



Chemical Tooling aids



FIBROLIT® Tooling resins and metal adhesives

FIBROLIT® Chemical tooling aids are offered as a comprehensive range of reliable agents, specifically developed for the requirements of the toolmaking trade, and closely integrated with other FIBRO products.

Quite categorically the FIBROLIT® bonding technique relies on first principles only for the attainment of absolute alignment accuracy. Which could be called the very criterion of modern high-precision toolmaking but often in the past involved the accumulation of many small errors from conventional diemaking steps. And attempts at compensation on the bench. Compromises.

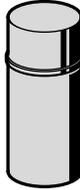
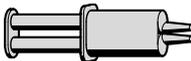
The FIBROLIT®-Concept achieves perfect die alignment by way of epoxy-bonding of vital die components, free from clamping stress and heat distortion, press fit shrinkages and errors arising from faulty machine tool geometry. And without recourse to sophisticated, expensive toolroom machines, thus saving both capacity and costs.

Successful application of the FIBROLIT® bonding technique however does depend on the observance of a few guide lines. These are fully explained in this section.

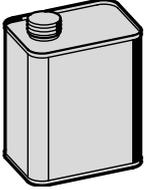
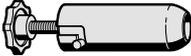
A quaint obstacle makes itself felt at times: conservatism, rooted deeply in the traditions of the toolmaking trade, sceptical of new ideas that often promise much ... but keep little!

In convincing contrast, the FIBROLIT®- Concept offers uncompromising success indeed. This is borne out by the unreserved acclaim from toolmaking experts all over the world.

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Technical data: FIBROLIT® ZWO FIBROFIX® SECHS

Physical properties:

viscosity at 25 °C	approx. 9000 mPas
pot life at 25 °C (mixed mann = 100 g)	approx. 25 min.
curing time at 20 - 25 °C*	approx. 24 h
storage life at 20 °C	approx. 1 Jahr
thermal resistance (Martens) DIN 53458	approx. 50 - 55 °C (75 - 80 °C*)
flashpoint of resin	approx. 210 °C
flashpoint of hardener	approx. 207 °C
decomposition temperature (ISO/R 871-68)	>300 °C
thermal conductivity, within range of 14-38 °C (VDE 0304 section 1/7.59)	0,531 W/km
density (resin)	approx. 2,5 g/ml
density (hardener)	approx. 1,06 g/ml
compressive strenght DIN EN ISO 604	approx. 130 - 140 N/mm ²
tensile strenght DIN EN ISO 527-1, -2, -3	approx. 50 N/mm ²
flexural strenght DIN EN ISO 178	approx. 70 N/mm ²
ball indentation test DIN EN ISO 2039-1	approx. 213 N/mm ²
impact test	3,57 KJ/m ²
modulus of elasticity (ex tensile test)	approx. 8760 N/mm ²
linear shrinkage	approx. 0,05 - 0,12%

*cured at ambient room temperature for 24, or 15 h at 50 °C

Chemical resistance

Chemical substance	Note
Acetone	C
Formaline 30%	B
Xylol	A
Silicone solution DC 20	A
Dieselene	A
White spirits	C
Tetrachloroethylene	A
Perchloroethylene	A
Ethylacetate	C
Epichlorohydrene	C
Fluoric acid 10%	C
Chlophen T 64	A
Water	B
Sea Water	B
Solution of NaCl 5%	A
Formic acid	C
Lactic acid 10%	C
Sulphuric acid	C
Acetic acid 10%	C
Ammonia 25%	B
Aniline	C
Phenol-90	C
Hydrochloric acid 10%	B

- A = no effect
- B = small effect
- C = destructive effect

Tooling resin FIBROLIT®-ZWO
Tooling resin FIBROFIX®-SECHS



280.02

280.05
 (hardener only)

FIBROLIT®-ZWO Tooling epoxy resin



resin: 365 ml, hardener: 50 ml

A well-tried epoxy resin, chiefly for casting purposes. Size and shape of container permit easy stirring and mixing therein. Important: resin must be stirred thoroughly prior to addition of hardener, whereupon complete intermixing requires further vigorous stirring which is a pre-requisite for even hardening.



280.02

FIBROLIT®-ZWO Consignment pack (Styrofoam)

1 can of casting resin + 1 cartridge hardener

Full instruction printed on package. Best results are obtained if ambient temperature and temperature of steel components etc. are about 20 °C. Curing completed in 24 hours. Especially when smaller portions of resin are spooned out, (for the mixing of small quantities of casting resin) it is important that removal is preceded by thorough stirring: fillers tend to settle at the bottom of the can and must therefore be mixed evenly.

Mixing ratio by weight: 18 to 1 (resin : hardener).

Physical properties: in chapter H

Optional thinning agent: in chapter H



280.08

FIBROFIX®-SECHS Tooling epoxy resin



six packs of ready-to-mix resin + hardener, 40 ml each

Six packs of tooling resin/hardener, for the expedient, clean use of tooling resin in small volume. FIBROFIX® SECHS contains the same resin as FIBROLIT® ZWO – therefore identical instructions apply. FIBROFIX® SECHS is specifically suited for use in our Injection Gun 280.09 – see details on page H 17.

Styrofoam consignment package

Contents: 6 resin cartridges + 6 ampoules hardener + 1 stirring rod



280.09

Injection gun

For the fast, tidy application of FIBROFIX® SECHS, especially where small gaps or inaccessible locations are involved. Gun accepts throw-away cartridge with mixed resin or adhesive. Forced injection through compressing of cartridge by means of screw plunger. Empty cartridge is removed from gun and thrown away. Gun remains clean at all times.



Technical data: Metal adhesive FIBROLIT® MK Thinning agent for FIBROLIT® ZWO

Physical properties: FIBROLIT® Metal adhesive

density of Resin MK	1,16 ± 0,01 g/ml
density of Hardener MK	1,13 ± 0,01 g/ml
tensile shear strenght	40 - 50 N/mm ²
thermal resistance (Martens)	45 - 50 °C
pot life (100 g-mixture)	15 - 20 min
shelf life at 20 - 25 °C	approx. 1 jaar
time for complete curing at 20 - 25 °C	24 h approx.

Physical properties: Thinning agent

density	1,16 ± 0,02 g/ml
flash point (DIN 51584)	97 °C
shelf life at 20 - 25 °C	approx. 1 year
viscosity at 25 °C	1000 ± 100 mPas

Chemical resistance

Chemical substance	Note
Acetone	C
Formaline 30%	B
Xylol	A
Silicone solution DC 20	A
Dieselene	A
White spirits	C
Tetrachloroethylene	A
Perchloroethylene	A
Ethyl acetate	C
Epichlorohydrene	C
Fluoric acid 10%	C
Chlophen T 64	A
Water	B
Sea Water	B
NaCl -solution of 5%	A
Formic acid	C
Lactic acid 10%	C
Sulphuric acid	C
Acetic acid 10%	C
Ammonia 25%	B
Aniline	C
Phenol-90	C
Hydrocloric acid 10%	B

- A = no effect
- B = small effect
- C = destructive effect

**Metal adhesive FIBROLIT® MK
Thinning agent for FIBROLIT®-ZWO**

281.01



FIBROLIT® MK Metal adhesive

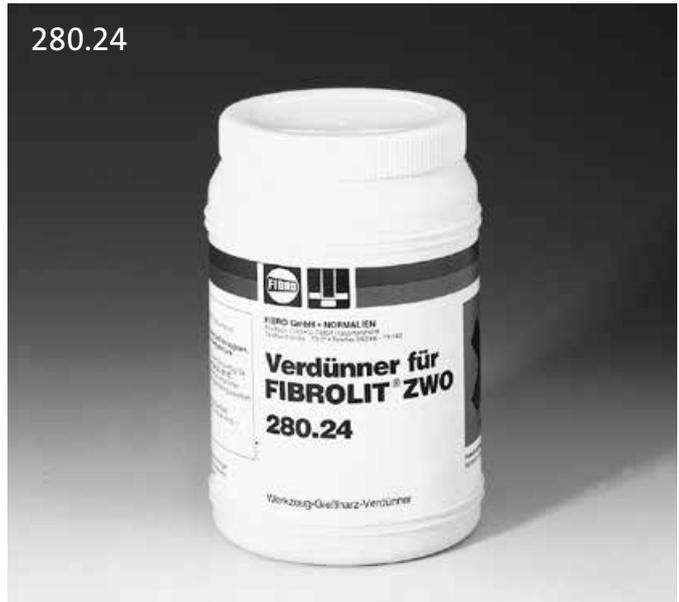
two-component tin, containing altogether 325 ml



Two-component adhesive on epoxy resin basis. Mixing ratio is 2:1 by weight. Parts to be joined must be thoroughly degreased. Coarse surfaces improve adhesion. Glue line should not exceed 0,6 to 0,7 mm in thickness.

Application with brush or other suitable tool. The adhesive hardens out completely after 24 hours, but reaches a tensile shear strength of 30 N/mm² after 6½ hours. Bushes epoxy-bonded with FIBROLIT® MK remain their geometry and size after hardening of the adhesive.

280.24



Thinning agent for FIBROLIT® ZWO

container of 500 ml



A pure epoxy resin, this agent may be added at a certain ratio to FIBROLIT® ZWO in order to reduce the viscosity of the resin mix. Maximum admixture = 5%. It must be noted that the addition of thinning agent will extend the curing time.

Together with hardener 280.05, the thinning agent can be used as a casting resin – the correct mixing ratio is 5:1 by weight.

Anaerobic metal adhesives for securing of screws and bearing bushes

281.243
LOCTITE 243



For screws and nuts

For the securing of screws and bolts with medium bonding strength. Protects against vibrations, corrosion and leakage, up to M 36. Normal hand tools will suffice for dismantling.

Temperature resistant from -55 to +150°C.

Bonding strength: 6 - 14 N/mm²

Contents of Bottle: 50 ml



281.270
LOCTITE 2701



For screws and nuts

For the securing of screws and bolts with high bonding strength, also for studs and nuts. Suitable for threads up to M 20.

Reliably seals hydraulic/pneumatic lines up to 1/2" BSP.

Temperature resistant from -55 to +150°C.

Secured parts cannot be dismantled easily.

Seals gaps up to 0,15 mm max.

Bonding strength: 11 - 20 N/mm²

Contents of Bottle: 50 ml



281.648
LOCTITE 648



For securing bushes and ball bearings

For bonding of bearings, bushes, bolts and other machine components. Very fast bonding to handling strength. Temperature resistant from -55 to +175°C.

Where oil-impregnated sintered bushes are to be secured, the special instructions must be observed.

Seals gaps up to 0,15 mm max.

Bonding strength: 16 - 30 N/mm²

Contents of Bottle 50 ml



Cleaner Leak detector spray

281.706
LOCTITE 7061 Aerosol



Rapid-Cleaning spray

Spray can 400 ml

In order to achieve optimum results in bonding work, the affected surfaces should be thoroughly cleaned beforehand. LOCTITE 706 Spray removes oil, grease and contamination from metal surfaces treated with it. Upon evaporation, no residue remains.



280.20
FIBROLIT®-LSP



Leak detector spray

400 ml

For fast and reliable detection of gas leaks and compressed air leaks:

Spray on to the suspect areas and foaming bubbles will appear at the location of any leaks.

The valve also allows you to spray upwards.

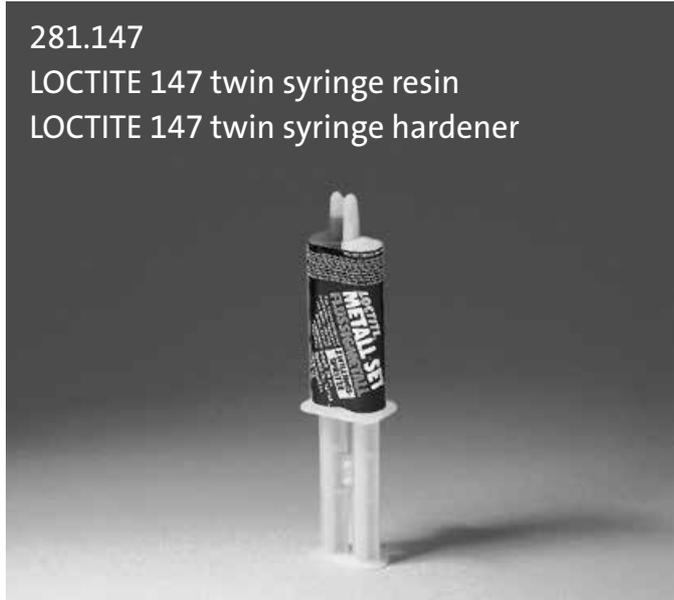
FIBRO Leak detector spray tests connections, whether they are brazed, screwed or welded, it tests fittings, valves, pressure vessels, hoses, pipe-work – in short, anything that needs a good seal.

You can use FIBRO Leak detector spray for all gases:

compressed air, oxygen, nitrogen, hydrogen, town gas, natural gas, liquid gas, carbon dioxide, nitrous oxide, acetylene, propane, butane, other flammable gases, etc.

FIBRO Leak detector spray is non flammable, non corrosive, non toxic and does not damage or crack plastics such as polyethylene, PVC etc.

**Fluid metal
Cyanoacrylate adhesive**



Fluid metal for fast repairs

Twin syringe 25 ml

Epoxy metal Product for high resistance repairs on steel and cast iron. Sticks on metal, glass, ceramics and other materials.

To be used e. g. for repairing of substandard working on tools and machine parts. Suitable as quick filler.

Potlife 8 min.

Fixturing strength 30 min.

Full curing 72 h.



LOCTITE cyanoacrylate adhesive 401/454

Typ 401, 50 g

Loctite 401 is a high performance cyanoacrylate adhesive. It bonds extremely rapidly to a wide variety of materials, including porous surfaces such as metal, plastics and rubber.

Typ 454, 20 g

Type 454 is as above but formulated to a thick, gel consistency. Will not flow into unwanted areas. Remains stationary on vertical or overhead surfaces. Fixturing strength depending to material between 20 - 120 sec.



**FIBROLIT®- RL
FIBROLIT®-ARF**



FIBROLIT® RL Penetration lubricant spray

300 ml aerosol spray can

Of enormous penetrating capability, spray deposit enters tiniest joint gaps and thus releases corroded and seized parts such as nuts, bolts and press fits. Acts as long-lasting rust protective and lubricant.



FIBROLIT® ARF Marking out blue

300 ml aerosol spray can – 500 ml liquid container

A fast-drying marking out blue of outstanding intensity.

Colour: dark blue.

Degrease before application.



Silicon oil Oil Release agent FIBROLIT®-TW



Silicon oil

400 ml aerosol spray can

A release agent on silicon oil basis – for the attainment of tight clearances in connection with epoxy casting resins.

Applications include: cast guides on die set pillars, cast-in punches etc.

It is important to observe that components intended for above operations must have smoothly finished surfaces in order to be released without force after curing of the epoxy resins FIBROLIT® ZWO or FIBROFIX® SECHS.

FIBROLIT® TS is applied by spraying or with a rag; it should be rubbed in well before casting of the resin.



Oil

400 ml aerosol spray can

280.8001 is a low viscosity oil with good penetrating properties. It is an excellent tool lubricant.



Release agent

400 ml aerosol spray can

silicon-free release agent

Application for moving parts such as guide pillars, punches etc. with epoxy casting resins FIBROLIT®-ZWO or FIBROFIX®-SECHS.

The release agent is applied by spray – distance 20 to 30 cm.

A uniform surface is achieved after rubbing with a cloth.



Release agent FIBROLIT® TW

500 ml liquid container

A release agent on wax basis – for the attainment of larger clearances in connection with epoxy casting resins. Applications include: cast guides on die set pillars, punches, cast-in bushes etc.

It is important to observe that components intended for above operations must have smoothly finished surfaces in order to release without force after curing of the epoxy resins FIBROLIT® ZWO or FIBROFIX® SECHS.

FIBROLIT® TW is applied with a rag. It should be rubbed in well. Repeated application will increase the clearance obtained.



FIBROLIT®-Oil-LD Grease-LD Long-term lubrication for sintered metal plain bearings



FIBROLIT® Grease LD

400 ml

FIBROLIT® Oil LD

1000 ml

Sintered guide bushings are filled under vacuum with special oil 280.35.

As additional long term lubrication use FIBROLIT® Grease 280.34. It replaces lost oil in the sintered guiding systems.

Further information see below.



New lubrication concept

FIBROLIT®-LD is a new lubrication concept for sintered metal plain bearings in order to achieve even longer running times.

FIBROLIT®-LD means that sintered bearing impregnation oils are kept in micro-cells for long-term and permanent lubrication in the form of a plastic oil reservoir.

Optimum results are achieved if the bushes have already been impregnated with the matched oil.

The plastic FIBROLIT® Grease-LD is provided in the oil supply grooves of the sintered bush. The supply groove is a advantage and is recommended but not absolutely necessary for additional lubrication, A capillary bridge to the surface of the sintered bearing is essential.

FIBROLIT®-LD-Lubrication has a number of crucial advantages over previous methods such as grease depot lubrication or felts.

Type of additional lubrication	Felt	Grease depot	FIBROLIT® Grease-LD
Provision of lubricating film			
– Wetting of shaft through unimpregnated bearing	Very Good	Satisfactory	Good
Storability			
– Prevention of leaking and bleeding of oil	Poor	Very Good	Very Good
Oil output			
– Use of oil supply	Very Good	Poor	Satisfactory
Effectivity			
– Longer life of bearing	Satisfactory	Satisfactory	Good
Automation			
– Automated application	Difficult, expensive	Good	Very Good
Overall assessment	Satisfactory	Satisfactory	Good

Lubricability

FIBROLIT®-LD is a gelled lubricant and has double the oil discharge capacity of conventional soap lubrication depot grease. An oil excess as with felts is not encountered. The guide slot is therefore better dised and so supplied for a longer period. The service life of the guide is prolonged.

FIBROLIT®-LD-additional lubrication offers longest service life.

Temperature and vibration-stable

FIBROLIT®-LD is temperature-stable (-40 to +150 °C) and does not flow off under the effect of heat. The plastic oil reservoir retains its strength and remains in place even under vibration forces.

The FIBROLIT®-LD lubrication concept opens up a new dimension of possible stroke speeds for tools with sintered guides.



FIBROLIT® Press tool lubricant

280.36.006



Container 1000 ml

FIBROLIT® 280.36.006 is a press tool lubricant without any detrimental influence on subsequent processes, thus eliminating the need for its removal after the stamping operation.

FIBROLIT® 280.36.006 evaporates at room temperature.

It is non-toxic and has no negative influence on the environment.

Advantages:

- cleaning of components falls away
- components do not stick together
- welding and soldering possible without rinsing etc.
- surface treatments possible without cleaning process (electro-chemical, cathoretic)
- affords good corrosion resistance
- no oxidation or bacteria-infestation of the lubricant
- increased tool life
- exposure to 300 °C results in absolutely residue-free evaporation

Applications:

- stamping of components from transformer sheet
- all kinds of forming operations
- an aid to bending and coining operations
- manufacture of steel drums
- assists difficult roll-forming processes
- also suitable for special chip-removing operations

Application of FIBROLIT® 280.36.006 to components, sheets and strip:

The lubricant can be applied by way of immersion, spraying and roll-coating. The use of wipers ahead of press ingress successfully controls lubricant layer.

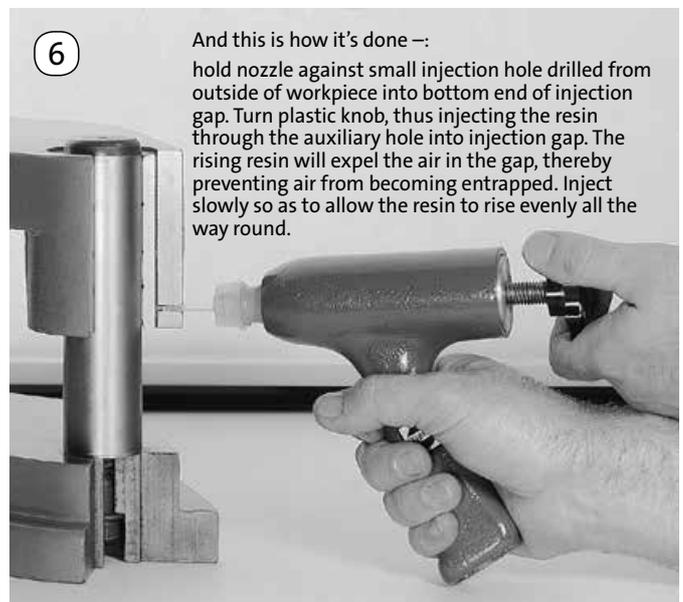
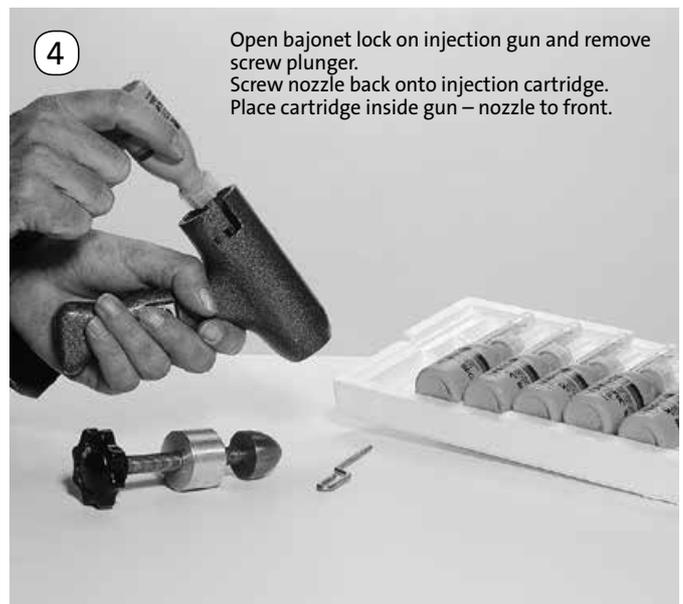
Drying time:

Depends on temperature and time span. An air blast as well as heat shortens the drying time considerably.

Suitable for:

All types of steel sheet, inox, aluminium, copper alloys, laquered and zinc plated steel sheet/strip.

Application of FIBROFIX® SECHS with the FIBRO Injection gun



Application examples: FIBROLIT® ZWO, FIBROFIX® SECHS

Casting of punch guides in guiding strippers

Suitable apertures in the stripper can be marked out from finished matrix. Allowance must be made for a casting gap of 1 - 3 mm around the punch.

Prolonged storage and cold can cause the resin to become stiff and unworkable. Place resin container in hot water of about 60 °C, then stir thoroughly and let cool down to room temperature.

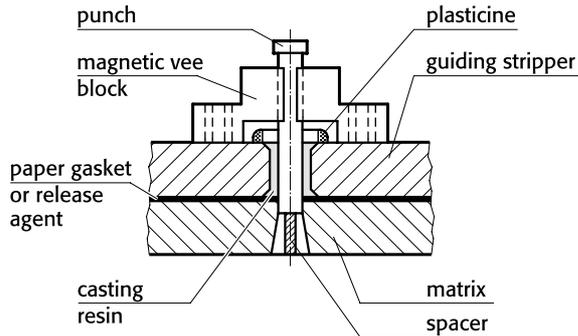


Fig. 1:
Casting of punch guide in guiding stripper

Quite often it will suffice to drill a hole in approximation of a shaped aperture – as shown in fig. 2.

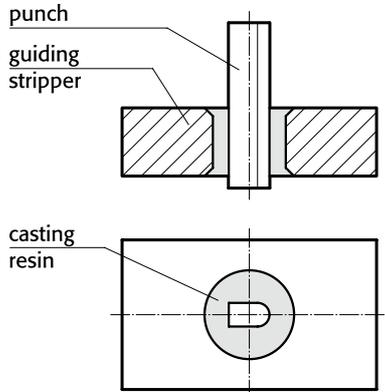


Fig. 2:
Cast guide for form punch

Where extremely thin casting gaps cannot be avoided, admixture of FIBROLIT® Thinning agent 280.24 will reduce the viscosity of the epoxy mixture, thus facilitating casting or injection.

The casting aperture/hole in the stripper requires thorough degreasing. Apply a coating of release agent to both the punch and the matrix. Bring stripper and matrix into accurate alignment, then clamp together.

Various methods exist for the exact positioning of the punch prior to casting. A magnetic vee block can be used for assuring verticality. Metal foil or plastic shims may help in providing equal clearance with the matrix. Segmented matrices are best made initially to zero clearance – relief and clearance to be ground after casting; this method ensures correct centring of the punch versus the matrix inserts.

A ring of plasticine helps to confine the poured resin, also acts as a casting funnel. Often the use of the FIBRO Injection gun 280.09 will be found much easier, especially where access is obstructed.

With simple dies, the following execution leads to expedient and good results:

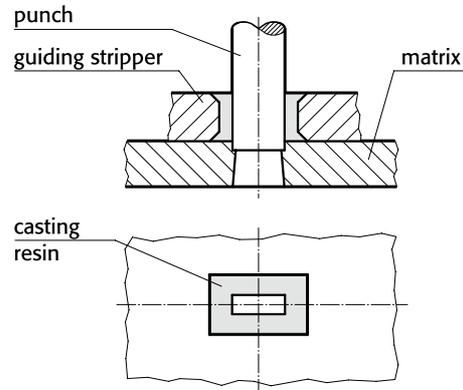


Fig. 3:
Casting of the punch guide in a simple piercing/blanking die

The punch is set up squarely and positioned dimensionally correct relative to the matrix. The punch guide is then cast in the prepared stripper aperture – the stripper being dowelled to the matrix, of course.

After hardening, the punch is forced lightly into the soft matrix, this being facilitated by the usual undersized preliminary matrix aperture.

The matrix is then worked to the impressed contours, finished and finally hardened.

Where stripping forces are considerable and/or where large runs are anticipated, the cast epoxy resin guides in the stripper can be protected against wear by a wear plate. This plate is fitted to the underside of the stripper – before or after casting.

Fast-running dies require lubrication of the punch guide; an oil well is easily formed at the top end of the cast resin guide – as shown in fig. 4.

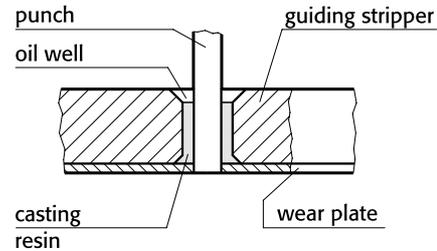


Fig. 4:
Cast punch guide with oil well and wear plate underneath stripper

Quill punches ought to be given maximum support over their length; a typical cast stripper guide for such thin punches is shown in fig. 5.

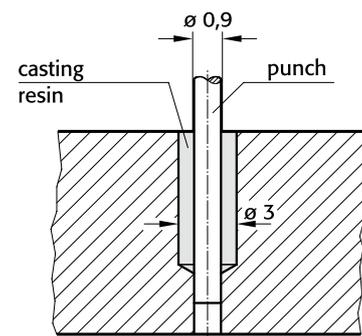


Fig. 5:
Cast guide for thin Quill-Type Punch

Application examples: FIBROLIT® ZWO, FIBROFIX® SECHS

Fig. 6 shows a guiding stripper with jig-bored holes for a number of dowel pins. The aperture was sawn. After driving in of the dowel pins the punch is inserted and then the guide is cast around it. The line contact with the hardened dowels makes the punch guide more durable, and the lining up of the punch (prior to casting) is eliminated.

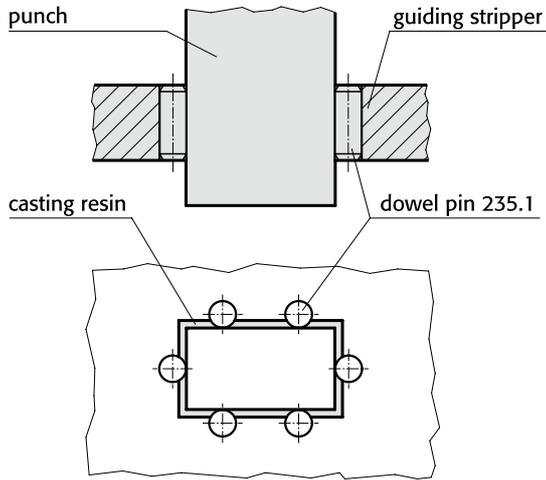


Fig. 6:
Cast punch guide with jig-bored positioning dowel pins

A complicated guiding stripper with many intricately-shaped punch guiding holes is shown in fig. 7. All apertures in the stripper were drilled, sawn or milled, and the punch guides were cast with FIBRO tooling resin.

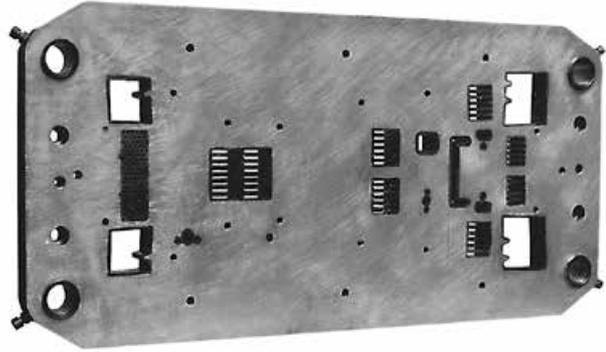
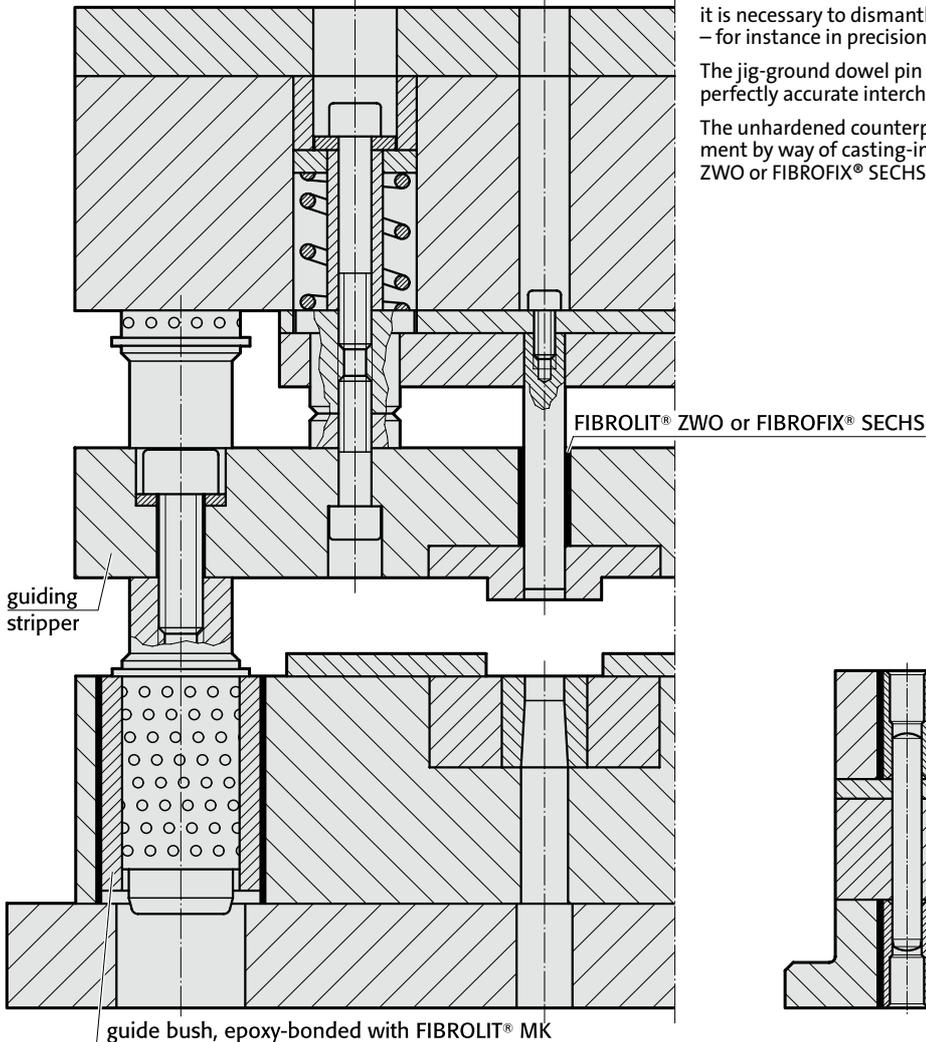


Fig. 7:
Guiding stripper with numerous punch guides, cast with FIBRO tooling resin

Examples of epoxy-casting and epoxy-bonding work in a progression die



Cast-in liner bushes for dowel pins

These hardened Liner Bushes are used to great advantage where it is necessary to dismantle or replace unhardened components frequently – for instance in precision stamping dies etc.

The jig-ground dowel pin holes in the hardened and ground plates assure perfectly accurate interchangeability.

The unhardened counterpart is brought into precise position and alignment by way of casting-in of the hardened liner bushes. Either FIBROLIT® ZWO or FIBROFIX® SECHS is used for casting.

