ABB MEASUREMENT & ANALYTICS | APPLICATION NOTE | AN/CORIOLIS/116-EN REV. A

Helping ship owners save energy and reduce maintenance costs

CoriolisMaster flow meters in scrubber systems

Process monitoring and quality control in scrubber systems increase efficiency and help reduce maintenance cost by using a Coriolis mass flow and density measurement system.

Measurement made easy

CoriolisMaster FCB100
CoriolisMaster FCB400

Introduction

Scrubber systems (e.g. chemical scrubbers, gas scrubbers) are a diverse group of air pollution control devices that can be used to remove some particulates and/or gases from industrial exhaust streams.

Application areas are absorption of sulfur dioxide contained in flue gas and extraction of sulfuric acid, exhaust gas desulfurization in maritime shipping, separation of mercury from combustion gases or oxidizing gas scrubbing of sewage gases with hydrogen peroxide.

Additional Information

Additional documentation on Helping ship owners save energy and reduce maintenance costs is available for download free of charge at www.abb.com/flow.
Alternatively simply scan this code:

Coriolis for flow and density measurement

—
01 CoriolisMaster FCB400

A Coriolis measuring system is used to check the system efficiency and to determine the degree of contamination of the drain liquid. The density (and thus the amount of salts and particles) as well as the flow can be measured.

01

Aside from measuring highly accurate mass fluid flowrates, the Coriolis technique offers numerous other advantages.

The Coriolis metering principle is independent of the fluid's density, temperature and conductivity, making it very flexible to use. It's also independent of the flow velocity profiles. So, it does not require upstream and downstream straight runs of piping.

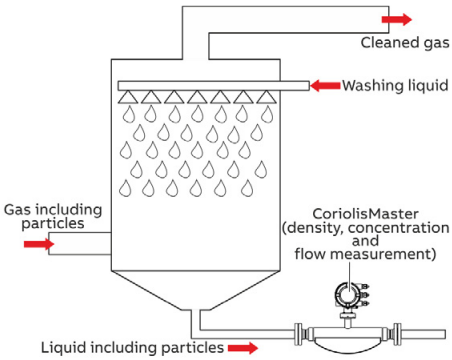
As a bonus, the flowmeter provides a measurement of fluid density within the tubes. It also includes a temperature sensor to compensate for dimensional and elasticity changes of the tubes with fluid temperature. Lastly, these flowmeters can measure nearly zero flow, where other measurement methods don't work or result in significant measurement errors.

The scrubber system

— 02 Gas scrubber

— 03 Closed loop scrubber system

A gas scrubber, wet scrubber or absorber is a process engineering apparatus in which a gas stream is brought into contact with a washing liquid stream in order to take up components of the gas stream in the liquid.



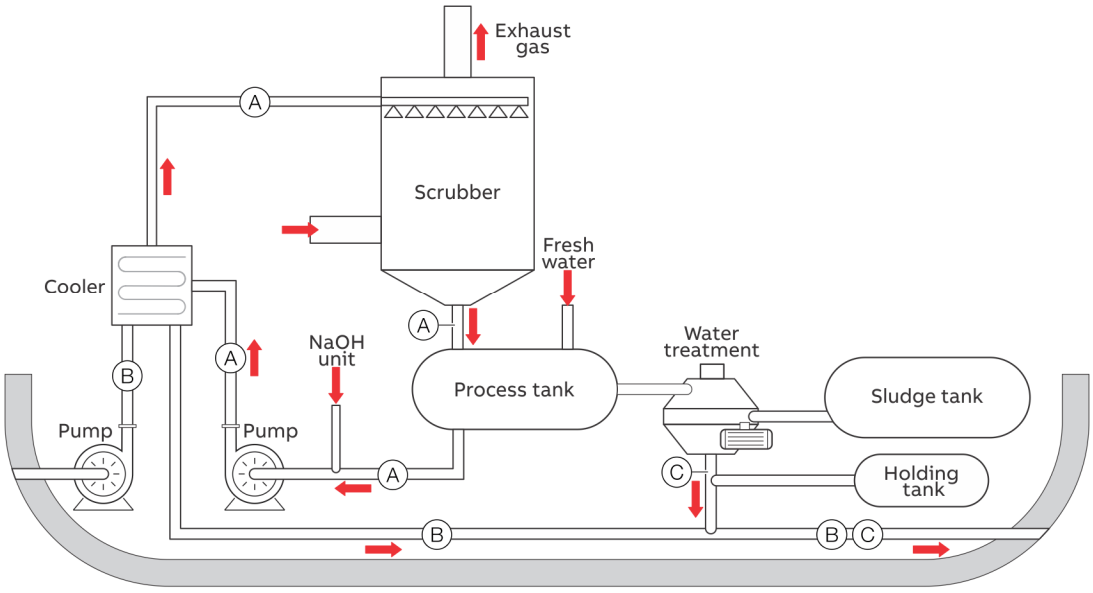
02

The passing components of the gas stream can be solid, liquid or gaseous substances. Pure liquids such as water, but also suspensions such as milk of lime (flue gas desulfurization) can be used as the washing liquid. Gas scrubbers can be used for dedusting and separating harmful gases at the same time.

The cleaning process means that the particles are washed out of the gas and thus combine with the liquid. The number of particles in the liquid is therefore a measure of the efficiency of the scrubber system.

The number of particles (the concentration), in the liquid changes the density. This can be determined precisely and reproducibly with a Coriolis measuring system.

In closed loop systems, the density value is often used to recognize when the liquid is too dirty and has to be replaced.



Ⓐ Closed loop washing liquid

Ⓑ Seawater

Ⓒ Treated wash water

03

Product information

—
04 CoriolisMaster FCB400

04

ABB's CoriolisMaster has a wide range of inputs and outputs signals: up to three current analog output signals (4 to 20 mA), a wide range of digital communication protocols are available.

Fully Compliant Solution
The CoriolisMaster flowmeter is fully compliant with many international approvals like ATEX/FM/IECEx approvals, DNV/GL for marine applications, SIL2 according to IEC 61508 - Functional Safety Standard.

ABB Common Platform Handling – Common look & feel
- Quick commissioning with the Easy Set-up function

Enhanced diagnostic, online-verification including sensor tube verification
- Improved process performance

Modular I/O concept
- Up to five I/Os at the same time
- Optimal tailoring to all kind off applications – Cards can be retrofitted

SensorApplication memory
- Plug and Play replacement of transmitter electronic components

Lower pressure loss due to optimized design
- Smooth Coriolis shape results in less energy consumption

Display with Through The Glass operation (TTG)
- Easy meter setup without opening the housing

Smart Sensor Design
- The 4-wire cable allow easy installation with standard cable

Notes

Notes

ABB Measurement & Analytics

For your local ABB contact, visit:
www.abb.com/contacts

For more product information, visit:
www.abb.com/flow

3KDE010117R3001

AN/CORIOLIS/116-EN Rev. A 10.2020