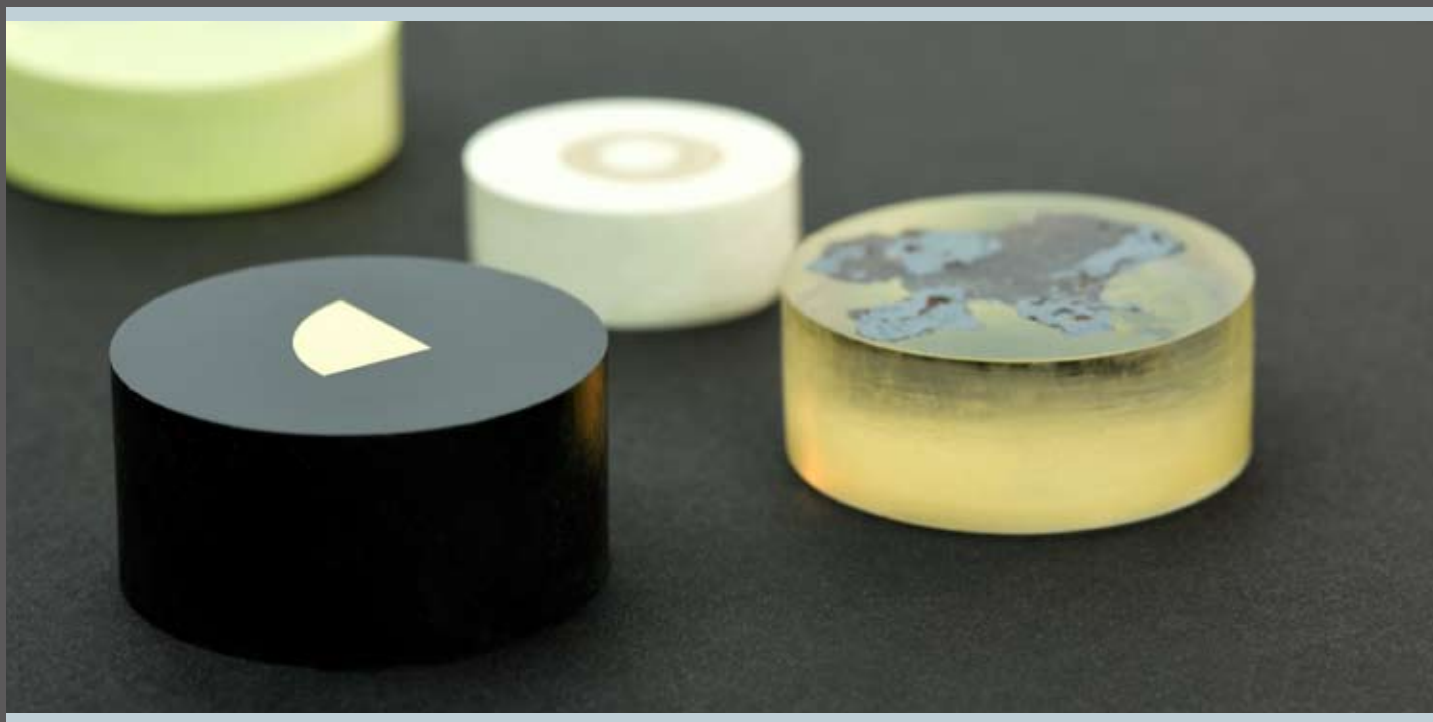
Pioneer in sample preparation

Technovit® resins, grinding and polishing systems
Kulzer materialography



KULZER
MITSUI CHEMICALS GROUP

Kulzer

In the service of our customers

Kulzer Materialography is more than just embedding, grinding and cutting. The focus is always on the best possible solution for our customers – for you!

1 **Listening and understanding** – Our product specialists will advise you to compile the best product portfolio for you and make your work as efficient as possible.

2 **Customized solutions** – You get the customized solution for your task under your working conditions. Thanks to our development department and strong, reliable cooperation partners, we are able to offer customized solutions in addition to our comprehensive standard program.

3 **Everything from a single source** – from the product idea to the development and production. Everything under one roof.

4 **Modern logistics** – With our logistics partner and lean internal processes, we can react quickly and flexibly. This means we are able to deliver your desired articles from the more than 3000 products in stock within 1–2 working days within Germany.

5 **Free on-site service** – Any questions after the purchase? To ensure optimal use of our products, we offer free on-site training.

We are pleased to be the competent contact for you when it comes to questions of material testing!

Making the invisible visible.
Kulzer Materialography.

Technovit® resins, grinding and polishing systems

Kulzer

Pioneer in sample preparation

Essential aspects for the materialographic examination are to make reliable statements about the characteristics of the samples to be examined.

Perfectly prepared samples support the analysis of cause and effect.

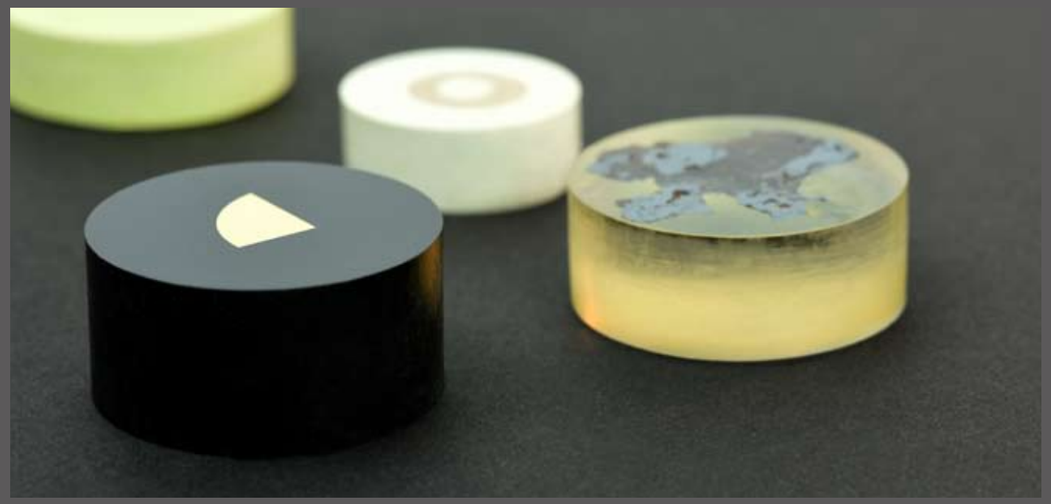
You will find Kulzer Technik to be a reliable partner in the field of materialography. We offer you free, individual advice and work with you to develop preparation methods for new tasks. Convince yourself of the quality of our products in your laboratory.

As far back as the early fifties, the idea was born to transfer the expertise in resin technologies to the field of materials testing.

This was the birth of Kulzer Technik and "Technovit"
In 1953, Kulzer Technik introduced the fast-curing resin Technovit – an important basic material for materialographic tests – to the market. In the course of the last almost 70 years, the product range of Technovit resins has been continuously expanded and adapted to changing requirements.

In addition to the product range of Technovit resins, Kulzer Technik offers a complete program of grinding and polishing media as well as a matching equipment series for materialography.

Minimal preparation steps and perfect preparation
The components are coordinated in such a way that from the cutting of the samples to the final polishing step, efficient, time- and thus cost-saving preparation takes place – naturally at the highest quality level! Our goal is to always offer you up-to-date and high-quality products and solutions for your individual working environment.



KULZER Technik – reliable and up-to-date, quality at the highest level.

Technovit®

Resins that set standards in quality and processing

High-quality resins with reliable properties and easy handling are the prerequisites for precise material testing. Kulzer has been a leader in the development and manufacture of resin products of the highest quality for many decades.

The resins from Kulzer meet the highest requirements. They are used as embedding resins for materialographic examinations or as aids in materialography and production processes. They thus occupy a permanent place in the everyday life of modern laboratories and manufacturing processes.

Technovit – the resin with many faces
The umbrella brand "Technovit" stands for a wide range of resin products of different technologies. The focus is on the application for material testing.

Gap-free embedding, transparency, time-saving and easy handling, as well as a maximum of impression accuracy and form stability are the outstanding features that are specifically required in "materialography." Kulzer Technik meets these requirements with its complete product range. In addition to classical materialographic applications, these products can also be used for industrial manufacturing processes, toolmaking, prototype construction *(spouts, fasteners)* or in the restoration sector.

All Technovit products originate from our own research and development laboratories.

Customized solutions
In addition to our standard program, we are also happy to provide you with our know-how for customized products.

Cold embedding resin

Opaque embedding resin – high hardness and perfect margin fit

Technovit 4000 | Technovit 4002 IQ

Filled cold embedding resins offer extremely low shrinkage in addition to high hardness. This allows excellent edge definition to be achieved. This makes it the optimal embedding resin for all samples that need to be examined in the edge region. A positive feature here is the opaque appearance. The focus is only on one layer so misinterpretations due to depth information are excluded.

We offer the perspective: transparent embedding resins if visual inspection is required

Technovit 4004 | Technovit 4006 | Technovit 4006 SE

The transparent Technovit cold embedding resins are adapted to the requirements in modern laboratories. They are used wherever a visual inspection of the sample through the embedding resin is necessary.

Transparent 2-component embedding resins based on MMA have a low boiling point, which leads to bubble formation during curing. The boiling point is increased by using the Technomat Pressure Pot. Thus, bubble-free, highly transparent impressions are achieved.

Resins for porous materials

Technovit EPOX

The embedding resin for the highest demands and low temperature load. Ideal for embedding porous and/or temperature-sensitive workpieces. Porous corrosion layers can be stabilized with vacuum support, as can electronic components with fine holes and narrow gaps. With the two hardener variants, even sensitive samples can be embedded reliably and highly transparently with virtually no heat input.

Highly developed resins for special tasks

Technovit 5000 | Technovit 5071 | Technovit 7100

Technovit 5000 is a 2-component, copper-based cold embedding resin that enables embedding that is ideal for SEM examinations.

Technovit 5071 provides gentle removal of sensitive samples and thus simplifies sample preparation, for example, for SEM examinations.

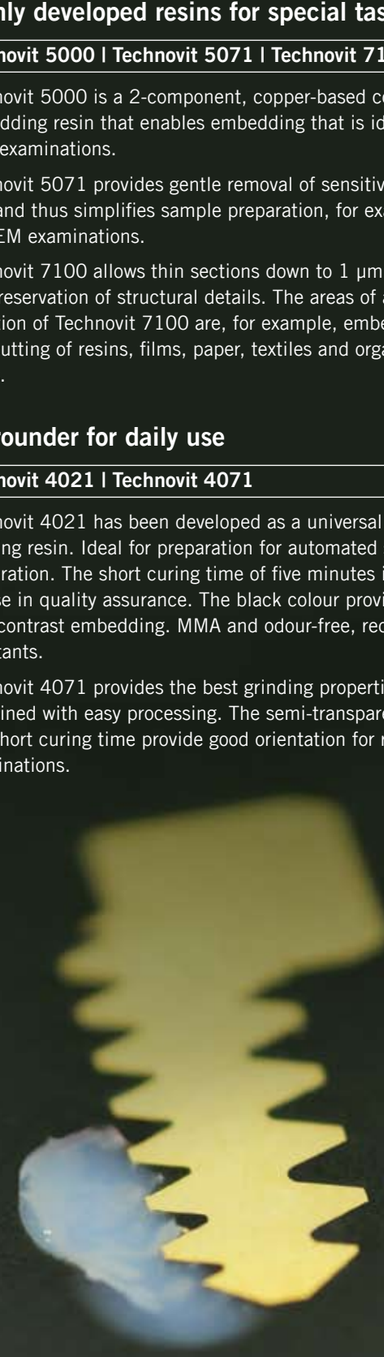
Technovit 7100 allows thin sections down to 1 µm and the preservation of structural details. The areas of application of Technovit 7100 are, for example, embedding and cutting of resins, films, paper, textiles and organic fibres.

All-rounder for daily use

Technovit 4021 | Technovit 4071

Technovit 4021 has been developed as a universal embedding resin. Ideal for preparation for automated sample preparation. The short curing time of five minutes is ideal for use in quality assurance. The black colour provides high-contrast embedding. MMA and odour-free, reduced pollutants.

Technovit 4071 provides the best grinding properties combined with easy processing. The semi-transparency and short curing time provide good orientation for routine examinations.



Technovit® 4000

The low-shrinkage

Phthalate- FREE

3-component cold embedding resin

Technovit 4000 is a fast-curing, cold-polymerizing, 3-component resin based on modified polyester and ultrafine inorganic filler in the form of powder, Syrup I and Syrup II.

- for optimum edge protection and marginal sharpness
- also ideal for embedding samples with porous surfaces, small gaps, blind holes or undercuts; vacuum impregnation is possible during the pot time

Properties and application

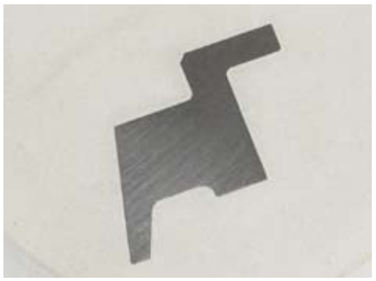
- very low polymerization shrinkage and optimum margin fit
- excellent flow behaviour
- very good adhesion to metal surfaces, therefore optimal edge protection and marginal sharpness
- excellent grinding and polishing properties
- Curing time of approx. 16–20 min
- Mixing ratio is 1:2:2 by volume or 1:2:3 by weight *(Syrup II : Syrup I : Powder)*

Technical specifications

Colour	creamy white
Designated use	embedding, low gap
Components	Powder / Syrup I + II
Mixing ratio [weight]	2:2:1
Processing width [min]	4
Curing time at 22 °C [min]	16–20
Peak temperature during curing in the block [°C]	122
Ball indentation hardness [N/mm²]	135
Hardness (Shore D) [MPa]	80
Temperature resistance [°C]	130
Solubility	insoluble
Density = spec. weight [g/cm³]	1.565
Impact strength [KJ/m²]	1.5
Flexural strength [N/mm²]	50
Compressive strength [N/mm²]	280
Linear shrinkage [%]	2.7
Volume shrinkage [%]	6.2
Storage temperature [°C]	25
Shelf life [years]	3
Lin. TCE	37–62 x 10^{-6}
Modulus of elasticity [MPa] EN ISO 604: 2003	2000–2200

Order no.: Technovit 4000

64708458	Technovit 4000 combipack 1 750 g powder / 500 ml Syrup I 250 ml Syrup II	
64708459	Technovit 4000 combipack 2 1500 g powder / 1000 ml Syrup I / 500 ml Syrup II	
66032003	Technovit 4000 powder	1500 g
64711227	Technovit 4000 powder	7500 g
66032002	Technovit 4000 Syrup I	1,000 ml
64711228	Technovit 4000 Syrup I	5,000 ml
64712092	Technovit 4000 Syrup II	500 ml
64711229	Technovit 4000 Syrup II	2500 ml



Quantities and mixing ratios of Technovit 4000 (without sample)

25 mm*	30 mm*	40 mm*	50 mm*	Mixing ratios	PDR	LIQ
15 g	25 g	40 g	60 g	20 g powder with 30 g liquid	40%	60%
6 g Syrup I	10 g Syrup I	16 g Syrup I	24 g Syrup I	20 g powder with 28 ml liquid		
3 g Syrup II	5 g Syrup II	8 g Syrup II	12 g Syrup II	first mix Syrup I and II		
6 g powder	10 g powder	16 g powder	24 g powder			

* Kulzer embedding forms. The mixing ratios mentioned are basic values and can be varied slightly depending on the application requirements.

Technovit® 4002 IQ

The gap-free

Phthalate FREE

Attention!
Not available in all markets.

2-component resin specially designed for gap- and shrink-free embedding
The areas of application cover the entire range of materials with a wide variety of geometric shapes in which high quality is required in terms of edge gap, grinding and polishing behaviour.

Technovit 4002 IQ is based on a modified polyester consisting of a powder component and a liquid. The powder can be easily wetted thus producing a very easy-flowing compound with optimum form-filling capacity.

- Technovit 4002 IQ provides sufficient pot time, e.g. for the infiltration of porous surfaces
- the embedding resin is ideal for fast, edge-sharp embedding *(vacuum assisted infiltrations are possible)*

Properties and application
- gap-free embedding
- no polymerization shrinkage
- excellent edge definition
- excellent grinding and polishing properties
- easy handling
- particularly fine powder component – very good form-filling behaviour

Technical specifications

Colour	white
Designated use	embedding, low gap
Components	Powder / liquid
Mixing ratio [weight]	3:2
Processing width [min]	5
Curing time at 22 °C [min]	12–17
Peak temperature during curing in the block [°C]	99 °C
Hardness (Shore D) [MPa]	85
Temperature resistance [°C]	100
Solubility	insoluble
Density = spec. weight [g/cm³]	1.63
Water absorption [% by vol]	2.7
Volume shrinkage [%]	0.46
Refractive index Monomer / polymer	M = 1.420 --
Storage temperature [°C]	Powder: 25 Liquid: 5–9
Shelf life	Powder: 3 years Liquid: 5 months

Order no.: Technovit 4002 IQ

66064414	Technovit 4002 IQ powder white	1300 g
66064415	Technovit 4002 IQ powder white	13000 g
66064412	Technovit 4002 IQ liquid	1000 ml
66064413	Technovit 4002 IQ liquid	5000 ml

Quantities and mixing ratios Technovit 4002 IQ (without sample), example for 3:2

25 mm*	30 mm*	40 mm*	50 mm*	Mixing ratios	PDR	LIQ
20 g	25 g	45 g	70 g	30 g powder with 20 g liquid	approx. 60%	approx. 40%
12 g powder	15 g powder	27 g powder	42 g powder	30 g powder with 19 ml liquid		
8 g liq.	10 g liq.	18 g liq.	28 g liq.			

* Kulzer embedding forms. The mixing ratios mentioned are basic values and can be varied slightly depending on the application requirements.

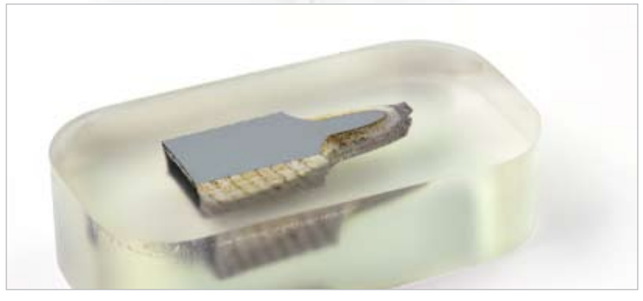
Technovit® 4004

The transparent

DMPT FREE | Phthalate FREE

Transparent for routine embedding
The powder-liquid system is optimal for quick routine examinations that require visual inspection.

Properties and application
- 2-component powder-liquid system
- fast curing time of 9–12 min
- easy application due to variable mixing ratio



Technical specifications

Colour	transparent
Designated use	embedding in the pressure pot free of bubbles
Components	Powder / liquid
Mixing ratio [weight]	5:3
Processing width [min]	2–3
Curing time at 22 °C [min]	9–12
Peak temperature during curing in the block [°C]	110
Ball indentation hardness [N/mm²]	103
Hardness (Shore D) [MPa]	84
Temperature resistance [°C]	125
Solubility	swellable only
Density = spec. weight [g/cm³]	1.14
Impact strength [KJ/m²]	6.4
Flexural strength [N/mm²]	95
Compressive strength [N/mm²]	100–200
Linear shrinkage [%]	2.25 / 2.08 / 1.80
Volume shrinkage [%]	1:1 = 6.75 1.8:1 = 5.8 2.3:1 = 5.4
Refractive index Monomer / polymer	M = 1.422 P = 1.434
Storage temperature [°C]	25
Shelf life [years]	3
Lin. TCE	110 x 10^{-6}
Modulus of elasticity [MPa] EN ISO 604: 2003	2000–2300

Order No.: Technovit 4004

64708471	Technovit 4004 powder	1000 g
64708472	Technovit 4004 powder	2 x 1000 g
64708473	Technovit 4004 powder	10000 g
64708474	Technovit 4004 liquid	500 ml
64708475	Technovit 4004 liquid	1000 ml
64708476	Technovit 4004 liquid	5000 ml

Quantities and mixing ratios of Technovit 4004 (without sample)

25 mm*	30 mm*	40 mm*	50 mm*	Mixing ratios	PDR	LIQ
13 g	18 g	32 g	48 g	25 g powder with 15 g liquid	approx. 62.5%	approx. 37.5%
8 g powder	11 g powder	20 powder	30 g powder	25 g powder with 16 ml liquid		
5 g liq.	7 g liq.	12 g liq.	18 g liq.			

* Kulzer embedding forms. The mixing ratios mentioned are basic values and can be varied slightly depending on the application requirements.

Technovit® 4006 / 4006 SE

High Clear

DMPT FREE | Phthalate FREE

Technovit 4006

The crystal-clear version for sensitive samples

The highly transparent 2-component cold embedding resin allows a lower temperature load due to the longer curing time. Thus target preparations are also possible on more sensitive materials – easy and straightforward!

Properties and application

- 2-component powder-liquid system
- easiest application due to variable mixing ratio
- low-gap embedding due to integrated bonding agent and lower temperature load
- good grinding and polishing properties
- new initiator system – less irritating!
- ideal for routine target preparations with lower temperature load

Technovit 4006 SE

For casting very thin layers

This variant provides almost all the positive features of Technovit 4006. Technovit 4006 SE is, moreover, suitable for casting very thin layers and provides the possibility of also transparently embedding of small samples with a low volume in a short time.

Properties and application

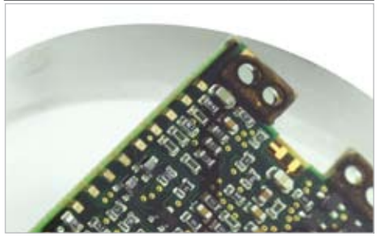
- excellent grinding and polishing properties
- lower bubble formation also without using the Technomat Pressure Pot
- also hardens in thin layers

Technical specifications

	Technovit 4006	Technovit 4006 SE
Colour	highly transparent	transparent
Designated use	embedding in the pressure pot free of bubbles	embedding, bubble-free
Components	Powder / liquid	Powder / liquid
Mixing ratio [weight]	5:3	5:3
Processing width [min]	4	4
Curing time at 22 °C [min]	9–13	11–15
Peak temperature during curing in the block [°C]	99	99
Ball indentation hardness [N/mm²]	169	137
Hardness (Shore D) [MPa]	82	87
Temperature resistance [°C]	125	105
Solubility	swellable only	swellable only
Density = spec. weight [g/cm³]	1.14	1.14
Impact strength [KJ/m²]	5.8	4.2
Flexural strength [N/mm²]	105	120
Compressive strength [N/mm²]	120–140	120–150
Water absorption [% by vol]	0.38	0.3
Linear shrinkage [%]	2.25 / 2.08 / 1.80	1.8
Volume shrinkage [%]	1:1 = 6.75 1.8:1 = 5.8 2.3:1 = 5.4	5.4
Refractive index Monomer / polymer	M = 1.425 P = 1.436	M = 1.439 P = 1.441
Storage temperature [°C]	25	25
Shelf life [years]	3	3
Lin. TCE	108 x 10^{-7}	108 x 10^{-7}
Modulus of elasticity [MPa] EN ISO 604: 2003	2000–2300	2400–2500

Order no.: Technovit 4006 / 4006 SE

66020676	Technovit 4006 powder	1000 g
66020679	Technovit 4006 powder	2 x 1000 g
66020677	Technovit 4006 powder	10000 g
66020680	Technovit 4006 liquid	500 ml
66020678	Technovit 4006 liquid	1000 ml
66020681	Technovit 4006 liquid	5000 ml
66030969	Technovit 4006 SE Powder	1000 g
66030966	Technovit 4006 SE Powder	10000 g
66030968	Technovit 4006 SE Liquid	1000 ml
66030967	Technovit 4006 SE Liquid	5000 ml



Quantities and mixing ratios of Technovit 4006/4006 SE (without sample)

25 mm*	30 mm*	40 mm*	50 mm*	Mixing ratios	PDR	LIQ
13 g	18 g	32 g	48 g	25 g powder with 15 g liquid	63%	37%
8 g powder	11 g powder	20 powder	30 g powder	25 g powder with 14 ml liquid		
5 g liq.	7 g liq.	12 g liq.	18 g liq.			

* Kulzer embedding forms. The mixing ratios mentioned are basic values and can be varied slightly depending on the application requirements.

Technovit® 4071

The universal

DMPT FREE | Phthalate FREE

Uncomplicated – Ideal for all routine embeddings

The highly cross-linked Technovit 4071 provides the best grinding properties combined with easy processing. The semi-transparency allows good orientation and the short curing time makes it indispensable for routine embedding. Series of samples can be produced in a very short time.

Properties and application

- easy handling, best for routine work
- low viscosity
- short curing time *(5–7 min.)*
- very good grindability, mechanically workable
- fast routine embedding resin for the entire range of materials

Technical specifications

Colour	green-transparent
Designated use	embedding
Components	Powder / liquid
Mixing ratio [weight]	5:3
Processing width [min]	1–2
Curing time at 22 °C [min]	5–7
Peak temperature during curing in the block [°C]	108
Ball indentation hardness [N/mm²]	155
Hardness (Shore D) [MPa]	85
Temperature resistance [°C]	100
Solubility	swellable only
Density = spec. weight [g/cm³]	1.19
Impact strength KJ/m²	6.1
Flexural strength [N/mm²]	94
Compressive strength [N/mm²]	100–200
Water absorption [% by vol]	0.3
Linear shrinkage [%]	1.93
Volume shrinkage [%]	5.8
Refractive index Monomer / polymer	M = 1.458 --
Storage temperature: [°C]	25
Shelf life [years]	3
Lin. TCE	119 x 10^{-6}
Modulus of elasticity [MPa] EN ISO 604: 2003	2100–2500

Order no.: Technovit 4071

64708485	Technovit 4071 powder	1000 g
64708486	Technovit 4071 powder	2 x 1000 g
64708487	Technovit 4071 powder	10000 g
64708488	Technovit 4071 liquid	500 ml
64708489	Technovit 4071 liquid	1000 ml
66095639	Technovit 4071 liquid	5000 ml

Quantities and mixing ratios of Technovit 4071 (without sample)

25 mm*	30 mm*	40 mm*	50 mm*	Mixing ratios	PDR	LIQ
13 g	18 g	32 g	48 g	25 g powder with 15 g liquid	approx. 63%	approx. 37%
8 g powder	11 g powder	20 powder	30 g powder	25 g powder with 14 ml liquid		
5 g liq.	7 g liq.	12 g liq.	18 g liq.			

* Kulzer embedding forms. The mixing ratios mentioned are basic values and can be varied slightly depending on the application requirements.

Technovit® 4021

The odor-free

DMPT FREE | Phthalate FREE

Pollutant-reduced

The Technovit 4021 powder-liquid system is absolutely odourless thanks to the absence of MMA, contains NO tetrahydrofurfuryl methacrylate, styrene or similar and therefore contains no teratogenic ingredients. In the selection of the other components, too, emphasis was placed on ingredients with a low level of harmful substances.

Technovit 4021 thus fulfils all the relevant requirements of a modern embedding resin.

A must for every laboratory

Technovit 4021 is a fast product and works very efficiently due to its short polymerization time of 5 minutes. Even fine sample geometries are well filled due to the low viscosity.

Properties and application

- pollutant-reduced
- odourless
- quick and uncomplicated
- bubble-free
- cost-effective

Moderate polymerization temperatures and low gap formation enable a wide range of preparation possibilities.
Applicable to a wide range of material samples.

Technical specifications

Colour	black
Designated use	embedding, odourless
Components	Powder / liquid
Mixing ratio [weight]	5:3
Processing width [min]	2
Curing time at 22 °C [min]	5–6
Peak temperature during curing in the block [°C]	99
Hardness (Shore D) [MPa]	83
Temperature resistance [°C]	100
Solubility	swellable only
Storage temperature [°C]	25
Shelf life [years]	3
Modulus of elasticity [MPa] EN ISO 604: 2003	1600–1800

Order no.: Technovit 4021

66094510	Technovit 4021 powder	1000 g
66094511	Technovit 4021 powder	10000 g
66094508	Technovit 4021 liquid	500 ml
66094509	Technovit 4021 liquid	5000 ml

Quantities and mixing ratios of Technovit 4021 (without sample)

25 mm*	30 mm*	40 mm*	50 mm*	Mixing ratios	PDR	LIQ
13 g	18 g	32 g	48 g	25 g powder with 15 g liquid	63%	37%
8 g powder	11 g powder	20 powder	30 g powder	25 g powder with 14 ml liquid		
5 g liq.	7 g liq.	12 g liq.	18 g liq.			

* Kulzer embedding forms. The mixing ratios mentioned are basic values and can be varied slightly depending on the application requirements.

Technovit 4021 – a must for every lab. See for yourself!

The Technovit 4021 powder-liquid system is absolutely odourless thanks to the absence of MMA, contains NO tetrahydrofurfuryl methacrylate, styrene or similar and therefore contains no teratogenic ingredients.

Technovit® 5000

The conductive

For SEM examinations

This 2-component, copper-based cold embedding resin enables conductive embeddings that are ideal for SEM examinations. Technovit 5000 is also a good basis for the electrolytic preparation of metallographic samples. Technovit 5000 is flowable for approx. 1 min. *(by lightly tapping on the form)* and hardens within 7 minutes.

Properties and application

- conductive
- electrolytic sample preparation

Technical specifications

Colour	copper-brown
Designated use	embedding, conductive
Components	Powder / liquid
Mixing ratio	20 g pdr. : 13 ml liq.
Processing width [min]	1
Curing time at 22 °C [min]	7–12
Peak temperature during curing in the block [°C]	125
Ball indentation hardness [N/mm²]	160
Temperature resistance [°C]	100
Solubility	swellable only
Density = spec. weight [g/cm³]	2.85
Impact strength KJ/m²	5.0 N/mm²
Flexural strength [N/mm²]	85
Compressive strength [N/mm²]	280
Water absorption [% by vol]	0.47
Linear shrinkage [%]	2.3
Volume shrinkage [%]	7.1
Refractive index Monomer / polymer	M = 1.420 P = 1.434
Storage temperature: [°C]	25
Shelf life [years]	3

Order no.: Technovit 5000

64708494	Technovit 5000 powder	1000 g
64708495	Technovit 5000 liquid	500 ml

Gap-free embeddings for SEM examinations in combination with Technovit EPOX.

Quantities and mixing ratios of Technovit 5000 (without sample)

Mixing ratios	PDR	LIQ
25 g powder with 15 g liquid	63%	37%
25 g powder with 14 ml liquid		

* Kulzer embedding forms. The mixing ratios mentioned are basic values and can be varied slightly depending on the application requirements.

Technovit® 5071

The dissolvable

DMPT FREE | Phthalate FREE

For samples that have to be removed again

Technovit 5071 provides the easiest application with very good mechanical machinability. It is very well suited for the embedding of samples that subsequently have to be removed in order to examine them under a scanning electron microscope, for example, or to prepare them electrolytically. Due to its good mechanical properties, Technovit 5071 is very suitable as an adhesive that may have to be removed again.

Technovit 5071 enables tje gentle removal of sensitive samples and thus all-round visibility during SEM examination.

Properties and application

- chemically soluble *(with acetone, dichloromethane or similar)*
- can be thermally softened (*becomes soft from 150 °C, 30 min holding time)*
- easiest application *(variable mixing ratio 1:1 to 3:1)*
- good adhesion properties

Technical specifications

Colour	green-transparent
Designated use	embedding
Components	Powder / liquid
Mixing ratio [weight]	5:3
Processing width [min]	2
Curing time at 22 °C [min]	8–10
Peak temperature during curing in the block [°C]	112
Ball indentation hardness [N/mm²]	144
Solubility	in acetone
Density = spec.. weight [g/cm³]	1.19
Impact strength [KJ/m²]	6.3 N/mm²
Flexural strength [N/mm²]	93
Compressive strength [N/mm²]	100
Water absorption [% by vol]	ca. 2
Linear shrinkage [%]	2.3
Volume shrinkage [%]	7
Storage temperature: [°C]	25
Shelf life [years]	3 Pdr. / 2 liq.
Lin. TCE	141 x 10^{-6}
Modulus of elasticity [MPa] EN ISO 604: 2003	2000–3000

Order no.: Technovit 5071

64708865	Technovit 5071 powder	1000 g
66022678	Technovit Universal Liquid	500 ml

Technovit 5071 – gentle removal of sensitive samples.

Thermally separable: If the samples are heat resistant, Technovit 5071 can be softened by heating the sample block to 150 °C. The sample block can also be heated to 150 °C. Simple geometric shapes can thus be removed again without much effort.

Chemically separable: Dissolution rate for a sample block (approx. 27 g resin) in 100 ml acetone at room temperature ca 11 h, at 50 °C approx. 4 h.

Quantities and mixing ratios of Technovit 5071 (without sample)

25 mm*	30 mm*	40 mm*	50 mm*	Mixing ratios	PDR	LIQ
13 g	18 g	32 g	48 g	25 g powder with 15 g liquid	approx. 63%	approx. 37%
8 g powder	11 g powder	20 powder	30 g powder	25 g powder with 16 ml liquid		
5 g liq.	7 g liq.	12 g liq.	18 g liq.			

* Kulzer embedding forms. The mixing ratios mentioned are basic values and can be varied slightly depending on the application requirements.

Technovit® EPOX

Resin for porous materials

Technovit EPOX – an epoxy resin system
Technovit EPOX is an epoxy resin system consisting of a resin component Technovit EPOX Resin and optionally with a fast hardener: Technovit Epox Hardener fast, or a slow hardener: Technovit EPOX Hardener regular. The choice of hardener can influence the curing time, pot life and above all the temperature load. The pot life of approx. 1 hour favours, for example, the infiltration of porous materials – especially under a vacuum.

A precise mixing ratio must be maintained for optimum results. The Technovit EPOX components are used in the ratio of 2 parts by weight of resin to 1 part by weight of hardener mixed and poured.

Curing takes place in approx. 10 or 18 hours depending on the hardener component used and the embedding resin volume. To influence the curing times, it is possible to cure the samples in a heating cabinet or in a refrigerator.

Technovit EPOX – for transparent embedding without a temperature load.

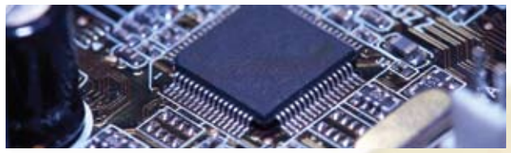
Quantities and mixing ratios of Technovit EPOX (without sample)

Embedding form	Quantity without sample	Ambient temperature	Max. curing temperature	Time to max. temperature	Time to end measurable temp.
Technovit EPOX Resin & Technovit EPOX Hardener regular					
25 mm*	12 g (8 g resin / 4 g hardener)	20 °C	30 °C	120 min	ca. 18 h
30 mm*	18 g (12 g resin / 6 g hardener)	20 °C	35 °C	110 min	ca. 18 h
40 mm*	30 g (20 g resin / 10 g hardener)	20 °C	45 °C	105 min	ca. 18 h
50 mm*	45 g (30 g resin / 15 g hardener)	20 °C	65 °C	100 min	ca. 18 h
40 mm*	30 g (20 g resin / 10 g hardener)	23 °C	48 °C	105 min	ca. 18 h
40 mm*	30 g (20 g resin / 10 g hardener)	50 °C	100 °C	40 min	ca. 3 h
Technovit EPOX Resin & Technovit EPOX Hardener fast					
25 mm*	12 g (8 g resin / 4 g hardener)	20 °C	37 °C	90 min	ca. 10 h
30 mm*	18 g (12 g resin / 6 g hardener)	20 °C	57 °C	80 min	ca. 10 h
40 mm*	30 g (20 g resin / 10 g hardener)	20 °C	110 °C	70 min	ca. 10 h
50 mm*	45 g (30 g resin / 15 g hardener)	20 °C	144 °C	60 min	ca. 10 h
40 mm*	30 g (20 g resin / 10 g hardener)	23 °C	120 °C	60 min	ca. 9 h
40 mm*	30 g (20 g resin / 10 g hardener)	50 °C	140 °C	40 min	ca. 2 h

* Kulzer embedding forms. The mixing ratios mentioned must be adhered to exactly and are a prerequisite for this product for flawless curing.

Properties and application
- Application under vacuum possible
- high transparency, good adhesion to the workpieces
- UV colour stable
- variable curing times, can be influenced individually
- gap-free

By using Hardener fast, the curing time is almost cut in half. By increasing the starting temperature, the curing time is significantly reduced and the practice-relevant final hardness is increased.



Technical specifications

Colour	highly transparent	
Designated use	embedding of porous materials	
Components	Resin / hardener regular	Resin / hardener fast
Mixing ratio	2:1 by weight	2:1 by weight
Processing width [min]	ca. 1 h	ca. 1 h
Curing time at 22 °C [min]	18 h	10 h
Peak temperature during curing in the block [°C]	65	144
Hardness (Shore D) [MPa]	78	79
Density = spec. weight [g/cm³]	1.13	1.13
Water absorption [% by vol]	0.6	--
Linear shrinkage [%]	0.90	0.80
Volume shrinkage [%]	1.3	1.1
Refractive index Monomer / polymer	M = 1.5539 P = 1.59	-- --
Storage temperature [°C]	25	--
Shelf life [years]	2	2

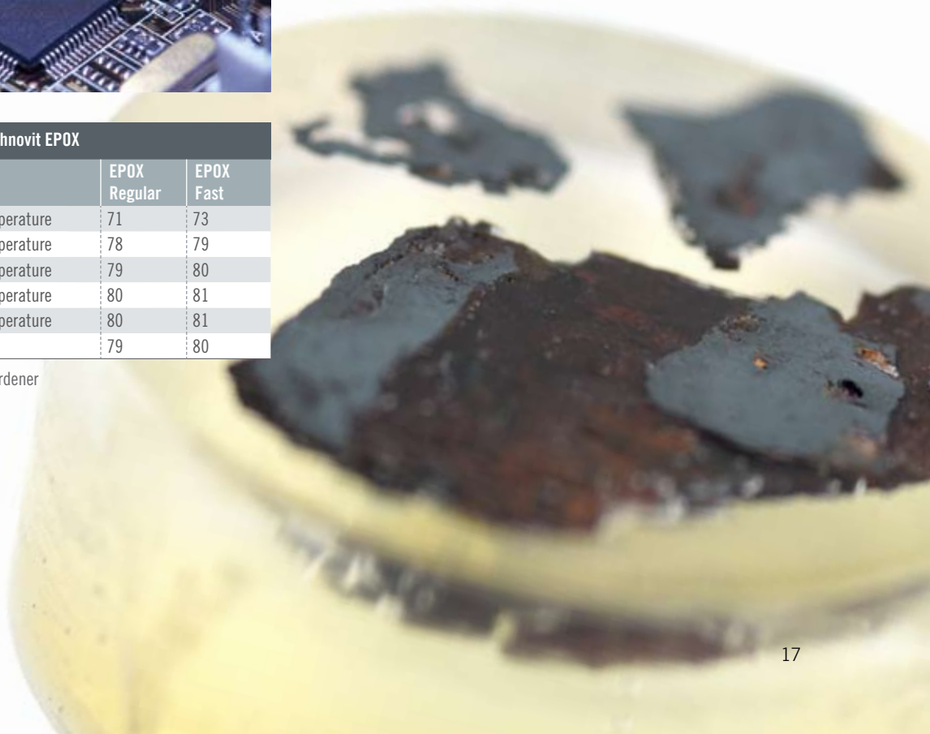
Order no.: Technovit EPOX

66040437	Technovit Epox Resin	1000 g
66087207	Technovit Epox Resin	5000 g
66040439	Technovit Epox Hardener fast	500 g
66087208	Technovit Epox Hardener fast	5000 g
66040438	Technovit Epox Hardener regular	500 g
66087209	Technovit Epox Hardener regular	5000 g

Hardness (Shore D) [MPa] Technovit EPOX

Product	Curing at	EPOX Regular	EPOX Fast
Shore D (20 h)	Room temperature	71	73
Shore D (2 d)	Room temperature	78	79
Shore D (7 d)	Room temperature	79	80
Shore D (14 d)	Room temperature	80	81
Shore D (21 d)	Room temperature	80	81
Shore D (20 h)	50 °C	79	80

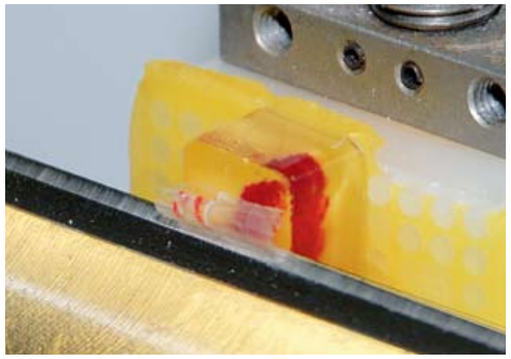
Mixing ratio: 100 g resin / 50 g hardener



Technovit® 7100

The cuttable

Sections of embedded materials
Whenever samples need to be embedded for cutting, Technovit 7100 is THE material of choice. Originally developed for histology, Technovit 7100 has also proven its worth in industry for many years due to its universal application possibilities.



Technovit 7100 – ideal for microtomy.

Thin sections down to 1 µm
This unique, easy-to-use 3-component HEMA-based resin allows thin sections down to 1 µm. This property makes Technovit 7100 an indispensable embedding resin for difficult resin samples, textiles, paper, fibres, polymer materials and their combinations.

Infiltration – preservation of structural details
In addition to the optimum infiltration and good cutting properties, the high tolerance to most polymer materials is particularly noteworthy.

- Smooth plastic samples can be embedded directly, while porous materials *(sponges, textile samples, etc.)* are infiltrated for stabilization
- Paper is impregnated with the very low-viscosity Technovit 7100 embedding solution within a very short time, so that additional infiltration is generally unnecessary.

Technical specifications

Colour	yellowish transparent
Designated use	Microsections for electron microscopy
Components	Basic solution / Hardener 2
Processing width [min]	5–7
Curing time at 22 °C [min]	60–75
Peak temperature during curing in the block [°C]	38 Form S 38 Form Q
Density = spec. weight [g/cm³]	1.07
Flexural strength [N/mm²]	50–60
Compressive strength [N/mm²]	90
Water absorption [% by vol]	0.33
Linear shrinkage [%]	2.8
Volume shrinkage [%]	8.4
Storage temperature: [°C]	25
Shelf life [years]	3

Order no.: Technovit 7100

64709003	Technovit 7100 combipack 500 ml liquid / 40 g Hardener II / 5 x 1 g Hardener I	
64708955	PE embedding form 25 mm	3 pcs.
66009903	"cradles"	3 pcs.

Properties and application
- embedding and production of sections and thin sections
- embedding of complex-shaped, fine plastic parts
- 3-component embedding resin based on HEMA
- optimal infiltration and thus stabilization of fragile materials
- ensures optimal infiltration of porous materials
- no temperature load
- the pointed shape distributes the cutting forces evenly and thus protects the blade and sample

Embedding forms and "cradle" use
Polyethylene embedding form, 25 mm diameter, and matching "cradle" insert *(makes it possible to reduce the cutting resistance and thus simplify cutting).*

Overview of Technovit® embedding systems

Product	System	Application	Colour	Pot time	Curing time / temperature	Hardness / Shore D	Vacuum Pressure
Technovit 2000 LC	1 component Light curing	bubble-free, low temperature development	transparent	unlimited	20 min / 95 °C	78	vacuum possible pressure not possible
Technovit 2000 LC FAST	1 component Light curing	bubble-free fast	transparent	unlimited	5 min / 105 °C	79	vacuum possible pressure not possible
Technovit 4000	3 component Self-curing	high edge definition Margin examinations	creamy white	4	16–20 min / 122 °C	80	vacuum possible pressure possible
Technovit 4002	2 component Self-curing	high edge definition	white and green	5	12–17 min / 99 °C	85	vacuum possible pressure possible
Technovit 4004	2 component Self-curing	Target preparation	transparent	3	9–12 min / 110 °C	84	Vacuum not possible Pressure necessary
Technovit 4006	2 component Self-curing	Target preparation colourless	transparent	4	9–13 min / 99 °C	82	Vacuum not possible Pressure necessary
Technovit 4006 SE	2 component Self-curing	Target preparation colourless	transparent	4	11–15 min / 99 °C	87	Vacuum not possible Pressure necessary
Technovit 4021	2 component Self-curing	Routine embedding, odourless	black	2	5–6 min / 99 °C	82	Vacuum not possible Pressure possible
Technovit 4071	2 component Self-curing	Routine embedding	green-transparent	2	5–7 min / 108 °C	85	Vacuum not possible Pressure necessary
Technovit 5000	2 component Self-curing	conductive SEM examinations	copper-brown	1	7–12 min / 125 °C	85	Vacuum not possible Pressure necessary
Technovit 5071	2 component Self-curing	separable for SEM examinations	green-transparent	2	8–10 min / 112 °C	84	Vacuum not possible Pressure necessary
Technovit Epox fast	2 component Self-curing	porous materials, workpieces with low hardness	transparent	20	10 h / 57 °C	79	Vacuum possible, Pressure possible
Technovit Epox regular	2 component Self-curing	porous materials, materials with low hardness	transparent	20	18 h / 35 °C	78	Vacuum possible, Pressure possible
Technovit 7100	3 component Self-curing	for microtome sections	transparent	7	75 min / 38 °C	--	--
Technotherm 2000	1 component fusing	low shrinkage fibre-reinforced	creamy white	--	10–15 min / 160–180 °C	90	--
Technotherm 3000	1 component fusing	conductive SEM examinations	black	--	10–15 min / 160–180 °C	89	--
Technotherm 4000	1 component fusing	Target preparation, colourless	transparent	--	10–15 min / 90–180 °C	--	--

All Technovit resins are resistant to the most common etching agents used in metallography.
See table on page 37.

Technovit® 2000 LC

For delicate, temperature-sensitive samples

Technovit 2000 LC is an easy to use, 1-component resin.
The polymerization is carried out under blue light in the Technotray POWER light polymerization unit. The system is used for the preparation of delicate, temperature-sensitive materials and micro parts.

Technovit® 2000 LC – Liquid

The light curing

Light-curing, 1-component embedding resin
The liquid enables highly transparent embeddings. The polymerization *(Time: 2x 10 min)* takes place in semi-transparent PE embedding forms in the Technotray POWER light polymerization unit at max. 90 °C.

By working in several layers or using a special irradiation programme, the polymerization temperature can be lowered even further *(to approx. 50 °C)*. The material reaches its final hardness after cooling to room temperature after which the sample can be mechanically processed.

Properties and application
- complete consumption – no mixing residues
- variable pot time, as polymerization is only initiated by using blue light
- low polymerization temperature of approx. 90 °C
- approx. 50 °C also achievable with the irradiation programme
- alcohol and acid resistant
- SEM-ready
- no bubble formation – highly transparent
- non-dangerous goods

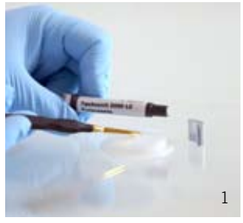
Technovit® 2000 – Inside Cure

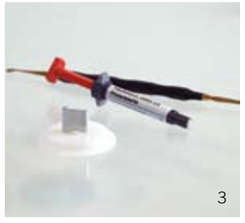
Brings "light into the darkness"

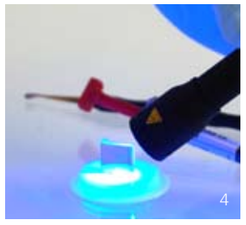
Special additive for shaded areas
Technovit 2000 Inside Cure is a special additive that enables the polymerization of Technovit 2000 LC in shadow areas or on the inside of the sample *(porous materials, inner areas of pipe sections, etc.)*.

Properties and application
- much wider range of applications, as it is suitable for all sample types
- for infiltration of porous samples
- same application as a standard product – no change to work processes, documentation, etc.
- flawless mixing
- add the complete bottle of Inside Cure to the bottle of Technovit 2000 LC Liquid, shake – ready; all application parameters remain unchanged

Technovit 2000 LC is ideal for target preparations in microelectronics and the embedding of polymer materials.







1 – Put Technovit fixing paste onto the bottom of the embedding form.
2 and 3 – Sample positioning
4 – Cure the fixing paste with the Technovit Blue LED; embed the sample as usual

Technovit 2000 LC Fixing Paste
The light-curing Technovit 2000 LC Fixing Paste is used for positioning the samples in the embedding form. It can be modelled like modelling clay and ground and polished after hardening. Due to its high hardness, the fixing paste is also ideally suited as edge protection.

Perfect positioning aid also for all other embedding systems with the aid of the Technovit Blue LED.

Technovit 2000 LC Covering Varnish
The Technovit 2000 LC Covering Varnish is used to prevent a dispersion layer on the reverse side of the sample so that a crystal-clear, hard and dry surface is created after polymerization has completed. It is applied to the sample in a layer a few millimetres thick after half the polymerization time. Sample markings can also be securely affixed in this way.

Curing with the Technotray POWER light polymerization unit

Technical specifications

Colour	transparent
Designated use	embedding bubble-free
Components	Liquid
Processing width [min]	unrestricted
Curing time at 22 °C [min]	2 x 10
Peak temperature during curing in the block [°C]	20 g = 95
Hardness (Shore D) [MPa]	78
Temperature resistance [°C]	max. 80
Solubility	insoluble
Density = spec. weight [g/cm³]	1.19
Linear shrinkage [%]	2.2
Volume shrinkage [%]	6.5
Refractive index Monomer / polymer	M = 1.4828 P = 1.5270
Storage temperature: [°C]	25
Shelf life [years]	3
Lin. TCE	65–95 [ppm]
Modulus of elasticity [MPa] EN ISO 604: 2003	approx. 2000–3000

Order no.: Technovit 2000 LC

64708496	Technovit 2000 LC Liquid	1000 ml
66053974	Technovit 2000 Inside Cure	40 ml
64712762	Technovit 2000 LC Cover Varnish	100 ml
66005103	Technovit 2000 LC Fixing Paste	4 g

Temperature max. 60 °C

Lamp	on	off	on	off	on	off	on	off	on	off	on	off	on	off	on
→	4 min	10 min	30 sec	10 min	30 sec	10 min	30 sec	10 min	30 sec	10 sec	20 min	--	--	--	--

Temperature max. 50 °C

Lamp	on	off	on	off	on	off	on	off	on	off	on	off	on	off	on
→	2 min	10 min	30 sec	10 min	30 sec	10 min	30 sec	10 min	30 sec	10 min	30 sec	10 min	2 min	10 min	20 min

Irradiation program: 3 lamps below, 1 lamp above, 40 mm embedding form (full)

Technovit® 2021 LC FAST

For delicate, temperature-sensitive samples

MMA FREE | THFMA FREE

Light-curing, 1-component embedding resin
Technovit 2021 LC FAST is an odourless, light-curing, 1-component resin for transparent mountings based on high-molecular special monomers.
Technovit 2021 LC FAST is for fast, crystal-clear embeddings of a wide range of materials.

Technovit 2021 LC FAST liquid is light-curing and is cured in the Kulzer Technotray POWER light polymerization unit. The product is very easy to use and can be processed without losses so that perfect embeddings can be achieved after a short application time.

The low viscosity of Technovit 2021 LC FAST and the associated form-filling capacity enable sample stabilization over the entire cross-section. Technovit 2021 LC FAST cures crystal-clear and bubble-free in less than 5 minutes in the Technotray POWER.

Application

- position the sample on the bottom of the Kulzer embedding form
- optionally secure it with Technovit 2000 LC fixing paste
- put the cylinder of the embedding form on the bottom
- fill the form with Technovit 2021 LC FAST
- vacuum infiltrate if necessary
- cure for 5 minutes in the Technotray POWER
- remove from the form

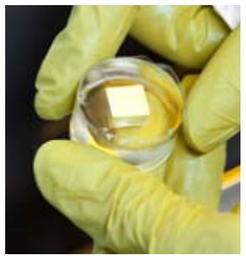
Technical specifications

Colour	transparent
Designated use	embedding bubble-free
Components	Liquid
Processing width [min]	unrestricted
Curing time at 22° [min]	2 (settings Technotray POWER 5 min)
Peak temperature during curing in the block [°C]	20 g = 116
Hardness (Shore D) [MPa]	79
Temperature resistance [°C]	max. 80
Solubility	insoluble
Density = spec.. weight [g/cm³]	1.19
Linear shrinkage [%]	2.2
Volume shrinkage [%]	6.5
Refractive index Monomer / polymer	M = 1.4828 P = 1.5270
Storage temperature: [°C]	25
Shelf life [years]	3
Lin. TCE	65–95 [ppm]
Modulus of elasticity [MPa] EN ISO 604: 2003	2400–2700

Order no.: Technovit 2021 LC FAST

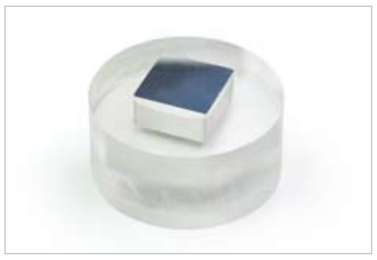
66094513	Technovit 2021 LC FAST	1000 ml
66005103	Technovit 2000 LC Fixing Paste	4 g

Technovit 2021 LC FAST – easy application, crystal-clear results.



Crystal-clear and bubble-free samples.

Perfect result made quickly.



Variable light sources

Perfect adaptation of the polymerization properties to the requirements of the sample

The new generation of light-curing products Technovit 2000 LC and Technovit 2021 LC FAST feature multifunctional initiators that allow them to react to a wide range of light wavelengths.

Together with the variable, cost-effective Technotray POWER light unit, this results in a highly versatile "light polymerization concept" that is very easy to adapt to the objective of sample preparation.

Standard light tubes:
Technovit 2000 LC: long curing time, temperature-time program possible, low temperature.

Combo light tubes:
Technovit 2021 LC FAST: fast polymerization in 5 minutes *(incl. cooling time in the unit)*. Dry surfaces.

Examples for combination blue light/LED

Loading Technotray Power	Polymerization time (min)	Embedding resin	Form PE	Temperature in °C after the end of the irradiation time
3x UV LEDs above 1x UV LED below *(middle)* 2x blue light lamp below *(left/right)*	2x 10	Technovit 2000 LC	40 mm	77 °C after 2x 10 minutes
3x UV LEDs above 1x UV LED below *(middle)* 2x blue light lamp below *(left/right)*	2x 10	Technovit 2000 LC	30 mm	77 °C after 2x 10 minutes
3x UV LEDs above 1x UV LED below *(middle)* 2x blue light lamp below *(left/right)*	1x 5	Technovit 2021 LC FAST	40 mm	107.3 °C after 2x 5 minutes
3x UV LEDs above 1x UV LED below *(middle)* 2x blue light lamp below *(left/right)*	1x 5	Technovit 2021 LC FAST	30 mm	104.8 °C after 2x 5 minutes

All-in-one starter set for light-curing embedding

Technovit 2000 LC or Technovit 2021 LC FAST Technotray POWER unit incl. consumables and accessories

Technotray® POWER

High power and spacious sample chamber, cost-effective

The Technotray POWER is a variable polymerization unit especially designed for the polymerization of light-curing Kulzer resins *(Technovit 2000 LC, Technovit 2021 LC FAST)*.

The Technotray Power provides a homogeneously illuminated sample chamber with space for up to 9 samples, auto-start and timer.

Technotray POWER – Light polymerization unit
Equipped with high-quality aluminium reflectors and internal dimensions of: W x D x H: 170 x 160 x 120 mm, the unit has a spacious and homogeneously illuminated polymerization chamber that can accommodate up to 9 embedding forms *(embedding form Ø 30 mm)*.

Light output
The arrangement of the light sources guarantees reliable polymerization with light-curing Technovit resins.
With a maximum of 6 blue light lamps or LED strips of 9 watts each, the Technotray POWER is a powerful light polymerization unit that ensures fast, intensive and homogeneous polymerization.

polymerization temperature
- Ø 40 mm form fully poured without sample: max. 120 °C
- Ø 40 mm form cast in layers *(2 mm)*: Irradiation 5 min: 70–90 °C

Technical specifications

Supply voltage	230 volt, 50 Hz
Power	max. approx. 60 Watt
Light	6 lamps each 9 watts
Lamp type	Fluorescent tubes / LED strip
Timer with 3 time settings	5 min, 10 min and continuous operation. Continuous operation switches off after 30 min automatically.
Interior dimensions	W x D x H: 170 x 160 x 120 mm
Auto-start	when pushing in the drawer
Interior	high-quality aluminium reflectors
Service life of the lamps	ca. 1,000 hours of operation or ca. 20,000 switching operations
Housing colour	white/grey
Dimensions of housing	L x W x H: 270 x 240 x 170 mm
Weight	approx. 3 kg

Order no.: Technotray POWER

66060914	Technotray POWER 230 V unit, 6 fluorescent tubes, power cable	1 pc.
66066474	Glass pane for Technotray POWER	1 pc.
66015894	Lamp, 9 watts for Technotray POWER	1 pc.
66096373	LED strip for Technotray POWER	1 pc.

Six LED strips / fluorescent tubes ensure homogeneous illumination of the sample compartment.

Technomat® Pressure Pot

With high pressure for a bubble-free sample

Technomat – perfect for fast-curing resins
The Technomat is a space-saving, compact pressure device. The pressurization is 2.0 bar. Polymerization in the Technomat creates bubble-free and thus higher-quality samples. This device a must-have, especially for embedding with the clear, fast-curing Technovit varieties 4004 and 4006.

Technical specifications

Pressurization	2.0 bar
Safety valve	2.8–3.3 bar
Pressure connection	3–10 bar
Dimensions	L x W x H: 340 x 340 x 255 mm
Weight	approx. 4 kg

Order no.: Technomat Pressure Pot

66081898	Technomat Pressure Pot	1 pc.

Vacuum Set impregnation device

Handy device for embedding or superficial impregnation of porous samples

Order no.: Vacuum Set

66076025	Vacuum Set Universal impregnator (100 mm pot)	1 pcs.
66080208	Vacuum Set Universal impregnator (140 mm pot)	1 pcs.

Accessories, embedding

The little helpers

Our paper cup has an extra-wide bottom. Due to the large surface area, stirred-in bubbles can rise much better. In this way, the embedding quality is improved once again

Spoon, spatula, mixing cup
Aids for the removal and mixing of all powder-liquid systems.

Embedding forms
Polyethylene forms for embedding materialographic samples. The smooth surfaces and high strength ensure easy release and long service life. The standardised sizes of 15, 25, 30, 40 and 50 mm enable efficient further processing of the samples in automatic or manual grinding and polishing machines.

Cover LAM
Protective film for covering prepared samples. The Cover LAM protects against contamination and tarnishing.

Embedding aids
The polystyrene embedding aids provide a simple and cost-effective way to align and position the materials of a variety of different forms precisely.
Bar widths of 1, 2 and 3 mm allow for a wide range of application, e.g. for sheet metal cuttings, printed circuit boards, securing irregularly shaped parts *(especially for longitudinal cutting)*.

Order no.: Accessories, embedding

66021107	Dosing spoon for powder components	2 pcs.
66021102	Mixing cup (rim-full volume = 200 ml)	10 pcs.
66021106	Wooden spatula	10 pcs.
66044445	Wooden spatula	100 pcs.
66064604	Cover LAM protective film	100 pcs.
64713126	PE embedding form Ø 15 mm, H 23 mm	3 pcs.
64708955	PE embedding form Ø 25 mm, H 23 mm	3 pcs.
64708956	PE embedding form Ø 30 mm, H 23 mm	3 pcs.
64708957	PE embedding form Ø 40 mm, H 23 mm	3 pcs.
64713127	PE embedding form Ø 50 mm, H 23 mm	3 pcs.
66095878	PE embedding form approx. 98 x 48 x 22 mm	1 pcs.
66015844	Silicone embedding form 100 x 50 x 22 mm	1 pcs.
64708952	Embedding aid narrow, 1 mm	1 pcs.
64708953	Embedding aid medium, 2 mm	1 pcs.
64708954	Embedding aid wide, 3 mm	1 pcs.

Technotherm®

Hot embedding resins – simply reliable

Hot embedding press
PRESSLAM 1.1
Our matching equipment program
at: kulzer-technik.de/geraete

Technotherm® 2000

Universal, glass-fibre-filled hot embedding resin

Technotherm 2000 is a glass-fibre-filled hot embedding resin with optimum form filling behaviour and minimal gap formation. Technotherm 2000 has excellent edge definition. This is necessary if the edges or layers of a sample must be examined. The white-grey colour provides optimal contrast to most sample surfaces.

Colour: cream-white

Curing takes place at:

Temperature	160–180 °C
Pressure	80–90 bar
Time	10–15 min.

Order no.: Technotherm 2000

66003628	Technotherm 2000	1000 g
66003629	Technotherm 2000	10000 g

Technotherm® 3000

Conductive hot embedding resin

Technotherm 3000 is based on a graphite filler and thus guarantees optimum conductivity with very low shrinkage. Technotherm 3000 is the conductive material of the Technotherm line. Technotherm 3000 is used wherever high conductivity is required *(e.g. in scanning electron microscopes)*
When testing in the SEM, Technotherm 3000 virtually eliminates voltage losses *(less than 0.5%)*.

Technotherm 3000 is also the ideal embedding resin for electrolytic polishing.

Colour: black

Curing takes place at:

Temperature	160–180 °C
Pressure	80–90 bar
Time	10–15 min.

Order no.: Technotherm 3000

66003630	Technotherm 3000	1000 g
66003631	Technotherm 3000	10000 g

Practical tip:
To prevent hot embedding resin from adhering to the punch of the press, brush the press cylinder with Solilub.

Technotherm® 4000

Transparent, fast melting, hot embedding resin

Technotherm 4000 is a highly transparent, hot embedding resin. The very fine powder ensures rapid melting, which gives Technotherm 4000 excellent flowability. Technotherm 4000 enables highly transparent embeddings that ensure an optimal view of the sample. This is an important criterion for target preparation for achieving an optimum preparation result.

Colour: transparent

Curing takes place at:

Temperature	90–180 °C
Pressure	50–60 bar
Time	10–15 min.

Order no.: Technotherm 4000

66009411	Technotherm 4000	1300 g
66040390	Technotherm 4000	10000 g

Order no.: Solilub

66068886	Solilub powder	50 g

Technotherm for the production of metallographic samples according to a standardized procedure.
Can be used for all materials that are not sensitive to pressure or heat.

Technotherm® hot embedding resins are not hazardous substances; there is no danger during application, processing, storage and transport.

Special program for sensitive samples – transparent embedding at moderate temperatures:
kulzer-technik.de/TT4000_embedding_parameters

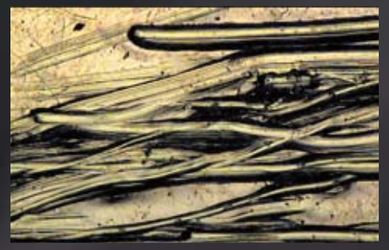
Precision impressions

Each impression like the original

Analysis of scratch marks on a key

Precision impressions are used in the most diverse areas and application situations.
The designated purpose is to make impressions, the reproduction of which calls for a high degree of precision.

the 200x magnification



Application
Surface impressions are important methods for documenting roughness, cracks or geometries with high precision. To obtain a high-quality result, tools are necessary that can be used with high precision to reproduce the surface to be evaluated.
Depending on the requirement or working method, the 2-component resin Technovit 3040, Technovit Provil silicones, or light-curing resins of the Technovit 2200 series are used.

a 200x magnification of the impression with Technovit Provil

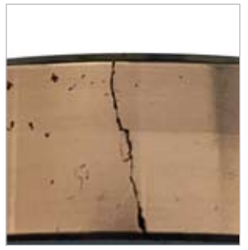
Prepared for all problems
- if the sample is too large or heavy for laboratory examination
- if the sample has to be examined non-destructively
- if the point to be examined is difficult for measuring instruments to access
- for documentation of wear
- for measuring initial samples and prototypes
- for the documentation of crack propagation

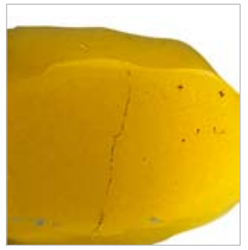
Detection of microcracks during ambulatory micrography

Properties and application
- Wear measurements
- ambulatory metallography
- Impression taking for restorations and mineralogy
- Reconstruction in case of damage
- Forensic investigations
- Optimization of process technologies

Technovit® 3040

For dimensionally stable impressions





The flexibility in mixing the components ensures both the pouring of a form and the impression in hard-to-reach places, verticals as well as working overhead.

The 2-component resin consists of a powder and a liquid component. Depending on the requirements, the material can be mixed in a ratio of 1:1 to 3:1 *(powder/liquid)*.
The standard mixing ratio of 2:1 can be poured for approx. 2 minutes and then is malleable for approx. 30 seconds. The curing time is 9–12 minutes from the start of mixing.

Properties and application
- Impression accuracy 1 µm
- dimensionally stable and easily removable
- variable mixing ratio possible
- Stabilization for mechanical processing
- Impressions can be evaluated with probes or non-contact measuring methods

From practice
- to ensure dimensional accuracy, keep the impression surfaces as small as possible *(for larger volumes, work in multiple layers)*
- the modelling of a handle facilitates the removal of the impression from the original
- Impressions should have a minimum thickness of 5 mm in order to avoid slight distortion during removal.
- Impressions of undercuts cannot be taken!
- To take impressions on verticals or overhead, we recommended pouring Technovit 3040 on a PE film and pressing it on the surface to be cast.

Technical specifications

Colour	yellow or black
Designated use	Impressions for surface inspection
Components	Powder / liquid
Mixing ratio	2:1
Processing width [min]	2
Curing time at 22 °C [min]	9–12
Peak temperature during curing in the block [°C]	110 30 g = 101
Ball indentation hardness [N/mm²]	110 MPa
Hardness (Shore D) [MPa]	--
Temperature resistance [°C]	130
Solubility	swellable only
Density = spec. weight [g/cm³]	1.18
Impact strength KJ/m²]	7.1
Flexural strength [N/mm²]	96
Compressive strength [N/mm²]	110
Water absorption [% by vol]	0.43
Linear shrinkage [%]	1.9
Volume shrinkage[%]	5.7
Refractive index Monomer / polymer	M = 1.419 --
Storage temperature: [°C]	25
Shelf life [years]	3
Lin. TCE	110 x 10-6
Modulus of elasticity [MPa] EN ISO 604: 2003	2000–2300

Order no.: Technovit 3040

64708806	Technovit 3040 powder yellow	1000 g
64708807	Technovit 3040 powder yellow	2 x 1000 g
64708808	Technovit 3040 powder yellow	10000 g
64708813	Technovit 3040 Powder black	1000 g
64708814	Technovit 3040 Powder black	2 x 1000 g
64708815	Technovit 3040 Powder black	10000 g
66022678	Technovit Universal Liquid	500 ml
66022679	Technovit Universal Liquid	5000 ml

Technovit 3040: The classic for indirect surface inspection.

Quantities and mixing ratios of Technovit 3040 (without sample)

Area	Quantity	Powder	Liquid	Comment
10 x 10 cm = 100 cm²	60 g	38 g	22 g	For one square centimetre
5 x 10 cm = 50 cm²	30 g	19 g	11 g	approx. 0.6 g of material is required
8 x 5 cm = 40 cm²	24 g	15 g	9 g	

Technovit® Provil® Putty and Putty Soft

The malleable

Technical specifications	Putty	Putty Soft
Dosing	1:1	1:1
Mixing time	45 s	45 s
Total processing time measured from the start of mixing	2 min	2 min
Setting time measured from start of mixing	4:45 min	4:45 min
Deformation under pressure	0.8–5.0%	0.8–5.0%
Recovery after deformation	99.70%	99.70%
Hardness test Shore-A measured from the start of mixing, after	10 min: 70 1 h: 71 24 h: 71	10 min: 57 1 h: 57 24 h: 60

The addition-curing silicones consist of a base and catalyst component and are malleable by hand in a ratio of 1:1. The compound is applied to the relevant area to take an impression. After 4.5–5 minutes, the silicone is cured and can be removed or demoulded. The two products differ mainly in consistency and final hardness *(see technical specifications)*. A typical application is impression taking for measuring in form and tool making. No special prior knowledge of the application is required.

Properties and application

- when impressions of larger areas have to be taken
- in places that are difficult to access or also for working overhead
- for stabilizing impressions with the flexible Technovit Provil Light
- faultless work due to the easiest application
- avoidance of mixing errors due to colour-coded pastes and spoons
- viable due to the easiest mixing in a few seconds
- Impressions can be evaluated with probes or non-contact measuring methods
- Technovit Provil can be removed from the sample easily and without residue

Perfect results with the combination of Technovit Provil Light and Putty: lowest shrinkage, highest level of detail.

Order no.: Technovit Provil Putty and Putty Soft

66004371	Technovit Provil Putty	450 ml base, 450 ml cat.
66004372	Technovit Provil Putty Soft	450 ml base, 450 ml cat.

Technovit® Provil® Light

Self-mixing 2-component silicone

Technical specifications	
Dosage (automatic in the mixing cannula)	1:1
Mixing time	non - selfmixing
Total processing time measured from the start of mixing	2 min
Setting time measured from start of mixing	4:45 min
Deformation under pressure	0.8–5.0%
Recovery after deformation	99.70%
Hardness test Shore-A measured from the start of mixing, after	10 min: 70 1 h: 71 24 h: 71

Technovit Provil Light is a free-flowing silicone and therefore ideally suited for moulding difficult geometric shapes. The application system consisting of a dispensing gun, double cartridge and mixing cannulas ensures a constant mixing ratio and thus a reliable and faultless application.

With the mixing gun, the silicone is pressed evenly from both chambers of the double cartridge through the mixing cannula. Hence, Technovit Provil Light is applied directly to the object in the form of a bead without bubbles. Additional mixing cannula attachments can be used to fill small cavities *(boreholes or similar)*.

Properties and application

- highest impression accuracy – therefore, for example, etched microstructures can be visualized *(max. 500:1)*
- Technovit Provil Light creates exact 3D replicas of the surface impressions.
- optimum recovery behaviour; this allows impressions to be taken of complicated geometric objects with undercuts
- faultless work, easiest application due to self-mixing cartridge system
- cost-effective process, no equipment investment, small time expenditure
- no hazardous material, problem-free application for all areas
- no transport problems
- no temperature development during curing; therefore no negative influence on the surface properties of the objects
- manifold evaluation and application possibilities

Exact 3D replicas

The advantages are used, for example, to measure and document wear marks in hard-to-reach places and geometries on tools and machine parts – without having to purchase cost-intensive devices.

Original and impression: Figure 1 shows the impression of an ingot mould. Ferritic grey cast iron with rosette-shaped arrangement of the graphite. Etched with 3% nitric acid. Figure 2 shows the photo of the impression.

Order no.: Technovit Provil Light

66009333	Technovit Provil Light	2 x 50 ml
66009334	Mixing cannulas	48 pcs.
66009335	Mixing cannula attachments	96 pcs.
66009337	Mixing gun	1 pc.

Technovit® Provil® BLACK

This is worth looking at – even in the tiniest details!

With the new Technovit Provil BLACK, we offer extremely precise impression silicon that can be used flawlessly via a standardised cartridge system.
Technovit Provil BLACK is a self-mixing silicone with very low viscosity, which makes it very flowable.
Due to the special material properties, it is possible to take impressions of surfaces with extremely detailed reproduction. The very intensive colouring and related high contrast enable precision, optical measurement even in very fine structures *(e.g. etched microstructures)*.

Benefits of Technovit Provil BLACK

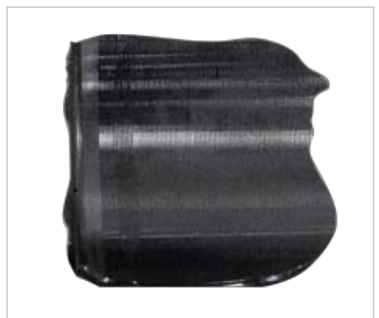
- highest impression accuracy
- optimum recovery behaviour
- very good optical behaviour / high contrast
- easy to remove
- high elasticity / tensile strength
- faultless work due to the easiest application
- cost-efficient process
- no temperature development during curing
- manifold evaluation and application possibilities

Technical specifications

Dosage (automatic in the mixing cannula)	1:1
Total processing time measured from the start of mixing	2 min
Setting time measured from start of mixing	6-8 min
Deformation under pressure [%]	4.0
Tear resistance [N/mm²]	2.5
Elongation at tear [%]	140
Tear energy [Nmm]	177
Toughness [N/mm²]	2.2
Modulus of elasticity [N/mm²]	1.9
Shore A 10 min	47
Shore A 1 h	48
Shore A 24 h	51

Order no.: Technovit Provil BLACK

66079678	Technovit Provil BLACK	2 x 50 ml
66009334	Mixing cannulas	48 pc.
66009335	Mixing cannula attachments	96 pc.
66009337	Mixing gun	1 pc.



Detailed impression with Technovit Provil BLACK

Aluminium casting with porosities. 1:1 reproduction on the impression. Material: Technovit Provil BLACK

Longitudinal section through an injection nozzle. Impression of the canals with Technovit Provil BLACK.

Technovit® 2200 series

Non-destructive microstructure impressions for surface analyses

The Technovit 2200 series represents a product line of light-curing materials for quality assurance measures and material tests that go beyond the classic procedures.

The easy application ensures perfect results.
The light-curing materials are applied directly to the relevant place *(spatula, brush or syringe)* and cure within 20–60 seconds by irradiation with special blue light lamps.

The application works reliably, even at very low and very high temperatures without any loss of quality.

Properties and application

- filling of microcracks and holes in ground sections
- securing of smallest *(electronic)* components
- encapsulation of small parts
- stabilization of corrosion layers
- stabilization for mechanical processing
- application of protective layers before embedding and preparation
- microstructure impressions
- roughness measurements
- determination of contours
- Documentation – the microstructure imprint serves as a document that is more meaningful than a photo
- no impairment due to temperature influences

Compatible with all light sources

All products of the Technovit 2200 series can be cured optionally with the Pekalux POWER LED or Technovit Blue LED. If thicker layers *(greater than 4 mm)* are required, work must be carried out in several layers. For this purpose, the smear layer formed on the polymerized surface is required as a "bond". Each layer must be cured individually. All products can be combined with each other. Further processing can be done mechanically as usual by grinding and polishing.

Technovit® 2200

Encapsulation of sensitive samples

- low viscosity transparent liquid *(bottle)*
- for subsequent infiltration of fine cavities *(cracks, gaps and similar)*
- for stabilizing porous layers or sensitive assemblies before cutting

Technovit® 2210

For surface impressions

- excellent impression accuracy *(10 µ)*
- easy to use, can be evaluated optically and tactilely, temperature-independent
- can also be used as a fixation aid or edge protection for fragile samples
- medium-viscosity paste, cream-coloured

Technovit® 2220

For microstructure imprints

- medium-viscosity liquid dyed blue or transparent *(can)*
- no wrinkling
- very good representation of finest details; even at higher magnification than 1000:1, still very true to detail *(10 µ impression accuracy)*
- easy application
- temperature-independent, constant impression quality and curing time even at low *(0 °C)* or high *(40–50 °C)* temperatures
- no vaporizing or sputtering necessary for observation in a light microscope!

Technical specifications, light-curing impression materials

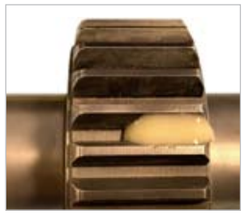
Product	Technovit 2200	Technovit 2210	Technovit 2220
Colour	milky-transparent	cream-coloured	blue or transparent
Dosage form	Glass bottle	Syringe	Can
Viscosity	low	medium	medium
polymerization type	light-curing (blue light)	light-curing (blue light)	light-curing (blue light)
Bending resistance	90–100 N/mm²	> 100 N/mm²	104.00 MPa
Bending modulus	3,500–4,500 N/mm²	5,000–6,000 N/mm²	2,321 MPa
Hardness HZ	180–200 N/mm²	180–200 N/mm²	120–150 N/mm²
Depth of cure	4 mm with Pekalux POWER LED: 20 s 7 mm with Technovit Blue LED: 40 s	4 mm with Pekalux POWER LED: 20 s 5 mm with Technovit Blue LED: 40 s	7 mm with Pekalux POWER LED: 40 s 7 mm with Technovit Blue LED: 60 s

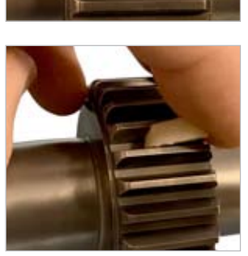
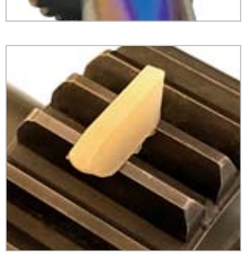
Impression taking with Technovit® 2210

"step-by-step"

1 – Apply Technovit 2210 on the clean surface.
2 – Polymerize with Technovit Blue LED for 40 seconds.
3 – Remove the hardened impression from the surface.
Ready for tactile measurement.





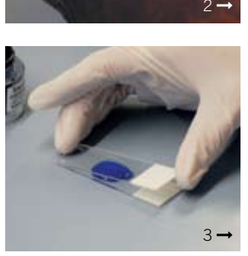



Impression taking with Technovit® 2220

"step-by-step"

1 – Grind, polish, etch, apply Technovit 2220, spread thinly on a film, cover and polymerize.
2 – Carefully remove cured Technovit 2220.
3.– To secure the sample, apply Technovit 2200 to the slide, position the impression, (CAUTION: Place the reverse side on the slide) press this "sandwich" as plane-parallel as possible with a second slide and cure with blue light.





With Technovit 2210 / 2220, even special "problem cases" in materialography can be easily solved.

Ambulatory metallography

With the Technovit 2200 series, microstructure impressions can be taken directly from the component in a non-destructive manner, which are then processed in the laboratory and evaluated in a light microscope or scanning electron microscope.

Order no.: Light-curing precision impression taking

66020775	Technovit 2200	4 x 15 ml
66020779	Technovit 2210	2 x 1 ml
66020780	Technovit 2220 blue	15 g
66043721	Technovit 2220 clear	15 g

Order no.: Light-curing precision impression taking

66014385	Plasmacoat Instrument	1 pc.
66087557	Brush attachments	100 pcs.
64711886	Brush holder	5 pcs.
66035691	Cannula attachments (for Technovit 2210)	5 pcs.
64712818	Covering foil	200 pcs.

Technovit® POWER LED

Light polymerization unit

The Pekalux POWER LED is a powerful and very handy light polymerization unit with easy handling. The polymerization takes place by blue light.

The Pekalux POWER LED is matched to the light-curing products of the Technovit 22 series.

Even tiny components encapsulated or secured with light-curing Technovit are cured quickly and reliably with the Pekalux POWER LED.

Application
The polymerization time is set directly on the handpiece of the Pekalux POWER LED. Four irradiation modes are available. After the set time has elapsed, the unit switches off automatically.

Technical specifications

Light source	Power LED
Wavelength range	430–490 nm
Light output	max. 3000 mW/cm² (+/- 10%)
Battery	3.7 V lithium-ion
Dimensions:	Handpiece: 225 x 115 x 41.5 cm Charger: 155 x 82 x 125 cm
Weight	Handpiece: 136 g Charger: 144 g
Operating voltage	5 V / 1.5 A
Supply voltage	100–240 V / 50–60 Hz 400 mA

Order no.: Pekalux POWER LED

66063092	Pekalux POWER LED 1 pc. incl. handpiece, light guide, glare shield, power supply unit, rechargeable battery	1 pc.

Technovit® Blue LED

Light polymerization lamp

Many application methods of the Technovit 2200 series are not to be solved in the laboratory but on-site. To be able to work independently of mains power, the Technovit Blue LED provides a real alternative to stationary lighting devices. This handy, mobile LED polymerization lamp works with standard batteries and can be used easily anywhere. Both spot and area irradiation can be achieved by the focussing. In this way, microstructure impressions can be taken directly from the component in no time and with little effort. The lamp housing is made of anodised aluminium. A high-power LED produces the irradiation with a wavelength of approx. 460 nm *(blue light)*.

Application
Position the Technovit Blue LED at a maximum distance of 1 cm above the applied Technovit products and switch it on. Depending on the product, the polymerization time is 40–60 seconds. Keep the light cone as small as possible to avoid radiation losses.

Technical specifications

Power supply	2 AA batteries (1.5 V each) recommended LR6 (Alkaline)
LED voltage / current	approx. 3.3 V / 350 mA
Light output / wavelength	approx. 300 mW / 460 nm, +- 20 nm
Lifetime of the LED	ca. 1000 h
Dimensions of housing	ø 26 x 170 mm / approx. 70 g
Operating temperature range	+10 °C to +35 °C
Temperature range for storage / transport	-10 °C to +40 °C
Air humidity / air pressure	35–95% relative humidity (no condensation) 500–1060 hPa

Order no.: Technovit Blue LED

66043553	Technovit Blue LED	1 pc.

Resistance of Technovit® resins to common substances

Test medium	Technovit 3040 / 4004 4006 / 5071	Technovit 4000 4002 IQ	Technovit 4071
acetone	--	•	•
Formic acid 10%	•	•	+
petrol	+	•	+
Butyl acetate	--	--	•
Cyclohexane	+	+	+
Dekalin	+	+	+
Diesel	+	+	+
Dimethylformamide – DMF	•	•	•
1,4-dioxane	•	•	•
Acetic acid conc.	•	•	•
Acetic acid 10%	•	•	•
Acetic acid 5%	•	•	•
Ethanol	+	+	+
Ethyl acetate	--	--	•
Hydrofluoric acid 40%	•	•	•
Fruit juice	+	+	+
Glycerine	+	+	+
Glycol	+	+	+
Heating oil	+	+	+
Heptane	+	+	+
Hexane	+	+	+
Potassium hydroxide 50%	+	+	+
Potassium hydroxide 10%	+	+	+
Methanol	+	+	+
Methyl ethyl ketone – MEK	--	--	•
Methylene chloride	--	--	•
Methyl methacrylate – MMA	--	--	•
Paraffin oil	+	+	+
Perchloroethylene - PER	--	--	•
Petroleum	+	+	+
Phosphoric acid (conc.)	+	+	+
Phosphoric acid 10%	+	+	+
Isopropyl	•	•	•
Propanol	•	•	•
Hydrochloric acid conc.	+	+	+
Hydrochloric acid 5%	+	+	+
Sulphuric acid conc.	•	•	•
Silicone oil	+	+	+
Edible oil/grease	+	+	+
Styrene	--	--	•
Tetrahydrofuran - THF	--	--	•
Toluene	+	•	+
Tetralin	+	+	+
Trichloroethylene - TRI	--	--	•
Hydrogen peroxide 30%	+	+	+
Brandy	+	+	+
Tartaric acid	•	•	•
Citric acid 10%	+	+	+

+ resistant / permanently resistant
• conditionally resistant / short-term resistant
-- not resistant

Application instructions and FAQ

Tips for the daily work in processing resins

Why are material samples embedded?

The main reason is the easier handling for the later sample preparation – the samples are brought into a standardised size to be able to process them automatically later.

But embedding also provides better handling for manual processing for a hardness test.

Another aspect is the stabilization of the material samples by additional infiltration with the embedding resin.

What is the optimal embedding?

This depends on the objective of the embedding or sample preparation. A simple flat sample is often sufficient for a simple hardness measurement. It is important that the workpiece to be tested is optimally held in the embedding resin and that measurements at different points do not lead to loosening of the workpiece.

For examinations in the edge region, it is particularly important to generate gap-free embeddings. Well-adhering embedding resin supports and protects sensitive coatings from damage as well as edge rounding, which would, for example, make coating thickness measurements more difficult.

Ideally, the grinding behaviour of the embedding resin is adapted to that of the sample so that it is much easier to achieve and evaluate plane grinding surfaces. Hard and high-strength samples are therefore best cast with mineral-filled embedding resins.

Why cold embedding?

Cold embedding is a simple and cost-effective method to produce materialographic samples. The expenditure on technical aids is rather small. Many embedding systems offer a variable mixing ratio, which makes the process easy. Especially if the samples are not "simple" there are advantages of temperature behaviour, pressure and infiltration possibilities. Fast embedding is possible for large sample volumes or in-process controls.

The benefits

- inexpensive systems without investment
- variable in time, temperature and mixing behaviour
- fast processes
- flexible in the choice of sample dimensions
- wide range of resins for all materialographic issues

When is embedding under pressure useful?

The polymerization of cold embedding resins under pressure is always advantageous if the sample is to be bubble-free. It is a must-have for transparent resin samples, otherwise the embedding appears milky and no target preparation is possible. MMA/PMMA-based embedding systems are particularly suitable for use with the Technomat.

When does embedding under vacuum make sense?

When embedding porous samples, samples with blind holes or undercuts, it is highly recommended to infiltrate the embedding resin into the sample with vacuum support. However, only cold embedding resins with a sufficiently long pot time *(at least 4 min.)* are suitable for this purpose. This starts with the light-curing embedding resins and polyether/MMA-based filled embedding resins up to the epoxy resins.

The correct handling of cold embedding resins

Always mix multicomponent resins homogeneously; correct mixing is the basis for optimum embedding. Avoid beating when mixing, as this will trap air in the dough-like resin that may not be able to escape and thus lead to the formation of bubbles.

To avoid air inclusions in the lower part of the sample, it is helpful to first cast a "mirror" and only then orientate the sample in the embedding form. This is particularly useful when embedding, for example, spot welds of sheet metal or similar.

Always completely pour embedding resin onto the sample to ensure that the sample is securely fixed during preparation.

Heat of reaction – influence temperature behaviour

Cold embedding resins cure by starting the polymerization. This begins as soon as the various components are mixed together. This results in an exothermic reaction that releases heat.

Mixing ratios can be changed slightly as required thus changing temperature and time curves.

The higher the volume of the powder/liquid mixture, the higher the temperature generated by the polymerization process.

Higher temperatures, both ambient and that of the product, accelerate, lower temperatures slow down the curing. For embedding larger samples or casting larger areas, it is necessary to work in several layers. This is the only way to prevent excessive heating and keep shrinkage low.

It is necessary to let the previous layer cool down completely between the working steps. *(heat acts as a catalyst, too fast curing leads to bubble formation)*

Use small embedding forms if possible to keep the polymerization temperature low.

Basic information on samples and embedding

Samples must always be clean and free of grease; contamination of the samples can lead to interference during embedding.

If several workpieces are to be cast in an embedding form, arrange the samples so that the distances between the individual parts and the edge of the embedding form are as equal as possible. Spacing between individual workpieces that is too narrow can prevent the penetration of embedding resins and thus produce air pockets.

Always align samples centrally in the embedding form so that the sample is surrounded by sufficient embedding resin (*edge distance approx. 3-5 mm*).

After demoulding, allow the sample to cool at room temperature. No "quenching" in cold water or a refrigerator compartment. Different expansion coefficients of resin and workpiece can thus lead to increased gap formation or cracks.

Why hot embedding

Hot embedding is an alternative to cold embedding. Here, with the aid of an embedding press, the 1-component embedding resins are melted under pressure and heat and thus formed into a homogeneous test sample.

The benefits

- 1-component resin – no mixing errors
- preset programs of the press for routine samples
- flat sample surface
- good edge definition

What general conditions have to be met?

The material sample must be resistant to pressure and heat. The selection of the embedding resin should be based on the objective of the sample preparation. For recurring samples, it is useful to work your way up to the correct temperature/pressure/time program.

Sample size and position

As with cold mounting resins, the sample size in relation to the cylinder must also be taken into account when hot embedding; here, a sufficient distance to the edge of approx. 3–5 mm is recommended *(especially for geometrically complicated sample forms)* and sufficient embedding resin over the sample.

Can the sample be positioned before the embedding process?

Technovit 2210 can also be used here to keep the samples in the desired position during hot embedding. The sample is secured on the stamp of the press and the paste is cured for 60 seconds with the Technovit Blue LED.

Hot embedding of temperature-sensitive samples

Hot embedding is often ruled out for material samples that are pressure-resistant but temperature-sensitive. We have worked out a special temperature program for Technotherm 4000 – see:
kulzer-technik.de/TT4000_Einbettparameter

Avoidance of adhesion of the hot embedding resin

In this case, it is recommended to brush the stamp and the press cylinder of the press with Solilub. This serves as a release agent and prevents the hot embedding resin from sticking in the press.

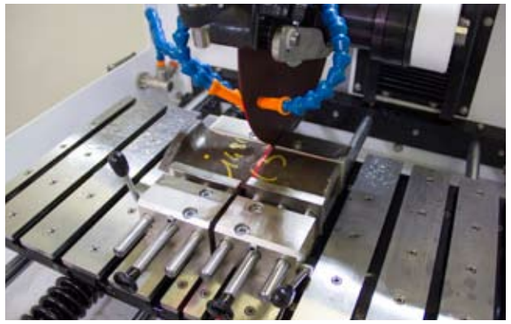
Cut-off wheels

Precise preparation for the perfect sample

The cornerstone of efficient sample preparation

In most cases, the examination of a materialographic sample begins with cutting it from a workpiece, either because it is too large for testing or because specific areas of the part need to be tested.

CUTLAM 3.1



Efficient sample preparation begins in this step, since many factors have to be taken into account during cutting. Here it is a question of an optimum combination of cut-off wheel and cutting machine to be able to work in a way that is gentle on the material but nevertheless effective, depending on the workpiece in question.

The aim here is to achieve precise cuts with little heat input and deformation of the workpiece so that the subsequent steps can be carried out optimally.

For this essential process, Kulzer offers a selected range of high-quality cut-off wheels, as well as corresponding machines that are specially designed for materialography and are constantly being further developed.

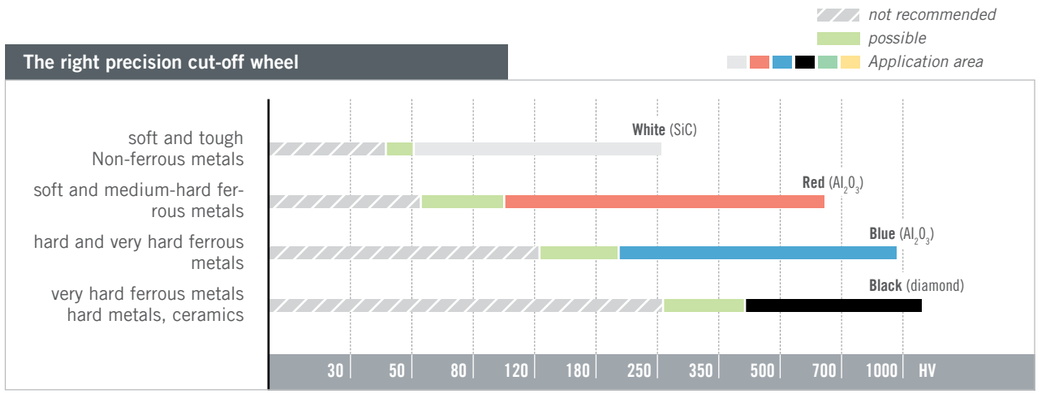
Precision cut-off wheels

Extraordinary, constant cutting quality

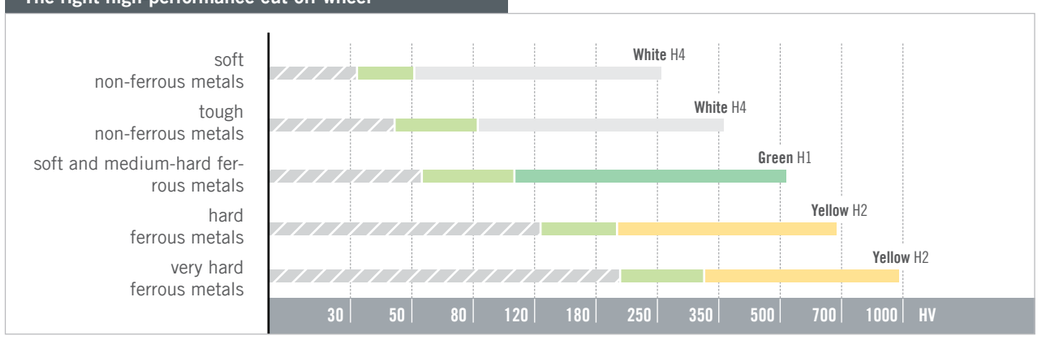
Developed for very high requirements, these cut-off wheels provide the user with precise cutting, also thanks to the properties of the binder and the quality of the abrasives. The cut-off wheels can be used in all commercially available cutting machines of all manufacturers and produce very fine, precise separating cuts that reduce all subsequent processing steps to a minimum.

Precision cut-off wheel 'black', diamond

The right precision cut-off wheel



The right high-performance cut-off wheel



Excellence
High performance cut-off wheels

High cutting speed and low wear

The new Excellence cut-off wheels enable faster cuts without heating. They can be used at higher turning speeds and make excellent quality cuts without damaging the structure of the material. The manufacturing quality guarantees limited wear and freedom from vibration during cutting. With the three available models, Excellence H1, H2 and H4, any type of metallic material can be cut. To help you choose the right wheel, the table below gives recommendations for use depending on the material to be cut – the optimum cut-off wheels for in-process quality control.

The universal cut-off wheels, which can be used on all commercially available cut-off machines, reduce the time required for the subsequent cutting process due to their very good cutting properties. Due to the efficient cutting and the low wear, these cut-off wheels are very cost-effective.

Precision cut-off wheels
Available in 4 variants depending on their hardness and used abrasives

White (SiC)

66064594	125 x 12.7 x 0.45 mm
66064595	150 x 12.7 x 0.45 mm
Quantity per delivery unit: 5 pieces	
66058082	203 x 25.4 x 1.0 mm
66058083	230 x 22 x 1.2 mm
66058084	250 x 32 x 1.5 mm
66058085	305 x 32 x 1.5 mm
Quantity per delivery unit: 10 pieces	

Red (Al_2O_3)

66058070	125 x 12.7 x 0.45 mm
66058071	150 x 12.7 x 0.45 mm
Quantity per delivery unit: 5 pieces	
66058072	203 x 25.4 x 1.0 mm
66058073	230 x 22 x 1.2 mm
66058074	250 x 32 x 1.5 mm
66058075	305 x 32 x 1.5 mm
Quantity per delivery unit: 10 pieces	

Blue (Al_2O_3)

66058076	125 x 12.7 x 0.45 mm
66058077	150 x 12.7 x 0.45 mm
Quantity per delivery unit: 5 pieces	
66058078	203 x 25.4 x 1.0 mm
66058079	230 x 22 x 1.2 mm
66058080	250 x 32 x 1.5 mm
66058081	305 x 32 x 1.5 mm
Quantity per delivery unit: 10 pieces	

Black (diamond)

66050376	102 x 12.7 x 0.3 mm
66050377	127 x 12.7 x 0.4 mm
66050378	152 x 12.7 x 0.5 mm
66058067	203 x 12.7 x 0.8 mm
66058068	254 x 32 x 1.0 mm
66058069	305 x 32 x 1.3 mm
66060405	356 x 32 x 1.3 mm
Quantity per delivery unit: 1 piece	

Excellence high performance cut-off wheels
Available in 3 variants

White H4

66076099	250 x 32 x 1.5 mm
66076100	300 x 32 x 2.0 mm
66076101	350 x 32 x 2.5 mm
66076102	400 x 32 x 3.0 mm
Quantity per delivery unit: 10 pieces	

Green H1

66076091	250 x 32 x 1.5 mm
66076092	300 x 32 x 2.0 mm
66076093	350 x 32 x 2.5 mm
66076094	400 x 32 x 3.0 mm
Quantity per delivery unit: 10 pieces	

Yellow H2

66076095	250 x 32 x 1.5 mm
66076096	300 x 32 x 2.0 mm
66076097	350 x 32 x 2.5 mm
66076098	400 x 32 x 3.0 mm
Quantity per delivery unit: 10 pieces	

Adapter rings
For cut-off wheels for fitting the inner diameter on different drive shafts

Adapter ring PVC*

66070154	22.1–12.7 mm
66064596	25.4–12.7 mm
66064597	25.4–22.1 mm
66064598	32.0–25.4 mm
Quantity per delivery unit: 5 pieces	

Adapter-Ring Metal**

66070155	22.1–12.7 mm
66064599	25.4–12.7 mm
66064600	25.4–22.1 mm
66064601	32.0–25.4 mm
Quantity per delivery unit: 10 pieces	

*For all wheels with a metal-reinforced inner hole
** For all wheels without metal reinforcement in the inner hole

Cutting Fluid 721
Cooling liquid for circulation cooling

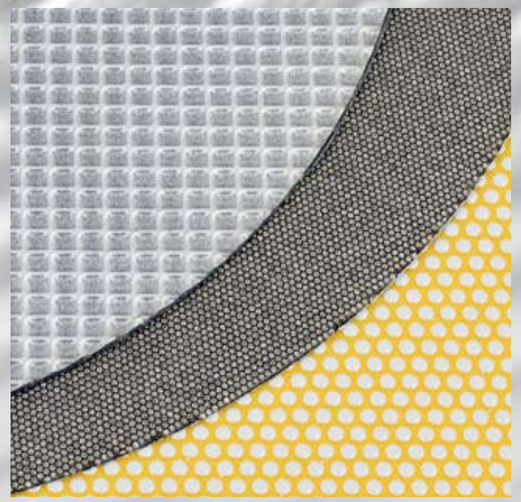
Cutting Fluid 721

66054648	5000 ml

Concentrated liquid for cooling of the cut-off wheel and workpiece during the cutting process, including corrosion protection for the cutting machine and workpiece.
Dilute to 5% in water.

Kulzer materialography

Making the invisible visible



Ways to a meaningful sample

Perfectly coordinated assortment for sample preparation

A decisive factor to be able to make statements in materialography is the precise surface preparation.

Only through optimal sample preparation can the actual microstructural state of a material be reliably determined.

The use of new materials has undergone rapid development in recent years. Ever-thinner coatings and extreme differences in hardness within a sample require particularly individual preparation methods.

Kulzer offers you a mature, clearly structured product range for materialography with solutions for all sample preparations in high quality.

The result is: minimization of preparation steps and low material consumption – an economical system for first-class grinding qualities.

You will find Kulzer Technik to be a reliable partner when it comes to materialography. We offer you free, individual advice on-site and work with you to develop preparation methods for new tasks. Convince yourself of the quality of our products in your laboratory.

Profit from efficient working techniques through perfectly coordinated products.

Grain size comparison

FEPA P Paper	Micron µm	Technodisc SiC	Technodisc Diamond	Cameo Platinium
P60	269	--	250 µm	Type 0
P80	201	P80	--	Type 0
P120	125	P120	125 µm	Type 1
P150	100	--	--	Type 1
P180	82	--	75 µm	Type 1
P220	68	--	75 µm	Type 2
P240	58.5 (± 2.0)	P240	--	Type 2
P280	52.2 (± 2.0)	--	--	Type 2
P320	46.2 (± 1.5)	P320	--	Type 2
P360	40.5 (± 1.5)	--	40 µm	--
P400	35.0 (± 1.5)	P400	--	--
P500	30.2 (± 1.5)	--	30 µm	--
P600	25.8 (± 1.0)	P600	--	Type 3
P800	21.8 (± 1.0)	--	20 µm	--
P1200	15.3 (± 1.0)	P1200	--	Type 4
P2000	10.3 (± 0.8)	--	10 µm	--
P2500	8.4 (± 0.5)	P2500	--	--
P3000	7	P4000	--	--
P5000	5	P4000	--	--

Product Range

- wide-ranging applications
- high application reliability of the products
- long service life, thus optimum cost-benefit factor
- high abrasive and polishing agent quality enables fewer work steps, which significantly reduces both material and time requirements
- optimum grinding quality due to ideal material removal rates and short preparation times *(edge definition)*

Technodisc SiC paper

Solid silicon carbide abrasive paper

The extremely stable SiC abrasive paper ensures very good, even material removal – the reliable classic in materialography, especially for softer materials.

P80 *(detailed picture)*

P320 *(detailed picture)*

P1200 *(detailed picture)*

P4000 *(detailed picture)*

Specifications	
Carrier	Latex/paper, tear-resistant, waterproof, flexible
Abrasives	Silicon carbide
Binding	Synthetic resin
Dispersion	Closed
Design	self-adhesive or non-adhesive

SiC wet abrasive paper non self-adhesive
Quantity per delivery unit: 100 sheets

Technodisc SiC paper P80	
66061031	Ø 200 mm
66061032	Ø 230 mm
66061033	Ø 250 mm
66061034	Ø 300 mm
Technodisc SiC paper P120	
66058025	Ø 200 mm
66061038	Ø 230 mm
66058032	Ø 250 mm
66058039	Ø 300 mm
Technodisc SiC paper P240	
66058026	Ø 200 mm
66061040	Ø 230 mm
66058033	Ø 250 mm
66058040	Ø 300 mm
Technodisc SiC paper P320	
66058027	Ø 200 mm
66061042	Ø 230 mm
66058034	Ø 250 mm
66058041	Ø 300 mm
Technodisc SiC paper P400	
66058028	Ø 200 mm
66061044	Ø 230 mm
66058035	Ø 250 mm
66058042	Ø 300 mm
Technodisc SiC paper P600	
66058029	Ø 200 mm
66061046	Ø 230 mm
66058036	Ø 250 mm
66058043	Ø 300 mm
Technodisc SiC paper P1200	
66058030	Ø 200 mm
66061048	Ø 230 mm
66058037	Ø 250 mm
66058044	Ø 300 mm
Technodisc SiC-Papier P2500	
66058031	Ø 200 mm
66061050	Ø 230 mm
66058038	Ø 250 mm
66058045	Ø 300 mm
Technodisc SiC paper P4000	
66067822	Ø 200 mm
66067823	Ø 230 mm
66067824	Ø 250 mm
66067825	Ø 300 mm

SiC wet abrasive paper self-adhesive
Quantity per delivery unit: 100 sheets

Technodisc SiC paper P80	
66061021	Ø 200 mm
66061021	Ø 230 mm
66061023	Ø 250 mm
66061024	Ø 300 mm
Technodisc SiC paper P120	
66058046	Ø 200 mm
66061035	Ø 230 mm
66058053	Ø 250 mm
66058060	Ø 300 mm
Technodisc SiC paper P240	
66058047	Ø 200 mm
66061039	Ø 230 mm
66058054	Ø 250 mm
66058061	Ø 300 mm
Technodisc SiC paper P320	
66058048	Ø 200 mm
66061041	Ø 230 mm
66058055	Ø 250 mm
66058062	Ø 300 mm
Technodisc SiC paper P400	
66058049	Ø 200 mm
66061043	Ø 230 mm
66058056	Ø 250 mm
66058063	Ø 300 mm
Technodisc SiC paper P600	
66058050	Ø 200 mm
66061045	Ø 230 mm
66058057	Ø 250 mm
66058064	Ø 300 mm
Technodisc SiC paper P1200	
66058051	Ø 200 mm
66061047	Ø 230 mm
66058058	Ø 250 mm
66058065	Ø 300 mm
Technodisc SiC-Papier P2500	
66058052	Ø 200 mm
66061049	Ø 230 mm
66058059	Ø 250 mm
66058066	Ø 300 mm
Technodisc SiC paper P4000	
66069201	Ø 200 mm
66070156	Ø 230 mm
66069202	Ø 250 mm
66069203	Ø 300 mm

Technodisc Diamond Grinding Disks

Self-adhesive diamond grinding disk

The nickel-bonded Technodisc Diamond Grinding Disks have a very good grip and are characterised by a high material removal rate. They are available in grain sizes 250 µm, 125 µm, 75 µm, 40 µm and 20 µm.

The Technodisc system is complemented by the two, very fine Technodisc 30 and 10 µm with a synthetic resin bond. The excellent efficiency is the result of a long tool life as well as the good and fast material removal rate of the Technodisc.

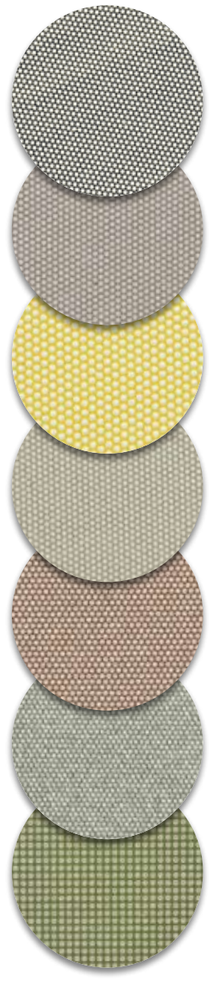
Technodisc Diamond Grinding Disks can also be combined with other grinding systems without any problems.

For example, the Technodisc 125 µm as a pre-grinding step for carbide is a good preparer for the subsequent CAMEO DISK SILVER with BIODIAMANT Liquid green. However, it can just as well be used for cold-embedded, medium-hard steels with poor cut-off as preparation for the subsequent CAMEO DISK PLATINIUM. The nickel bond enables good pre-grinding – both for embedding resin as well as steel. Water or the "Booster Liquid" is used as the lubricant.

Alternative lubricants can also be used for water-sensitive samples.

Technodisc Diamond Grinding Disk, self-adhesive
Quantity per delivery unit: 1 pieces

Technodisc Diamond Grinding Disk 10 µm	
64708640	Ø 200 mm
64708660	Ø 250 mm
64708670	Ø 300 mm
Technodisc Diamond Grinding Disk N 20 µm	
64708639	Ø 200 mm
64708659	Ø 250 mm
64708669	Ø 300 mm
Technodisc Diamond Grinding Disk 30 µm	
64708638	Ø 200 mm
64708658	Ø 250 mm
64708668	Ø 300 mm
Technodisc Diamond Grinding Disk 40 µm	
64708637	Ø 200 mm
64708657	Ø 250 mm
64708667	Ø 300 mm
Technodisc Diamond Grinding Disk 75 µm	
64708635	Ø 200 mm
64708655	Ø 250 mm
64708665	Ø 300 mm
Technodisc Diamond Grinding Disk 125 µm	
64708633	Ø 200 mm
64708653	Ø 250 mm
64708663	Ø 300 mm
Technodisc Diamond Grinding Disk 250 µm	
64708632	Ø 200 mm
64708652	Ø 250 mm
64708662	Ø 300 mm



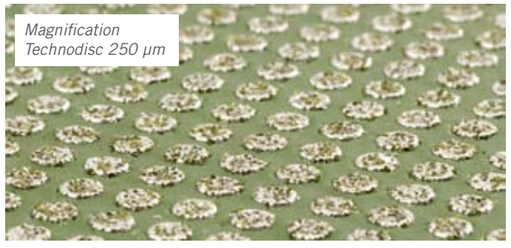
Cut-out surfaces, Technodisc Diamond Grinding Disks

Matching metal blanks to stick-on the disks
Quantity per delivery unit: 1 piece

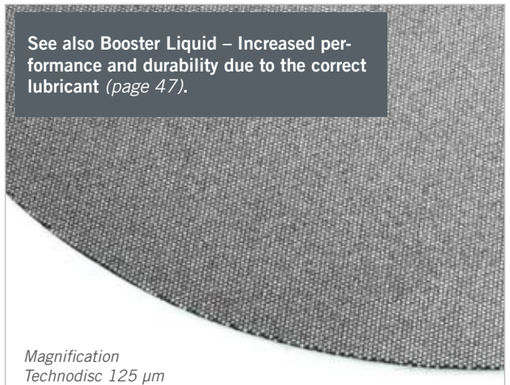
Metal blanks	
66078656	Ø 200 mm
66078659	Ø 250 mm
66078660	Ø 300 mm

Comparison of grain size for SiC papers / diamond grinding disks

Magnification Technodisc 250 µm



See also Booster Liquid – Increased performance and durability due to the correct lubricant *(page 47)*.

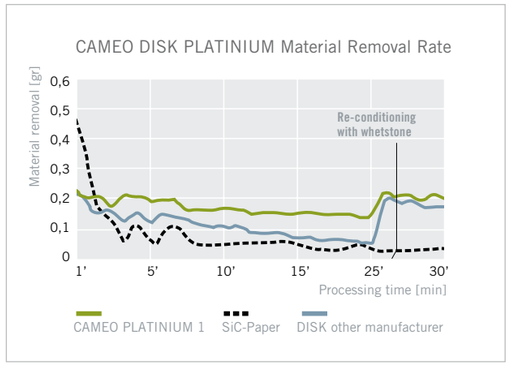


Magnification Technodisc 125 µm

CAMEO DISK PLATINIUM

Long service life, gentle and planar material removal

The PLATINIUM Diamond Grinding Disks are an alternative to SiC paper for grinding medium-hard to hard materials such as steel, hard metal, ceramics and various material composites.



The secret of the material removal rate – the patented CAMEO DISK cell structure.

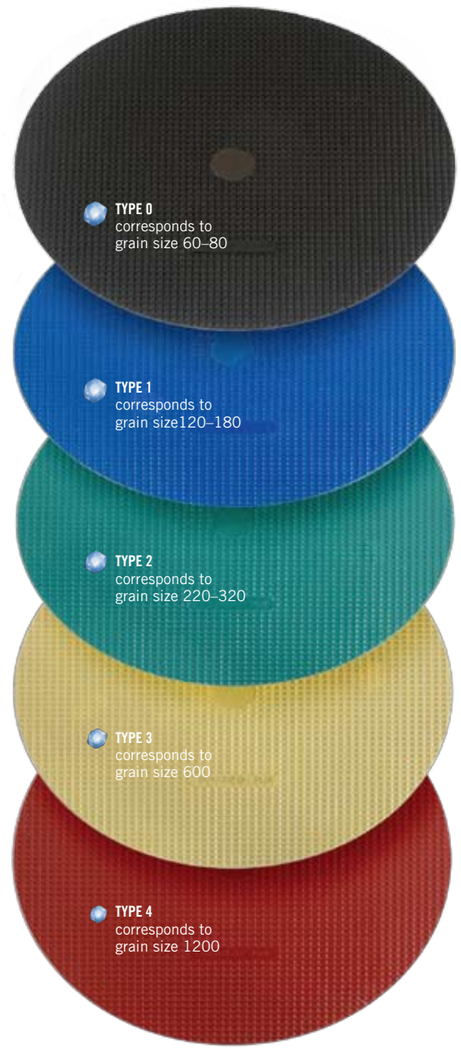
The CAMEO DISK PLATINIUM diamond grinding disks can be used in all common automatic and semi-automatic grinding and polishing machines. However, due to the narrow grid of the diamond-tipped bars, the CAMEO DISK PLATINIUM is also excellently suited for manual preparation.

CAMEO DISK PLATINIUM is very easy to use. Water or the "Booster Liquid" is used as a lubricant. Alternative lubricants can also be used for water-sensitive samples.

The edge definition is significantly better than with preparation using SiC paper, which is related to both the abrasive itself *(diamond)* and the flat, stable carrier.

Even non-embedded samples and large welds can be processed without problems after a good cut. After 2 to a maximum of 3 grinding steps, the samples are optimally prepared for the subsequent polishing.

In addition to the long service life, the excellent grinding quality is the big plus. This means that preparation with CAMEO DISK PLATINIUM provides excellent value for money!



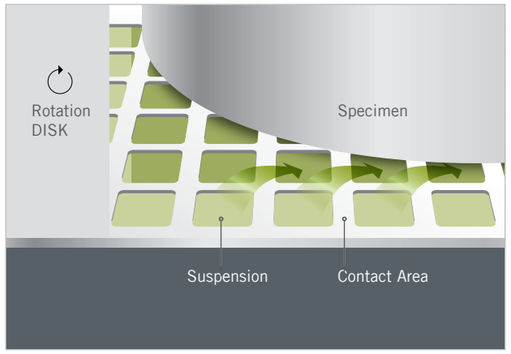
CAMEO DISK PLATINIUM at a glance

- excellent edge definition – even with non-embedded samples
- easy handling, easy to clean
- reproducible results
- for manual and automatic grinding
- long tool life; gentle, planar material removal
- excellent cost-effectiveness
- suitable for almost all materials
- replaces a high number of SiC papers
- fewer and faster changeover times
- low storage requirements

Automatic preparation
To achieve flatness of the samples and uniform wear of the disk, the sample holder is placed in such a way that the samples reach to the centre and protrude a few millimetres beyond the working disk at the outer diameter. When using larger working disks, change the sample holder position from time to time in order to maintain the flatness of the disk and to make optimum use of the abrasive.

Manual preparation
The CAMEO DISK PLATINIUM is also excellently suited for manual sample preparation. Here, the samples are moved from the edge to the centre and back again during the preparation process in order to achieve uniform loading on the disk. Despite the different surface, they feel when sanded like a well ground SiC paper – permanently.
(For higher material removal rates, work with the Booster Liquid. The lubricant is specially adapted to the Platinium and keeps the gaps clean and guarantees uniformly high material removal.)

Contact surface
The homogeneous diamond distribution of the CAMEO DISK PLATINIUM ensures constant material removal rates throughout the life of the disk. The special honeycomb structure guarantees optimum lubrication of the samples during the grinding process. The individual cells hold the lubricant, or water, on the surface and thus counteract the centrifugal force of the grinding disk. The excellent cutting action of the CAMEO honeycomb structure enables a high material removal rate at low pressure. This protects the sample, disk and machine.



Lubrication, micro tanks
Due to the permanent circulation of the lubricant between the individual combs, this is optimally exploited and the wear debris is continuously removed.

Cleaning
The CAMEO DISK PLATINIUM is regularly honed with the enclosed whetstone under running water at 150 rpm directly in the machine and thus reconditioned.

CAMEO DISK PLATINIUM
Quantity per delivery unit: 1 piece
Adaptation: Metal backing for magnet systems

PLATINIUM TYPE 0

66050031	Ø 200 mm
66050032	Ø 250 mm
66050033	Ø 300 mm

PLATINIUM TYPE 1

66012983	Ø 200 mm
66012986	Ø 250 mm
66012989	Ø 300 mm

PLATINIUM TYPE 2

66012984	Ø 200 mm
66012987	Ø 250 mm
66012990	Ø 300 mm

PLATINIUM TYPE 3

66012985	Ø 200 mm
66012988	Ø 250 mm
66012991	Ø 300 mm

PLATINIUM TYPE 4

66018162	Ø 200 mm
66018164	Ø 250 mm
66018165	Ø 300 mm

Booster Liquid

The Booster Liquid is a specially developed lubricant for use on the CAMEO DISK PLATINIUM during grinding. This Booster Liquid maintains the optimum grip of the diamond grinding disks over the entire service life and at the same time buffers sensitive samples.

Ready to use, this lubricant ensures constant conductivity and avoids the use of a grindstone.

Application advantages of Booster Liquid

- improved performance of the diamond grinding disks
- keeps efficiency constant over time
- reduces the consumption of water
- universally applicable, can be used for all types of material
- Ready for use

Delivery units of Booster Liquid

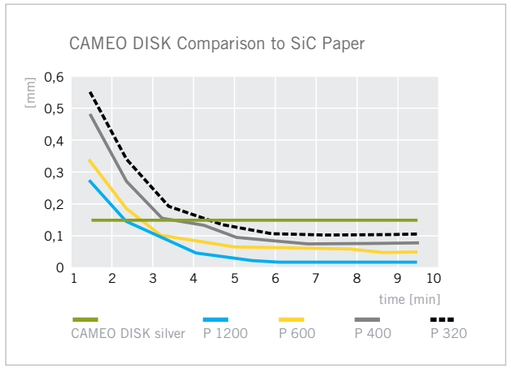
Booster Liquid

66064605	Booster Liquid	5000 ml

CAMEO DISK SILVER & GOLD

High, constant material removal rate

The CAMEO DISK SILVER and CAMEO DISK GOLD lapping disks with a gentle, constant material removal rate. The BIODIAMANT Liquids serve as abrasives. The CAMEO Disk replaces work steps for which abrasive papers with grain sizes 240–4000 are used as an alternative for medium-hard to hard materials.



CAMEO DISK SILVER & GOLD are lapping disks with a highly constant material removal rate and excellent edge definition.

The patented, close-meshed honeycomb pattern of the CAMEO DISK optimizes the operation of the sprayed BIODIAMANT Liquids. The diamond suspension remains on the disk and is thus optimally utilized. The CAMEO process guarantees optimum flatness and gentle material removal for all types of samples with minimum material consumption.

Areas of application
The choice of CAMEO DISK SILVER or GOLD depends largely on the material.

CAMEO DISK SILVER & GOLD
Quantity per delivery unit: 2 piece
Adaptation: Metal backing for magnet systems

CAMEO DISK SILVER		CAMEO DISK GOLD	
66005722	Ø 200 mm	66005730	Ø 200 mm
66005724	Ø 250 mm	66005732	Ø 250 mm
66005725	Ø 300 mm	66005733	Ø 300 mm

CAMEO DISK SILVER

Fine grinding of medium-hard to very hard materials *(> 200 HV)* in combination with diamond liquids from 12–6 µm.

CAMEO DISK GOLD

Fine grinding of hard, brittle materials, for example ceramics, material composites, soft materials and non-ferrous materials, in combination with diamond liquids from 12-3 µm.

CAMEO DISK Advantages
- easy handling
- very good material removal rate
- grinding step jumps, for example, from the 120 grinding stone on the CAMEO DISK SILVER with Suspension green are possible.
- economical – with a single disk, CAMEO replaces the whole range of SiC papers from grain size 240–4000 – with ideal edge definition
- the patented surface profile creates a highly constant material removal rate
- The micro tanks of the CAMEO surface hold the diamond suspension on the disk, the CAMEO DISK is optimally lubricated, and the cutting edges of the diamond grains are utilised in the best possible way. They significantly reduce the need for diamond suspension compared to lapping systems from other suppliers.
- compatible with all grinding and polishing systems!
- time-saving preparation with optimal surface flatness of all samples
- efficient: Different grain sizes of diamond suspensions can be used on just one CAMEO lapping disk.. The disk adapts to the requirements.

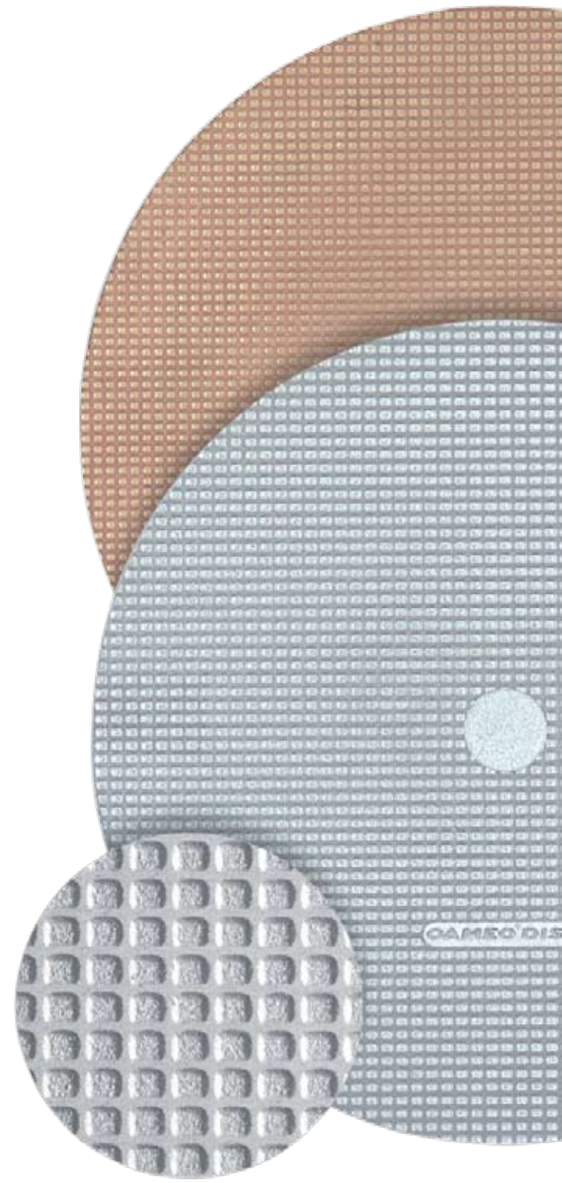
Lapping is usually much more gentle than grinding and therefore better suited for sensitive, brittle samples.

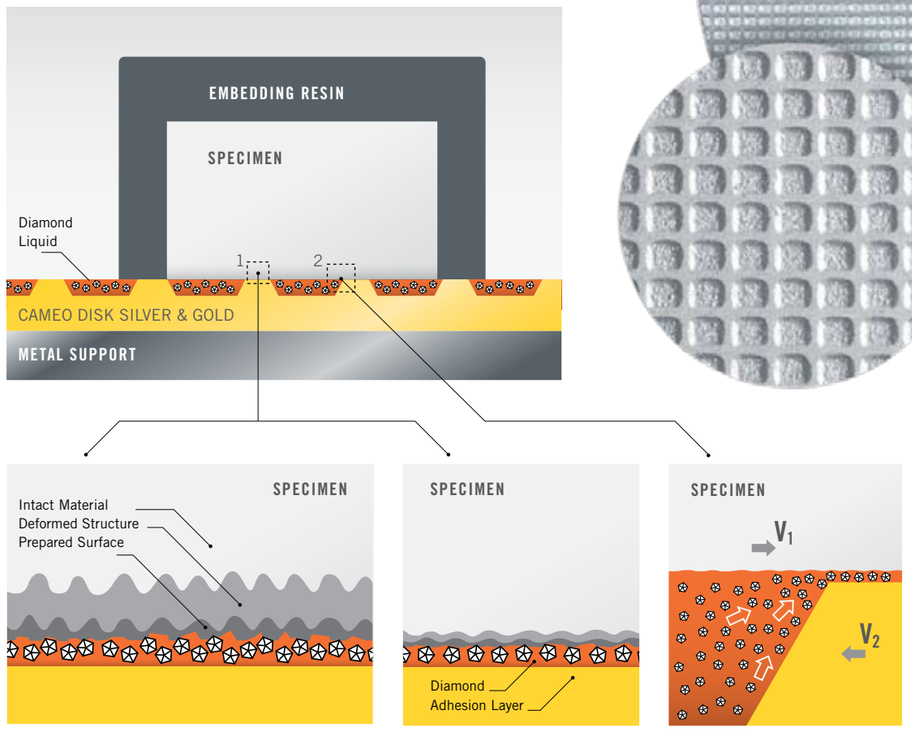
For most materials, BIODIAMANT Liquid green *(9 µm)* is the right choice. For particularly difficult materials or material combinations to be prepared, the optimum grinding surface can be achieved by using coarser *(blue, 12 µm)* and/or finer BIODIAMANT Liquids *(yellow, 6 µm)*. The diamond suspension is added sparingly at regular intervals to ensure optimum material removal and ideal lubrication.

Automatic preparation
To achieve precise flatness of the samples and uniform wear of the CAMEO DISK, the sample holder is placed in such a way that the samples reach to the centre and protrude a few millimetres beyond the working disk at the outer diameter. When using larger working disks, it is advisable to change the sample holder position from time to time to maintain the flatness of the disk and to make optimum use of the abrasive.

Manual preparation
CAMEO DISK SILVER & GOLD are excellent for manual sample preparation. To achieve uniform loading of the disks, the samples are guided from the edge to the centre during the preparation process.

Cleaning
The CAMEO DISK SILVER & GOLD are easily cleaned with a soft brush under running water after use and can then be used further with any diamond grain size.





Surface material removal after 10 s

Surface material removal after 180 s

TOUCHLAM polishing cloths

Effective work with TOUCHLAM polishing cloths

Various cloths are available in the TOUCHLAM system. These differ in material and type of fabric, flocking or fibre, density and thickness. The cloths are finely graduated so that the polishing steps can be individually matched to the preparation.

Too many polishing steps and long polishing times significantly reduce the flatness of a sample. Therefore, it is particularly important to carefully match the cloths used to the polishing steps.

A polishing cloth is a complex combination of different material layers, each of which has a specific function. The overall structure determines the cloth quality and is essential for the polishing result and durability. The cloth is selected according to the type of samples and/or polishing step.

In combination with the right polishing agents, even difficult sample surfaces can be polished artefact-free in a very short time. Too many polishing steps and long polishing times, especially on soft cloths, significantly reduce the flatness of a sample.

The active surface of the polishing cloth is the first selection criterion; the other parameters result from the layer structure. The insulating layer prevents the cloth from being soaked so that the surface does not separate from the adhesive. This is the basis for a long service life.

The adhesive layer guarantees optimum adhesion within the composite. It influences the hardness and the polishing behaviour of the cloth by its consistency.

An important aspect is also the carrier. It is the foundation and thus responsible for the stiffness, flatness and elasticity of the polishing cloth.

Designs

Depending on the design, all cloths can be easily placed on various changing systems and also removed again – wrinkle-free, without leaving any residue and without taking a lot of time.

- with self-adhesive back
- with flexible metallic carrier for direct adaptation to magnet systems
- with flat, smooth, stable plastic back for adaptation to the XLAM adhesive system

Product	Application	Properties			
		Material removal	Flatness	Fine polish	Final polish
2TT1	Pre-polishing of tough materials	Yes	Yes	-	-
2TS1	Fine polishing of all materials, final polishing of hard materials	-	Yes	Yes	-
2TS4	Intermediate polishing of all materials, final polishing of hard materials	-	Yes	-	-
2TS5	Fine polishing of all materials, final polishing of hard materials	-	Yes	Yes	-
2TS8	Fine polishing of all materials, final polishing of hard materials	-	Yes	Yes	-
3TL1	Polishing/finishing of medium-hard to hard materials	-	-	Yes	-
3FV1	Final polishing of medium-hard to hard materials	-	-	Yes	Yes
4FV1	Final polishing of soft, medium-hard to hard materials	-	-	-	Yes
4MP1	Chemical/mechanical polishing of sensitive materials	-	-	-	Yes

TOUCHLAM 2TT1

Hard cloth made of woven synthetic taffeta fibres for good material removal rates and flatness. The field of application is mainly pre-polishing. Works out deformations quickly and easily – especially with tough materials such as titanium. For combination with BIODIAMANT Liquids 6–12 µm.

TOUCHLAM 2TS1

Satin-woven, waterproof, natural fibre cloth for a high material removal rate and excellent edge definition. For polishing almost all materials especially for thin layers of different hardness in combination with BIODIAMANT Liquids 1–6 µm.

TOUCHLAM 2TS4

Satin woven natural fibre cloth for high flatness and edge definition on samples with different hardness or coated materials. For combination with BIODIAMANT Liquids 1–6 µm.

TOUCHLAM 2TS5

Flexible, medium-hard natural fibre cloth consisting of a salmon-coloured satin fabric. The combination of soft thread and flat surface provides fine polishing results with good edge definition. Suitable for the preparation of almost the entire range of materials in combination with BIODIAMANT Liquids 1–6 µm.

TOUCHLAM 2TS8

With its flat surface and soft natural fibre thread, the orange polishing cloth 2TS8 provides a precise fine polish with very good edge definition when using BIODIAMANT Liquids 1–6 µm. For multi-stage polishing with the 1 µm suspension, it is the perfect complement to the 2TS1 Polishing Cloth with BIODIAMANTLiquids, 6 µm or 3 µm..

TOUCHLAM 3TL1

Robust all-round wool cloth for soft to hard routine samples. Particularly suitable for polishing soft to hard non-embedded samples. For combination with BIODIAMANT Liquids 1–6 µm.

TOUCHLAM 3FV1

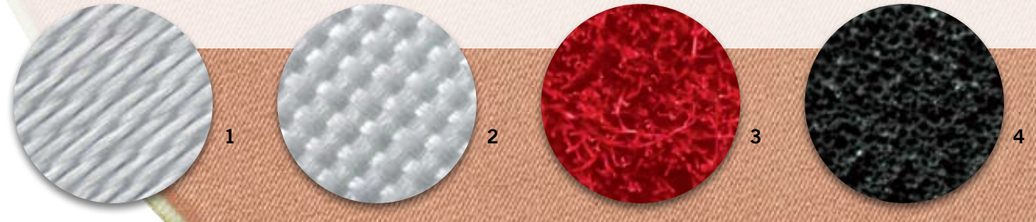
Flocked, medium-hard synthetic fibre cloth. For the final polishing of hard embedded samples as a universal polishing wheel with 3 µm in the hardening shop as well as for the fine polishing of medium-hard to hard samples. For combination with BIODIAMANT Liquids 1–6 µm.

TOUCHLAM 4FV1

Flocked, medium-hard synthetic fibre cloth. For final polishing of hard embedded samples. Can also be used very well as a universal polishing cloth for undemanding samples. For combination with BIODIAMANT Liquids 1–3 µm. Can be used just as well as with oxide polish (Al_2O_3) or SiO_2 for finishing.

TOUCHLAM 4MP1

The chemically resistant cloth made of microporous PU foam can be used with all oxide polishing agents and shows no edge rounding even with longer polishing times of difficult preparations. Etching polishes are also possible.



1. *Natural fibres*
2. *Synthetic fibres*
3. *Flock*
4. *Foamed*

TOUCHLAM polishing cloths

Delivery units

TOUCHLAM 2TT1

	SA	MG	XLAM
Ø 200 mm	66055540	66055543	66055549
Ø 250 mm	66055541	66055545	66055550
Ø 300 mm	66055542	66055546	66055551

TOUCHLAM 2TS1

	SA	MG	XLAM
Ø 200 mm	66055554	66055561	66055566
Ø 250 mm	66055556	66055562	66055567
Ø 300 mm	66055557	66055563	66055568

TOUCHLAM 2TS4

	SA	MG	XLAM
Ø 200 mm	66055570	66055577	66055581
Ø 250 mm	66055572	66055578	66055582
Ø 300 mm	66055573	66055579	66055583

TOUCHLAM 2TS5

	SA	MG	XLAM
Ø 200 mm	66058388	66060413	66060416
Ø 250 mm	66058389	66060414	66060417
Ø 300 mm	66058391	66060415	66060418

TOUCHLAM 2TS8

	SA	MG	XLAM
Ø 200 mm	66061231	66061237	66061234
Ø 250 mm	66061232	66061238	66061235
Ø 300 mm	66061233	66061239	66061236

TOUCHLAM 3TL1

	SA	MG	XLAM
Ø 200 mm	66055593	66055596	66055599
Ø 250 mm	66055594	66055597	66055600
Ø 300 mm	66055595	66055598	66055601

TOUCHLAM 3FV1

	SA	MG	XLAM
Ø 200 mm	66055602	66055605	66055608
Ø 250 mm	66055603	66055606	66055609
Ø 300 mm	66055604	66055607	66055610

TOUCHLAM 4FV1

	SA	MG	XLAM
Ø 200 mm	66055612	66055616	66055620
Ø 250 mm	66055613	66055617	66055621
Ø 300 mm	66055614	66055618	66055622

TOUCHLAM 4MP1

	SA	MG	XLAM
Ø 200 mm	66055623	66055626	66055629
Ø 250 mm	66055624	66055627	66055630
Ø 300 mm	66055625	66055628	66055631

Quantity per delivery unit:
5 pcs. special varieties and diameter on request!
SA = self-adhesive
MG = magnetic
XLAM = adapter system

BIODIAMANT Liquids

High performance, safe for health and the environment

The BIODIAMANTLiquids are diamond abrasives that meet our high quality requirements, both in the high quality of the diamond grain, the grain size distribution, but also regarding health and environmental compatibility.

All input materials of the BIODIAMANT products comply with European standards 1999/45/EC and 2000/59/EC. In this way, we have achieved our goal of offering users high-performance products that do not pose any environmental or health risks.

ENVIRONMENTAL PROTECTION

Leading the way
Environmental awareness is growing steadily, and protection of the environment is becoming more and more important. Environmental compatibility not only plays a role in the selection of raw materials, but the packaging of the products is just as important.

Biodegradable
BIODIAMANT Liquids are more than 70% biodegradable. The unique NEODIA plastic bottle is 100% biodegradable and compostable (*(standard NF EN 13 432)*.

HEALTH PROTECTION

Work healthier
Innovative, user-oriented products no longer only fulfil qualitative and economic requirements, they also focus on the health of the user.

Free of VOCs
NEODIA Liquids have a novel binder that is free of volatile organic compounds *(VOC)*.

REACH-compliant
Non-toxic, harmless to health and REACH compliant. All substances in the NEODIA formulation comply with the REACH regulation and are classified as non-toxic and harmless.

HIGH LEVEL OF CONVENIENCE

Efficient, high-performance and high user comfort
BIODIAMANT high-performance suspensions are convincing not only in terms of health and environmental protection, but also in particular due to their optimum polishing properties.

Optimal composition
While the powerful BIO-DIAMANT All-in-One Liquids prevail with tight grain-size tolerance, high diamond concentration and economical use, the NEODIA liquids score points mainly by their VOC-free binding agent and excellent cost-effectiveness.

Metallographic grinding and polishing machines

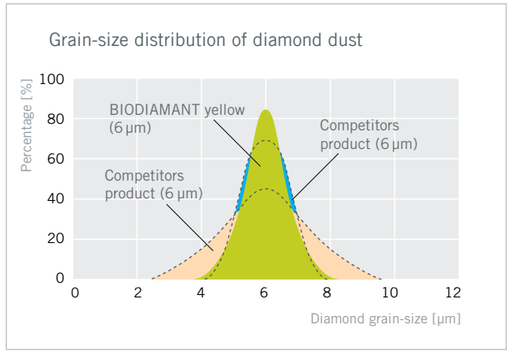
SMARTLAM 2.0

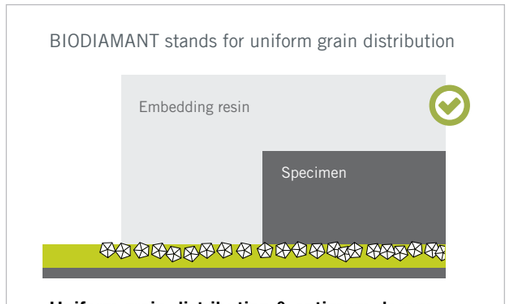
Kulzer offers a wide range of machines for the use of our grinding disks and polishing cloths. From the manual or semi-automatic SMARTLAM to the automatic grinding

MASTERLAM 3.0

and polishing machine MASTERLAM with central and individual sample pressure, all requirements for modern sample preparation are covered here.

BIODIAMANT “All-in-One”

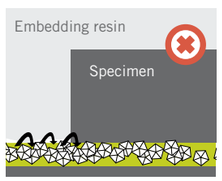




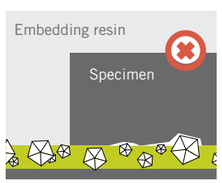
Uniform grain distribution & optimum dosage
- uniform material removal
- short preparation times
- lower deformation depth
- uniform deformation
- contact to the working disk
- adequate lubrication/cooling

Avoid application errors

Poor dosage
- Aquaplaning effect
- Edge rounding
- long preparation times



Uneven grain sizes or grain distribution
- Decrease in grinding quality
- long preparation times



Kulzer "All-in-One" diamond suspensions are used without any additional lubricant, which results in a consistent, reproducible quality at all times and a significant savings in consumption. This ensures that the same number of diamonds is always sprayed on and partial dilution of the suspension is avoided.

BIODIAMANT abrasives satisfy all these requirements.
In addition to the liquids coded according to our own colour system, the special types MM 140 as an unpigmented variant and the Diamantstick as a Diamantpaste are also available. All BIODIAMANT Liquids can be optimally applied with automatic dosing equipment as well as with the manual pump bottle.

BIODIAMANT Benefits
- more efficient than conventional diamond suspensions
- harmless to health
- narrow tolerances of the grain sizes
- high diamond concentrations
- optimum lubricating effect of the water-based carrier fluid
- economical in use
- optimal for processing in automatic machines or manually
- All-in-One

Delivery units BIODIAMANT (spray bottle)

66031402	BIODIAMANT Liquid blue	12 µm	250 g
66031403	BIODIAMANT Liquid green	9 µm	250 g
66031404	BIODIAMANT Liquid yellow	6 µm	250 g
66031382	BIODIAMANT Liquid orange	3 µm	250 g
66031383	BIODIAMANT Liquid red	1 µm	250 g

Delivery units BIODIAMANT Liquid MM and Diamantpaste

66031386	BIODIAMANT Liquid MM 140 Spray bottle	1 µm	250 g
64708736	Diamantpaste MM 140 A	1 µm	10 g Stick

NEODIA BIODIAMANT

We remain true to the claim of perfect sample preparation. But NEODIA Liquids can do more: Optimum polishing results due to good material removal behaviour are complemented by the highest-possible health and environmental protection.

NEODIA BIODIAMANT Liquids set standards!
NEODIA is the first VOC*-free diamond suspension in a 100% biodegradable plastic bottle. *VOC *(Volatile Organic Compounds)* refers to the group of volatile organic compounds.

NEODIA benefits
- VOC-free, non-toxic, harmless to health
- narrow tolerances of the grain sizes
- polycrystalline diamonds provide the best cutting edges
- homogeneous micrograph due to high concentration of poly-crystalline diamonds and finely graded grain sizes
- biodegradable liquid, compostable bottle
- excellent cost-effectiveness
- suitable for the NEODIA suspensions:

Lubricant Fluid MM 702 and MM 704
Water-based lubricants for combination with the NEODIA suspensions.. The formula provides the best lubrication and cooling during preparation. The sample can be easily cleaned with water, alcohol or watery cleaning agents.

We go one step further.
Come along! We remain true to the claim of perfect sample preparation. But NEODIA Liquids can do more: Optimum polishing results due to good material removal behaviour are complemented by the highest-possible health and environmental protection. NEODIA Liquids have a novel binder that is free of volatile organic compounds (VOC).

FINAL LIQUID & SUPERFINISH

FINAL LIQUID
Final polishing solution made of colloidal silicon dioxide. Abrasive: Silica *(SiO_2)* pH 9 with a grain size of 50 nm. High efficiency with flocked polishing cloths *(TOUCHLAM 4FV3, 4FV1, 3FV1)* or TOUCHLAM 4MP1, 4MP2. Used for all types of material.

SUPERFINISH
Aluminium-oxide suspension with very high level of purity. The extremely fine open particles guarantee an excellent polish. Easy to use and very well suited for the final polish of soft materials. The SUPERFINISH is available in 2 grain sizes *(SUPERFINISH 1 = 0.25 µm and SUPERFINISH 2 = 0.05 µm)*.

Delivery units NEODIA Liquids

66077903	BIODIAMANT NEODIA F POLY, blue	1 µm	400 ml
66077904	BIODIAMANT NEODIA F POLY, green	3 µm	400 ml
66077905	BIODIAMANT NEODIA F POLY, yellow	6 µm	400 ml
66077906	BIODIAMANT NEODIA F POLY, red	9 µm	400 ml
66079385	BIODIAMANT NEODIA F POLY, grey	14 µm	400 ml
66077907	BIODIAMANT NEODIA F POLY, blue	1 µm	2500 ml
66077908	BIODIAMANT NEODIA F POLY, green	3 µm	2500 ml
66077909	BIODIAMANT NEODIA F POLY, yellow	6 µm	2500 ml
66077910	BIODIAMANT NEODIA F POLY, red	9 µm	2500 ml
66079386	BIODIAMANT NEODIA F POLY, grey	14 µm	2500 ml
66007014	Spray head for NEODIA bottles, 400 ml	--	1 pc.

Delivery units Lubricant Fluid MM 702 and 704

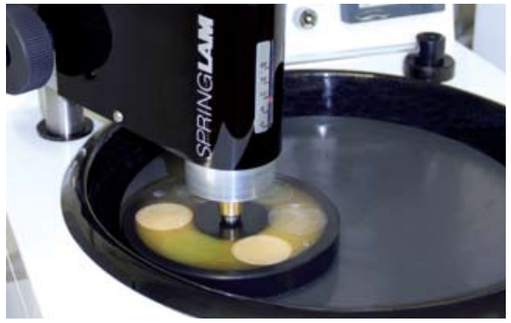
66050056	Lubricant Fluid MM 702	--	1000 ml
66069908	Lubricant Fluid MM 702	--	5000 ml
66079694	Lubricant Fluid MM 704	--	1000 ml

Delivery units FINAL LIQUID and SUPERFINISH

66006892	FINAL LIQUID	0.05 µm	500 ml
66046713	SUPERFINISH 1	0.25 µm	1000 ml
66046714	SUPERFINISH 2	0.05 µm	1000 ml
66079858	SUPERFINISH LIQUID L1	--	1000 ml
66094436	SUPERFINISH LIQUID L2	--	1000 ml

Adapter systems

The efficient way



Adapter systems allow the quick change of grinding and polishing cloths as well as diamond grinding disks and SiC papers. Due to the coating, the special surfaces allow a quick change of all grinding and polishing media without adhesive residues in almost unlimited cycles.

FIXLAM / FIXLAM-M

FIXLAM is a self-adhesive film for securing sandpaper with paper backing in the grinding machine – ideal in combination with the non-stick-coated FAS disks in the adhesive version and with metal backing (FIXLAM-M) suitable for all magnet carrier disks (MS-Disk).

FAS / FAS-M

The FAS disk is a special non-stick disk that is suitable for all gluing systems. The FAS-M provides the same surface properties and can be used for all magnet systems. Thus, self-adhesive disks and especially SiC papers can be easily integrated into a magnet system.

Combination of adapter systems and application
With the changing systems, different adaptations can be combined and thus prepare the next preparation steps quickly and easily.

FIXLAM Disk

64713122	Ø 200 mm
64713124	Ø 250 mm
64713125	Ø 300 mm

FIXLAM-M Disk

66056007	Ø 200 mm
66056008	Ø 250 mm
66056009	Ø 300 mm

Delivery unit FIX LAM: 5 pieces

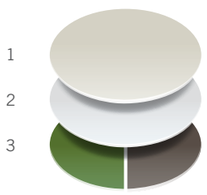
FAS Disk

64713115	Ø 200 mm
64713117	Ø 250 mm
64713118	Ø 300 mm

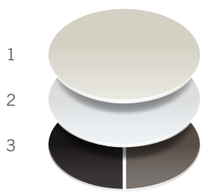
FAS-M Disk

64714612	Ø 200 mm
64714613	Ø 250 mm
64714614	Ø 300 mm

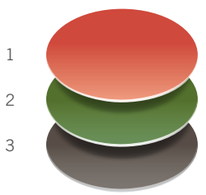
Delivery unit FAS: 1 piece



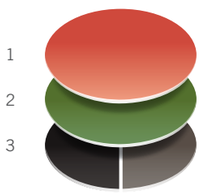
1. SiC paper without adhesive backing
2. FIXLAM
3. FAS / FAS-M Disk or carrier disk (non-magnetic)



1. SiC paper without adhesive backing
2. FIXLAM-M
3. MS-Disk or magnetic support disk



1. SiC paper self-adhesive, Grinding or polishing disk adhesive-backed
2. FAS Disk
3. support disk (non-magnetic)



1. SiC paper self-adhesive, Grinding or polishing disk adhesive-backed
2. FAS-M Disk
3. MS disk or magnetic support disk

XLAM and XLAM-M

The XLAM disk has a microstructured surface that secures the XLAM cloths and all smooth surfaces by means of a suction effect.

With their smooth plastic backing, the polishing cloths can be securely and easily attached to the XLAM backing disk, just like SiC abrasive foils, the non-adhesive SiC paper or grinding disks with smooth metal backing, for example the CAMEO DISK PLATINIUM / SILVER / GOLD.

Use the XLAM-M disk to take advantage of the XLAM system, also with magnetic systems. This is specially designed for magnet systems.

MAGNETIQUE SUPPORT DISK (MS-DISK)

The self-adhesive Magnetique Support Disk turns your aluminium support disk into a magnetic changing system. The MS-DISK is glued onto the carrier disk and you can use all the advantages of the magnet system.

Magnetique Support Disk
- Self-adhesive back
- Magnetic surface

XLAM-M

66061591	Ø 200 mm
66061592	Ø 250 mm
66061593	Ø 300 mm

Delivery unit: 1 piece

MS-Disk

66005892	Ø 200 mm
66005894	Ø 250 mm
66005895	Ø 300 mm

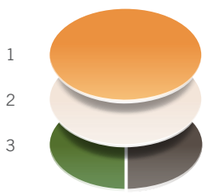
Delivery unit: 1 piece

XLAM

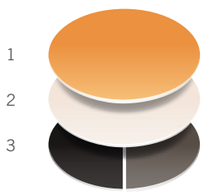
66061595	Ø 200 mm
66061596	Ø 250 mm
66061597	Ø 300 mm

Delivery unit: 1 piece

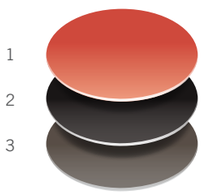
XLAM-M
- Back side self-adhesive or magnetic
- Surface with suction effect



1. SiC paper self-adhesive, Grinding or polishing disk with smooth back
2. XLAM
3. FAS / FAS-M Disk or carrier disk (non-magnetic)



1. SiC paper self-adhesive, Grinding or polishing disk with smooth back
2. XLAM-M
3. MS disk or magnetic support disk



1. Grinding or polishing disk metal-backed
2. MS-Disk
3. support disk (non-magnetic)

Manual sample holder and BOX LAM 300

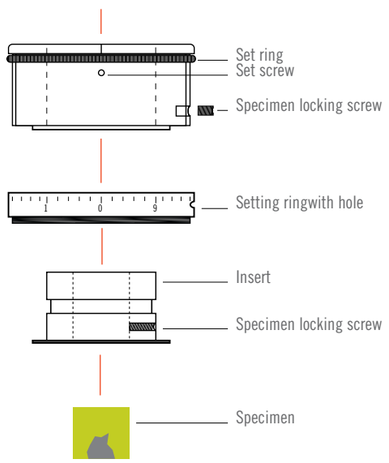
Clever accessories

Manual sample holder

Ceramic ring (manual sample holder view from below)

Insert M

Insert H



Manual sample holder

An important tool for target preparation. The risk of over-grinding and the microscopic control effort are extremely minimized. The manual sample holder is designed for polished sections as well as thin sections (holder or insert H). The vernier setting makes it possible to achieve a defined material removal *(distance between 2 graduation marks of the scale = 0.02 mm)*. The locking ring prevents the preset dimension from being altered during the grinding process. The very hard ceramic ring prevents over-grinding and ensures reliable material removal to the desired level.

Manual sample holder

66031155	Manual sample holder M, Ø 40 mm	1 pc.

Inserts for manual sample holder M Ø 40 mm

66031159	Insert Ø 25 mm	1 pc.
66031160	Insert Ø 30 mm	1 pc.
66031161	Insert Ø 32 mm	1 pc.
66031157	Insert H	1 pc.

BOX LAM 300

BOX LAM 300

The BOX LAM 300 storage system for disks and cloths up to Ø 300 mm. 10 push trays with a special surface provide space for disks as well as samples, among other things, which can be placed in foam pads *(accessories)*.

BOX LAM

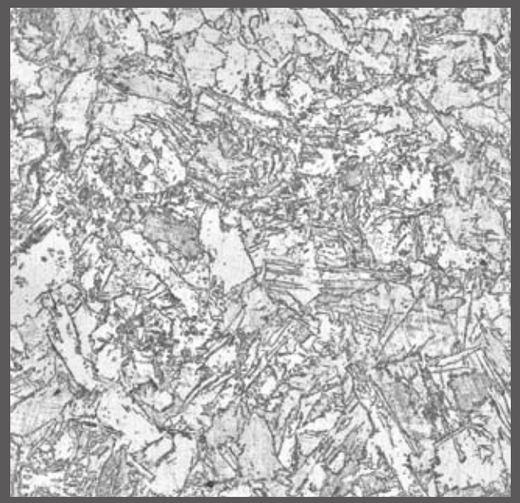
66056022	BOX LAM 300 storage system	1 pc.

From practice

The result counts

With the grinding and polishing products from Kulzer, surfaces are removed very gently without deformation or artefacts.

An optimally prepared sample reproduces the true microstructure unaltered. Inhomogeneous structures are uniformly well represented, brittle edge layers are processed without breakouts and soft microstructural components are not eroded or smeared. Only optimally prepared samples ensure the exact evaluation of the microstructures.



Sample material: Steel above 45 HRC and cast iron
embedded in: hot embedding resin Technotherm 2000 or cold embedding resin Technovit 4002 IQ

Work step	Grinding/ polishing cloth	Grinding/ polishing agent	Time
Grinding I	CAMEO DISK PLATINIUM 1 or 2, depending on the quality of the cut	Water	until flat
Grinding II	CAMEO DISK PLATINIUM 2	Water	1–3 min
Grinding III	CAMEO DISK PLATINIUM 3	Water	1–3 min
Polish I	2TS1	BioDiamant Liquid yellow	3 min
Polish II	4FV1	BioDiamant Liquid red	1 min

Alternative

work step	Grinding/polishing cloth	Grinding/polishing agent	Time
Grinding I	CAMEO DISK PLATINIUM 1 or 2, depending on the quality of the cut	Water	until flat
Grinding II	CAMEO DISK SILVER	BioDiamant Liquid blue or green	3 min
Polish I	2TS1	BioDiamant Liquid yellow	1–3 min
Polish II	4FV1	BioDiamant Liquid red	1 min

Sample material: Nitriding layer on steel
embedded in: hot embedding resin Technotherm 2000 or cold embedding resin Technovit 4002 IQ

work step	Grinding/polishing cloth	Grinding/polishing agent	Time
Grinding I	SiC paper 180 grain size	Water	until flat
Grinding II	CAMEO DISK PLATINIUM 2	BioDiamant Liquid green	3–5 min
Polish I	2TS1	BioDiamant Liquid yellow	3 min
Polish II	4FV1	BioDiamant Liquid MM 140	1–2 min

Alternative

work step	Grinding/polishing cloth	Grinding/polishing agent	Time
Grinding I	CAMEO DISK PLATINIUM 2	Water	1 min
Grinding II	CAMEO DISK PLATINIUM 4	Water	2 min
Polish I	2TS1	BioDiamant Liquid yellow	3–5 min
Polish II	4FV1	BioDiamant Liquid MM 140	1–2 min

From practice

The result counts

Sample material: Sprayed layer on steel
embedded in: hot embedding resin Technotherm 2000 or cold embedding resin Technovit 4002 IQ

work step	Grinding/polishing cloth	Grinding/polishing agent	Time
Grinding I	CAMEO DISK PLATINIUM 1	Water	until flat
Grinding II	CAMEO DISK PLATINIUM 2	Water	1–2 min
Grinding III	CAMEO DISK PLATINIUM 3	Water	1 min
Grinding IV	CAMEO DISK PLATINIUM 4	Water	1 min
Polish I	2TS1	BioDiamant Liquid yellow	3–5 min
Polish II	2TS8	BioDiamant Liquid MM 140	2 min
Polish III	4FV1	BioDiamant Liquid MM 140	1 min

Sample material: Sprayed layer on steel
embedded in: cold embedding resin 4000 or cold embedding resin Technovit 4002 IQ

work step	Grinding/polishing cloth	Grinding/polishing agent	Time
Grinding I	CAMEO DISK PLATINIUM 1	Water	
Grinding II	CAMEO DISK SILVER	BioDiamant Liquid blue	5 min
Polish I	2TS1	BioDiamant Liquid yellow	2–3 min
Polish II	2TS8	BioDiamant Liquid red	5 min

Sample material: Populated printed circuit board with chip
embedded in: cold embedding resin 4006 SE or light-curing embedding resin Technovit 2000 LC

work step	Grinding/polishing cloth	Grinding/polishing agent	Time
Grinding I	SiC paper 320 grain size	Water	until flat
Grinding II	SiC paper 600 grain size	Water	1 min
Grinding III	SiC paper 2500 grain size	Water	1/2 min
Polish I	2TS1	BioDiamant Liquid MM 140	3–5 min
Polish II	4FV1	BioDiamant Liquid MM 140	1/2–1 min

Sample material: Unpopulated printed circuit board
embedded in: cold embedding resin 4006 SE or light-curing embedding resin Technovit 2000 LC

work step	Grinding/polishing cloth	Grinding/polishing agent	Time
Grinding I	SiC paper 180 grain size	Water	until flat
Grinding II	SiC paper 320 grain size	Water	1 min
Grinding III	SiC paper 600 grain size	Water	1 min
Grinding IV	SiC paper 1200 grain size	Water	1 min
Polish I	2TS5	BioDiamant Liquid yellow	2–3 min
Polish II	4FV1	BioDiamant Liquid MM 140 or red	1 min

Sample material: Aluminium and alloys
embedded in: cold embedding resin Technovit 4071, Technovit 4002 IQ, Technovit 4006 SE or light-curing embedding resin Technovit 2000 LC

work step	Grinding/polishing cloth	Grinding/polishing agent	Time
Grinding I	SiC paper 180 grain size	Water	until flat
Grinding II	SiC paper 320 grain size	Water	1 min
Grinding III	SiC paper 600 grain size	Water	1 min
Grinding IV	SiC paper 1200 grain size	Water	1 min
Grinding V	SiC paper 2500 grain size	Water	1 min
Polish I	2TS8	BioDiamant Liquid MM 140	3–6 min
Polish II	4FV1	BioDiamant Liquid MM 140	1–2 min

Sample material: Titanium and titanium alloy
embedded in: cold embedding resin Technovit 4006 SE

work step	Grinding/polishing cloth	Grinding/polishing agent	Time
Grinding I	SiC paper 180 grain size	Water	until flat
Grinding II	SiC paper 320 grain size	Water	1 min
Grinding III	SiC paper 600 grain size	Water	1 min
Grinding IV	SiC paper 1200 grain size	Water	1 min
Polish I	2TS1	BioDiamant Liquid green	3–5 min
Polish II	4FV1, 4MP1	BioDiamant Final Liquid	1–5 min

Sample material: Ceramic
embedded in: cold embedding resin Technovit EPOX

work step	Grinding/polishing cloth	Grinding/polishing agent	Time
Grinding I	Diamond grinding disk 40 µm	Water	until flat
Grinding II	CAMEO DISK GOLD	BioDiamant Liquid green	3–5 min
Polish I	2TS1	BioDiamant Liquid yellow	10–20 min
Polish II	2TS8	BioDiamant Liquid MM 140	5 min
Polish III	4FV1	BioDiamant Liquid MM 140	2 min

Sample material: Glass body soldered in steel sleeve embedded in:
cold embedding resin 4071 or Technovit EPOX

work step	Grinding/polishing cloth	Grinding/polishing agent	Time
Grinding I	Diamond grinding disk 20 µm or CAMEO DISK PLATINIUM 2	Water	until flat
Grinding II	CAMEO DISK GOLD	BioDiamant Liquid green	3 min
Polish I	2TS1	BioDiamant Liquid yellow	3 min
Polish II	2TS4	BioDiamant Liquid MM 140	2 min
Polish III	4FV1	BioDiamant Final Liquid	1 min

Sample material: CFRP material
embedded in: Cold embedding resin 4000 or 4002 IQ

work step	Grinding/polishing cloth	Grinding/polishing agent	Time
Grinding I	Diamond grinding disk 20 µm or SiC paper up to 2500 grain size	Water	
Polish I	2TS1	BioDiamant Liquid MM 140	5–10 min
Polish II	2TS8	BioDiamant Liquid MM 140	5 min

Sample material: Printed circuit board with VIAS
embedded in: cold embedding resin Technovit 4006 SE

work step	Grinding/polishing cloth	Grinding/polishing agent	Time
Grinding I	SiC paper 1200 grain size	Water	
Polish I	2TS4	BioDiamant Liquid yellow	3 min
Polish II	4FV1	BioDiamant Liquid red	1 min

Sample material: Hard metal
embedded in: hot embedding resin Technotherm 2000 or cold embedding resin Technovit 4002 IQ

work step	Grinding/polishing cloth	Grinding/polishing agent	Time
Grinding I	CAMEO DISK PLATINIUM 1 or 2	Water	until flat
Grinding II	CAMEO DISK SILVER	BioDiamant Liquid blue	2–5 min
Polish I	2TS1	BioDiamant Liquid yellow	2–3 min
Polish II	4FV4	BioDiamant Liquid red	2–4 min

Sample material: Sandwich metal steel, bronze, aluminium, unetched
embedded in: Cold embedding resin Technovit 4002 IQ

work step	Grinding/polishing cloth	Grinding/polishing agent	Time
Grinding I	SiC paper 180 grain size		
Grinding II	SiC paper 1200 grain size		
Polish I	2TS1	BioDiamant Liquid yellow	3 min
Polish II	2TS5	BioDiamant Liquid MM 140	4 min
Polish III	4FV1	BioDiamant Liquid red	1 min

Sample material: Galvanized connecting wire
embedded in cold embedding resin Technovit 4006 SE

work step	Grinding/polishing cloth	Grinding/polishing agent	Time
Grinding I	SiC paper 320 grain size		
	SiC paper 600 grain size		
	SiC paper 1200 grain size		
Polish I	2TS1	BioDiamant Liquid yellow	3 min
Polish II	2TS8	BioDiamant Liquid MM 140	2 min
Polish II	4MP1	BioDiamant Final Liquid	1 min

Sample material: Hard metal
embedded in: Cold embedding resin 4002 IQ or Technovit 4071

work step	Grinding/polishing cloth	Grinding/polishing agent	Time
Grinding I	CAMEO DISK PLATINIUM 2	Water	until flat
Grinding II	CAMEO DISK GOLD	BioDiamant Liquid green	3–5 min
Polish I	2TS4	BioDiamant Liquid yellow	3–4 min
Polish II	2TS4	BioDiamant Liquid red	5 min

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