

INSTRUCTIONS MANUAL

FOR INSTALLATION, OPERATING, AND MAINTENANCE

HELISEM[®] AGITATORS

VRP / VR2P Ranges

This manual is intended to the staff responsible for installation,
operating and maintenance of the equipment.

TRANSLATION OF THE ORIGINAL MANUAL

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TABLE OF CONTENTS

DECLARATION OF CONFORMITY	4
ABOUT THIS MANUAL.....	5
I – HEALTH AND SAFETY INSTRUCTIONS.....	5
I – 1: TERMINOLOGY FOR SAFETY RECOMMENDATIONS	5
I – 2: HEALTH CARE / SAFETY	7
I – 3: ENVIRONMENTAL RISK.....	9
I – 4: RESIDUAL RISK	10
I – 5: REQUIREMENTS	11
I – 6: PRECAUTIONS TO BE TAKEN	12
I – 7: INSTRUCTIONS CONCERNING NOISE AND VIBRATION	13
A) <i>Noise</i>	13
B) <i>Vibration</i>	13
I – 8: ATEX REGULATION	13
II – GENERAL INFORMATION	14
II – 1: NORMAL USE OF THE MACHINE	14
A) <i>Conditions and limits of use</i>	14
B) <i>General operating mode</i>	14
II – 2: WARNING CONCERNING WAYS IN WHICH THE MACHINERY MUST NOT BE USED	15
III – RECEIPT	17
III – 1: UNPACKING AND STORAGE	17
III – 2: STORAGE PRECAUTIONS	19
III – 3: DESCRIPTION OF THE MIXER.....	19
IV – INSTALLATION.....	22
IV – 1: HANDLING.....	22
IV – 2: SETTING UP	25
A) <i>NEED OF BAFFLES</i>	25
B) <i>REQUIRED TOOLS AND MATERIALS</i>	26
C) <i>MOUNTING THE MIXER ON THE TANK SUPPORT, ASSEMBLY PRINCIPLE</i>	26
D) <i>MOUNTING THE COUPLING ON THE SHAFT, ASSEMBLY PRINCIPLE</i>	28
E) <i>MOUNTING THE IMPELLER ON THE SHAFT</i>	31
IV – 3: ELECTRICAL INSTALLATION	34
V – START UP	37
V – 1: PROCEDURES BEFORE THE FIRST START UP.....	37
V – 2: FIRST START UP	38
V – 3: FAILURES ON START UP	38
V – 4: OPERATION	38
V – 5: CHECKS AND MAINTENANCE OPERATIONS SCHEDULE	39



VI - MAINTENANCE	42
VI – 1: BASIC MAINTENANCE	42
A) CHECKING THE LOCKING OF ALL BOLTING.....	42
B) CLEANING THE MOTOR FAN	42
C) CHECKING THE OIL LEVEL IN THE GEAR BOX HOUSING	42
D) OIL CHANGE	43
E) TRACING CAUSES OF FAILURES.....	45
F) ORDERING SPARE PARTS.....	45
VI – 2: CORRECTIVE MAINTENANCE.....	48
A) MOTOR	48
B) GEAR BOX.....	49
VII – TECHNICAL CHARACTERISTICS.....	52
VII – 1: CODIFICATION	52
VII – 2: CHARACTERISTICS OF THE RANGE MOTORIZATION	52
VII – 3: LUBRICATION OF THE RANGE GEAR BOXES	53
VII – 4: CHARACTERISTICS OF THE AGITATORS OF THE RANGE	53
VIII – CHECK LIST	58
IX – DECOMMISSIONING AND SCRAPPING.....	60
GLOSSARY	62
GUARANTEE.....	63
INDUSTRIAL OWNERSHIP	64
CONTACT LIST	65

**DECLARATION DE CONFORMITE
DECLARATION OF CONFORMITY
DECLARACION DE LA CONFORMIDAD
KONFORMITÄTSERKLÄRUNG**



Nous MILTON ROY Europe - Etablissement de Samoreau
We
Nosotros MILTON ROY Europe - Samoreau Facility
Wir

déclarons sous notre propre responsabilité, que la machine :
declare under our own responsibility, that the machine :
declaramos, bajo nuestra propia responsabilidad, que la máquina :
erklären in eigener Verantwortung, dass die Maschine:

VRP VR2P

répond à la Directive 2006/42/CE Art 4-2 et Annexe II-B
answers the Directive 2006/42/CE Art 4-2 and annexe II-B
responde a la Directiva 2006/42/CE Art 4-2 y Anexo II – B
der Richtlinie 2006/42/CE Art 4-2 und Anhang II-B entspricht

La mise en service est interdite avant que la machine, dans laquelle notre matériel doit être incorporé, soit déclarée conforme aux dispositions de la Directive 2006/42/CE.

The startup is prohibited before the machine, in which our material must be incorporated, is declared in conformance with the provisions of the Directive 2006/42/CE.

La puesta en servicio está prohibida antes de que la máquina, en la cual nuestro material debe incorporarse, esté declarada conforme a las disposiciones de la Directiva 2006/42/CE.

Die Inbetriebnahme ist erst dann erlaubt, wenn festgestellt wurde, dass die Maschine, in die unsere Maschinenteile eingebaut werden sollen, die Bestimmungen der Richtlinie 2006/42/CE erfüllt.

SAMOREAU
03/11/2015

Alexandra PETIT
EMEA Quality Manager

Siège social

Milton Roy Europe

10 Grande rue - 27360 Pont-Saint-Pierre - France
BP 8313 - 27108 Val-de-Reuil Cedex - France
Tel : +33 (0)2 32 68 30 00
Fax : +33 (0)2 32 68 30 93
mr14.accuwell@miltonroy.com
www.miltonroy-europe.com

Centre Opérationnel Produits Milton Roy Mixing

Etablissement de Samoreau

10, Rue du Bois Gasseau
77 210 Samoreau - France
Tel : +33 (0)1 60 74 95 20
Fax : +33 (0)1 60 74 95 29
mr18.contact@miltonroy.com
www.miltonroymixing.com



ABOUT THIS MANUAL

This manual contains important information about mixer installation, mounting, start-up, operation and maintenance.



Safety rules



People who are in charge of mixer installation, operation and maintenance must consider manual's recommendations in order to prevent some hazards to the person and environmental degradations while assuring a better use of the mixer. A particular interest in suggestions and rules of this manual is required. Finally, any mixing of chemicals requires to follow safety data sheet.

I – HEALTH AND SAFETY INSTRUCTIONS

I – 1: Terminology for safety recommendations

Please spend a few minutes to read the following table regarding safety terminology used throughout this manual.

SAFETY TERMS	Risk if the recommendations are not followed
ATTENTION	Risk of serious or mortal injury in case the danger is not taken into account.
<i>Warning</i>	Incurred risk (minor injury) in case the danger is not taken into account.
<i>Caution</i>	Risk of material damage in case the danger is not taken into account.
Note	Necessary remarks for a better use of the mixer.
LOTO	« Lockout – Tagout » is a safety procedure to ensure that dangerous machines are properly shut off and not started up again prior to the completion of maintenance of servicing work.



The staff responsible for installation, operation and maintenance of this equipment must follow and assimilate this manual in order to:

- avoid any possible risk to themselves or to third parties,
- ensure the reliability of the equipment,
- avoid any error or pollution due to incorrect operation.



ATTENTION:

- **Any servicing on this equipment must be carried out when it is stopped. Any accidental start-up must be prevented (either by locking the switch or removing the fuse on the power supply line).**
- **All handling of the agitator or part of it must be performed by an appropriate qualified person (eg CACES, bridge operator-slinger...).**
- **Any intervention on the electrical part must be performed by a qualified and authorized person (eg electrical skills...).**

In all events, refer to the legislation in force, to safety regulations and good practice for load manipulation and for electrical and mechanical works in the country as well as the site where the agitator is installed. Please also refer to usage rules for manipulation of the products present in the tank and in contact with the agitator (Personal protective gear, Safety datasheet).

It is necessary that you respect the safety procedures of your company during maintenance or repair of equipment. Make sure that you understood all procedures and instructions before you begin to work on the agitator.

Check that the place where the mixer will be installed is not subject to any specific regulation. If so, please adapt these specific regulations to this instruction manual in order to have a full compliance with the local safety and health regulations.



I – 2: Health Care / Safety



Wearing gloves is imperative:

- During any handling, to avoid any potential cut.
- During the handling of any chemical, to prevent potential chemical attack and burn.



Wearing safety shoes is imperative during any handling to avoid potential crushing.



Wearing safety glasses is essential when working on the agitator to protect from any kind of projection whatsoever.



Wearing suitable work cloth (close to the body) is essential to prevent cuts, burns, chemical attacks, dragging by the rotating parts.



Depending on the installation, the helmet is essential during any intervention to avoid any blow to the head.



Depending on the installation, wearing hearing protection is mandatory in case of exceeding the sound pressure threshold regulatory in your area.



Depending on the installation and used products, wearing breathing equipment is essential in case of exceeding the exposure limit threshold regulatory in your area.



Depending on the installation, wearing protective equipment against falls is imperative as soon as there is a potential risk of falling from height. Staff must be trained to work at height and be acquainted to the use of harness.



Measure against fire



Suitable Extinguishing Media: Use foam, dry chemical or carbon dioxide (CO₂) to extinguish flames.

Staff must be trained to measures against fire. There must be a first aid worker or a qualified person according to the regulation in your country.

Unsuitable Extinguishing Media: Direct water jet



Firefighting Instruction: Evacuate the area. Prevent runoff of the extinguisher solution in direction of potable water systems and sewers. Firefighters should use standard protective equipment and individual breathing apparatus in confined spaces.

The suitable extinguishing media must be used by a trained personnel in accordance with current regulations in your region.

I – 3: Environmental risk



Packing used to protect the agitator (cardboard, stuffing, wood ...) must be eliminated by relevant selective sorting in force in your region.



During oil changing operations, the waste oil must be collected in a suitable bin and eliminated in accordance with current regulations in your region.



Any overflow of oil which may result must be removed using a degreasing agent suitable for the operating conditions.



Soiled cleaning cloths must be thrown away in suitable receptacles and eliminated in accordance with current regulations in your region.



Oil, degreasing agent and all other chemical products must be stored in accordance with current regulations in your region.



Outside operating conditions (storage, maintenance...), any part of the agitator that has been in contact with chemical products must be decontaminated and residues from that decontamination must be removed in accordance with current regulations in your region.



Any part of the agitator that has been replaced must pass through a re-processing circuit in accordance with current regulations in your region.

It is recommended to have an accidental spillage kit or an emergency kit near places where chemicals are handled (with rollers, gloves, safety glasses, recovery bags).

I – 4: Residual risk

As far as the security has been incorporated into the design and the protection and prevention measures have been taken, the following residual risks still exist:

- Mechanical risk:
 - During any handling, it is imperative to be performed by trained and qualified personnel (eg CACES, bride operator-slinger...).
 - When working in the entourage of rotating parts, it is imperative that the agitator has been locked (as per “Lockout - Tag out” procedures) to prevent its unintentional start.
 - When working on a pressurized system, it is imperative to isolate the pressure, purge any product, lock the inlet valve and remove residual energy to prevent an unintentional pressurization.
- Electrical hazards:
 - When working on the electrical power supply, this procedure must be performed by trained and qualified personnel who is equipped with adequate protective equipment (eg electrical skills...).
 - Switch off the agitator. Check that the equipment cannot be switched on accidentally. Put a notice at the location of the switch (LOTO).
 - It is mandatory to wear adapted personal protective equipment.
- Risk generated by materials and products:
 - When working on a pressurized system, it is imperative to isolate the pressure, purge any product, lock the inlet valve and remove residual energy to prevent an unintentional pressurization.
 - Before working on a part of the machine which has been in contact with hazardous materials, perform decontamination.
 - In case of preventive maintenance by Milton Roy Europe, contact the after-sales service and send a decontamination sheet before sending the agitator.



- Thermal risk:
 - In case of abnormal operation of the machine, some parts may heat up and cause a risk of burns.
- Risk caused by noise:
 - During the operation of the entire system including our machine, in case of exceeding the allowed noise threshold, enforce the use of hearing protection.
- Risk caused by vibrations:
 - During the operation of the entire system including our machine, in case of exceeding the permitted threshold, enforce the use of proper protective equipment.



I – 5: Requirements

Essential health and safety requirements relating to the the design and construction of machinery

○ =applicable N/A : non applicable

MACHINE TYPE OF MRM	VR
QUASI machine	X
Machine	X
1-ESSENTIAL HEALTH AND SAFETY REQUIREMENTS	
1.1. GENERAL remarks	
1.1.1. Definitions	N/A
1.1.2. Principles of safety integration	○
1.1.3. Materials and products	○
1.1.4. Lighting	N/A
1.1.5. Design of machinery to facilitate its handling	○
1.1.6. Ergonomics	N/A
1.1.7. Operating positions	N/A
1.1.8. Seating	N/A
1.2. CONTROL SYSTEMS	
1.2.1. Safety and reliability of control systems	N/A
1.2.2. Control devices	N/A
1.2.3. Starting	N/A
1.2.4. Stopping	
1.2.4.1. Normal stop	N/A
1.2.4.2. Operational stop	N/A
1.2.4.3. Emergency stop	N/A
1.2.4.4. Assembly of machinery	N/A
1.2.5. Selection of control or operating modes	N/A
1.2.6. Failure of the power supply	N/A
1.3. PROTECTION AGAINST MECHANICAL HAZARDS	
1.3.1. Risk of loss of stability	○
1.3.2. Risk of break-up during operation	○
1.3.3. Risks due to falling or ejected objects	N/A
1.3.4. Risks due to surfaces, edges or angles	○
1.3.5. Risks related to combined machinery	N/A
1.3.6. Risks related to variations in operating conditions	N/A
1.3.7. Risks related to moving parts	○
1.3.8. Choice of protection against risks arising from moving parts	
1.3.8.1. Moving transmission parts	○
1.3.8.2. Moving parts involved in the process	N/A
1.3.9. Risks of uncontrolled movements	○
1.4. REQUIRED CHARACTERISTICS OF GUARDS AND PROTECTIVE DEVICES	
1.4.1. General requirements	○
1.4.2. Special requirements for guards	
1.4.2.1. Fixed guards	○
1.4.2.2. Interlocking movable guards	N/A
1.4.2.3. Adjustable guards restricting access	N/A
1.4.3. Special requirements for protective devices	N/A
1.5. RISKS DUE TO OTHER HAZARDS	
1.5.1. Electricity supply	○
1.5.2. Static electricity	○
1.5.3. Energy supply other than electricity	N/A
1.5.4. Errors of fitting	○
1.5.5. Extreme temperatures	N/A
1.5.6. Fire	N/A
1.5.7. Explosion	N/A
1.5.8. Noise	○
1.5.9. Vibrations	○
1.5.10. Radiation	N/A
1.5.11. External radiation	N/A
1.5.12. Laser radiation	N/A
1.5.13. Emissions of hazardous materials and substances	N/A
1.5.14. Risk of being trapped in a machine	N/A
1.5.15. Risk of slipping, tripping or falling	N/A
1.5.16. Lightning	N/A
1.6. MAINTENANCE	
1.6.1. Machinery maintenance	○
1.6.2. Access to operating positions and servicing points	○
1.6.3. Isolation of energy sources	N/A
1.6.4. Operator intervention	N/A
1.6.5. Cleaning of internal parts	N/A
1.7. INFORMATION	
1.7.1. Information and warnings on the machinery	
1.7.1.1. Information and information devices	N/A
1.7.1.2. Warning devices	N/A
1.7.2. Warning of residual risks	○
1.7.3. Marking of machinery	N/A
1.7.4. Instructions	
1.7.4.1. General principles for the drafting of instructions	○
1.7.4.2. Contents of the instructions	○
1.7.4.3. Sales literature	○

I – 6: Precautions to be taken

Milton Roy Europe mixers are designed and manufactured for the full satisfaction of the user in terms of mixing efficiency and reliability of the mechanical parts.

A mixer is subject to relatively high stresses, for which it is designed, and generates big efforts on both its support and the tank. For instance, it puts in motion a hundred tons of liquid for a 100 m³ tank. It is important to take into account the mixer loads for the support and tank design and to take care of the correct mixer mounting and maintenance, according to the procedures described in this instruction manual. Then, the agitator will be able to get an exceptional service life.

1. Do not use the agitator in other conditions than it has been designed for.
2. Never intervene on the mixer while it's rotating.
3. Do not handle the mixer by the shaft tip or the impeller.
4. Do not use other bolting than which was supplied or is specified in the maintenance handbook.
5. For cylindrical tanks, it is highly recommended to position the mixer shaft on the tank axis and to fit the vessel with baffles in order to stop the liquid rotation around the shaft which could generate excessive bending of the rotating parts.
6. Please follow all recommendations about the mounting of the agitator and the torque to apply on bolting.
7. Only approach the mixer driving head after you've made sure there is no abnormal movement.
8. Strictly follow the agitator mounting procedure. Particularly, the mixer support must resist to static and dynamic loads (please see the mixer data), the mixer must be placed in an acceptable vertical position on a perfectly horizontal support (see relevant tolerances in the handbook) to avoid any additional stress on the shaft that could decrease the agitator life (except for the exceptional case of inclined mixers).
9. After dismounting, it is recommended to use a new bolting set because the old one may have been damaged.
10. Do not remove any guard around rotating parts if there are any and depending on the tank configuration, add any device to prevent contact with rotating pieces.
11. Do not try to deviate the flow of liquid while the mixer is running or to brake the impellers rotation with any device whatsoever.
12. Do not change the characteristics of the mixed products without Milton Roy Europe agreement in order to check if the change is compatible with the mixer capacity (potential power increase, additional effort that could damage the equipment).
13. Do not change operating conditions such as temperature or pressure without checking the capacity of the mixer to resist to the new conditions.
14. Do not put the mixer on another tank than the original one without consulting Milton Roy Europe.
15. Do not run a direct motor-driven mixer in air, during filling or discharging or with a variable speed device.
16. Stop the agitator if any abnormal vibration occurs, if the electrical current is superior to motor nominal one and in case of abnormal noise or excessive temperature.
17. Please regularly check the condition of the machine (rust mark, loosened parts...) and stop the mixer if something abnormal is observed.
18. Do not substitute genuine parts with others that are not supplied by Milton Roy Europe in order to be sure of the right compatibility between the components.
19. Do not change the impellers position on the shaft without making check the impact on the loads on the mixer.
20. Do not modify the impeller diameter or shape and do not fit the mixer with an additional impeller.
21. Do not use the shaft or impeller on another mixer.
22. Do not rotate at a higher rotation speed than the nominal one because the power and loads will drastically change.
23. The temperature at the level of the motor must be inferior to 60°C.

I – 7: Instructions concerning noise and vibration

A) Noise

The A-weighted emission sound pressure level at 1m from the mixers of the agitators of the Helisem® range is inferior to 85 dB(A).

Except for other known values according to the specifications from MR quote.

In some configurations of resonance between the mixer and the installation, this sound pressure level might be amplified.

In this case, we recommend to:

- modify the natural frequency of the installation (for instance: stiffening of the structure, moving elements of the structure...),
- or insert damping systems between the mixer and its support,
- or install a hooding to improve the soundproofing.

B) Vibration

Agitators of the Helisem® range generate vibrations inferior to 4,5 mm/s at the level of the gearbox, except for other known values according to the specifications from MR quote.

In some configurations of resonance between the mixer and the installation, this vibration level might be amplified.

In this case, we recommend to:

- modify the natural frequency of the installation (for instance: stiffening of the structure, moving elements of the structure...),
- or insert damping systems between the mixer and its support (Contact MR).

I – 8: ATEX Regulation

If the supplied mixer is in agreement with ATEX (utilization in explosive zone), the maintenance must be executed according to the legislation in force by staff competent and authorized for this type of intervention. Contact your field service. Any intervention on the mixer by an uncertified organization shall result in the invalidity of the ATEX certification.

It is necessary to check the conformity of the equipment ATEX marking with the installation zone.



II – GENERAL INFORMATION

II – 1: Normal use of the machine

A) Conditions and limits of use

- Agitator assembled and all tightening torques in accordance with the manual.
- Agitator fixed on the tank or a support designed to withstand static and dynamic loads.
- Electrical connection in accordance with the motor nameplate and safety rules.
- Shaft inside the tank.
- Propeller inside the tank.
- For the agitators:
 - Maximum product density and viscosity compliant with the quote.
 - Maximum product temperature and pressure inside the tank compliant with the quote.
 - Maximum outside temperature compliant with the quote.
 - Stirred product compatible with the shaft and impeller material.
- Rotation speed in conformity with the quote.
- Mixing operation in accordance with the quote.
- Product volume in accordance with the quote.
- Safety and protection equipment in place and functioning (safety guard, thermal relay (out of MRM supply), etc.).

B) General operating mode

- 1- Stop the mixer
- 2- Add the product(s) to mix
- 3- Start the mixer
- 4- Agitation operation
- 5- Stop the mixer
- 6- Draining of the product(s)

II – 2: Warning concerning ways in which the machinery must not be used

The reasonably foreseeable misuse is considered when the mixer is running.

Reasonably foreseeable misuse	RESULT ON:		
	Equipment	Persons health and safety	Environment
Non respect of the tightening torques	- Vibrations may occur - Lose of a component that may cause considerable damages	Lose of a component that may cause considerable damages, severe injuries up to death.	Lose of a component that may cause considerable damages.
Mixer used outside the tank		Risk that moving parts (shaft, impeller) may cause severe injuries up to death.	
Undersized mixer support	Mixer oscillations that could cause support or agitator failure.	Risk related to broken parts	Risk related to broken parts
Inadequate electrical wiring	- Partial damage of the electrical installation - Fire	Risk related to fire	Risk related to fire
Mixed products specific gravity and viscosity over the value used for sizing	- Mechanical failure - Motor overheating - Risk for the installation depending on the product and/or process	Risk related to broken parts	- Energy overconsumption - Risk related to broken parts
Product temperature and/or pressure inside the tank different from the valued used for sizing	- Mechanical failure - Risk for the installation depending on the product and/or process	Risk related to broken parts	Risk related to broken parts
Outside temperature different from the value used for sizing	- Motor/Gearbox overheating - Partial damage of the electrical installation - Fire	Risk related to fire	Risk related to fire

Reasonably foreseeable misuse	RESULT ON:		
	Equipment	Persons health and safety	Environment
Mixing operation different from the planned one	- Degraded process performance - Mechanical failure - Risk for the equipment/installation	Risk related to broken parts	Risk related to broken parts
Product to mix different from the planned one	- Corrosion that may cause important damages to the equipment & installation and/or the product - Decreased mixer service life - Damages may occur on the equipment/installation	Risk related to broken parts	Risk related to broken parts
Use of another tank than planned	Damages may occur on the equipment/installation	Risk related to broken parts	Risk related to broken parts
Liquid volume to mix different than planned	Damages may occur on the equipment/installation	Risk related to broken parts	Risk related to broken parts
Adding a device that changes the initially given rotation speed or non respect of the authorized range of rotation speeds	Damages may occur on the equipment/installation	Risk related to broken parts	Risk related to broken parts
Addition or modification of a mixer component	Damages may occur on the equipment/installation	Risk related to broken parts	Risk related to broken parts
Trying to enter or intervene in the tank (to add a substance, remove deposit, clean parts...)		- Risk that moving parts (shaft, impeller) may cause severe injuries up to death. - Risk of electrocution or electrical shock	
Removed covers/protections		- Risk that moving parts (shaft, impeller) may cause severe injuries up to death. - Risk of electrocution or electrical shock	

III – RECEIPT

III – 1: UNPACKING AND STORAGE

The packaging must be carefully examined on receipt of the parcel in order to ensure that the package has not suffered any obvious damage. Open the packaging carefully. Check that all parts cope with the delivery note. Check the conformity of the manufacturer plates compared to the order.

If the parcel is in bad condition, a declaration of damage must be written in the presence of the carrier, then warn MILTON ROY EUROPE. In addition, in the event of missing parts, please warn MILTON ROY EUROPE as soon as possible (**within 7 days**).

The VRP range consists of a single type:

- With a cast solid shaft and an impeller in one part and a MAC coupling (delivered in one small package).

In this parcel, you will find:

Note: Before unpacking, check that the parcel was not damaged. Also, before beginning the mounting, check that any part is missing.

Mixer with a MAC cylindrical coupling:

For a mixer with cylindrical coupling, the equipment is delivered in only one part (see the picture). In some cases, the shaft is too long and the mixer is delivered in 2 parcels. All parcels are numbered and wrapped with a plastic film for a better storing condition.



This parcel contains:

- The drive head (x1)



- The impeller (x1)



- The shaft (x1)



With marks (Rep 1, Rep 2) at each end of the shaft

- One end, for the coupling fixation, **Rep 1**
- One end, for the impeller fixation, **Rep 2**

(See [Part IV-2 D\) MOUNTING THE COUPLING ON THE SHAFT, ASSEMBLY PRINCIPLE](#))

- The instruction manual (x1)



The bolting is pre-assembled. However, the bolting for the mixer fixation on the tank is not supplied. A set of Allen keys is necessary to mount this mixer.

III – 2: STORAGE PRECAUTIONS

➤ **Storage for less than six months**

Equipment shall preferably be stored in its original packaging, protected from bad weather conditions (rain, snow, direct sunlight...) and impacts, and not too close to vibrating devices as the resulting vibrations may cause wear on the bearings and mechanical mating faces.

➤ **Storage for more than six months**

Consult us.

Note:

- The shaft should be stored in horizontal position.
- Any longtime storage before or after use, in particular environmental conditions (humidity, salinity, vibrations or corrosion) shortens the guarantee application.

III – 3: DESCRIPTION OF THE MIXER

See [Figure 1: Assembly drawing](#) and [Figure 16: Overall drawing and technical characteristics of the agitators](#)

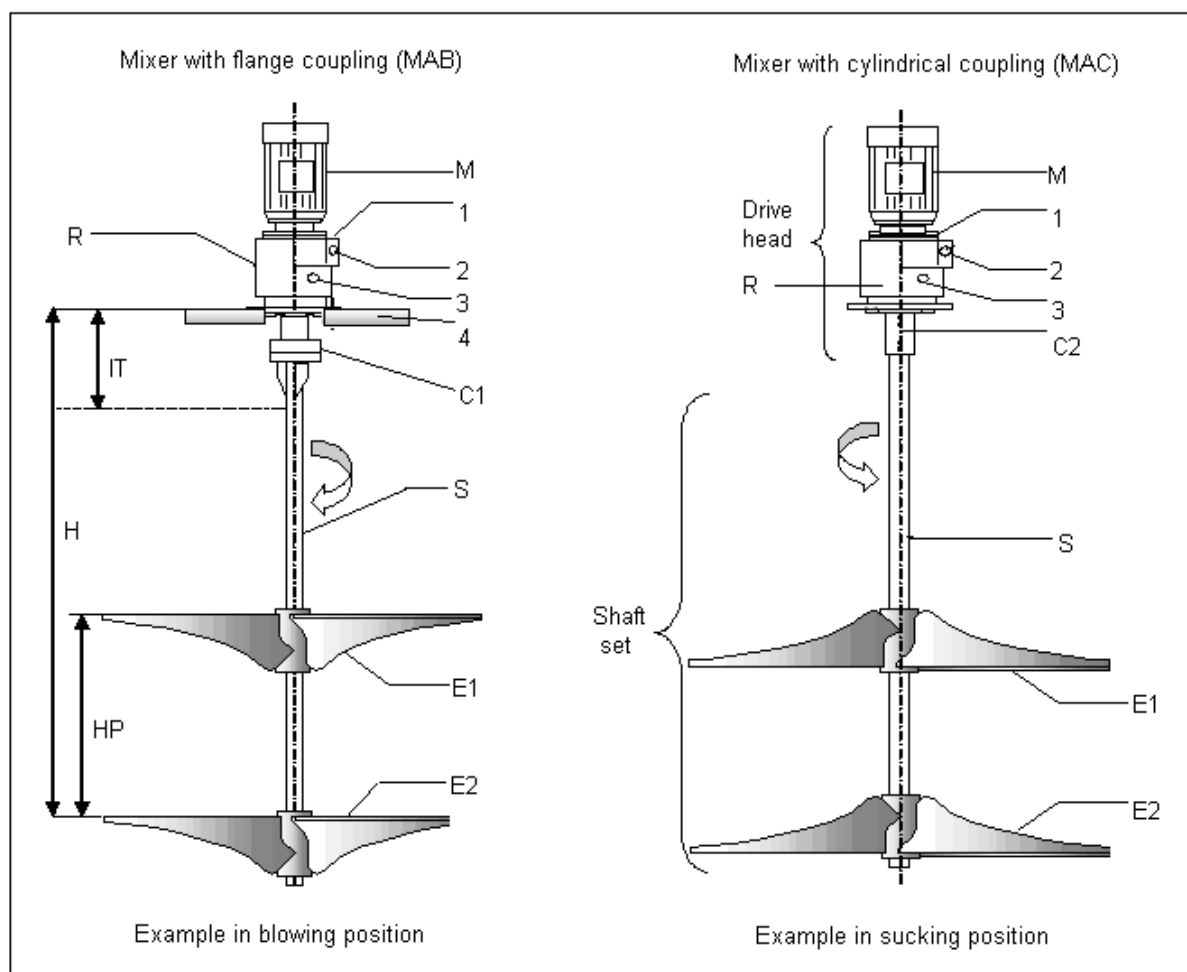
This is made up of the following items:

- A driving device consisting of a motor [M],
- A gear box [R] which reduces the speed between the motor and the agitation shaft. It is splash-lubricated by an oil bath.
- An agitation device, including a shaft [S] and a mixing element [E] (one or two impellers). It is connected to the output shaft of the gear box via a coupling sleeve [C].

For a VRP, the used impeller is a 4 blades **pitch blade turbine**.

In case of 2 impellers, the blades must be aligned.

Figure 1: Assembly drawing



M	Motor or Variable Frequency Drive	**C2	Cylindrical coupling
1	Oil filling and vent valve	*IT	Max liquid level
R	Gear box	S	Shaft
2	Level plug	*H	Impeller position
3	Drain plug	*HP	Distance between 2 impellers (if any)
4	Support	**E1	Upper impeller (if any)
**C1	Flange coupling	**E2	Lower impeller

* Please see [Figure 16: Overall drawing and technical characteristics of the agitators](#)

** Depending on the model (there are not necessarily two impellers; the coupling type depends on the mounting).

Summary of Part III

► Unpacking and storage

1. Check the good condition of the equipment.
2. Check the content of the parcel on receipt using the delivery note.
3. Check the conformity of the manufacturer plates compared to the order.
4. Check the content of the MAC parcel (1 package):
 - the impeller,
 - the shaft,
 - the drive head,
 - the instruction manual.
5. Storage precautions:
 - storage in the original packaging,
 - storage sheltered from adverse weather conditions and impacts,
 - storage far away from vibrating devices,
 - storage for more than six months, consult MR.

► Description

1. The agitator consists of:
 - a drive head consisting of a motor,
 - a gear box,
 - an agitation device consisting of a shaft and an impeller.
2. Position of the two impellers:
 - Depending of the option: the blades must be aligned.

IV – INSTALLATION

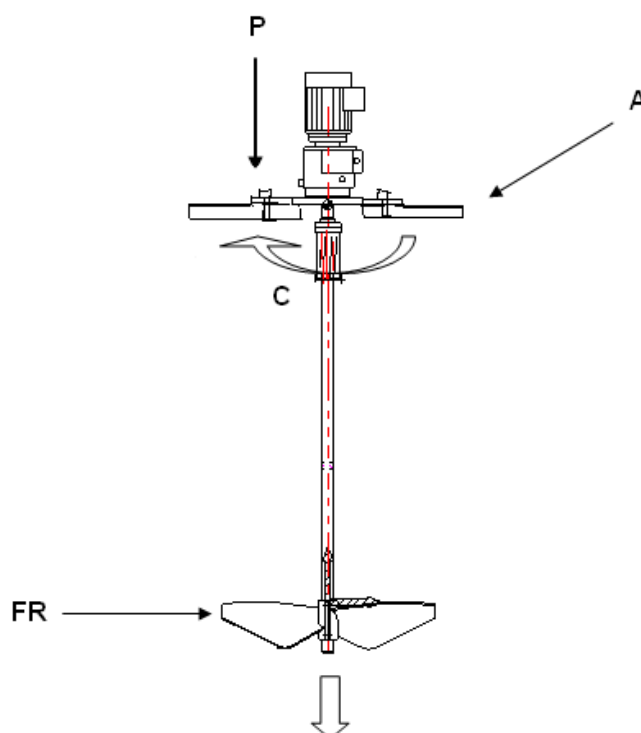


The installation and fixation of the mixer must be performed by trained and qualified personnel (eg CACES, bridge operator-slinger...) with enough skills in mechanics and electricity to be in conformity with the instruction manual.

IV – 1: HANDLING

Choose lifting equipment that is compatible with the weight of the part to handle (see [part VII – Figure 16: Overall drawing and technical characteristics of the agitators](#)).

Note: Please see that the support can bear the static load and the efforts generated by the agitator. (See columns **Load**, **FR** & **Cm** of [Figure 16: Overall drawing and technical characteristics of the agitators](#)).



P	Load (weight + axial load)
A	Mixer support (out of MR supply)
C	Maximum torque that has tendency to shear the fixation bolts
FR	Radial load

The weight of the parts to handle doesn't require particular precaution. However, the utmost care must be taken to not damage the shaft during the handling, particularly not to bend it.



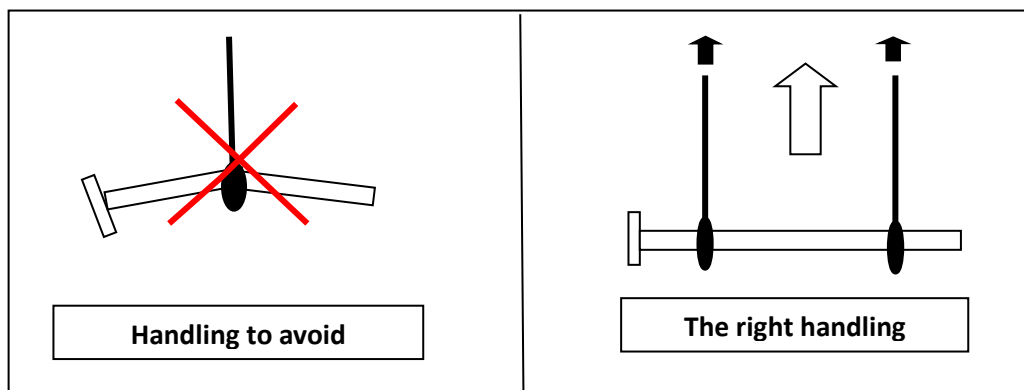
Caution: Please, ensure that you do not damage the paint! Mechanical (stripes), chemical (acids, detergent) or thermal (sparks, welding bead, heat) damages generate a phenomenon of corrosion and prevent the protection from playing its role. Any degradation may result in the cancellation of guarantee.

The handling requires the following precautions:

➤ **Shaft**

See [figure 2 "Fitting the sling"](#) next page.

- Fit the sling around the shaft, taking care not to damage the machined and/or painted surfaces.



➤ **Gear motor**

See [figure 2 "Fitting the sling"](#) next page.

- Fit the sling around the gear motor, taking care not to damage the terminal box and machined and/or painted surfaces.
- Check that the assembly is correctly balanced before starting to move it.
- Proceed with mounting as soon as it is set up on site (see [Part IV-2: SETTING UP](#)).

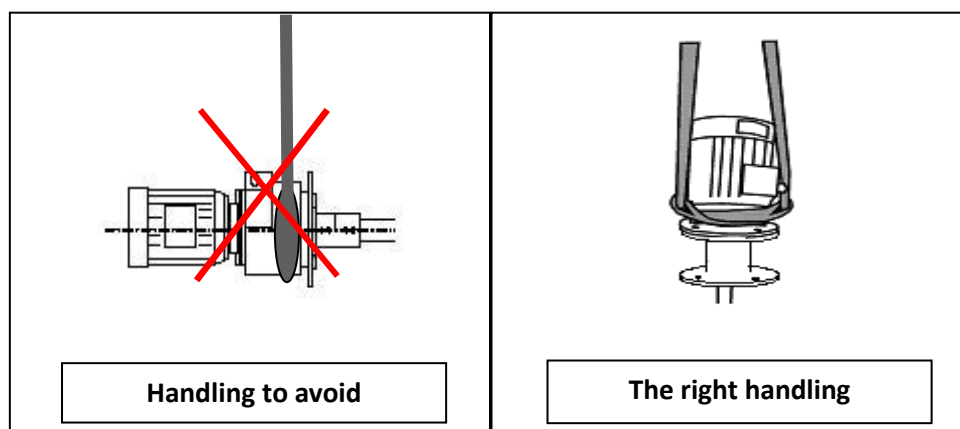
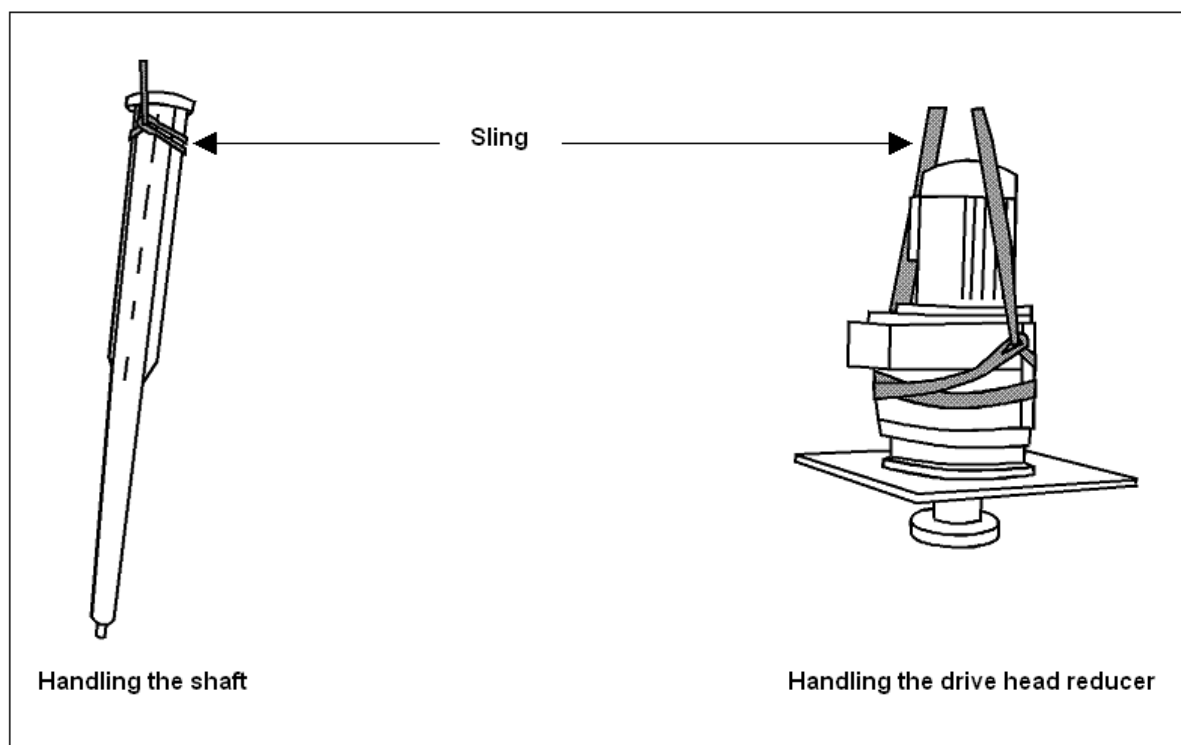


Figure 2: Fitting the sling



IV – 2: SETTING UP

Clean all machined parts that will be in contact after assembling (centering faces of flange...). Ensure that there is no trace of impact and grease these faces. Bring together the parts to assemble and compare the bill of material to ensure that no part is missing during assembling. Check that these parts are in good condition.

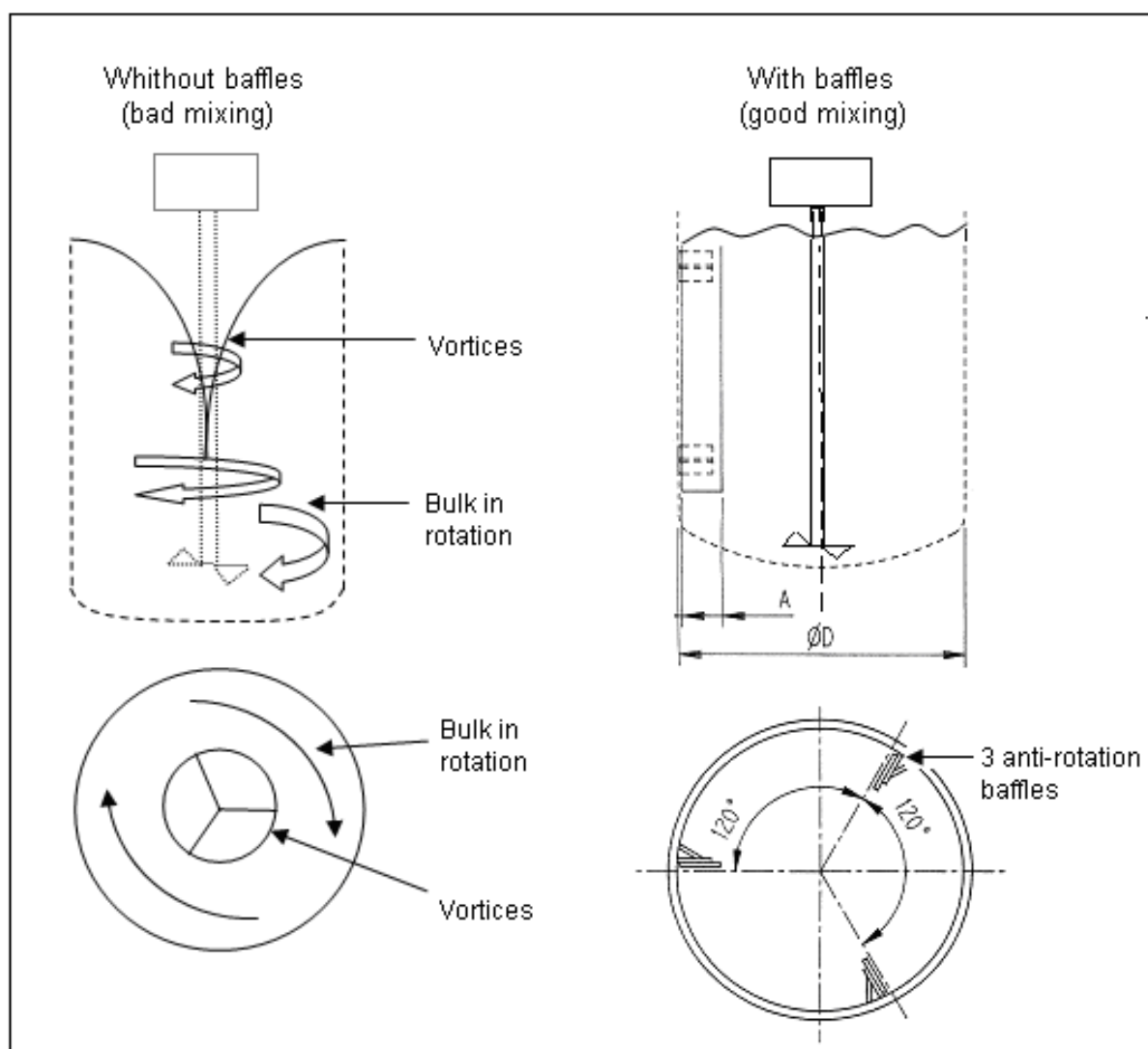
A) NEED OF BAFFLES

As any agitator must imperatively be installed at the center of a cylindrical tank, it is strongly advised to add anti-rotation baffles, following the below schematic drawing. The baffles will:

- prevent the global rotation of the fluid,
- avoid the formation of **vortices*** which are dangerous for the shaft as well as the introduction of air,
- allow to get a satisfactory quality of mixing.

*See Glossary page 62

Figure 3: Anti-rotation baffles



ØD	A	ØD	A	ØD	A
100	8	1000	80	4500	360
200	16	1200	96	5000	400
300	24	1600	128	6000	480
400	32	2000	160	7500	600
500	40	2500	200	10000	800
600	48	3000	240	12000	960
800	64	4000	320		

Dimensions in mm.

In some particular cases, the mixer can be off-centered from tank axis; this generates additional mechanical efforts on the shaft and must be specified before the order.

B) REQUIRED TOOLS AND MATERIALS

You need all the following tools for a better assembling:

- Lifting equipment able to lift the total weight of the mixer.
- Slings, hooks, shackles, ropes.
- Standard tool kit up to wrench n°24.
- A level adjuster.
- **Torque meter wrench*** with tips consistent with the torque couplings indicated in the manual
- PTFE in spray or molybdenum sulfide grease, if compatible with the products in the tank, for stainless steel bolting.
- **Wood beam*.**

*See Glossary page 62

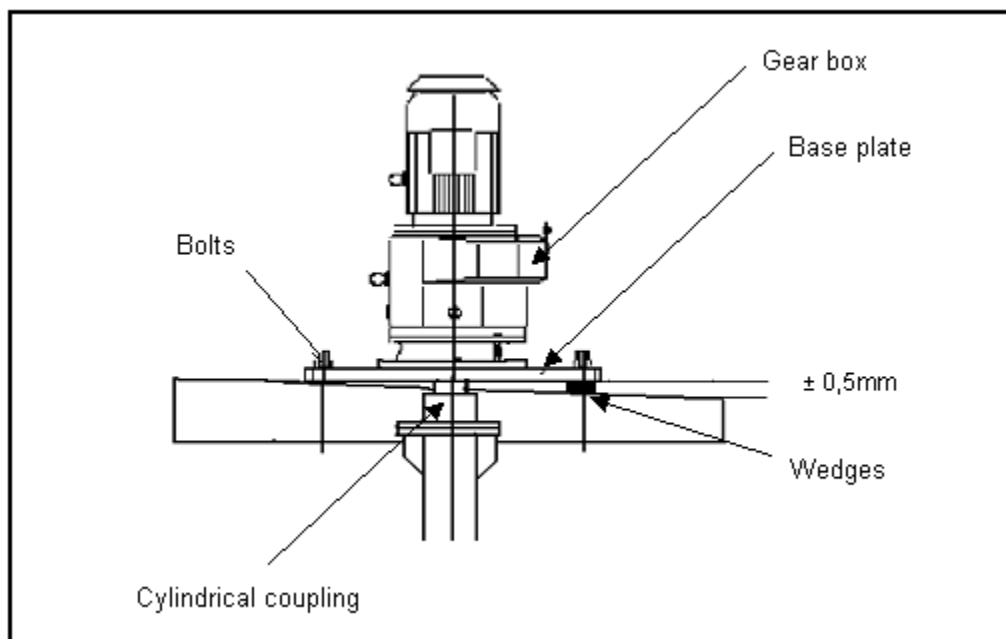
C) MOUNTING THE MIXER ON THE TANK SUPPORT, ASSEMBLY PRINCIPLE

Check the horizontality of the tank support as follows:

- Put the mixer on the support.
 - Adjust the horizontality using wedges to avoid the deformation of the base plate (see [figure 4](#), below).
 - The support (concrete) must be perfectly levelled in relation to the baseplate and the maximum acceptable default must not exceed 0,5 mm. Larger defaults must be eliminated by placing a steel wedge in the gap. This wedging must be carried out at the fixing points and the operation be performed before the horizontality of the baseplate is adjusted.
- Adjusting the horizontality is also very important for the agitator to function, as it determines the verticality of the agitation shaft (maximum acceptable default tolerance 2 mm/m).

Assemble and screw the bolting in accordance with the table [page 33](#)

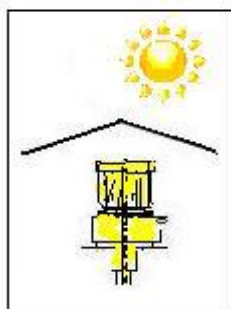
Figure 4: Fitting the baseplate on the support



The tightening torque is depending on the bolting material (recommended material: grade 8.8 carbon steel). The fixation can be done using chemical plugs capable of resisting to the tensile force due the tightening torque of the grade 8.8 bolting.

When fixing on a concrete slab already in place, we recommend the use of through bolts (not supplied by MR).

Caution: It is recommended to fit a rain cover above equipment installed outdoors.



D) MOUNTING THE COUPLING ON THE SHAFT, ASSEMBLY PRINCIPLE

After verifying the support, withdraw the agitation head and carry out the following mounting process.

Caution: The mixer must always be mounted in vertical position.

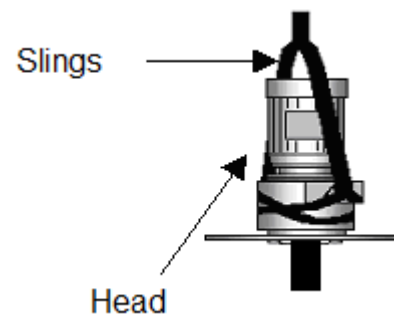
Please refer to [Figure 16: Overall drawing and technical characteristics of the agitators](#).

The agitation shaft [S] is connected to the gear box output shaft using the coupling [C], as follows:

a) Mixer mounting stages

STAGE 1

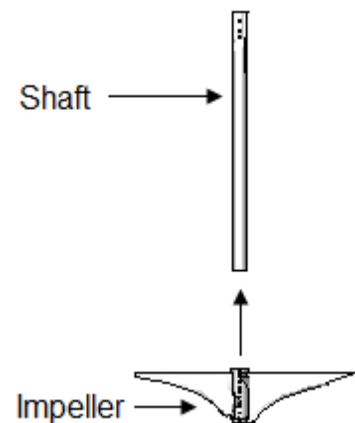
Suspend the agitation head using slings.
 Keep the head in a vertical position.
 See [Part IV – 1: HANDLING](#).



STAGE 2

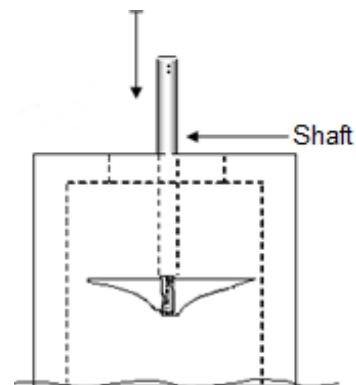
Mount the impeller on the shaft.
 Please refer to [part IV-2:](#)

E) MOUNTING THE IMPELLER ON THE SHAFT



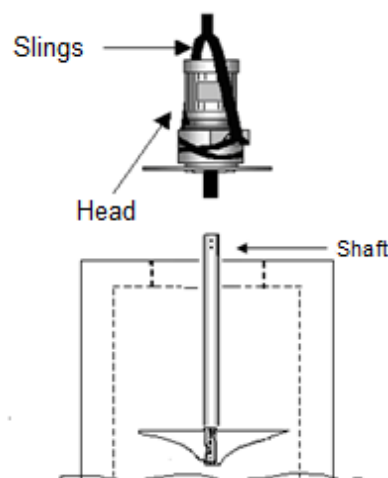
STAGE 3

Hang the shaft up vertically in order to introduce it in the tank.



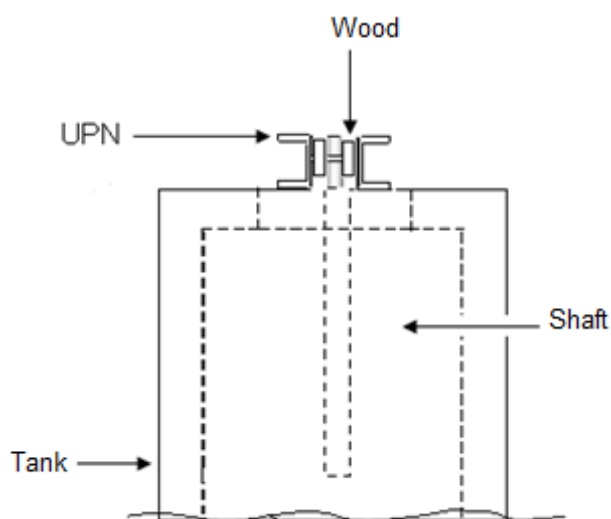
STAGE 4

Finally, bring the agitation head close to the shaft and tighten the whole as instructed on [figure 5](#) page 30.



For MAC mounting with a heavier and/or longer shaft, please carry out the mounting as follows:

- Suspend the agitation head using slings (same procedure than stage 1, previous page)
- Mount the impeller on the shaft (same procedure than stage 2, previous page).
- Introduce the shaft into the tank and hold it up using UPN (U beam) and pieces of wood.



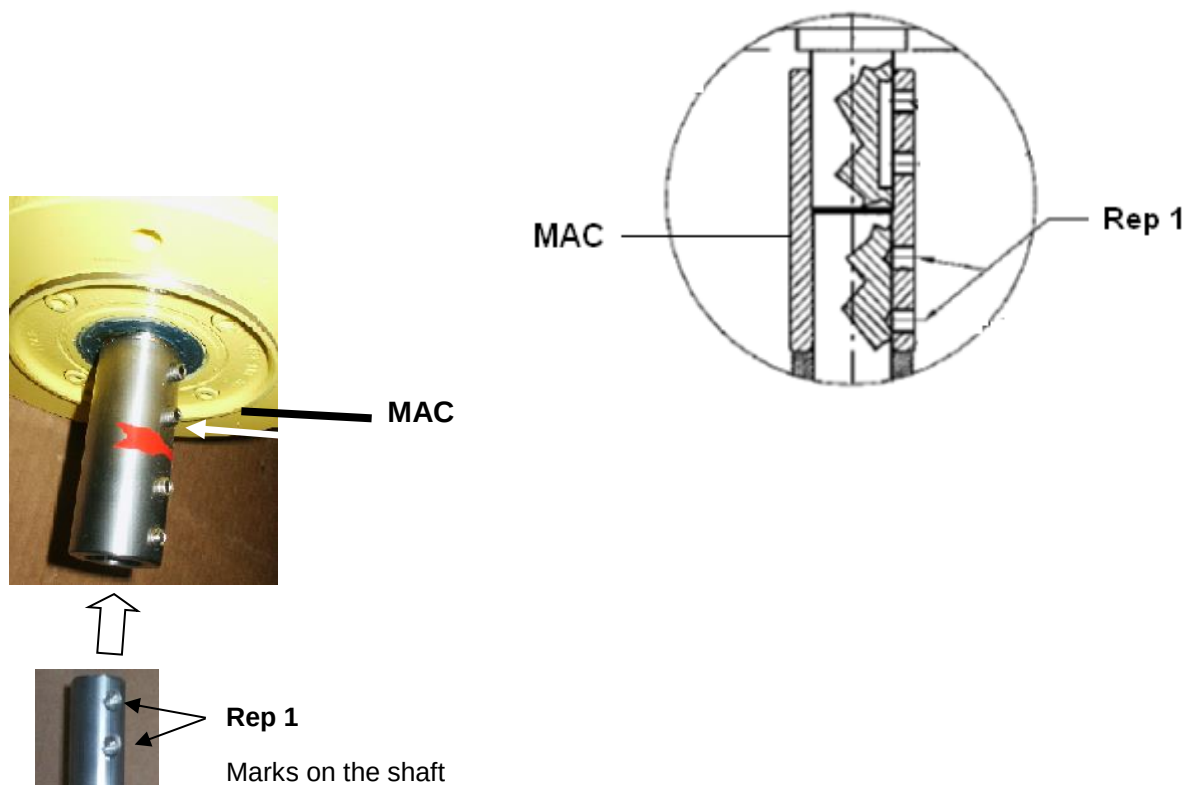
b) Mounting of the cylindrical coupling

The cylindrical coupling is mounted beforehand on the gear box output shaft in the assembly shop.

To conclude the assembly of the shaft with the cylindrical coupling:

- **Step 1**, hold the shaft firmly and introduce it into the coupling (MAC).
- **Step 2**, make it so that the screws are in front of the marks (**Rep 1**) existing on the shaft (for mounting the impeller on the shaft, see page 32).
- **Step 3**, assemble and screw the set screws by applying the tightening torques indicated on the chart (figure 6: Table of tightening torques, page 33).

Figure 5: Cylindrical coupling



E) MOUNTING THE IMPELLER ON THE SHAFT

Fitting the impeller on the agitation shaft can be facilitated by assembling them at the bottom of the tank (depending on the dimensions of the elements and/or the installation).

When the impeller is located too far away from the bottom, use a scaffold.

Please refer to [Figure 1: Assembly drawing](#) and [Figure 16: Overall drawing and technical characteristics of the agitators](#) to position the impeller(s) [E] on the shaft [S] at the right position. Check the impeller blow direction (downwards or upwards). Generally, place the impeller at a few centimeters from the shaft end.

Label roped on the impeller blade for the indication of the rotation direction.

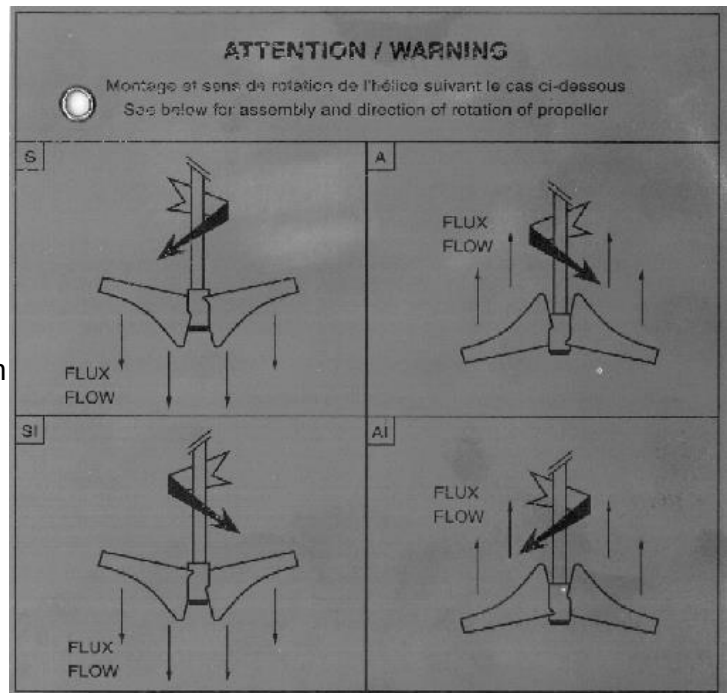
Code is:

S → blowing down, with CW rotation

A → blowing up (sucking), with CCW rotation

SI → blowing down, with CCW rotation

AI → blowing up, with CW rotation



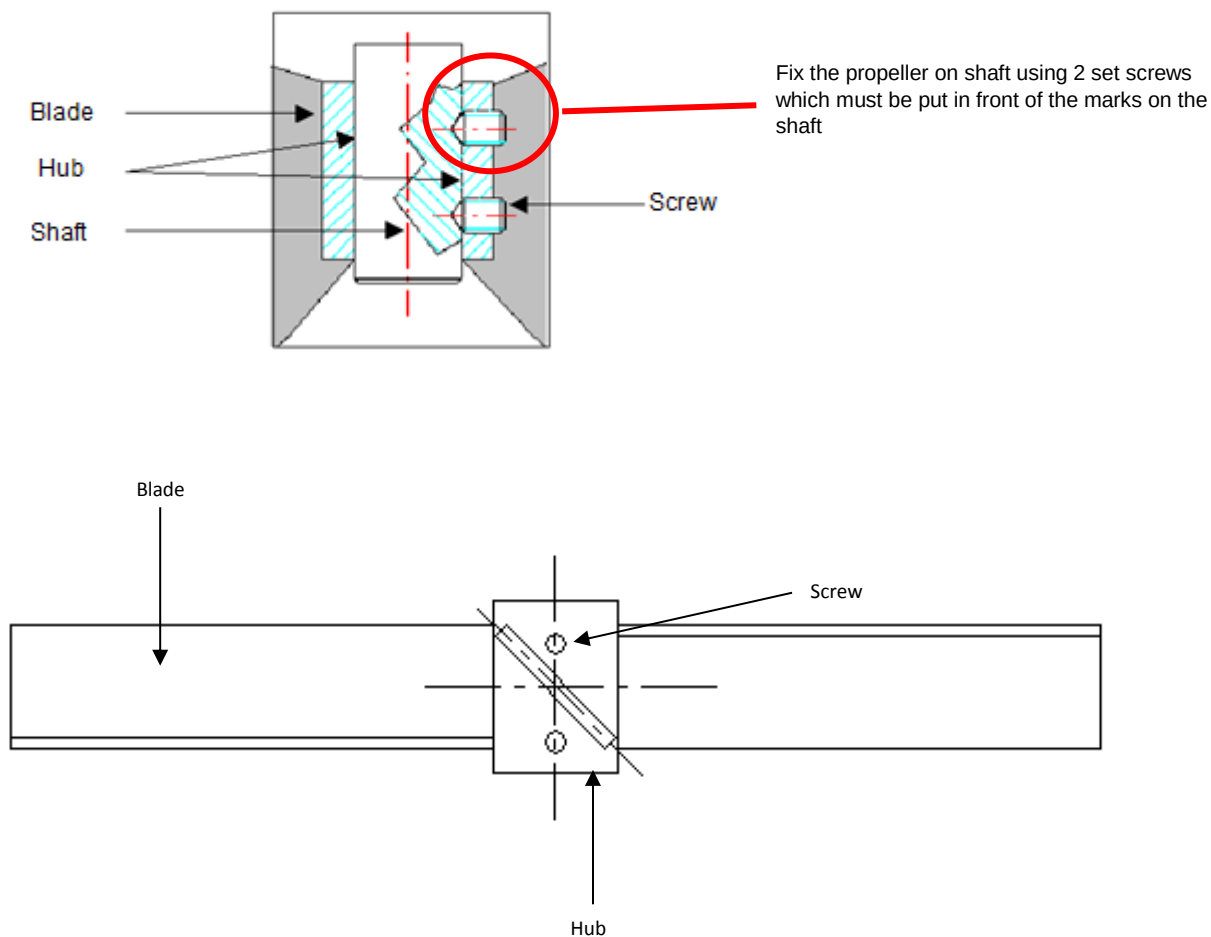
Check the impeller position from the tank bottom and wall.

Identify on the overall drawing the altitude of each impeller and the flow direction (blowing or sucking), so that the blades are presented at the right place and in the right position at the time of the assembly. The flow generated by a sucking impeller is directed towards the liquid interface, while that of a blowing impeller is directed towards the tank bottom.

Note: The final tightening of the impeller fixing bolts is a very important operation on which the subsequent good operation of the agitator depends. This operation is explained in detail ([Figure 6](#)) and must be respected to the letter.

➤ **Impeller welded on a hub (mixer with cylindrical coupling MAC)**

They are fixed on the shaft by one or two setscrews. Put the impeller so that the screws embed in imprints existing on the shaft.



Note: In the case of a coated agitator, the propellers are welded onto the shaft definitively.

TIGHTENING TORQUES (The respect of the prescribed tightening torques is mandatory).

The values indicated in the table below are defined for screws or bolts in a new and lubricated condition.

Figure 6: Table of tightening torques

Dimensions	Tightening torque		
	Fixing bolts in A4-70 stainless steel	Fixing bolts in grade 8.8 steel	Fixing screw in grade 8.8 steel or in A4-70 stainless steel, implanted in a material with yield stress ≥ 210 MPa
M6	6.5 N.m	9.5 N.m	3 N.m
M8	16 N.m	23 N.m	7.5 N.m
M10	32 N.m	46 N.m	15 N.m
M12	57 N.m	81 N.m	26.5 N.m
M14	90 N.m	128 N.m	42 N.m
M16	133.5 N.m	190 N.m	62 N.m
M18	183 N.m	260 N.m	85 N.m
M20	260 N.m	370 N.m	121.5 N.m
M24	470 N.m	650 N.m	213 N.m

1daN=10N

IV – 3: ELECTRICAL INSTALLATION

CONNECTING THE MOTOR



Warning: Electrical connection must be performed by qualified personnel according to safety regulation.

Take into account the nameplate data.

Before doing the connection, check the compatibility between the power supply (frequency, current, voltage) and the motor data.

The electrical protection (fuse, circuit breaker) must be in accordance with the nominal amperage of the motor.

Connect the motor wiring according to the indications given into the terminal box (figure 7) without forgetting the ground connection [PE].

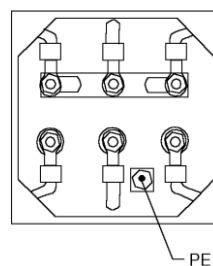
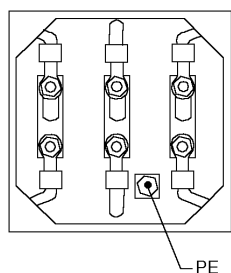
For a 230 / 400 V motor, for a 230 V power supply, use the delta connection Δ (figure 8) and for 400 V, use the star connection Y (figure 9).

For a 400 / 690 V motor, for a 400 V power supply, use the delta connection Δ (figure 8) and for 690 V, use the star connection Y (figure 9).

Tightly close any unused cable entry to prevent the introduction of dust and humidity.

Caution: After prolonged storage or stop and before start-up, have an authorized person measure the coil insulation resistance, between phases and between phase and ground. Wet windings may produce leakage currents, arcing and breakdowns.

Figure 7: Motor Terminal Box



DELTA CONNECTION

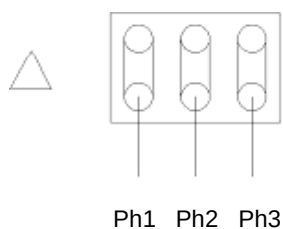


Figure 8

STAR CONNECTION

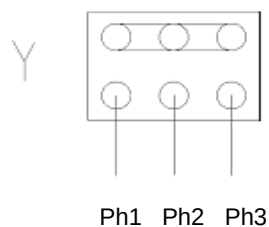


Figure 9

Summary of Part IV

► Handling

1. Any degradation of the paint may result in the cancellation of the guarantee.
2. The shaft must be handled vertically.
3. Check the right weight balance before lifting.
4. The manipulation of the shaft and motor is done using a sling.

► Setting up

1. Check the cleanliness of the agitator.
2. Check the good condition of the parts.
3. The agitator must be at the center of the tank.
4. Recommendation of baffles in the tank.
5. Bring tools such as lifting equipment, slings, standard toolbox, torque meter wrench, PTFE in spray, wood beams.
6. Setting up the cylindrical coupling:
 - introduce the shaft in the cylindrical coupling,
 - check that the screws are in front the marks on the shaft,
 - check the tightening torque.
7. For heavy shafts, use U beams to hold the shaft in position in the tank.
8. Check the good horizontality of the tank support.
9. Check the mounting flange fixation on the support.
10. Check the impeller blow direction (downwards or upwards).
11. Place the impeller preferably a few centimeters from the shaft end.
12. Check the impeller(s) fixation on the shaft.
13. Check the mixer main dimensions.

► Electrical installation

1. Take into account the nameplate data.
2. Check the electrical current.
3. Check the electrical connections.
4. Check that the unused cable entries are tightly closed.

V – START UP

V – 1: PROCEDURES BEFORE THE FIRST START UP

Caution: To avoid any unintentional start up, turn the agitator off (unplug) and signal the intervention (e.g. “an operator is proceeding to a maintenance on the mixer, do not plug in, do not touch”; “LOTO”).

Before the first start up:

- Check the different fixations and that the screws are locked tight (see [Part IV - 2. “Setting up”](#)).
- Check that no obstacle is in the way of the rotation of the mixer.
- Take note of the indications on the nameplates.
- Check the good accordance between the motor voltage & frequency and the power supply.
- Check the rotation direction.
- In case of a frequency inverter, make sure that the maximum rotation speed indicated in the drawing cannot be exceeded.
- Check that the electrical connections are properly tightened and that all safety devices are correctly connected.
- Check that all additional devices, if any, are in good working conditions.
- Check that cooling exhaust openings and surfaces are clean.
- Check that protection devices (ground connection on the mixer) are well adapted.
- Check that the motor is well fixed.
- Check that the terminal box and cable entries are tightly closed.

Note: All HELISEM® agitators are delivered full of oil.

- Put in place the vent valve on the gear reducer, in place of the seal cap.

Note: If the agitator is used in a dusty area or where there is a risk of wind-blown sand, a special filter is required. Please consult us for this purpose

- Check the oil level in the gear box [R]. For this, you need to:
 - **Step 1**, unscrew the oil level plug [2] and check that the oil reaches the level of the bore in the plug.
 - **Step 2**, top up via the filler plug [1], if necessary, in order to obtain the recommended volume (to know the recommended oil level, see the manufacturer id plates).



Caution: Remove any overflowed oil immediately with a degreasing agent suitable for the operating conditions.

- **Step 3**, screw plugs [1] and [2] back into place.

Note: For ZF29 and DF29 gear boxes, there is no drain plug. The lubrication is adapted to the life of the gear box. No oil change is necessary. Just check the right oil level and add some oil if needed. The oil, in case of any maintenance, can be extracted by sucking it under vacuum.

Control of the motor electrical connection

Start up the agitator in order to check the rotation direction of the motor. It must comply with the direction indicated by the arrow marked on the housing. To reverse the motor's rotation direction, stop the agitator and invert Ph1 and Ph2 or Ph1 and Ph3 ([Figure 7: Motor Terminal Box](#)).

V – 2: FIRST START UP

- Once all the checks and procedures described in the previous chapter have been carried out, please proceed to the first start up of the mixer.
- Do a visual and sound check (particularly, check that there is no abnormal noise).
- Stop the mixer.
- Fill the tank up to its operating level and check that there is no foreign matter in the tank.
- Start up the mixer.

Amperage check

Check the current on the three phases with a clamp-on tester when the liquid is in motion and compare the reading with the voltage indicated on the motor identification plate.

V – 3: FAILURES ON START UP

GEAR MOTOR PROBLEMS

- **The motor runs with difficulty and heats up.**
 - One phase is incorrectly connected.
 - The characteristics of the electrical power supply do not match the specifications of the motor.
 - The electrical connection used is not suitable (type Star – Delta).
- **The gear box overheats.**
 - There is an insufficient quantity of lubricating oil.

V – 4: OPERATION

During operation, the following should be checked:

- Normal operating temperature.
- Changes in noise.
- Any oil leakage.
- **For mixers used in wastewater treatment with presence of fibers, the rotation direction of the shaft must be regularly reversed for a few minutes.**

These checks are described in [part V – 5 “Checks and maintenance operation schedule”](#).

Note: Do not use the mixer when the liquid level is below the minimum level of immersion of the mobile. The minimum and maximum levels are indicated on the [Figure 16: Overall drawing and technical characteristics of the agitators](#)

If a default is detected during operation, the motor must be stopped.

To determine the cause of the dysfunction, please refer to [part VI-1 E](#)) "Tracing causes of failures".

If there is any problem in identifying the cause of dysfunction or in repairing it, contact our Technical Support Service.

Note: In case of a coated agitator, the propellers are welded onto the shaft definitively.

V – 5: CHECKS AND MAINTENANCE OPERATIONS SCHEDULE

The checks and maintenance operations schedule depends on the conditions in which the equipment is used. For this reason, the following frequencies are given as an example only. Individual users should adapt these frequencies to their own specific operating conditions.

Figure 10: Table of maintenance program

When	Check	Servicing action	See
Every month	Check by ear (for worn bearings) If unsatisfactory ->	Remove the motor for overhauling	VI – 2 A Page 48
	Check the extent of soiling of the motor fan If necessary ->	Clean the motor fan	VI – 1 B Page 42
Every 3 months	Check the oil temperature (max. as in Part VI – 1 D) If incorrect ->	Check - date of last oil change - fouling of the oil - if the motor fan is soiled	VI – 1 C Page 42
Every 2,500 hours	Check the oil level in the gear box casing If incorrect ->	Trace the oil leak	VI – 1 C Page 42
Every 5,000 hours		Change the gear box oil (except for ZF/DF29 models)	VI – 1 D Page 43
At least once a year	Check the relevant locking of all bolting.		VI – 1 A Page 42

A model maintenance sheet is shown in [figure 11](#) (next page) to help you with your servicing actions (checking or maintenance operations).

Agitator code :
Contract N° :
Date of first start up :

[illegible]

Summary of part V

► Procedures before start up

With the agitator

1. Visual inspection of the agitator:
 - the fitting and locking of screws,
 - the rotation direction,
 - the electrical connections,
 - the additional devices,
 - the cooling exhaust openings and surfaces,
 - the fixation of the motor,
 - the closure of the terminal box.
2. Check that the vent valve has been put.
3. Check the oil level inside the gear box.
4. Control of the electrical connections.

► First start up

1. Start up the agitator
2. Visual and sound check.
3. Stop the agitator.
4. Fill the tank.
5. Start up the agitator again.
6. Control the electrical current.

► Failures on start up

Gear motor problems:

- Checking of phases connection.
- Checking of motor characteristics.
- Checking of the electrical connection.
- Checking of the oil level inside the gear box casing.

► Operation

1. Checking of operating temperature.
2. Checking of changes in the noise.
3. Checking of possible oil leak.

► Checks and maintenance operations schedule

1. Every month:
 - Check by ear.
 - Check the extent of soiling of the motor fan.
2. Every 3 months:
 - Check the oil temperature.
3. Every 2,500 hours:
 - Check the oil level inside the gear box casing.
4. Every 5,000 hours:
 - Change the gear box oil (except for ZF/DF29 models)
5. At least once a year:
 - Check the relevant locking of all bolting.

VI - MAINTENANCE



Caution: If your mixer has some particular options, the maintenance may be changed (special motor, lantern mounting, frequency inverter, food compatible oil...). Please check the delivered additional manual or contact Milton Roy Europe.

VI – 1: BASIC MAINTENANCE

A) CHECKING THE LOCKING OF ALL BOLTING



ATTENTION: Switch off the agitator. Check that the equipment cannot be switched on accidentally. Put a notice at the location of the switch (LOTO).

Check the various attachment fittings on the agitator and check that they are locked. The tightening torques are specified in the [figure 6](#) de la [part IV – 2 “Setting up”](#).

Defective fixing assemblies are to be replaced by assemblies of the same grade.

B) CLEANING THE MOTOR FAN

This maintenance operation ensures good heat dissipation.

- **Switch off the agitator. Check that the equipment cannot be switched on accidentally. Put a notice at the location of the switch (LOTO).**
- Remove all traces of soiling and dust. Do not use a high-pressure cleaning system or sharp tools.

C) CHECKING THE OIL LEVEL IN THE GEAR BOX HOUSING



Caution: Before any maintenance, please take account of the oil temperature which must be lower than 30°C. Even after a short rotation period, let the oil settle for a few minutes to allow the removal of any air bubbles.

Caution: To prevent any risk of burning with hot oil, wear suitable personal protective gear.



Switch off the agitator. Check that the equipment cannot be switched on accidentally. Put a notice at the location of the switch (LOTO).

To check the oil level in the gear box housing, it is necessary to:

- **Step 1**, unscrew the oil level plug and check that the oil reaches the bore of the plug.
 - **Step 2**, fill up the housing if necessary (with oil suitable for the conditions of use) until the oil reaches the bore of the plug.
-  **Caution:** any overflow of oil must immediately be removed, using a degreasing agent suitable for the operating conditions.
- **Step 3**, check the good condition of the sealing ring and change it if required.
 - **Step 4**, screw the plug back into place.

D) OIL CHANGE

* except for models equipped with ZF29 or DF29 gear box.



Caution: Before any maintenance, please take account of the oil temperature which must be lower than 30°C. Even after a short rotation period, let the oil settle for a few minutes to allow the removal of any air bubbles.

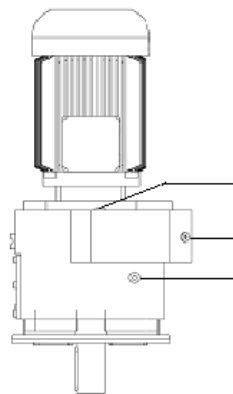
Nevertheless, it is better to have the oil temperature around 30°C to make it less viscous and ease its draining. To do so, let the gear box work for 15 to 30 minutes.

Drain the oil every 5,000 hours of operation. To prevent any risk of burning with hot oil, wear suitable personal protective gear.



* the reducer oil degrades our environment, please collect waste oil carefully and send it to a central waste treatment. Do the same for cleaning cloths soiled by the oil.

Figure 12: Oil change of the gear reducer



[1] Oil filling plug (vent valve)

[2] Oil level plug

[3] Oil sump plug

Before starting this operation, switch off the agitator. Check that the equipment cannot be switched on accidentally. Put a notice at the location of the switch (LOTO).

Stage 1: Draining of the reducer

To drain the oil from the gear reducer, it is necessary to:

- **Step 1**, put a suitable container under the oil sump plug [3].
- **Step 2**, unscrew the plug [3] and let the oil flow completely into the container. The housing must be perfectly cleaned of any oil residue or particles.
- **Step 3**, screw the oil sump plug back into place.

Stage 2: Filling of the reducer

To fill the reducer with oil, it is necessary to:

- **Step 1**, unscrew the oil level plug [2] and the oil filling plug [1].
- **Step 2**, to fill up the housing, it is advised to pour the new oil through a filter (with an oil suitable for the service conditions) until the oil reaches the level of the bore of the plug [2].
- **Step 3**, screw the oil level and oil filling plugs back into place.

Caution: any overflow of oil must be immediately be removed, using a degreasing agent suitable for the operating conditions.

Characteristics:

- Quantity: see the technical data sheet at the end of the manual.
- Original oil: Mineral oil ISO VG 220 RP (according to DIN 51502 norm).
- Ambient temperature: - 5°C to + 40°C
- Maximum oil temperature during operation: 90°C
- Waste oil and polluted wipe must be collected into proper bins.

Equivalence table:

BP	ENERGOL GR-XP220
ESSO	SPARTAN EP220
MOBIL	MOBILGEAR 630
SHELL	OMALA OIL 220

E) TRACING CAUSES OF FAILURES

MOTOR PROBLEMS

➤ **The motor does not run.**

The thermal relay has been triggered.

- Too much amps due to:
 - fibers
 - viscosity, density of the product are higher than expected.
- The motor is defective.
- Wiring is defective.

➤ **The motor is difficult to start up or runs with difficulty.**

- The gear box oil quality is not correct (viscosity).

➤ **The motor heats up abnormally.**

- The motor fan is soiled.
- There is an insufficient quantity of lubricating oil: trace the leak.
- The quality of the lubricating oil is unsatisfactory. Check the date of the last oil change, the characteristics of the used oil and its degree of contamination.
- The agitator is used in conditions it is not designed for.

PROBLEMS OF NOISY MECHANICAL ASSEMBLIES

- The clearance of bearings is excessive or the bearings are worn (motor).
- The gears are worn (gear box).

If the vent valve is not connected, following trouble can appear:

- Too high oil temperature,
- oil leakage.

F) ORDERING SPARE PARTS

To make your order easier to register and to ensure that spare parts are delivered in the shortest possible time, please specify:

- the necessary data regarding the agitator: type [1] and contract number [2]. This data is given on the identification plate mounted on the motor casing ([see figure 13](#) below).
- the necessary data regarding the spare part: reference, description and quantity. These details are shown in the spare parts list.

Contact MILTON ROY EUROPE to get the spare parts list.

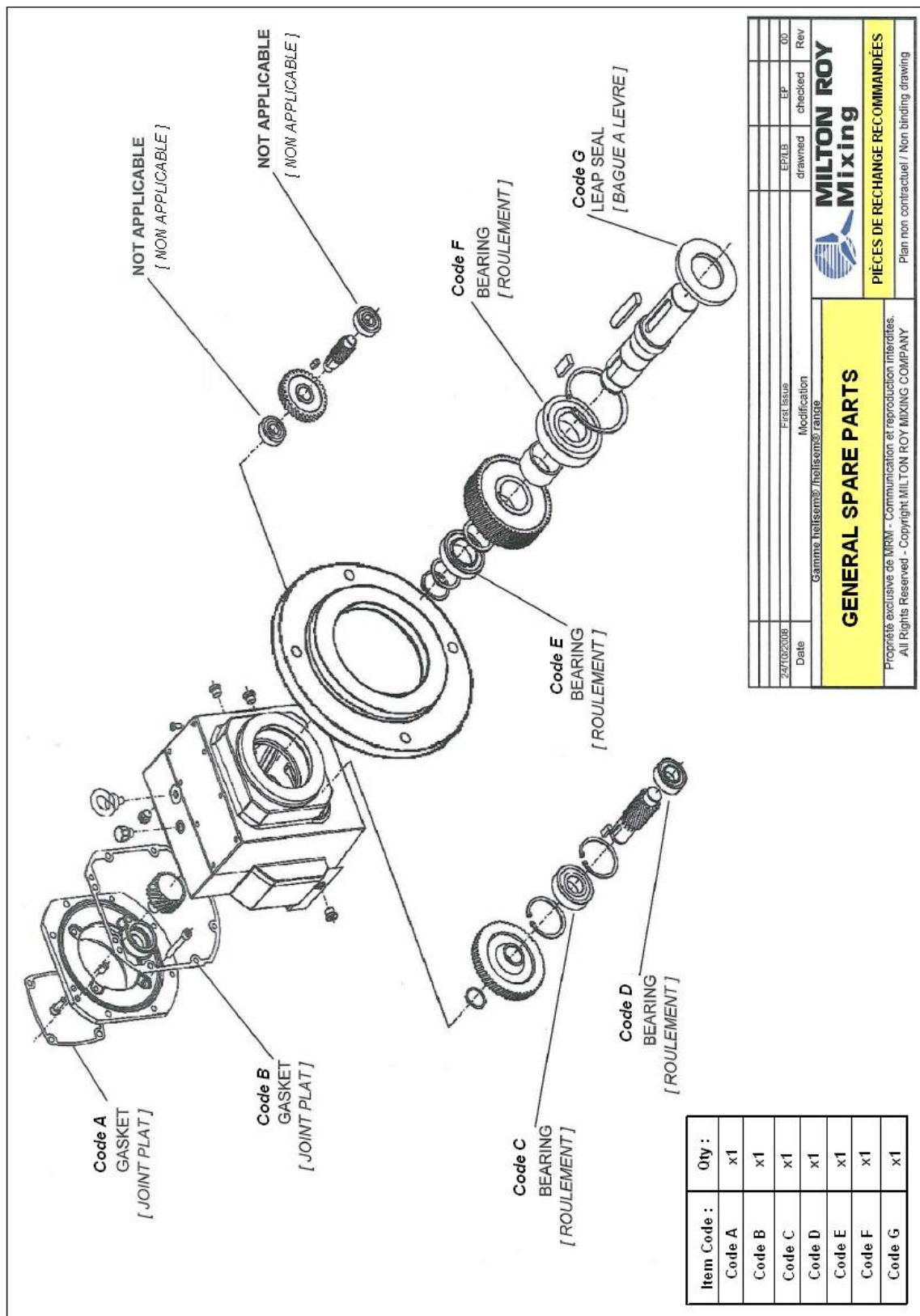


Figure 13: Identification plate



MILTON ROY
Mixing

10 rue du Bois Gasseau
77210 Samoreau - FRANCE
TEL : +33 (0)1 60 74 95 20
www.miltonroymixing.com

TYPE

S/N

ITEM

Mfg

CE



Robin®

HELISEM®



Filiale
MILTON ROY

1	TYPE: Agitator code
2	S/N: Serial or order N°
3	ITEM: Your reference
4	Mfg: Year of manufacturing

After Sales Service: Tel: +33 (0)1 60 74 61 32 / +33 (0)1 60 74 95 33

VI – 2: CORRECTIVE MAINTENANCE

A) MOTOR

GENERAL

➤ **Precautions**

Dry damp motors before starting up and have their insulation value checked by qualified personnel.

➤ **Bearings**

The motor bearings are life-lubricated and, therefore, require no servicing.

Any unusual bearing noise and high temperature on bearing indicates that the relevant bearings are in unsatisfactory condition.

REMOVING THE MOTOR

➤ **REMOVAL**

- **Switch off the agitator. Check that the equipment cannot be switched on accidentally. Put a notice at the location of the switch (LOTO).**
- Mark the connection of the motor before disconnecting the wires from the terminal box.
- Fit a sling around the motor to handle it (see [Part IV – 1 “Handling”](#)).
- Remove the motor.

➤ **REASSEMBLY**

The tightening torques are indicated in [figure 6](#) of [part IV – 2 “Setting up”](#).

- Reinstall the motor on the gear box. Assemble and lock by applying the torque specified in the table above.
- Connect up the motor, complying with the markings made before it was removed.
- Check the connection of the motor which must comply with the indication of the arrow on the casing (see paragraph [“Control of the motor electrical connection”](#) of [part V-I](#)).

B) GEAR BOX

GENERAL

The gear box only requires little servicing. The lubrication is done by oil splashing.

REMOVING THE GEAR BOX OR GEAR MOTOR

➤ **REMOVAL**

- **Switch off the agitator. Check that the equipment cannot be switched on accidentally. Put a notice at the location of the switch (LOTO).**
- Mark the connection of the motor before disconnecting the wires from the terminal box.
- Fit a sling around the motor to handle it (see [Part IV – 1 “Handling”](#)).
- Remove the bolting from agitator and support and install a shaft holding device.
- Lift up the agitator to access to the fixation screws and disconnect the agitation shaft (the coupling sleeve remains on the gear box output shaft).
- If applicable, drain the oil from the gear reducer and separate the motor from the gear reducer (fitted with the coupling sleeve).

➤ **REASSEMBLY**

The tightening torques are indicated in [figure 6](#) of [part IV – 2 “Setting up”](#).

- If applicable, connect the motor with the gear reducer. Assemble and lock by applying the torque specified in the table above.
- Handle the gear motor as described in [part IV – 1 “Handling”](#) and position it above its support.
- Secure the agitation shaft in the coupling sleeve.
- Secure the agitator onto its support.
- If applicable, fill the gear box casing with oil (see [part VI – 1 “Basic maintenance”](#)).
- Connect up the motor, complying with the markings made before it was removed.
- Check the connection of the motor which must comply with the indication of the arrow on the casing (see paragraph [“Control of the motor electrical connection”](#) of [part V-I](#)).

Summary of part VI

► **Checking the locking of all bolting**

1. Switch off the agitator and put a notice of caution (LOTO).
2. Checking of various attachment fittings on the agitator.
3. Check that they are locked.

► **Cleaning the motor fan**

1. Switch off the agitator and put a notice of caution (LOTO).
2. Remove all traces of soiling and dust.

► **Checking the oil level in the gear reducer housing**

1. Check the oil temperature before any maintenance (30°).
2. Switch off the agitator and put a notice of caution (LOTO).
3. Wear suitable personal protective gear (gloves).
4. Check the oil level in the gear reducer housing.
5. Check the good condition of the sealing ring.

► **Oil change**

1. Check the oil temperature before any maintenance (30°).
2. Switch off the agitator and put a notice of caution (LOTO).
3. Wear suitable personal protective gear (gloves).
4. Execute the oil change every 5,000 hours.
5. Drain the oil from the gear box.
6. Fill up the gear box.
7. Remove any overflow of oil.
8. Check the recommended oil characteristics.

► **Tracing causes of failures**

1. Motor problems:
 - Check the electrical current,
 - Check the product density and viscosity,
 - Check the wiring,
 - Check the quality of oil inside the gear box housing,
 - Check the quality of oil inside the gear box housing,
 - Check the fan cleanliness,
 - Check the agitator operating conditions.
2. Mechanical problems:
 - Check the bearings,
 - Check the gears,
 - Check that the vent valve is in place.

► **Ordering spare parts**

1. Checking of complete information for ordering spare parts:
 - Mixer type and contract number.
 - Spare parts reference, description and quantity.

► **Corrective maintenance: motor**

1. Check the insulation value of the agitator.
2. Check the good condition of bearings.
3. Removal of the motor:
 - switch off the agitator and put a notice of caution (LOTO),
 - mark the connection of the motor before disconnecting,
 - use a sling to handle the motor.
4. Reassembly of the motor:
 - connect up the motor, complying with the markings made before it was removed,
 - check the connection of the motor which must comply with the indication of the arrow on the casing.

► **Corrective maintenance: gear box or gear motor**

1. Removal:
 - switch off the agitator and put a notice of caution (LOTO),
 - mark the connection of the motor before disconnecting,
 - use a sling to handle the mixer,
 - remove the bolting for fixation on support and install a shaft holding device,
 - lift up the agitator and disconnect the agitation shaft,
 - if applicable, drain the oil from the gear box and separate the motor from the gear reducer.
2. Reassembly:
 - if applicable, connect the motor with the gear reducer,
 - handle the gear motor using slings,
 - secure the agitation shaft inside the coupling sleeve,
 - secure the agitator onto its support,
 - if applicable, fill up the gear box housing with oil,
 - connect up the motor, complying with the markings made before it was removed,
 - check the connection of the motor which must comply with the indication of the arrow on the casing.

VII – TECHNICAL CHARACTERISTICS

Note: Value here below are for standard versions.

VII – 1: CODIFICATION

Type of material (1) : VRP ...S... VRP...A... VRP...B... VRP...E... VRP...P...

Type of mobile : 4 blades turbine

(1) See the identification plate to get the agitator code

VII – 2: CHARACTERISTICS OF THE RANGE MOTORIZATION

Figure 14a: Table of the range motorization for 50Hz

Type	VRP			VR2P		
	0208	0358	0508	0208	0358	0508
Power, kW	0,18	0,37		0,25	0,37	
Speed, rpm	1350	1370		1350	1370	
Voltage, V	220-240 / 380-420 V					
Degree of protection	IP55					
Tropicalization	Yes (up to 30 g water / m3 of air)					
Insulation class	F					
Heating class	B					
Frequency, Hz	50					

Figure 14b: Table of the range motorization for 60Hz

Type	VRP			VR2P		
	0209	0359	0509	0209	0359	0509
Power, kW	0,18	0,37		0,25	0,37	
Speed, rpm	1650	1670		1650	1670	
Voltage, V	440-480 V					
Degree of protection	IP55					
Tropicalization	Yes (up to 30 g water / m3 of air)					
Insulation class	F					
Heating class	B					
Frequency, Hz	60					

VII – 3: LUBRICATION OF THE RANGE GEAR BOXES

Figure 15: Volume of oil for the gear boxes of VRP/VR2P range

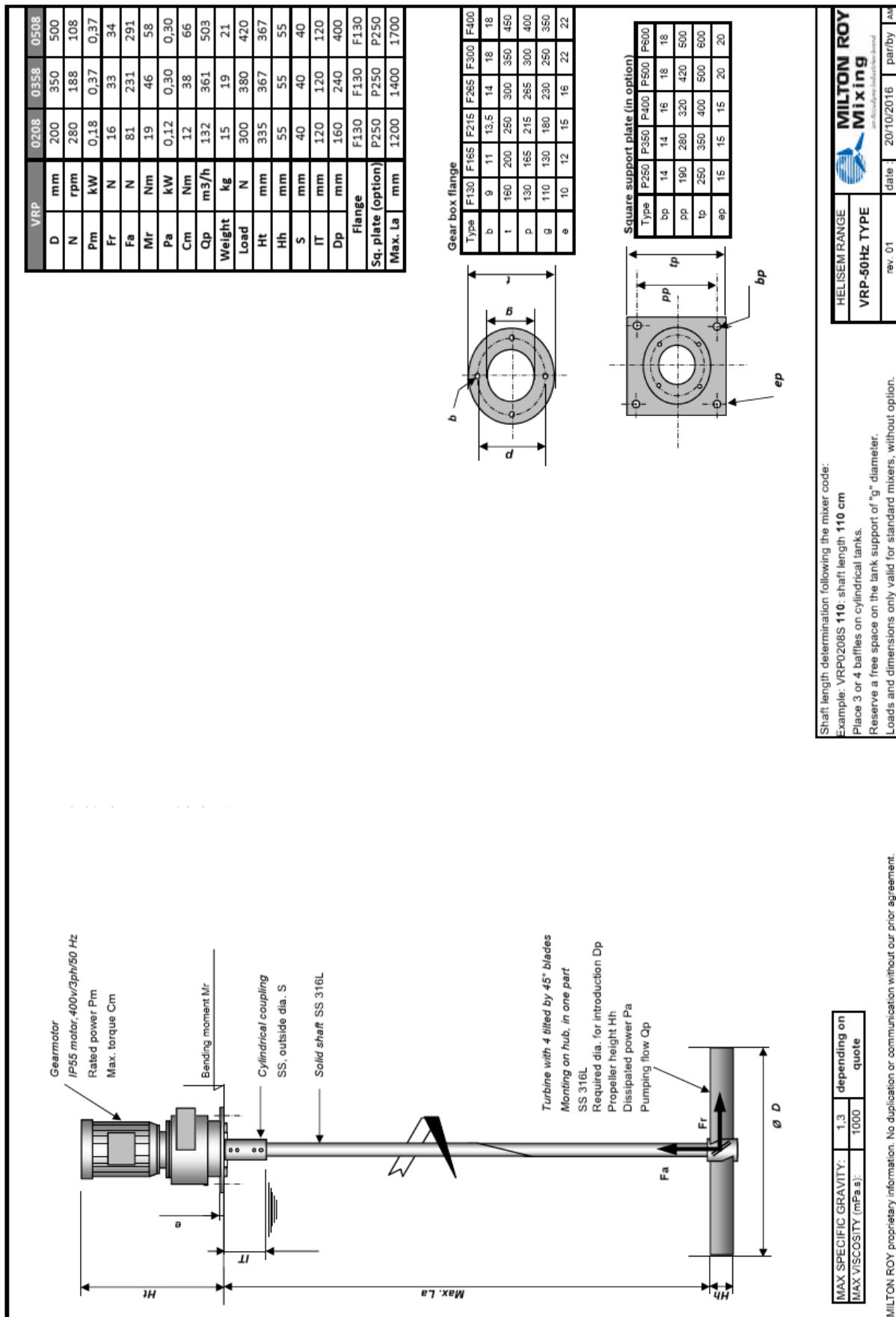
Type VRP	All
Type VR2P	All
Mounting position	M4
Volume of oil, l	0,6*
Oil Quality	See part VI-1

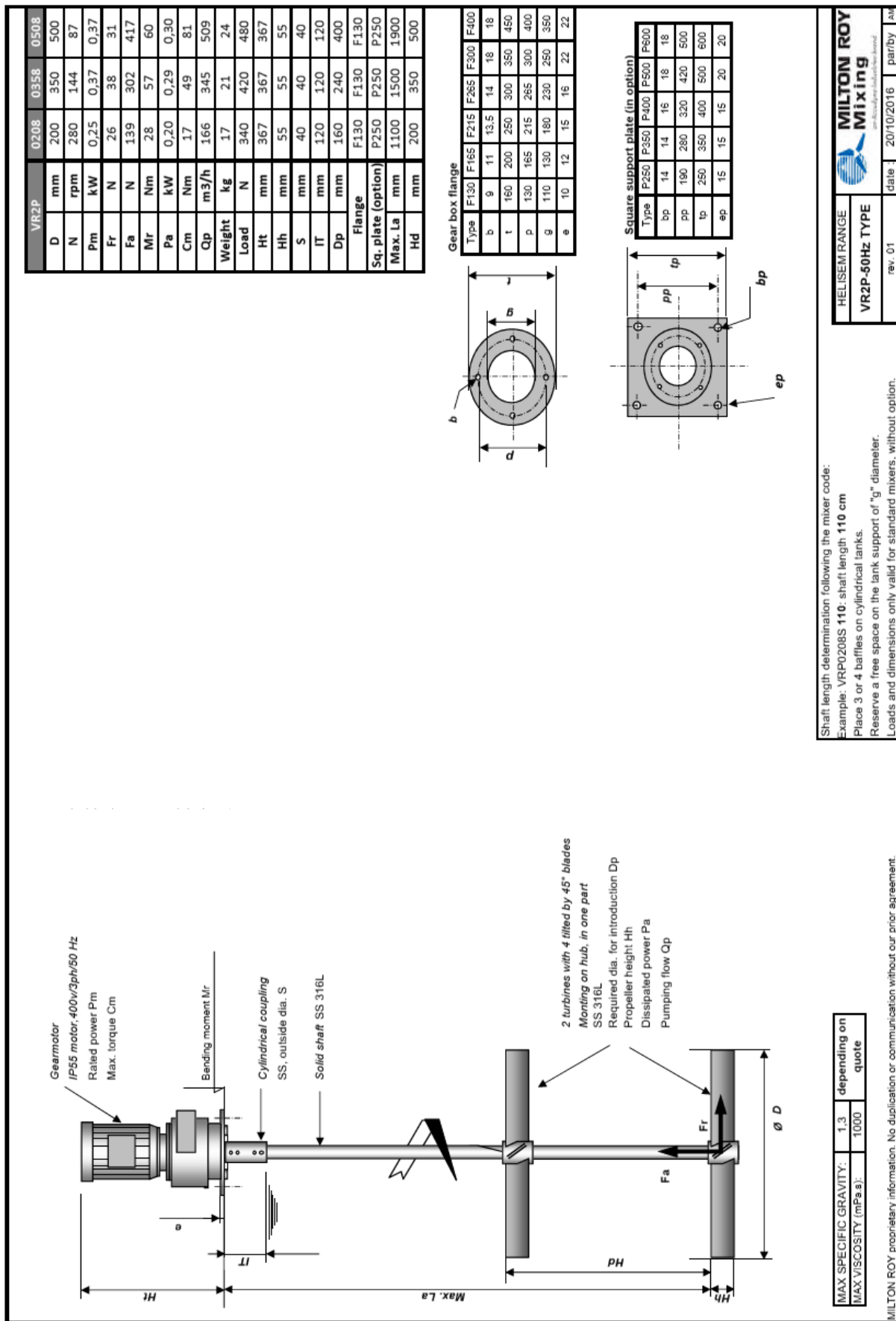
* For ZF29 and DF29 gear reducers, no oil change necessary.

VII – 4: CHARACTERISTICS OF THE AGITATORS OF THE RANGE

Figure 16: Overall drawing and technical characteristics of the agitators

See next page.







Gearmotor
IP55 motor, 460V/3ph/60 Hz
Rated power Pm
Max. torque Cm

Bending moment Mr

Cylindrical coupling
SS, outside dia. S

Solid shaft SS 316L

Turbine with 4 tilted by 45° blades
Mounting on hub, in one part
SS 316L
Required dia. for introduction Dp
Propeller height Hh
Dissipated power Pa
Pumping flow Qp

Dimensions: Ht, IT, e, Hr, Hh, D, Fa, Fr, Max. La

VRP		0209	0359	0509
D	mm	200	350	500
N	rpm	279	178	108
Pm	kW	0,18	0,37	0,37
Fr	N	16	35	40
Fa	N	80	245	291
Mr	Nm	19	49	58
Pa	kW	0,12	0,30	0,30
Cm	Nm	12	40	66
Qp	m ³ /h	132	341	503
Weight	kg	15	19	21
Load	N	300	380	420
Ht	mm	335	367	367
Hh	mm	55	55	55
S	mm	40	40	40
IT	mm	120	120	120
Dp	mm	160	240	400
Flange		F130	F130	F130
Sq. plate (option)		P250	P250	P250
Max. La	mm	1200	1400	1700

Gear box flange

Type	F130	F165	F215	F265	F300	F400
b	9	11	13,5	14	18	18
t	160	200	250	300	350	450
p	130	165	215	265	300	400
g	110	130	180	230	250	350
e	10	12	15	16	22	22

Square support plate (in option)

Type	P250	P350	F400	F500	F600
bp	14	14	16	18	18
pp	190	280	320	420	500
tp	250	350	400	500	600
ep	15	15	15	20	20

Shaft length determination following the mixer code:
 Example: VRP0208S 110: shaft length 110 cm
 Place 3 or 4 baffles on cylindrical tanks.
 Reserve a free space on the tank support of "g" diameter.
 Loads and dimensions only valid for standard mixers, without option.

MAX SPECIFIC GRAVITY: 1,3 depending on quote

MAX VISCOSITY (mPa.s): 1000

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VR2P

D	mm	200	350	500
N	rpm	276	152	86
Pm	kW	0,25	0,37	0,37
Fr	N	26	36	40
Fa	N	140	285	424
Mr	Nm	29	54	60
Pa	kW	0,20	0,29	0,29
Cm	Nm	17	47	83
Qp	m ³ /h	164	364	501
Weight	kg	17	21	24
Load	N	340	420	480
Ht	mm	367	367	367
Hh	mm	55	55	55
S	mm	40	40	40
IT	mm	120	120	120
Dp	mm	160	240	400
Flange		F130	F130	F130
Sq. plate (option)		P250	P250	P250
Max. La	mm	1100	1500	1900
Hd	mm	200	350	500

Gear box flange

Type	F130	F165	F215	F265	F300	F400
b	9	11	13,5	14	18	18
t	160	200	250	300	350	450
p	130	165	215	265	300	400
g	110	130	180	230	250	350
e	10	12	15	18	22	22

Square support plate (in option)

Type	P250	P350	F400	F500	F600
bp	14	14	16	18	18
pp	190	280	320	420	500
tp	250	350	400	500	600
ep	15	15	15	20	20

Shaft length determination following the mixer code:
Example: VRP0208S 110: shaft length 110 cm
Place 3 or 4 baffles on cylindrical tanks.
Reserve a free space on the tank support of "g" diameter.
Loads and dimensions only valid for standard mixers, without option.

HELISEM RANGE
VR2P-60Hz TYPE

rev. 02

date : 03/11/2016

parby: AV

MAX SPECIFIC GRAVITY: 1,3 depending on quote
MAX VISCOSITY (mPa.s): 1000

Shaft length determination following the mixer code:
Example: VRP0208S 110: shaft length 110 cm
Place 3 or 4 baffles on cylindrical tanks.
Reserve a free space on the tank support of "g" diameter.
Loads and dimensions only valid for standard mixers, without option.

GEAR MOTOR
IP55 motor, 460v 3ph/60 Hz
Rated power Pm
Max. torque Cm

BENDING MOMENT Mr

Cylindrical coupling
SS, outside dia. S

Solid shaft SS 316L

2 turbines with 4 tilted by 45° blades
Mounting on hub, in one part
SS 316L
Required dia. for introduction Dp
Propeller height Hh
Dissipated power Pa
Pumping flow Qp

Max. La

Ht

IT

Fr

Fa

PH

HP

Ø D



VIII – CHECK LIST

Please fill this check list before starting up to control the risk and ensure the proper functioning of the agitator.

BEFORE STARTING UP:

- ☐ Instructions manual has been read and followed.
- ☐ Check the material on receipt.
- ☐ Check the good condition and horizontality of the support.
- ☐ Check the impeller blow direction (downwards or upwards).
- ☐ Check the impeller position on the shaft.
- ☐ Check that the locknuts are in place.
- ☐ Check the right fixations of the following parts:
 - ☐ Mixer on the support
 - ☐ Shaft with the coupling
 - ☐ Impeller(s) on the shaft
- ☐ Check the tightening torques.
- ☐ Check the conformity with the voltage (Y or Δ connection)
- ☐ Check that all unused cable entries are tightly closed.
- ☐ Check the electrical connections.
- ☐ Check the oil level inside the gear reducer.

Done by:	Checked by:	Date:
Start up of the mixer authorized:		
☐ YES ☐ NO		

START UP:

- ☐ Check the rotation direction of the mixer.
- ☐ Check the electrical current.
- ☐ Check that the mixer does not generate any abnormal noise and heating.

Done by:	Checked by:	Date:
Start up of the mixer authorized:		
☐ YES	☐ NO	



IX – DECOMMISSIONING AND SCRAPPING

The directive concerning waste electrical and electronic equipment (DEEE - 2002/96/CE) entered into force on August 13th 2005. Its goal is to avoid wastes due to the scrapping of electrical and electronic equipment and promote their reuse, recycling or other forms of recovery. When you dispose of this material, respect the current regulations in your region for waste disposal. Do not dispose of it in the environment but give it to a collection center specialized in electrical and electronic waste and/or ask your reseller.

	Français	English	Deutsch	Espagnol
A	Hauteur tête	Drive height	Höhe der Antriebseinheit	Altura de la "cabeza"
ØD	Diamètre hélice	Impeller diameter	Durchmesser der Rührflügel	Diámetro hélice
Da	Diamètre accouplement	Coupling diameter	Durchmesser der Kupplung	Diámetro del acoplamiento
FA	Force axiale	Axial load	Axialkraft	Fuerza axial
FR	Force radiale	Radial load	Radialkraft	fuerza radial
H	Position hélice	impeller position	Lage der Rührflügel	Sitio del hélice
HD	Hauteur hélice	impeller height	Höhe der Rührflügel	Altura del hélice
IM	Immersion minimum	Minimum imersion	Min Eintauchen	Min inmersión
IT	Niveau de liquide max	Max liquid level	Höchststand der Flüssigkeit	Nivel máx del liquido
P	Puissance moteur	Rated power	Motorleistung	Potencia del motor
Q	Débit	Pumping flow rate	Durchfluss	Caudal
TH	Diamètre de passage	Man hole	Durchmesser der Montage	Mín. Paso montaje
	Vitesse	Rotation speed	Drehzahl	Velocidad
	Entraînement	Drive	Antrieb	Arraste
	Poids	Weight	Gewicht	Peso
	Diamètre centrage	Centrer diameter	Durchmesser der Zentrierung	Diámetro del centrado
	4 trous sur diamètre	4 holes on diameter	4 Löcher auf dem Durchmesser	4 agujeros
	Diamètre extérieur bride	Outside diam of flange	Außendurchmesser der Flansch	Diámetro exterior de la brida
	Epaisseur bride	Flange thickness	Dicke der Flansch	Grossor de la brida
	Longueur d'arbre max	Maxi shaft length	Max Länge der Welle	Longitud máx del eje
M	Moteur	Motor	Motor	Motor
C	Accouplement	Coupling	Kupplung	Acoplamientos
S	Arbre	Shaft	Welle	Eje
E	Hélice	Impeller	Drehkörper	Roterer

Français	English	Deutsch	Espagnol
Ne pas tourner à vide.	Do not run without liquid.	Ohne flüssigkeit nicht drehen.	No poder en marcha sin liquido.
Ne pas tourner durant la vidange et le remplissage.	Do not rotate during draining and filling.	Wenn entleerung oder füllen nicht drehen.	No poder en marcha durante el llenado o el vaciado.
Pour une réduction de la longueur d'arbre, nous consulter.	For a shorter shaft length, please consult Milton Roy Europe.	Für eine reduzierung der wellenlänge, Milton Roy Europe aufsuchen.	Para reducir el longitud del eje, contactar MR.
Attention: une option peut modifier les caractéristiques de l'agitateur.	Caution: an option may change the mixer characteristics.	Achtung: eine option kann die leistungdaten der rührwerk ändern.	Cuidado: dimensiones, peso y fuerzas válidas que para la ejecución standard (sin opcionales).
TH: diamètre mini pour l'introduction de l'hélice.	TH: mini diameter for impeller introducing.	TH: mini durchmesser für die einföhrung der rührflügel	TH : min diámetro para la introduction de la hélice.
Option plaque d'assise : réserver un espace libre dans le support égal au diam ext. B de la bride.	Bas plate option: reserve a free space into the support device as big as the standard flange outside diameter.	Halterung option: ein platz in der halterung aufsparen(gleich der außendurchmeter B der flansch).	Brida opcional: reservar un espacio libre en el soporte igual al diámetro exterior Bde la brida standard.
En dessous de l'hélice de 800 mm : accouplement et hélice en une pièce.	Below 800 mm impeller: impeller and coupling un one piece.	Unten den 800 mm rührflügel: kupplung und rührflügel zusammen.	Diámetro de la hélice debajo de 800 mm: acoplamiento e hélice agrupado.

GLOSSARY

Vent valve: a vent valve is a mechanical device that allows the balancing of pressure between air and oil during heating or cooling.



Torque meter wrench: this wrench allows the torque measurement during bolting so that is done optimally.



Vortices: a hydraulic phenomenon that appears when the liquid is rotating (swirling) around an axis. The centrifugal effect generates a central depression and the liquid surface takes a conical form.

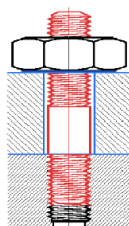
Drive head: part of the mixer which is out of the tank (motor, lantern...)



Fibers: These filaments can tangle around the impeller hub to form a « ball » which increases the power consumption and unbalances the shaft.

Wood beams: pieces of wood used to support the mixer shaft during erection. They have the same function than U beams but are less effective.

Dowel: threaded metal bar allowing a complete, rigid and dismountable connection between two parts. For instance, it can be sealed in concrete on one side and be used to bolts components on the other side. See this picture.



GUARANTEE

The Seller guarantees the Goods for twenty-four (24) months following delivery date, except for agitators and spare parts thereof for which warranty period is twelve (12) months. Any claim shall be raised to the Seller's in writing within ten (10) working days of becoming aware of the same and shall enclose the corresponding purchase invoice. Failing that, the Purchaser implicitly waives all right of recourse regarding warranty.

The Seller's warranty covers replacement or repair of proven defective parts or Goods at its sole option:

(a) returned to its workshops; or (b) returned to its distributor or authorized service centre workshop ; or (c) should the Seller agrees that Goods shall not be returned for financial or practical reasons, default or defect shall be assessed on-site at the Purchaser's expense by a Seller's employee, distributor, representative or authorised service centre. In such a case, the Purchaser shall be asked to issue an order to cover report fees for an amount to be determined on a case-by-case basis.

If the Seller's responsibility is established under the warranty, the latter shall replace or repair the defective parts at its own expense, excluding equipment provision (such as, without limitation dismantling, reassembling and approach (including emptying of the tanks)) and transport costs.

The Seller shall reserve the right to modify all or part of its Goods to comply with its warranty obligations.

The replacement or the repair of one or more parts for whatever reason shall not extend the warranty period.

The warranty shall not apply in the following circumstances: fair wear and tear, installation not compliant with Industry Practice and/or the Seller's instruction manual, lack of monitoring or maintenance, wilful act on the part of the Purchaser, its employees or Third Parties, accident, any modification to the operating conditions, chemical attack, corrosion or erosion.

The suggested manufacturing materials are recommendations subject in all cases to the verification and acceptance of the Purchaser, whose liability in this respect cannot be excluded, whether in whole or in part. Any recommendations based on the Seller's experience and any available information which has been communicated by it to the Purchaser shall not provide any warranty against wear or tear or chemical action.

The warranty shall automatically end: (a) if the storage of the Goods by the Purchaser fails to comply with the Seller's recommendations and with Industry practices or maintenance manuals; (b) in the event of the Goods being worked on or dismantled without the express written agreement of the Seller or in the event of such work being carried out by a person not approved in writing by the Seller; (c) if original parts have been replaced by other parts non-supplied by the Seller.

Warranty claim shall not affect payment terms.

INDUSTRIAL OWNERSHIP

Notwithstanding anything to the contrary and except an express licence is granted, each Party shall remain the exclusive owner of the Intellectual Property Rights it owns, develops or uses, whether such ownership, development or usage arises before, during or after the Agreement.

The Seller warrants to the Purchaser that the Goods do not constitute a breach of any preexisting rights nor any other form of infringement of Intellectual Property Rights, and indemnifies it against any action or claim in this respect, provided that: (a) Seller has been informed in advance and in writing of the existence of such a claim and within a reasonable timeframe for it to be able to prepare its defence, (b) payment has been received for the Goods, and (c) the Purchaser provides the Seller with the necessary opportunity, authority, information and assistance for it to be able to take on exclusive control of the defence against such claims or legal action, including arbitration, mediation, settlements and appeals.

This obligation does not apply in respect of any claims/infringement action or any other Intellectual Property Rights resulting from the use of the specifications provided by the Purchaser or derived from the design created by the latter, or from changes or modifications to the equipment imposed by it.

Should the liability of the Seller be recognised by any jurisdiction, the Seller shall at its sole option: (1) obtain from the Purchaser the right to use the Goods under the conditions defined by the Agreement; or (2) replace it with a reasonably equivalent Good; or (3) modify it to make it usable without contravening any Third Party rights and in compliance with the Agreement; or (4) recall the Goods, refund the Order Price to the Purchaser less an obsolescence discount.

Should the Goods supplied by the Seller for the Purchaser be produced in accordance with the Purchaser's designs, samples or instructions, or were been designed exclusively by the Seller, or were combined with other Goods not supplied by the Seller, the Purchaser will have to defend, guarantee and indemnify the Seller under equivalent conditions to the aforementioned obligation placed upon the Seller.

CONTACT LIST

Need for information?

**MILTON ROY EUROPE
Etablissement de Samoreau
10 RUE DU BOIS GASSEAU
77210 SAMOREAU
FRANCE**

- **Tel : +33 (0)1 60 74 95 20**

A problem?

Contact the After Sales Service

- **Tel : +33 (0)1 60 74 95 25**
- **mr18.aftersales@miltonroy.com**

Spare parts?

Contact the After Sales Service

- **Tel : +33 (0)1 60 74 99 57**
- **Tel : +33 (0)1 60 74 95 33**

Other Countries:

Please visit our website to find our local representative.

www.miltonroymixing.com