

DEVELOPMENT OF COMPOSITE ABLATIVE LINERS FOR SOLID ROCKET MOTOR FLEX NOZZLES

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Abstract

Solid Rocket Motor generates high thrust by accelerating high pressure gases to supersonic velocities in convergent divergent nozzle, thus converting pressure energy to kinetic energy of propulsion. As exhaust gas from chamber is of high temperature, the structural steel members of nozzle should be protected from hot gases by highly erosion resistant thermal liners. For this purpose, ablative composite liners made up of Phenolic resin matrix based combined with reinforcement material like carbon fabric is extensively used [1]. Divergent being largest component and contributes more to nozzle weight, the thickness of liner should be as least as possible at the same time; it should be more erosion resistant. The erosion resistant due to hot gases can be increased by fabricating the liner in such a way that the flame only touches the edge of the composite ply of liner and liner has more density. This can be achieved by tape winding of composite prepreg tapes at Zero degrees on tapered metal mandrel using tape winding machine followed by Autoclave curing [2]. This paper gives the details of prepreg, Tape winding, Autoclave Curing and NDT of ablative liner.

Keywords : Ablative liner, Tape winding, Prepreg, Rayon carbon fabric, Phenolic resin

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