Space X1 First Entry Sample

International Space Station: One mini-grab sample container (m-GSC) was returned aboard Space X1 because of the importance of quickly knowing first-entry conditions in this new commercial module. This sample was analyzed alongside samples of the portable clean room (PCR) used in the Space X complex at KSC. The recoveries of ^{13}C-acetone, fluorobenzene, and chlorobenzene from the GSCs averaged 130, 129, and 132 %, respectively.

Table 1. Analytical Summary of Space X1, First-Entry and PCR samples

Module/ Sample	Date of Sample	NMVOCs[a] (mg/m^3)	Perfluoro (2-methyl) pentane (mg/m^3)	Freon 218 (mg/m^3)	T Value[b] (units)	Alcohols (mg/m^3)
Space X1 module	10/9/12	33	10	2.4	0.69	10
PCR	10/7/12	1.3	*n/a*	*n/a*	*n/a*	*n/a*
PCR	10/7/12	2.2	*n/a*	*n/a*	*n/a*	*n/a*
Guideline		*<25*	*n/a*	*none*	*<1.0*	*<5*

[a] Non-methane volatile organic hydrocarbons, excluding Freon 218
[b] Based on 7-d SMACs and calculated excluding CO_2 and formaldehyde.

This result is quite consistent with the predicted T-value at first entry. Given that the module was sealed for 1.71 days before first entry, the predicted T-value was 0.62 T-units (0.07 + 1.71 x 0.32), whereas the actual T-value was 0.69 T-units. Trimethylsilanol was the primary component contributing to the T-value.

Perfluoro (2-methyl) pentane is not an offgas product, but a heat-exchange fluid used by the Dragon vehicle. The amount of perfluoro(2-methyl) pentane predicted from the ground-based offgas test was much higher than we found in the first-entry sample because the leak of this fluid was stopped by repair of the thermal exchange system after the offgas test.

T-values were not calculated on the PCR samples because T-values are not applicable to ground-based samples. None the less, these samples show a relatively clean atmosphere in the PCR at the time of sampling.

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Enclosures
Table 1: Analytical concentrations of compounds found in the Space X1 and PCR samples.
Table 2: T-values of the compounds found in the Space X1 sample.