KLEIBERIT®

ADHESIVES • COATINGS

Filter Guide

Competence PUR

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Adhesives and Moulding Compounds for the Filter Industry

KLEIBERIT offers a wide range of adhesive and moulding products for the manufacture of filter cartridges, replacement filters and filter-inserts. These products are specially formulated for specific uses. In most cases they are based on Polyurethane (PUR), Epoxy (EP) and Plastisol (PVC).

KLEIBERIT adhesives and moulding compounds are available as two component systems based on polyurethane or cold-curing epoxy resin. The product range is complemented by a comprehensive portfolio of reactive and standard hotmelt adhesives.

KLEIBERIT adhesives made for the filter industry are solvent-free.

KLEIBERIT moulding compounds are mainly two-component PUR systems. A choice can be made from hard curing to permanently elastic and from compact to foam.

KLEIBERIT adhesives and moulding compounds fulfill the most stringent demands and requirements.

Motor vehicle air-filter seal development

Metal end caps are used only in the case of large air filters for heavy machinery. In most cases, the filter end cap is moulded and has been developed to form a foam sealing lip. This technique places high demands on the ff This technology places high requirements on form and equipment construction, but also on the foam system.

Foam systems with various densities are used to fulfill differing requirements.

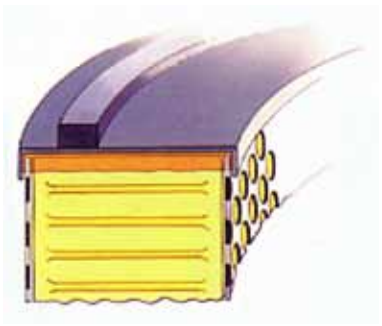

Fig.1: Metal end cap with separately bonded sealing lip.

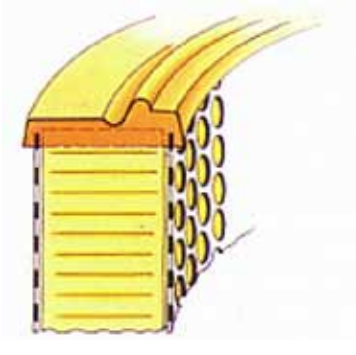

Fig. 2: Fully moulded end cap with moulded sealing lip

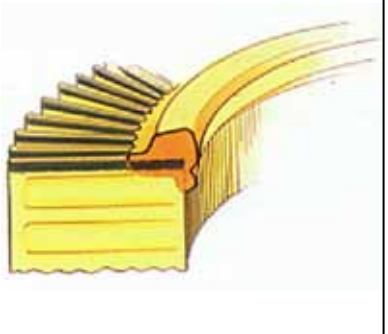

Fig. 3: Pocket filter with foamed sealing lip

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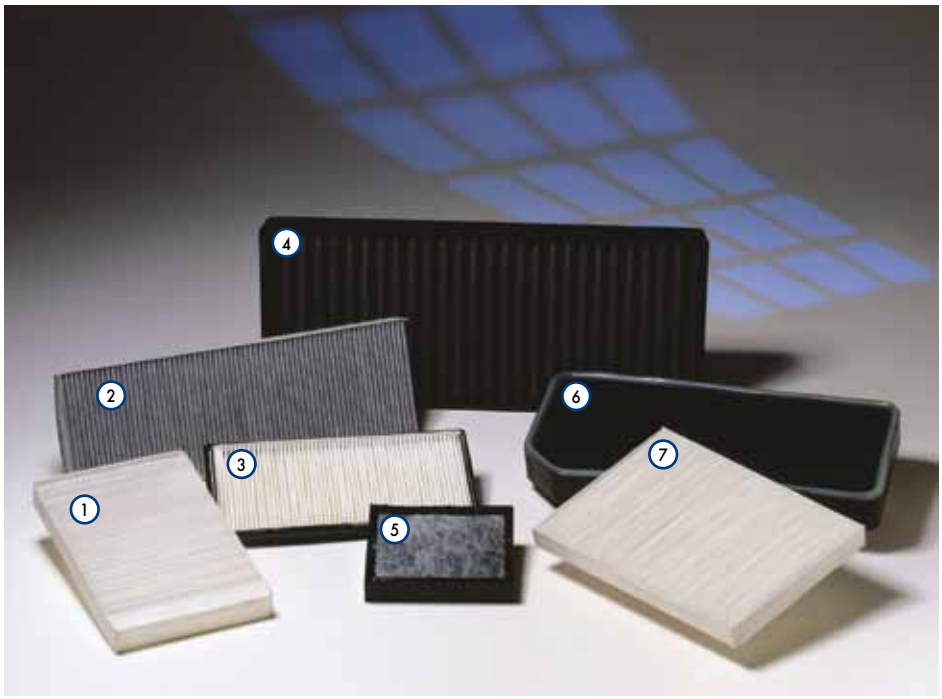
Adhesives and Moulding Compounds for Motor Vehicle Interior Filters



The Range of **KLEIBERIT** products includes adhesives and moulding compounds for forming end-caps and frames

Number	Areas of use	Products	Base	Properties
1	Motor vehicle interior filter	719 725.7*	EVA PO	Hotmelt *low fogging grade available
2, 7	Motor vehicle interior filter	703.5*, 703.8* 796	PUR HM Polyester	*low fogging grade available Hotmelt
3	Motor vehicle interior filter	521, 522	2C PUR	Foamed / elastic
4, 5, 6	Motor vehicle interior filter	547 525* 549.5*	2C PUR 2C PUR 2C PUR	Compact / elastic Compact / hard Compact / elastic, *low fogging grade available

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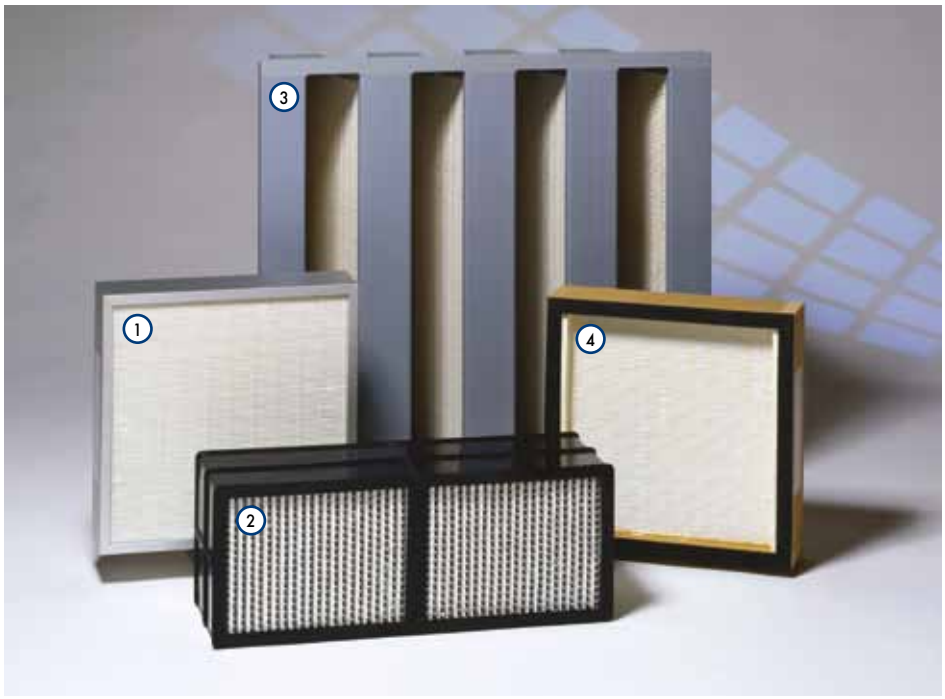
Adhesives and Moulding Compounds for Air Conditioning and Computer Filters



The Range of **KLEIBERIT** products includes adhesives and moulding compounds for moulding fleece or paper packs for operating temperature range up to 130°C.

Number	Areas of use	Products	Base	Properties
1, 4	Air condition filter, HEPA, ULPA	425.6 575.0 719 574.4	Dispersion 2C PUR EVA 2C PUR	Textile thread coating, bacteriostatic and fungistatic Hard/tough, bacteriostatic and fungistatic Hotmelt Transparent, uv-stable, bacteriostatic and fungistatic (repair moulding compound)
2	Computer filter	572, 575	2C PUR	Compact-hard
3	Air condition filter	425 572, 575 576 719	Dispersion 2C PUR 2C PUR EVA	 Compact-hard Foamed-hard Hotmelt

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Adhesives and Moulding Compounds for Motor Vehicle Air Filters

The Range of **KLEIBERIT** products includes adhesives and moulding compounds for bonding and moulding end caps and sealing lips, as well as for bonding paper pleats

Number	Areas of use	Products	Base	Properties
1, 2, 6	Airfilter with foamed sealing lips in closed forms, bonding and fixing pleats	521, 522 715, 725 791 796	2C PUR PO PA Polyester	Foamed / elastic Hotmelt Hotmelt Hotmelt
3, 4	Airfilter bonding and moulding end caps	571 703.8 576 750	2C PUR PUR HM 2C PUR PO	Compact / hard Hotmelt Foamed / hard Hotmelt
5, 7	Airfilter with foamed sealing lips in open forms	526 547	2C PUR 2C PUR	Foamed / elastic Compact / elastic

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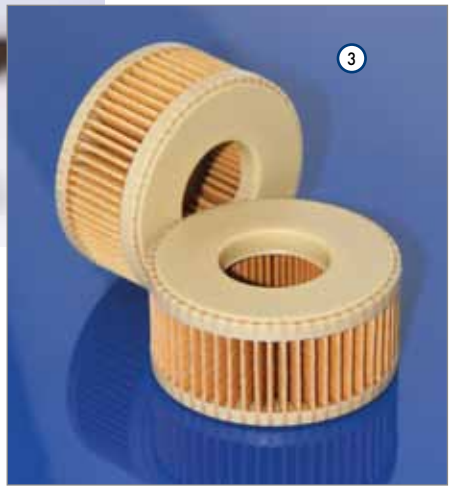
Adhesives and Moulding Compounds for Oil, Hydraulic and AdBlue-Filter

The Range of **KLEIBERIT** products includes adhesives and moulding compounds for bonding and moulding metal end caps and filter pleats made from paper or metallic materials:



Metal free end caps with mit KLEIBERIT 599

Number	Areas of use	Products	Base	Properties
1	Hydraulic filters – Steel end cap, metallic material	531 Plastic-Mastic 525	2C-EP 2C PUR	Compact / hard Compact / hard
2	Motor vehicle filter cartridges for motor oil and diesel fuel	571 576	2C PUR 2C PUR	Compact / hard Foamed / hardt
2	AdBlue-Filter	512	2C PUR	Compact / hard
3	Oil and diesel filter for self supporting metal free end cap	599	2C PUR	Compact / hard

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Adhesives and Moulding Compounds for Special Filters

The Range of **KLEIBERIT** products includes adhesives and moulding compounds for bonding and moulding end caps and sealing lips.

Number	Areas of use	Products	Base	Properties
1	Dry cleaning	525	2C PUR	Compact / hard
2	Air filters for small combustion engines	547	2C PUR	Compact / elastic
3, 4, 5	Ventilation filter for oil and hydraulic tanks	525 545, 547	2C PUR 2C PUR	Compact / hard Compact / elastic
6, 7	Filters for industrial vacuum cleaners	525*, 541*, 542.4** 547, 549* 708.8	2C PUR 2C PUR PUR HM	Compact / hard, *FDA compliant, **EU 10/2011 compliant Compact / elastic, *FDA compliant Good temperature resistance
8	Special filters	525*, 541*	2C PUR	Compact / hard, *FDA compliant

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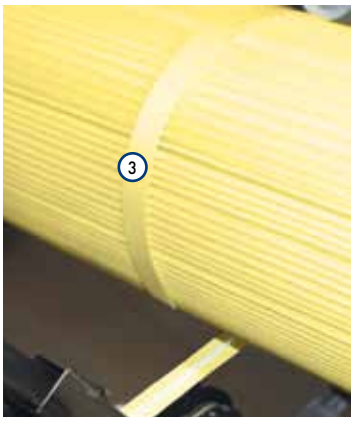
Moulding Compounds for Filters in the Food Industry



Special requirements apply for filter materials used in the food industry. KLEIBERIT offers specifically developed adhesives and moulding compounds which are tested and certified for use in dust filters according to the current FDA (FDA 21 CFR Ch. I § 177.1680 and FDA 21 CFR Ch. I § 175.105) and EU (EU 10/2011) guidelines.

Number	Areas of use	Products	Base	Properties
2	Bonding and moulding of hard filter end caps	541.0 541.1	2C PUR	Complies with FDA 21 CFR Ch. I § 177.1680
2	Bonding and moulding of hard filter end caps	542.4	2C PUR	Complies with EU 10/2011
1, 2	Moulding of elastic filter end caps	549.1 549.6	2C PUR	Complies with FDA 21 CFR Ch. I § 177.1680
1,2	Moulding of elastic filter end caps	549.8	2C PUR	Complies with EU 10/2011
3	Pleats and banderole	703.2	PUR HM	Complies with FDA 21 CFR Ch. I § 177.1680 & FDA 21 CFR Ch. I § 175.105
3	Pleats and banderole	708.8	PUR HM	Complies with EU 10/2011

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Filter Types (Filter Terms)

General Description

In-Line Filter	Completely disposable unit consisting of an insert and a housing which is installed directly in-line
Filter Insert **Filter Cartridge**	In order to function correctly, they must be enclosed in a suitable filter housing.
Pocket Filter	Mainly used for filtering air and liquids. Each individual filter is pocket shaped, i.e. three sides are closed and one side is open. In the case of large filters it saves end-cap material, and in the case of small filters it increases the filter surface.
Felt Filter	This type of filter is not made from paper, but from a wound felt material.
Wound Filter	The filter bellow is made from a special paper which is wound in the shape of a coil. End-caps are not provided. The wound filter coil is sealed in a housing.
Gap Filter	The size of the particles to be retained by the filter is pre-determined by the size of gap. These are precision filters!
Ultra Filter	Filter without binding agent manufactured from a new type of micro-fleece, (non-woven material).
Frame Filter	The filter material (fleece, paper, etc.) is glued or cast into a frame or insert.

Filter Applications

Various Specifications for Area of Use:

Fuel Filters **Petrol Filters** **Gasoline Filters** **Diesel Filters**	(motor vehicles)	In-line filter for motor vehicles. Their purpose is to filter the motor fuel.
Oil Filters **Motor Oil Filters** **Transmission Oil Filter**	(motor vehicles)	Filterinserts used in motor vehicle engines which are usually only effective when contained in a housing, and filter cartridges which are screwed on to the engine block. Their purpose is to filter the lubricants.
Air Filters	(motor vehicles)	Filter-inserts which must be contained in a housing to function correctly. Their purpose is to filter the air which is fed to the combustion engine.
Hydraulic Filters **Hydraulic Oil Filters**		Filter-inserts which must be contained in a housing located in hydraulic system (e.g., excavator, rolling mill), to function correctly. Their purpose is to filter the hydraulic fluids.
Filters for Chemical Cleaning-Appliances **Washing Machines**		Filter-inserts to filter the cleaning agent (usually perchlorethylene PER) used in chemical cleaning appliances.
Filters for Air-Conditioners		Filters used to filter the air in air-conditioners.
Industrial Filters		Filter-inserts used to filter gaseous, liquid and solid Materials.

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Filter Components

Components, Materials

Filter Type	Components	Materials
Fuel Filter	Filter-insert	Impregnated paper
	Filter housing	Polyamide or metal, e.g. thin sheet metal or aluminium
Oil Filter-Insert	Sealing ring	Elastomer
	Filter end cap	Thin galvanised sheet metal, aluminium
	Inner supporting frame	Perforated, thin galvanised sheet metal
	Filter bellow (Filter pleat)	Impregnated paper, felt, and in some cases plastic fleece
	Filter casing	Perforated special paper, and in some cases perforated sheet metal
Air Filter Insert	Filter end-cap	Permanently elastic PVC or PUR based moulding compounds, foamed or non-foamed. In some cases, thin sheet metal
	Inner supporting frame	Perforated paper or perforated sheet aluminium, in certain cases extendable stretched aluminium web.
	Filter bellow (Filter star)	Impregnated paper
	Filter casing	Perforated paper or perforated sheet aluminium

Filter Type	Components	Materials
Hydraulic Filter Insert	Sealing ring	Elastomer
	Filter end cap	Deep drawn sheet-metal V2A sheet metal (non-ferrous)
	Inner support frame	According to the end caps, perforated
	Filter bellow (Filter pleat)	Impregnated paper or metal material with varying mesh densities, felt
	Filter casing	Seldom available if found, then made from perforated sheet metal
Chemical Cleaning Plant Filter Inserts	Sealing ring	Elastomer
	Filter End Cap	Thin galvanised sheet metal or moulded from PUR
	Filter bellow (Filter pleat)	Impregnated paper
	Inner support frame	Special part made from perforated thin sheet metal not available
	Filter casing	Form stability achieved by fixing the folds
Air Conditioning Filter	Frames	Metals, large range of plastics or wood filter inserts
	Filter cells / mats	Special paper, glass-fibre matting, plastic fleece

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Filter Manufacture

Parts to be Joined
Joining Methods

Filter Type	Parts to be Joined	Joining Methods
Fuel Filter	Filter-insert with filter housing	High quality adhesives, usually epoxy's, which seal the filter according to the given conditions
Oil Filter-Insert	End-cap with filter pleat	Two-component PUR based reaction adhesive
	Filter pleat seam	Metal clip or bonding with a dispersion or hotmelt adhesive
	Filter casing	Made from paper, bonded with dispersion adhesive or hot melt adhesive
Air Filter Inserts for Motor Vehicles	Sealing ring with filter end-cap	Contact, cyanacrylate or PUR adhesives, in those cases where a metal end-cap is used
	Filter end-cap with filter pleat	Two component PUR based reaction adhesive
	End-cap cast with filter pleat	Without the use of a metal end cap! The 'self-supporting non-metallic' end cap is an integral cast. The casting process is carried out with PUR (two-component, cold setting) based moulding compounds. Due to their permanently elastic properties these end-caps are self-sealing and therefore do not require sealing rings

Filter Type	Parts to be Joined	Joining Methods
Air Filter	Pocket filter	Intergrated in the manufacture of the filter folds, the for the pocket filters fold is bonded into a pocket form using a bead of hot melt adhesive which is applied to both sides of the filter bellows. Sealing lips made out of PUR foam.
Hydraulic Filter Inserts	End-cap with filter pleat	High-quality PUR or epoxy based adhesive.
	Filter bellow seam	It is also possible to use PUR or thixotropic epoxy adhesive.
Inserts for Chemical Cleaning Filter	End-cap with filter pleat	PUR or epoxy as adhesive for metal end caps. For non-metallic end-caps a PUR moulding compound is used.
	Filter pleat seam	Metal clip
Air Filter for Air Conditioning Systems	Due to the diversity of construction, it is not possible to provide a schematic outline. Filter cartridges and filter cells are used. Frames made from wood, plastic and metal are bonded and sealed with filter paper and filter fleece using two-component PUR moulding compounds.	

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Filter Adhesives and Moulding Compounds

Methods of Processing

Two-Component Epoxy System	For small batches, the adhesive is mixed and dosed manually, i.e., by hand. For serial production, an automatic mixing and dosing plant is used. The setting process can be accelerated by the application of heat.
Two-Component Polyurethane System	Excellent suitability for large serial production as the setting process can be accelerated. To bridge the short setting time, an automatic mixing and dosing device should be used together with a rotating table or conveyor belt. Thereby both end-caps can be bonded in rapid succession. PUR Systems from hard to soft (shore hardness) and foamed or compact are available.
Dispersion Adhesive	Double-sided adhesive application. Dosing by means of a pressurised container and a pistol applicator. Evaporation and pressing allow contact bonding.
Hotmelt Adhesive	Single-sided adhesive application. Dosing using a hotmelt application plant fitted with a spray head. Short cooling and pressing process times enable rapid bonding.
Hotmelt Adhesive for Special Purposes	For improved handling of filter pleats, a thread of Special Purposes hotmelt adhesive can be applied to the top edges of the pleated paper immediately following pleating. This provides the filter bellows with a greater degree of stability during any further processing, and the filter folds have a uniform shape.
Hotmelt Adhesive for Pocket Filters	Integrated in the manufacture of the filter folds, the for Pocket Filters fold is bonded into a pocket form using a bead of hotmelt adhesive which is applied to both sides of the filter bellows. When a hotmelt adhesive is used which is resistant to high temperatures, hardening of the filter paper is possible.

KLEIBERIT *Products*

Brief Description

Cold Setting Two-Component Moulding Compounds and Foams.

Our two component systems are **based on PUR.**

These systems are used for the manufacture of air-filter inserts.
End-caps and sealing rings are cast in moulds or foamed.
Metal end-plates are not required. Air filters manufactured in this manner using elastic systems are self-sealing. Two component systems are, as opposed to plastisols cold-hardening and therefore do not require exposure to heat in order to gel. That saves energy ! When in their hardened state they are ecologically friendly because they can be disposed of without any special measures being necessary.

Working Process

In order to process such two-component systems, mixing and dosing equipment is required. Please contact us for names and addresses of the manufacturers of such equipment.

The mixed system is either dosed into moulds (matrix) which either rotate underneath the dosing head of the application equipment, or are fed by a co-ordinate table system, or are fed by the applicator according to the shape of the mould. The filter paper pleat is placed into the moulding compound while it is still in a fluid state, following which the compound sets. After a few minutes the moulded assembly can be removed. Now the second end-cap (which is also a sealing ring) can be moulded.
For serial production a rotating table or a conveyor belt is recommended. Dependant upon the setting time of the moulding compound, the required time for each cycle for these devices and the number of casting moulds to be used can be determined. The setting reaction can also be suited to a pre-determined cycle period.

It is recommended that a release agent be used. Please contact us should you require any information required regarding such suitable products.

The product types 521, 522, 525, 526, 541, 542, 545, 547 and 549 represent the basic systems.

The following distinctive features should be noted:

521: PUR-Foam, soft-elastic, for closed forms
522: PUR-Foam, soft-elastic, according to VW TL 848, for closed forms
525: PUR-Moulding Compound, without foam reaction, hard. Can also be used as an adhesive
526: PUR-Moulding Compound, with foam reaction, soft-elastic, for open forms
541/542: PUR-Moulding Compound, without foam reaction, hard. Can also be used as an adhesive. 541.1 and 541.9 FDA compliant and 542.4 (EU) 10/2011 compliant
545: PUR-Moulding Compound, compact elastic, for open forms
547: PUR-Moulding Compound, compact elastic, for open forms
549: PUR-Moulding Compound, compact elastic, for open forms
549.1 and 549.6 FDA compliant and 549.8 (EU) 10/2011 compliant

Please pay attention to the following technical data sheets. It is possible to adjust the reaction of individual products according to other individual requirements.

KLEIBERIT *Products*

Brief Description

Cold Setting Two-Component Reaction Adhesive KLEIBERIT 531.1 and 531.8 Plastic-Mastic

KLEIBERIT 531.1 Plastic-Mastic

This adhesive is **epoxy based**. It is used to bond filter metal end-caps with filter pleats made from paper or wire mesh. Owing to their resistance to fluids (extraction) as well as their temperature resistance, epoxy adhesives can be used for the manufacture of filter inserts for petrol/gasoline and hydraulic fluids.

To bond the filter bellows a thixotropic component A can be used (see 531.4).

The adhesive sets at room temperature (approx. 20 °C). The process can be accelerated by warming the bond, which will also serve to increase the chemical resistance of the system.

After having been mixed, the adhesive can be manually processed.

However, it is safer and economically more advantageous to process the adhesive using a mixing and dosing plant designed for two-component adhesives. Please contact us should you require details of the manufacturers of such machinery.

Such application equipment can be complemented by the use of a rotating table upon which the filter end-cap is placed to be filled. The centrifugal force resulting from the rotation of the table serves to evenly spread the adhesive over the complete surface of the filter end cap.

In thixotropic form, KLEIBERIT 531 Plastic-Mastic is suitable for the sealing of filter bellows on filter stars made from metal mesh.

KLEIBERIT 531.8 Plastic-Mastic

Filler-free low viscosity **epoxy system** adhesive
This product is used for coil filters to seal the end-cap against the filter housing.

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KLEIBERIT *Products*

Brief Description

Cold Setting Two-Component PUR Adhesives 525, 541, 571, 572, 575, 599 and Adhesive Foam 576.1

These adhesives are **based upon PUR**. They are used in various fields to bond metal filter end-caps with filter pleats made from paper and for the manufacture of metal free end caps.

Distinctive Features:

512:	AdBlue-Filter
525:	Filters for chemical cleaning machines
541:	Special filters and dust removal
572, 575:	Filters for air-conditioner, particularly good flow properties
571:	Filters for the motor vehicle industry
576.1:	see 571, this is more commercially favourable due to its foaming reaction
599:	oil and diesel filter with self supporting metal free end cap

These adhesives are processed using a two-component mixing and dosing plant. Please contact us should you require details of the manufacturers of such equipment. Due to the mechanical method of processing, the bonding is accelerated which in turn requires only a very short setting (or curing) period. This factor is important for short cycle times in the case of serial production.

The dosing of the adhesive is performed directly in the end cap (rotation principle). A rotating table or a conveyor belt bridges the setting time, which is only a few minutes.

The paper filter pleat is placed into the fluid adhesive. In most cases it is not necessary to provide additional heat for the setting process.

In the field of air conditioner there is a wide range of materials which are to be bonded or moulded, e.g. frames made from plastic, metal, or wood with various filter fleece materials.

Please provide us with details of your specific requirements.

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KLEIBERIT *Products*

Brief Description

Hotmelt Adhesive 703.5, 703.8, 708.8, 715.5, 719, 725, 750, 756, 791 and 796

Hotmelt adhesives are mainly used as a support in the assembly stage and to bond filter paper.

A further use is bonding of filter folds to form so-called "pocket filters" which are used mainly used for air filters.

KLEIBERIT 703.5 Hotmelt Adhesive	Base: Polyurethan
KLEIBERIT 703.8 Hotmelt Adhesive	Base: Polyurethan
KLEIBERIT 708.8 Hotmelt Adhesive	Base: Polyurethan
KLEIBERIT 715.5 Hotmelt Adhesive	Base: Polyethylene
KLEIBERIT 719 Hotmelt Adhesive	Base: EVA
KLEIBERIT 725 Hotmelt Adhesive	Base: Polyolefin
KLEIBERIT 750 Hotmelt Adhesive	Base: Polyolefin
KLEIBERIT 756 Hotmelt Adhesive	Base: Reactive Polyolefin
KLEIBERIT 791 Hotmelt Adhesive	Base: Polyeamid
KLEIBERIT 796 Hotmelt Adhesive	Base: Polyester

For the purposes of application, commercially available application appliances can be used. Please contact us should you require details of the manufacturers of such appliances.

Polyurethane hotmelt adhesives reach their final strength by chemical cross linking with exposure to humidity. The filter paper can be hardened / cured using **KLEIBERIT 791** Hotmelt Adhesive.

All statements and information provided in this brochure are based upon our experience gained to date. Please perform your own tests to establish the suitability for your own particular purposes.

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