

MATERIALS AND STRUCTURES SYMPOSIUM (C2)
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Author: Prof.Dr. Rajeev Vaghmare
Indian Space Research Organization (ISRO), India, rvaghmare@yahoo.com

CONFIGURATION OF EXPERIMENTAL SET UP FOR OUT GASSING EVALUATION OF
SPACECRAFT MATERIALS

Abstract

Out gassing properties of polymeric materials used for fabrication of satellites is of prime importance to ensure the functional performance of any remote sensing as well as communication satellite. This calls for the evaluation of total mass loss and collected volatile condensate mass loss that is likely to be evolved due to hard vacuum environment backed up with varied range of temperatures during the operational time period of the satellite. Attempts are made during the course of this work to configure the two different set ups working parallel backed up by the common vacuum system backed with turbo molecular pumping system. Total mass loss is evaluated using Cahn USA make thermogravimetric system 113 and the collected volatile condensates were computed using quartz crystal micro balance having resolution one nano gram. All the materials used for configuration of the said system have been free from any possibility of out gassing during the test run. The testing was done exactly in accordance with ASTM E 595 1983 standard and exceeded the requirements spelled out like that not touching the test sample by human hand throughout the test duration of twenty four hours. The kind of precision and accuracy obtained both for total mass loss and that for collected volatile condensates was even one order better than specified in ASTM standard E 595 1983. The configuration developed does not have any maintenance or idle period for years together and is being successfully used for screening of all the polymeric materials being used for Indian national satellite and Indian remote sensing satellites.