



Processing Guidelines

Badaflex® TPU Grades for Injection Moulding and Extrusion Applications

General Information

This information brochure is intended to give hints and advices to skilled processor about the processing of the Badaflex TPU grades using the extrusion process. Due to the huge variety of articles and in the configuration of machine and tooling, this information brochure can only give general advice.

In case of more specific questions, Bada’s Application Technicians remain at your disposal:

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Advice for the safe handling and processing of Badaflex TPU Compounds can be found in the respective material safety data sheet.

Process Support on site – our special service

We would be pleased to support you on site if you have any questions or problems with the processing of new sample materials or in ongoing series applications. We offer our processing support service for this purpose. Together with you we look for the cause to find a solution for you. If you would like to find out more, just contact us at ProcessSupport@bada.de.

Nomenclature

Badaflex TPU grades are thermoplastic elastomers based on polyurethane (polyether or polyester type).

The general material designation is as follows:

Badaflex TPU xxx 8yyy

| | |
|-----------------|--|
| <i>Badaflex</i> | Trade name |
| <i>TPU</i> | Characterisation of the material family: |
| | TPU: thermoplastic polyurethane (polester and polyether based) |
| | TPE-S: thermoplastiv elastomers based on SEBS (Styrene- Ethylene / Butadiene- Styrene- copolymers) |

The information given in this brochure is only valid for Badaflex TPU grades. Processing guidelines for Badaflex TPE-S grades are available on request.

xxx hardness given in Shore A or Shore D hardness scale (two digit number followed by one capital letter A or D to indicate the respective Shore hardness scale)
e.g. Badaflex TPU 80A 8yyyy is a grade with a hardness of 80 Shore A

8yyy four digit number starting with an 8
This number is an identification number to identify the recipe / formulation.
The number does not give any further information on material type or properties



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of the compound.
Please refer to the technical data sheet of the respective grade to get further information.

Storage

Badaflex TPU grades are supplied in the form of pellets. Usually, they are shipped in bags. The shelf life of Badaflex TPU grades shipped in moisture proof silver bags is 12 months.

Other shipping containers (big bags, octabins) are intended for immediate use.

Once being opened, the containers should be consumed completely. The granulate should be exposed to the surrounding air only for as long as essential. It's also important to cover the feed hopper during production. Drying it's recommend if the container has been opened for several times.

The material should be stored at dry places, according to prevent condensation material should be brought at room temperature before opening the container.

Although the Badaflex TPU grades are not readily flammable or explosive, please keep away all sources of ignition and open flames for safety reasons.

Predrying

In general, Badaflex TPU grades should be predried prior to processing, excessive moisture leads to processing problems. The moisture of the material should not exceed 0,02%.

The recommended drying parameters are:

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|---------------------|-----------------|----------------------------|
| drying temperature: | 80 °C to 90 °C | (70 – 90 shore A hardness) |
| | 90 °C to 120 °C | (harder than shore 90 A) |
| drying time: | 3 hours | |
| dryer type: | dry air dryer | |
| dew point: | -30 °C or below | |

Processing: Injection Moulding

Typical pocessing parameters for injection moulding are:

| Temperature zone | SI Units | English Units |
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| <i>Heating zone</i> | 170 – 210 °C | 340 – 410 °F |
| <i>Nozzle</i> | 200 – 210 °C | 390 – 410 °F |
| <i>Melt Temperature</i> | 190 – 205 °C | 375 – 400 °F |
| <i>Mould Temperature</i> | 20 – 70 °C | 70 – 160 °F |

Processing: Extrusion

Typical processing parameters for extrusion of Badaflex TPU are:

| Temperature zone | SI Units | English Units |
|-------------------------|-----------------|----------------------|
| <i>Feed zone</i> | 25 – 40 °C | 80 – 105 °F |
| <i>Barrel</i> | 160 – 200 °C | 320 – 395 °F |
| <i>Adapter</i> | 175 – 200 °C | 345 – 395 °F |
| <i>Head / Die</i> | 175 – 205 °C | 345 – 405 °F |

Processing: Equipment

Badaflex TPU can be processed on modern standard processing equipment. For questions concerning machine and screw configuration, extrusion dies or injection moulding tools, please consult the machine supplier or the tool manufacturer.

It is essential to have good and proper working control means for the respective temperatures.



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Application-specific processing instructions to reduce carbon emissions

When testing the carbon emissions according to VW PV 3341, for example, the carbon emissions from components can be minimized during processing by adhering to the following parameters.

Mechanical load:

- Minimize shear during melt preparation, i.e., screw speed and Dynamic pressure as low as possible (use cooling time)
- Keep injection shear low, i.e., injection speed as low as possible, nozzle and gate cross-sections as large as possible, sharp-edged transitions avoid

Thermal stress:

- Keep cylinder and, if applicable, hot runner temperatures as low as possible but still high enough that the mechanical shear is as low as possible.
- Residence time of the melt in the overall system of cylinder, nozzle and, if applicable, hot runner as short as hold possible.

The information given herein represent the state of Bada's knowledge at issue date. The information is intended to give advice to a skilled and trained staff how to process Badaflex TPU grades. The parameters given herein are typical values. Based on the experience, it should be possible to obtain a basic parameter setup. The optimum parameters are depending on a large variety of influences; the optimum parameters have to be determined by the processor individually. The information is not transferable to other products. They must neither be construed as confirmation of specific properties nor as specification limits.