rating of the unit
- Pump model
- Year of manufacture
- Part number
- Serial number

10 List of Figures and Tables

10.1 List of Figures

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11 EC Declaration of Conformity

EC declaration of conformity according to machinery directive, appendix II A

We,
 VERDER Ltd., Unit 3 California Drive, Castleford
 hereby declare that the following machine adheres to the relevant EC directives detailed below:

Designation **Dura 05-55**

EC Directives:

- Machinery Directive (2006/42/EC)
- Equipment intended for use in Potentially Explosive Atmospheres (ATEX) 2014/34/EU

Dura 5-35, 45-55
 Classification,  h IIB T4 Gb for T ambient -5°C to 40°C
 Classification,  h IIB T4 Db for T ambient -5°C to 40°C

Technical Reference File:

- BASEEFA18ATEX0155DR

Notified Body:

- Baseefa 1180 Buxton UK

On behalf of Verder, I declare that on the date the equipment accompanied by this declaration was sold, the equipment conforms to all technical and regulatory requirements of the above listed directives.

Manufacturer	VERDER Ltd. Unit 3 California Drive Castleford WF10 5QH UK	
Date: 01/07/2019	Company stamp / signature:  Anthony Beckwith Head of Development/Construction	Company stamp / signature:  Paul Storr Head of Quality

Table 13 Declaration of Conformity