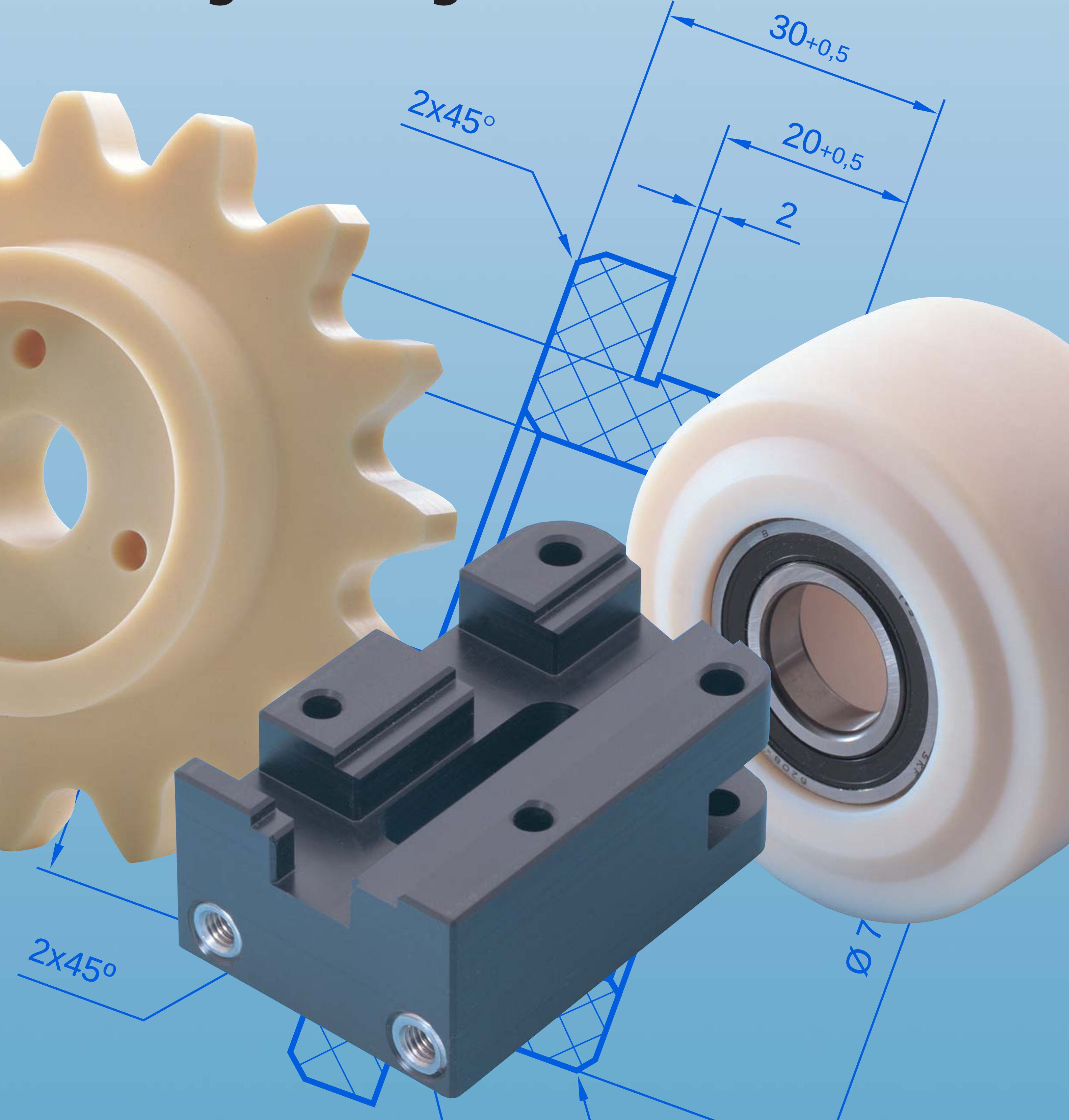
Licharz
engineering plastics

Designing with engineering Plastics



Licharz on the web

Flexibility is our strength.

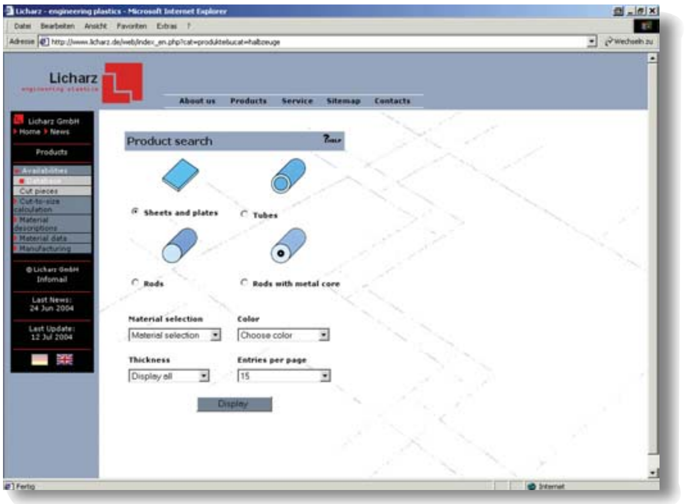
Whatever ideas you decide to pursue with our materials, we will give them tangible form. Our manufacturing facility's modern fleet of machinery opens up many paths for us to convert your idea cost effectively, quickly and precisely from structural design to tangible reality.

With CNC controlled machines, it is possible to produce machined parts with workpiece dimensions up to 2000 x 1000 mm, turned parts with diameters up to 1560 mm or lengths of up to 2000 mm. We fabricate automatic lathe work with conventional and CNC automatic lathes that are capable of a spindle swing of up to 100 mm. For the manufacture of gear wheels up to module 10/ ø 400 mm, we have the appropriate gear cutting machines. We round off our fleet of machinery with CNC circular saws, four-edge and thickness planers, spindle moulding machines as well as conventional lathes and milling machines. Thanks to our own in-house semi-finished product manufacture, there are almost no limits to your design possibilities. Flexibility is our strength.

Reliable quality is our standard.

Consistent quality - that is the basis of a lasting business relationship. We work according to DIN ISO 9001, and we do everything to ensure the quality of our product.

The core component of our computer supported Quality Management is an in process quality check of the machined parts on a 3-D measuring machine. In our testing laboratory, we test the mechanical properties of the material, and we conduct wear tests. We do not leave anything to chance. Quality is our standard.



Product search

● Sheets and plates
○ Tubes
○ Rods
○ Rods with metal core

Material selection: Material selection
Color: Choose color
Thickness: Display all
Entries per page: 15

DIN EN ISO 9001:2000
Certificate No 01 100 040034

Certified quality management according to DIN EN ISO 9001 : 2000

Behaviour in fire

1. Behaviour of plastics in fire and fire ratings

Generally, plastics are organic substances or modifications of organic substances, which, like other organic substances are threatened by chain breakage, cleavage of substitutes and oxidation at high temperatures. Therefore, apart from a few exceptions, plastics are more or less combustible which is something that can be a serious technical problem in the specific use of plastics.

1.1 Combustibility

If plastics are heated locally or over large surfaces to above their specific decomposition temperature, they release volatile, low molecular constituents. In many cases together with the ambient oxygen, these form a flammable gas mixture which can ignite if an ignition source is added and an adequate supply of oxygen is available.

The amount of heat that is fed in and the volume of the combustible surface that this can affect are both very significant for the evolution of a fire and the course of the fire. Another decisive factor is the atmospheric oxygen concentration.

For instance, it is possible that a large quantity of heat which affects a large volume with a large surface area but a lack of oxygen only leads to pyrolytic cleavage in the beginning (→ release of highly flammable, volatile and low molecular constituents). If one adds oxygen in the right concentration, under unfavourable conditions this can result in a deflagration or an explosion.

However, with the same volumes and a lower heat input, as well as an adequately high oxygen concentration, the same substance only burns slowly.

Because of this behaviour, it is very difficult, if not impossible, to make any fire-technical forecasts.

1.2 Conflagration gases

As with the combustion of other substances, when plastics burn they produce various conflagration gases. As a rule, these are said to be highly toxic. This is not absolutely correct as, on the one hand, the toxicity depends on the type and quantity of the plastic involved in the fire and, on the other, all conflagration gases resulting from a (substance-independent) fire should be regarded as toxic.

One example is the conflagration gases resulting from the incineration of polyethylene, which, in addition to small quantities of soot and low molecular plastic constituents, almost exclusively contain carbon monoxide, carbon dioxide and water. This is comparable with the conflagration gases that occur when wood or stearine are burned.

On the other hand, when polyvinyl chloride is burned, there is a danger of chlorine being released, which in combination with atmospheric moisture or extinguishing water forms to hydrochloric acid.

Many plastics produce a lot of soot when they burn, which makes it difficult for the fire brigades to reach the source of the fire. These plastics include the polyolefins PE and PP as well as styrene plastics such as PS and ABS.

This must be considered for designs in fire-critical areas.

1.3 Behaviour in fire

Almost all plastics are combustible. Exceptions to this are PTFE and silicones, which are virtually non-combustible. Most plastics continue to burn after they have been ignited and the source of ignition has been removed. Several extinguish when the ignition source is removed, while others cannot be ignited. In many cases, the plastic melts due to the heat of combustion and forms burning droplets which can promote the spread of the fire. The degree of combustibility can be reduced by adding the corresponding additives.
Additives based on the following mechanisms are used:

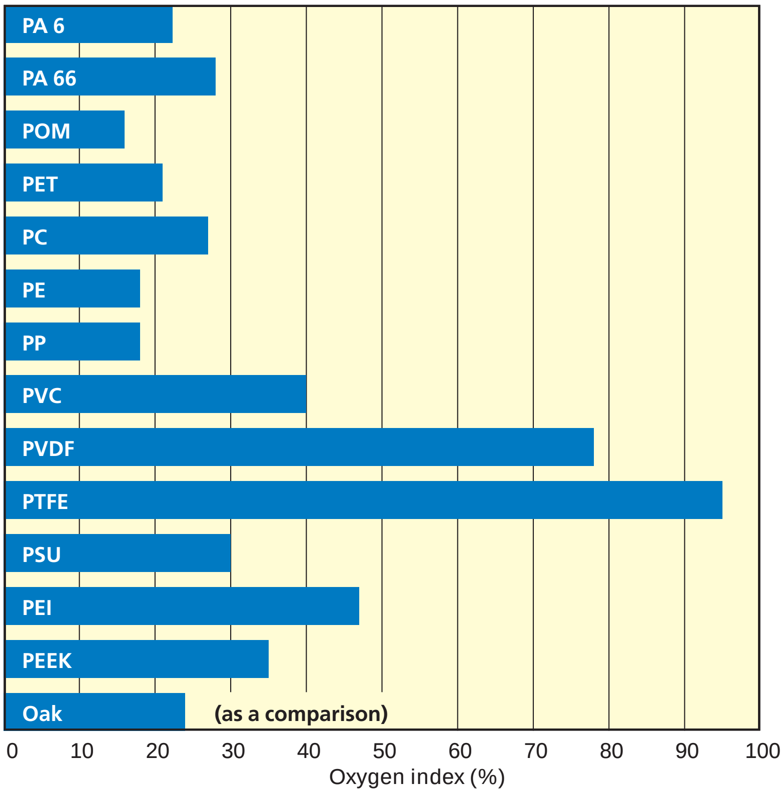
- **Endothermy**
  The temperature of the plastic is reduced by the decomposition or vaporisation of the additive. This is possible for example with water stores (aluminium hydroxide) or phosphorous compounds being added to the plastic.
- **Radical bonding**
  The radicals that form during the fire are bonded by the additive, which slows down the thermal decomposition and consequently the release of flammable, volatile constituents.
- **Formation of heavy gases**
  Heavy gases are formed through the thermal effects on the additive, preferably halogens, which shield the plastic from atmospheric oxygen and thus prevent oxidation.

But the use of fire retarding additives does not make plastics non-combustible. Only plastics that are regarded as being non-flammable are suitable for applications that demand non-combustibility of the plastic.

1.4 Fire ratings

Often, to assess how plastics behave in fire, imprecise terms such as “highly flammable” or “fire resistant” or “non combustible” are used. These terms inadequately reflect the actual behaviour of the plastics and only provide a limited inference for the usability of a plastic for a specific application. To assess how plastics behave in fire in the areas of electro-technology, traffic, building, etc. there are currently approx. 700 national and international test methods. In the electrical sector the method UL 94 HB or UL 94 V from Underwriters Laboratories (USA) has become the most widely accepted. These tests refer to the burning time and the burning behaviour of plastics. In test UL 94 V a distinction is made between classifications V0 to V2, V0 being the most favourable rating.

Another possibility of comparing the flammability of plastics is the oxygen index. In a controllable O_2/N_2 mixture a vertical plastic sample is ignited and the minimum volume of O_2 required to burn the plastic is measured. This test also allows the effects of flame retardants to be observed. The diagram opposite contains several oxygen indices for comparison.
Index values ≤ 21% can lead to continued burning after the source of ignition has been removed.



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	PA
• Polyacetal	POM
• Polyethylene terephthalate	PET
• Polyethylene 1000	PE-UHMW
• Polyethylene 500	PE-HMW
• Polyethylene 300	PE-HD
• Polypropylene	PP-H
• Polyvinyl chloride (hard)	PVC-U
• Polyvinylidene fluoride	PVDF
• Polytetrafluoroethylene	PTFE
• Polyetheretherketone	PEEK
• Polysulphone	PSU
• Polyether imide	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.
You can download the latest version containing all changes and supplements as a pdf file at www.licharz.de.

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DIN ISO 2768 Part 2	General tolerances for features; Beuth Verlag

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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