

## Low Modulus Flex Seal Compound

Flex Nozzle Control (FNC) is one among the thrust vector control system used in solid rocket propulsion. The system enables the submerged nozzle to be vectored in all directions and to a limited angle, by an actuation system, as the nozzle is connected to the main motor through a flexible joint. The flex seal is made up of alternate layers of metallic shims and elastomeric pads. Natural rubber based elastomeric pads are found to be most suitable element for this application because of its easiness with which it can be formulated to give low shear modulus coupled with high shear strength. The method is further recommended for large size flex seals for bigger size boosters of ISRO.

The technology for realization of this low modulus flex seal rubber compound using Natural rubber, ISNR grade is offered for industrial application. The complete formulation, processing/compounding, process parameter selection, specimen preparation, property evaluation, storage and shelf life are detailed, for the developed material. The material exhibits excellent rubber to metal and rubber to carbon-carbon composite interface adhesion, enabling it for use as multilayer structural element and leak free joint.

### Salient Features

- Low shear modulus
- High shear strength
- Amenable for extrusion, transfer and compression moulding processes
- Good rubber to metal and rubber to carbon epoxy composite interface property

### Properties

Sl. No.	Properties of Low modulus flex seal compound	
1.	Tensile strength, ksc	100 (Min)
2.	Elongation at break, %	600 (Min)
3.	Hardness, Shore A	40 (Max)
4.	Shear strength, ksc	20 (Min)
5.	Shear strain, %	700 (Min)
6.	Shear modulus, ksc @ 3.57 ksc shear stress	1.6-2.0
7.	Compression set @ 70degC/22hrs, %	40 (Max)

### Applications

- Submerged flex nozzle vectoring unit
- Anti-vibration structural element