Translation

DMT

(1) # EC-Type Examination Certificate

(2) **- Directive 94/9/EC -**
Equipment and protective systems intended for use in potentially explosive atmospheres

(3) ## DMT 99 ATEX E 078 X

(4) **Equipment:** **Vortex flowmeter type VTX1... / VTX2...**

(5) **Manufacturer:** **Bopp & Reuther Messtechnik GmbH**

(6) **Address:** **68261 Mannheim**

(7) The design and construction of this equipment and of any approved variations are specified in the schedule to this type test certificate.

(8) The certification body of Deutsche Montan Technologie GmbH, notified body no. 0158 in accordance with Article 9 of the Directive 94/9/EC of the European Parliament and the Council of 23 March 1994, certifies that the equipment has been found to comply with the essential health and safety requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres, given in Annex II to the Directive.
The examination and test results are recorded in confidential test and assessment report BVS PP 99.2076 EG.

(9) The Essential Health and Safety Requirements are assured by compliance with

EN 50014:1997	General requirements
EN 50020:1994 (VDE 0170/0171 Part 7/4.96)	Intrinsic safety 'i'
EN 50284:1999	Electrical apparatus in Group II Category 1G

(10) If an "X" is placed after the certificate number it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.

(11) This EC type test certificate relates only to the design and construction of the described equipment. Further requirements of Directive 94/9/EC apply to the manufacture and placing on the market of this equipment.

(12) The marking of the equipment shall include the following:

Ex II 1/2G EEx ia IIC T6

Deutsche Montan Technologie GmbH
Essen, 16.12.99

Signed: Dr. Jockers
DMT-Certification Body

Signed: Dr. Dill
Head of Special Services Unit

Am Technologiepark 1; 45307 Essen, Telephone (0201)172-1416, Telefax (0201)172-1716

(13) Schedule to

(14) # EC-Type Examination Certificate

DMT 99 ATEX E 078 X

(15) 15.1 Type explanation for vortex flowmeter type VTX1... / VTX2...

15.1.1 Type VTX1... : vortex flowmeter with paddle sensor
15.1.2 Type VTX2... : vortex flowmeter with tandem sensor

(In the complete name, the dots are replaced by letters and/or digits for marking details of the design that are not relevant to explosion-protection.)

15.2 Description

The vortex flowmeter type VTX1... or type VTX2... is a flow meter supplied by an intrinsically safe power supply and is used for continuous measurements of gaseous media or liquids in pipelines in potentially explosive atmospheres that require the use of apparatus in categories 1/2G.

The vortex flowmeter consists of a cylindrical light-metal enclosure (electronic enclosure) sealed with threaded covers which contains insulating boards with electronic components embedded in casting compound.

There is an LCD display below one cover, which may be fitted optionally with an inspection glass, and below the other cover are the terminals for the intrinsically safe supply and signal circuits.

The flow sensor is incorporated in a stainless steel measuring chamber designed as a meter enclosure. For the purposes of thermal decoupling the measuring chamber is placed away from the electronic enclosure by means of a spacing tube.

The electronic enclosure is installed in potentially explosive atmospheres that require Category 2 apparatus. The process connection elements of the measuring chamber are integrated in a pipe which separates atmospheres that require apparatus in Categories 1 or 2 respectively.

15.3 Electrical, mechanical and thermal parameters

15.3.1 2-conductor supply and signal circuit (4 -20 mA current loop)
Terminals 1 /2

Voltage	U_i	=	DC	30 V
Current	I_i	=		110 mA
Power	P_i	=		825 mW
Effective internal capacitance	C_i	≤		11 nF
Effective internal inductance	L_i	≤		4 µH

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15.3.2 2-conductor signal circuit (NAMUR impulses)
(Frequency signal output in accordance with NAMUR protocol; galvanically separated from 2-conductor supply and signal circuit)

Terminals 3 /4

Voltage	U_i	=	DC	20 V
Current	I_i	=		50 mA
Power	P_i	=		160 mW
Effective internal capacitance	C_i	≤		11 nF
Effective internal inductance	L_i	≤		4 µH

15.3.3 Permitted ambient temperature range for the electronics enclosure - 40°C ≤ Ta ≤ + 70°C
Permitted medium temperature range for the measuring chamber - 40°C ≤ Ta ≤ +450°C

15.3.3.1 The allocation between temperature class, medium and ambient temperature when the vortex flowmeter is used in potentially explosive atmospheres that require Category 2 apparatus may be seen in the following table:

Temperature class	Medium temperature	Ambient temperature range (electronics enclosure)
T1	up to + 450°C	-40°C < Ta < + 70°C
T2	up to + 300°C	-40°C < Ta < + 70°C
T3	up to + 200°C	-40°C < Ta < + 70°C
T4	up to + 135°C	-40°C < Ta < + 70°C
T5	up to + 100°C	-40°C < Ta < + 70°C
T6	up to + 85°C	-40°C < Ta < + 70°C

15.3.3.2 The allocation between temperature class, medium and ambient temperature when the vortex flowmeter is used in potentially explosive atmospheres that require Category 1/2 apparatus may be seen in the following table:

Temperature class	Medium temperature	Ambient temperature range (electronics enclosure)
T4	-20°C up to + 60°C	-40°C < Ta < + 70°C
T5	-20°C up to + 60°C	-40°C < Ta < + 70°C
T6	-20°C up to + 60°C	-40°C < Ta < + 70°C

With apparatus in Category 1 the process pressure must be between 0.8 bar ...1.1 bar

The conditions for use in operations without potentially explosive mixtures can be seen in the technical information.

(16) Test report
No. BVS PP 99.2076 EG
33 pages

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(17) Special provisions for safe use

17.1 The measuring chamber of the vortex flowmeter must be installed in the pipe in such a way that degree of protection IP 67 in accordance with IEC Publication 529 is guaranteed.

17.2 The manufacturer's technical information on using the vortex flowmeter in connection with aggressive or corrosive media must be observed.

17.3 The measuring chamber of the vortex flowmeter must be included in the equipotential bonding of the pipeline.

17.4 Sudden temperature changes of the electronics enclosure of the vortex flowmeter must be avoided.

We confirm the correctness of the translation from the German original.
In the case of arbitration only the German wording shall be valid and binding.

45307 Essen, 15.03.2000
BVS-Scha/Loh A 9900439

Deutsche Montan Technologie GmbH

Head of certification body

Head of special services unit

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