3.2 Medical Requirements Overview

TABLE 3.2: MEDICAL REQUIREMENTS OVERVIEW

MRID# and Title:	MR037L Toxicological Assessment Using Formaldehyde Monitor Kit (FMK)
Sponsor:	Medical Operations
Discipline:	Environmental Health
Category:	Medical Requirements
References:	ISS Medical Operations Requirements Document SSP 50260
Purpose/Objectives:	Determine and assess crew exposure to airborne formaldehyde on ISS.
Measurement Parameters:	Formaldehyde levels
Deliverables:	Post-flight report evaluating the concentration of formaldehyde in the spacecraft air based on analysis of archival samples.
Flight Duration:	≥ 30 days
Number of Flights:	Every ISS Increment
Number and Type of Crew Members Required:	One crewmember (CM) is trained in all Environmental Health System (EHS) activities (US Specialist). All CMs are trained in EHS Toxicology Operations. One CM will perform the in-flight activity.
Other Flight Characteristics:	N/A

3.3 Preflight Training

TABLE 3.3: PREFLIGHT TRAINING

Preflight Training Activity Description:	FMK training will include sampling location and recording of results.			
Schedule:	**Duration:**	**Schedule:**	**Flexibility:**	**Personnel Required:**
	EHS Assessment: 90 minutes	See MA/ITP Schedule	N/A	Instructors/ Crewmembers
Ground Support Requirements Hardware/Software	**Preflight Hardware:**	**Preflight Software:**	**Test Location:**	
	Formaldehyde Monitor Kit	N/A	U.S.	
Training Facilities	**Minimum Room Dimensions:**	**Number of Electrical Outlets:**	**Temperature Requirements:**	**Special Lighting:**
	29' x 14'	None	Ambient	N/A
	Hot or Cold Running Water:	**Privacy Requirements:**	**Other:**	
	N/A	Private room free from distractions	1 table, 6-8 chairs	
Constraints/Special Requirements:	None			
Launch Delay Requirements:	Refresher training is conducted at crewmember request.			
Notes:	EHS Assessment includes training for FMK, Grab Sample Containers (GSCs), Compound Specific Analyzer – Combustion Products (CSA-CP), Portable Oxygen Monitor (POM), Carbon Dioxide Monitor Kit (CDMK), Portable Gas Delivery System, and Air Quality Monitor (AQM). USOS and Russian Crewmembers who have completed ASCAN Training or have flown before will complete the EHS Assessment.			

3.4 Preflight Activities - None

3.5 In-Flight Activities

TABLE 3.5.1: IN-FLIGHT ACTIVITIES

<table>
<tr><td>In-Flight Activity Description:</td><td colspan="4">Formaldehyde monitors are unstowed and deployed in duplicate in each of the designated locations as defined in the activity Execute Notes package. On the face of the monitor, a space has been provided to recording sampling dates, start/stop times, and sampling location. At the time of deployment, the date and time of deployment are recorded on the monitors. After 48-hours of unattended continuous sampling, the exact date and time when the monitors are removed from the area is recorded on each monitor label. The monitors are removed from the area and stowed in the Return “Used” bag inside the FMK.</td></tr>
<tr><td>Schedule:</td><td>Duration:</td><td>Schedule:</td><td>Flexibility:</td><td>Personnel Required:</td></tr>
<tr><td></td><td>Unstow and Deploy(for both locations): 10 minutes

Unattended (continuous sampling) : 48 hours

Retrieve and Stow(for both locations): 10 minutes</td><td>Once every 45 days in Lab and SM</td><td>N/A</td><td>1 Crewmember</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Procedures:</td><td colspan="4">Procedures are located in the Systems Operations Data File (SODF) Med Ops Book</td></tr>
<tr><td>Constraints / Special Requirements:</td><td colspan="4">• Monitors must be deployed side-by-side approximately mid-axis, 5-10 cm apart
• Deployment sites must permit air to move freely over the monitor surface
• FMK sampling should be coordinated with nominal GSC sampling sessions, and with Russian AK-1M sampling if it occurs during the 48 hour FMK deploy period.
• FMK Monitors can be retrieved 40-60 hours after deployment.</td></tr>
<tr><td>Photo / TV Requirements:</td><td colspan="4">Photo documentation may be requested during contingency situations.
Two photos of each monitor should be taken to give a reasonable perspective of the sampling area: 1) One photo will be a close up view (2 feet away), and 2) Second photo will be a medium distance view of the sampling area and the proximity to other hardware.</td></tr>
<tr><td>Cold Stowage Requirements:</td><td colspan="4">N/A</td></tr>
<tr><td>Mission Extension Requirements:</td><td colspan="4">N/A</td></tr>
<tr><td>Landing Wave-Off Requirements:</td><td colspan="4">N/A</td></tr>
<tr><td>Data Delivery</td><td colspan="4">See Table 3.6 Post-flight Activities for FMK data delivery.</td></tr>
</table>

TABLE 3.5.2: IN-FLIGHT HARDWARE

Hardware/Software Name
Formaldehyde Monitor Kit (FMK)

3.6 Postflight Activities

TABLE 3.6: POSTFLIGHT ACTIVITIES

Postflight Activity Description:	The FMK monitors deployed in-flight will be returned and analyzed by the JSC Toxicology and Environmental (TEC) Laboratory.
Constraints/Special Requirements:	Stowage temperatures during transport of returned samples to JSC TEC Laboratory should be within the range of 0 °F (-18 °C) to 115 °F (46 °C).
Early Destow / Early Return:	*FMK samples collected during nominal and contingency operations on ISS are required to be early destowed from the returning vehicle to ensure the prompt return of the samples to the JSC TEC Laboratory for analyses.
Notes:	SF, SD, OC, or MTLO is responsible for the early return of samples to JSC depending on the return vehicle.
Data Delivery	• If the analysis of formaldehyde levels indicates an elevation or trend, then JSC Toxicology will notify the Contingency Action Team, which includes the ISS Lead Surgeon. • A preliminary report will be provided within 1 week of receipt for samples collected during a contingency event (including, but not limited to, crew symptoms). • A final report will be posted to the JSC Toxicology Website after all returning samples have been analyzed.

3.7 Summary Schedule

TABLE 3.7: SUMMARY SCHEDULE

ACTIVITY	DURATION	SCHEDULE	FLEXIBILITY	PERSONNEL REQUIRED	CONSTRAINTS
Preflight Training					
EHS Assessment	90 minutes	See MA/ITP Schedule	N/A	Instructors /Crewmembers	None
Preflight: N/A					
In-Flight					
FMK Nominal Sampling	Unstow and Deploy: 10 minutes (for both locations) Unattended: 48 hours (continuous sampling) Retrieve and Stow: 10 minutes (for both locations)	Once every 45 days in Lab and SM	N/A	1 Crewmember	• Duplicate monitors must be deployed side-by-side approximately mid-axis, 5-10 cm apart. • Deployment sites must permit air to move freely over the monitor surface • Monitors can be retrieved 40-60 hours after deployment. • FMK sampling should be coordinated with nominal GSC sampling sessions, and with Russian AK-1M sampling if on the same day. GSC and AK-1M sampling can occur anytime during the 48 hours FMK deployment period.
Postflight: N/A					
Postflight					
Debrief	No extra time	~R+30	N/A	Crewmembers/ Toxicology Team	Included as part of the nominal Med Ops debrief.