

HALO SPECIFICATIONS SUMMARY ^{1,2}										
PRODUCT	PART #	ANALYTE	GAS MATRIX	LDL	RANGE	SENSITIVITY	ACCURACY (GREATER OF)	PRECISION (GREATER OF)	FLOW RATE	PRESSURE
HALO 3 H ₂ O (Moisture in Pressurized Gases)	F7600	H ₂ O	Air:CDA	1.5 ppb	0-18 ppm	1.2 ppb	+/- 4% or ½ LDL	+/- 0.75% or $\frac{1}{3}$; sensitivity	up to 1.8 slpm	10-125 psig
			Ar	0.7 ppb	0-9 ppm	0.6 ppb				
			C ₂ F ₆	4 ppb	0-15 ppm	3 ppb				
			C ₃ F ₈	4 ppb	0-20 ppm	3 ppb				
			C ₄ F ₈	4 ppb	0-20 ppm	3 ppb				
			C ₅ F ₈	30 ppb	0-32 ppm	25 ppb				
			CF ₄	5 ppb	0-15 ppm	4 ppb				
			Cl ₂	2.0 ppb	0-25 ppm (Hastelloy® recommended)	1.5 ppb				
			CO	2 ppb	0-24 ppm	1.5 ppb				
			CO ₂	2.5 ppb	0-25 ppm	2.0 ppb				
			COS	15 ppb	0-23 ppm	12 ppb				
			H ₂	1.2 ppb	0-16 ppm	1.0 ppb				
			HBr	15 ppb	0-100 ppm (Hastelloy® required)	12 ppb				
			HCl	4.5 ppb	0-50 ppm (Hastelloy® recommended)	3 ppb				
			He	0.3 ppb	0-4 ppm	0.25 ppb				
			Kr	0.8 ppb	0-11 ppm	0.6 ppb				
			N ₂	1.5 ppb	0-20 ppm	1.2 ppb				
		Ne	0.4 ppb	0-5 ppm	0.3 ppb					
		NF ₃	3 ppb	0-20 ppm	2.5 ppb					
		O ₂	0.9 ppb	0-12 ppm	0.7 ppb					
		SF ₆	1.2 ppb	0-15 ppm	1.0 ppb					
		Xe	1 ppb	0-13 ppm	0.8 ppb					
PRODUCT	PART #	ANALYTE	GAS MATRIX	LDL	RANGE	SENSITIVITY	ACCURACY (GREATER OF)	PRECISION (GREATER OF)	FLOW RATE	PRESSURE
HALO 3Q H ₂ O (Moisture in Pressurized Gases)	F7600-Q	H ₂ O	Ar	0.4 ppb	0-9 ppm	0.3 ppb	+/- 4% or ½ LDL	+/- 0.75% or $\frac{1}{3}$; sensitivity	up to 1.8 slpm	10-125 psig
			H ₂	0.6 ppb	0-16 ppm	0.4 ppb				
			He	0.25 ppb	0-4 ppm	0.12 ppb				
			N ₂	0.8 ppb	0-20 ppm	0.6 ppb				
			O ₂	0.4 ppb	0-12 ppm	0.3 ppb				
PRODUCT	PART #	ANALYTE	GAS MATRIX	LDL	RANGE	SENSITIVITY	ACCURACY (GREATER OF)	PRECISION (GREATER OF)	FLOW RATE	PRESSURE
HALO 3 CO (CO in	F7602	CO	H ₂	100	0-2000 ppm	70 ppb	+/- 4% or ½	+/- 0.75% or $\frac{1}{3}$;	up to 1.8	10-125

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Pressurized Gases)				ppb			LDL	sensitivity	slpm	psig
			N ₂	100 ppb	0-2000 ppm	70 ppb				
PRODUCT	PART #	ANALYTE	GAS MATRIX	LDL	RANGE	SENSITIVITY	ACCURACY (GREATER OF)	PRECISION (GREATER OF)	FLOW RATE	PRESSURE
HALO 3 CO ₂ (CO ₂ in Pressurized Gases)	F7604	CO ₂	He	10 ppb	0-12 ppm	7 ppb	+/- 4% or ½ LDL	+/- 0.75% or ⅓ sensitivity	up to 1.8 slpm	10-125 psig
			N ₂	10 ppb	0-12 ppm	7 ppb				
PRODUCT	PART #	ANALYTE	GAS MATRIX	LDL	RANGE	SENSITIVITY	ACCURACY (GREATER OF)	PRECISION (GREATER OF)	FLOW RATE	PRESSURE
HALO 3 CH ₄ (Methane in Pressurized Gases)	F7601	CH ₄	Air:CDA	1.9 ppb	0-7.5 ppm	1.6 ppb	+/- 4% or ½ LDL	+/- 0.75% or ⅓ sensitivity	up to 1.8 slpm	10-125 psig
			Ar	1.7 ppb	0-7 ppm	1.4ppb				
			H ₂	2.0 ppb	0-8 ppm	1.6 ppb				
			He	1.3 ppb	0-5 ppm	1.1 ppb				
			N ₂	2.0 ppb	0-8 ppm	1.6 ppb				
			O ₂	1.4 ppb	0-6 ppm	1.1 ppb				
PRODUCT	PART #	ANALYTE	GAS MATRIX	LDL	RANGE	SENSITIVITY	ACCURACY (GREATER OF)	PRECISION (GREATER OF)	FLOW RATE	PRESSURE
HALO 3 CH ₂ O (CH ₂ O in Pressurized Gases)	F7618	CH ₂ O	H ₂	17 ppb	0-200 ppm	10 ppb	+/- 4% or ½ LDL	+/- 0.75% or ⅓ sensitivity	up to 1.8 slpm	10-125 psig
			N ₂	10 ppb	0-180 ppm	9 ppb				
PRODUCT	PART #	ANALYTE	GAS MATRIX	LDL	RANGE	SENSITIVITY	ACCURACY (GREATER OF)	PRECISION (GREATER OF)	FLOW RATE	PRESSURE
HALO 3 HF (HF in Pressurized Gases)	F7604	HF	N ₂	0.5 ppb	0-5 ppm	0.4 ppb	+/- 4% or ½ LDL	+/- 0.75% or ⅓ sensitivity	up to 1.8 slpm	10-125 psig
			NF ₃	0.75 ppb	0-7.5 ppm	0.6 ppb				
			CF ₄	1.0 ppb	0-6 ppm	0.8 ppb				
			C ₂ F ₆	2.0 ppb	0-12 ppm	1.6 ppb				
			C ₃ F ₈	2.0 ppb	0-12 ppm	1.6 ppb				
			C ₄ F ₈	2.0 ppb	0-14 ppm	1.6 ppb				
			SF ₆	1.5 ppb	0-8 ppm	1.2 ppb				
PRODUCT	PART #	ANALYTE	GAS MATRIX	LDL	RANGE	SENSITIVITY	ACCURACY (GREATER OF)	PRECISION (GREATER OF)	FLOW RATE	PRESSURE
HALO 3 HCl (HCl in Pressurized Gases)	F7615	HCl	Air:CDA	2.5 ppb ⁴	0-15 ppm	1.7 ppb	+/- 4% or ½ LDL	+/- 0.75% or ⅓ sensitivity	up to 1.8 slpm	10-125 psig
			N ₂	2.5 ppb ⁴	0-15 ppm	1.7 ppb				
PRODUCT	PART #	ANALYTE	GAS MATRIX	LDL	RANGE	SENSITIVITY	ACCURACY (GREATER OF)	PRECISION (GREATER OF)	FLOW RATE	PRESSURE

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HALO KA H₂O (Low-Range Moisture in Pressurized Gases)	F7500	H ₂ O	Air:CDA	500 ppt	0-18 ppm	350 ppt	+/- 4% or ½ LDL	+/- 0.75% or $\frac{1}{13}$; sensitivity	up to 1.8 slpm	10-125 psig
			Ar	200 ppt	0-9 ppm	130 ppt				
			C ₂ F ₆	1.5 ppb	0-15 ppm	1.2 ppb				
			C ₃ F ₈	1.5 ppb	0-20 ppm	1.2 ppb				
			C ₄ F ₈	1.5 ppb	0-20 ppm	1.2 ppb				
			C ₅ F ₈	10 ppb	0-32 ppm	8 ppb				
			CF ₄	1.0 ppb	0-15 ppm	0.8 ppb				
			Cl ₂	0.75 ppb	0-25 ppm (Hastelloy© recommended)	0.65 ppb				
			CO	0.7 ppb	0-24 ppm	0.6 ppb				
			CO ₂	1.0 ppb	0-25 ppm	0.8 ppb				
			COS	5 ppb	0-23 ppm	4 ppb				
			H ₂	300 ppt	0-16 ppm	200 ppt				
			HBr	15 ppb	0-100 ppm (Hastelloy© required)	12 ppb				
			HCl	1.5 ppb	0-50 ppm (Hastelloy© recommended)	1.2 ppb				
			He	200 ppt	0-4 ppm	60 ppt				
			Kr	200 ppt	0-11 ppm	160 ppt				
			N ₂	400 ppt	0-20 ppm	300 ppt				
			Ne	120 ppt	0-5 ppm	100 ppt				
			NF ₃	0.75 ppb	0-20 ppm	0.6 ppb				
			O ₂	200 ppt	0-10 ppm	150 ppt				
		SF ₆	500 ppt	0-15 ppm	400 ppt					
		Xe	300 ppt	0-13 ppm	250 ppt					
PRODUCT	PART #	ANALYTE	GAS MATRIX	LDL	RANGE	SENSITIVITY	ACCURACY (GREATER OF)	PRECISION (GREATER OF)	FLOW RATE	PRESSURE
HALO KA H₂O for corrosive service	F7500-C	H ₂ O	Cl ₂	0.75 ppb	0-25 ppm	0.65 ppb	+/- 4% or ½ LDL	+/- 0.75% or $\frac{1}{13}$; sensitivity	up to 1.8 slpm	10-125 psig
			HBr	15 ppb	0-100 ppm	12 ppb				
			HCl	1.5 ppb	0-15 ppm	1.2 ppb				
PRODUCT	PART #	ANALYTE	GAS MATRIX	LDL	RANGE	SENSITIVITY	ACCURACY (GREATER OF)	PRECISION (GREATER OF)	FLOW RATE	PRESSURE
HALO OK³	F7502	O ₂	Ar	110 ppt	0-1 ppm	90 ppt	+/- 4% or ½ LDL	+/- 0.75% or $\frac{1}{13}$; sensitivity	0.5-1.8 slpm (gas dependent)	10-125 psig (sample) 20-125 psig (H ₂ supply ³)
			He	100 ppt	0-0.5 ppm	50 ppt				
			H ₂	200 ppt	2 ppm	150 ppt				
			N ₂	250 ppt	2.5 ppm	200 ppt				

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PRODUCT	PART #	ANALYTE	GAS MATRIX	LDL	RANGE	SENSITIVITY	ACCURACY (GREATER OF)	PRECISION (GREATER OF)	FLOW RATE	PRESSURE
HALO H ₂ O in N ₂ O	F7025-1	H ₂ O	N ₂	3 ppb	0-20 ppm	2.2 ppb	+/- 4% or ½ LDL	+/- 0.75% or ⅓ sensitivity	up to 1.8 slpm	10-125 psig
			N ₂ O	10 ppb	0-20 ppm	7.5 ppb				
PRODUCT	PART #	ANALYTE	GAS MATRIX	LDL	RANGE	SENSITIVITY	ACCURACY (GREATER OF)	PRECISION (GREATER OF)	FLOW RATE	PRESSURE
HALO RP H ₂ O (Moisture in Sub-Atmospheric Applications)	F7005-1	H ₂ O	Ar	2.0 ppb	0-20 ppm	1.6 ppb	+/- 4% or ½ LDL	+/- 0.75% or ⅓ sensitivity	up to 1.8 slpm	50 Torr - 15 psig
			H ₂	3.5 ppb	0-20 ppm	2.8 ppb				
			HCl	4.0 ppb	0-25 ppm (Hastelloy© recommended)	3.2 ppb				
			He	1.0 ppb	0-12 ppm	0.8 ppb				
			N ₂	3.5 ppb	0-20 ppm	2.8 ppb				
PRODUCT	PART #	ANALYTE	GAS MATRIX	LDL	RANGE	SENSITIVITY	ACCURACY (GREATER OF)	PRECISION (GREATER OF)	FLOW RATE	PRESSURE
HALO RP H ₂ O for corrosive service	F7005-C-1	H ₂ O	HCl	4.0 ppb	0-25 ppm	3.2 ppb	+/- 4% or ½ LDL	+/- 0.75% or ⅓ sensitivity	up to 1.8 slpm	50 Torr - 15 psig
PRODUCT	PART #	ANALYTE	GAS MATRIX	LDL	RANGE	SENSITIVITY	ACCURACY (GREATER OF)	PRECISION (GREATER OF)	FLOW RATE	PRESSURE
HALO QRP (Moisture at <50 Torr pressure)	F7048	H ₂ O	N ₂	1.0 μTorr _{pp}	0-12 mTorr _{pp}	0.7 μTorr _{pp}	+/- 5% or ½ LDL	+/- 1% or ⅓ sensitivity		1-100 Torr (standard) 1-1000 Torr (optional)
			H ₂	1.0 μTorr _{pp}	0-12 mTorr _{pp}	0.7 μTorr _{pp}				
PRODUCT	PART #	ANALYTE	GAS MATRIX	LDL	RANGE	SENSITIVITY	ACCURACY (GREATER OF)	PRECISION (GREATER OF)	FLOW RATE	PRESSURE
HALO LP H ₂ O (Moisture in Hydride Gases)	F7007-1	H ₂ O	Ar	1.4 ppb	0-4 ppm	1.0 ppb	+/- 4% or ½ LDL	+/- 1% or ⅓ sensitivity	up to 1.8 slpm	10-125 psig
			H ₂	1 ppb	0-6 ppm	0.8 ppb				
			He	1 ppb	0-3 ppm	0.8 ppb				
			N ₂	1.4 ppb	0-6 ppm	1.0 ppb				
			NH ₃	12 ppb	0-20 ppm	9 ppb				
			NO	20 ppb	0-100 ppm	16 ppb				
PH ₃	12 ppb	0-10 ppm	9 ppb							
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PRODUCT	PART #	ANALYTE	GAS MATRIX	LDL	RANGE	SENSITIVITY	ACCURACY (GREATER OF)	PRECISION (GREATER OF)	FLOW RATE	PRESSURE
HALO LP H ₂ O in AsH ₃	F7011-1	H ₂ O	AsH ₃	6 ppb	0-10 ppm	4 ppb	+/- 4% or ½ LDL	+/- 1% or ⅓ sensitivity	up to 1.8 slpm	10-125 psig
			N ₂	1.4 ppb	0-6 ppm	1.0 ppb				
HALO 3 H ₂ O 500 (High-Range Moisture in Pressurized Gases)	F7603	H ₂ O	Air:CDA	9 ppb	0-450 ppm	7 ppb	+/- 4% or ½ LDL	+/- 0.75% or ⅓ sensitivity	up to 1.8 slpm	10-125 psig
			Ar	8 ppb	0-200 ppm	6 ppb				
			CO	15 ppb	0-500 ppm	12 ppb				
			CO ₂	750 ppb	0-600 ppm	600 ppb				
			COS	50 ppb	0-550 ppm	40 ppb				
			H ₂	8 ppb	0-400 ppm	6 ppb				
			He	5 ppb	0-125 ppm	4 ppb				
			N ₂	10 ppb	0-500 ppm	8 ppb				
			O ₂	10 ppb	0-250 ppm	8 ppb				

¹LDL is dependent upon the quality of the sample gas and the integrity of the sampling system.

²High levels of moisture in or prolonged exposure to corrosive gases can damage some instruments. Please contact Tiger Optics for more information.

³H₂ supply (maximum 10 ppm H₂O and O₂ impurity) is required for sample conditioning via catalytic conversion.

⁴with H₂O content of less than 2000 ppm in the sample gas

Note: Measurement in stable mixtures of two listed gases is generally OK. Check with factory for 3 or more constituents in the gas matrix.