



MarFlex

Deepwell pump system
Condition monitoring - Visual oil analysis/Megger test

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Introduction

Periodical condition monitoring may identify early deficiencies and, upon proper action, it will prevent equipment from further and unnecessary deterioration as well as maintaining the lifetime of the MarFlex equipment. This document describes additional half-yearly monitoring of the oil as used in the MarFlex Deepwell pumps and provisional Megger testing of the MarFlex pump motors prior to each discharge.

Visual oil analysis

In addition to the usual laboratorial analysis, oil samples can be inspected visually. The following general conditions can be identified and would mean replacement of the oil and further monitoring.

General Guidelines

	Description	Remedial action(s)
 	Clean oil sample	none
 	Water contamination <ul style="list-style-type: none"> Oil - water separation Oil is cloudy Emulsified oil 	Drain oil until clear and refill with new/clean oil. Additional: <ul style="list-style-type: none"> Inspect all seals of the top cover for any possible ingress of water Execute purging routine Take new oil sample after next loading-discharge cycle
 	Cargo contamination <ul style="list-style-type: none"> Discoloration Smell of cargo Any other method of determining cargo content 	Drain all oil, flush and refill with new/clean oil. Additional: <ul style="list-style-type: none"> Execute purging routine Take new oil sample after next loading-discharge cycle
 	Metal contamination <ul style="list-style-type: none"> Discoloration Sediment Identifying metal partials by a magnet 	Drain oil until clear and refill with new/clean oil. Additional: <ul style="list-style-type: none"> Observe the pump for any abnormal vibration/noises during operation Take new oil sample after next loading-discharge cycle



Megger testing, prior to every discharge

In addition to regular insulation checks, we advise that you perform a megger test prior to each discharge. During the additional megger testing, a motor start where there is low insulation is to be avoided. Low insulation may result in damaging the starter and/or electromotor.

Shock hazard



- Do not perform megger testing when the main power supply is switched on (380 ~ 480 VAC)
- Do not perform megger testing immediately after the system is switched off. Wait at least 15 minutes.
- Check the terminals prior to megger testing for any remaining voltage.
- Do not touch the phase terminals during megger testing.
- Check the terminals after megger testing for any remaining voltage in case the terminals require reconnection.



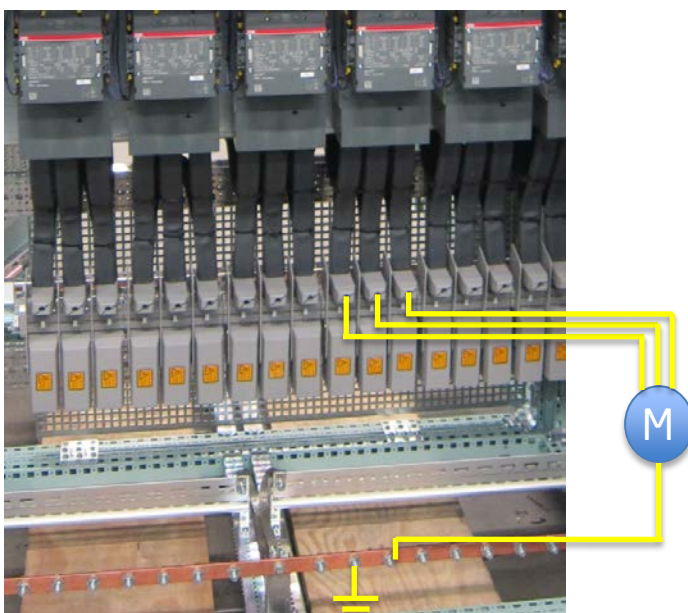
Warning

- Do not megger test a frequency converter or softstarter. Megger testing may damage a frequency converter or softstarter.

Procedure

The preferred location for megger testing is at the motor terminals in the MarFlex electrical cabinets. This is due to easy access and megger test results which include the motor cabling.

- Switch off the main power supply to the MarFlex electrical system.
- Ensure the motor cables are separated from a frequency converter/soft-starter by means of a motor-contactor. In case the motor cables are directly terminated to a frequency converter/soft-starter, or in case of doubt, the motor cable is to be disconnected.
- Megger test the motor cables and the electromotor. Megger test setting maximum 1000 V(DC).
- Record the megger test results.
- If applicable, reconnect the electromotor cables to the prescribed torque.



Anticipated duration of megger testing:

For MarFlex systems, in which the electromotor cabling is separated by motor-contactors, it takes approximately 15 minutes.

Description:

Megger testing is method used to determine the insulation condition of electrical equipment. Variations of insulation can be found in:

- Moisture
- Excessive dirt
- Punctures in insulation

Megger values with the corresponding actions:

Resistance Value	:	Action
>2200 MΩ - 150 MΩ	:	None
150 MΩ - 50 MΩ	:	Investigate; able to run E-motor
50 MΩ - 0 MΩ	:	Investigate; do NOT run E-motor until issue is resolved

Guidelines for further investigation

Warning



When a hazardous atmosphere is present, the terminal box can only be opened as per the instructions of the manufacturer of the motor. Ensure that the proper safety precautions are initiated and that no power can be supplied to the motor, and that the standstill heating is switched off. Maintain the time criteria between powering off and opening the terminal box. Other measurement equipment must comply with the hazardous area restrictions.

- Canvas covers to be removed, moisture may be able to evaporate and this should improve the insulation value.
- Inspection of terminal box. Any presence of water.
- Disconnecting motor cabling at the motor to allocate the lower insulation values: electromotor or motor cables.
- Contact MarFlex for specific assistance.

For any queries or technical advice, please contact MarFlex at:

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