

Flow Measurement, Control & Verification

Mass Flow Controllers & Meters
In Situ Flow Verifiers
Flow Ratio Controllers
Flow Related Products
Flow Products Power Supplies, Readouts, & Accessories



Gas Correction Factors for Thermal-based Mass Flow Controllers

The following table lists theoretical gas correction factors for various gases with respect to Nitrogen for thermal-based mass flow controllers. Please note that a non-linearity may exist between a Nitrogen calibration and the actual flow of process gases.

Gas	Symbol	Specific Heat, CP cal/g°C	Density g/l @ 0°C	Conversion Factor
Air	- - -	0.240	1.293	1.00
Ammonia	NH ₃	0.492	0.760	0.73
Argon	Ar	0.1244	1.782	1.39
Arsine	AsH ₃	0.1167	3.478	0.67
Boron Trichloride	BCl ₃	0.1279	5.227	0.41
Bromine	Br ₂	0.0539	7.130	0.81
Carbon Dioxide	CO ₂	0.2016	1.964	0.70*
Carbon Monoxide	CO	0.2488	1.250	1.00
Carbon Tetrachloride	CCl ₄	0.1655	6.86	0.31
Carbon Tetrafluoride (Freon - 14)	CF ₄	0.1654	3.926	0.42
Chlorine	Cl ₂	0.1144	3.163	0.86
Chlorodifluoromethane (Freon - 22)	CHClF ₂	0.1544	3.858	0.46
Chloropentafluoroethane (Freon - 115)	C ₂ ClF ₅	0.164	6.892	0.24
Chlorotrifluoromethane (Freon - 13)	CClF ₃	0.153	4.660	0.38
Cyanogen	C ₂ N ₂	0.2613	2.322	0.61
Deuterium	D ₂	1.722	0.1799	1.00
Diborane	B ₂ H ₆	0.508	1.235	0.44
Dibromodifluoromethane	CBr ₂ F ₂	0.15	9.362	0.19
Dichlorodifluoromethane (Freon - 12)	CCl ₂ F ₂	0.1432	5.395	0.35
Dichlorofluoromethane (Freon - 21)	CHCl ₂ F	0.140	4.592	0.42
Dichloromethylsilane	(CH ₃) ₂ SiCl ₂	0.1882	5.758	0.25
Dichlorosilane	SiH ₂ Cl ₂	0.150	4.506	0.40
1,2-Dichlorotetrafluoroethane (Freon - 114)	C ₂ Cl ₂ F ₄	0.160	7.626	0.22
1,1-Difluoroethylene (Freon - 1132A)	C ₂ H ₂ F ₂	0.224	2.857	0.43
2,2-Dimethylpropane	C ₅ H ₁₂	0.3914	3.219	0.22
Ethane	C ₂ H ₆	0.4097	1.342	0.50

Fluorine	F ₂	0.1873	1.695	0.98
Fluoroform (Freon - 23)	CHF ₃	0.176	3.127	0.50
Freon - 11	CCl ₃ F	0.1357	6.129	0.33
Freon - 12	CCl ₂ F ₂	0.1432	5.395	0.35
Freon - 13	CCIF ₃	0.153	4.660	0.38
Freon - 13 B1	CBrF ₃	0.1113	6.644	0.37
Freon - 14	CF ₄	0.1654	3.926	0.42
Freon - 21	CHCl ₂ F	0.140	4.592	0.42
Freon - 22	CHClF ₂	0.1544	3.858	0.46
Freon - 23	CHF ₃	0.176	3.127	0.50
Freon - 113	C ₂ Cl ₂ F ₃	0.161	8.360	0.20
Freon - 114	C ₂ Cl ₂ F ₄	0.160	7.626	0.22
Freon - 115	C ₂ ClF ₅	0.164	6.892	0.24
Freon - 116	C ₂ F ₆	0.1843	6.157	0.24
Freon - C318	C ₄ F ₈	0.1866	8.93	0.164
Freon - 1132A	C ₂ H ₂ F ₂	0.224	2.857	0.43
Helium	He	1.241	0.1786	1.45
Hexafluoroethane (Freon - 116)	C ₂ F ₆	0.1843	6.157	0.24
Hydrogen	H ₂	3.419	0.0899	1.01
Hydrogen Bromide	HBr	0.0861	3.610	1.00
Hydrogen Chloride	HCl	0.1912	1.627	1.00
Hydrogen Fluoride	HF	0.3479	0.893	1.00
Isobutylene	C ₄ H ₈	0.3701	2.503	0.29
Krypton	Kr	0.0593	3.739	1.543
Methane	CH ₄	0.5328	0.715	0.72
Methyl Fluoride	CH ₃ F	0.3221	1.518	0.56
Molybdenum Hexafluoride	MoF ₆	0.1373	9.366	0.21
Neon	Ne	0.246	0.900	1.46
Nitric Oxide	NO	0.2328	1.339	0.99
Nitrogen	N ₂	0.2485	1.250	1.00
Nitrogen Dioxide	NO ₂	0.1933	2.052	**
Nitrogen Trifluoride	NF ₃	0.1797	3.168	0.48
Nitrous Oxide	N ₂ O	0.2088	1.964	0.71
Octafluorocyclobutane (Freon - C318)	C ₄ F ₈	0.1866	8.93	0.164
Oxygen	O ₂	0.2193	1.427	0.993
Pentane	C ₅ H ₁₂	0.200	0.210	0.21

Pentane	C ₅ H ₁₂	0.398	3.219	0.21
Perfluoropropane	C ₃ F ₈	0.194	8.388	0.17
Phosgene	COCl ₂	0.1394	4.418	0.44
Phosphine	PH ₃	0.2374	1.517	0.76
Propane	C ₃ H ₈	0.3885	1.967	0.36
Propylene	C ₃ H ₆	0.3541	1.877	0.41
Silane	SiH ₄	0.3189	1.433	0.60
Silicon Tetrachloride	SiCl ₄	0.1270	7.580	0.28
Silicon Tetrafluoride	SiF ₄	0.1691	4.643	0.35
Sulfur Dioxide	SO ₂	0.1488	2.858	0.69
Sulfur Hexafluoride	SF ₆	0.1592	6.516	0.26
Trichlorofluoromethane (Freon - 11)	CCl ₃ F	0.1357	6.129	0.33
Trichlorosilane	SiHCl ₃	0.1380	6.043	0.33
1,1,2-Trichloro - 1,2,2-Trifluoroethane (Freon - 113)	CCl ₂ FCClF ₂ or C ₂ Cl ₃ F ₃	0.161	8.360	0.20
Tungsten Hexafluoride	WF ₆	0.0810	13.28	0.25
Xenon	Xe	0.0378	5.858	1.32

** Consult [MKS Instruments](#)
Note: Standard pressure is defined as 760 mmHg (14.7 psia). Standard temperature is defined as 0°C.

[Find gas correction factors for ionization vacuum gauges here.](#)

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