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### 1. General Remarks

The following remarks are related to mud boxes in straight and angle pattern as well as in horizontal angle pattern. The main perspective of this operating manual is the shipbuilding industry, whereas the mud boxes are certainly not limited to this application.

Rules and Regulations:

The technical design is generally in correspondence with all classification societies' rules and regulations for the construction of ships as well as with the Pressure Equipment Directive (PED) 97/23/EG as pressure equipment acc. to category II, module A1.

**Since technical requirements partly vary with the a.m. bodies, please advise which rules have to be applied for a specific order.**

#### 1.1. Marking

Mud boxes are marked with the following information:

- manufacturer (AW-label, cast)
- type-no. (cast)
- body material (cast)
- pressure class (cast)
- nominal size (cast)
- batch no. and foundry sign (cast)
- direction of flow (cast)

Mud boxes with CE mark (please advise with the order!) are marked with an additional name plate containing the following information:

- service pressure PS (min/max)
- test pressure PT
- fluid temperature TS (min/max)
- category acc. to PED 97/23/EG
- fluid group acc. to PED 97/23/EG
- conformity assessment module
- CE mark or Named Body
- order no.
- order position

## 1.2. Medium

Before installation and start-up of the plant it has to be verified that mud box materials are suitable for the medium. In case of doubt the manufacturer will be glad to assess and approve the adequacy of the chosen materials. ARMATUREN-WOLFF offers various material combinations and options of surface coating or lining, in order to achieve a suitable chemical resistance against the impact of different fluids. Please contact us in case of need.

Unsuitable combinations of medium and mud box materials may lead to leakages at the mud box cover. Dangerous kinds of medium may not get into the environment.

For assembly, we use lubricants on mineral oil basis. Please note that these can get in contact with the medium, if no special measures are undertaken against this effect. Lubricants and auxiliary liquids may theoretically get into the medium and cause pollution or provoke unintended chemical reactions.

## 1.3. Ambient and Medium Temperature

Mud boxes from ARMATUREN-WOLFF are not sensitive against changing ambient temperatures. The minimum service temperature is -10°C for mud boxes.

If electric components (differential pressure indicator<sup>1</sup> with electrical switch contacts, e.g.) are mounted, and in case ambient temperature should be above 55°C, suitable measures have to be undertaken to prevent heat impact on these components as well as possible (for instance, isolation against ambient heat and heat radiation from the mud box body, cooling, etc.).

## 1.4. Vibrations

The mud boxes are generally insensitive against weak shocks and vibrations below 0,7g. In case it should not be possible to limit the local vibrations under this value, the valves should be isolated from the pipeline. For this purpose, ARMATUREN-WOLFF offers special vibration dampers.

## 1.5. Pipe Tensions

Pipelines and pipeline systems have to be installed in such way that no tensions from thermal expansion (or other) of the pipeline may have impact on the mud box. This can theoretically even lead to breaks in the mud box, causing danger from medium spills. ARMATUREN-WOLFF offers suitable expansion joints for this purpose.

## 1.6. Protection during Storage and Transport

All protection devices for transport and storage have to be removed before installation. If the equipment is not installed directly after delivery, the following measures should be taken care for:

- Storage in a dry place, protected from environmental impact
- Optimum storage temperature is 5°C to 40°C
- Protection against dust and dirt impact

## 2. Installation and Initial Operation

### 2.1. Installation into the Pipeline

Please ensure at the installation into pipelines that the filter orientation is upward (cover is the top-most part) and that there are no mechanical tensions on the filter (smooth fit into the pipeline, bolts tightened diagonally). The medium must flow in the direction shown on the housing.

To minimize the risk of electrochemical corrosion, appropriate electrolytic safety measures should be applied depending on the medium and system context. In case of doubt, ARMATUREN-WOLFF will be ready to provide specific recommendations or to jointly discuss and decide about appropriate technical measures.

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<sup>1</sup> optional equipment – if necessary please advise with the order

## 2.2. Putting into Operation

For the filling of the pipeline it is possible to open the venting device<sup>2</sup> on the top of the mud box cover, allowing the enclosed air to escape. If such a venting device is not fitted, or in case a loss of a small quantity of medium through this opening should not be acceptable, other suitable measures have to be undertaken to make sure that the enclosed air is taken out.

- a. Open the venting device<sup>2</sup> and fill the pipeline / the filter with medium until the liquid splashes out.
- b. Close the venting device<sup>2</sup>.
- c. Mud box is ready for operation.

## 2.3. Cleaning

The relevant regulations on safety and accident prevention must be observed.

**At every opening of the mud box the pipeline in the range of the filter must be pressure-less (relevant valves must be closed and if necessary, pumps have to be switched off).**

- a. Open the venting device<sup>2</sup> in the cover.
- b. Dismantle and remove the cover fixing nuts / loosen the bow nuts with a suitable lever and swing the bolts carefully to the side. Lift the cover vertically with an appropriate lifting device over the stud bolts. In case that the mud box is fitted with ICCP electrodes (no regular scope of delivery), make sure that these cannot be damaged.
- c. Open the draining device<sup>2</sup> and empty the filter at least below the strainer support.
- d. Lift the strainer insert vertically out of the mud box until it is pending above the rim (per hand or lifting tool), lay aside onto a suitable ground, clean and check for damages and corrosion.
- e. Check the position of the O-ring in the groove on top of the filter body (cover seal), insert the cleaned strainer and close the mud box with the cover. Tighten the cover fixing bolts diagonally, torque approx. 10-12 Nm.

## 3. Maintenance

It is recommended to clean and check the strainer in regular intervals, which are dependent on the operating conditions and which should be determined by the operator, or at a certain level of dirt collection in the strainer (rise of differential pressure).

Apart from that, the mud box is maintenance-free.

## 4. Safety Remarks

- The operating instructions have to be observed in an obligatory way. In case of noncompliance, all guarantees and liabilities are reserved!
- Sharp edges and flashes can cause injuries. Handle parts with care.
- Mud boxes may only be installed, connected and taken into service by appropriately instructed personnel.
- Maintenance personnel must be informed about the dangers related to disassembling and mounting of pipeline equipment as well as electric and machinery installations (as applicable).
- At all work at a mud box installed in a pipeline, it has to be made sure that the plant is not under pressure and that medium cannot escape from the pipeline.
- The electric installation of differential pressure indicators with electric contacts, as applicable, may only be done in a voltage-free situation. Never loosen electrical contacts during operation! Electrical connections may only be installed in a voltage-free state!
- When not genuine parts are used for replacement, guarantees and liabilities become void.

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<sup>2</sup> optional equipment – if necessary please advise with the order