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(ABS)

Sheet 11

As the conditions under which our products may be used are beyond our control, any statement or recommendation is made without warranty or guarantee.

CHEMICAL NAME: Acrylonitrile Butadiene Styrene.

NORMAL STATE: Rigid, solid rod and sheet.

NORMAL COLOUR: Grey.

ODOUR: None.

REACTION WITH WATER: None.

REACTION WITH OTHER CHEMICALS: Information available on request.

SOFTENING POINT: 80 - 118 degrees C. (VICAT, 5kg)

TOXICITY: Non toxic - suitable for direct contact with food.

FLAMMABILITY: Flash point 360 degrees C.

FIRE FIGHTING: Small fires dry chemical or CO₂ extinguishers.
Large fire foam or water.
Use breathing apparatus in presence of smoke/fumes. Gives off styrene fumes.

PERSONNEL PROTECTING: No special precaution other than normal machine shop safety practise.

WASTE DISPOSAL: Do not incinerate. Use dry waste disposal method.

General remarks*

- Non-reinforced thermoplastics can be machined with cutting tools of high-speed steel. For reinforced materials hard metal tools are required.
- In all cases only properly sharpened tools are to be used.
- Due to the poor thermal conductivity of plastics provision has to be made for good heat dissipation. Heat is best dissipated via the chips.

Dimensional stability

- Dimensional stability of parts is conditional on stress-relieved semi-finished materials which have to be annealed. The heat generated by the cutting tool otherwise inevitably leads to the release of processing stresses and deformation of the part. In the case of high material removal volumes, intermediate stoving may be necessary after the main machining operation so as to remove the arising thermal stresses.
- Materials with the high moisture absorption (e.g. polyamides) may require conditioning before machining.
- Plastics require larger finishing tolerances than metals. Furthermore, allowance has to be made for the many times greater thermal expansion.

Machining operations

1. Turning

Guide values for cutting tool geometry are given in the table. For particularly high quality surface finishes the tip is to be shaped as a broad-nosed finishing tool as shown in Fig. 1.

For cutting off the tool should be ground to the profile shown in Fig. 2 so as to avoid a remaining stump.

On thin-walled and particularly flexible workpieces, on the other hand, it is better to work with tools that are ground to a knife-like cutting geometry. Figs. 3 and 4.

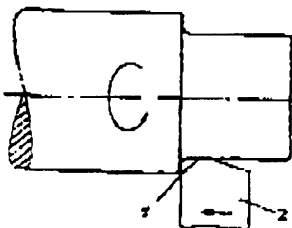


Fig. 1. Turning tool with broad-nosed finishing tip produces a better surface finish

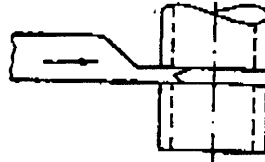


Fig. 2. Profile prevents remaining stump

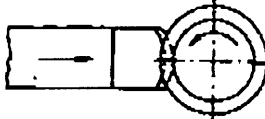


Fig. 3

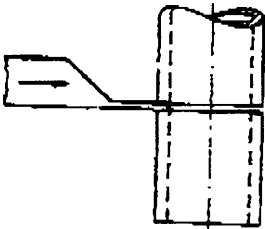


Fig. 4

Figs. 3 and 4. Cutting-off of flexible plastics

2. Milling

For plane surfaces face milling is more economical than peripheral milling. For peripheral milling and profiling the cutting tools should not have more than two cutting edges so that vibrations due to the number of teeth is kept to a minimum and chip widths are sufficiently large. Optimum removal rates and surface finish are obtained with single-point tools.

3. Drilling and boring

As a general rule it is possible to use twist drills; these should have an angle

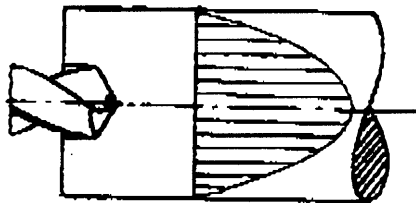


Fig. 5. blunt drill

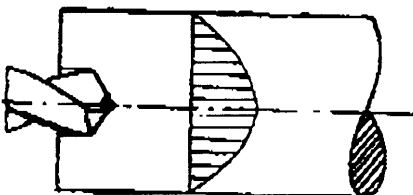


Fig. 6. sharp drill

Stress pattern caused by the drill

of twist of 12 - 16° and very smooth helical flutes for good chip removal. Larger diameters should be rough drilled or produced by trepanning or internal turning.

On drilling into solid material care must be taken to ensure that the tools are properly sharpened, as otherwise the arising compressive strain can build up and cause the material to split.

Reinforced plastics possess higher residual processing stresses with lower impact strength than unreinforced plastics and are thus particularly susceptible to cracking. Where possible, these should be heated to about 120° C before drilling (heating time approx. 1 hour per 10 mm cross-section). This procedure is also recommended in the case of polyamide 66 and polyester.

4. Sawing

Unnecessary generation of heat by friction is to be avoided since sawing is mostly applied for cutting off thick-walled parts with relatively thin tools. Well-sharpened and heavily crossed sawblades are therefore advised.

5. Thread cutting

Threads are best cut with chasing tools. Burring can be avoided by using double-toothed chasing tools. Cutting dies are not recommended, for on backing off the die further cutting is to be expected. An overmeasure has frequently to be allowed in the case of tapping tools (according to material and diameter, guide value: 0.1 mm).

6. Safety precautions

Failure to comply with the guide values and released stress can lead to local overheating, this can cause material decomposition. The free decomposition products including PTFE filler are removed with extraction equipment. Tobacco in connection with this can produce possible poisoning and must be kept away from the work shop.

* Application-related advice given by us verbally and in writing is intended to assist your own work. It is to be deemed as non-binding information, also with respect to any third party proprietary rights. In case of damages occurred during processing liability is excluded.