![MSA - The Safety Company]

ALTAIR® 5X Multigas Detector
Product Specification

PHYSICAL CHARACTERISTICS	
Gas delivery	Unit shall have integral pump that is not detachable and is capable of sampling up to 75 feet (22, 86 m) at 0.3 lpm.
Size, pumped unit without IR	Instrument shall not exceed 6.68"L x 3.52"Wx 1.95"H (16,9 cm L x 8,9 cm W x 4,2 cm H) in total size.
Size, pumped unit with IR	Instrument shall not exceed 6.68"L x 3.52"Wx 1.65"H (16,9 cm L x 8,9 cm W x 5,0 cm H) in total size.
Weight	Weight shall not exceed 1 lb (453 g) or 1.15 lbs (680 g) (IR version).
Handling	Unit shall be a one-hand operation device.
Case material	Unit shall have rugged rubberized armor.
Environmental protection	Instrument shall be minimum IP65-rated for dust and water ingress.
Display location	Instrument display shall be viewable from the front.

USER INTERFACES	
Display type	Liquid crystal, high-contrast display (LCD), (1.79" x 1.39") (4, 5 cm x 3,5 cm) with large icons should be visible in bright sunlight. Display shall be available in either color or monochrome options.
Backlight	Unit provides white backlight for low-light viewing. Backlight time-out to conserve power must be user-adjustable.
Keypad/switches	Unit must have no more than 3 pushbuttons to operate. Buttons must be easy to operate while gloves are worn.
Data access	Access to data log shall be non-intrusive using infrared links to Windows-ready PCs.

MONITORING CAPABILITY	
Sensor configuration	User shall be able to enable/disable individual sensor channels.
Sensor missing alarm	All sensor channels provide missing sensor alarm if sensor has been removed and sensor channel has not been disabled.
Combustible gas display	Instrument shall be capable of displaying combustible gas reading as % Lower Explosive Limit (LEL) or 0-100% by volume.
Pressure compensation	Instrument oxygen sensor shall have built-in pressure compensation.
Sensor types	*Instrument shall be available with the following gas sensing options:*

Gas type	Range	Resolution
Combustible	0-100%	LEL 1% LEL
Oxygen	0-30%Vol	0.1%Vol
Carbon monoxide	0-2000 ppm	1 ppm
Hydrogen sulfide	0-200 ppm	1 ppm
Sulfur dioxide	0-20 ppm	0.1 ppm
Chlorine	0-20 ppm	0.1 ppm
Ammonia	0-100 ppm	1 ppm
Nitrogen dioxide	0-20 ppm	0.5 ppm
Chlorine dioxide	0-1 ppm	0.01 ppm
Phosphine	0-5 ppm	0.1 ppm
Hydrogen cyanide	0-30 ppm	0.1ppm
Carbon dioxide, CO2	0-10%Vol	0.01%Vol
Butane, C4H10	0-25%Vol	0.1%Vol
Methane, CH4	0-100%Vol	1%Vol
Propane, C3H8	0-100%Vol	1%Vol

BASIC OPERATIONAL FEATURES

Instrument buttons	Buttons on instrument must easy to operate with gloves on.
Inadvertent shutoff	Instrument shall be designed to protect against accidental shutoff.
Zero adjustments	Instrument shall provide Fresh Air Setup (FAS) function at user's discretion.
Zero adjustment safety lockout	FAS function shall not allow unit to zero out hazardous readings.
Confidence signals	Instrument shall provide periodic audible and visual signals indicating instrument operation. User shall have option of disabling audible and visual signals if desired.
Time/date	Instrument must be able to display time and date. User must be able to reset time and date without tools.
Last calibration date	Instrument must be able to display last successful calibration date.
Instrument power-on	Power-on instrument button must be clearly marked.

ADVANCED DISPLAY & SOFTWARE OPTIONS

Industrial hygiene displays	Instrument shall have capability of displaying PEAK, STEL, and TWA at user's discretion. User shall have ability to enable/disable STEL and TWA functions.
Instrument settings	All settable instrument parameters (alarm set points, expected calibration gas values, etc.) shall be protected by user-selectable password.
Reset of functions	User shall be provided with capability of resetting PEAK, STEL, and TWA readings in the field.
Measurement units	Unit shall be capable of displaying both types of gas sensors installed and measurement units for each gas.

INSTRUMENT ALARMS

MotionAlert™ feature	Instrument shall offer standard MotionAlert feature. When activated, instrument shall eventually go into latch alarm when no instrument movement is detected for 30 seconds.
InstantAlert™ feature	Instrument shall have InstantAlert feature to allow users manual activation of all alarms if situation requires.
Visual alarms	Visual alarms shall consist of bright, flashing LEDs on top and bottom of instrument, and positive indication on unit's display for alarm type identification.
Audible alarm	Audible alarm shall be rated at a typical >95 dB.
Vibrating alarm	Unit shall be offered with standard vibrating alarm.
Lock alarm™ Circuit feature	Catalytic combustible channel shall have non-resettable latching alarm when combustible gas level exceeds 100% LEL, or 5.00%Vol CH4 when no 0-100%Vol CH4 IR sensor is installed.
Auto recover feature	Catalytic combustible channel shall auto recover from Lockalarm Circuit situation if 0-100 %Vol CH4 IR sensor is installed, and reading is back to low methane levels.
Oxygen alarms	Oxygen channel shall have alarm set points for both oxygen deficiency and oxygen enrichment.
Alarms set points	Alarm set points must be user-settable.
STEL and TWA alarm	Instrument shall provide audible, visual, and vibrating alarms if STEL or TWA levels are exceeded. Alarm set points for STEL and TWA shall be user-selectable.
Battery alarms	Monitor shall provide user with 10-minute warning of battery power loss in all environmental conditions. Power consumption alarms shall activate audible, visual, and vibrating alarms.

INSTRUMENT POWER	
Run time	Instrument run time shall be at least 20 hours at room temperature.
Power supply	Instrument shall be equipped with rechargeable lithium-ion battery and have alkaline option available (non-IR equipped units).
Battery life indication	Monitor shall provide icon depicting estimated remaining battery operation time. Battery icon must always be visible when instrument is powered on.
Charging cradle	Optional charging cradle shall be offered.
Charger input voltages	Chargers shall be available for 110VAC/220 VAC and 12-24 VDC.
Charging status	Both instrument and charging cradle shall provide visual indication of battery charging status.

CALIBRATION	
Calibration tools	Unit shall require no special tools for calibration other than cylinder, regulator, and tubing to supply gas to instrument.
Calibration access	Calibration access can be hidden behind password when desired.
Pushbutton calibration	Calibration shall be easily performed using instrument's push buttons. Internal instrument access or tools shall not be necessary for calibration.
Calibration time	Span calibration shall not exceed 60 seconds for LEL, O2, CO, H2S, and SO2. Other gases shall not exceed the following span calibration times. **Gas type** **Span time** Chlorine 2 minutes Ammonia 2 minutes Nitrogen dioxide 4 minutes Chlorine dioxide 6 minutes Phosphine 4 minutes Hydrogen cyanide 4 minutes
Automatic calibration	Instrument shall be compatible with optional automated test and with calibration system able to store data. External system shall automatically recognize and calibrate instrument and retain all calibration records.

SAMPLING SYSTEMS	
Sampling modes	Instrument shall be available with internal pump.
Sampling systems filters	Pump must contain user-replaceable filters to prevent liquids and dust ingress.
Allowable sample line length	Instrument must be capable of sample draw from 50 feet away within 9 seconds or from 80 feet (24, 38 m) within 15 seconds.
Fluid ingress protection	Sample probe shall be offered that is designed to prevent water and debris from entering instrument.
Reactive gas monitoring	Special sample probe shall be offered when used with Cl2, NH3, and ClO2.

SENSOR CHARACTERISTICS AND PERFORMANCE	
Sensor life	LEL, oxygen, CO, H2S, and IR sensors shall have expected 4-year life. NH3, SO2, Cl2 sensors shall have expected 3-year life.
End-of-life sensor indicator	Instrument shall notify user when sensor is close to and at its end-of-life, following calibration.
Typical t(90) response times[1]	Combustible sensor <10 seconds (methane) < 15 seconds (pentane) Oxygen sensor < 10 seconds CO sensor < 15 seconds H2S sensor < 15 seconds NH3 sensor < 40 seconds SO2 sensor < 10 seconds Cl2 sensor < 30 seconds IR CO2 < 35 seconds IR CH4 < 34 seconds IR C4H10 < 35 seconds

All sensors	All sensors should have built-in/dedicated control circuitry, including drive circuits, memory, microprocessor, and analog-to-digital converter to all for sensor level control and compensation.
Oxygen sensor	Oxygen sensor shall be lead-free and use a non-consumable chemical reaction.
Combustible sensor	Combustible sensor must have at minimum the following poison resistance: 3000 ppm*hours to H2S 90 ppm*hours to silicon
CO / H2S Sensor	CO / H2S sensor shall be designed with extremely robust carbon filter for CO channel to block interference. Sensor shall be designed for virtually no cross-channel interference.
NH3 Sensor	NH3 sensor shall use non-consuming chemical reaction and self-recover after significant gas exposures. Sensor shall have 3-year or greater expected life.
SO2 Sensor	SO2 sensor shall have response time of 10 seconds or less, use non-consuming chemical reaction, and self-recover after significant gas exposures. Sensor shall have a 3-year or greater expected life.
Cl2 Sensor	Cl2 sensor shall have minimal drift even under dry conditions. Sensor shall have virtually no cross-interference with CO, H2S, and SO2. Sensor shall have 3-year or greater expected life.
IR Sensors	IR sensor shall not rely on mirror to obtain appropriate path length, as mirrors are very susceptible to humidity and to condensing atmospheric conditions.

[1] All response times are calculated using manufacturer-recommended operation.

[2] Dirt, dust, and cleanliness of sampling line can and will impact response time.

DATA LOGGING (INSTRUMENT DATA STORAGE)	
Data logging	Instrument must be available with standard data logging.
Event log	Instrument shall record at least 1000 events.
Data log capacity	Data log shall record and store data for average of 200 hours (at 1-minute intervals) without overwriting existing information during normal use.
Gas record content	Data log entries shall contain as minimum date, time, and record of peak and average readings for each gas sensor (oxygen shall be recorded as maximum and minimum for these intervals).
Atmospheric record	Instrument shall have provisions to record atmospheric temperature changes.
Record intervals	Time span among data records shall be user-selectable from 15 seconds to 15 minutes.
Data retention	Instrument data stored in memory shall not be lost or corrupted in event of sudden instrument power loss.
Activity record Content page	Instrument data log shall record and be capable of reporting significant instrument events including: • Gas and battery alarms • Fresh air setups, sensor re-zeroing, and calibrations • Battery voltage and elapsed run time

CERTIFICATIONS	

North America	**USA / UL**
	
	Class I, Division 1, Groups A, B, C & D
	Class II, Division 1, Groups E, F & G
	Class III, Division 1
	Ambient temperature: -40 C to +50 C; T4
	  ALTAIR 5X Multigas Detector with alkaline battery pack T3/T4
	  ALTAIR 5X or ALTAIR 5X iR Multigas Detector with rechargeable battery pack T4
	
	Canada CSA – Pending
	Class I, Division 1, Groups A, B, C & D
	CAN/CSA C22.2 No. 152 Combustible Gas Detection Instruments
	C22.2 No. 152 Performance Ambient Temperature: -20° C to +50° C
	C22.2 No. 157 Intrinsic Safety Ambient Temperature: -40° C to +50° C

	ALTAIR 5X Multigas Detector with alkaline battery pack T3/T4 ALTAIR 5X or ALTAIR 5X iR Multigas Detector with rechargeable battery pack T4

Europe	**ATEX Directive 94/9/EC**
	ALTAIR 5X Multigas Detector:
	    II 2G Ex d ia mb IIC Gb IP65 – Zone 1 when XCell Ex sensor
	    is installed.
	    II 1G Ex ia IIC Ga IP65 – Zone 0 when XCell™ Ex Sensor is
	    not installed.
	    ALTAIR 5X Multigas Detector with rechargeable battery pack T4
	    I M1 Ex ia I Ma
	
	ALTAIR 5X iR Multigas Detector II 2G Ex d e ia mb IIC T4 Gb IP65
	CE 0080
	Directive 2004/108/EEC (EMC): EN 50270 Type 2, EN61000-6-3

Australia / New Zealand	**ANZEx Australia/New Zealand - Test Safe Australia**
	    ALTAIR 5X & ALTAIR 5X iR Multigas Detector
	        Ex ia sa IIC T4 (Zone 0) IP65
	            ALTAIR 5X Multigas Detector with alkaline battery
	            pack T3/T4
	            ALTAIR 5X or ALTAIR 5X iR Multigas Detector with
	            rechargeable battery pack T4
	        Ex ia sa I (Zone 0) IP65
	
	IECEx - Test Safe Australia
	    ALTAIR 5X & ALTAIR 5X iR Multigas Detector
	        Ex ia mb d IIC IP65 – Zone 1 when XCell Ex sensor
	         is installed.
	        Ex ia IIC IP65 – Zone 0 when XCell™ Ex Sensor is
	        not installed.
	            ALTAIR 5X Multigas Detector with alkaline battery
	            pack T3/T4
	            ALTAIR 5X or ALTAIR 5X iR Multigas Detector with
	            rechargeable battery pack T4
	        Ex ia I IP65 – Zone 0

Manufacturing system quality approvals	Instrument manufacturer must be certified as compliant with ISO 9001 provisions.

ENVIRONMENTAL	
Temperature	Normal operation: 0° to 40° C Extended: -20° to 50° C Short periods (15 minutes): -40° to +50° C
Humidity	15-90% RH (non-condensing) continuous 5-95% RH (non-condensing) for short periods.

MAINTENANCE & WARRANTIES	
Sensor replacement	Sensors shall be easily accessed and replaced by users if desired by purchaser.
Warranty, consumables	Instrument shall have 3-year back-to-back warranty under normal use conditions, including CO/H2S/LEL/O2/SO2/IR sensors. NH3 and Cl2 shall be warranted for 2 years. Other sensors shall be warranted for at least 12 months.