



## SPM Flex Specifications

Chemcassette® Tape-Based Gas Detector for Portable or Fixed Applications

GENERAL SPECIFICATIONS	
DETECTION TECHNIQUE	Chemcassette tape-based with advanced self monitoring optics design and K-factor multiplier options. Duty cycle options to save paper.
DIMENSIONS	Height: 13.2 in. (33.6 cm); Width: 7.2 in. (18.3 cm); Depth without handle: 6.4 in. (16.3 cm); Depth with handle: 9.5 in. (24.1 cm).
WEIGHT	9.1 lbs. (4.1 kg).
MOUNTING SCREWS	Concrete: 5/16 in x 2 in vibration-resistant stud anchor for concrete (McMaster-Carr 94475A185 or equivalent), add 0.25 in. to length when mounting bracket with sun shield. Wood: 5/16 in. x 2 in. flange head lag screw for wood (McMaster-Carr 95526A375 or equivalent), add 0.25 in. to length when mounting bracket with sun shield.
OPERATING TEMPERATURE	32°F to 104°F (0°C to 40°C) for most gases/applications.
OPERATING HUMIDITY	0-100% RH for unit (Sample RH limited per tape/calibration). Sample line requires additional hardware to remove moisture in high RH conditions where condensing may occur. The sample must be non-condensing. Dry conditions may require humidification.
FLOW SYSTEM	Automatic flow control with bypass system, higher flow at inlet to reduce sample time (internal bypass system); sample up to 100 ft, check manual for specific gases.
LOCAL ALARMS/STATUS	Visual: LEDs for alarm, normal condition, fault and external power. Audible: User selectable: Off, Low ~75 dB at 1 m, Medium ~85 dB at 1 m, High >90 dB at 1.
INTERFACE	4 large buttons, 3.5 in. Color LCD TFT display, web server. Flip screen.
DATA LOGGING	Rolling up to 3 months (15-22 sec. with no gas reading, 1-2 sec. when reading gas), Event history (1500 events – approx. 1 year).
MAXIMUM INLET/OUTLET PRESSURE DIFFERENTIAL	The overall maximum load on the pump between the inlet and the exhaust should not exceed 10" WC (24.8 mbars or 2488 Pascals).
RELAYS	250V AC, 6 A maximum.
USB	2.0 or later.
INDOOR/OUTDOOR USE	Both (the power supply provided is indoor only)
OPERATING ALTITUDES	-1,000 to 3,000 ft. above sea level: standard; 3,000 ft. to 6,000 ft. above sea level: requires adjustment by Honeywell Analytics.
INGRESS PROTECTION RATING	IP65.
EXTERNAL SWITCH OR CIRCUIT BREAKER REQUIREMENT (DESCRIPTION & LOCATION)	Meet or exceed all local codes and regulations.
VENTILATION REQUIREMENTS	Mount with no obstructions within 4 in. (10 cm) of either side or within 2 in. (5 cm) above and below the detector.
ELECTRICAL	
POWER SUPPLY	Universal Line powered (90-260 VAC 50/60 Hz) for battery charger.
POWER CONSUMPTION	~1.9 A at 24 VDC +/- 10% (including battery-charging current).
BATTERY TYPE	Lithium ion.
BATTERY LIFE	6+ hours under typical conditions – acts as battery back-up in fixed applications. Approximately 70% of its original capacity after 300 full charge/discharge cycles.
POWER ADAPTOR	Input: 90-264 VAC, 1.2A, 47-63 Hz. Output: 24 VDC, 3.75 A max.
WIRE GAUGES	Minimum: 24; Maximum: 14. AWG for relay and 4-20 mA outputs.

COMMUNICATIONS	
OPTIONS	Relays: Alarm 1, Alarm 2, Fault (user configurable for normally open/closed) 4-20mA Ethernet (with Modbus TCP/IP and web server). USB port (for memory stick configuration/data transfer). Communications connector and optional communications cable: 60 V, 5 A maximum.
4-20 MA OUTPUT DEFAULTS AND RANGES	
INHIBIT	2 mA, programmable from 1.5-3.5 mA in 0.5 mA increments.
MAINTENANCE	3 mA, programmable from 1.5-3.5 in 0.5 increments.
INSTRUMENT FAULT	1 mA or less, not programmable (will be driven under 1 mA).
OVER-SCALE	21.5 mA, programmable 21-22 mA.
4-20 MA CONFIGURATIONS	Sink, source, isolated.
STORAGE CONDITIONS	
DETECTOR	0°C to 40°C, 0-100% RH non-condensing.
CHEMCASSETTE CARTRIDGES	See the label on the Chemcassette cartridge for storage conditions.
CERTIFICATIONS	
DETECTOR	UL 61010-1, 3rd Edition, 2012-05 (ELECTRICAL EQUIPMENT FOR MEASUREMENT, CONTROL, AND LABORATORY USE - Part 1: General Requirements). CAN/CSA-C22.2 No. 61010-1, 3rd Edition, 2012-05, (ELECTRICAL EQUIPMENT FOR MEASUREMENT, CONTROL, AND LABORATORY USE - Part 1: General Requirements). IEC 61010-1:2010, 3rd Edition.
RFID APPROVALS	USA (FCC), Canada (IC), Mexico (IFT), Japan (IFERW), Singapore, Taiwan, Korea, China (CMIIT), Malaysia, Australia (RCM), New Zealand (R-NZ), Europe (RED).
BATTERY	UL/cUL Recognition to UL 2054 + 60950-1. IEC 62133 1st Edition CB Certification. UN Test Report to UN 38.3.
CE	EMC, LVD, ROHS, WEEE & RED.
CONSUMABLES	
CHEMCASSETTE TAPE	14, 30 or 90 day cartridges for 7 specific family gases.
DUTY CYCLE OPTIONS	Duty cycle options to conserve chemcassette tape in high background applications.
RFID LABELS	Smart radio frequency FD labels affixed to cartridges for error-proof use and quick gas selection. Chem keys no longer required.
FILTERS	Most gases require a filter. See manual for filter requirements.

**Please Note:**

While every effort has been made to ensure accuracy in this publication, no responsibility can be accepted for errors or omissions. Data may change, as well as legislation, and you are strongly advised to obtain copies of the most recently issued regulations, standards, and guidelines. This publication is not intended to form the basis of a contract.

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**For more information**

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## Detectable Gases

Family	Gas	Range	TLV <sup>1</sup>	LAL	Default Alarm		Response Time (T50) at 2 TLV Gas Concentr'n. (sec)	Max. Sample Tubing Length (m) <sup>12</sup>	Sample Line Particulates Filter <sup>2, 12</sup>	Sample Analysis Flow Rate (cc/min ±10%)	ChemCassette <sup>10</sup>				Allowable Days After First Use <sup>11</sup>	Optimum Temp Range (°C)	Optimum % RH Range for Best Accuracy <sup>7, 8</sup>	
					A1	A2					Name	Part Number (14d)	Part Number (30d)	Part Number (90d)				
Hydrides	Arsine (AsH <sub>3</sub> )	0.5-500ppb	5 ppb	1 ppb	2.5 ppb	5 ppb	55	30	A	250	Flex CC XP Hydrides	1265-4000	n/a	1265-3000	90	0-40	10-70% RH <sup>4, 5</sup>	
	Phosphine (PH <sub>3</sub> )	3-3000 ppb	300 ppb	1 ppm STEL	5 ppb	150 ppb	300 ppb										6	30-70% RH <sup>4, 5</sup>
	Diborane (B <sub>2</sub> H <sub>6</sub> )	5-1000 ppb	100 ppb		10 ppb	50 ppb	100 ppb										14	30-70% RH <sup>4, 5</sup>
	Silane (SiH <sub>4</sub> )	0.03 - 50 ppm	5 ppm		0.05 ppm	2.5 ppm	5 ppb										13	34-50% RH <sup>4, 5</sup>
	Germane (GeH <sub>4</sub> )	50-2000 ppb	200 ppb		100 ppb	100 ppb	200 ppb										245	40-50% RH <sup>4, 5</sup>
	Hydrogen Selenide (H <sub>2</sub> Se)	2-500 ppb	50 ppb		5 ppb	25 ppb	50 ppb										14	10-60% RH <sup>4, 5</sup>
	Hydrogen Sulphide (H <sub>2</sub> S)	0.001-9.999 ppm	1 ppm	5 ppm STEL	0.005 ppm	0.5 ppm	1 ppm	7								10-75% RH <sup>4, 5</sup>		
Mineral Acids	Hydrogen Fluoride (HF)	0.02-20 ppm	0.5 ppm	2 ppm STEL-C	0.03 ppm	1 ppm	2 ppm	7	5	B, C	Flex CC XP Mineral Acids	1265-4001	n/a	1265-3001	90	0-35	15-75% RH <sup>4, 5</sup>	
	Hydrogen Chloride (HCl)	0.02-20 ppm	2 ppm	STEL-C	0.03 ppm	1 ppm	2 ppm	5									30-50% RH <sup>4, 5</sup>	
	Hydrogen Bromide (HBr)	0.02-10 ppm	2 ppm	STEL-C	0.03 ppm	1 ppm	2 ppm	5									20-50% RH <sup>4, 5, 9</sup>	
	Boron Trifluoride (BF <sub>3</sub> )	0.05-10 ppm	0.1 ppm	0.7 ppm STEL/C	0.1 ppm	0.5 ppm	1.0 ppm	5									15-60% RH <sup>4, 5</sup>	
	Nitric Acid (HNO <sub>3</sub> )	0.02-20 ppm	2 ppm	4 ppm STEL	0.05 ppm	1 ppm	2 ppm	15									40-50% RH <sup>4, 5</sup>	
	Sulfuric Acid (H <sub>2</sub> SO <sub>4</sub> )	5-750 ppb	50 ppb	0.2mg/m <sup>3</sup>	10 ppb	25 ppb	50 ppb	2000									0.1	No filter
	Hydrogen Iodide (HI)	0.2-10 ppm	n/a	(2 ppm) PAC-1 = 1 ppm AEG1-1 = 1 ppm	0.03 ppm	1 ppm	2 ppm	15	0.1	No filter	35-55% RH <sup>4, 5, 9</sup>							
Mineral Acids (export unrestricted)	Hydrogen Fluoride (HF)	0.4-20 ppm	0.5 ppm	2 ppm STEL-C	0.4 ppm	1 ppm	2 ppm	7	5	B, C	Flex CC-U XP Mineral Acids	1265-4012	n/a	1265-3012	90	0-35	15-75% RH <sup>4, 5</sup>	
	Hydrogen Chloride (HCl)	0.02-20 ppm	2 ppm	STEL-C	0.03 ppm	1 ppm	2 ppm	5									30-50% RH <sup>4, 5</sup>	
	Hydrogen Bromide (HBr)	0.02-10 ppm	2 ppm	STEL-C	0.03 ppm	1 ppm	2 ppm	5									20-50% RH <sup>4, 5, 9</sup>	
	Boron Trifluoride (BF <sub>3</sub> )	0.05-10 ppm	0.1 ppm	0.7 ppm STEL/C	0.1 ppm	0.5 ppm	1.0 ppm	5									15-60% RH <sup>4, 5</sup>	
	Nitric Acid (HNO <sub>3</sub> )	0.02-20 ppm	2 ppm	4 ppm STEL	0.05 ppm	1 ppm	2 ppm	15									3	40-50% RH <sup>4, 5</sup>
	Sulfuric Acid (H <sub>2</sub> SO <sub>4</sub> )	5-750 ppb	50 ppb	0.2 mg/m <sup>3</sup>	10 ppb	25 ppb	50 ppb	2000									0.1	No filter
	Hydrogen Iodide (HI)	0.2-10 ppm	n/a	(2 ppm) PAC-1 = 1 ppm AEG1-1 = 1 ppm	0.03 ppm	1 ppm	2 ppm	15	0.1	No filter	35-55% RH <sup>4, 5, 9</sup>							
Oxidizers	Chlorine (Cl <sub>2</sub> )	0.005-5 ppm	0.5 ppm	1 ppm STEL	0.02 ppm	0.25 ppm	0.5 ppm	7	30	B, C	Flex CC XP Chlorine	1265-4002	n/a	1265-3002	90	0-40	30-55% RH <sup>4, 5</sup>	
	Chlorine (Cl <sub>2</sub> )	0.01-5 ppm	0.5 ppm	1 ppm STEL	0.05 ppm	0.25 ppm	0.5 ppm	9	30								5-75% RH <sup>4, 5</sup>	
	Fluorine (F <sub>2</sub> )	0.01-10 ppm	1 ppm	0.1 ppm OSHA PEL	0.05 ppm	0.5 ppm	1.0 ppm	5	10								0-85% RH <sup>4, 5</sup>	
	Nitrogen Dioxide (NO <sub>2</sub> )	0.03-10 ppm	0.2 ppm		0.05 ppm	0.1 ppm	0.2 ppm	56	30	B, C	Flex CC Fluorine/Oxidizers	1265-4004	1265-3004	n/a	30	0-40	10-70% RH <sup>4, 5</sup>	
	Chlorine Dioxide (ClO <sub>2</sub> )	20-1000 ppb	100 ppb	0.3 ppm STEL	25 ppb	50 ppb	100 ppb	36	10								5-90% RH <sup>4, 5</sup>	
		Ammonia (NH <sub>3</sub> )	0.01-150 ppm	25 ppm	35 ppm STEL	0.05 ppm	12.5 ppm	25 ppm	5									0-90% RH <sup>4, 5</sup>
Amines	Dimethylamine (DMA, C <sub>2</sub> H <sub>7</sub> N)	0.5-50 ppm	5 ppm	15 ppm STEL	0.1 ppm	2.5 ppm	5 ppm	10	30	B, C	Flex CC XP Ammonia	1265-4003	n/a	1265-3003	90	0-35	5-90% RH <sup>4, 5</sup>	
	Tetrakis (Dimethylamido) Titanium (TDMAT, C <sub>4</sub> H <sub>16</sub> N <sub>4</sub> Ti)	0.01-20 ppm	n/a		0.05 ppm	1 ppm	2 ppm	14									5-90% RH <sup>4, 5</sup>	
	Trimethylamine (TMA, C <sub>3</sub> H <sub>9</sub> N)	0.03-50 ppm	5 ppm	15 ppm STEL	0.05 ppm	2.5 ppm	5 ppm	10									1-90% RH <sup>4, 5</sup>	
	Phosgene (COCl <sub>2</sub> )	2-2000 ppb	100 ppb		5 ppb	50 ppb	100 ppb	15										
Phosgene	Ethylchloroformate (ECF, C <sub>2</sub> H <sub>5</sub> ClO <sub>2</sub> )	0.02-30 ppm	n/a	PAC-1=1 ppm, AEG1-2=0.2 ppm (8hr), ERPG-2=5 ppm (AHA)	0.02 ppm	0.5 ppm	1 ppm	6 (@ 2 ppm)	30	A	Flex CC XP Phosgene	1265-4007	n/a	1265-3007	90	0-40	5-90% RH <sup>4, 5</sup>	
	Methylchloroformate (MCF, C <sub>2</sub> H <sub>5</sub> ClO <sub>2</sub> )	0.03-30 ppm	n/a	PAC-1=0.2 ppm, AEG1-2=0.7 ppm (8hr), ERPG-2=2 ppm (AHA)	0.03 ppm	0.1 ppm	0.2 ppm	10 (@ 0.4 ppm)									1-95% RH <sup>4, 5</sup>	
Diisocyanates	Toluene Diisocyanate (TDI, C <sub>9</sub> H <sub>7</sub> N <sub>2</sub> O <sub>2</sub> )	0.5-200 ppb	1 ppb	5 ppb STEL	0.6 ppb	1 ppb	2 ppb	10	0.15	no filter	Flex CC Diisocyanates	1265-4006	1265-3006	n/a	30	0-40	5-65% RH <sup>4, 5</sup>	
	Methylene Bisphenyl isocyanate (MDI, C <sub>15</sub> H <sub>9</sub> N <sub>2</sub> O <sub>2</sub> )	0.5-200 ppb	5 ppb		0.6 ppb	2.5 ppb	5 ppb	10									5-80% RH <sup>4, 5</sup>	
	Hexamethylene Diisocyanate (HDI, C <sub>12</sub> H <sub>22</sub> N <sub>2</sub> O <sub>2</sub> )	0.5-150 ppb	5 ppb		0.6 ppb	2.5 ppb	5 ppb	30									15-85% RH <sup>4, 5</sup>	
	Hydrogenated Xylene Diisocyanate (HMDI, C <sub>14</sub> H <sub>18</sub> N <sub>2</sub> O <sub>2</sub> )	0.5-150 ppb	5 ppb		0.6 ppb	2.5 ppb	5 ppb	15									25-85% RH <sup>4, 5</sup>	
	Methylene bis-(4-cyclohexylisocyanate) (HMDI, C <sub>14</sub> H <sub>22</sub> N <sub>2</sub> O <sub>2</sub> )	0.5-100 ppb	5 ppb		0.6 ppb	2.5 ppb	5 ppb	15									20-65% RH <sup>4, 5</sup>	
	Isophorone Diisocyanate (IPDI, C <sub>15</sub> H <sub>24</sub> N <sub>2</sub> O <sub>2</sub> )	0.5-150 ppb	5 ppb		0.6 ppb	2.5 ppb	5 ppb	15									5-90% RH <sup>4, 5</sup>	
	Xylene Diisocyanate (XDI, C <sub>12</sub> H <sub>16</sub> N <sub>2</sub> O <sub>2</sub> )	0.5-200 ppb	5 ppb		0.6 ppb	2.5 ppb	5 ppb	10								5-85% RH <sup>4, 5</sup>		
Hydrazines	Hydrazine (N <sub>2</sub> H <sub>4</sub> )	3-1000 ppb	10 ppb		5 ppb	5 ppb	10 ppb	220	3	no filter	Flex CC Hydrazines	1265-4008	1265-3008	n/a	30	0-40	15-90% RH <sup>4, 5</sup>	
	Monomethyl Hydrazine (MMH, CH <sub>3</sub> N <sub>2</sub> H <sub>3</sub> )	3-2000 ppb	10 ppb		5 ppb	5 ppb	10 ppb	110	5								20-75% RH <sup>4, 5</sup>	
	Dimethyl Hydrazine (UDMH, C <sub>2</sub> H <sub>8</sub> N <sub>2</sub> )	3-2000 ppb	10 ppb		5 ppb	5 ppb	10 ppb	110	5								10-70% RH <sup>4, 5</sup>	
	Hydrogen Cyanide (HCN)	0.2-30 ppm	4.7 ppm	STEL/C	0.5 ppm	2.4 ppm	4.7 ppm	15	30	A	Flex CC Hydrogen Cyanide	1265-4009	n/a	n/a	15	0-30	15-70% RH <sup>4, 5</sup>	
	Sulphur Dioxide (SO <sub>2</sub> )	10-2500 ppb	250 ppb	STEL	25 ppb	120 ppb	250 ppb	12	30	B, C	Flex CC Sulfur Dioxide	1265-4005	1265-3005	n/a	30	0-40	25-90% RH <sup>4, 5</sup>	
	Ozone (O <sub>3</sub> )	20-1000 ppb	100 ppb		25 ppb	50 ppb	100 ppb	55	5	no filter	Flex CC Ozone	1265-4011	1265-3011	n/a	30	0-40	15-90% RH <sup>4, 5</sup>	
	Hydrogen Peroxide (H <sub>2</sub> O <sub>2</sub> )	0.1-3 ppm	1 ppm		0.2 ppm	0.5 ppm	1.0 ppm	27	5	no filter	Flex CC Hydrogen Peroxide	1265-4010	1265-3010	n/a	30	0-40	35-50% RH <sup>4, 5</sup>	

1 Source: ACGIH 2016 TLVs and BEs.  
 2 A = 780248 (disposable particulate filter), B = 1830-0055 (filter membrane 0235-1072 must be replaced every 30 days), C = 1991-0147 (disposable filter for corrosive gases)  
 Outside of RH range:  
 3 Tends to have lower response at higher humidities.  
 4 Tends to increase sensitivity at higher humidities (due to the chemistry of the reaction).  
 5 Tends to under-report at higher humidities (typically >75% RH) due to the gas characteristics to adhere or decompose on contact with water/moisture. The response seems to be lower but the actual gas concentration under these high humidity conditions will be lower than expected.  
 6 Tends to under-report in dry conditions (<25-30% RH).  
 7 Depending on the combination of temperature and humidity, even within the ranges specified above, a detector's performance efficiency can be influenced due to condensation, physical tape material changes, or optical changes. Consult Honeywell Analytics' Service Department.  
 8 Refer to TechNotes 971131 (ChemCassette®-based Instrument Accuracy and Precision) and 1998-0219 (Protocol for Testing Gas Detectors).  
 9 Slow recovery: Prolonged exposure to high levels of gas/vapor (2x TLV or above) can condense in the system and may require purging with dry clean air or inert gas.  
 10 For information about the expiration date of the ChemCassette, refer to "ChemCassette" on page 40 (Review menu).  
 11 The number of days from the installation date that the ChemCassette cartridge can be used. When the allowable-days limit is reached, or if the absolute expiration date (printed on cartridge) is reached, the detector will issue an Expired ChemCassette Cartridge fault. The type of expiration is found in the event history data field for the fault (either 1 [stale] or 2 [expired]). Replace the cartridge when this fault is issued. The only exception is if the cartridge was used only briefly and then removed from the detector and properly stored in the sealed bag at the recommended temperature. In this case, the cartridge can be used past the stale-tape date (but not past the absolute expiration date) by clearing the stale-tape fault before going into monitor mode. Advance the tape manually about five inches before installing the cartridge and entering monitor mode.  
 12 Do not use the optional sampling wand for those gases with recommended sample tubing lengths of less than five meters and no recommended sample line particulate filter.