3.2 Medical Requirements Overview

TABLE 3.2: MEDICAL REQUIREMENTS OVERVIEW

MRID# and Title:	MR091L Air Quality Monitor (AQM)
Sponsor:	Medical Operations
Discipline:	Environmental Health
Category:	Medical Requirements
References:	ISS Medical Operations Requirements Document SSP 50260
Purpose/Objectives:	The AQM monitors the atmosphere of the International Space Station (ISS) for volatile organic compounds (VOCs).
Measurement Parameters:	VOCs in the ISS atmosphere
Deliverables:	The AQM identifies volatile organic compounds. The toxicology group delivers a weekly report of the concentrations of a variety of compounds analyzed by the AQM.
Flight Duration:	≥ 30 days
Number of Flights:	All flights
Number and Type of Crew Members Required:	One crewmember (US Specialist) trained in EHS activities. One EHS crewmember will perform the in-flight activity.
Other Flight Characteristics:	N/A

3.3 Preflight Training

TABLE 3.3: PREFLIGHT TRAINING

Preflight Training Activity Description:	Crewmember (US Specialist) trained in all EHS activities. All crewmembers are trained in Environmental Health System (EHS) Toxicology Operations.			
	Duration:	**Schedule:**	**Personnel Required:**	
Schedule:	Experienced: 50 min Inexperienced: 1 hour 15 minutes	L-16 months	Crewmembers/Instructors	
Ground Support Requirements Hardware/Software	**Preflight Hardware:**	**Preflight Software:**	**Test Location:**	
	AQM and associated parts	N/A	U.S.	
Training Facilities	**Minimum Room Dimensions:**	**Number of Electrical Outlets:**	**Temperature Requirements:**	**Special Lighting:**
	29' x 14'	One	Ambient	None
	Hot or Cold Running Water:	**Privacy Requirements:**	**Other:**	
	N/A	N/A	1 Table & 6-8 chairs	
Constraints/Special Requirements:	None			
Launch Delay Requirements:	Refresher training will be available upon crewmember request.			
Notes:	Experienced crewmembers – those who have had previous EHS Toxicology Operations Training. Inexperienced crewmembers – those who have never had EHS Toxicology Operations Training. EHS Toxicology Operations Training includes training for GSC, FMK, CSA-CP, Portable Oxygen Monitor, CDMK, Portable Gas Delivery System, and AQM.			

3.4 Preflight Activities – No Preflight Activities

3.5 In-Flight Activities

TABLE 3.5.1: IN-FLIGHT ACTIVITIES

In-Flight Activity Description:	Primary activity: In flight monitoring of targeted compounds to assess the quality of the air for crew respiration. Secondary activity: In flight monitoring of major non-targeted compounds following accidental contamination of the ISS atmosphere.			
Schedule:	**Duration:**	**Schedule:**	**Flexibility:**	**Personnel Required:**
	AQM Deploy: 30 minutes (per AQM)	Once per delivery. Resupply schedule is every three years.	Units may remain in use longer if they continue to provide acceptable analytical performance.	1 crewmember
	AQM Mobile Sampling: 20 minutes [0:10 Set up, 0:10 Stow and 0:45 min untended]	As needed	N/A.	1 crewmember
	AQM Relocate: 20 minutes	Once per 60 days (one unit only)	Limited - rotation schedule tied to sieve pack replacement	1 crewmember
	AQM Sampling: 15 minutes	Automatic execution every 71 hours or remotely by MCC, as needed.		Untended
	Sieve Pack Replacement: 20 minutes	Once per 180 days (2 units)	Limited – sieve packs should be replaced when units are collocated in the US Lab.	1 crewmember
Procedures:	Procedures are located in the Medical Operations book, under Environmental Health Systems: • Air Quality Monitor – Relocate • Air Quality Monitor – Operations with Battery Holder			
Constraints / Special Requirements:	AQM runs should occur on the same day that archive samples are collected in GSCs. On these days, the AQM runs should be started remotely by MCC within 30 minutes of GSC sampling. When this is not feasible, the AQM runs may be delayed provided they are started within 2 hours of GSC sampling. On days of first ingress of US and IP cargo vehicles, AQM runs should be started remotely by MCC within 30 minutes of vehicle hatch opening. AQM runs should be started remotely by MCC on both units following relocation.			
Photo / TV Requirements:	Two pictures from opposite angles of the hardware at medium range. Imagery will be used to document actual position of AQM, confirm all supporting hardware is connected properly, and determine if surrounding hardware will affect air flow to the AQM.			
Cold Stowage Requirements:	N/A			
Mission Extension Requirements:	N/A			
Landing Wave-Off Requirements:	N/A			
Notes:	AQM hardware was validated according to JSC-66644, "Air Quality Monitor (AQM) On-orbit Validation Plan". Locations for the AQM relocation will alternate between the JEM and the Columbus module.			
Data Delivery	Data from both AQM units are automatically transferred into an AQM folder on the ISS Server. Data is transferred via the ISS wireless network using a software script on each AQM. OCA console downlinks the AQM data weekly from the ISS server weekly into the BME Downlink Data folder using the Orbital Communications Adapter Management System (OCAMS). The Ops Team Lead distributes the data to			

	personnel in the Toxicology and Environmental Chemistry (TEC) Laboratory by copying the data from the BME Downlink Data folder into a designated AQM data folder on the TEC network server.

TABLE 3.5.2: IN-FLIGHT HARDWARE

Hardware/Software Name
Air Quality Monitor
AQM 120V/28V Power Supply Cable
AQM 24V Power Cable
AQM Power Supply
Battery Holder with batteries connected

3.6 Postflight Activities – No Postflight Activities

3.7 Summary Schedule

TABLE 3.7: SUMMARY SCHEDULE

ACTIVITY	DURATION	SCHEDULE	FLEXIBILITY	PERSONNEL REQUIRED	CONSTRAINTS
Preflight Training					
Crewmember Training	Experienced: 50 minutes Inexperienced: 1 hour 15 minutes	L-16 months		Crewmember(s)/ Instructor	
Preflight – N/A					
In-Flight					
AQM Deploy	30 minutes (per AQM)	Once per delivery. Resupply schedule is every three years.	N/A	1 Crewmember	AQMs need vents to remain unobstructed. Appropriate power supply must be available. Adequate connection to wireless access point (WAP) is required.
AQM Relocate	20 minutes	Once per 60 days (one unit only)	N/A	1 Crewmember	AQMs need vents to remain unobstructed. Appropriate power supply must be available. Adequate connection to WAP is required. AQM runs should be started remotely by MCC on both units following relocation.

AQM Mobile Sampling: 20 minutes	20 minutes [0:10 Set up, 0:10 Stow] and 45 minutes untended.	As needed	N/A	1 crewmember	
In-flight Monitoring	15 minutes	Automatic execution weekly or remotely by MCC, as needed.	N/A	Untended	AQMs need vents to remain unobstructed. Appropriate power supply must be available. Adequate connection to WAP is required. AQM runs should occur on the same day that archive samples are collected in GSCs. On these days, the AQM runs should be started remotely by MCC within 30 minutes of GSC sampling. When this is not feasible, the AQM runs may be delayed provided they are started within 2 hours of GSC sampling.
Sieve Pack Replacement	20 minutes	Once per 180 days (both units)		1 Crewmember	Sieve Packs should be replaced in both AQM units when they are collocated in the US Lab. New Sieve Packs should be installed at least 30 days prior to the next scheduled rotation.
Postflight – N/A					
Postflight Debrief					
Debrief	No extra time	~R+30 days	N/A	Crewmembers/ Toxicology Team	Part of Med Ops debrief