



## Processing Guidelines

### Badamid PA12 Polyamide Grades for Extrusion Applications

#### General Information

This information brochure is intended to give hints and advices to skilled processor about the processing of the Badamid Polyamide 12 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 Badamid 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](mailto:ProcessSupport@bada.de).

#### Nomenclature

Badamid PA12 grades are compounds based on polyamide 12. Generally these grades have a medium viscosity suitable for injection moulding and thin-walled extrusion applications.

The product family Badamid PA12 consists of a large variety of different grades and versions. The nomenclature is as follows:

##### Fillers / reinforcement:

GF glass fibres  
CF carbon fibres  
GK glass beads  
M minerals

##### Tough modification:

L dry impact resistant  
TM-Z... tough modified  
SM-Z... tough modified at low temperatures

##### Heat stabilisation:

K, H, different heat stabilisers  
HH, HHC against thermal ageing

##### Flame retardant grades:

FR flame retardant  
FR HF flame retardant, without halogens

##### Special grades:

LB laser printable  
LT transparent for laser (welding)  
TF lubricated with PTFE  
MoS2 lubricated with Molybdenum Disulfide  
EL improved electrical conductivity  
UV stabilisation against harmful ultraviolet irradiation

##### Processing:

S nucleated, for fast production cycles

Besides the abbreviations given above, there are some more nomenclatures in use for special applications. Please refer to the technical datasheet of a specific grade where a description of the material is provided.



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Basically, all Badamid PA12 grades have additives incorporated to improve flowability and mould release.

In impact modified Grades, the numbers from 1 to 3 indicate the grade of modification.

Colours are identified by an internal colour reference number. They are assigned in ascending order by Bada's colour lab. There is no correlation to RAL colours or other colour systems.

Special grades are denominated with an S, followed by a number.

#### Storage

Badamid PA12 compounds are delivered in different packagings.

For material in original factory packaging, the following reference values for the storage times are given:

**Bags:** Under normal circumstances, material can be stored significantly longer than one year. However, there is a small risk that the bags become intight.

**Octabins:** The recommended storage time for Octabins in original packaging is maximum 6 months.

**Big Bags:** Material in big bags is intended for the immediate use.

Once being opened, the content of the packaging should be processed directly.

Storage under dry conditions, if possible at modest temperatures and in closed rooms, is advisable

The condensation of moisture on the material, e.g. when transferring cold material into a humid environment, must absolutely be avoided.

Although there is no acute hazardous potential, sources of ignition and open flames should be kept away from Badamid grades for safety reasons.

#### Pre-drying

Depending on the degassing capabilities of the extrusion line and the sensitivity of both the extrusion process and the product, predrying might be advisable.

Predrying is required when the degassing capabilities of the extrusion line are not sufficient.

Predrying parameters are as follows:

predrying temperature	80 °C
predrying time	2 to 4 hours
predryer	dry air dryer

The predrying conditions can also be found on the technical datasheet of the respective grade.

The moisture content for processing by extrusion should be below 0.1%. Too high moisture contents result in hydrolytic material degradation with a significant loss in the mechanical performance of the parts, especially in terms of toughness.

But it should be kept in mind that it is possible to overdry the material. The lubricants and processing aids can be roasted out of the material. Yellowing is an indication for drying too long or too hot.



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### Extrusion Line Configuration

The basic layout of the extrusion line is defined by the type of product to be produced.

In general, Badamid PA12 extrusion grades can be processed on any modern extruder which can maintain the required temperature level and has enough torque.

Screws with three zones and an L/D ratio of >24 are commonly used for polyamide extrusion.

The feed section is usually 8 D, the metering zone is about 8 to 15 D with shear sections of 1 or 2 D, located at approx. 22 to 25 D.

Barrier screws are useful for a constant output. Mesh or screens are recommended for melt homogeneity and back pressure build-up.

In order to have minimal leakage, the clearance should be 0.1 to 0.2 mm.

### Cleaning

Due to the fact that Badamid PA12 is not mixable with other polyamides it is recommended to purge the extrusion machine with PP before using. During the purging process it is possible to increase temperature by 10 Kelvin.

### Processing – General Information on Processing Parameters

The following typical parameters are guidelines for processing Badamid PA12 grades:

<b>Badamid PA12 grades</b>	<b>not reinforced</b>	<b>reinforced (GF, CF, GK, M)</b>	<b>flame retardant (FR, FR HF)</b>
<i>Heating zones</i>	200 – 250 °C	200 – 250 °C	210 – 230 °C
<i>Melt temperature</i>	200 – 250 °C	200 – 250 °C	210 – 230 °C
<i>Die temperature</i>	200 – 250 °C	200 – 250 °C	210 – 230 °C

The typical values given above are guidance values. The actual values are depending on machine and tool configuration, part geometry and other parameters and can vary in a broad range.

### Processing information for special material grades

#### **flame retardant materials (FR, FR HF):**

It is recommended to choose both melt temperature and tool temperature in the lower region of the mentioned range.

In case the material is dry and the melt is foaming anyway it could be possible that the flame retardant additives start to pyrolyse. If so clean the machine totally and start the process again with lower temperatures and less shear stress for the melt.

#### **tough modified materials (TM-Z..., SM-Z...):**

It could be possible that tough modified materials require a decrease of the melt temperature of 20°C below the recommended values.

#### **antistatic grades, electrical conductive grades (EL):**

It is recommended to choose both melt temperature and tool temperature in the upper region of the mentioned range.



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#### Processing of Milled Material (Regrind)

In general, the use of regrind is possible. It has to be considered that moisture, dust and other impurities as well as the repeated thermal stress may have a negative influence on the mechanical properties.

In coloured grades, the colour can change (yellowing).

Processing regrind with flame retardant grades (FR, FR HF) is not recommended. The flame retardant properties can be massively deteriorated by the use of regrind.

As a rule, there content of regrind shall be significantly below 20%.

It is the duty of the processor to verify whether the processing of regrind is in accordance with the requirements and the specification, or not.

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 Badamid PA12 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.