Calculation header

Identifier		**12/31578**		
Client		**Airlitec**		
TAG No.		**051 FW FT 002 / 052 FW FT 002**		

Operating data

Medium		**Water**		
Operating pressure	p1	**84,3**		bar(g)
Operating temperature	t1	**130,0**		°C
☒ Automatic phase detection				

Properties at operating point

State		**Liquid**		
Vapour pressure (t1)	pv1	**1,6895**		bar(g)
Vapour temperature (p1)	tv1	**299,53**		°C
Operating density (t1, p1)	ρ	**939,07**		kg/m³
◉ Dynamic viscosity (t1,p1)	η1	**215,03**	**E -6**	Pa s
○ Kinematic viscosity (t1,p1)	ν1	**228,98**	**E -9**	m²/s

Physical constants

Critical pressure	pc	**220,64**		bar(a)
Critical temperature	tc	**373,95**		°C

Pipeline

Material number		**1.0425**		
Material short name		**P265GH**		
Condition		**new, seamless, cold drawn**		
Pipe diameter		**Circular**		
◉ Pipe outside diameter	Do	**48,3**		mm
Pipe wall thickness	tp	**3,6**		mm
○ Pipe inside diameter (20°C)	Di	**41,1**		mm
Linear coefficient of thermal expansion	αlin	**12,111**	**E -6**	1/K
Pipe roughness	k	**0,02**		mm

Flow element - operating values

Device type		**ISO 5167-device**		
Calculation standard		**EN ISO 5167:2003**		
Primary device		**Corner orifice**		
Calculation reference		**Sizing: C and ε with 2/3 qm**		
Calculated value		**d**		
Throttle orifice (20°C)	d	**19,837**		mm
Pressure difference	Δp	**4.000,0**		mmH2O
◉ Mass flow rate	qm	**6.000,0**		kg/h
○ Volume flow rate (operating conditions)	qv	**6,3893**		m³/h

Flow element - material

Material number	Device	**1.4404**		
Material short name	Device	**A 182 (F 316 L)**		
Linear coefficient of thermal expansion	αlin,D	**16,15**	**E -6**	1/K
Edge radius (20°C)	rk	**5,9512**	**E -3**	mm

Values table

☒ Flow value table			
Increment for value table	n	**10,0**	%

No.	Δp [%]	Δp [mmH2O]	qm [kg/h]	qv [m³/h]	up [m/s]	Meets stand...
1	10,0	400,0	1.902,0	2,026	0,423	☐
2	20,0	800,0	2.687,0	2,861	0,5974	☐
3	30,0	1.200,0	3.288,0	3,502	0,7312	☐
4	40,0	1.600,0	3.795,0	4,042	0,8439	☐
5	50,0	2.000,0	4.242,0	4,517	0,9433	☐
6	60,0	2.400,0	4.646,0	4,947	1,033	☐
7	70,0	2.800,0	5.017,0	5,343	1,116	☐
8	80,0	3.200,0	5.363,0	5,711	1,192	☐
9	90,0	3.600,0	5.687,0	6,056	1,265	☐
10	100,0	4.000,0	5.994,0	6,383	1,333	☐

More calculated values

Values marked (*) depend on the calculation reference qm or 2/3 qm

☐ Discharge coefficient (*)	C	**0,60878**	-
Residual pressure loss	Δω	**2.990,3**	mmH2O
Power loss	PΔω	**0,052046**	kW
Mechanical stream power	PΔp	**0,069619**	kW
Flow velocity in pipeline	up	**1,3342**	m/s
Flow velocity in flow element	uf	**5,7221**	m/s
Reynolds number (*)	ReD	**159.860,0**	-
Pipe inside diameter (t1)	Di,t1	**41,155**	mm
Throttle orifice (t1)	d,t1	**19,873**	mm
Diameter ratio	β	**0,48287**	-
Relative pipe roughness	kr	**4,8597**	-
Correction factor for pipe roughness	br	**1,0**	-
Correction factor for edge radius	bk	**1,0**	-

In- and outlet section

☐ Specify as factors

Presentation **0% additional uncertainty**

Required inlet sections

One or two 90° bends, S>30D	**905,4**	mm
Two 90° bends, 30D>S>10D, same plane	**740,79**	mm
Two 90° bends, 10D>S, same plane	**905,4**	mm
Two 90° bends, 30D>S>5D, perpendicular planes	**1.810,8**	mm
Two 90° bends, 5D>S, perpendicular planes	**3.086,6**	mm
Single 90° tee	**781,94**	mm
One or two 45° bends, S>2D	**1.234,6**	mm
Reducer	**329,24**	mm
Diffusor	**823,1**	mm
Gate valve, completely open	**493,86**	mm
Abrupt diameter reduction	**1.234,6**	mm
Thermometer pocket, φ < 0,03 Di	**205,77**	mm
Thermometer pocket, φ > 0,03 Di	**823,1**	mm

Required outlet section

Required outlet section	**246,93**	mm

Warning:

Pipe inside diameter (t1) - Di,t1 < 50.0 mm is not according to standard but can be realized by calibration.