DEFECT FREE VIBRATION ISOLATORS WITH LOW OUTGASSING PROPERTIES USING ROOM TEMPERATURE VULCANISABLE SILICONE RUBBER FOR SATELLITE APPLICATIONS

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Vibration isolators are being used to reduce the orbital micro vibration induced by reaction wheel (RW) operation for spacecraft with sensitive optical payload like CARTOSAT, MICROSAT and GISAT. Vibration isolators are also required to isolate high frequency vibration generated by bearing and unbalance mass during RW operation. The room temperature vulcanizable (RTV) vibration isolators completely isolate the vibration transmission from the RW to the moulding platform. Electronic components and sensors are highly sensitive to pyroshock environments (near and mid-field) and may lead to damage or failure while resistant to low frequency environments (far-field), sine vibrations and random vibrations. Pyroshock is defined as the transient response of the structure (which includes structural elements, components, assemblies, subsystems and/or systems) to loading induced by the activation of pyrotechnic devices attached to the structure. Generally pyrotechnic devices are explosive or propellant activated. Hence it is necessary to isolate these electronic components and sensors positioned in near or mid-field pyro shock environments. To achieve shock isolation in near or mid-field without altering thermal environment, an isolation system was designed and tested. Characterization such as mechanical and thermal properties was carried out. Tensile strength of 221 kPa and thermal stability above 500^{o}C was achieved. Beside these, silicone rubber had low outgassing property. Acousto ultrasonic (AUS) detection test confirmed that the newly developed system was devoid of defects such as bubbles, air entrapment, holes *etc*.

Keywords: Low outgassing, RTV Silicone rubber, Space craft, Vibration Isolator

INTRODUCTION

Spacecraft are affected by harsh environment in low earth orbit. At an altitude of 200 to 700 km, due to synergistic effect of high influence of atomic oxygen, charged particles, thermal cycling and full spectrum of solar radiation (de Groh and Bank, 1994; Brunsvold *et al*., 2004), critical damages to the polymers used in spacecraft structures could occur (Serenko *et al*., 2020). Therefore, it is highly essential to protect the bare polymers.

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