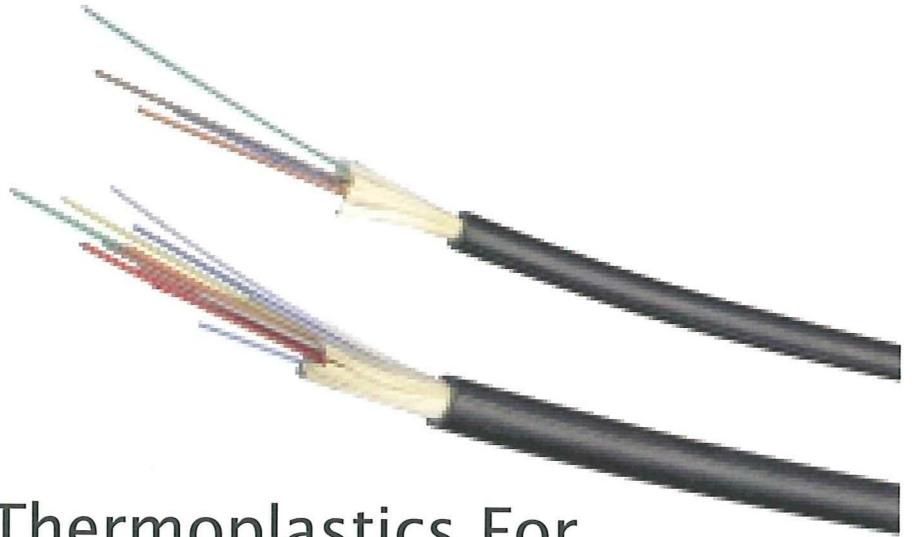


PBT Resin

TORAYCON 1200MF

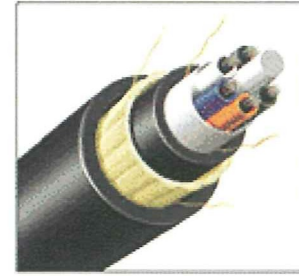


Engineering Thermoplastics For
Loose Tube Optical Fiber Cable

Toray Plastics (M) Sdn. Bhd.

<http://www.torayplastics.com.my/>

2. LOOSE TUBE CABLES

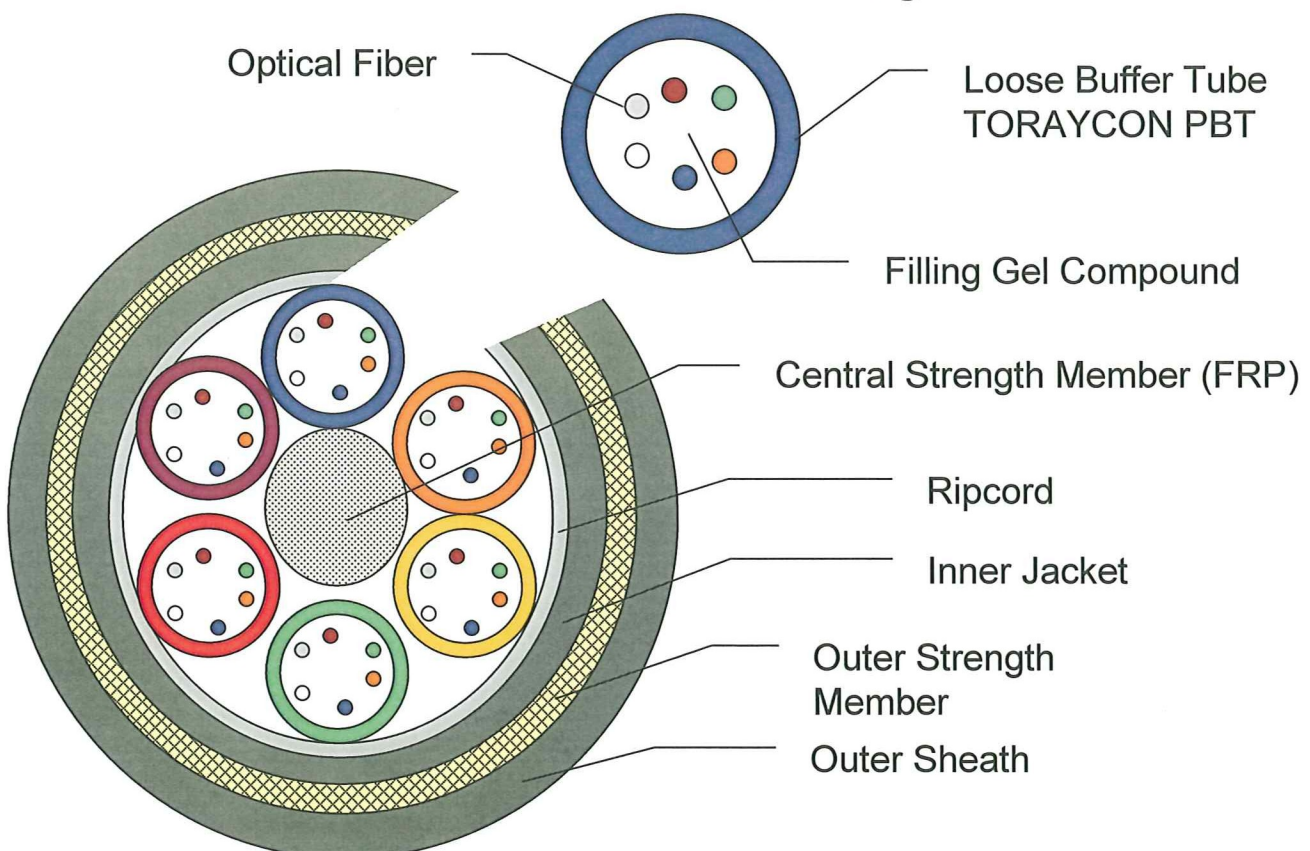


For the loose tube optical fiber cable design, normally the cable consists of more than one loose buffer tube. In each loose buffer tube, single fiber or multi-fibers bundle is loosely arranged and the tube is normally filled with a water-blocking gel compound.

PBT resin is a widely used loose buffer-tube material because it works well across a wider range of conditions. Loose buffer tube diameter varies with the number of fibers enclosed, but is typically 2 to 2.5 mm. It usually has a wall thickness of 0.4 mm.

This gel-filled loose buffer tube gives excellent protection to the optical fibers against external stresses which act on the cable during cable processing and during the on site cable lay out operation.

As shown in below figure, the loose tube optical cable is protected by various wrappings, polymer jackets and additional reinforcements in form of strength member layers or armoring.



3. PROPERTY DATA

Properties	Test Method	Test Condition	Units	TORAYCON 1200MF
				(Typical value)
Melting Point (DSC)	Toray Method	-	°C	224
Density	ISO 1183	23°C/ 50%RH	kg/m ³	1,315
Charpy Impact Strength	ISO 179/1eA	23°C Notched	kJ/m ²	5.1
Hardness	ISO 7619	23°C	Shore D	78
Flexural Strength	ISO 178	23°C	MPa	83
Flexural Modulus		23°C	MPa	2,400
Tensile Elongation at Break	ISO 527	23°C	%	120
Tensile Strength		23°C	MPa	58
Tensile Modulus		23°C	MPa	2,300
Melt Volume Rate	ISO 1133	250°C, 2.16kg	cm ³ /10min	16
Moisture Content	ISO 960	-	% w/w	≤ 0.06
Intrinsic Viscosity	Toray Method	0.5wt% OCP	dl/g	1.23

Note : These values are typical data for this product under specific test condition and not intended as limiting specifications.

4. PROCESSING CONDITIONS

4.1 Pellet pre-drying

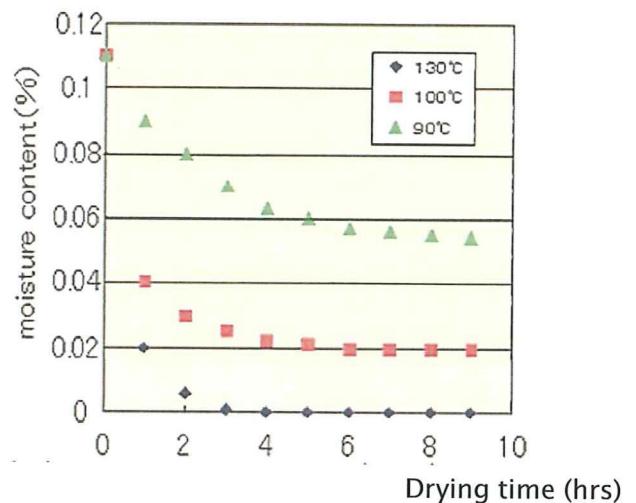
PBT resin moisture absorption level depends on the surrounding environment conditions (temperature and humidity) and time of exposure. Minimizing the PBT resin moisture content, preferably $\leq 0.02\%$ through pellet pre-drying process is important in ensuring the extrusion process stability and to avoid the possibility of hydrolysis process to happen.

The recommended pre-drying condition is 120°C – 130°C for 3–5 hours. The efficiency of dryer/oven used has to be verified to optimize the effectiveness of drying process.

Basically, PBT resin shows excellent thermal resistance. However, the drying temperature should not $> 150^{\circ}\text{C}$ to prevent discoloration problem.

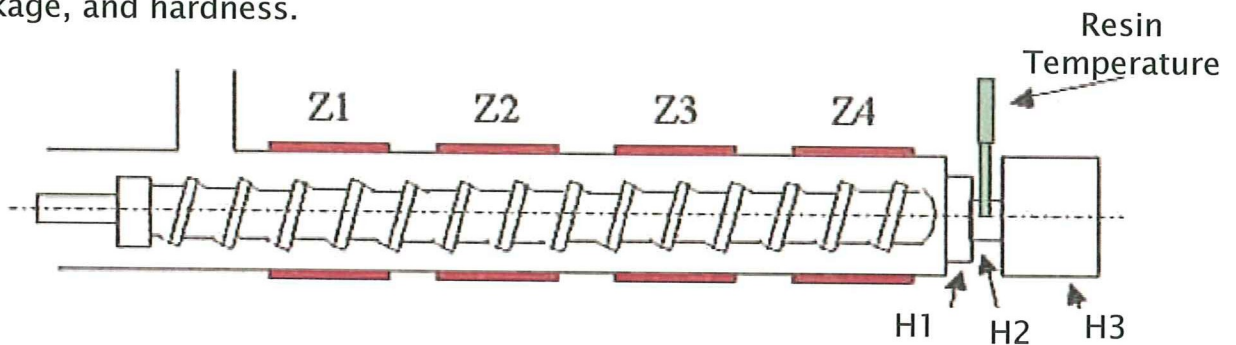
Drying temperature :

- $< 130^{\circ}\text{C}$ – No discoloration (> 200 hrs)
- 150°C – No discoloration (< 100 hrs)
- 170°C – Slightly discoloration (~ 100 hrs)



4.2 Extrusion condition

TORAYCON PBT can be processed on most conventional single-screw extruders. Below is recommended extruder cylinder temperature setting. Optimize the balance of extrusion speed, draw down ratio and extrusion temperature to achieve good quality loose tube in terms of tube diameter, excess fiber length, post production shrinkage, and hardness.



Cylinder		Head	
Z1	Z2 - Z4	H1, H2	H3
240–250°C	250 - 270°C	250 - 270°C	250 - 260°C