

A close-up photograph of vibrant green pine needles, showing their fine texture and arrangement on a branch. The background is a soft, out-of-focus green, creating a natural and fresh atmosphere.

FibraQ[®]
by Biofiber Tech

**Processing recommendations
for FibraQ PP/PE compounds**

1. Make sure your extruder configuration is suitable for FibrAQ.

- **A twin Screw Extruder (TSE)** is required to achieve a proper mixing
- **Screw diameter:** : The pelletized form of FibrAQ cannot fit small extruders. Therefore, a screw diameter of >20 mm is required. Alternatively, FibrAQ can be grinded to be fed into any compounder in powder form.
- **Screw design:** Sufficient shear forces are required to achieve a proper dispersion of the fibres. Therefore, make sure that your screw configuration includes a "semi-aggressive" kneading zone.

2. Dry your FibrAQ pellets.

- FibrAQ must be dried before compounding. Recommended drying conditions are >6h @ 90°C.

3. Set your extruder's temperature profile.

- Always extrude FibrAQ at temperatures lower than 200 °C to avoid burning the fibres.

Matrix	PP	PLA	ABS	PA11
Recommended Temperature	165-185°C	170-190°C	190-210°C	190-210°C

4. Prepare your formulation.

- **Coupling agent:** The use of coupling agents is strongly encouraged to achieve the best material performance. 2% dosing (MAPP, MAPE, or other corresponding analogous) is recommended for composites comprising 20-30wt% FibrAQ, or 3% dosing for composites comprising >30% FibrAQ.
- Mix FibrAQ with the polymer pellets and coupling agent at your desired ratios. Please contact our technical assistance for advice.

5. Compounding

- Besides an appropriate screw configuration, it is crucial to optimize the process parameter settings for producing high-quality compound. Enough mechanical energy input is needed to disperse the fibers (sufficient shear forces and enough residence time) while avoiding burning of the fibres. Some visual examples of compounds are shown on the following page.

6. Post-compounding recommendations.

- Store the pellets in a cool and dry location.

Visual examples of compounds



Example 1:
High quality compound.

Good because the fibres are uniformly distributed in the polymer matrix without discoloration or burn signs.



Example 2:
Insufficient dispersion of the fibers.
This can occur because of
a) an inappropriate screw configuration without sufficient mixing zones,
b) Insufficient residence time.



Example 3:
Too low process temperatures in the compounder.
This results in an inhomogeneous compound with poorly dispersed fibres.



Example 4:
„Burnt compound“.
This can be caused by too high process temperatures or by a too long residence time in the process.

Injection moulding recommendations

1. Drying the granulates:

To ensure optimal results, the compounded granulates should be dried prior to injection moulding. The recommended drying conditions are 4 h at temperatures 90°C. The recommended drying time can vary depending on storage conditions of the compounded granulate.

2. Temperature:

The injection should be done at temperatures lower than 200°C to avoid fibre burning.

Matrix	Mould Temperature	Rear Barrel Temperature	Middle Barrel Temperature	Front Barrel Temperature	Nozzle Temperature
PP	20-50°C	160-175°C	175-185°C	180-185°C	180-190°C
PLA	25-55°C	160-175°C	170-185°C	175-190°C	180°C
ABS	40-80°C	180-200°C	190-205°C	200-210°C	205°C
PA11	20-70°C	180-200°C	190-200°C	200°C	200-205°C
rPE	50-60°C	165-175°C	170-180°C	175-185°C	175°C

3. Continuous processing:

To avoid risk of material degradation, the dwell time of the material inside the injection moulding machine should be minimized. So continuous operation is highly recommended.

4. Purge:

After production, it is very important to purge/rinse the injection moulding machine and tooling with neat PP (or whatever polymer matrix is being used) or a purging compound. In case there is still remaining material on the metal mould after purging, citric acid solution (10% in water) can be used to clean the surface.

Injection moulding recommendations

Further remarks:

Regarding the other processing parameters, we advise to use, as a start, similar processing parameters to the neat polymer (PP, HDPE or other chosen matrix), as they are dependent on the injection moulding machine and dimensions of the injected parts. Changes in pressure, temperature or time can be then carried out, to find the optimum injection parameters with the composites.

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