AQUAMETRO
OIL & MARINE

VISCOMASTER™

Measurement / Management & Treatment

Viscomaster™

Viscosity systems

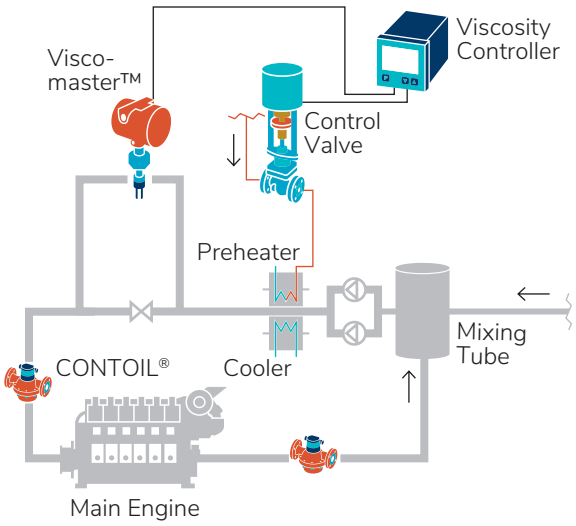
Certified HFO system from one source for highest efficiency through best and most innovative HFO solutions.

Features:

- On-line real-time kinematic viscosity
- Marine approved
- Minimum maintenanc
- High accuracy
- Simple to use

Benefits:

- Monitor and controll of fuel viscosity
- Optimize combustion efficiency, fuel consumption
- Discover saving potential by CII & CCAI
- No calibration ever needed
- Prepared for sulfur cap fuel oil
- Viscosity range configurable



SYSTEM OVERVIEW

The Viscomaster™ and the new Viscomaster™ Dynamic transmitters are a major innovation in the measurement of all types of fuel oil that supply engines, turbines and marine burners.

The main instruments in the Viscomaster™ transmitter series, the Viscomaster™ and the Viscomaster™ Dynamic, have been designed to support the current developments in engine technology and the need for fuel quality data tracking throughout the engine service life.

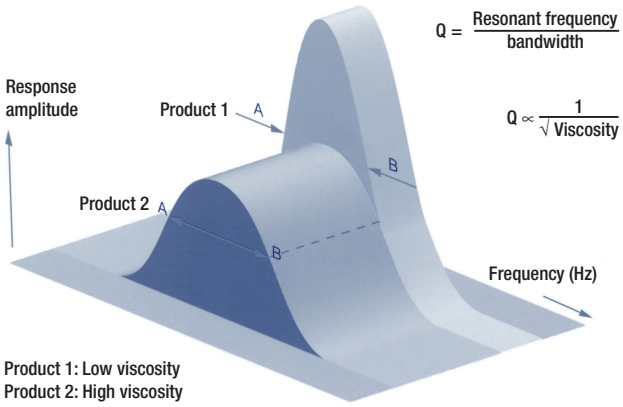
In combination with steam valves available in in different configurations the measurement and control of fuel oil viscosity for marine and diesel engine the Viscomaster™ System is the solution needed.

Viscomaster™ Dynamic	Viscomaster™
2 x 4-20mA analog outputs: - 1 Configurable dynamic/kinematic viscosity - 1 Fixed as temperature	2 x 4-20mA analog outputs: Both outputs fully configurable to any calculated measurement including density, dynamic/kinematic viscosity, temperature, CCAI, etc.
Fixed density input, temperature corrected	On-line density measurement
Dynamic and Kinematic viscosity	Dynamic and Kinematic viscosity
MODBUS output of all parameters including calculated density at operating temperature and calculated Kinematic viscosity at operating temperature	MODBUS output of all parameters including density, base density, (API 2540) viscosity, base viscosity (ASTM D341) and ignition index (CCAI, CII)
No moving parts, minimum maintenance	No moving parts, minimum maintenance
1.5“ Cone seat fitting, leaktight metal to metal seal	1.5“ Cone seat fitting, leaktight metal to metal seal
316L Stainless steel wetted parts	316L Stainless steel wetted parts
Factory calibrated	Factory calibrated
DLC coated tines for asphaltene rich fuels	DLC coated tines for asphaltene rich fuels

Motor Controll Valve
Two-way form for water and steam
Step controlled valves or PID controlled valves
With manual emergency operation
From DN 15 - 100 / JIS 15 - 50 JIS 15
PN16 - PN40

TECHNICAL DESCRIPTION

Features	Benefits
Stable and accurate in-line measurement	- Optimum combustion efficiency - Optimal fuel consumption - Reduced maintenance required - Prevention of engine damage - True measurement enables the correct calculation of fuel mass consumption - True kinematic viscosity measurement
Simultaneous on-line Viscosity and Density outputs (Viscomaster™ gives continuous on-line density measurement)	- Fuel savings with engine performance parameters (CII & CCAI) - True fuel oil characterisation (no assumed density values)
Designed for marine environments	- Unaffected by vibration - Dirt / Asphaltene resistant
Rugged design, no moving parts	- Robust tine design - No thin sensor sections - Virtually no maintenance - Low cost of ownership
Simple Installation	- Compact design - Standard & customer specific installations available
Vibrating fork principle	- Proven design >10 years experience in viscosity measurement - Reliable, stable & accurate
Internal PT100	- No need for external temperature sensor
Two head-mounted integral 4-20mA outputs	- No need for external 4-20 mA interface box - Simple wiring
Stable calibration	- No need for re-calibration - No local service requirements
Worldwide marine approvals	- No operator training needed - Certified safety & performance by recognised marine authorities
Retrofit kits available	- Easy replacement of existing viscometer technologies - No need to change pipework/system design



Principle of Operation

The sensor is a simple tuning fork maintained in vibration electronically. The density is a function of the resonant frequency, the viscosity is a function of the bandwidth.

Viscomaster™ digitally measures the frequency at a point A (the lower - 3db point) and then at point B (the upper - 3db point) - see diagram. From these two measurements the Viscomaster™ can calculate the bandwidth (B-A), resonant frequency ((A+B)/2) and hence the quality factor (resonant frequency / bandwidth), to give digitally determined values of the density and viscosity for the fluid.

SYSTEM CONFIGURATION

To assist the operator to reduces costs and lower maintenance the Viscomaster™ system with controller / monitor and controlled steam valve is indispensable.

Controlling

Step Controlled Valves
PID Controlled valves
From DN 15 - 100 / JIS 15 - 50 JIS 15

Monitoring

Universal controllers with preadjusted selectable functions

Measuring

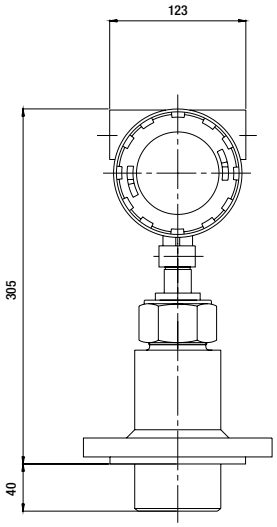
Viscomaster™
Viscomaster™ Dynamic

System depth

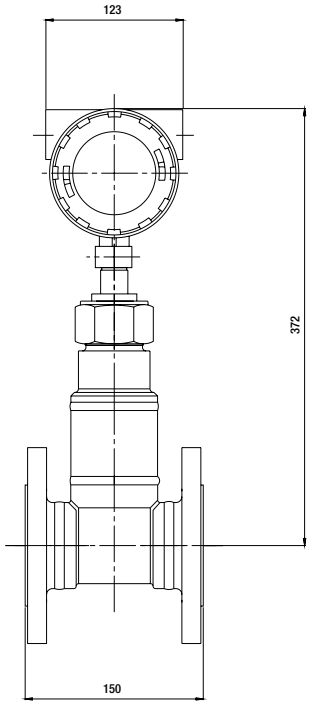
Retrofit of existing viscometer technologies

Aquametro Oil & Marine now offers adapters to retrofit existing viscometer technologies with the Viscomaster™ series transmitters. Please contact us for further details.

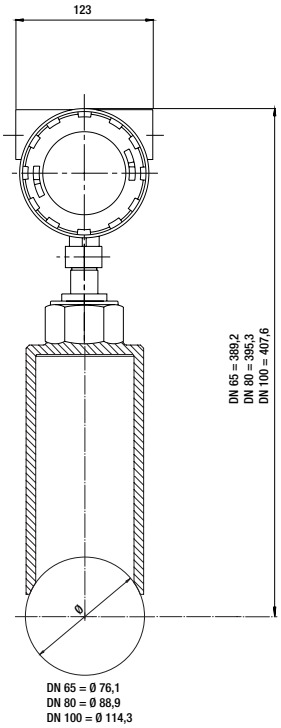
Viscomaster™
Capillary adapter
(retrofit for VAF Viscotherm or Nakakita)



Viscomaster™
In-line adapter
(retrofit for VAF Viscosense)



Viscomaster™
Weld-on-Pipe adapter
(for DN >50 mm or new buildings)



CERTIFICATES

Det Norske Veritas - German Lloyd
Norway - Germany

Lloyds Register
United Kingdom

RRR
Russian River Register

RMRS
Russian Maritime Register of Shipping

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