Phenolic Matrix Resin (PF-108)

Vikram Sarabhai Space Centre has developed different types of resins catering to specific applications in Launch Vehicles and Satellites. These materials may also find various industrial applications such as bonding, sealing, coating, potting, laminating, molding, etc.

PF-108 is a special grade liquid phenolic matrix resin which is used as a precursor for production of silica phenolic throat inserts for the liquid engines of ISRO launch vehicles.

Operational steps for synthesising PF 108

1. Melting of Phenol

2. Charging of formalin and molten phenol into the reactor in the desired mole ratio

3. Addition of catalyst

4. Condensation polymerization of phenol and formalin

5. Neutralization of reaction mixture with acid to desired pH

6. Settling of reaction mixture

7. Removal of water of reaction and sodium salt by decantation

8. Vacuum drying of resin to remove the final traces of water and other volatiles

Major equipments needed are phenol melting vessel and reaction vessel

1. Melting vessel for phenol melting

2. Jacketed SS reactor fitted with cooling coils, stirrer, motor, condenser and receiver for polymerisation and drying. The reactor is suitably linked with the utility system during operation. It is also equipped with load cell, vacuum systems, temp controllers, cooling systems pressure/vacuum gauges, etc

3. Decanter vessel for removal of water

4. Water jet ejector for vacuum

PF 108 Product Specifications

Appearance	:	Yellowish brown to dark brown liquid
Viscosity at 30 DC	:	400 – 600 cps
Specific gravity at 30 DC	:	1.18 – 1.20
Refractive Index at 30 DC	:	1.570 – 1.575
Total solids	:	72 –75%
Free phenol (%)	:	18 –22%
Free formalin (%)	:	0.5% (max.)
Ash Contact	:	0.5% (max.)
Point of trouble	:	13 – 15.5 ml of water/10 ml solution
pH (5%solution)	:	7.3 –7.8
Sodium Content	:	0.4% (max.)
Water Content	:	14% (max.)
Storage conditions		
Temperature	:	<15°C
ShelfLife	:	3 months (in above condition)