PHTHALONITRILE RESIN — AZKLM0301

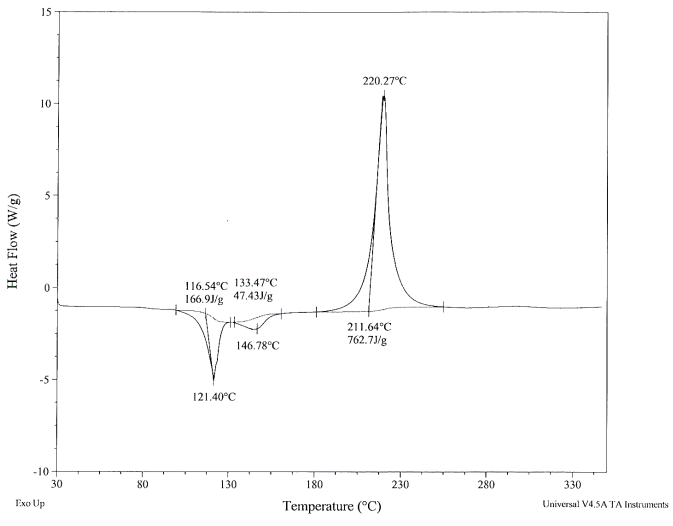
TECHNICAL DATA SHEET

AZKLM 0301 belongs to the family of high-performance thermosets capable of satisfying the stringent requirements of exigent applications. The fire performance of Phthalonitrile-Carbon and Phthalonitrile-glass composites are superior to that of any other thermoset-based composite currently in use for aerospace, ship, and submarine applications, and opens up many more applications that could be realized for other resin systems.

NEAT RESIN CHARACTERISTICS

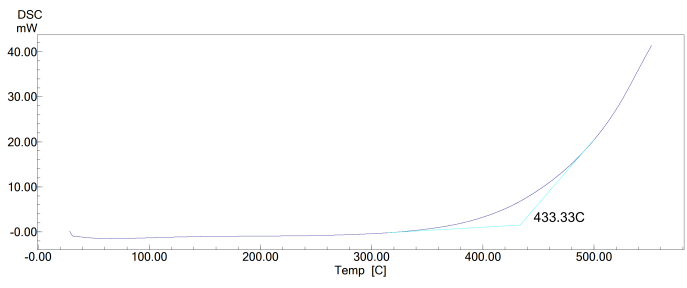
	CURED AT 375°C
FLEXURAL STRENGTH, 3-POINT BENDING	100 MPa
GLASS TRANSITION TEMPERATURE (T_g)	435°C
CHAR YIELD	72% upto 1000°C (inert atm)
MOISTURE ABSORPTION (54 h at 60°C water)	1.5%
DENSITY	1.33 g/cc
MELT VISCOSITY	< 150 cps at 150°C

DSC (Uncured)



Uncured resin
Ramp 10°C/min upto 350°C

DSC (Cured)

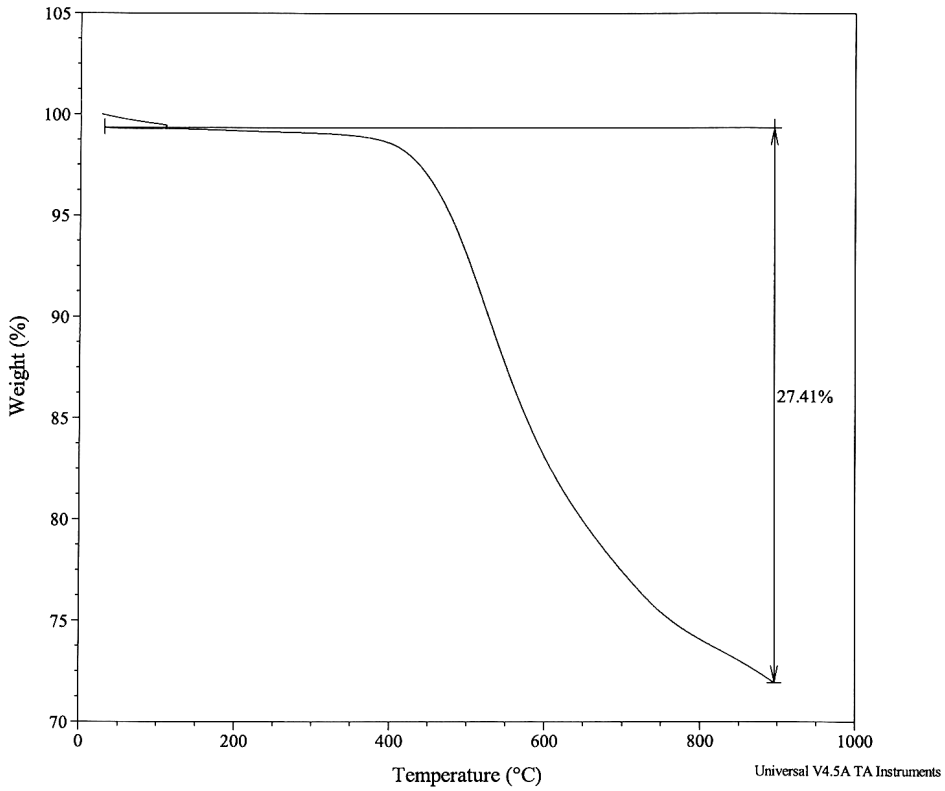


Post-cured at 375°C
Ramp 10°C/min upto 550°C

STANDARD OPERATING PROCEDURE FOR PHTHALONITRILE COMPOSITE (RESIN TRANSFER MOLDING METHOD)

- Take the mould as per the geometric profile of the composite required. The mould should be provided with vacuum ports and transfer ports. Make sure that the vacuum and transfer ports are on the diagonally opposite sides of the component, and not close to each other.
- Place the reinforcement into the mould cavity. Take appropriate number of layers as per the required fibre volume fraction and close the mould with fasteners to make it leak proof and to maintain vacuum inside the mould cavity.
- Couple the vacuum ports with valves and traps to the mould.
- Pre-heat the mould to 150^0C with vacuum. Maintain the vacuum at 10mbar.
- Take 20-30% more resin than that is actually required to be transferred into the cavity.
- Place the resin in a closed melting pot and maintain the temperature at 150^0C $\pm 3^0$C.
- The melt viscosity at 140°C is in the range 60 to 120 cps depending on the duration of exposure to that temperature. It remains almost constant for 4 hours before it starts to increase
- De-gas the resin after melting at 150^0C, typically for 10 minutes. Until the De-Gas is completed, make sure the transfer port valve is closed.
- After De-Gas is completed, open the transfer port valve and maintain the vacuum in mould cavity for successful impregnation.
- Apply positive pressure to the resin pot for better impregnation on component. Typically, pressure applied should be 5 bar.
- You can confirm that the impregnation of the composite is successful only after melt resin comes through vacuum traps.
- Close the vacuum port valves and proceed for further curing as per the below cure cycle at a rate of 2^0C/min rise in the temperature on the mould.
- Cure cycle
  180^0C --- 1hour | 200^0C --- 2hours | 220^0C --- 4hours
- After cure is completed, cool down the mould to 60^0C at a rate of < 5^0C/min.
- De-mould the component and proceed for post cure cycle at 2^0C/min in free standing condition.
- Post cure cycle:
  300^0C --- 4 hours | 375^0C --- 6 hours (optional, only for the composites that require high glass transition temperature)
- After post cure is completed, cool down the mould to 60^0C at a rate of < 5^0C/min.

TGA (THERMOGRAVIMETRIC ANALYSIS)



Post-cured at 375°C
Ramp 10°C/min upto 900°C

5% wt. loss temp > 475°C
10% wt. loss temp > 550°C

COMPOSITE PROPERTIES

	ROOM TEMPERATURE	AFTER AGING TO 300°C FOR 100 hrs IN AIR
CARBON FABRIC (T-300)		
FLEXURAL STRENGTH	650 MPa	480 MPa
TENSILE STRENGTH	425 MPa	—
E-GLASS FABRIC		
FLEXURAL STRENGTH	590 MPa	500 MPa
TENSILE STRENGTH	440 MPa	—

FIBRE VOLUME FRACTION ($60V_f$)

AZISTA AEROSPACE

Sy.No 80-84, Melange Towers, 4th Floor, C wing, Patrikanagar,

Madhapur, Hyderabad, Telangana, India - 500081.

Phone: +91-99129-20011, +9140 4047 3500