

1 EU-TYPE EXAMINATION CERTIFICATE



2 **Equipment or Protective systems intended for use in Potentially Explosive Atmospheres - Directive 2014/34/EU**

3 **EU-Type Examination Certificate No:** FM17ATEX0018X

4 **Equipment or protective system:** Pro V Vortex Models AX22, M22, AX23, M23, AX24, AX24R, M24, M24R and Pro T Turbine Mass Flowmeters
(Type Reference and Name)

5 **Name of Applicant:** Azbil VorTek LLC

6 **Address of Applicant:** 8475 W I-25 Frontage Rd, Suite 300
Longmont CO 80504
United States of America

7 This equipment or protective system and any acceptable variation thereto is specified in the schedule to this certificate and documents therein referred to.

8 FM Approvals Europe Ltd, notified body number 2809 in accordance with Article 17 of Directive 2014/34/EU of 26th February 2014, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in confidential report number:

3061361 dated 02nd February 2018

9 Compliance with the Essential Health and Safety Requirements, with the exception of those identified in item 15 of the schedule to this certificate, has been assessed by compliance with the following documents:

EN IEC 60079-0:2018, EN 60079-1:2014,
EN 60079-31:2014 and EN 60529:1991+A1:2000+A2:2013

10 If the sign 'X' is placed after the certificate number, it indicates that the equipment is subject to specific conditions of use specified in the schedule to this certificate.

11 This EU-Type Examination certificate relates only to the design, examination and tests of the specified equipment or protective system in accordance to the directive 2014/34/EU. Further requirements of the Directive apply to the manufacturing process and supply of this equipment or protective system. These are not covered by this certificate.

12 The marking of the equipment or protective system shall include:



Pro T and Pro V (ST Versions)
II 2 G Ex db IIB+H2 T6...T2 Gb
II 2 D Ex tb IIIB T85°C Db
-40°C ≤ Tamb ≤ 60°C

Pro- V (HT Versions)
II 2 G Ex db IIB+H2 85°C...405°C Gb
II 2 D Ex tb IIIB T85°C Db
-40°C ≤ Tamb ≤ 60°C

Pro- T (HT Versions)
II 2 G Ex db IIB+H2 85°C...459°C Gb
II 2 D Ex tb IIIB T85°C Db
-40°C ≤ Tamb ≤ 60°C

Damien Mc Ardle
Certification Manager, FM Approvals Europe Ltd.

Issue date: 27th October 2020

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13 Description of Equipment or Protective System:

General – The Model Pro-T Multivariable Mass Turbine Flowmeters measure the flow of liquid, gas or steam by detecting the frequency of rotation of the turbine blades. The turbine blades are mounted external to the insertion probe tip. The frequency at which the turbine rotates is directly proportional to the flow velocity. Flow is measured by detecting the local velocity at a strategically location position within the process pipe. The Model Pro-T detects the turbine blade frequency within the sensor head and uses the local velocity, along with other parameters such as fluid type, pipe size and Reynolds number to calculate the average pipe velocity, and consequently, the volumetric flowrate.

Vortek Instrument's Pro-V™ Multivariable Mass Vortex Flowmeters Models AX22, M22, AX23, M23, AX24, AX24R, M24 and M24R utilize three primary sensing elements (a vortex shedding velocity sensor, an RTD temperature sensor and a solid-state pressure transducer) to measure the mass flow rate of gases, liquids and steam. The meters are available for in-line (Model M22) and Insertion (M23) applications. The AX22, M22, AX24, AX24R, M24 and M24R in-line meter can be configured for pipe sizes from ½ inch to 12 inches while the M23 insertion meter can be installed in any pipe two inches in diameter or greater. The M22 and M24 in-line meter incorporates a new split adapter design which allows the pressure transducer to be field serviceable. In addition, the Pro-V™ flowmeter enclosure incorporates a new method of securing the window in the windowed cover.

Construction – The construction of the Model Pro-T Multivariable Mass Turbine Flowmeters is identical in construction to the Pro-V™ Multivariable Mass Vortex Flowmeters Models AX22, M22, AX23, M23, AX24, AX24R, M24 and M24R with the exception of the welded insertion probe end section and the minor electronics changes. The Model Pro-T Multivariable Mass Turbine Flowmeters utilize the same power supply section and maintain the same electrical ratings as the Pro-V™ Multivariable Mass Vortex Flowmeters Models AX22, M22, AX23, M23, AX24, AX24R, M24 and M24R. All other aspects of the design remain the same.

The Pro-V™ flowmeter enclosure is a cylindrical shaped housing constructed of aluminium with a powder coat finish. Each end of the enclosure is closed via threaded covers (blank or windowed). The enclosure is provided with two ¾ inch-14 NPT entries. The joint between the meter body enclosure and process connection adapter is threaded. O-rings are provided on the threaded covers, in-line split adapter, and insertion adapter for environmental protection. The enclosures have an ingress protection rating of IP66

Ratings – The Model Pro-T Multivariable Mass Turbine Flowmeters operate from 12-36 VDC or 100-240 VAC. The flowmeters can provide any combination of outputs consisting of 4-20 mA, HART, Modbus or Pulse. The transmitters are rated for use in an ambient temperature range of -40°C to +60°C. The Model Pro-T Multivariable Mass Turbine Flowmeters are rated for use in a process temperature range of -40°C to +238°C with a high temperature option (HT) for process temperatures -40°C to +454°C.

The Pro-V™ Multivariable Mass Vortex Flowmeters Model AX22, M22, AX23, M23, AX24, AX24R, M24 and M24R operate from 12-36 VDC or 100-240 VAC, 4-20 ma. The Pro-V™ Multivariable Mass Vortex Flowmeters Models AX22, M22, AX23, M23, AX24, AX24R, M24 and M24R are for use in process temperatures of -40°C to 260°C with a high temperature option (HT) for process temperatures -40°C to +400°C.

PRO-Tabcdefghij. Insertion TurboPro™ Multivariable Mass Turbine Flowmeter.

a = Multivariable options V, VT, VTP, VTEP, VETEP, VT-EM, VTP-EM, VTEP-EM or VETEP-EM.

b = Probe length SL, CL or EL.

c = Electronics enclosure L or R (*). *Specify cable length.

d = Display options DD or ND.

e = Input power DCL, DCH, or AC.

f = Output 1AB, 1AHL, 1AH, 1AM, 3AB, 3AH or 3AM.

g = Temperature options ST or HT.

h = Pressure options P0, P1, P2, P3, P4 or P5.

i = Process connections CNPT, C150, C16, C300, C40, C600, C63, C900, PNPT, P150, P16, P300,

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P40, PNPTR, P150R, P16R, P300R, P40R, P600R, P63R or P900R.
j = Rotor options R40, R30, R25, R20, R15, R10 or L40.

AX22abcdefghijkl. In-Line Vortex Meter.

a = Multivariable Options: 00, 11, 22, 33, 44, 55, 66, or 67.
b = Flow Body: 015, 020, 025, 040, 050, 080, 100, 150, 200, 250, or 300.
c = Meter Body Material: C, S or H.
d = Process Connection: FA, FB, FC, D1, D2, D3, WC, WJ, WY J1, J2, J3, J4, Y1, or Y2.
e = Electronics Enclosure: LE, or R (*). *Specify cable length.
f = Display Options: D.
g = Input Power: 1, 2, 3 or 4.
h = Output Options: A, B, C, D, E, F, G, H, I, J, or K.
j = Temperature Option: S or H.
k = Pressure Options: X, A, B, C, D or E.
l = Certification Options that have no effect on FM certification.

M22abcdefghijkl. In-Line Pro-V™ Multivariable Mass Vortex Flowmeter.

a = Multivariable options V, VT, VTP, VTEP, VETEP, VT-EM, VTP-EM, VTEP-EM or VETEP-EM.
b = Flow body 04, 06, 08, 12, 16, 24, 32, 48, 64, 80 or 96.
c = Meter body material C, S or H.
d = Process connection 150, 300, 600, 900, W, 16, 40, 63, 100, J10, J20 or J30.
e = Electronics enclosure L or R (*). *Specify cable length.
f = Display options DD.
g = Input power DCL, DCH, DCHPOE or AC.
h = Output 1AHL, 1AH, 1AM, 1AMIP, 1AB, 1ABIP, 3AH, 3AM, 3AMIP, 3AB or 3ABIP.
i = Process ST or HT.
j = Process pressure P0, P1, P2, P3, P4 or P5.

AX23abcdefghijkl. Insertion Vortex Meter.

a = Multivariable Options: 00, 11, 22, 33, 44, 55, 66, or 67.
b = Probe length: S, C or E.
c = Electronics Enclosure: LE or R (*). *Specify cable length.
d = Display Options: D.
e = Input Power: 1, 2, 3 or 4.
f = Output Options: A, B, C, D, E, F, G, H, I, J or K.
g = Temperature Option: S or H.
h = Pressure Options: X, A, B, C, D or E.
j = Process Connections: CFNPT, CF150, CF300, CF600, CFJ1K, CFJ2K, CFJ3K, CFJ4K, CFJPT, CFP16, CFP40, CFP63, PG150, PG15E, PG15R, PG300, PG30E, PG30R, PG60E, PG60R, PGJ1E, PGJ1K, PGJ1R, PGJ2E, PGJ2K, PGJ2R, PGJ3E, PGJ3R, PGJ4E, PGJ4R, PGJPE, PGJPR, PGJPT, PGNPE, PGNPR, PGNPT, PGP16, PGP1E, PGP1R, PGP40, PGP4E, PGP4R, PGP6E, or PGP6R,
k = Certification Options: that have no effect on FM certification.

M23abcdefghijkl. Insertion Pro-V™ Multivariable Mass Vortex Flowmeter.

a = Multivariable options V, VT, VTP, VTEP, VETEP, VT-EM, VTP-EM, VTEP-EM or VETEP-EM.
b = Probe length SL, CL or EL.
c = Electronics enclosure L or R (*). *Specify cable length.
d = Display options DD.
e = Input power DCL, DCH, DCHPOE or AC.
f = Output signal 1AHL, 1AH, 1AM, 1AMIP, 1AB, 1ABIP, 3AH, 3AM, 3AMIP, 3AB or 3ABIP.
g = Temperature options ST or HT.
h = Pressure options P0, P1, P2, P3, P4 or P5.
j = Process connections CNPT, C150, C16, C300, C40, C600, C63, CJ10, CJ20, CJ30, C900, PNPT, P150, P16, P300, P40, PJ10, PJ20, PNPTR, P150R, P16R, P300R, P40R, P600R, P63R, P900R, PJ10R, PJ20R, or PJ30R.

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AX24abcdefghijkl. In-Line Vortex Flowmeter.

- a = Multivariable Options: 00, 11, 22, 33, 44, 55, 66, or 77.
- b = Flow body: 015, 020, 025, 040, 050, 080, 100, 150, 200, 250, or 300.
- c = Meter Body Material C, S or H.
- d = Process Connection FA, FB, FC, D1, D2, D3, WC, WJ, WY, J1, J2, J3, J4, Y1, or Y2.
- e = Electronics Enclosure: LE or R (*). *Specify cable length.
- f = Display Options D.
- g = Input Power 1, 2, 3 or 4.
- h = Output Options: A, B, C, D, E, F, G, H, I, J, or K.
- j = Temperature options S or H.
- k = Process pressure X, A, B, C, D or E.
- l = Certification Options that have no effect on FM certification.

AX24Rabcdefghijkl. In-Line Vortex Flowmeter.

- a = Multivariable Options: 0, 1, 2, 3, 4, 5, 6, or 7.
- b = Flow body: 020, 025, 040, 050, 080, 100, 150, 200, 250, or 300.
- c = Meter Body Material C, S or H.
- d = Process Connection FA, FB, FC, D1, D2, D3, WC, WJ, WY, J1, J2, J3, J4, Y1, or Y2.
- e = Electronics Enclosure: LE or R (*). *Specify cable length.
- f = Display Options D.
- g = Input Power 1, 2, 3 or 4.
- h = Output Options: A, B, C, D, E, F, G, H, I, J, or K.
- j = Temperature options S or H.
- k = Process pressure X, A, B, C, D or E.
- l = Certification Options that have no effect on FM certification.

M24abcdefghijkl. In-Line Pro-V™ Multivariable Mass Vortex Flowmeter.

- a = Multivariable options V, VT, VTP, VTEP, VETEP, VT-EM, VTP-EM, VTEP-EM or VETEP-EM.
- b = Flow body 04, 06, 08, 12, 16, 24, 32, 48, 64, 80 or 96.
- c = Meter body material C, S or H.
- d = Process connection 150, 300, 600, 900, W, 16, 40, 63 or 100.
- e = Electronics enclosure L or R (*). *Specify cable length.
- f = Display options DD.
- g = Input power DCL, DCH, DCHPOE or AC.
- h = Output 1AHL, 1AH, 1AM, 1AMIP, 1AB, 1ABIP, 3AH, 3AM, 3AMIP, 3AB or 3ABIP.
- j = Process ST or HT.
- k = Process pressure P0, P1, P2, P3, P4 or P5.

M24Rabcdefghijkl. In-Line Reducing Pro-V™ Multivariable Mass Vortex Flowmeter.

- a = Multivariable options V, VT, VTP, VTEP, VETEP, VT-EM, VTP-EM, VTEP-EM or VETEP-EM.
- b = Flow body 06, 08, 12, 16, 24, 32, 48, 64, 80, or 96.
- c = Meter body material S.
- d = Process connection 150, 300, 600, 900, W, 16, 40, 63 or 100.
- e = Electronics enclosure L or R (*). *Specify cable length.
- f = Display options DD.
- g = Input power DCL, DCH, DCHPOE or AC.
- h = Output 1AHL, 1AH, 1AM, 1AMIP, 1AB, 1ABIP, 3AH, 3AM, 3AMIP, 3AB or 3ABIP.
- j = Process ST or HT.
- k = Process pressure P0, P1, P2, P3, P4 or P5.

14 **Specific Conditions of Use:**

1. Contact Manufacturer regarding flamepath information.
2. Clean with a Damp cloth only to avoid build-up of electrostatic charge.
3. The Model Pro-T Multivariable Mass Turbine Flowmeters standard temperature option (ST)

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process temperature range is -40°C to +238°C. The high temperature option (HT) process temperatures range is -40°C to +454°C.

The Model Pro-T Multivariable Mass Turbine Flowmeters		
Tmax (Process)	Temperature Class Value (Gas)	
	ST Version	HT Version
80°C	T6	85°C
95°C	T5	100°C
130°C	T4	135°C
195°C	T3	200°C
238°C	T2	300°C
445°C	N / A	450°C
454°C	N / A	459°C

4. The Pro-V™ Multivariable Mass Vortex Flowmeters Model AX22, M22, AX23, M23, AX24 AX24R, M24 and M24R standard temperature option (ST) process temperature range is -40°C to 260°C. The high temperature option (HT) process temperature range is -40°C up to +400°C.

Model AX22, M22, AX23, M23, AX24, AX24R, M24 and Pro-V™ Multivariable Mass Vortex Flowmeters		
Tmax (Process)	Temperature Class Value (Gas)	
	ST Version	HT Version
80°C	T6	85°C
95°C	T5	100°C
130°C	T4	135°C
195°C	T3	200°C
260°C	T2	300°C
400°C	N / A	405°C

15 Essential Health and Safety Requirements:

The relevant EHSRs that have not been addressed by the standards listed in this certificate have been identified and assessed in the confidential report identified in item 8.

16 Test and Assessment Procedure and Conditions:

This EU-Type Examination Certificate is the result of testing of a sample of the product submitted, in accordance with the provisions of the relevant specific standard(s), and assessment of supporting documentation. It does not imply an assessment of the whole production.

Whilst this certificate may be used in support of a manufacturer's claim for CE Marking, FM Approvals Europe Ltd accepts no responsibility for the compliance of the equipment against all applicable Directives in all applications.

This Certificate has been issued in accordance with FM Approvals Europe Ltd's ATEX Certification Scheme.

17 Schedule Drawings

A list of the significant parts of the technical documentation is annexed to this certificate and a copy has been kept by the Notified Body.

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18 Certificate History

Details of the supplements to this certificate are described below:

Date	Description
22 nd February 2018	Original Issue.
14 th November 2018	<u>Supplement 1:</u> Report Reference: RR215065 dated 11 th November 2018. Description of the Change: Documentation update and addition of Models AX22, AX23 and AX24, which are the same as models M22, M23 and M24 with marking update.
05 th June 2019	<u>Supplement 2:</u> Report Reference: RR218696 dated 04 th June 2019. Description of the Change: Updated model code options, including addition of AX24R and M24R Model description update to the Model code. Certificate transferred from FM Approvals Ltd., notified body no. 1725, to FM Approvals Europe Ltd., notified body no. 2809.
12 th September 2019	<u>Supplement 3:</u> Report Reference: PR452728 dated 09 th September 2019. Description of the Change: Model code changes to add process connection option to M and Pro T Series Flowmeters. AX Series are unchanged. Other minor documentation changes not affecting the product safety.
11 th November 2019	<u>Supplement 4:</u> Report Reference: RR221107 dated 08 th November 2019. Description of the Change: Updates were made to the drawings that do not impact previous evaluations. Drawings updated to clarify thread and to clarify machining details.
21 st April 2020	<u>Supplement 5:</u> Report Reference: RR222841 dated 20 th April 2020. Description of the Change: Update made to Standard EN IEC 60079-0 to latest version. Model code changes to add process connection option to M22 and M23. The M24, M24R, Pro Tand AX Series are unchanged. Updates were made to the drawings that do not impact previous evaluations.
27 th October 2020	<u>Supplement 6:</u> Report Reference: RR224868 dated 26 th October 2020. Description of the Change: Updates were made to the drawings that do not impact previous evaluations.

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Blueprint Report

Azbil VorTek LLC (1000007881)

Class No 3615

Original Project I.D. 3061361

Certificate I.D. FM17ATEX0018X

<u>Drawing No.</u>	<u>Revision Level</u>	<u>Drawing Title</u>	<u>Last Report</u>
1108032	E	Vortek Approvals Label	RR218696
1110037	C	Model Code Label	3061361
1110038	A	WARNINGS - DO NOT OPEN / CLEAN WITH A DAMP CLOTH (ENGLISH / FRENCH)	3061361
1205018	D	Azbil Approvals Label	RR218696
1302006	E	INLINE SADDLE (STD. LINE SIZES)	RR224868
200052	A	3/4"NPT EXTERNAL / STOPPING PLUG, FM / ATEX / IECEX CERTIFIED	3061361
2004112	E	THERMAL WELL, INLINE, STD. SIZES (1/2" - 12")	3061361
2004147	C	PRESSURE TUBE (INLINE)	3061361
2203107	J	SPLIT SADDLE / ENCLORURE ADAPTOR - BOTTOM SECT.	RR224868
2203108	I	SPLIT SADDLE / ENCL. ADAPTOR - BOTTOM SECTION	RR222841
2504112	E	LABEL, TERMINAL BOARD, LOW POWER	3061361
2507115	C	LABEL, TERMINAL BOARD, DC HIGH POWER	3061361
2507116	E	LABEL, TERMINAL BOARD, AC	3061361
2611112	L	FLAMEPATH, INLINE AND INSERTION	3061361
2707114	D	FM PRIVATE LABELER	3061361
2809135	C	Heavy Duty V-Tab	PR452728
2809136	C	Heavy Duty (HD) Insertion Saddle	PR452728
2809137	B	Heavy Duty (HD) Stem - Saddle ADAPTOR for INSERTION	PR452728
300380	A	Insertion- Flanged Compression/Swegelok w/ 900#/1500#RF Blind/Mach'd	PR452728
300424	A	SP. 3" Sch 80 w/ 900#RF WN, NO Press., 12.25" Long, w/ FM Apprv.	PR452728
9600139	F	STEM/CONDUIT ADAPTER	3061361
9600140	D	ALIGNMENT HANDLE	RR222841
9704110	F	STEM / ENCLOSURE ADAPTER	3061361
9705123	D	PRESSURE TUBE(INSERTION)	3061361
9705129	C	PTX HOUSING\ENCLOSURE ADAPTER	3061361
9705130	E	PTX ADAPTER	RR224868
9705143	I	PTX HOUSING (STD) INSERTION	3061361
9705145	D	3/4X1/2 MALE X MALE NPT REDUCER MODIFICATION	3061361
9903112	E	INSERTION / RT SADDLE	3061361
9903113	E	V-TAB	3061361
9903114	D	241 RT STEM / SADDLE ADAPTOR	3061361
9903115	H	STEM, INSERTION	RR224868
9903118	H	PTX Filter (flame arrestor)	3061361
9904134	P	ENCLOSURE BODY	RR221107
9904135	M	BLIND CAP	3061361
9904136	Q	WINDOW CAP	3061361
9904137	I	GLASS, DISPLAY	3061361
9906172	L	WINDOW CAP, ASSEMBLY	3061361
9906173	E	RETAINING RING, CAST ENCLOSURE	3061361
CM2-AX2000-2001	4/2019	Models AX2200, AX2300 and AX2400 Instruction Manual	RR218696
M-000-00010	07/2019	VorTek Series M22, M23 and M24 Instruction Manual	PR452728
M-000-00020	1/2020	VorTek Pro-T Model Turbo-Pro Instruction Manual	RR222841