

Fluid: Stack gas
 Model: PSF-54 HA2 CS25 FADS0 FADC TRA
 Pipe Size: I.D. = 274.3 Wall = 45.72 cm

D.P. Eq'n 2.4 REV 1.0 Gas Volume Rate of Flow @ STD Cond

$$C = Fna \times K \times D \times Fra \times Ya \times Fpb \times Ftb \times Ftf \times Fg \times Fpv \times Fm \times Faa \times Ff$$

$$Q_s = \frac{1}{C} \times \left(\frac{Q_s}{2} \right) \times \left(\frac{hw}{Pf} \right) \times \left(\frac{1}{C} \right)$$

$$Q_s = C \times \sqrt{hw \times Pf}$$

P_f = "flowing press."
 = absolute press
 of each gas.

Description	Term	Value	Units
Units Conversion Factor	Fna	.00000031	
ANNUBAR Flow Coefficient	K	.825	
Internal Pipe Diameter	D	274.3	mm
Base Pressure Factor	Fpb	1	@ 760 mm Hg @ 0°C
Base Temperature Factor	Ftb	1.0347	@ 25°C
Specific Gravity Factor	Fg	1.0155	SG = .9697
Manometer Factor	Fm	1	
Gage Location Factor	Ff	1	

		MAX	NORM	MIN	
*Flowrate	Qs	13.132	13.132	0	NM3/S
*Calculation Constant	C	1.84204	1.84204	0	
Pipe Reynolds Number	RD	0	0	0	
Reynolds Number Factor	Fra	1	1	0	
Gas Expansion Factor	Ya	1	1	0	
Flowing Viscosity			0		Centipoise
Flowing Temperature			78.9		C
Flowing Temp Factor	Ftf		.9047		
Supercompress. Factor	Fpv		1		
Thermal Expansion Factor	Faa		1.001		
*Flowing Pressure	P_f		97.637		kPa A
*Differential Pressure	hw	.521	.521	0	mm H2O

0.9636 ATMOS.

* - Indicates Manual Override

LIMITS

Max Allowable DP:	2370	mm H2O	@ 79	C
Flow at Max Allowable DP:	891	NM3/S		
Natural Frequency:	4.06	CPS		
Max Allowable Pressure:	6.9	Bars G	@ 204.4	C
and Temperature:	204.44	C		

CAUTION Max design press/temp = zero
 CAUTION Side support maybe required
 CAUTION Low DP warning @ Norm flow
 CAUTION Low DP warning @ Max. flow

FROM DIETRICH - STANDARD
 Calculation of stack gas flow (Q_s) in
 normal cubic meters per second. [analyzer
 provides $mg SO_2 / Nm^3$]

Sales Order: 289558 Customer: ROSEMOUNT INSTRUMENTS LTD Date: 04/11/97
 Item: 31 P.O.: 507901 Time: 09:11:09
 Serial No: 289558.1.1 Tag No:

Fluid: Stack gas
 Model: PSF-S4 HA2 CS2S FADSO FADC TRA
 Pipe Size: I.D.= 274.3 Wall= 45.72 cm

D.P. Eq'n 2.4 REV 1.0 Gas Volume Rate of Flow @ STD Cond

$C = Fna \times K \times D \times Fra \times Ya \times Fpb \times Ftb \times Ftf \times Fg \times Fpv \times Fm$
 $\times Faa \times Fl$

$1 \dots (Qs) 2$
 $hw = \dots \times (\dots)$
 $Pf \dots (C)$

$Qs = C \times \sqrt{hw \times Pf}$

flow in pressure

Description	Term	Value	Units
Units Conversion Factor	Fna	.00000031	
ANNUBAR Flow Coefficient	K	.825	
Internal Pipe Diameter	D	274.3	mm
Base Pressure Factor	Fpb	1	@ 760 mm Hg @0C G
Base Temperature Factor	Ftb	1.0347	@ 25 C
Specific Gravity Factor	Fg	1.0155	SG = .9697
Manometer Factor	Fm	1	
Gage Location Factor	Fl	1	

		MAX	NORM	MIN	
Flowrate	Qs	13.132	13.132	0	NM3/S
Calculation Constant	C	1.84204	1.84204	0	
Pipe Reynolds Number	RD	0	0	0	
Reynolds Number Factor	Fra	1	1	0	
Gas Expansion Factor	Ya	1	1	0	
Flowing Viscosity			0		Centipoise
Flowing Temperature			78.9		C
Flowing Temp Factor	Ftf		.9047		
Supercompress. Factor	Fpv		1		
Thermal Expansion Factor	Faa		1.001		
Flowing Pressure			97.637		kPa A
Differential Pressure	hw	.521	.521	0	mm H2O

* - Indicates Manual Override

LIMITS

Max Allowable DP: 2370 mm H2O @ 79 C
 Flow at Max Allowable DP: .891 NM3/S
 Natural Frequency: 4.06 CPS
 Max Allowable Pressure: 6.9 Bars G @ 204.4 C
 and Temperature: 204.44 C

CAUTION Max design press/temp = zero

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CAUTION Low DP warning @ Norm flow

CAUTION Low DP warning @ Max. flow

Order: 289558 Customer: ROSENDAHL INSTRUMENTS LTD Date: 04/11/97
 Item: 1 P.O.: 507901 Time: 09:11:09
 Serial No: 289558-1.1 Tag No:

Fluid: Stack gas
 Model: PSF-S4 HA2 CS2S FADS0 FADC TRA
 Pipe Size: I.D.= 274.3 Wall= 45.72 cm

D.P. Eq'n 2.4 REV 1.0 Gases Volume Rate of Flow @ STD Cond

$C' = Fna \times K \times D \times Fra \times Ya \times Fpb \times Ftb \times Ftf \times Fg \times Fpv \times Fm$
 $\times Faa \times Fl$

$Qs = \frac{1}{C'} \times \left(\frac{hw}{Pf} \right)^{0.5}$
 $Qs = C' \times \sqrt{hw \times Pf}$

Description	Term	Value	Units
Units Conversion Factor	Fna	.00000031	
ANNUBAR Flow Coefficient	K	.825	
Internal Pipe Diameter	D	274.3	mm
Base Pressure Factor	Fp5	1	@ 760 mm Hg @0C G
Base Temperature Factor	Ftb	1.0347	@ 25 C
Specific Gravity Factor	Fg	1.0155	SG = .9697
Manometer Factor	Fm	1	
Gage Location Factor	Fl	1	
		MAX	NORM MIN
Flowrate	Qs	13.132	13.132 0 NM3/S
Calculation Constant	C'	1.84204	1.84204 0
Pipe Reynolds Number	RD	0	0 0
Reynolds Number Factor	Fra	1	1 0
Gas Expansion Factor	Ya	1	1 0
Flowing Viscosity			0 Centipoise
Flowing Temperature			78.9 C
Flowing Temp Factor	Ftf		.9047
Supercompress. Factor	Fpv		1
Thermal Expansion Factor	Faa		1.001
Flowing Pressure			97.637 kPa A
Differential Pressure	hw	.521	.521 0 mm H2O

* - Indicates Manual Override

LIMITS

Max Allowable DP: 2370 mm H2O @ 79 C
 Flow at Max Allowable DP: 891 NM3/S
 Natural Frequency: 4.06 CPS
 Max Allowable Pressure: 6.9 Bars G @ 204.4 C
 and Temperature: 204.44 C

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CAUTION Low DP warning @ Norm flow

CAUTION Low DP warning @ Max. flow

Sales Order: 289558 Customer: ROSEMOUNT INSTRUMENTS LTD Date: 04/11/97
 Item: 1 P.O.: 507901 Time: 09:11:09
 Serial No: 289558.1.1 Tag No:

Fluid: Stack gas
 Model: PSF-S4 HA2 CS2S FAD50 FADC TRA
 Pipe Size: I.D.= 274.3 Wall= 45.72 cm

D.P. Eq'n 2.4 REV 1.0 Gas Volume Rate of Flow @ STD Cond

$C' = Fna \times K \times D \times Fra \times Ya \times Fpb \times Ftb \times Ftf \times Fg \times Fbv \times Fm$
 $\times Faa \times FI$

$hw = \frac{1}{Pf} \times \frac{(Qs)^2}{C'^2}$ /-----
 $Qs = C' \times \sqrt{\frac{hw \times Pf}{1}}$

Description	Term	Value	Units
Units Conversion Factor	Fna	.00000031	
ANNUBAR Flow Coefficient	K	.825	
Internal Pipe Diameter	D	274.3	mm
Base Pressure Factor	Fpb	1	@ 760 mm Hg @0C G
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Specific Gravity Factor	Fg	1.0155	SG = .9697
Manometer Factor	Fm	1	
Gage Location Factor	FI	1	
		MAX	NORM MIN
Flowrate	Qs	13.132	13.132 0 NM3/S
Calculation Constant	C'	1.84204	1.84204 0
Pipe Reynolds Number	RD	0	0 0
Reynolds Number Factor	Fra	1	1 0
Gas Expansion Factor	Ya	1	1 0
Flowing Viscosity			0 Centipoise
Flowing Temperature			78.9 C
Flowing Temp Factor	Ftf		.9047
Supercompress. Factor	Fbv		1
Thermal Expansion Factor	Faa		1.001
Flowing Pressure			97.637 kPa A
Differential Pressure	hw	.521	.521 0 mm H2O

* - Indicates Manual Override

LIMITS

Max Allowable DP: 2370 mm H2O @ 79 C
 Flow at Max Allowable DP: 891 NM3/S
 Natural Frequency: 4.06 CPS
 Max Allowable Pressure: 6.9 Bars G @ 204.4 C
 and Temperature: 204.44 C

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Daily. Low sea.