

# CE DOCUMENT C27 ENGINE

INSTALLATION, OPERATION and MAINTENANCE

© Van Heck 2021. All rights reserved.

# Contents

- Section 1 General ..... 4
  - 1.1 Preface..... 4
  - 1.2 Safety instructions..... 4
  - 1.3 Pump types & motor specifications ..... 4
  - 1.4 Specifications..... 6
- Section 2 Risks and safety guidelines ..... 8
  - 2.1 Risks..... 8
  - 2.2 Safety guidelines ..... 8
  - 2.3 Intended use..... 9
  - 2.4 Accidents and injury ..... 9
- Section 3 Inspection, storage and transportation..... 10
  - 3.1 Inspection after receipt..... 10
  - 3.2 Storage ..... 10
  - 3.3 Transport and lifting..... 10
- Section 4 Safety, installation and commissioning..... 11
  - 4.1 Safety..... 11
  - 4.2 Installation..... 11
  - 4.3 Commissioning ..... 12
  - 4.4 Starting the pump unit..... 13
    - 4.4.2. Starting the pump unit automatically (e.g. floating switches or level sensors)..... 15
    - 4.4.3. Starting the pump unit with wired remote control..... 15
- Section 5 Utilisation of the pump unit ..... 16
  - 5.1 During use..... 16
  - 5.2 COMAP ..... 16
  - 5.3 CAT Messenger display..... 17
  - 5.4 Problems during use..... 17
  - 5.5 Stopping the pump unit..... 18
  - 5.6 Emergency stop..... 19
- Section 6 Maintenance..... 20
  - 6.1 Planning and implementation ..... 20
  - 6.2 Breakdown or failure..... 20
  - 6.3 Connecting ECM's..... 21
    - 6.4.1 Assembly intake piping..... 21
    - 6.4.2. Connection discharge hose ..... 22
  - 6.5 Disassembly..... 22
- Section 7 Waste and recycling ..... 23

|                |                                                  |    |
|----------------|--------------------------------------------------|----|
| Section 8      | Appendices .....                                 | 24 |
| appendix 1.1   | Technical drawing DPPG750-HK700 .....            | 24 |
| appendix 1.2   | technical drawing DPPG750 – SC300/400 .....      | 25 |
| appendix 1.3   | Technical drawing DPPG750 – SC300/500 .....      | 26 |
| appendix 1.4   | Technical drawing DPPG750 – SC350/400 .....      | 27 |
| appendix 1.5   | Technical drawing DPP760 – SC350/400 .....       | 28 |
| appendix 1.6   | Technical drawing DPP760 – HK700 .....           | 29 |
| appendix 1.7   | Technical drawing DPP760 – SC300/400 .....       | 30 |
| appendix 1.8   | Technical drawing DPP760 – SC300/500 .....       | 31 |
| appendix 1.9   | Technical drawing DPPG750 – SC200/500 .....      | 32 |
| appendix 1.10  | Technical drawing DPP760 – SC200/500 .....       | 33 |
| appendix 2     | Maintenance schedule .....                       | 34 |
| appendix 3     | Service parts .....                              | 35 |
| appendix 3.1   | HK700 technical drawing with parts lists .....   | 36 |
| appendix 3.1.1 | HK700 parts list, parts 1 and 2 .....            | 37 |
| appendix 3.2   | SC200/500 Technical drawing .....                | 39 |
| appendix 3.2.1 | SC200/500 parts list .....                       | 40 |
| appendix 3.3   | SC300/400 technical drawing .....                | 41 |
| appendix 3.3.2 | SC300/400 parts list .....                       | 43 |
| appendix 3.4   | SC300/500 technical drawing .....                | 44 |
| appendix 3.4.1 | SC300/500 pump as seal .....                     | 45 |
| appendix 3.4.2 | SC300/500 parts list .....                       | 46 |
| appendix 3.5   | SC350/400 technical drawing .....                | 47 |
| appendix 3.5.1 | SC350/400 pump as seal .....                     | 48 |
| appendix 3.5.2 | SC350/400 parts list .....                       | 49 |
| appendix 4     | Alternative lubrication .....                    | 50 |
| appendix 5     | Malfunction: possible causes and solutions ..... | 51 |
| appendix 6     | Pump curves .....                                | 53 |
| appendix 6.1   | HK700 .....                                      | 53 |
| appendix 6.2   | SC300/400 .....                                  | 55 |
| appendix 6.3   | SC300/500 .....                                  | 56 |
| appendix 6.4   | SC350/400 .....                                  | 57 |
| appendix 6.5   | SC200-500 .....                                  | 58 |
| appendix 7     | Safety and warning pictograms and notices .....  | 59 |
| appendix 8     | Declaration of conformity (IIA) .....            | 60 |

# Section 1 General

## 1.1 Preface

This installation, use, safety and maintenance manual is intended as guide to the correct installation and intended use of the pump set. It is very important that technicians, electricians and operating personnel are fully aware of the contents of this manual before starting any activities. It is the responsibility of the owner / renter / user that only qualified personnel work with the pump set and that they know the instructions. A copy of the operating instructions is also to be found on the inside of the door behind which the operating panel is found.

Each pump set is tested in the test facilities at Van Heck for power, head and volume flow. The pump curves can be found in appendix 6.

You can always contact Van Heck regarding matters such as installation, maintenance and spare parts, as well as for advice and support. When contacting us, always state the type of pump and the pump unit ID found on the registration plate.

The warranty conditions that apply to the pump set are stated in Van Heck's General Delivery Conditions. The warranty period starts at the time of delivery. Van Heck accepts no liability for damage, material or physical, as a result of:

- Not adhering to the instructions and/or information in this manual;
- normal wear and tear;
- use of spare parts other than indicated or making modifications without the written permission of Van Heck;
- the removal of safety components.

## 1.2 Safety instructions

Places where there are potential risks of injury are indicated on the pump set. These pictograms are in accordance with European directive 92/ 58/ EEC and may never be removed. The icons are divided into warning signs (triangle shape with a black print on a yellow background) and mandatory signs (round shape with a white print on a blue background). Unreadable or missing icons can be ordered from Van Heck. Additional safety measures are listed in section 2 of this manual.

## 1.3 Pump types & motor specifications

- DPP: Diesel Powered Pack.
- DPPG: Diesel Powered Pack silenced.
- 750/760/770/780: ID/Serial number van de pomp unit.

HK700:

- Large flow pump with a  $\varnothing$  700 mm intake. The  $\varnothing$  900 mm intake pipe is mounted via a robust conical adaptor. On top of the adaptor is the vacuum boiler which, if necessary, can be removed together with the adaptor for transport.
- The pump has a half-axial impeller. It has a discharge head of 26 mwc or a volume flow of 6500 m<sup>3</sup>/h at an engine speed of 1800 rpm.
- This will rise to a head of 30 mwc or a volume flow of 7000 m<sup>3</sup>/h at an engine speed of 1950 rpm.

- The direction of rotation of the pump, viewed from the intake/suction side, is clockwise. This is also called a pump with a left-turning impeller.
- It is possible to rotate the pump housing and place the discharge line to the left, vertical or right in relation to the container.
- The transmission between pump and motor is made by means of a gearbox that is cooled by an oil cooler. The oil is pumped around by a small pump connected to the pump shaft.

#### SC300/400:

- Medium high pressure pump with a  $\varnothing$  400 mm intake/suction connection of and a  $\varnothing$  300 mm discharge connection.
- By means of reducers and/or a Van Heck non-return valve  $\varnothing$  400 mm piping can be mounted, for the intake and discharge lines.
- On top of the intake/suction line there is a vacuum boiler to prime the system using the vacuum system.
- The pump is a double suction radical 'split case' pump. It is suitable for a head of 85 mwc and a volume flow of 2000 m<sup>3</sup>/h.

#### SC300/500:

- Medium high pressure pump with a  $\varnothing$  350 mm suction connection and a  $\varnothing$  300 mm discharge connection of.
- By means of reducers and/or a Van Heck non-return valve  $\varnothing$  400 mm piping can be mounted for the intake/suction pipe and  $\varnothing$  300 mm for the discharge line. There are two types; gland packing (suitable for self-priming in combination with a vacuum system) and mechanical seal (does not work with vacuum system).
- For the gland seal type there is a vacuum boiler mounted on top of the intake/suction line to prime the system using the vacuum system.
- The pump is a double suction radical 'split case' pump. It is suitable for a head of 150 mwc and a volume flow of 1850 m<sup>3</sup>/h.

#### SC350/400:

- Medium high pressure pump with a  $\varnothing$  350 mm intake/suction connection of and a  $\varnothing$  300 mm discharge connection.
- By means of reducers and/or a Van Heck non-return valve  $\varnothing$  400 mm piping can be mounted, for the intake and discharge lines.
- On top of the intake/suction line there is a vacuum boiler to prime the system using the vacuum system.
- The pump has a double suction radical 'split case' pump and is suitable for a delivery head of 97 mwc and a volume flow rate of 2900 m<sup>3</sup>/h.

#### SC200/500:

- Medium high pressure pump with a  $\varnothing$  350 mm intake/suction connection and a  $\varnothing$  200 mm discharge connection.
- By means of reducers and/or a Van Heck non-return valve  $\varnothing$  400 mm piping can be mounted, for the intake and discharge lines.
- On top of the intake/suction line there is a vacuum boiler to prime the system using the vacuum system.
- The pump has a double suction radical 'split case' pump and is suitable for a delivery head of 190 mwc and a volume flow of 1200 m<sup>3</sup>/h.

The engine of the pump set is a Caterpillar C27. The engine is electronically controlled and meets the EPA Tier II and Euro Stage II emission requirements. The engine has a capacity of 597 kW and a range from 1800 rpm to 2100 rpm. The specifications follow in the next section.

## 1.4 Specifications

### Engine specifications C27

|                        |                                                                  |                                          |
|------------------------|------------------------------------------------------------------|------------------------------------------|
| <b>Motor type</b>      | Caterpillar C27 DIT-ATAAC                                        |                                          |
| <b>Power</b>           | 597 kW (800 pk)                                                  |                                          |
| <b>Arrangement no.</b> | 252-0148                                                         |                                          |
| Engine number DPPG751  | TWM 00160                                                        | 2006 ( <i>built</i> )                    |
| Engine number DPPG752  | TWM 03730                                                        | 2006 ( <i>built</i> )                    |
| Engine number DPPG753  | TWM 04798                                                        | 2007 ( <i>built</i> )                    |
| Engine number DPPG754  | TWM 00405                                                        | 2007 ( <i>built</i> )                    |
| Engine number DPPG755  | TWM 01399                                                        | 2010 ( <i>built</i> )                    |
| Engine number DPPG756  | TWM 01398                                                        | 2010 ( <i>built</i> )                    |
| Engine number DPPG757  | TWM 02503                                                        | 2011 ( <i>built</i> )                    |
| Engine number DPPG758  | TWM 03713                                                        | 2012 ( <i>built</i> )                    |
| Engine number DPPG759  | TWM 04395                                                        | 2014 ( <i>built</i> )                    |
| Engine number DPPG781  | TWM 04798                                                        | 2015 ( <i>built</i> )                    |
| Engine number DPPG782  | TWM 04799                                                        | 2015 ( <i>built</i> )                    |
| Engine number DPP761   | TWM 00556                                                        | 2008 ( <i>built</i> )                    |
| Engine number DPP762   | TWM 00860                                                        | 2008 ( <i>built</i> )                    |
| Engine number DPP763   | TWM 05153                                                        | 2009 ( <i>built</i> )<br>new engine 2017 |
| Engine number DPP764   | TWM 05154                                                        | 2009 ( <i>built</i> )<br>new engine 2016 |
| Engine number DPP765   | TWM 01734                                                        | 2011 ( <i>built</i> )                    |
| Engine number DPP766   | TWM 01743                                                        | 2011 ( <i>built</i> )                    |
| Engine number DPP767   | TWM 02595                                                        | 2012 ( <i>built</i> )                    |
| Engine number DPP768   | TWM 02594                                                        | 2012 ( <i>built</i> )                    |
| Engine number DPP769   | TWM 03521                                                        | 2013 ( <i>built</i> )                    |
| Engine number DPP770   | TWM 03580                                                        | 2013 ( <i>built</i> )                    |
| Engine speed           | 1800 rpm tot 1950 rpm                                            |                                          |
| Fuel                   | Diesel to EN-590 specification<br>(Winter: winter diesel EN-590) |                                          |
| Fuel consumption max   | 130 litre/h                                                      |                                          |
| Fuel tank              | Separate tank IBC: 3000 litre                                    |                                          |
| Jacket water temp.     | 70 °C - 104 °C                                                   |                                          |
| Radiator               | Adam drawing.nr: 2 02 5913 00 00 8<br>Oversluizen: PON30307      |                                          |
| Coolant volume         | 192 litre                                                        |                                          |
| Radiator cool fan      | Spec. sheet 2428 (1800rpm)<br>Spec. sheet 2258 (1950rpm)         |                                          |
| Sump volume            | 68 litre                                                         |                                          |

Dry weight DPPG750/780

± 17.000 kg (excl. extra silencer and intake conus)

Dry weight DPP760/770

± 16.500 kg (excl. intake conus)

Dimensions

ISO 20 ft. high cube container

Vacuum pump

Demag Wittig SL-15-1VR

Voltage:

24 Volt

Exhaust (TIO)

VRDAD 10/DA801, drawing no. 060306-12

Sound level engine bay

± 100 dB

Sound level doors closed

± 80 dB at 3 m (1 m above ground level)

### Transmission

Flexible couplings (Reich): Arcusaflex AC VSK.55.WN.F2.14.225  
 Support bearing: 6309-2RS1  
 HK700 Universal joint shaft: Spicer GWB: 687.55.02; Fl = 225-8 x Ø 16; Lz = 577 mm

### Gearbox TW 700G in combination with the HK700

Gearbox temperature: 60 °C - 85 °C  
 Gear ratio: TWK: 3.565:1  
 Gearbox cooler: Drawing No. 220502-23

### Pump specifications HK700

Impellor: 4 blades, Ø 924 mm (left turning)  
 J in water: 57 kgm<sup>2</sup>  
 Ass seal: Gland seal  
 Impellor speed: 504 rpm (at 1800 rpm engine speed)  
 547 rpm (at 1950 rpm engine speed)  
 Intake/suction side: 700 mm (900 mm after intake conus)  
 Discharge side: 700 mm (900 mm after non return valve)  
 Medium: Water, lightly soiled water  
 Density medium: 1000 kg/m<sup>3</sup>  
 Max capacity: 6500 m<sup>3</sup>/h at 1800 rpm  
 7000 m<sup>3</sup>/h at 1950 rpm  
 Max discharge pressure: 26 mwc/2.6 bar at 1800 rpm  
 30 mwc/3.0 bar at 1950 rpm

| <i>Pump specifications</i>       | <i>SC200/500</i>            | <i>SC300/400</i>                      | <i>SC300/500 with gland seal</i> | <i>SC300/500 with mechanical seal</i> | <i>SC350/400</i>            |
|----------------------------------|-----------------------------|---------------------------------------|----------------------------------|---------------------------------------|-----------------------------|
| <i>Impellor</i>                  | Ø 524 mm                    | Ø 425 mm +<br>Ø 445 mm                | Ø 529 mm                         | Ø 529 mm                              | Ø 529 mm                    |
| <i>Ass seal</i>                  | Gland seal                  | Gland seal                            | Gland seal                       | Mechanical seal                       | Gland seal                  |
| <i>Pump speed</i>                | 2000 rpm                    | 1800 rpm                              | 1800 rpm                         | 1800 rpm                              | 1800 rpm                    |
| <i>Medium</i>                    | Clean water                 | Clean water                           | Clean water                      | Clean water                           | Clean water                 |
| <i>Density medium</i>            | 1000 kg/m <sup>3</sup>      | 1000 kg/m <sup>3</sup>                | 1000 kg/m <sup>3</sup>           | 1000 kg/m <sup>3</sup>                | 1000 kg/m <sup>3</sup>      |
| <i>Max flow</i>                  | 1250 m <sup>3</sup> /h      | 2000 m <sup>3</sup> /h                | 2000 m <sup>3</sup> /h           | 2000 m <sup>3</sup> /h                | 2800 m <sup>3</sup> /h      |
| <i>Max head</i>                  | 185 mwc/<br>18.5 bar        | 90 mwc/9.0 bar or<br>100 mwc/10.0 bar | 140 mwc/<br>14.0 bar             | 140 mwc/<br>14.0 bar                  | 95 mwc/<br>9.5 bar          |
| <i>Intake flange Van Heck</i>    | 450 mm                      | 400 mm PN16                           | 400 mm PN 16                     | 400 mm PN 16                          | 400 mm PN 16                |
| <i>Discharge flange Van Heck</i> | 300 mm PN 25<br>(after NRV) | 400 mm PN25<br>(after NRV)            | 300 mm PN 40<br>(after NRV)      | 300 mm PN 40<br>(after NRV)           | 400 mm PN 40<br>(after NRV) |

**WARNING: The pump sets are intended for use only in accordance within the parameters specified in the official documentation and maintenance manual. The use of the pump sets for purposes other than those mentioned above is considered as in conflict with the intended use. Van Heck cannot be held liable for damage caused by such use.**

## Section 2 Risks and safety guidelines

This section provides an overview of potential risks when working with the pump set. It is therefore necessary to read this manual carefully before starting work on the pump set.

Any use of the pump set, other than described in this manual, can cause unsafe working situations. Van Heck disclaims any liability for damage or personal injury caused by not following the instructions in this manual or by carelessness during transport, installation, operation, maintenance, repair or disassembly of the pump set.

**Always read the safety instructions before working on or with the pumps unit!**

### 2.1 Risks

If the manual is not followed, these are the potential hazards:

- Falling into the suction zone and be drawn/sucked into the pump;
- Being washed away by the discharge of liquids on the discharge side of the pump;
- Injury by touching the pump shaft and/or sharp edges;
- Assembly errors due to non-compliance with installation instructions;
- Falling off and damage to the pump set due to incorrect lifting / moving;
- Injury due to failure to wear personal protective equipment;
- Injury due to working near rotating parts;
- Burns from the exhaust pipes and/or turbos despite the shielding of these parts;
- Hearing damage due to the sound level of  $\pm 100$  dB in the motor cabin;
- Fire and/or explosion from/at the pump set due to smoking or another source of ignition in the vicinity of the pump set;
- Pumps set to "Auto" start automatically without warning.

### 2.2 Safety guidelines

- The working area of the pump unit must be closed to everyone, with the exception of authorised personnel, so that the area is inaccessible for persons and/or animals. The closed working area includes the suction area to the place where the water is discharged.
- The pump set may only be installed, operated, maintained, repaired or dismantled by authorised and qualified personnel.
- Doors must remain closed while the pump is running. This in regards to noise reduction and to prevent unauthorised access.
- Doors must be secured to prevent unexpected movement and/or slamming of doors (risk of trapped limbs).
- Keep hands, hair or clothing away from rotating parts such as V-belts, shafts and other moving parts.
- Keep ignition sources and open flames away from the pump set.
- Stay away from hot parts such as the exhaust, oil cooler and turbo.
- Be aware of low hanging objects.
- Ensure adequate lighting of the work area.
- Wear suitable clothing and safety shoes.
- Wear hearing protection and gloves.
- Immediately clean up spilled (diesel) oil and lubricants in or next to the pump set.
- Avoid contact between electrical cables and diesel oil, lubricants and battery acid.
- Always keep a fire extinguisher in the vicinity of the pump set.
- Only start the pump set when safety is guaranteed.
- Place warning signs when servicing the pump set.
- Do not carry out any work on/near the pump set without having consulted the manual.
- No open fire and no smoking in the work environment.



## 2.3 Intended use

The pump set is exclusively intended for pumping water and slightly soiled water, in which no hard objects such as wood and steel are present. If such material is present in the fluid to be pumped, you must place a high-quality intake filter in front of the pump intake. The pump set should only be used outdoors due to the exhaust gas discharge. If the pump set is nevertheless used indoors, the exhaust gases must be properly extracted.

All other uses are considered by the manufacturer to be improper use and are therefore prohibited. The CE marking also expires if the purpose of use and/or the construction of the pump set is changed.

## 2.4 Accidents and injury

There is a risk of personal accident while using the pump set. Below is an explanation of what to do in the event of such an accident.

Panic and disorientation make can cause more victims during an accident. So don't panic and stay focused!

### **Guidelines what to do in case of an accident during pump unit installation/use/or removal:**

1. Don't leave the victim alone;
2. Warn others in the immediate area and ask for help;
3. If the victim is in immediate danger of the rotating pump set, press the emergency stop button; If not, switch off the pump set regularly (see section 5.4 or 5.5);
4. Call the first aid person / doctor / ambulance, depending on the severity of the accident;
5. Call on the local first aid person to look after the victim until a doctor / ambulance has arrived;
6. If safe to do so, investigate the cause of the accident;
7. Repair any defect in the pump set. Or have this done;
8. Inform Van Heck of the accident, with the cause of the accident explained in a detailed report.

### **Guidelines what to do in case of an accident during transport:**

1. Don't leave the victim alone;
2. Warn others in the immediate area and ask for help;
3. Call the first aid person / doctor / ambulance, depending on the severity of the accident;
4. Call on the local first aid person to look after the victim until a doctor / ambulance has arrived;
5. If safe to do so, investigate the cause of the accident;
6. Repair any defect in the pump set. Or have this done;
7. Inform Van Heck of the accident, with the cause of the accident explained in a detailed report.

**It is important to follow the guidelines during an accident. In stressful and/or panic situations more victims can easily fall.**

**SAFETY FIRST, think and act accordingly even in case of an accident.**

## Section 3 Inspection, storage and transportation

This chapter contains information about the inspection after receipt, storage and transport of the pump unit.

### 3.1 Inspection after receipt

When the pump set arrives, check immediately if all parts are present. Some parts can be packed separately. Any damage must be reported immediately to the carrier and to Van Heck. Van Heck is not liable for transport damage.

### 3.2 Storage

The pump set is supplied ready for installation and use (see sections 4.2 and 4.3).

If the pump set should be stored (temporarily), the following instructions had to be followed:

- Ensure a flat, firm and dry surface;
- Ensure that the storage location is dry and frost-free (in case of frost, there must be enough antifreeze in the engine cooling system and the pump must be empty);
- Switch off the earth switch at the battery ('0');
- Coat the gland packing with water pump grease before and after storage of the pump set;
- Coat all other bearings with grease before and after storage of the pump set;
- Drain the oil separator from the vacuum pump and bleed the crankcase;
- Check the pump every week. See appendix 2 "Maintenance schedule".

### 3.3 Transport and lifting

The pump unit consists of different parts: the main container, two removable parts, silencer and the intake conus with the vacuum boiler.

For transport by ship, the silencer and conus with vacuum boiler are removed and transported separately in a container with the other appendages.

For transport by truck, the silencer and the conus can be left on, if the legislation of the country in question permits this. If the legislation of the country concerned does not allow this, the silencer and the intake conus must be transported in a container with the other fittings.

The silencer behind the radiator can, if necessary, be removed for transport. Together with the vacuum boiler and other accessories, such as a non-return valve and a pressing bag. This material can be transported in a separate container (sea freight) or on a truck to the destination.

The pump set must be lifted simultaneously on all four lifting eyes so that it does not tilt. The angle at the top between the chains or cables must not exceed 90° to prevent damage to the structure. The lifting equipment must be suitable for the situation, be able to safely lift the weight of the pump, be in good condition and be certified.

During transport, the frame must be properly secured in accordance with the applicable regulations on/on the means of transport. The doors must also be closed and locked during transport, so that they cannot open unexpectedly.

**It is mandatory to wear a safety helmet and safety shoes during hoisting. It is strictly forbidden to stand under the lifted pump set or walk under it.**

**Van Heck is not responsible for damage caused by not following the above transport regulations.**

## Section 4 Safety, installation and commissioning

### 4.1 Safety

When using or working on the pump unit, it is important to always ensure the safety of people and the pump unit. Before any activity is undertaken, the manual must first be studied explicitly and all instructions carefully read and followed.

To prevent accidents, the following precautions must be read carefully.

- Make sure that the engine cannot be started when working on the pump set. By removing the key and turning off the electric ground switch (to '0'), the engine cannot start.
- If static electricity can occur, the pump must be grounded.
- Ensure that the non-return valve is closed and the pump is empty before any maintenance is carried out on the pump set.
- Wear all necessary personal safety equipment when working on a working pump set.
- A warning sign must be placed that says:



**Not in use due to servicing**

### 4.2 Installation

The pump set must be placed on a flat, sturdy and horizontal surface to prevent damage to the pump set. There must also be enough space around the pump set to open the doors, to allow sufficient (cooling-) air to the pump unit and allow for the escape of exhaust gases without any problems.

A non-return valve must be installed on the discharge side to prevent damage (e.g. water hammer) and to use the vacuum system. A discharge hose must be attached to the non-return valve to prevent damage due to the operation of the pump. The pressure and suction lines must be of a suitable pressure class and quality to prevent damage and accidents.

The pump must not draw in air. Air can cause cavitation and air in the system can cause vibrations and noise. This can be harmful to the pump set.

### 4.3 Commissioning

Hereby an overview of what must be done before a pump unit is put into use:

- Check whether the pump set is placed on a flat, sturdy and horizontal surface;
- Check whether the intake/suction and discharge side are free and are not accessible to people and / or animals;
- Check whether there is enough room for the pump set to take in and discharge cooling air;
- Check the operation of the non-return valve and the flow direction;
- Check whether the discharge hose is properly installed;
- Check whether dangerous situations can arise;
- Check if nobody is present or working in the danger zone;
- Check the oil level in the engine, gearbox and vacuum pump;
- Check the fluid level in the radiator and the fuel level;
- Check the condition and tension of all V-belts;
- Check hoses, nipples and seals for leaks;
- Check the battery;
- Check whether the earth switch is switched on;
- Check manually whether the pump shaft is rotatable;
- Close all doors of the pump set, except those for the control box;
- Start the pump set with the control box according to section 4.4.1;
- Start the pump set automatically according to section 4.4.2;
- Start the pump set with the remote control according to section 4.4.3;
- Also close the control box door after starting.

**If the pump set is started automatically or with the remote control, warning signs must be placed with "Starts automatically".**

**The operator's workplace is in front of the control box when starting the pump set. All other doors must remain closed due to the safety of the operator and other bystanders.**

**If these conditions are not met, starting the pump set is not safe and starting or attempting to do so is strictly prohibited.**

#### 4.4 Starting the pump unit.

Before starting the pump unit, first follow the flow chart 'fig. 1' below;

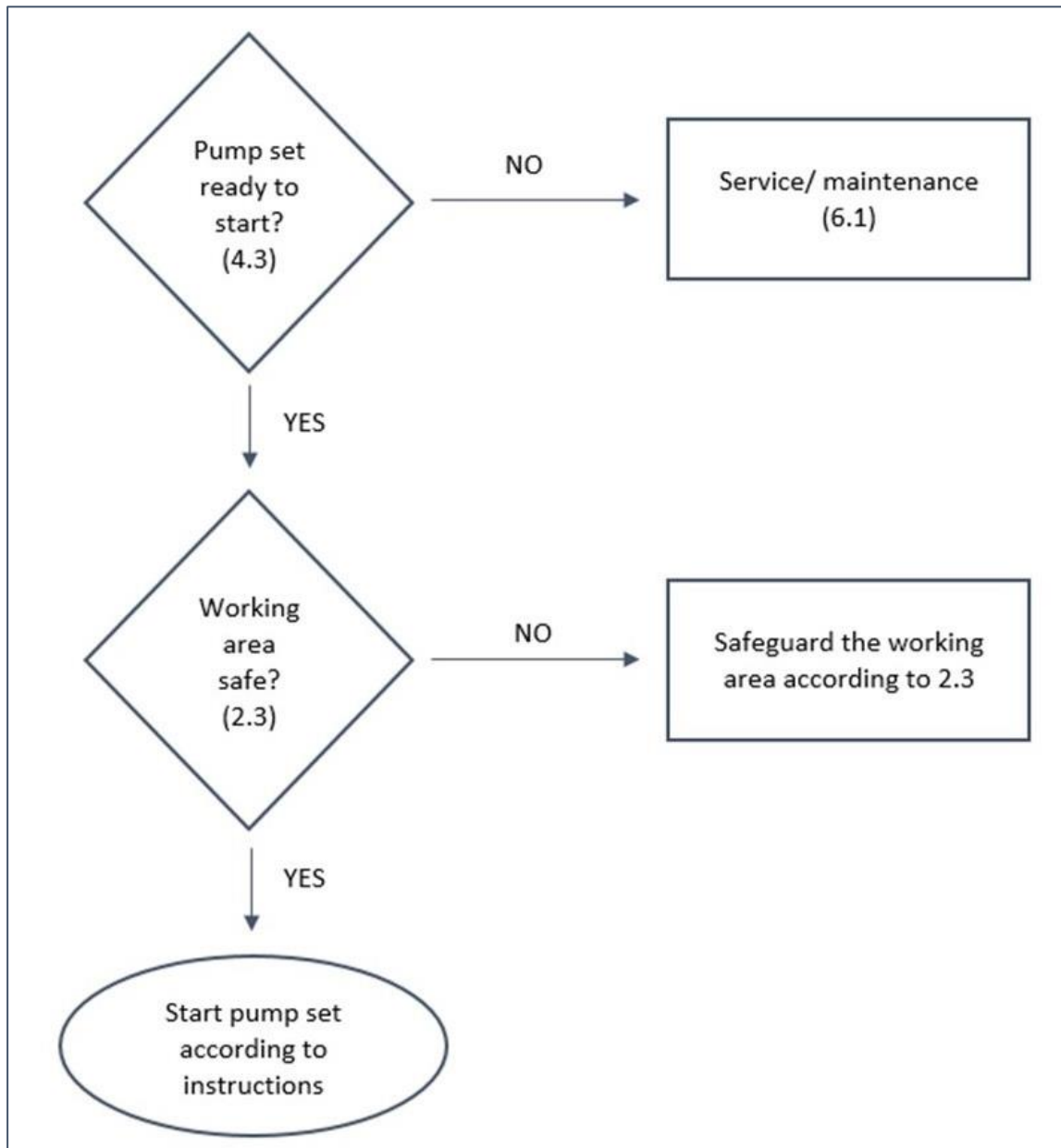


Fig. 1: Flow chart - pump unit starting

#### Instructions for starting the pump unit

Before starting the pump unit, make sure it is safe to do so.  
Please visually check the unit before starting. Check liquid levels (oil, coolant, etc.).

1. Examine the descriptions for each switch and the warning light.
2. Close the non-return valve.
3. Switch the main earth switch on by turning it.  
Switch is shown here in the 'off' position.
4. After opening the protective door in front of the operating panel. Switch the ignition switch clockwise one 'step' to the right so that the lights on the operating panel light up.  
The switch is in the 'ON' position in the photo.

5. Make sure the engine speed control is fully turned to the left (anticlockwise).
6. Turn the switch one step anticlockwise to the "HAND" position. The engine will now start and run at idle (ca. 700 rpm).
7. The engine will warm up for +/- 3 minutes, during which time it is not possible to increase the engine speed.

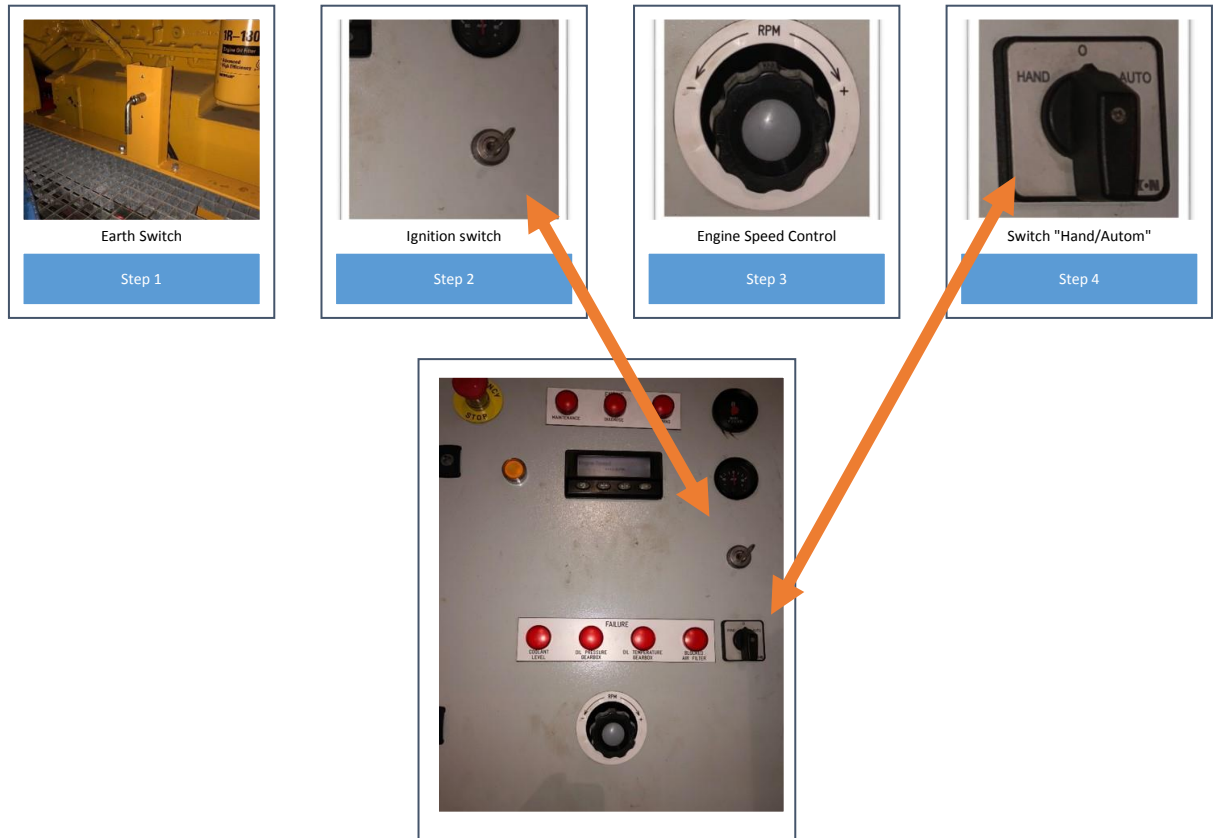


Fig. 2: Starting in the following order

#### 4.4.1 Starting the pump unit manually

- Set the "Local / Remote" selector switch to "Local" (inside the control box).
- Set the "Hand / 0 / Auto" switch to the "Hand" position.
- The engine starts automatically and runs at idle speed.
- Once the engine is running, it will have to run at idle for about  $\pm 3$  minutes until the minimum operating temperature is reached. After these  $\pm 3$  minutes the speed can be increased by means of the speed adjustment button on the control panel.

#### 4.4.2. Starting the pump unit automatically (e.g. floating switches or level sensors).

- Set the "Local / Remote" selector switch to "Local" (inside the control box).
- Set the "Hand / 0 / Auto" switch to the "Auto" position.
- The ignition key must remain in the clockwise direction.
- The engine starts automatically.

If the engine is running, it will have to run at idle for about  $\pm 3$  minutes until the minimum operating temperature is reached. After these  $\pm 3$  minutes the engine will go to the desired speed set with the speed control knob.

The motor starts (and stops) automatically on the connected level floats and / or other signal. If the engine does not start automatically, it will try again after  $\pm 40$  seconds. This cycle continues for up to 3 minutes. If the engine has not started yet, a fault message will be displayed.

#### 4.4.3. Starting the pump unit with wired remote control.

- Set the "Local / Remote" selector switch to "Remote" (inside the control box).
- Leave the engine speed control knob turned to the left.
- Turn the speed control knob on the remote control all the way to the left.
- Press the yellow push button, if it is not lit (remote control is on).
- Set the "Hand / 0 / Auto" switch to the "Hand" position.
- The engine will start and run at idle.

Once the engine is running, it will have to run at idle for about  $\pm 3$  minutes until the minimum operating temperature is reached. The speed can be increased after  $\pm 3$  minutes with the rotary control on the remote control.

With continuous use (24 hours a day) the engine may switch on / off a maximum of four times per hour. This is to keep sufficient capacity in the batteries.

As long as the engine is running, the doors must remain closed due to noise pollution.

## Section 5 Utilisation of the pump unit

### 5.1 During use

During use the pump set must function according to the specifications in chapter 1.4.

If it appears that the pump set does not function according to these specifications, the cause must be investigated and Van Heck must be informed immediately. During use, the pump set must be checked regularly to ensure that the pump set still functions according to specifications. Reports of these checks must be kept in a logbook. Deviations of 10% or more of logged data are a warning that problems are imminent. The cause must then be investigated and Van Heck must be informed. Observed deviations must be repaired immediately according to this user manual.

### 5.2 COMAP

Engine speed is controlled by the variable dial, shown here.

Turn to the right (clockwise) to increase engine speed (max 1.800 rpm).

Turn to the left (anticlockwise) to decrease engine speed (idle, ca. 700 rpm).

The COMAP display shows the engine speed in its default screen.

To read out other engine parameters you will need to access the menu:

This can be done by pushing the 'page' button (next to the up arrow).

Then the 'up' and 'down' arrows can be used until the desired readout is shown (e.g. Load).



Fig. 3: Engine speed

The COMAP can be used to display various parameters and diagnoses of the motor during use, these parameters are:

- Engine speed
- Oil pressure
- Oil pressure of the gearbox (*if fitted*)
- Temperature of the oil in the gearbox (*if fitted*)
- Engine load
- Battery voltage
- Temperature of the coolant
- Fuel pressure
- Temperature of the fuel
- Temperature of the air inlet
- Engine running time registration



Fig. 4: COMAP

**It is not permitted for the hirer/user of the pump set to read-out the COMAP settings with a computer or to change the settings.**



### 5.3 CAT Messenger display

Engine speed is controlled by the variable dial, shown here.

Turn to the right (clockwise) to increase engine speed (max 2.050 rpm).

Turn to the left (anticlockwise) to decrease engine speed (idle, ca. 700 rpm).

The CAT Messenger display shows the engine speed in its default screen.

To read out other engine parameters you will need to access the menu:

This can be done by pushing the 'down' button (next to the OK button).

To scroll back up the menu, use the 'up' button.



Fig. 5: Engine speed

The CAT Messenger display can be used to display various parameters and diagnoses of the motor during use, these parameters are:

- Engine speed
- Oil pressure
- Oil pressure of the gearbox (*if fitted*)
- Temperature of the oil in the gearbox (*if fitted*)
- Engine load
- Battery voltage
- Temperature of the coolant
- Fuel pressure
- Temperature of the fuel
- Temperature of the air inlet
- Engine running time registration



Fig. 6: CAT Messenger Display

**It is not permitted for the hirer/user of the pump unit to read-out the settings with a computer or to change the settings.**

### 5.4 Problems during use

Appendix 5 contains a list of problems with their possible causes and solutions. It is recommended that this list (and this user manual) be kept in an accessible place near the pump unit.

If it is necessary to open the inspection hatch on the intake conus HK700 pump, follow the next instructions:

- Switch off the engine when it is still running;
- Remove the ignition key from the ignition lock;
- Set the earth switch to (0);
- Ensure that no water flows from the delivery line back to the pump;
- Drain the suction line;
- Open the inspection hatch and inspect;
- Remove the suction line if necessary;
- Remove the conus if necessary;
- Remove the object that blocks the pump;
- Inspect the pump for damage. In case of no or slight damage, assemble in reverse order. In the event of serious damage, contact Van Heck for advice.

**During a malfunction the same safety rules apply as during maintenance of the pump set, see section 6**

## 5.5 Stopping the pump unit

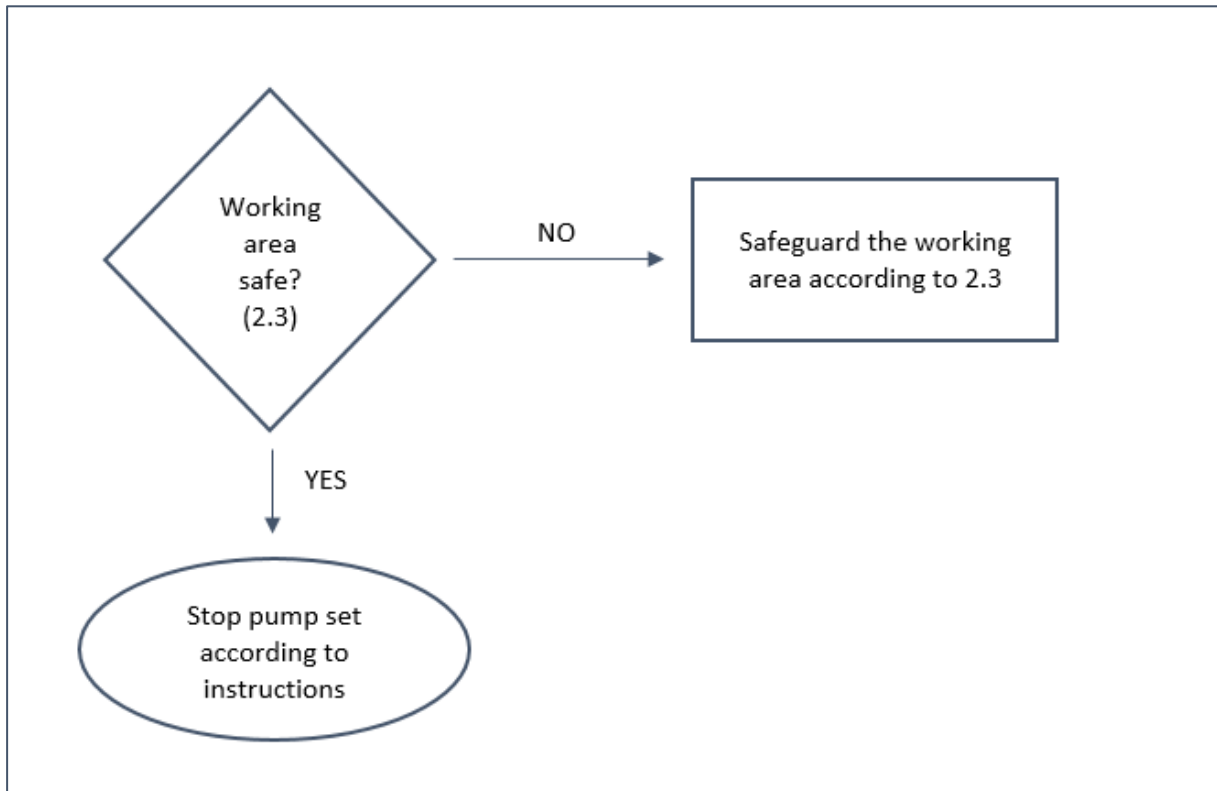


Fig. 7: Flow chart - pump unit stopping

### Instructions for stopping the pump unit

- Turn the speed control knob of the control box anticlockwise to idle speed.
- Set the "Hand / 0 / Auto" switch to position "0". The engine will stop automatically after  $\pm 3$  minutes.
- Turn the key to the left to turn off the display.
- Check whether the non-return valve is closed. If not, close it manually.

## 5.6 Emergency stop

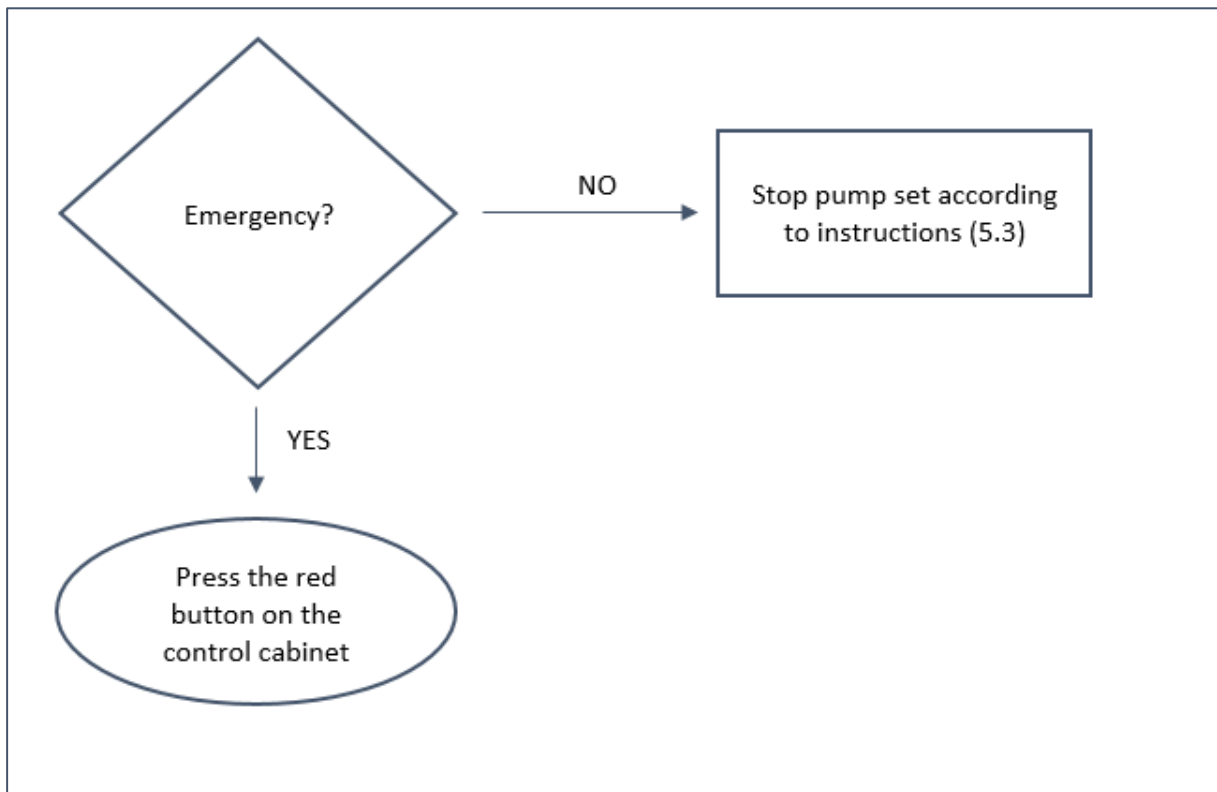


Fig. 8: Emergency stop

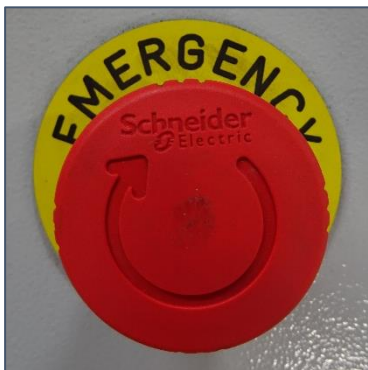


Fig. 9: Emergency stop button

Check if the non-return valve is closed. If not, close it manually.

### **Instructions unlock emergency stop**

- Turn the speed control knob of the remote control anti-clockwise to idle speed.
- Set the "Hand / 0 / Auto" switch to position "0".
- Turn the key to the left.
- Call Van Heck to unlock the emergency stop.

**Only use the emergency stop in an emergency!**

## Section 6 Maintenance

### 6.1 Planning and implementation

Scheduled maintenance according to the maintenance schedule in appendix 2 increases the reliability and service life of the pump unit and reduces the long-term costs. To maintain the quality and specifications of the pump set, original parts must always be used. These parts are specially designed and made in accordance with the applicable standards and guidelines. All maintenance described and any repairs can be carried out with standard tools. A competent person must carry out major maintenance. Specialist maintenance should preferably be carried out by Van Heck.

The planned maintenance must be carried out according to the schedule in appendix 2. Parts and lubricants can be found in appendices 3 and 4. When performing maintenance, all safety rules must be observed and the pump set must be stopped.

In the event of maintenance problems, please must contact Van Heck and state the pump name and type.

A protection or shield that has been removed for maintenance must be installed immediately before the pump can be used again.

Before any maintenance or repair can be done on the pump set, the next instructions must be followed:

- Remove the key from the control box and turn off the earth switch at the batteries (to 0);
- Place a warning sign for maintenance work;
- Ensure that the non-return valve is closed and the pump is empty.

You can now start work on the basis of the safety regulations

### 6.2 Breakdown or failure

Appendix 5 contains various malfunctions, possible causes and solutions. For malfunctions that are not on the list, contact Van Heck.

No electrical welding may be carried out on or near the pump set. This can cause irreparable damage to the Electronic Motor Controller (ECM). If this is unavoidable, the next steps must be followed in the order as indicated:

1. Remove the key and turn the earth switch off (to 0);
2. Place a warning sign for maintenance work;
3. Ensure that the non-return valve is closed and the pump is empty;
4. Disconnect the two CAT data plugs on the CAT motor;
5. Remove the battery cable from the - terminal of the battery;
6. Remove the battery cable on the + pole of the battery;
7. Remove the alternator cables.

When the work has been carried out, the reverse order applies for connecting the cables.

Place the ground clamp as close as possible to the part to be welded to prevent current from flowing through the bearings.

**Never disconnect a battery while the engine is running.**

**Welding on or near the fuel system is absolutely forbidden due to fire and explosion hazard.**

**Welding work must be carried out by a specialised company or by Van Heck.**

**If a malfunction occurs, Van Heck must be informed of this at all times.**

### 6.3 Connecting ECM's

ECM's are connected with two plugs on top of the engines.

**ALWAYS ENSURE THE EARTH SWITCH IS IN THE OFF POSITION BEFORE CONNECTING OR DISCONNECTING THE ECM PLUGS.**

Plugs must be positioned carefully above their sockets and held in position by hand.

Using a 4 mm Allen key and turn the fixing bolt carefully clockwise.

If you feel any resistance stop immediately and check the seating of the plug above the socket.

Once you are sure the plug is aligned properly, carefully and without using any excessive force, tighten the Allen bolt.

During tightening carefully 'wiggle' the plug to assist the correct seating of the plug in the socket.

The plug (and Allen bolt) are sufficiently tight when you can no longer turn the Allen key (with the long part inserted in the Allen bolt head and the short part between finger and thumb) and the plug does not 'wiggle'.

Removal of the ECM plugs is in reverse order of above. Once the Allen bolt is loosened, carefully pull on the plug to ensure it is totally free from the socket and then lay it back loosely on top of the socket.



**DISCONNECT ECM CONNECTORS WHILE WELDING ON FRAME!**

Fig. 10. ECM DPPG750/780/DPP760

### 6.4 Assembly

**The safety requirements from section 2 apply during assembly.**

For the connection of some loose parts to the pump unit, such as the intake conus with the vacuum boiler, the (optional) silencer and the non-return valve, see the technical drawings in appendices 1.1 to 1.9. The vacuum line between the vacuum boiler and the pump must be connected as follows:

- the vacuum line must be attached to the hose nozzle on the left side of the frame (viewed from the rear).
- The aeration line must be attached to the hose grommet on the right-hand side of the frame (viewed from the rear).

#### 6.4.1 Assembly intake piping

The suction line must be connected in such a way that no air can accumulate in the line. To prevent this, the intake conus must be the highest point on the suction side of the pump. This can be achieved by installing the suction line horizontally. However, it is better to have the suction line angled down at an angle immediately after the intake conus. Placing the suction pipe at an angle upwards causes air accumulations which leads to unwanted vibration, noise and ultimately damage to the pump.

To ensure an airtight seal, the gaskets between the suction line must be lubricated with grease or silicone sealant. This is because these gaskets will expand when they come in contact with water, however they are dry at the first start-up. This contact with water (saturation) is necessary for a seal.

The suction line must be positioned in such a way that it does not absorb any soil from the substrate. This can compromise the stability of the pump set. The pump has enough suction power to suck loose to reasonably firm soil.

#### 6.4.2. Connection discharge hose

The discharge hose must be placed between the non-return valve and the first pipeline. This is to absorb vibrations and tension in the piping system. This also prevents damage by water hammer and expansion/contraction of the pipeline. If the discharge hose is placed in a different way, or not at all, forces such as those mentioned could damage the pump unit.

When connecting the discharge hose, it is mandatory to follow the sequence "pump - non-return valve – discharge hose - pipe and any bends". This is to prevent material damage. If this is not possible, you should ask Van Heck for other possible solutions to the problem.

**If everything is properly assembled, the pump unit can be started according to the procedure described in chapter 4.**

**When the user wants to change something about the pump unit, they must have permission from the owner.**

**The change must also be carried out in such a way that the pump unit is still in accordance with the applied and applicable guidelines from this manual.**

#### 6.5 Disassembly

**The safety requirements from section 2 apply during dismantling. During disassembly, the discharge pipeline must be empty or closed off by a valve, so that no danger arises.**

When dismantling, all parts must be stored properly. This is essential for subsequent reassembly. The suction line must be removed from the water or securely anchored and the silencer must be stored immediately in a clean location to prevent damage. The non-return valve and discharge hose must also be properly stored to prevent damage.

When dismantling the intake conus with the vacuum boiler, the vacuum line must first be dismantled. The vacuum boiler can then be dismantled and then the conus. These must also be properly stored in connection with damage.

## Section 7 Waste and recycling

During maintenance or servicing of the pump unit, various components will end up in the waste and recycling process.

These components mainly consist of:

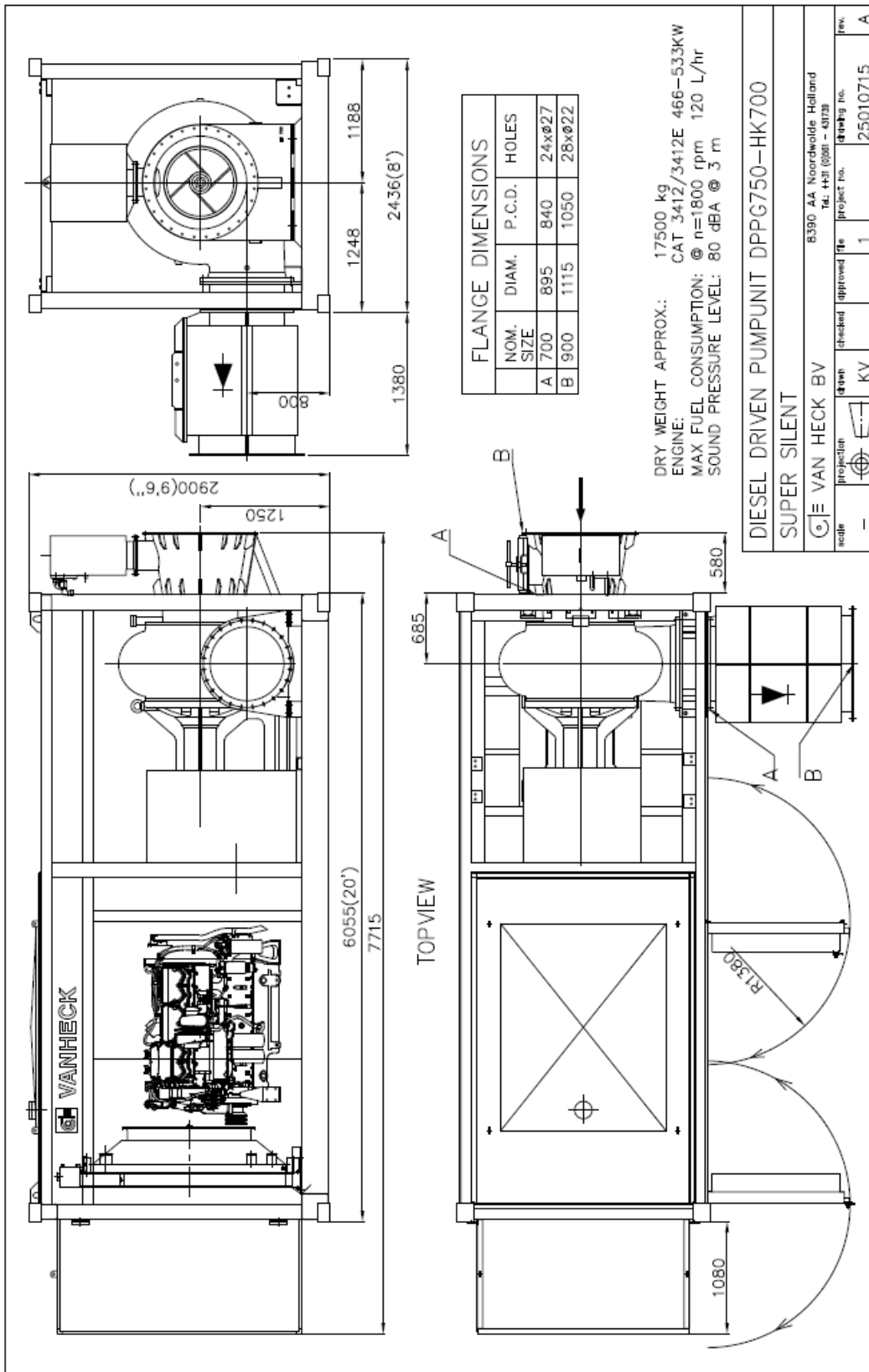
- Used lubricants (oil and grease);
- Used filters;
- Used coolant (coolant);
- Batteries;
- Worn metal pump parts;
- Various synthetic parts (O-rings, packing rings, etc.)
- Other environmentally unfriendly waste materials.

All waste and rejected products must be disposed, processed or recycled in accordance with the laws of the country.

If you want to scrap the pump unit, you can contact Van Heck (only applicable for owners of pump units, not applicable if you are hiring the unit). Van Heck will advise you on how to act in your case.

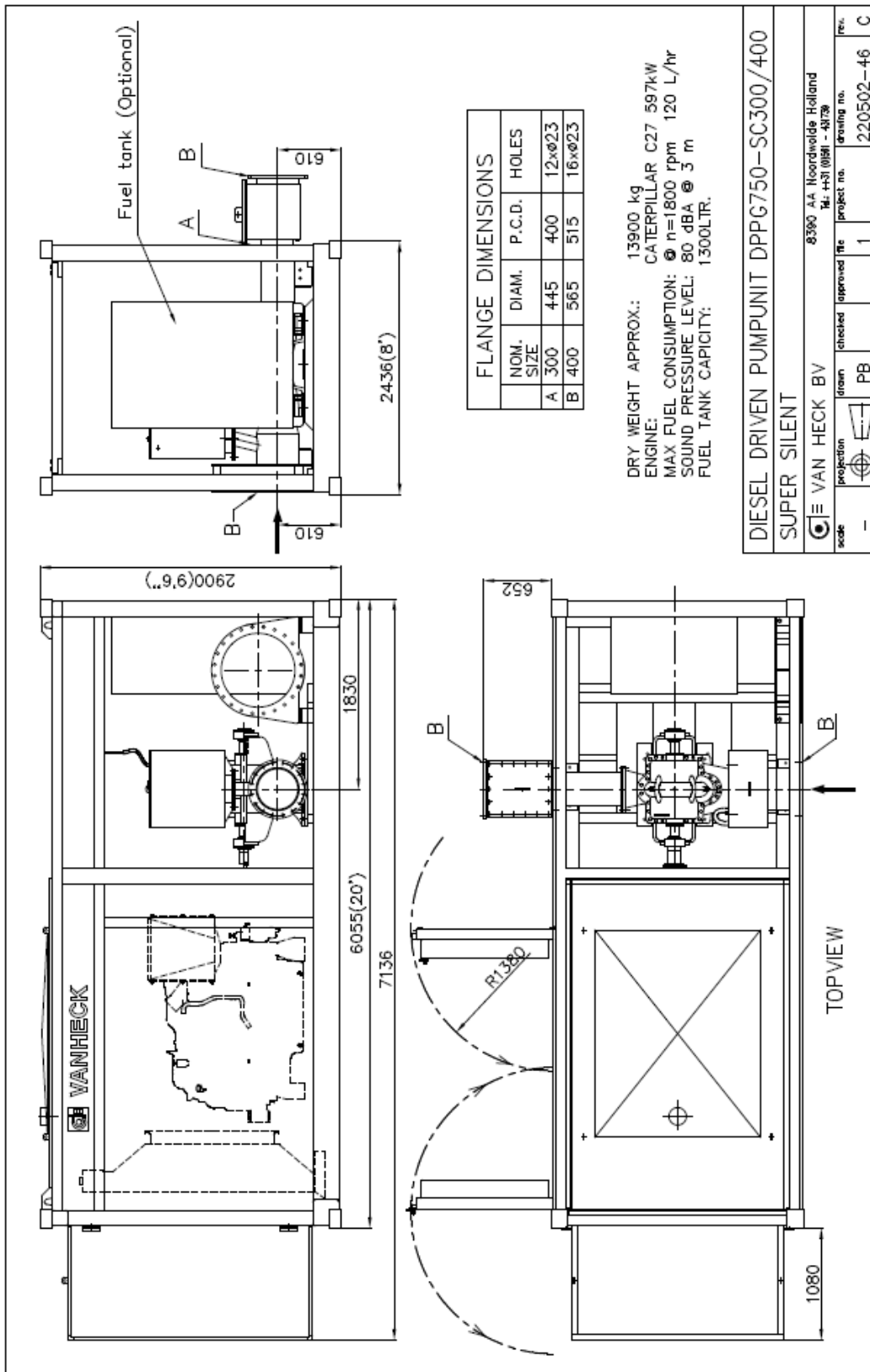
# Section 8 Appendices

appendix 1.1 *Technical drawing DPPG750-HK700*  
*(Identical for the DPP780 – HK700)*

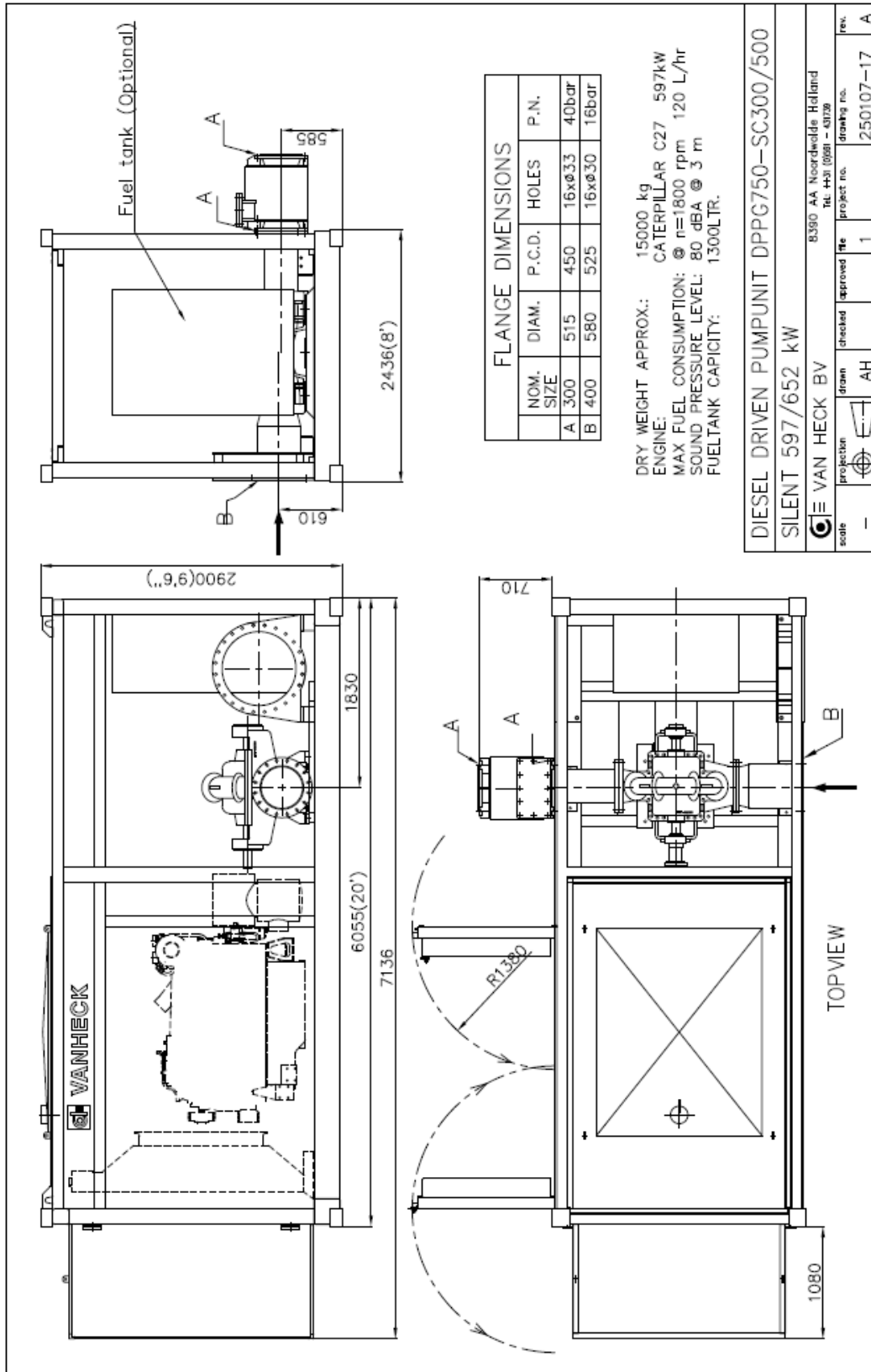




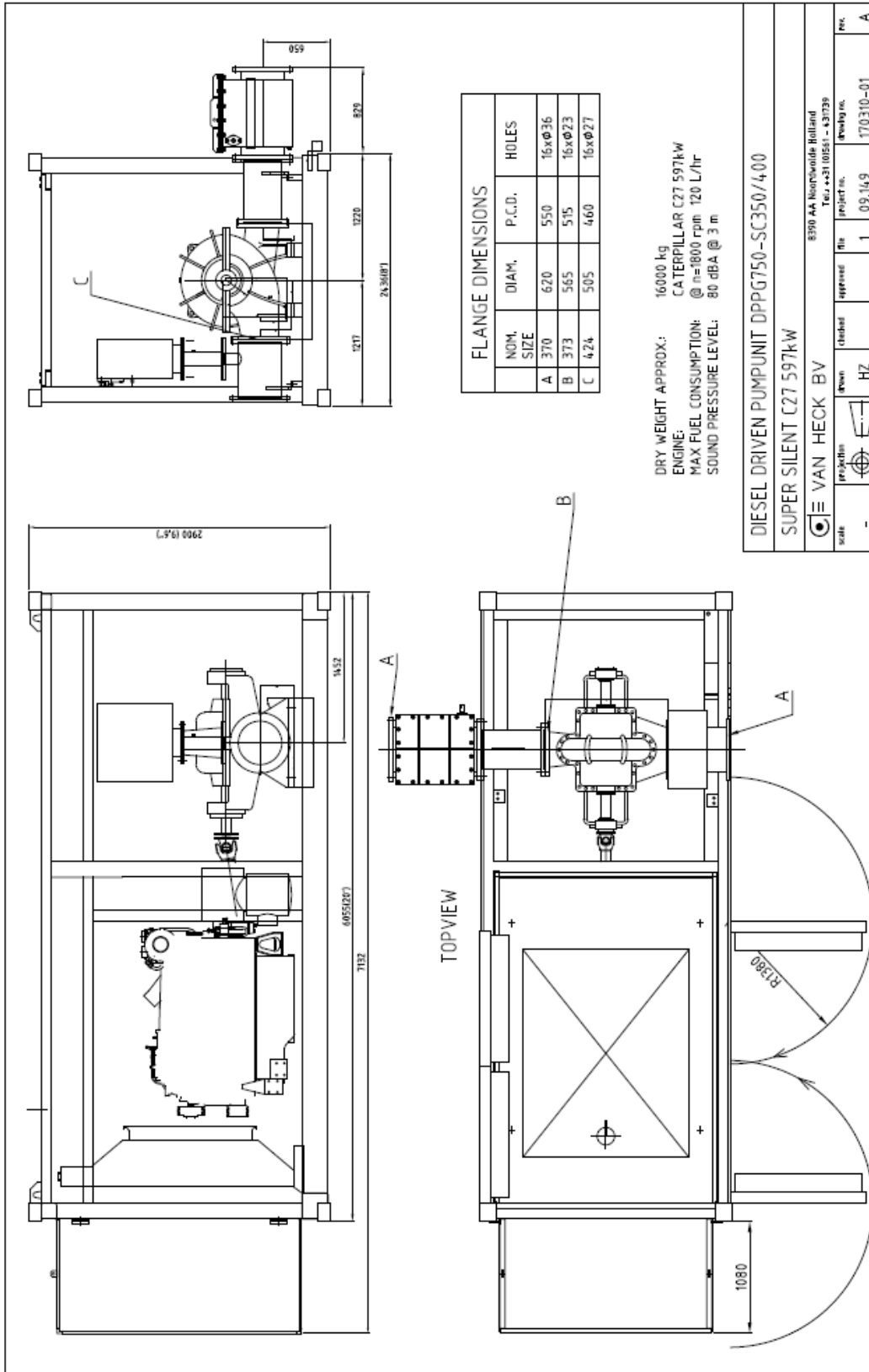
appendix 1.2 technical drawing DPPG750 – SC300/400  
 (Identical for the DPPG780 – SC300/400)



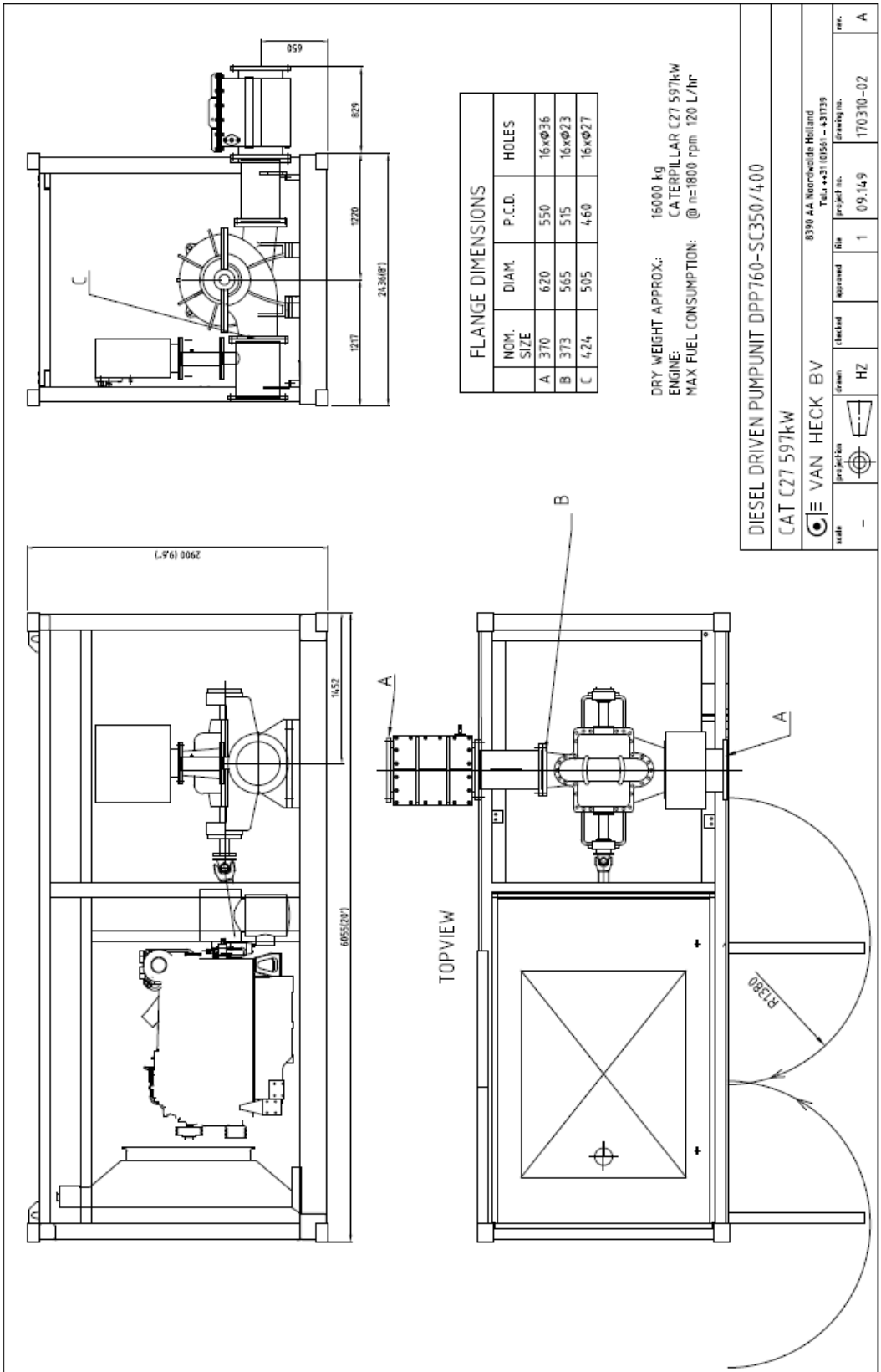
appendix 1.3 Technical drawing DPPG750 – SC300/500  
(identical for the DPPG780 – SC300/500)



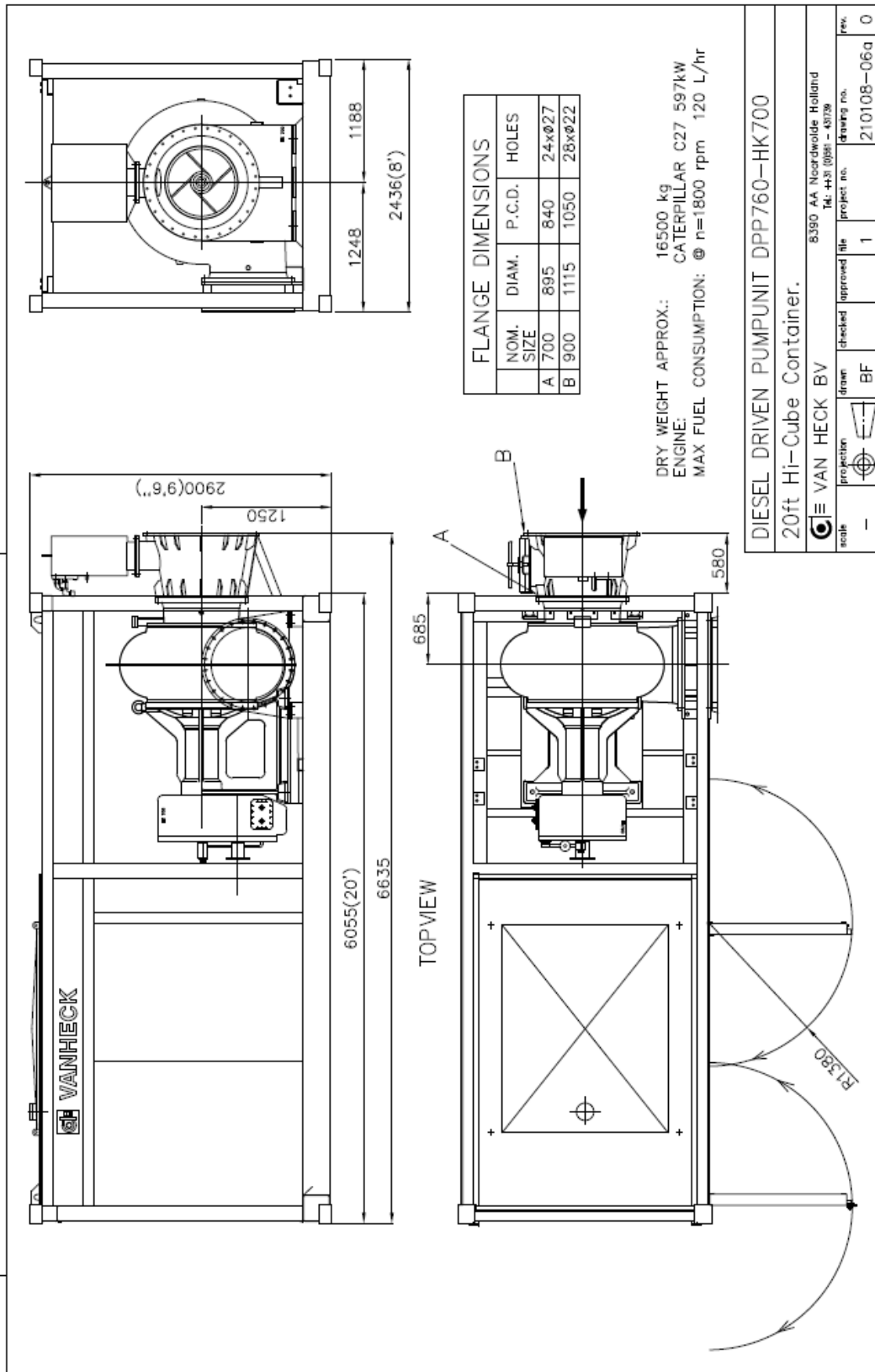
appendix 1.4 Technical drawing DPPG750 – SC350/400  
(identical for DPPG780 – SC350/400)



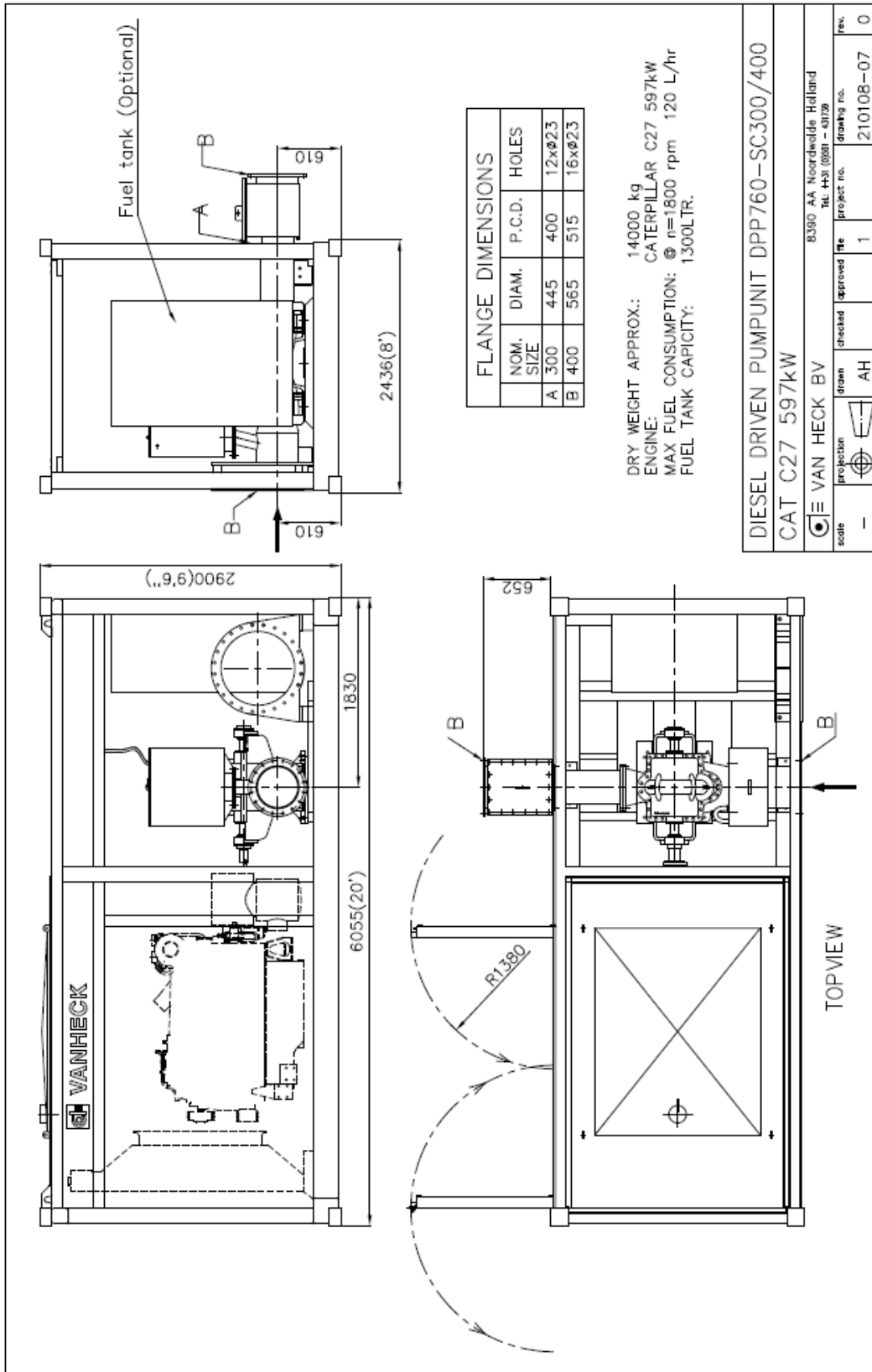
appendix 1.5 Technical drawing DPP760 – SC350/400  
(identical for DPP770 – SC350/400)



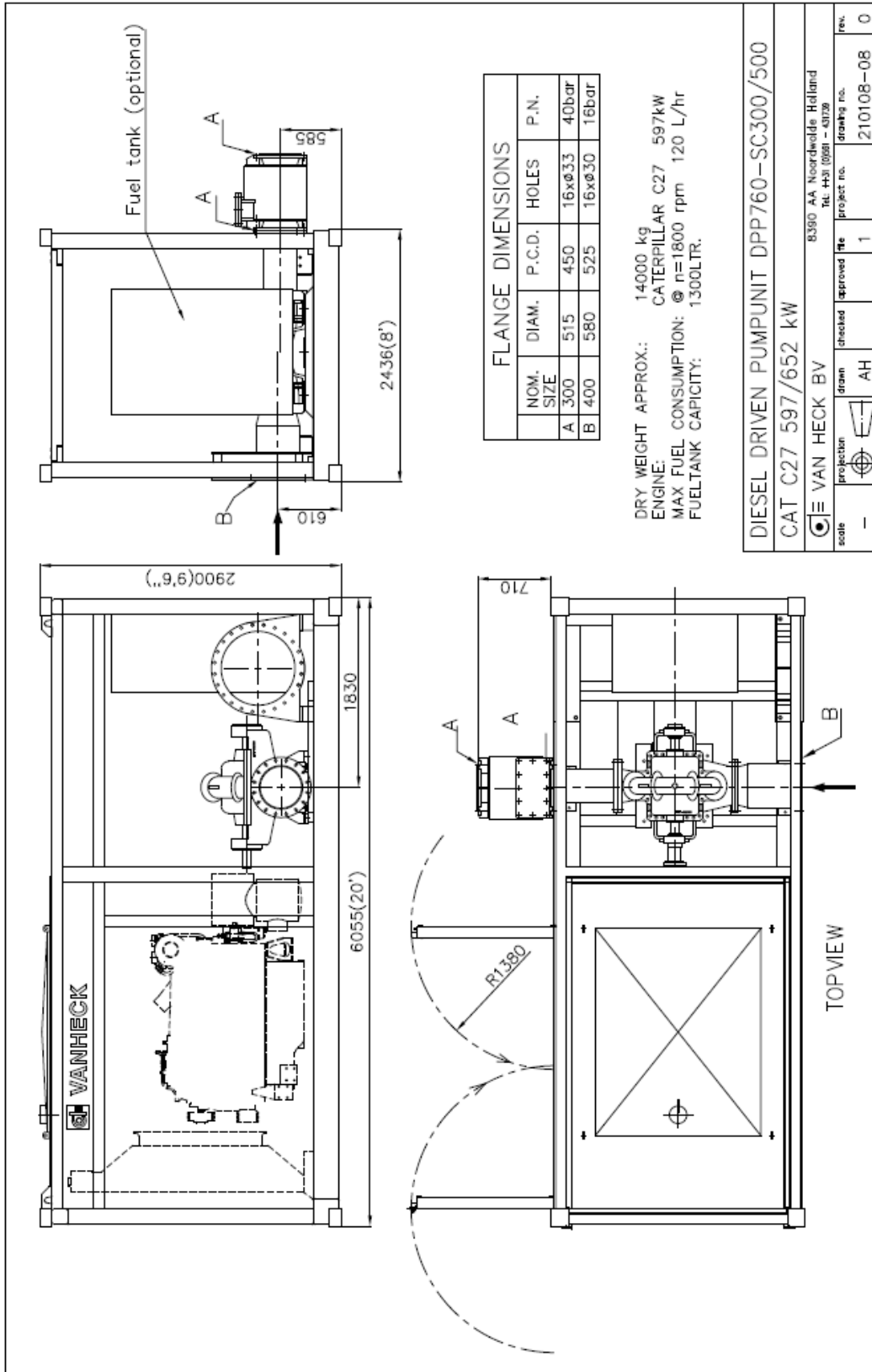
appendix 1.6 Technical drawing DPP760 – HK700  
 (identical for DPP770 – HK700)



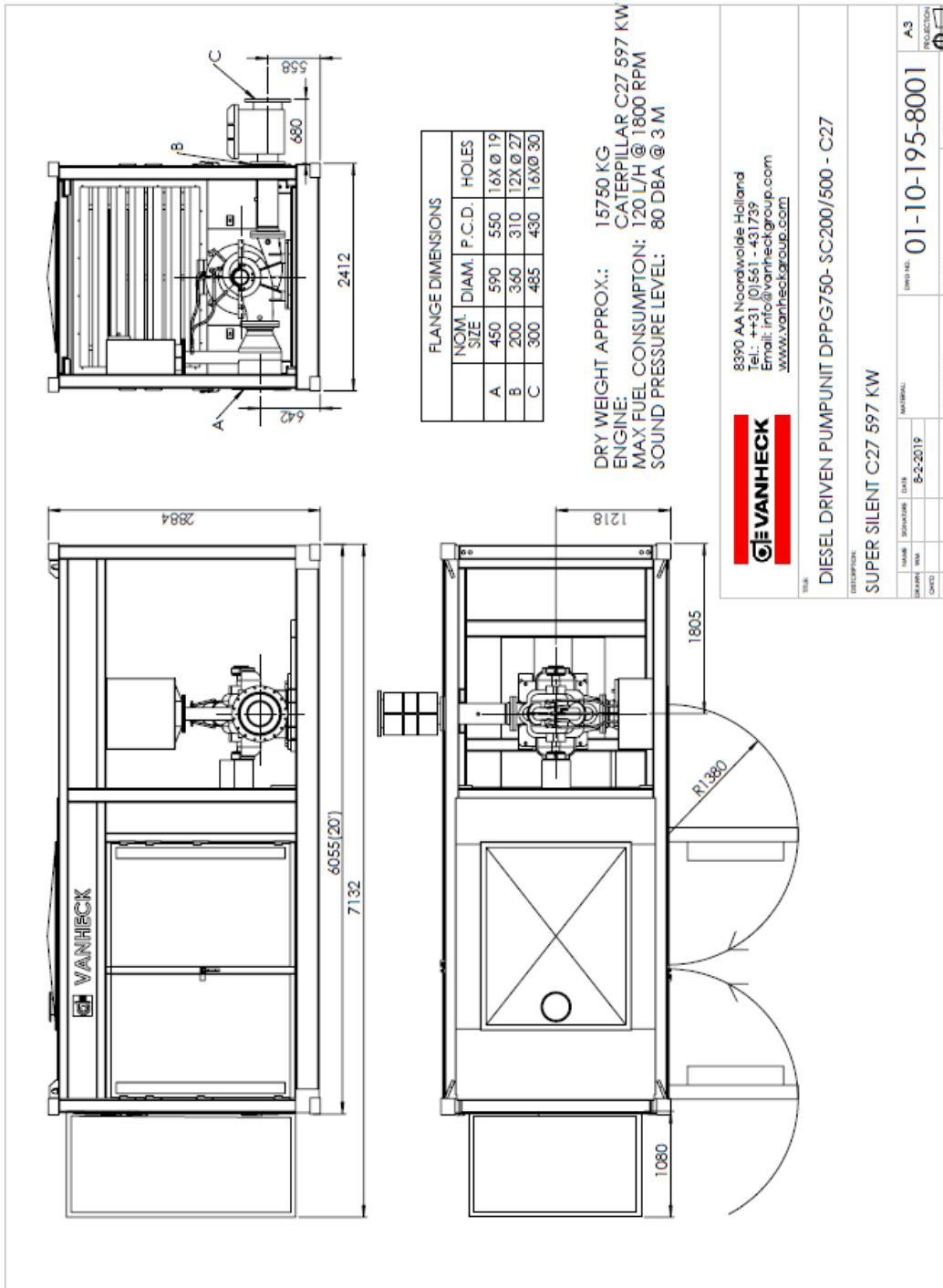
appendix 1.7 Technical drawing DPP760 – SC300/400  
(identical for DPP770 – SC300/400)



appendix 1.8 Technical drawing DPP760 – SC300/500  
(identical for DPP770 – SC300/500)

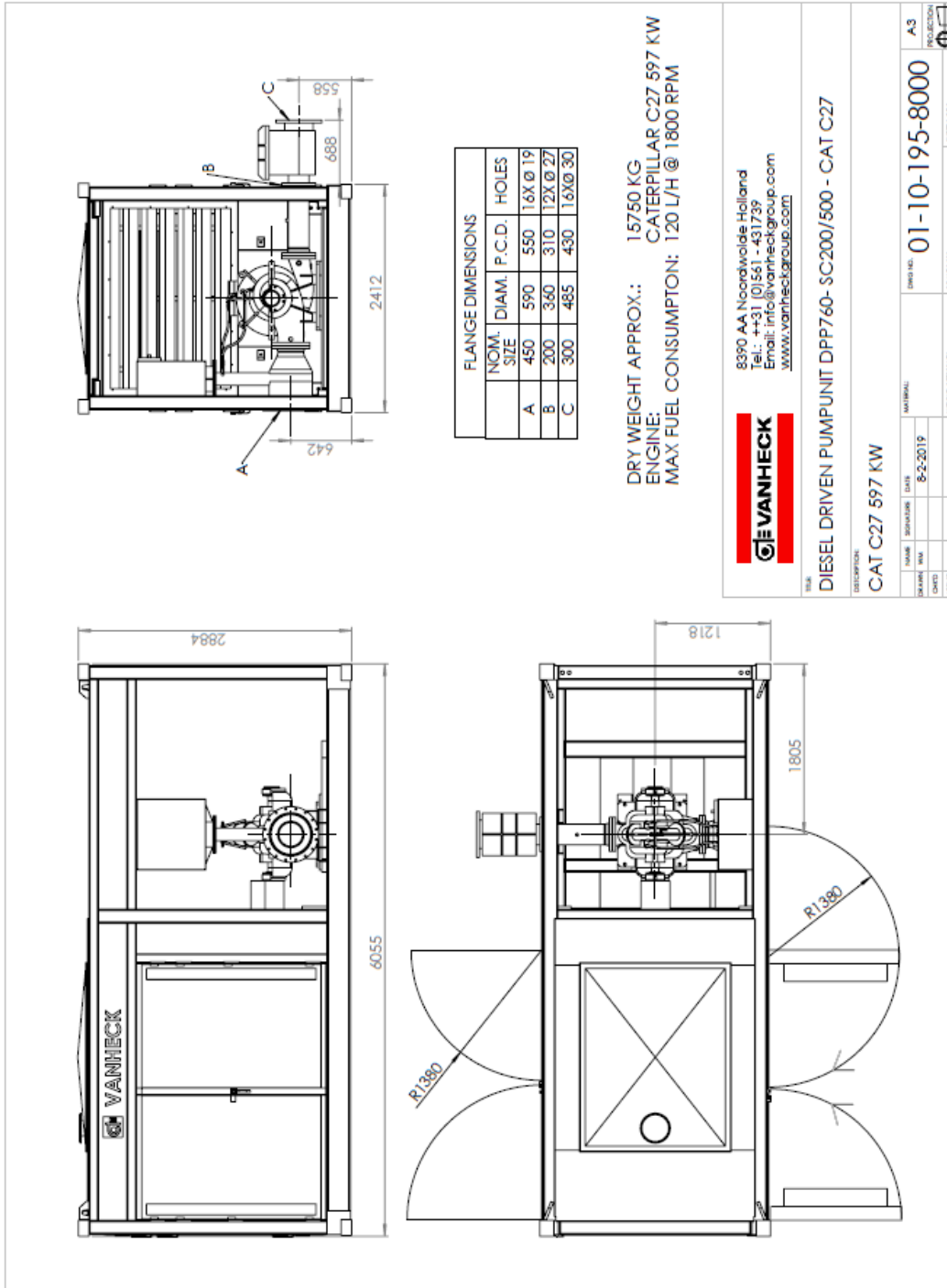


appendix 1.9 Technical drawing DPPG750 – SC200/500  
(identical for DPPG780 – SC200/500)





appendix 1.10 Technical drawing DPP760 – SC200/500  
 (identical for DPP770 – SC200/500)



appendix 2 Maintenance schedule

| Period            | Activity                                                                  | Object                                                                                                                                                 | Remark/additional information                                                                                                           |
|-------------------|---------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <b>continuous</b> | Check                                                                     | Charge voltage<br>Gland seal<br>Gasket inspection intake conus<br>Temperature gearbox<br>Temperature engine coolant<br>Engine coolant lever motor      | ± 28 Volt<br><br>60° - 85°<br>70° - 104°<br>Murphy switch                                                                               |
| <b>6 hours</b>    | Lubricate                                                                 | Gland seal                                                                                                                                             | 2x pump of grease gun                                                                                                                   |
| <b>12 hours</b>   | Check                                                                     | Oil level engine<br><br>Oil level gearbox<br>V-belts/multi-belts                                                                                       | Not running: "Ending stop"<br>At idle: "Low idle"<br>3/4 inspection glass<br>Max. 10 mm depression                                      |
|                   | Top up/fill                                                               | Oil reservoir vacuum pump                                                                                                                              | Full                                                                                                                                    |
|                   | Lubricate                                                                 | Bearings pump ass                                                                                                                                      | 1 pump of grease gun                                                                                                                    |
|                   | Tap-off/drain off                                                         | Water separator vacuum boiler<br>Oil separator vacuum pump                                                                                             |                                                                                                                                         |
| <b>24 hours</b>   | Tap-off/drain off                                                         | Water separator fuel pre-filter<br>Oil separator, vacuum pump                                                                                          |                                                                                                                                         |
|                   | Empty                                                                     | Dust pan under air filters                                                                                                                             |                                                                                                                                         |
| <b>250 hours</b>  | Inspect and lubricate                                                     | Universal joint shaft (PTO)                                                                                                                            | Use grease nipples ½ pump grease gun                                                                                                    |
|                   | Clean                                                                     | Radiator and radiator fan<br>Oil cooler gearbox<br>Sump breather oil separator                                                                         |                                                                                                                                         |
|                   | Tap-off/drain off                                                         | Sump breather oil separator<br>Water separator fuel pre-filter                                                                                         |                                                                                                                                         |
|                   | Check                                                                     | Impellor and pump intake wear ring<br>Start batteries and poles<br><br>Radiator fan<br>V-belts, multi belts and hoses<br>Fine air filter (inside part) | Max. 5 mm play/space<br>Distilled water, see level<br>Leakage or broken?<br><br>Tighten or replace if necessary<br>Replace if necessary |
|                   | Clean                                                                     | Coarse air filter (outside part)                                                                                                                       | With compressed air or replace if necessary                                                                                             |
|                   | Change/replace/renew                                                      | Fuel filters<br>Oil filters<br>Vacuum filters                                                                                                          | Fill with fuel before fitting                                                                                                           |
|                   | Drain and Renew                                                           | Engine oil                                                                                                                                             | ± 68 litre (dip stick)                                                                                                                  |
| <b>1000 hours</b> | Check                                                                     | Rotor + vanes vacuum pump                                                                                                                              | Max. 6 mm wear                                                                                                                          |
|                   | Drain and Renew                                                           | Gearbox oil                                                                                                                                            | ± 100 litre (to 3/4 inspection glass)                                                                                                   |
|                   | Replace/Renew                                                             | Gearbox oil filter<br>All v-belts and/or multi-belts                                                                                                   | Service list                                                                                                                            |
| <b>2000 hours</b> | <b>By a Van Heck Service engineer or qualified diesel engine engineer</b> |                                                                                                                                                        |                                                                                                                                         |
|                   | Lubricate                                                                 | Bearings radiator fan                                                                                                                                  | Lightly lubricate                                                                                                                       |
|                   | Inspect                                                                   | Diesel injectors<br>Turbo's<br>Start motor and alternator<br>Engine supports<br>Flexible coupling (on fly-wheel)                                       |                                                                                                                                         |
|                   | Check and adjust                                                          | Valve clearances cylinder head                                                                                                                         | Exhaust: 0.76 ± 0.10 mm (0.030 ± 0.004 inch)<br>Intake: 0.38 ± 0.10 mm (0.015 ± 0.004 inch)                                             |
|                   | Check                                                                     | Gear wheels<br>Pump as play                                                                                                                            | Wear, pitting and alignment<br>Max. 0.2 – 0.3 mm                                                                                        |
|                   | Test                                                                      | Operation panel all functions<br>Vacuum pressure (pump)                                                                                                | Including warnings and safety features                                                                                                  |
|                   | Inspect and lubricate                                                     | Universal joint shaft (PTO)                                                                                                                            | Grease nipples ½ pumps grease gun                                                                                                       |

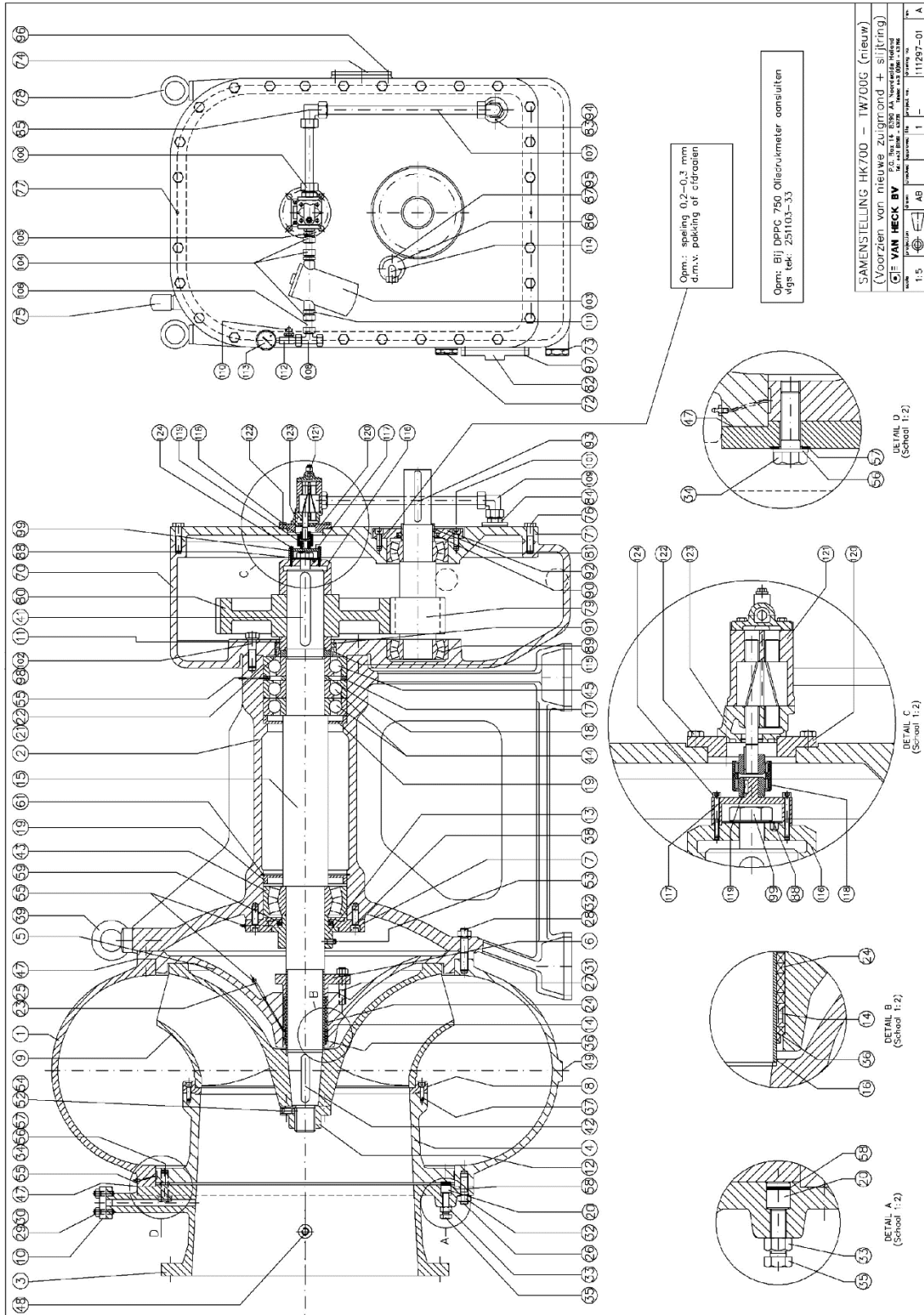
appendix 3 Service parts

| Part                    | No. of or volume | Type                               | remark                    |
|-------------------------|------------------|------------------------------------|---------------------------|
| Engine oil              |                  | Shell Rimula Super 15W40           |                           |
| Gear box oil            |                  | Shell Omala 220                    |                           |
| Vacuum pump oil         |                  | Shell Rimula X40 ( <i>summer</i> ) | X30 ( <i>winter</i> )     |
| Grease                  |                  | Shell Alvania EP2                  |                           |
| Engine coolant          |                  | Shell Coolant Standard             |                           |
| Oil filter              | 2                | IR-1808                            |                           |
| Fuel pre-filter         | 1                | IR-0755                            |                           |
| Fuel filter             | 1                | 326-1643                           |                           |
| Air filter (outer part) | 1                | Donaldson P18-1039/P18-2039        | Clean with compressed air |
| Air filter (inner part) | 1                | Donaldson P11-4931                 | Do not clean              |
| Vacuum filter           | 1                | GS1441                             |                           |
| Gearbox oil filter      | 1                | Arlon ST/60                        |                           |
| V-belt radiator fan     | 4                | 6N-6657                            |                           |
| V-belt alternator       | 2                | GL-6643                            |                           |
| V-belt vacuum pump      | 1                | SPA 1857                           |                           |
| Alternator 24V-60A      | 1                | CAT 4N-3986                        | Or exchange OR-5203       |
| Starter 24V             | 1                | CAT 6V-0890                        | Or exchange OR-4272       |
| Battery                 | 2                | Centurion 96803                    | 12V/280Ah                 |

**Always use original Caterpillar filters during operating hours!**

For other parts of the pump and gearbox, see the drawing and parts list on the following pages.

appendix 3.1 HK700 technical drawing with parts lists





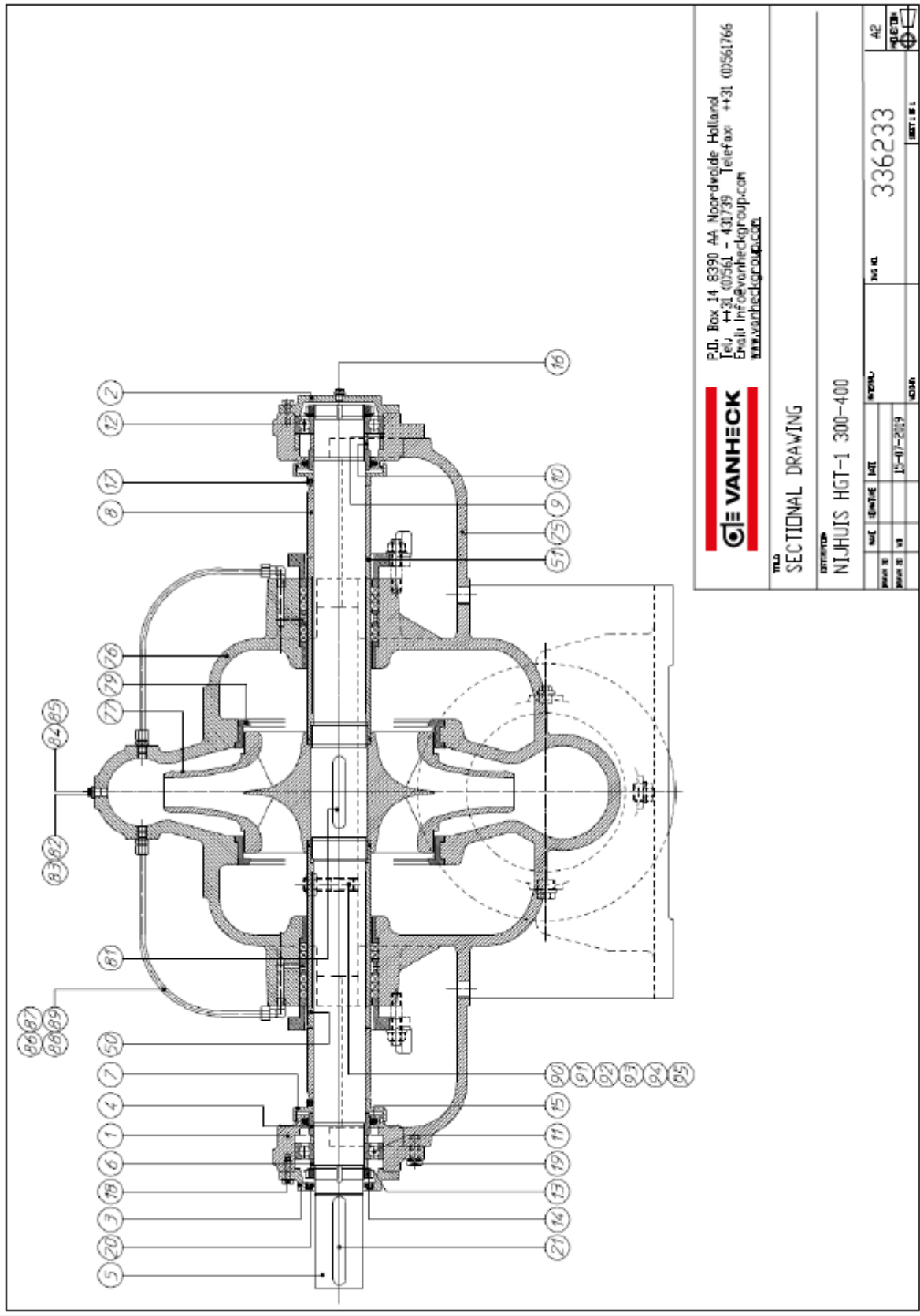




appendix 3.2.1 SC200/500 parts list

| Pos. Nr. | Code         | Description                             | Qty   |    |
|----------|--------------|-----------------------------------------|-------|----|
| 1        | NP139009106  | BEAR. HOUSING D.S. VENUS-75 + PT 100    | 1     | PC |
| 2        | NP139008106  | B.HOUSING NDS VENUS-75 + PT100          | 1     | PC |
| 3        | NP139007106  | BEARING COVER VENUS-75                  | 2     | PC |
| 4        | NP139006235  | P. SHAFT VENUS-75K                      | 1     | PC |
| 5        | NP139004240  | RETAINER SLEEVE VENUS-75                | 2     | PC |
| 6        | NP730183000  | DEEP GR BALL BEARING SKF 6216 2Z        | 2     | PC |
| 7        | NP703257000  | LOCK NUT SKF KM 16                      | 2     | PC |
| 8        | NP706216000  | LOCK RING MB 16                         | 2     | PC |
| 9        | NP904423250  | ADJ. SCREW DIN 916 M16X 16-A4           | 1     | PC |
| 10       | NP902112216  | HEX.H.SCREW DIN 933 M16X 55-8.8 ELVZ    | 8     | PC |
| 11       | NP906037211  | PLAIN WASHER DIN 125A M16 - VERZ        | 8     | PC |
| 12       | NP902090216  | HEX.H.SCREW DIN 933 M12X 40-8.8 ELVZ    | 8     | PC |
| 13       | NP906035211  | PLAIN WASHER DIN 125A M12 - VERZ        | 8     | PC |
| 14       | NP906893213  | KEY DIN 6885A 020X012X125 - 1.0503      | 1     | PC |
| 15       | NP906890255  | KEY DIN 6885A 020X012X100 - 1.4571      | 2     | PC |
| 16       | NP725189000  | V-RING V- 75S NITR.RUBBER               | 1     | PC |
| 17       | NP725400000  | SEAL GAMMA RB 95X115X5.5                | 2     | PC |
| 18       | NP725224000  | O-RING BUNA-N 70S 77 X 1.5              | 2     | PC |
| 40       | NP139005305  | SHAFT SLEEVE VENUS-75K                  | 2     | PC |
| 42       | NP139189302  | GLAND VENUS-75                          | 2     | PC |
| 44       | NP120303305  | LANTERN RING                            | 2     | PC |
| 45       | NP120304305  | PACKING SEATING RING                    | 2     | PC |
| 50       | NP765010000  | GLAND PACKING THERMOFL.4KT 12.5MM6230AK | 3.540 | M  |
| 52       | NP725272000  | O-RING BUNA-N 70S 85 X 3                | 2     | PC |
| 54       | NP906037250  | PLAIN WASHER DIN 125A M16 -A4           | 4     | PC |
| 56       | NP905722250  | GLAND STUD M16X 20-10-50-A4             | 4     | PC |
| 57       | NP903309250  | HEX.NUT DIN 934 M16 -A4                 | 4     | PC |
| 70       | NP142480320K | IMPELLER                                | 1     | EA |
| 73       | NP137458305  | WEAR RING HGT1-200.500                  | 2     | PC |
| 80       | NP149537112  | PUMP CASING HGT1-200.500                | 1     | PC |
| 81       | NP905482216  | STUD DIN 939 M16X 40-8.8 ELVZ           | 38    | PC |
| 81       | NP905495216  | STUD DIN 939 M16X110-8.8 ELVZ           | 2     | PC |
| 81       | NP903655216  | HEX.SCREW DIN 912 M16X 50-8.8 ELVZ      | 8     | PC |
| 82       | NP903387216  | HEX. DOM. CAP NUT DIN 1587 M16-ST.8ELVZ | 40    | PC |
| 83       | NP902110216  | HEX.H.SCREW DIN 933 M16X 45-8.8 ELVZ    | 4     | PC |
| 84       | NP706448000  | TAPER PIN ISO 8737 10X 75 MM -STEEL     | 2     | PC |
| 85       | NP906034211  | PLAIN WASHER DIN 125A M10 - VERZ        | 2     | PC |
| 86       | NP903307216  | HEX.NUT DIN 934 M10 -ST.8 ELVZ          | 2     | PC |
| 87       | NP908023345  | HEX.PLUG DIN 910 1/2"G -BRASS           | 2     | PC |
| 88       | NP908015350  | WASHER 1/2"G 21X28X2 MM COPPER          | 2     | PC |
| 89       | NP908024345  | HEX.PLUG DIN 910 3/4"G -BRASS           | 2     | PC |
| 90       | NP908018350  | WASHER 3/4"G 26X34X2 MM COPPER          | 2     | PC |
| 91       | NP908025345  | HEX.PLUG DIN 910 1"G -BRASS             | 2     | PC |
| 92       | NP908019350  | WASHER 1"G 33X39X2 MM COPPER            | 2     | PC |
| 101      | NP962100350  | BY-PASS 8X 6 MM A661981 COPPER          | 2     | M  |
| 102      | NP918142345  | JOINING 1/4"G X 8-BRASS                 | 2     | PC |
| 103      | NP916441101  | UNION NR.344 1/4"G -ELVZ                | 2     | PC |
| 104      | NP918109345  | JOINING 1/4"GX 8 -BRASS                 | 2     | PC |
| 105      | NP735213000  | NEEDLE VALVE 1/4"G ECON FIG.718         | 2     | PC |
| 300      | NP363974315  | PROT.GUARD SHAFTGR. 75                  | 2     | PC |
| 301      | NP905441250  | STUD DIN 939 M10X 25-A4                 | 4     | PC |
| 302      | NP906033250  | PLAIN WASHER DIN 125A M 8 -A4           | 8     | PC |
| 303      | NP903307250  | HEX.NUT DIN 934 M10 -A4                 | 8     | PC |



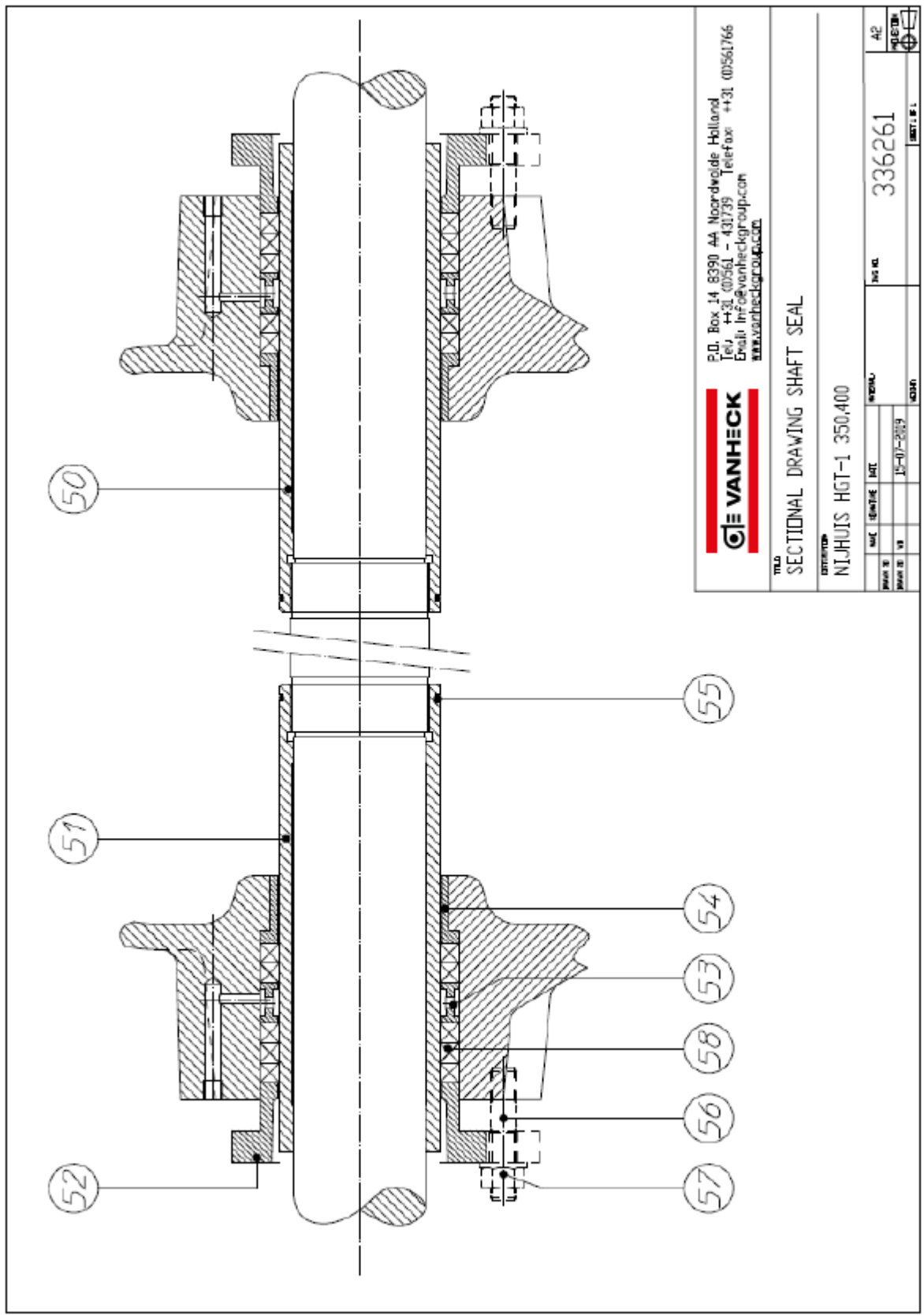


**GJE VANHECK**  
 P.O. Box 14 8390 AA Noordwijde Holland  
 Tel: +31 (0)561 - 431739 Telefax: +31 (0)561766  
 Email: info@vanheckgroep.com  
 www.vanheckgroep.com

TITEL  
**SECTIONAL DRAWING**

OBJECT  
**NLJHUIS HGT-1 300-400**

|            |          |       |         |        |     |
|------------|----------|-------|---------|--------|-----|
| DATE       | DESIGNED | DRAWN | NO. NO. | 336233 | 4/2 |
| 19         |          |       |         |        |     |
| REVISION   |          |       |         |        |     |
| 15-01-2019 |          |       |         |        |     |
| A0001      |          |       |         |        |     |

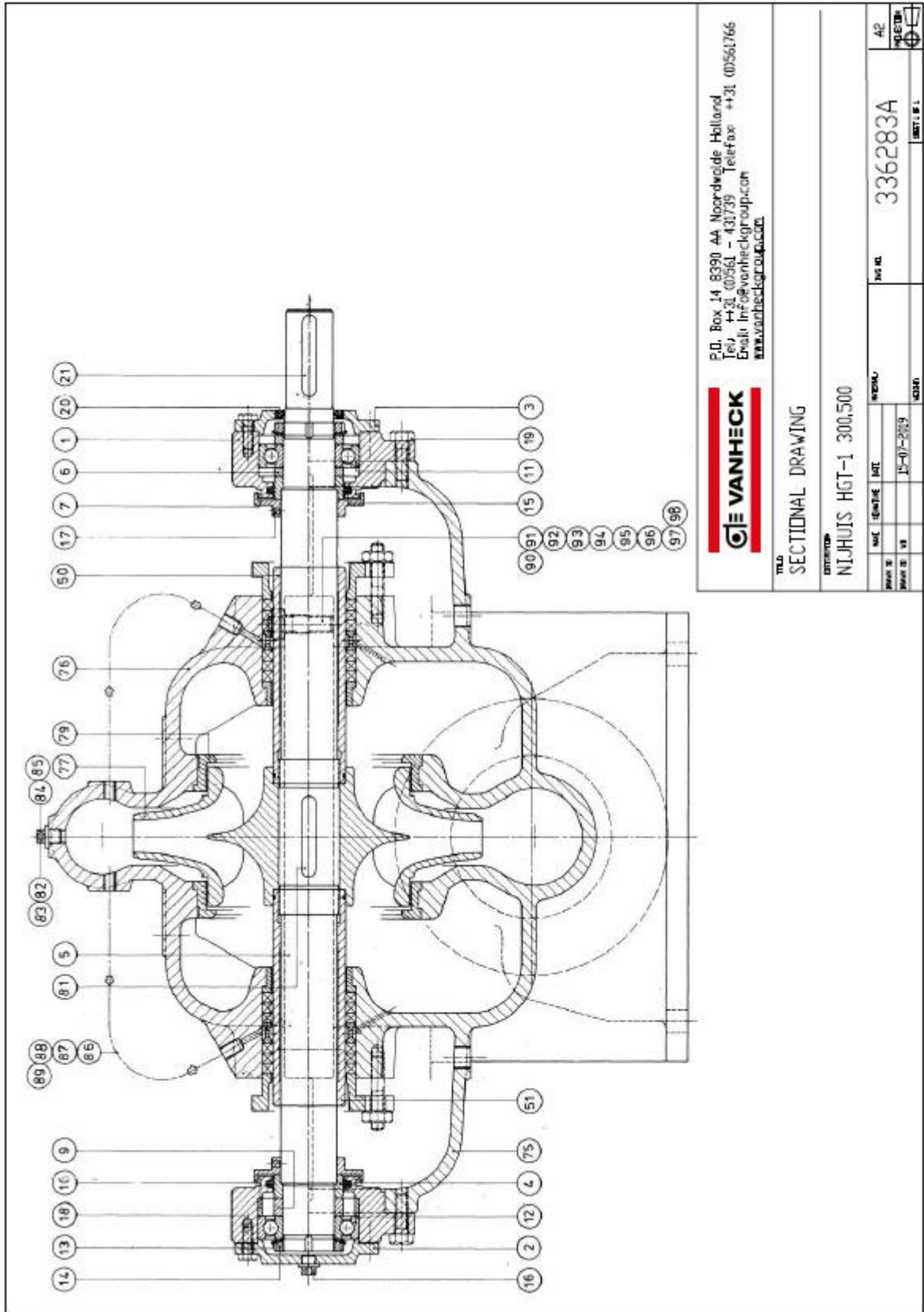


**VANHECK**  
 P.O. Box 14 8390 AA Noordwijde Holland  
 Tel: +31 (0)561 - 431735 Telefax: +31 (0)561766  
 Email: [info@vanheckgroup.com](mailto:info@vanheckgroup.com)  
[www.vanheckgroup.com](http://www.vanheckgroup.com)

|           |            |                              |           |
|-----------|------------|------------------------------|-----------|
| TITEL     |            | SECTIONAL DRAWING SHAFT SEAL |           |
| OEFENING  |            | NIJHUIS HGT-1 350,400        |           |
| MAK       | LEVENSTIJD | WED. NIJHUIS                 | 42        |
| MAK N°    | 12-11-2019 | FIG. NO.                     | 336261    |
| MAK N° 18 |            | SOORT                        | ART. N° 1 |

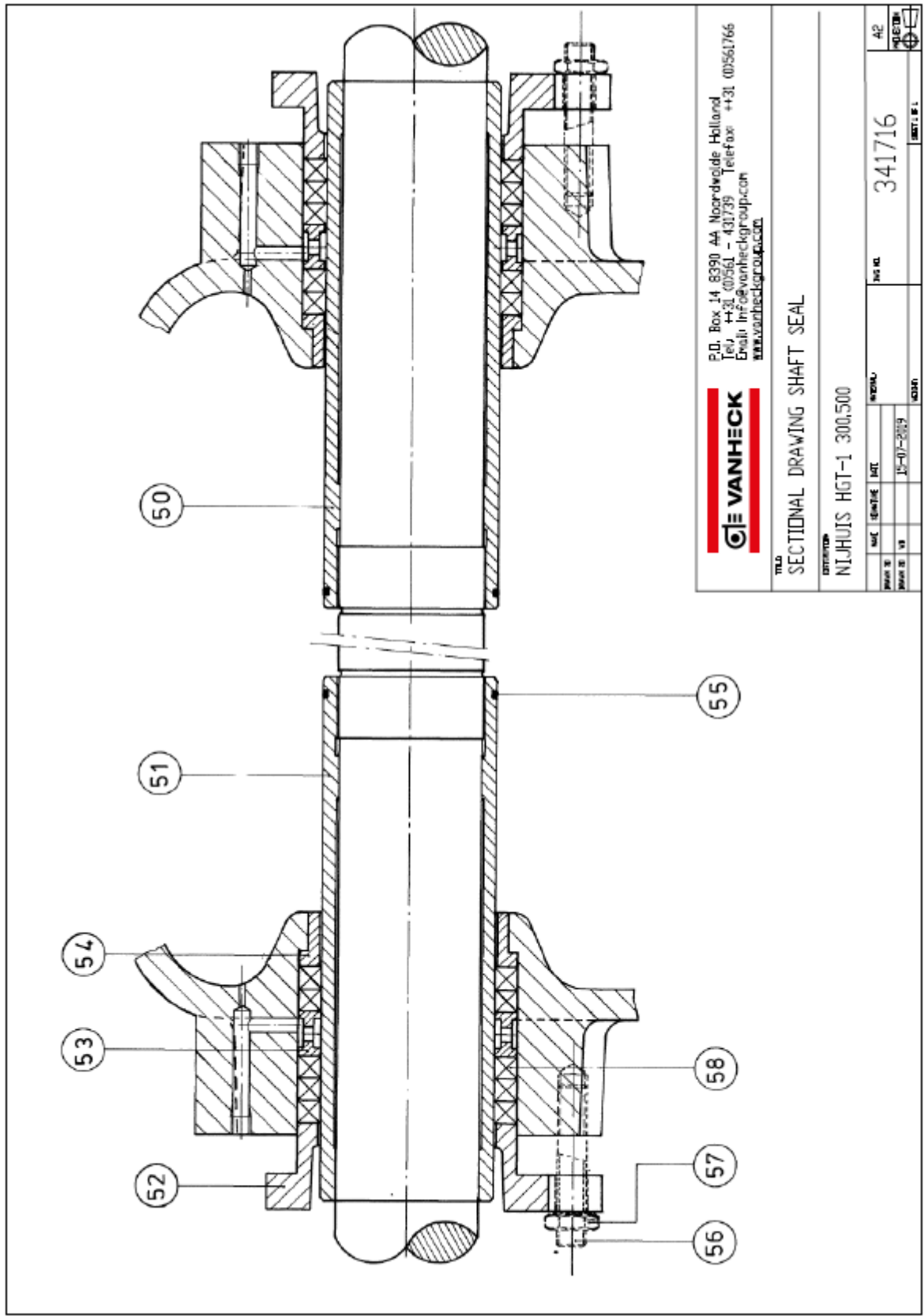
appendix 3.3.2 SC300/400 parts list

| Pos. Nr. | Code         | Description                             | Qty   |    |
|----------|--------------|-----------------------------------------|-------|----|
| 1        | NP120323106  | BEAR. HOUSING HGT-75                    | 2     | PC |
| 2        | NP120324106  | BEARING COVER N.D.S. HGT-75             | 1     | PC |
| 3        | NP120325106  | BEARING COVER D.S. HGT-75               | 1     | PC |
| 4        | NP120369208  | RING 095 X 080 X 031 MM HGT-75          | 2     | PC |
| 5        | NP120371235  | P. SHAFT HGT-75                         | 1     | PC |
| 6        | NP120370208  | RING 095 X 080 X 013 MM HGT-75          | 2     | PC |
| 7        | NP120329106  | THROWER RING HGT-75                     | 2     | PC |
| 9        | NP120819208  | SPACER RING HGT-75                      | 1     | PC |
| 10       | NP120820208  | SPACER RING HGT-75                      | 1     | PC |
| 11       | NP730151000  | DEEP GR BALL BEARING SKF 6216           | 1     | PC |
| 12       | NP730151000  | DEEP GR BALL BEARING SKF 6216           | 1     | PC |
| 13       | NP706216000  | LOCK RING MB 16                         | 2     | PC |
| 14       | NP703257000  | LOCK NUT SKF KM 16                      | 2     | PC |
| 15       | NP725004000  | FELT RING FS 370                        | 2     | PC |
| 17       | NP904396250  | ADJ. SCREW DIN 916 M 8X 10-A4           | 4     | PC |
| 18       | NP902088216  | HEX.H.SCREW DIN 933 M12X 30-8.8 ELVZ    | 12    | PC |
| 19       | NP902110216  | HEX.H.SCREW DIN 933 M16X 45-8.8 ELVZ    | 12    | PC |
| 20       | NP725102000  | SIMMERRING DIN 3760 A 78X100X10 MM-NBR  | 1     | PC |
| 21       | NP906893213  | KEY DIN 6885A 020X012X125 - 1.0503      | 1     | PC |
| 50       | NP120368240  | SHAFT SLEEVE L. HG2                     | 1     | PC |
| 51       | NP120367240  | SHAFT SLEEVE R. HG2                     | 1     | PC |
| 52       | NP120326302  | GLAND HGT-75                            | 2     | PC |
| 53       | NP120303305  | LANTERN RING                            | 2     | PC |
| 54       | NP120304305  | PACKING SEATING RING                    | 2     | PC |
| 55       | NP725278000  | O-RING BUNA-N 70S 95 X 3                | 2     | PC |
| 56       | NP905722250  | GLAND STUD M16X 20-10-50-A4             | 4     | PC |
| 57       | NP903309250  | HEX.NUT DIN 934 M16 -A4                 | 4     | PC |
| 58       | NP765010000  | GLAND PACKING THERMOFL.4KT 12.5MM6230AK | 4.320 | M  |
| 75       | NP135094106  | PUMP CASING HGT1-300.400                | 1     | PC |
| 77       | NP121489301K | IMPELLER                                | 1     | EA |
| 79       | NP135953305  | WEAR RING HGT1-300.400                  | 2     | PC |
| 81       | NP906893255  | KEY DIN 6885A 020X012X125 - 1.4571      | 1     | PC |
| 82       | NP908024345  | HEX.PLUG DIN 910 3/4"G -BRASS           | 2     | PC |
| 83       | NP908018350  | WASHER 3/4"G 26X34X2 MM COPPER          | 2     | PC |
| 84       | NP908023345  | HEX.PLUG DIN 910 1/2"G -BRASS           | 3     | PC |
| 85       | NP908015350  | WASHER 1/2"G 21X28X2 MM COPPER          | 3     | PC |
| 90       | NP905502216  | STUD DIN 939 M20X 50-8.8 ELVZ           | 30    | PC |
| 91       | NP903388216  | HEX. DOM. CAP NUT DIN 1587 M20-ST.8ELVZ | 30    | PC |
| 92       | NP902136216  | HEX.H.SCREW DIN 933 M20X 60-8.8 ELVZ    | 6     | PC |
| 93       | NP706448000  | TAPER PIN ISO 8737 10X 75 MM -STEEL     | 2     | PC |
| 94       | NP906034211  | PLAIN WASHER DIN 125A M10 - VERZ        | 2     | PC |
| 95       | NP903307216  | HEX.NUT DIN 934 M10 -ST.8 ELVZ          | 2     | PC |



**GE VANHECK**  
 P.O. Box 14, 8390 AA Noordwilde, Holland  
 Tel: +31 (0)561 - 43739 Telefax: +31 (0)561766  
 Email: info@vanheckgroup.com  
 www.vanheckgroup.com

|             |          |                   |       |
|-------------|----------|-------------------|-------|
| TITLE       |          | SECTIONAL DRAWING |       |
| DRAWING NO. |          | 336283A           |       |
| DATE        | SCALE    | DATE              | SCALE |
| 15-07-2019  | 1:1      |                   |       |
| DESIGNER    | APPROVED | DATE              | SCALE |
|             |          |                   |       |
| DRAWN BY    |          | CHECKED BY        |       |
|             |          |                   |       |
| PROJECT NO. |          | JOB NO.           |       |
|             |          |                   |       |
| SHEET NO.   |          | SHEET TOTAL       |       |
|             |          | 1 / 1             |       |

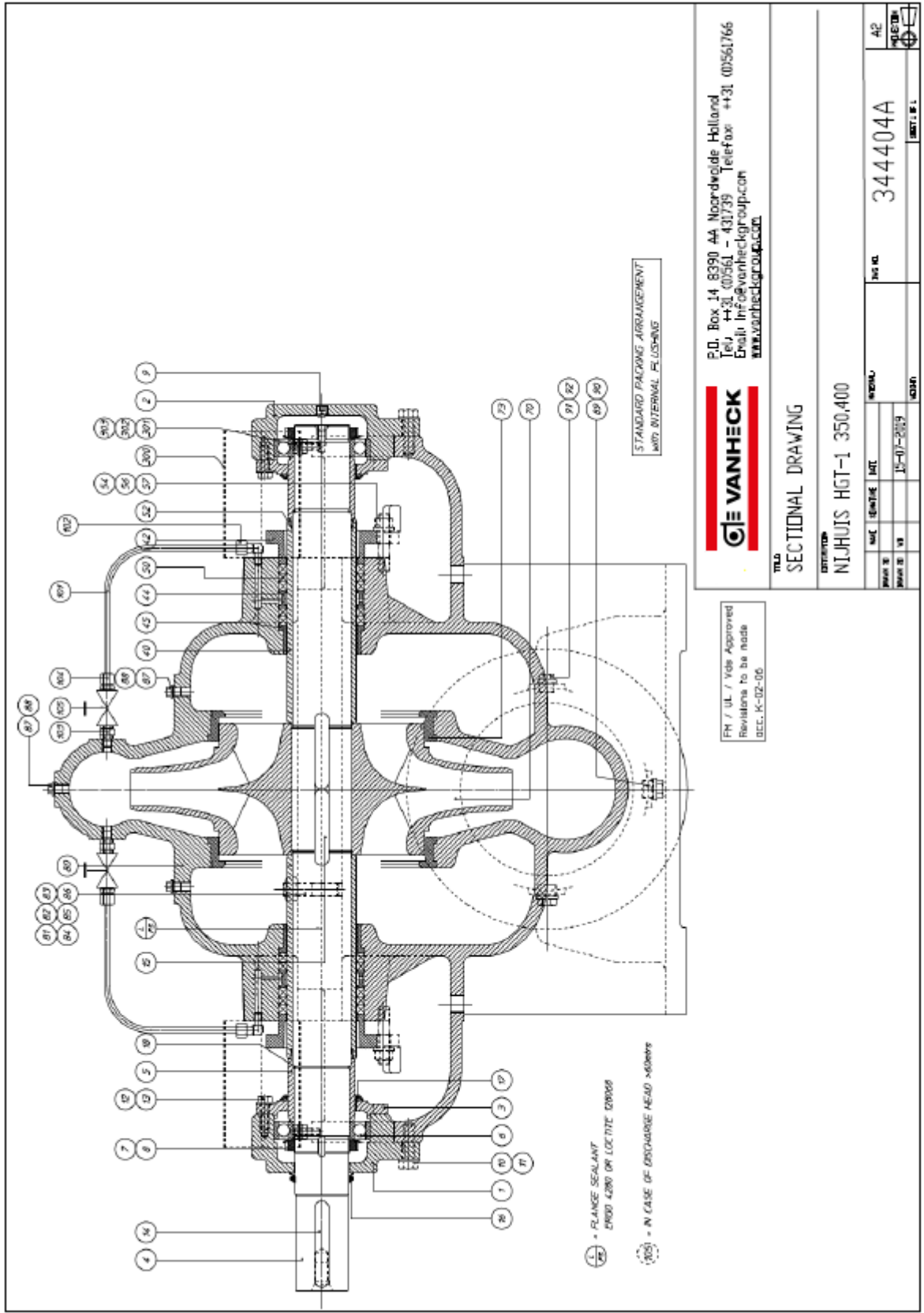


**GJE VANHECK**  
 P.O. Box 14 8390 AA Noordwijde Holland  
 Tel: +31 (0)561 - 431735 Telefax: +31 (0)561766  
 Email: inf@vanheckgroup.com  
 www.vanheckgroup.com

|                              |        |            |         |                       |  |    |  |
|------------------------------|--------|------------|---------|-----------------------|--|----|--|
| TITEL                        |        |            |         | 341716                |  | A2 |  |
| SECTIONAL DRAWING SHAFT SEAL |        |            |         | NO. NO.               |  | A2 |  |
| ONTWERP                      |        |            |         | NIJHUIS HGT-1 300,500 |  | A2 |  |
| MAK                          | ENTITE | DATE       | REVISIE |                       |  |    |  |
| 18                           |        | 12-10-2019 | 02/01   |                       |  |    |  |
|                              |        |            |         | A2/01                 |  |    |  |

appendix 3.4.2 SC300/500 parts list

| Pos. Nr. | Code         | Description                             | Qty   |    |
|----------|--------------|-----------------------------------------|-------|----|
| 1        | NP121150106  | BEAR. HOUSING HGT-85                    | 2     | PC |
| 2        | NP121171106  | BEARING COVER N.D.S. HGT-85             | 1     | PC |
| 3        | NP121170106  | BEARING COVER HGT-85                    | 1     | PC |
| 4        | NP121279208  | SUPPORT WASHER HGT1-400.400             | 2     | PC |
| 5        | NP125859235  | P. SHAFT HGT-85                         | 1     | PC |
| 6        | NP121281208  | SPACER RING HGT-85                      | 2     | PC |
| 7        | NP121173106  | THROWER RING HGT-85                     | 2     | PC |
| 9        | NP121289208  | SPACER RING HGT-85                      | 1     | PC |
| 10       | NP121290208  | SPACER RING HGT                         | 1     | PC |
| 11       | NP730153000  | DEEP GR BALL BEARING SKF 6218           | 1     | PC |
| 12       | NP730153000  | DEEP GR BALL BEARING SKF 6218           | 1     | PC |
| 13       | NP706218000  | LOCK RING MB 18                         | 2     | PC |
| 14       | NP703259000  | LOCK NUT SKF KM 18                      | 2     | PC |
| 15       | NP725005000  | FELT RING FS 460                        | 2     | PC |
| 17       | NP904396250  | ADJ. SCREW DIN 916 M 8X 10-A4           | 4     | PC |
| 18       | NP902088216  | HEX.H.SCREW DIN 933 M12X 30-8.8 ELVZ    | 12    | PC |
| 19       | NP902110216  | HEX.H.SCREW DIN 933 M16X 45-8.8 ELVZ    | 12    | PC |
| 20       | NP725112000  | SIMMERRING DIN 3760 A 90X120X12 MM-NBR  | 1     | PC |
| 21       | NP906908213  | KEY DIN 6885A 022X014X160 - 1.0503      | 1     | PC |
| 50       | NP125858305  | SHAFT SLEEVE L.                         | 1     | PC |
| 51       | NP125857305  | SHAFT SLEEVE R.                         | 1     | PC |
| 52       | NP121172302  | GLAND HGT-85                            | 2     | PC |
| 53       | NP111039305  | LANTERN RING CC493K                     | 2     | PC |
| 54       | NP121278305  | PACKING SEATING RING                    | 2     | PC |
| 55       | NP731982000  | O-RING 110X4 BUNA70                     | 2     | PC |
| 56       | NP905722250  | GLAND STUD M16X 20-10-50-A4             | 4     | PC |
| 57       | NP906037250  | PLAIN WASHER DIN 125A M16 -A4           | 4     | PC |
| 57       | NP903309250  | HEX.NUT DIN 934 M16 -A4                 | 4     | PC |
| 58       | NP765013000  | GLAND PACKING THERMOFL.4KT 16MM 6230AK  | 4.100 | M  |
| 75       | NP130740112  | PUMP CASING HGT1-300.500                | 1     | PC |
| 77       | NP137498302K | IMPELLER                                | 1     | EA |
| 79       | NP120327305  | WEAR RING HGT1-300.800                  | 2     | PC |
| 81       | NP906907255  | KEY DIN 6885A 022X014X140 - 1.4571      | 1     | PC |
| 82       | NP908024345  | HEX.PLUG DIN 910 3/4"G -BRASS           | 2     | PC |
| 83       | NP908018350  | WASHER 3/4"G 26X34X2 MM COPPER          | 2     | PC |
| 84       | NP908023345  | HEX.PLUG DIN 910 1/2"G -BRASS           | 3     | PC |
| 85       | NP908015350  | WASHER 1/2"G 21X28X2 MM COPPER          | 3     | PC |
| 90       | NP905502216  | STUD DIN 939 M20X 50-8.8 ELVZ           | 35    | PC |
| 91       | NP903388216  | HEX. DOM. CAP NUT DIN 1587 M20-ST.8ELVZ | 39    | PC |
| 92       | NP902136216  | HEX.H.SCREW DIN 933 M20X 60-8.8 ELVZ    | 4     | PC |
| 93       | NP706450000  | TAPER PIN ISO 8737 10X100 -STEEL        | 2     | PC |
| 94       | NP906034211  | PLAIN WASHER DIN 125A M10 - VERZ        | 2     | PC |
| 95       | NP903307216  | HEX.NUT DIN 934 M10 -ST.8 ELVZ          | 2     | PC |
| 97       | NP905506216  | STUD DIN 939 M20X 70-8.8 ELVZ           | 2     | PC |
| 98       | NP905519216  | STUD DIN 939 M20X170-8.8 ELVZ           | 2     | PC |







appendix 3.5.2 SC350/400 parts list

| Pos. Nr. | Code         | Description                             | Qty   |    |
|----------|--------------|-----------------------------------------|-------|----|
| 1        | NP121150106  | BEAR. HOUSING HGT-85                    | 2     | PC |
| 2        | NP121171106  | BEARING COVER N.D.S. HGT-85             | 1     | PC |
| 3        | NP121170106  | BEARING COVER HGT-85                    | 1     | PC |
| 4        | NP121279208  | SUPPORT WASHER HGT1-400.400             | 2     | PC |
| 5        | NP121286235  | P. SHAFT HGT-85                         | 1     | PC |
| 6        | NP121281208  | SPACER RING HGT-85                      | 2     | PC |
| 7        | NP121173106  | THROWER RING HGT-85                     | 2     | PC |
| 9        | NP121289208  | SPACER RING HGT-85                      | 1     | PC |
| 10       | NP121290208  | SPACER RING HGT                         | 1     | PC |
| 11       | NP730153000  | DEEP GR BALL BEARING SKF 6218           | 1     | PC |
| 12       | NP730153000  | DEEP GR BALL BEARING SKF 6218           | 1     | PC |
| 13       | NP706218000  | LOCK RING MB 18                         | 2     | PC |
| 14       | NP703259000  | LOCK NUT SKF KM 18                      | 2     | PC |
| 15       | NP725005000  | FELT RING FS 460                        | 2     | PC |
| 17       | NP904396250  | ADJ. SCREW DIN 916 M 8X 10-A4           | 4     | PC |
| 18       | NP902088216  | HEX.H.SCREW DIN 933 M12X 30-8.8 ELVZ    | 12    | PC |
| 19       | NP902110216  | HEX.H.SCREW DIN 933 M16X 45-8.8 ELVZ    | 12    | PC |
| 20       | NP725112000  | SIMMERRING DIN 3760 A 90X120X12 MM-NBR  | 1     | PC |
| 21       | NP906908213  | KEY DIN 6885A 022X014X160 - 1.0503      | 1     | PC |
| 50       | NP121285305  | SHAFT SLEEVE L.                         | 1     | PC |
| 51       | NP121284305  | SHAFT SLEEVE R.                         | 1     | PC |
| 52       | NP121172302  | GLAND HGT-85                            | 2     | PC |
| 53       | NP111039305  | LANTERN RING CC493K                     | 2     | PC |
| 54       | NP121278305  | PACKING SEATING RING                    | 2     | PC |
| 55       | NP731982000  | O-RING 110X4 BUNA70                     | 2     | PC |
| 56       | NP905724250  | GLAND STUD M16X 20-10-60-A4             | 4     | PC |
| 57       | NP903309250  | HEX.NUT DIN 934 M16 -A4                 | 4     | PC |
| 58       | NP765013000  | GLAND PACKING THERMOFL.4KT 16MM 6230AK  | 3.956 | M  |
| 75       | NP144084112  | PUMP CASING HGT1-350.400                | 1     | PC |
| 77       | NP135853303K | IMPELLER                                | 1     | EA |
| 79       | NP126638305  | WEAR RING HGT1                          | 2     | PC |
| 81       | NP906908255  | KEY DIN 6885A 022X014X160 - 1.4571      | 1     | PC |
| 82       | NP908024345  | HEX.PLUG DIN 910 3/4"G -BRASS           | 2     | PC |
| 83       | NP908018350  | WASHER 3/4"G 26X34X2 MM COPPER          | 2     | PC |
| 84       | NP908023345  | HEX.PLUG DIN 910 1/2"G -BRASS           | 3     | PC |
| 85       | NP908015350  | WASHER 1/2"G 21X28X2 MM COPPER          | 3     | PC |
| 86       | NP962100350  | BY-PASS 8X 6 MM A661981 COPPER          | 1.500 | M  |
| 87       | NP918109345  | JOINING 1/4"G X 8 -BRASS                | 2     | PC |
| 88       | NP918142345  | JOINING 1/4"G X 8 -BRASS                | 2     | PC |
| 90       | NP905502216  | STUD DIN 939 M20X 50-8.8 ELVZ           | 41    | PC |
| 91       | NP903388216  | HEX. DOM. CAP NUT DIN 1587 M20-ST.8ELVZ | 41    | PC |
| 92       | NP902136216  | HEX.H.SCREW DIN 933 M20X 60-8.8 ELVZ    | 4     | PC |
| 93       | NP706448000  | TAPER PIN ISO 8737 10X 75 MM -STEEL     | 2     | PC |
| 94       | NP906034211  | PLAIN WASHER DIN 125A M10 - VERZ        | 2     | PC |
| 95       | NP903307216  | HEX.NUT DIN 934 M10 -ST.8 ELVZ          | 2     | PC |

appendix 4 *Alternative lubrication*

| Supplier  | Engine oil         | Gear box oil      | Hydraulic oil     |
|-----------|--------------------|-------------------|-------------------|
| Shell     | Rimula Super 15W40 | Omala 220         | Tellus T32        |
| Mobil     | Mobil Guard HSD    | SHC630            | DTE 24            |
| Total     | Rubia TIR 7400     | Carter EP 220     | Equivis ZS 32     |
| BP        | Vanellus C6 Global | Energol GR-XP 220 | Energol SHF-HV 32 |
| Valvoline | Premium Blue E     | EPG-220           | Ultramax HVLP 32  |
| Elf       | Performance Trophy | Reductelf SP 220  | Hydrelf DS32      |
| Agip      | Sigma Truck        | Blasia 220        | Arnica 32         |
| Kendall   | Super D3           | Gear Guard 220    | R&O AW 32 HVI     |
| Beverol   | Victory Artol XTR  | Transol 220       | Inula HV 32       |

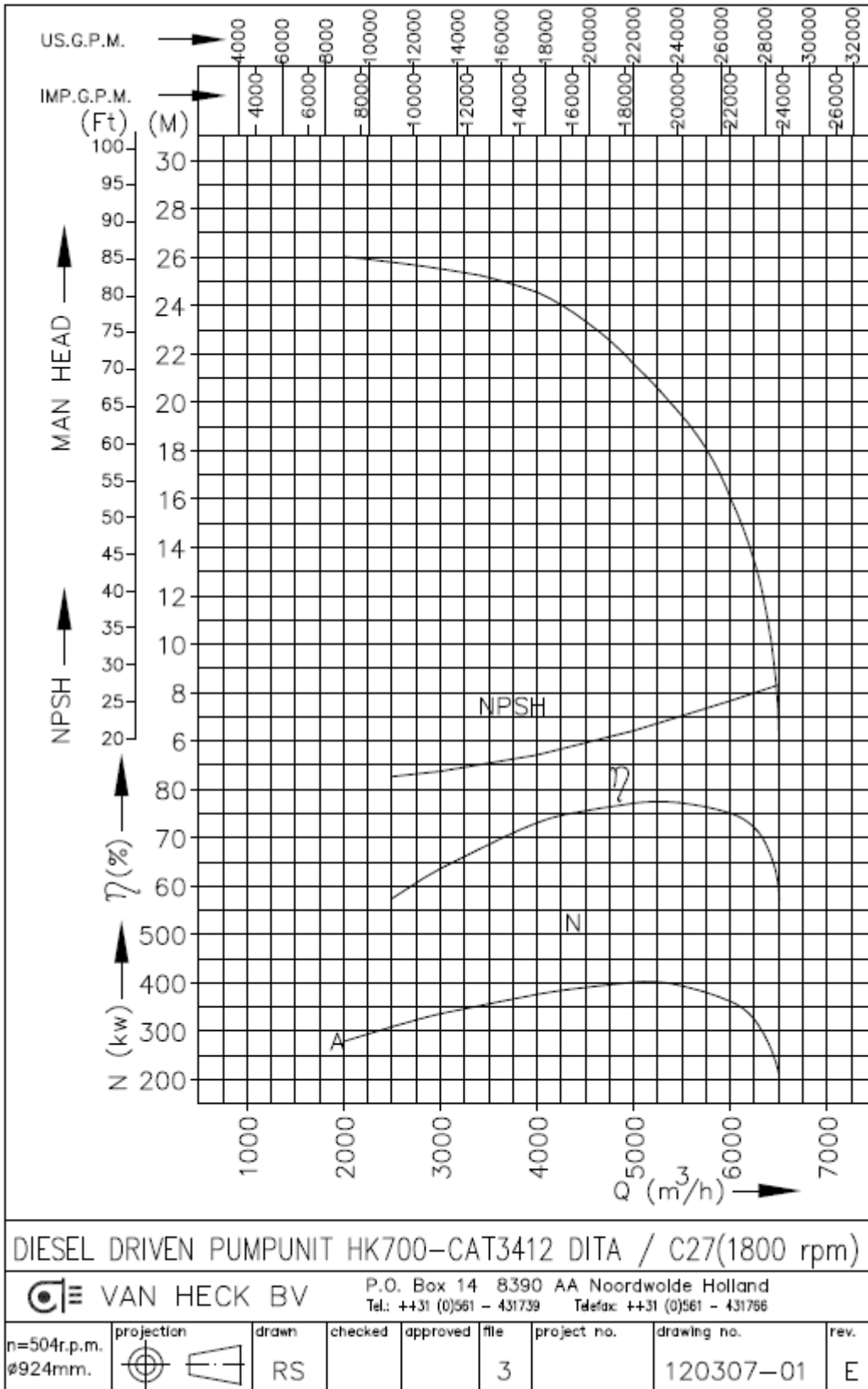
| Merk      | Vacuum pump oil        | Grease              | Engine coolant                 |
|-----------|------------------------|---------------------|--------------------------------|
| Shell     | Rimula X40             | Alvania EP2         | Coolant Standard               |
| Mobil     | Mobil Guard 412        | Mobilux EP2         | Coolant                        |
| Total     |                        | Multis EP2          | Thermocool                     |
| BP        | Energol HD-S SAE 30/40 | Energrease LS-EP2   | Isocool                        |
| Valvoline |                        | Multipurpose Grease | Coolant-46                     |
| Elf       |                        | Epexelf 2           | Coolelf Classic                |
| Agip      |                        | GR MU/EP2           | Permanent Fluid LL Alu Protect |
| Kendall   |                        | L-426 EP2           | Kenlux                         |
| Beverol   |                        | Lical EP2           | Bevercool                      |

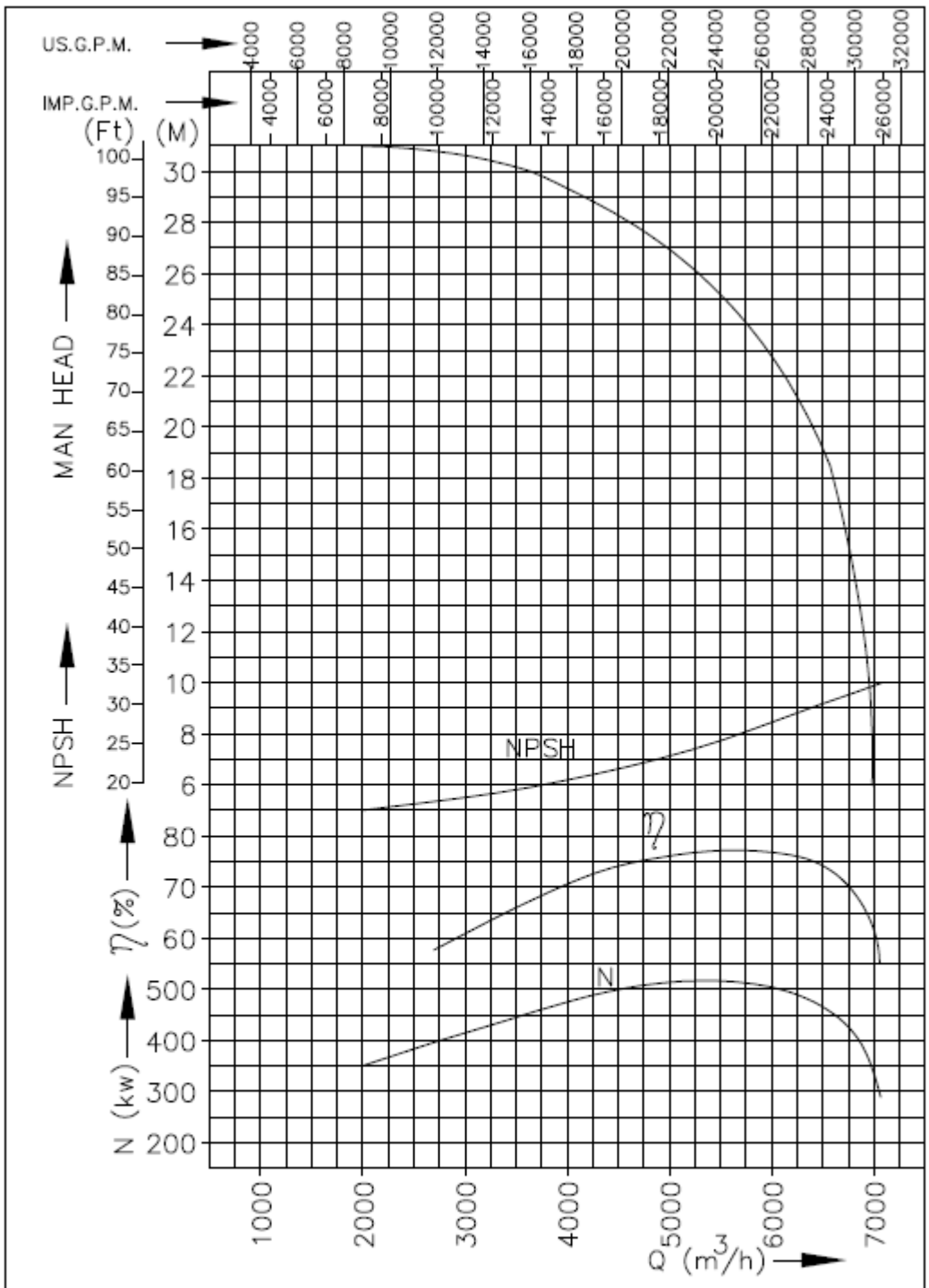
appendix 5 *Malfunction: possible causes and solutions.*

This list contains the most common causes for breakdown or malfunction. The solutions or repairs must be carried out in accordance with the rules laid down in this manual. For malfunctions or defects not mentioned, contact can be made with Van Heck.

| <b>Problem</b>                                                                                     | <b>Possible cause</b>                         | <b>Possible solution</b>                                                                            |
|----------------------------------------------------------------------------------------------------|-----------------------------------------------|-----------------------------------------------------------------------------------------------------|
| <b>Engine won't start (clicks)</b>                                                                 | Battery poles oxidised, loose connections     | Clean battery poles and tighten connections                                                         |
|                                                                                                    | Earthing switch off ('0')                     | Switch to '1'.                                                                                      |
|                                                                                                    | Battery empty                                 | Charge or replace battery                                                                           |
|                                                                                                    | Starter or start relay sticking               | Repair or replace starter/start relay                                                               |
| <b>Engine won't start, no power (electrical)</b>                                                   | Emergency stop activated                      | Reset emergency stop using key                                                                      |
| <b>Engine turns but does not run</b>                                                               | No fuel                                       | Fill fuel tank                                                                                      |
|                                                                                                    | Blocked fuel line/hose                        | Unblock (or reroute) fuel hoses                                                                     |
|                                                                                                    | Dirty fuel filters                            | Replace filter                                                                                      |
|                                                                                                    | Dirty/soiled pre-fuel filter                  | Replace filter                                                                                      |
|                                                                                                    | Air in fuel system                            | Purge fuel system                                                                                   |
| <b>Battery does not charge</b>                                                                     | V-belt broken (or loose)                      | Replace v-belt                                                                                      |
|                                                                                                    | Carbon contacts worn/corroded                 | Replace carbon contacts                                                                             |
|                                                                                                    | Alternator defect                             | Replace alternator                                                                                  |
| <b>Oil pressure fault</b>                                                                          | Low oil level                                 | Top up oil level (see instructions)                                                                 |
|                                                                                                    | Sensor defect                                 | Check wiring, replace sensor                                                                        |
| <b>Temperature fault</b>                                                                           | Coolant level low                             | Top up coolant level (see instructions)                                                             |
|                                                                                                    | Blocked radiator (dirt in louvres)            | Clean radiator                                                                                      |
|                                                                                                    | Blocked/insufficient air flow                 | Check air intake/discharge to pump unit for blockages.                                              |
|                                                                                                    | V-belts slipping or broken                    | Tighten or replace belts                                                                            |
|                                                                                                    | Air filters dirty or blocked                  | Check air filter and filter system. Clean or replace filters                                        |
| <b>Engine stops after starting</b>                                                                 | No (or little) fuel                           | Fill the fuel tank                                                                                  |
|                                                                                                    | Blocked fuel line                             | Unblock (or reroute) fuel hoses                                                                     |
|                                                                                                    | Dirty fuel filters                            | Replace filters                                                                                     |
|                                                                                                    | Dirty/soiled pre-fuel filter                  | Replace filters                                                                                     |
|                                                                                                    | Air in fuel system                            | Purge fuel system                                                                                   |
|                                                                                                    | Engine overload                               | Reduce engine load                                                                                  |
|                                                                                                    | Pump impellor blocked/jammed                  | Remove blockage                                                                                     |
|                                                                                                    | Intake/discharge pump blocked                 | Remove blockage                                                                                     |
| <b>Engine exhaust smoke (black or dark grey)</b>                                                   | Engine overload                               | Reduce engine load                                                                                  |
|                                                                                                    | Air filters dirty or blocked                  | Check air filter and filter system. Clean or replace filters                                        |
|                                                                                                    | Injector malfunction/worn                     | Check injector performance. Replace if required                                                     |
| <b>Pump gives no or little water, low or little discharge pressure or vibrates and makes noise</b> | Pump and intake piping not completely filled. | Check vacuum system for leaks. Check vacuum pump v-belt for slippage or break (replace or tension). |
|                                                                                                    | Intake pipe not under water                   | Re-route intake piping                                                                              |
|                                                                                                    | Intake pipe blocked                           | Remove obstruction                                                                                  |
|                                                                                                    | Waste/solids in water                         | Remove waste. Place coarse filters.                                                                 |
|                                                                                                    | Air in the intake piping                      | Alter intake piping                                                                                 |
|                                                                                                    | Maximum suction height                        | Lower pump unit closer to waterline                                                                 |

|                                                                                                          |                                                                          |                                                                    |
|----------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------|
|                                                                                                          | Water does not conform with the stipulated minimum criteria              | Place grate to filter large waste.                                 |
|                                                                                                          | Damaged impellor                                                         | repair or replace impeller                                         |
| <b>Pump units vibrates and is noisy, high wear on bearings and are hot, pump is hot or will not turn</b> | Contact between moving parts                                             | Adjust and/or replace defective parts                              |
|                                                                                                          | Bearings worn or incorrectly installed                                   | Have bearings replaced by a professional.                          |
|                                                                                                          | Wear parts worn                                                          | Replace wearing parts                                              |
|                                                                                                          | Impellor worn or damaged                                                 | Replace or repair impeller                                         |
|                                                                                                          | Incorrect or insufficient lubrication of the bearings                    | Lubricate bearings with grease specified, according to this manual |
|                                                                                                          | Intake or discharge blocked                                              | Remove the blockage                                                |
| <b>Pump does not prime</b>                                                                               | Vacuum filter blocked                                                    | Replace filter                                                     |
|                                                                                                          | Vacuum pump defect                                                       | Replace or repair pump                                             |
|                                                                                                          | Non return valve open or leaking. Intake pipe leaking (flanges).         | Check valve, remove pollution and replace rubber, if necessary     |
|                                                                                                          | Ball cock valves in vacuum boiler stuck open. Dirt in the vacuum boiler. | Clean or sweep plungers                                            |





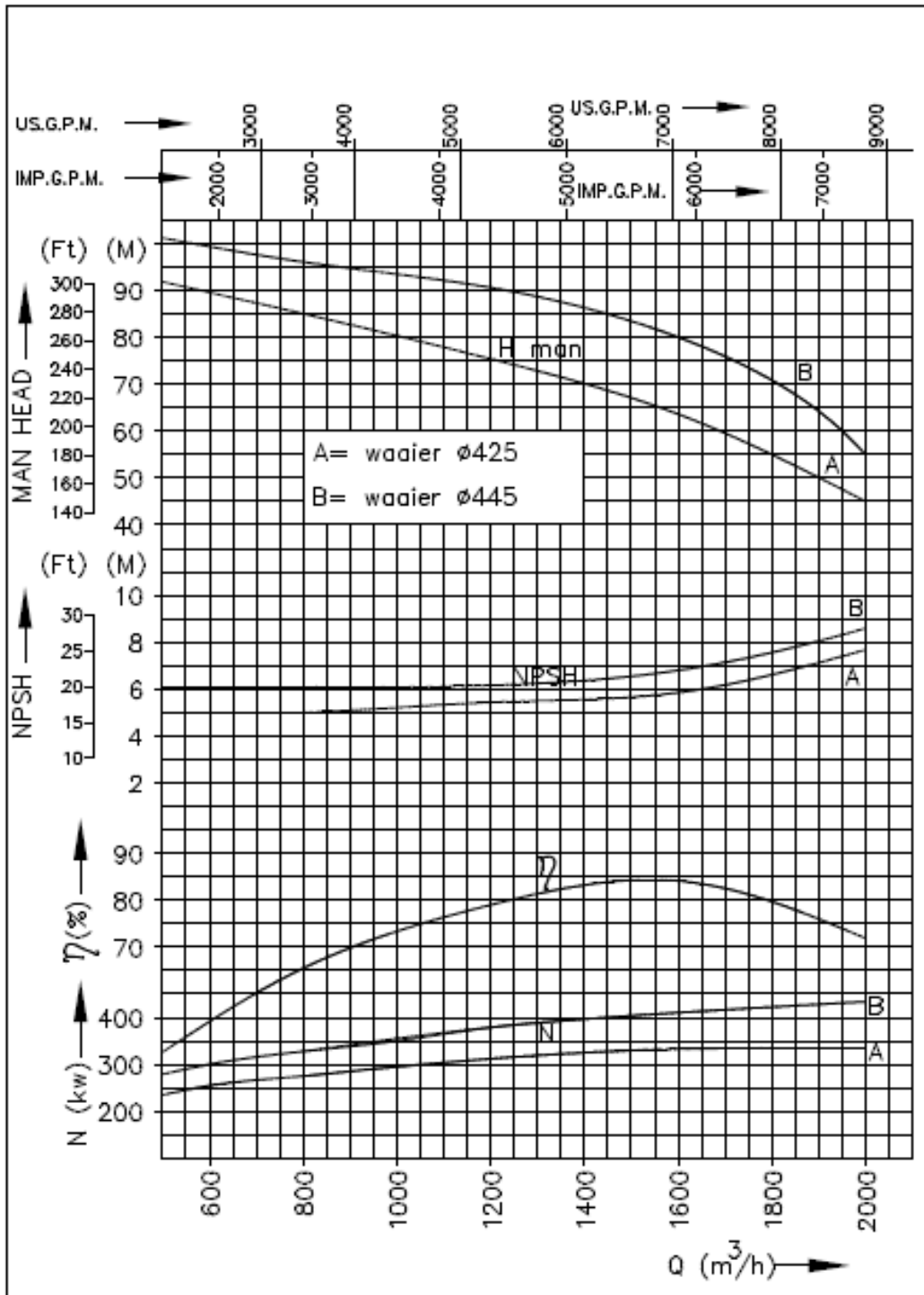
DIESEL DRIVEN PUMPUNIT HK700 – C27 597kW (1950 rpm)



VAN HECK BV

P.O. Box 14 8390 AA Noordwolde Holland  
 Tel.: ++31 (0)561 - 431739      Telefax: ++31 (0)561 - 431766


|                        |            |       |         |          |      |             |             |      |
|------------------------|------------|-------|---------|----------|------|-------------|-------------|------|
| n=540r.p.m.<br>ø924mm. | projection | drawn | checked | approved | file | project no. | drawing no. | rev. |
|                        |            | BF    |         |          | 3    |             | 120307-02   | 0    |

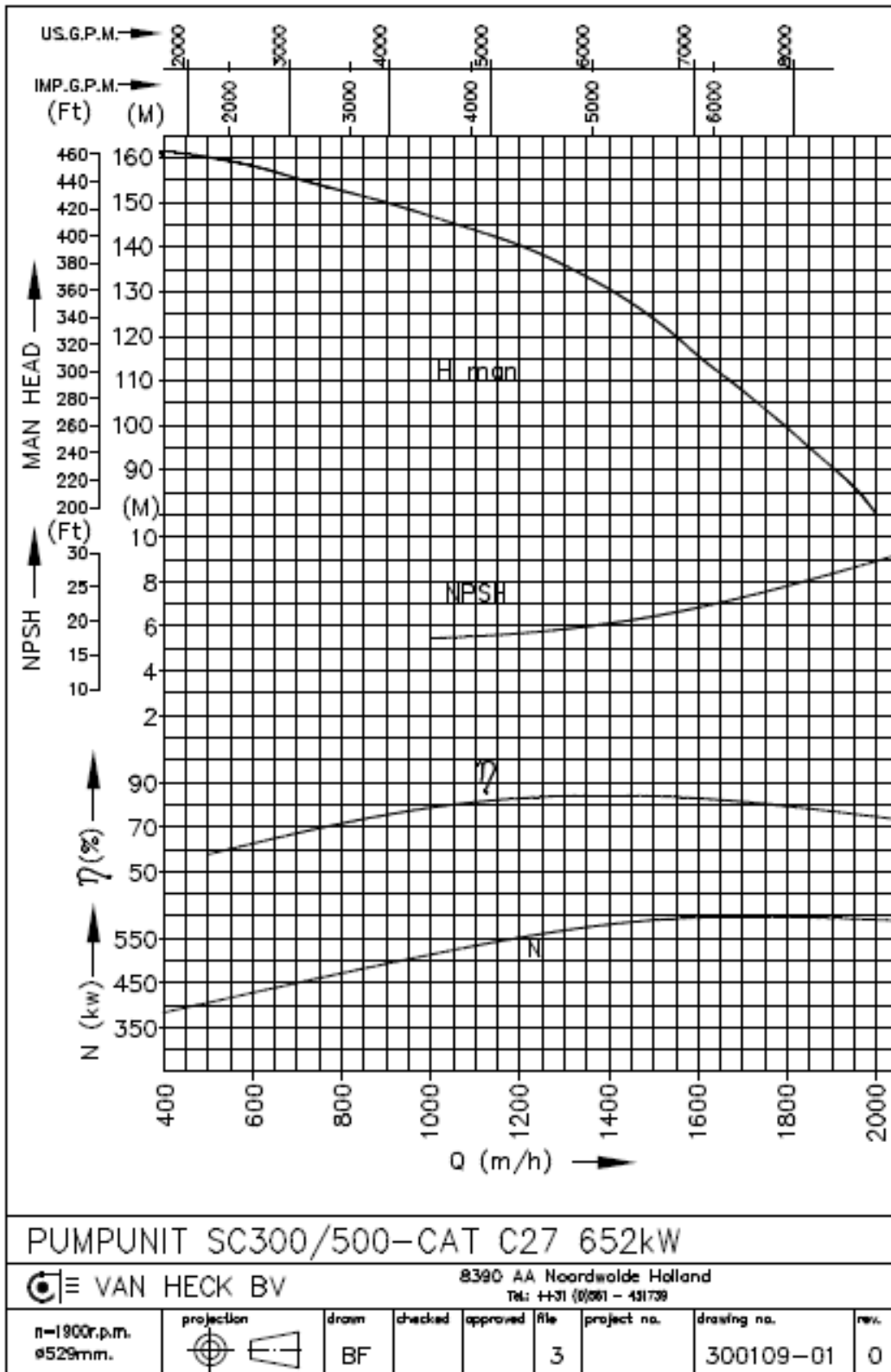


DIESEL DRIVEN PUMP SC300/400-CAT C27/3412DITA

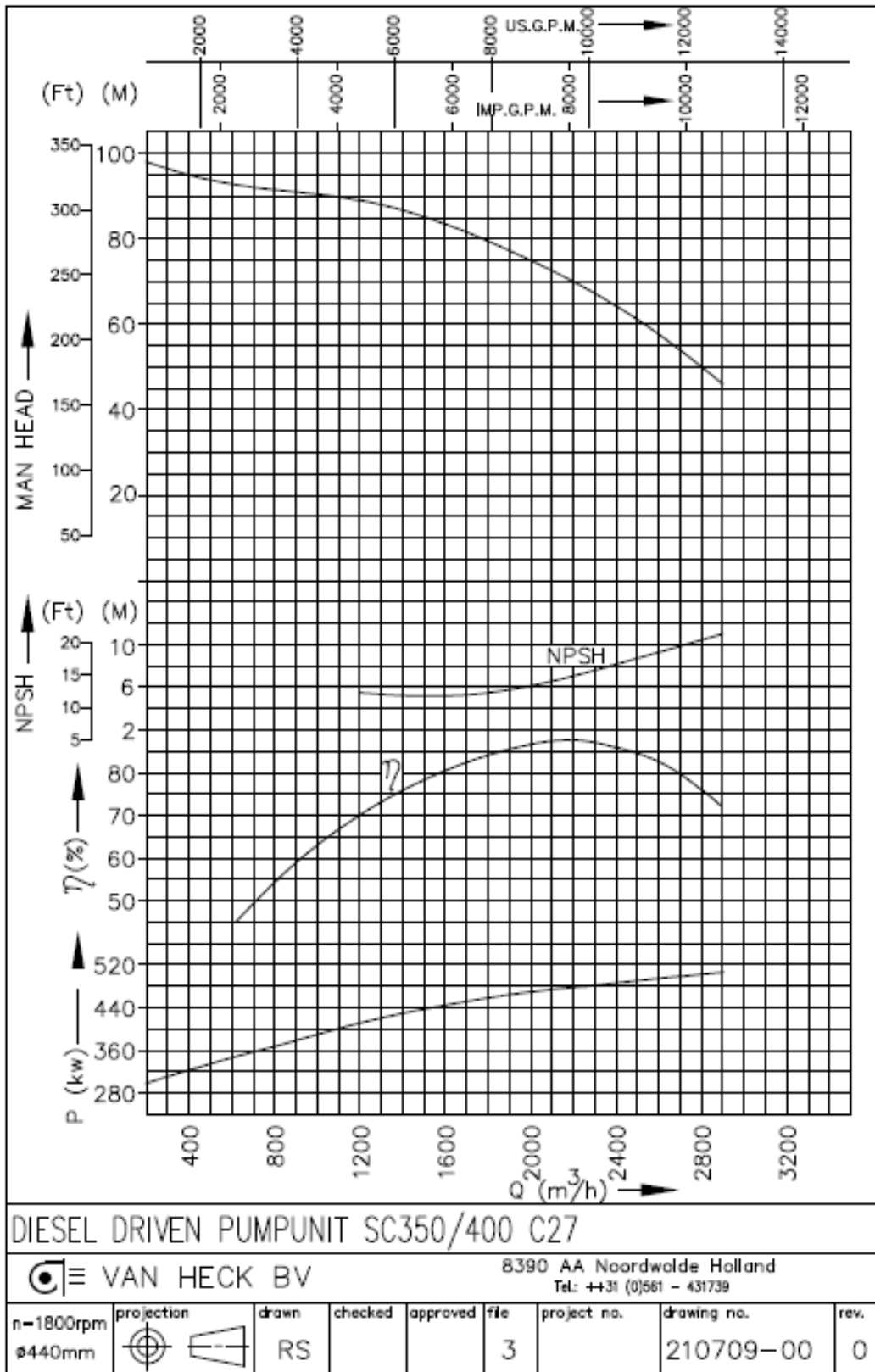
 VAN HECK BV

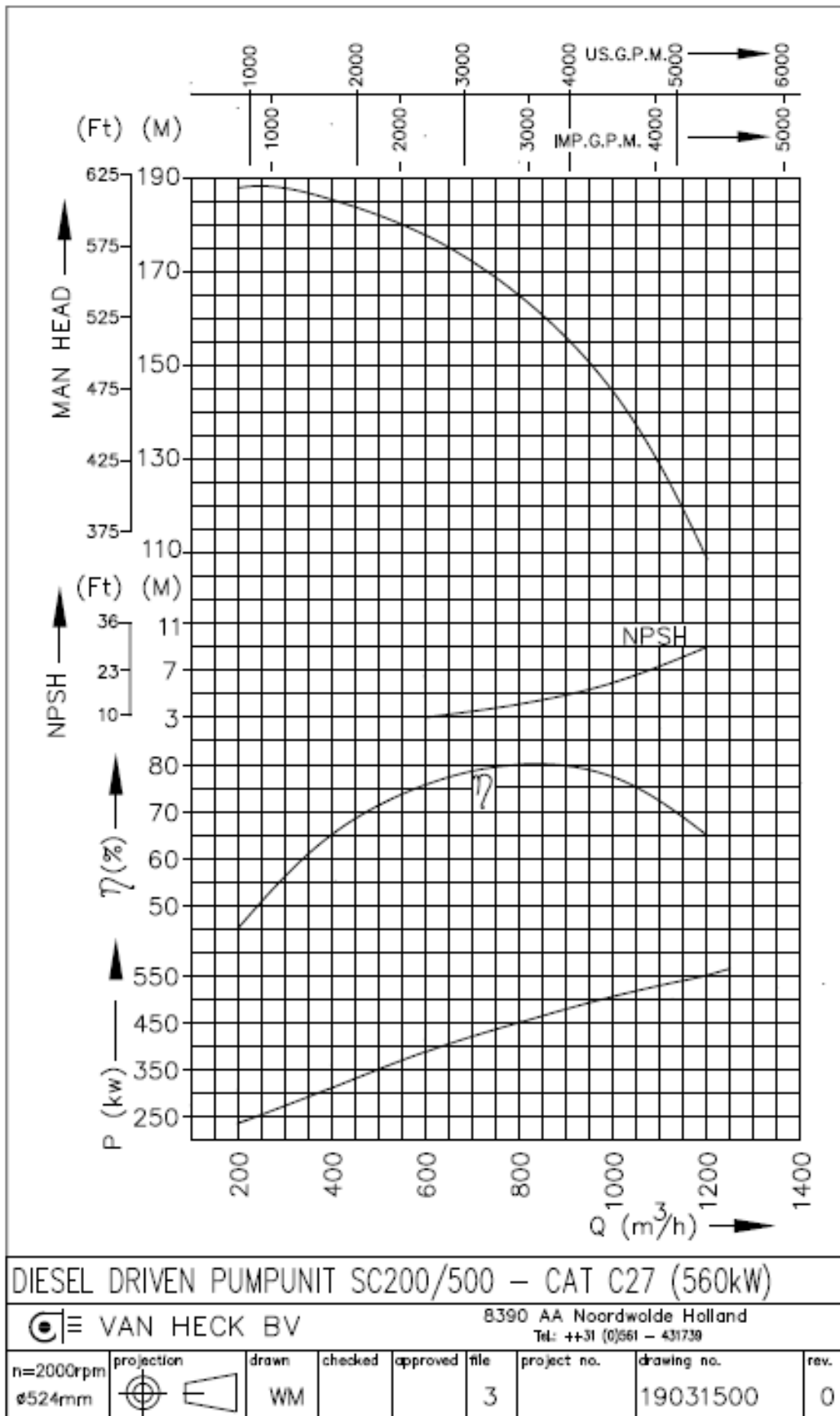
8390 AA Noordwolde Holland  
Tel: ++31 (0)961 - 431739

|              |                                                                                                |       |         |          |      |             |             |      |
|--------------|------------------------------------------------------------------------------------------------|-------|---------|----------|------|-------------|-------------|------|
| n=1800r.p.m. | projection  | drawn | checked | approved | file | project no. | drawing no. | rev. |
| A=φ425mm     |                                                                                                | ND    |         |          | 3    |             | 280990-11   | D    |
| B=φ445mm     |                                                                                                |       |         |          |      |             |             |      |









*appendix 7 Safety and warning pictograms and notices*

There are various icons on the pump unit. These icons are also shown at relevant places in the manual. The overview below shows the most used icons and their meanings.



**Danger**



**Danger from moving parts**



**Ear protection mandatory**



**Safety glasses mandatory**



**No smoking**



**Hot surface**

**Only personnel with the right skills may work on the pump set.**

**It is very important that everyone's safety is guaranteed when working on the pump set. Before starting any activity, the manual must be read carefully and the instructions must be followed.**



**Delivered product**

Diesel driven pump unit with C27 Caterpillar engine

**Applicable guidelines**

- Machinery Directive 2006/42 / EC
- EMC directive 2004/108 / EC

**Statement**

We, Van Heck, declare under our sole responsibility that the pump set as stated is in accordance with the requirements of the aforementioned guidelines.

**Disclaimer:**

Van Heck cannot be held liable for any damage incurred as a result of using the information contained in this document.