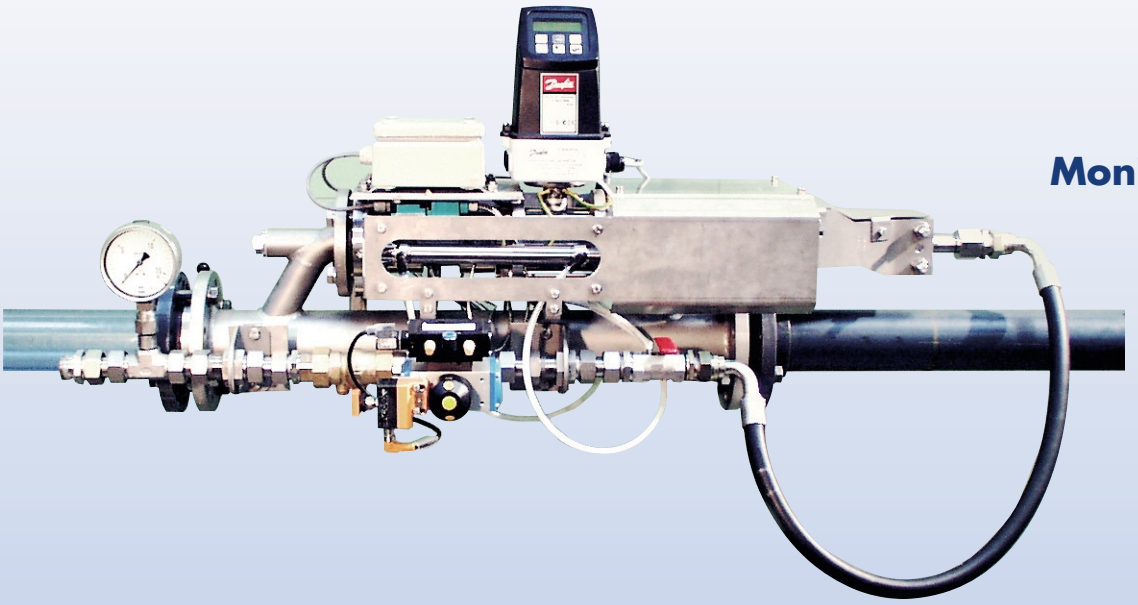
IN-TA-CT®

Ball Effectiveness Monitor BEM

Taprogge

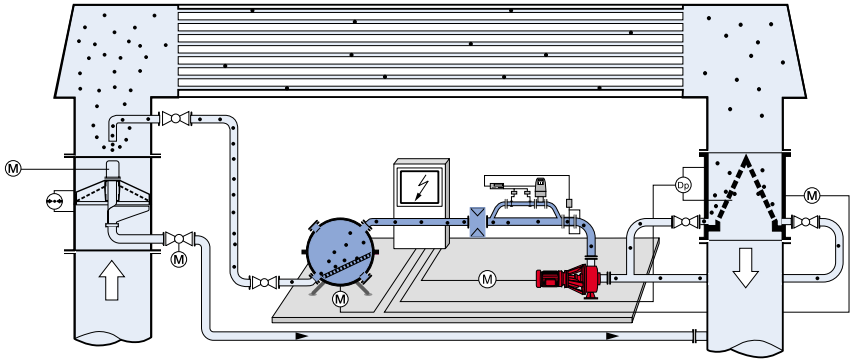


Monitoring 5

BEM

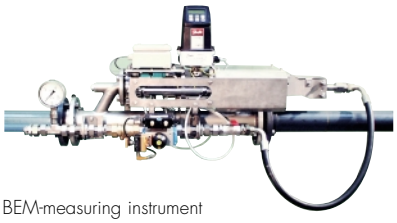
BEM-display

The BEM (Ball Effectiveness Monitor) serves as an optional add-on device to the TAPROGGE System for the automatic measurement of the effectiveness of circulating cleaning balls. It enables the operator to check the state of the cleaning balls in circulation – at any time and without further effort – with a necessary ball exchange being signalled at the same time. This ensures that your TAPROGGE System constantly remains in best shape – without the need for manual intervention.



Arrangement of the TAPROGGE-modules within the entire system

The Task



BEM-measuring instrument

Effective tube cleaning is safeguarded as long as the circulating cleaning balls have sufficient oversize against the tube diameter. Depending on the state of the tube and local water chemistry, ball oversize and hardness are exposed to different wear conditions. Once the oversize reduces to below 0.5 mm, or the balls lose their resistance to crushing due to influences of the cooling water quality, their cleaning effect is quickly reduced. Balls without oversize do not have any cleaning effect. By continuously monitoring ball oversize and hardness, the time for the exchange of a ball charge can be optimised.

Functional Principle

BEM establishes the effectiveness of circulating cleaning balls via velocity differential measurement. This method follows the principle that the throughflow velocity of a new ball, in consequence of its cleaning task, is decelerated compared to that of the cooling water. However, the throughflow velocity of a ball without oversize, i.e. completely worn down, nearly corresponds to that of the cooling water. The differential between the throughflow velocity of a cleaning ball and the cooling water velocity itself is therefore an appropriate parameter for measuring the effectiveness of cleaning balls.

Design and Operational Characteristics

Being an optional part of the recirculating unit of the TAPROGGE System, BEM is installed in the recirculating pipe between recirculating pump and ball collector. Measurement is effected in a branch pipe of the ball recirculating pipe where the BEM measuring pipe is located. The BEM measuring pipe has the same inner diameter as the tubes to be cleaned.

Via an adjustable diaphragm in the inlet area of the branch pipe the ball frequency towards the BEM measuring pipe can be adjusted. When a ball passes through the BEM measuring pipe first its throughflow velocity is measured by means of two light barriers connected in series. Immediately afterwards, the velocity of the cooling medium is taken in the throughflow measuring cell connected downstream of the measuring pipe.

The measured data is transmitted to the BEM evaluation instrument that has been prepared for the installation in the TAPROGGE control panel where the data is processed by means of the special TAPROGGE Softcare® package.
The actual state of the remaining effectiveness of circulating balls is displayed. Once the ball effectiveness drops to a pre-set limit value an alarm signal is given. Configuration and evaluation data can be accessed locally or remotely.

Special Features and Benefits

- Continuous determination and display of ball effectiveness without manual measuring
- Ball exchange at optimal point of time through automatic alarm signal
- Highly precise and staff-independent measuring technology
- Consideration of ball oversize and hardness when determining the ball effectiveness

- TAPROGGE Softcare® package for data evaluation
- Menu-guided system configuration with adjustable operator language
- Storage of system configuration and up to 1,000 measured data (can be accessed)
- Data access locally via terminal program or remotely by modem and telephone line

- Option: flushing ability of the BEM measuring pipe for applications with risk of clogging due to macro fouling
- Retrofit possible
- Upgrade of earlier solution (TAPROGGE BOM)
- Can be combined with TAPROGGE BRM (Ball Recirculating Monitor) by using the same evaluator

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