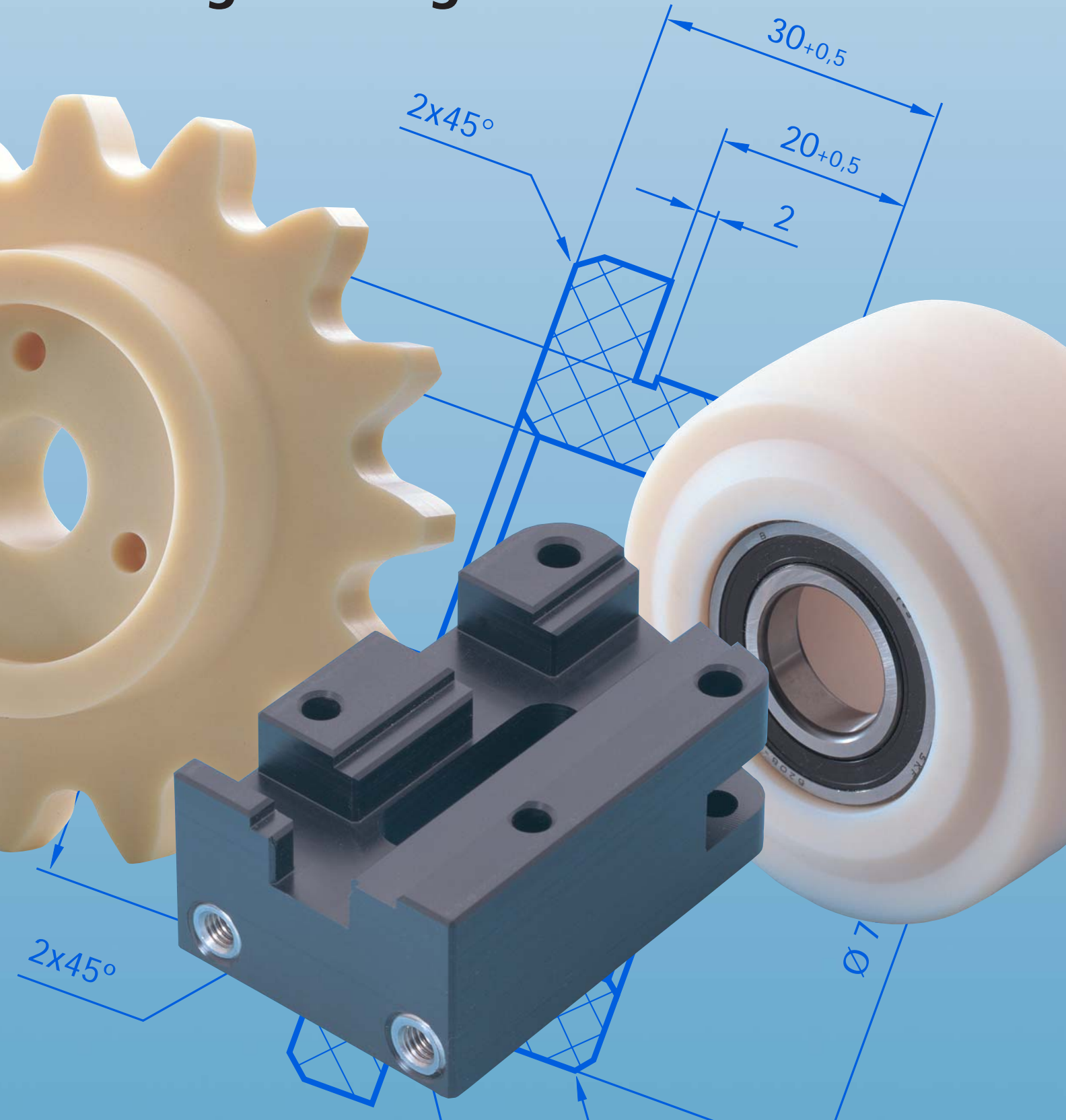
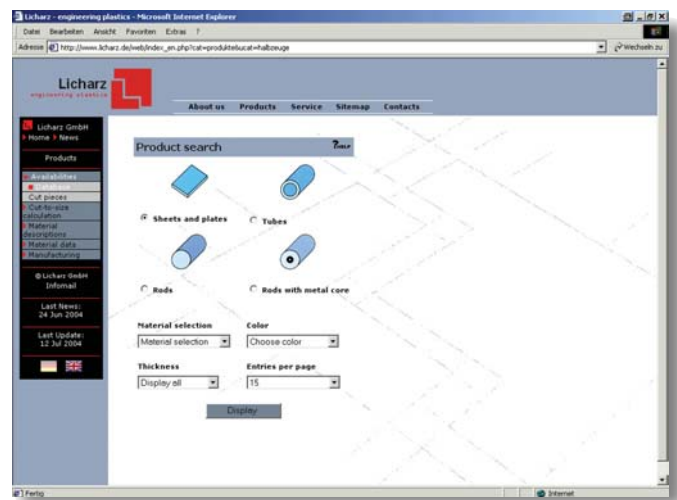




Designing with engineering Plastics



Licharz on the web





Thermoplastic sliding pads

Plastic sliding pads

1. Thermoplastic sliding pads

In the same way that friction bearing bushes are used to arrange the bearings of a shaft for rotational and up and down movements, the same plastics can of course be used for linear movements in the form of sliding pads. Basically all the plastics listed in the “Friction bearings” chapter are suitable for use as sliding pads. However, several are especially suitable. These will be described in the following with their advantages.

1.1 Materials

Plastics that are used as sliding pads require good sliding properties as well as high stability and elasticity and creep resistance. These requirements are fulfilled especially well by Polyamide 6 cast. The high stability compared to other thermoplastics allows higher loads. The good elasticity ensures that deformation is reversed when the material is subjected to impact load peaks. Assuming that the load remains below the permissible limit, this ensures that permanent deformation is avoided to a great extent.

The oil-filled modification OILAMID is available for highly stressed sliding pads. The oil which is embedded in the molecular structure reduces sliding friction by around 50% and also considerably reduces sliding abrasion.

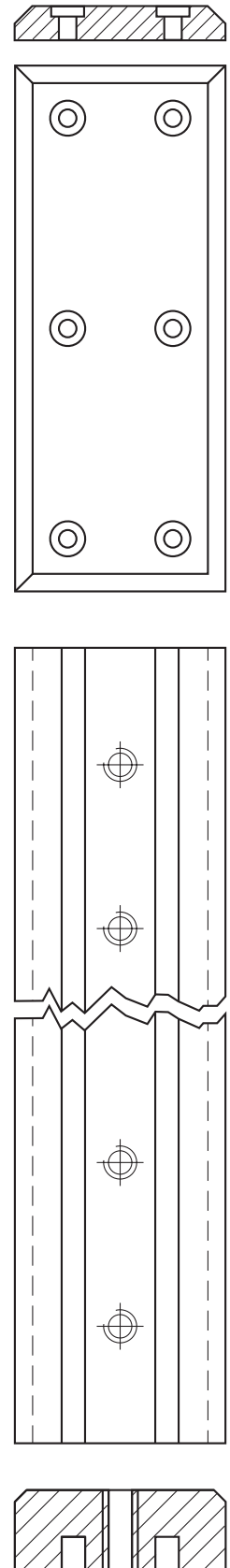
PET is best suited for applications where a high level of moisture is expected. The material has high mechanical stability, creep resistance, dimensional stability and good sliding properties. Water absorption is low and has virtually no effect on the mechanical or electrical properties.

However, PET is not as wear resistant as polyamides. But PET-GL is available as a modified grade with a solid lubricant. This has improved sliding properties and much better wear resistance.

2. Design information

2.1 Friction heat

As opposed to friction bearings that operate continuously at high speeds, most sliding pads and guide rails usually work under conditions that minimise the evolution of friction heat. The running speeds are relatively slow and operation is more intermittent than continuous. Under these conditions, it is unlikely that friction heat builds up to a level that could cause increased wear or a breakdown in the component.



2.2 Pressure and running speed

As a rule, when dimensioning and designing sliding elements, the design engineers consider the pressure and speed ratio. If the pressure and speed ratios are unfavourable, the resulting friction heat leads to excess wear and even to a premature breakdown of the component. However, experience in the design and operation of guide pads has shown that it is generally unnecessary to calculate the pressure and speed values due to the favourable operating conditions of sliding pads. Instead of this, the following limiting pressure values can be used as a basis for most guide rail applications. The values apply at a standard temperature of 23°C.

PA	PET	Load	Movement	Lubrication
28 MPa	21 MPa	interrupted	interrupted	periodic
14 MPa	10 MPa	continuous	interrupted	periodic
3,5 MPa	2,5 MPa	continuous	continuous	none

2.3 Lubrication

Again the statements regarding dry running and the use of lubricants from the “Friction bearings” chapter apply. Basically it must be said that installation lubrication considerably improves the service life and running behaviour. The materials that have been modified with lubricant, such as Oilamid, have much longer service lives than all other plastics.

2.4 Mounting

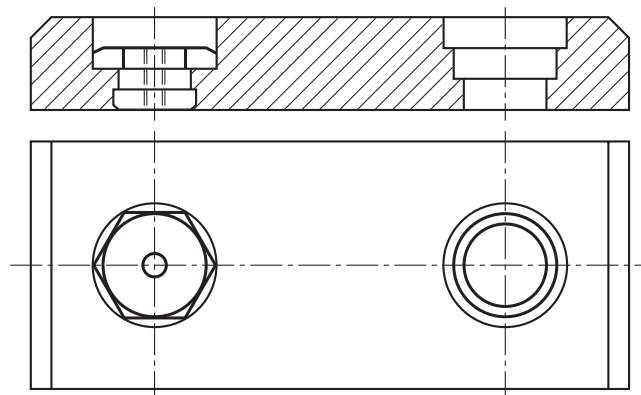
Polyamide sliding pads or guide rails with a mechanical sliding function are generally mounted on steel constructions.

Countersunk screws or machine screws can be used without any problem for applications at room temperature and normal climatic conditions (50% RH). For operating conditions with high humidity, we recommend that you consider using PET / PET-GL.

If a higher ambient temperature is expected, the approx.10 times higher linear expansion of plastic compared to steel must be considered. Firmly screwed plastic rails can corrugate due to linear expansion. To prevent this from happening, the mounting points should be less than 100mm apart. In the case of longer sliding rails, one single fixed point screw is advised. The other screws in oblong holes should be able to absorb the thermal expansion. Instead of oblong holes, the rails can also be held in grooves, T-slots or similar. Changes in length caused by extreme ambient conditions have no effect on the fixing or function.

For polyamide sliding pads in high performance applications such as telescopic booms on mobile cranes, we recommend special nuts that are pressed into hexagonal holes on the sliding panels. By pressing the nut into the hexagonal hole it cannot fall out or loosen. The bottom of the slide plate should be absolutely flush.

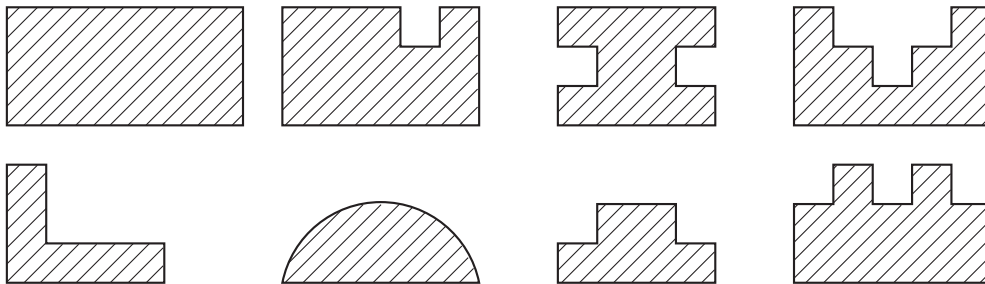
Figure 1: Example of threaded inserts



Under full torque, the polyamide is held under pressure by the threaded insert and the insert sits on the steel support. For mountings such as this, pad thicknesses of 12 – 25mm are adequate for optimum performance.

2.5 Applications and examples of shapes

Slide and guide pads in telescopic cranes, garbage presses, car body presses, road and rail vehicles, timber processing machines and plants, packaging and filling plants, transport and conveyor systems, chain guides, etc.





Our machining capabilities:

- CNC milling machines, workpiece capacity up to max. 2000 x 1000mm
- 5-axis CNC milling machines
- CNC lathes, chucking capacity up to max. 1560 mm diameter and 2000 mm long
- Screw machine lathes up to 100mm diameter spindle swing
- CNC automatic lathes up to 100mm diameter spindle swing
- Gear cutting machines for gears starting at Module 0,5
- Profile milling (shaping and molding)
- Circular saws up to 170mm cutting thickness and 3100mm cutting length
- Four-sided planers up to 125mm thickness and 225mm width
- Thickness planers up to 230mm thickness and 1000mm width



We process:

- Polyamide
- Polyacetal
- Polyethylene terephthalate
- Polyethylene 1000
- Polyethylene 500
- Polyethylene 300
- Polypropylene
- Polyvinyl chloride (hard)
- Polyvinylidene fluoride
- Polytetrafluoroethylene
- Polyetheretherketone
- Polysulphone
- Polyether imide

- PA
- POM
- PET
- PE-UHMW
- PE-HMW
- PE-HD
- PP-H
- PVC-U
- PVDF
- PTFE
- PEEK
- PSU
- PEI

Examples of parts:

- Rope sheaves and castors
- Guide rollers
- Deflection sheaves
- Friction bearings
- Slider pads
- Guide rails
- Gear wheels
- Sprocket wheels
- Spindle nuts
- Curved feed tables
- Feed tables
- Feed screws
- Curved guides
- Metering disks
- Curved disks
- Threaded joints
- Seals
- Inspection glasses
- Valve seats
- Equipment casings
- Bobbins
- Vacuum rails/panels
- Stripper rails
- Punch supports

Information on how to use this documentation

All calculations, designs and technical details are only intended as information and advice and do not replace tests by the users in regard to the suitability of the materials for specific applications. No legally binding assurance of properties and/or results from the calculations can be deduced from this document. The material parameters stated here are not binding minimum values, rather they should be regarded as guiding values. If not otherwise stated, they were determined with standardised samples at room temperature and 50% relative humidity. The user is responsible for the decision as to which material is used for which application and for the parts manufactured from the material. Hence, we recommend that practical tests are carried out to determine the suitability before producing any parts in series.

We expressly reserve the right to make changes to this document. Errors excepted.
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For further information, detailed catalogs are available:

- Information on Licharz machining capabilities of component parts
- Brochure „Material Guiding Values/chemical Resistance“
- Product information on semi-finished products of PA, POM und PET
- Delivery programme

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