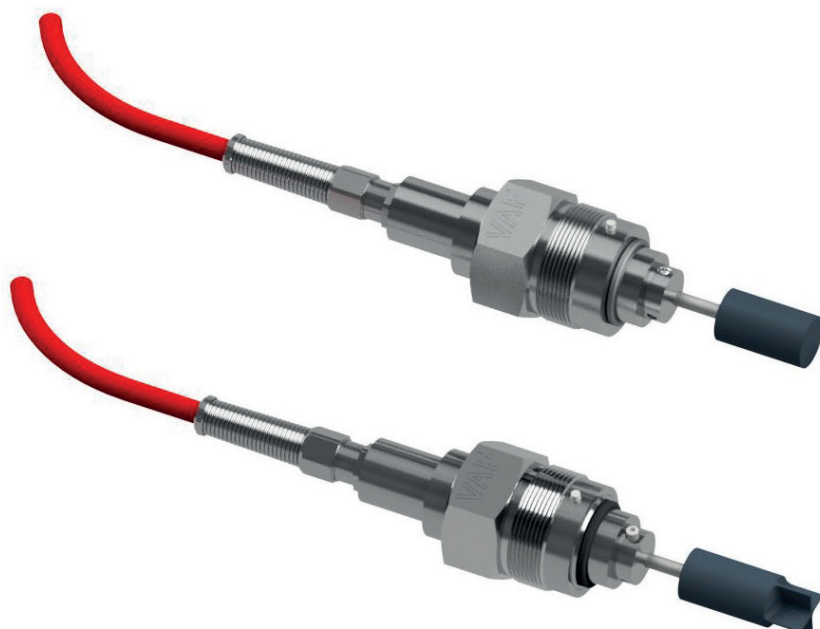
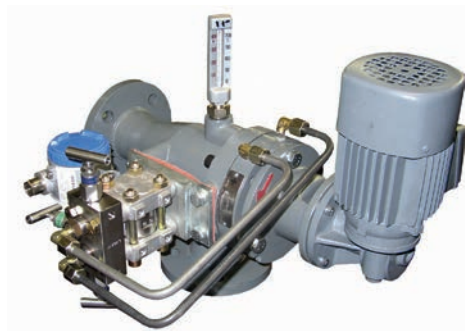


VAF

INSTRUMENTS



Retrofitting

Viscotherm to ViscoSense®

732

Information Bulletin

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Introduction

Having over 60 years of experience and more than 80000 systems sold, VAF Instruments is the worldwide market leader for inline viscosity measurement and control systems. ViscoSense® is the latest innovative development in a long history of outstanding viscosity sensors for fuel oil applications. In this most demanding environment of diesel engines on board ships and in land based power plants, VAF Instruments has proven itself with high quality products and a comprehensive and professional customer support.

Necessity of viscosity control

Most of the operating costs of a ship are fuel related. Therefore it is very important to use fuel in the most efficient way. A large variation in the quality and composition of fuel oil makes the behaviour of the fuel oil at higher temperatures difficult to predict. An optimal viscosity is needed for the best possible atomization of HFO in the engine, so the fuel will be burnt completely without remaining deposits. The measurement and control of the viscosity ensures an improved combustion efficiency, preventing engine damage and reducing cost of maintenance.

Mass flow measurement

In general fuel is bought in metric tonnes. Therefore, to be consistent, fuel consumption is more and more monitored in kilograms. Smart usage of (existing) VAF Instruments PD Flowmeters in the fuel system in combination with ViscoSense®3D enables mass flow measurement. In bunkering applications measurement of viscosity and density by ViscoSense®3D enables the detection of possible cappuccino effect.

Accuracy and reliability

ViscoSense®3(D) is a highly accurate viscosity sensor with a superior measuring principle. This patented measuring principle is based on a torsional vibration of a pendulum in liquid. The measured damping of this piezo-driven vibration is directly related to the viscosity, whilst frequency is related to the density. A built-in temperature sensor is used to measure the temperature at the same location where viscosity and density are measured. Due to the operating principle based on a torsional vibration, the measurement is insensitive to unwanted external influences. Flow velocity, flow direction and pulsations have no effect on the sensor operation. The robust sensor is designed to operate under the most difficult conditions in which a faultless and stable viscosity and density measurements are required.

Cost-effective operation

The ViscoSense®3(D) sensor is developed to measure viscosity and density without interruptions and with low operating costs. Since the sensor does not actually move, it is not subject to wear and therefore it ensures a long lifetime and a maintenance free operation. The surface of the pendulum (which has undergone special surface treatment to improve its non-stick performances) in combination with a smooth edged design makes the sensor highly insensitive to fouling and easy to clean. The sensor is calibrated for life and the accuracy will be kept without the necessity of re-calibration. Due to its compact design, the sensor is suitable for easy installation in any new or retrofit system.

ViscoSense® is a registered trade mark of VAF Instruments

Retrofitting

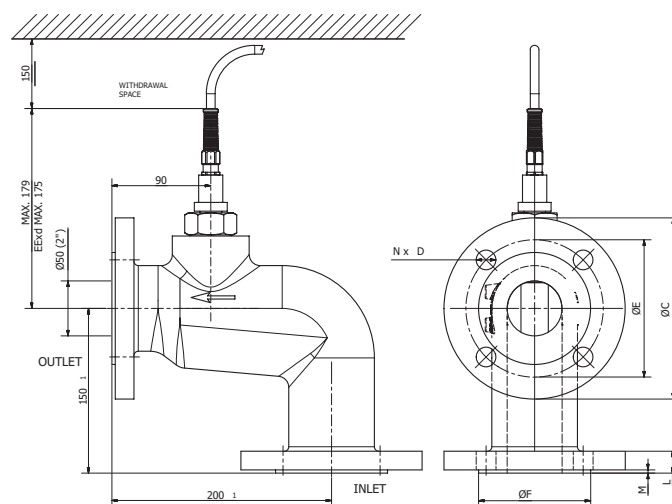
Retrofitting from Viscotherm to ViscoSense®

Since the late 1950's VAF Instruments has manufactured the well known VAF Viscotherm product line. In the year 2000, VAF has introduced the ViscoSense® and in 2007 the ViscoSense®2 has been launched which has been followed up by the ViscoSense®3 in 2014, and the ViscoSense®3D in 2016.

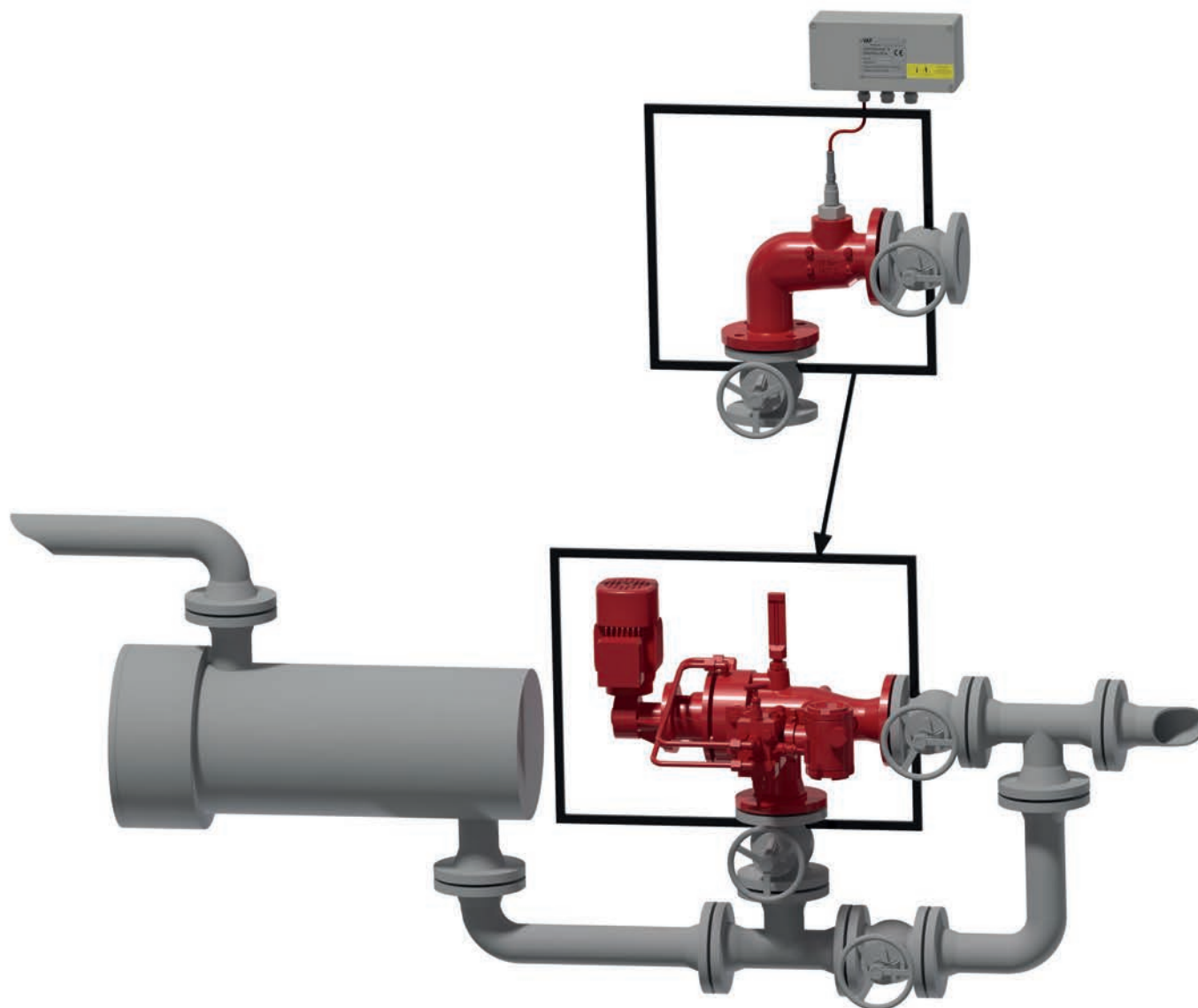
The ViscoSense® is used to measure and control the viscosity of (heavy) fuel oil for ships and power plants engines and replaces the Viscotherm systems in all applications with the following advantages:

- the sensor is a state-of-the-art design without moving parts;
- the smooth edged design makes it highly insensitive to fouling;
- once calibrated the sensors' accuracy is set for life; this provides you with excellent measurement quality against low operation costs;
- fast and accurate measurement of viscosity and temperature of the fuel oil;
- insensitive to disturbing vibrations;
- temperature measurement standard included;
- density measurement included in ViscoSense®3D.

For replacing a complete conventional Viscotherm system with a ViscoSense® system an adapter housing is available.



Typical system arrangement



Flange	Max. working pressure (bar)	C	N x OD	E	F	H	G	VAF-NUMBER
DIN DN50 PN40	40	165	4x18	125	102	20	3	0401-0816
ANSI CLASS 150RF	20	152.4	4x19	120.6	92	20	1.6	0401-0818
JIS DN50 10K	10	155	4x19	120	97	20	2	0401-0819
JIS DN50 16/20K	20	155	8x19	120	97	20	2	0401-0820

Quotation and ordering information

1.	Basic system designation:	ViscoSense®3 / ViscoSense®3D		
2.	Viscosity range:	<input type="radio"/> 0 - 25	<input type="radio"/> 0 - 50	<input type="radio"/> special:
3.	Viscosity reading [unit]:	<input type="radio"/> mPa.s	<input type="radio"/> cSt	
4.	Density range [g/l]:	<input type="radio"/> 750-1100 (standard)	<input type="radio"/> Other:.....	
5.	Temperature range [°C]:	<input type="radio"/> 0 - 100	<input type="radio"/> 0 - 200	
6.	Fluid type:	<input type="radio"/> HFO	<input type="radio"/> MDO	
		<input type="radio"/> MGO	<input type="radio"/> Other:.....	
7.	Flow rate [m3/h]:			
8.	Nominal diameter of piping:			
9.	Flange type:	<input type="radio"/> DIN PN [bar]	<input type="radio"/> ANSI [lbs]	<input type="radio"/> JIS [K]
10.	Optional extras:			
		<input type="radio"/> viscosity controller	<input type="radio"/> remote indicator	
		<input type="radio"/> control valve		
		<input type="radio"/> flow computer / read-out for mass flow (please consult factory)		
		<input type="radio"/> inspection by classification bureau, bureau name:		

Below information is only required when 'control valve' is selected in question 10.

11.	Control valve:			
	actuation	<input type="radio"/> electric (relay)	<input type="radio"/> electric (analog)	
	medium	<input type="radio"/> steam	<input type="radio"/> thermal oil	
	body material	<input type="radio"/> ductile iron	<input type="radio"/> steel	
	flange connections	<input type="radio"/> DIN PN [bar]	<input type="radio"/> ANSI RF [lbs]	<input type="radio"/> JIS [K]
12.	Nominal diameter of piping:			
13.	Inlet pressure [bar]:			
14.	Nominal flow rate [for steam in kg/h, liquids in m3/h]:			
15.	Allowable pressure drop across valve [max. 1 bar]:			
16.	Specific gravity of medium [water=1,0]:			

Please fill out this form and send it to sales@vaf.nl. We will reply with a quotation and ordering information for the requested product or solution a.s.a.p.

For further information see relevant Product Bulletins or www.vaf.nl

Name:

Place and date:

VAF

INSTRUMENTS

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Agents and distributors in more than 50 countries