ABSTRACT OR SUPPORTING INFORMATION

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Testing of an Ammonia EVA Vent Tool for the International Space Station

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Abstract
When components of the International Space Station ammonia External Active Thermal Control System are replaced on-orbit, they must be vented immediately after removal from the system. Venting ensures that the component is not hard packed with liquid and thus does not pose a hazard. An extravehicular activity (EVA) vent tool has been developed to perform this function. However, there were concerns that the tool could whip, posing a hazard to the EVA astronaut, or would freeze.
The ammonia vent tool was recently tested in a thermal/vacuum chamber to demonstrate that it would operate safely and would not freeze during venting. During the test, ammonia mimicking the venting conditions for six different heat exchanger initial conditions was passed through representative test articles.
In the present work, the model that was used to develop the ammonia state and flow for the test points is discussed and the test setup and operation is described. The qualitative whipping and freezing results of the test are discussed and vent plume pressure measurements are described and interpreted.