

# The perfect choice of adhesives

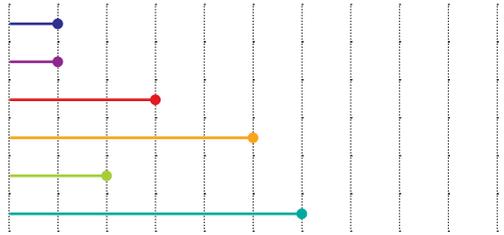


# Adhesives and their properties



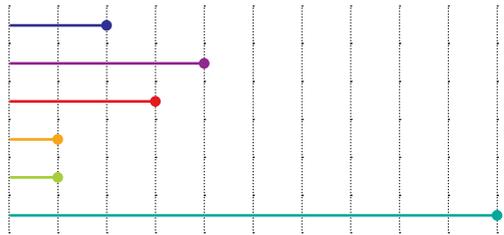
## Acrylate adhesives

- Water resistance
- Weathering resistance
- Temperature resistance
- UV resistance
- Stress-equalising/elasticity
- Bonding strength



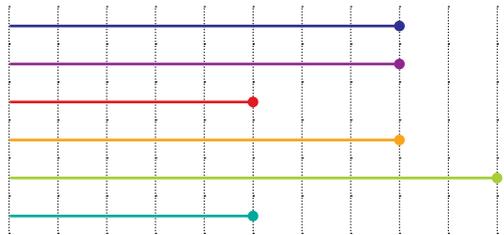
## PU adhesives

- Water resistance
- Weathering resistance
- Temperature resistance
- UV resistance
- Stress-equalising/elasticity
- Bonding strength



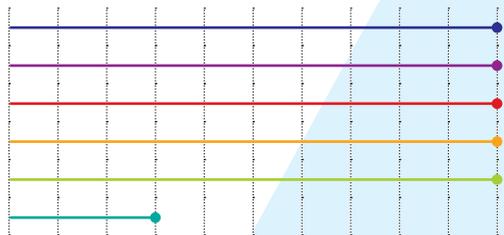
## Hybrid adhesives

- Water resistance
- Weathering resistance
- Temperature resistance
- UV resistance
- Stress-equalising/elasticity
- Bonding strength



## Silicone adhesives

- Water resistance
- Weathering resistance
- Temperature resistance
- UV resistance
- Stress-equalising/elasticity
- Bonding strength



# Which adhesive is the right choice and when?

## Systems by professionals for professionals

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### The perfect choice of adhesives

Adhesives take on many different tasks nowadays in industry and in construction. However, compared with the well-known all-purpose adhesives, products designed for professional use must be true specialists that are always fit for the intended purpose. When searching for a suitable adhesive for an application, it is not just necessary to understand the varied performance ranges of the adhesives, but also to know how they behave both chemically and physically in certain environments and situations.

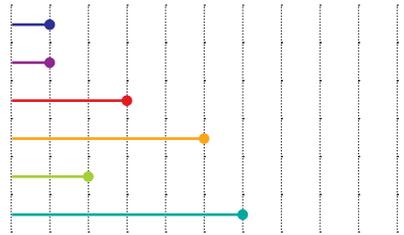
# Acrylate adhesives



## Acrylate adhesives demonstrate their qualities on absorbent materials

- ✓ Powerful bonding
- ✓ Paintable

- Water resistance
- Weathering resistance
- Temperature resistance
- UV resistance
- Stress-equalising/elasticity
- Bonding strength



## A permanent fixture for indoors

Acrylate adhesives are material compounds made up of water and very fine bonding particles. They harden very quickly as a result once the fluid is able to evaporate. On the other hand, their water content makes them sensitive to frost which is why it should be ensured that they are kept at temperatures above zero during storage and transport. Their UV and weathering resistance is similarly low. Acrylate adhesives are therefore a good solution for varied forms of mounting work indoors such as the bonding of skirting boards, decorative profiles or cable ducts.

# Good dry bonding

## On plaster

OTTOCOLL® A-series acrylate adhesives are ideal for numerous kinds of interior mounting work, such as the bonding of stucco and acoustic elements.



## On concrete

Acrylate adhesives reliably bond polystyrene insulation boards. They can even bond to a ceiling without any additional fixation.



## Under a roof

Acrylate adhesives are also the right choice for the bonding of airtight vapour retarders and vapour barriers.



### It comes down to absorbent materials

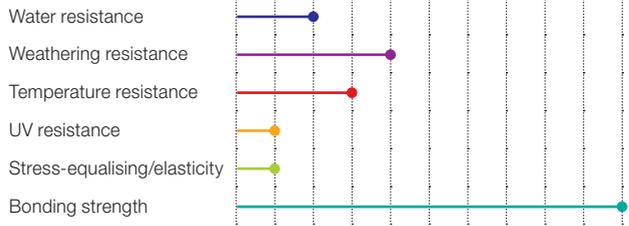
Acrylate adhesives require at least one absorbent surface in order to be able to harden and dry. Wood, concrete or plaster are able to absorb the moisture from the adhesive. However, a consistent room temperature must be ensured.

# PU adhesives



## PU adhesives display their greatest strengths on uneven or rough surfaces

- ✔ Single-component PU adhesives fill small cavities
- ✔ Very high adhesive power
- ✔ Able to be sanded and coated



### A permanent fixture for indoors

PU adhesives are the first-choice group of adhesives for experts where a permanent bond is needed. Single-component PU adhesives foam slightly when applied, fill small cavities and thus provide perfect adhesive conditions. After hardening they can be easily sanded and coated. Due to their low UV and temperature resistance and limited weathering resistance, they should only be used for interior applications which are protected against water.

# Perfect when things get tough

## Dowels and walls

Thanks to their foaming nature, single-component OTTOCOLL® P-series adhesives reliably close off the cavities between dowels and walls. The result is a permanent, secure bond.



## Furniture construction

Wood parts can be permanently bonded with PU adhesives. The OTTOCOLL® P-series therefore has numerous candidates for bonding furniture for example using a dovetail.



## Worktops

OTTOCOLL® P-series PU adhesives are the right solution in the kitchen for the permanent bonding of worktops.



## You determine the speed

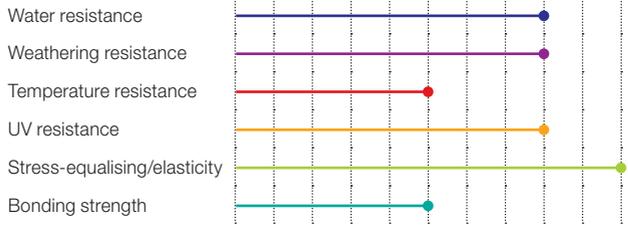
PU adhesives are available as single-component and two-component products. The difference is in the hardening speed. While single-component adhesives react with the ambient moisture, two-component adhesives harden even quicker thanks to their additional second component (hardener). You thus have the choice of the processing time in your own hands if you work with a commercially available hand-operated gun (single-component) or a special discharge unit (two-component).

# Hybrid adhesives



The latest generation of adhesives combines the positive properties of PU and silicone adhesives

- ✔ Elastic and highly adhesive
- ✔ Weather and temperature resistant
- ✔ Bonds to many materials without pre-treatment
- ✔ Non-toxic



## The happy medium between two worlds

Hybrid adhesives are a relatively new development which closes the gap between PU and silicone adhesives. One of the exact designations of the polymer base is “silane-terminated polymer” or, in short form, STP. As with the polyurethane adhesives, the hardening of the hybrid products takes places through a reaction with moisture. However, hybrid adhesives are free of isocyanates and are, as a result generally not subject to labelling.

# Skilfully designed to absorb stress

## Bonding in finishings

Stair treads can be made of a variety of different materials, such as wood, natural stone or metal. For the different installation requirements, hybrid adhesives from the OTTOCOLL® M-series offer the right solution with their own unique properties.



## Assembly made easy

Adhesives of the OTTOCOLL® M-series are the perfect solution for assembling baseboards and decorative strips. Thanks to their elastic properties, the hybrid adhesives can optimally compensate for tension and movement.



## Bonding in drywall construction

The floor rails of a stud frame can also be bonded in the case of special requirements, for example so as not to damage existing underfloor heating. Hybrid adhesives of the OTTOCOLL® M-series help here with sound-insulating installation.



## Relaxed both inside and outside

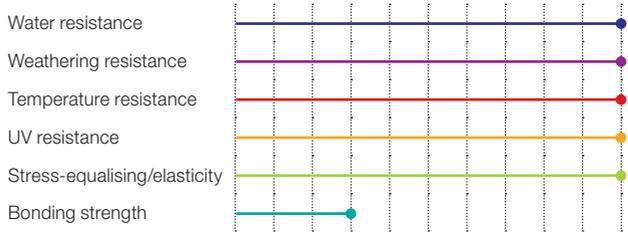
Hybrid adhesives are a thoroughly relaxing solution, especially for materials that expand with heat. They bond to many materials even without primer. Notches in the adhesive strips prevent additionally tearing. And they are suitable for both interior and exterior applications due to their good bonding, even when exposed to humidity and UV radiation.

# Silicone adhesives



**This top-quality solution performs convincingly in interior and exterior areas due to its diverse range of strengths**

- ✓ Extremely elastic
- ✓ 100% waterproof
- ✓ Absolutely weatherproof
- ✓ Enormously resistant against temperatures and UV radiation



## The highly flexible all-rounder

Silicone adhesives stand out due to their high elasticity and robustness when exposed to water, moisture, UV radiation, high temperatures and variations in temperature, chemical influences and ageing. They are therefore perfect for applications on outdoor glass facades, in bathroom areas and even under water.

# Extremely flexible against applied forces

## Bonding of mirrors

Whether fibre cement, gypsum fibre board or cellular concrete: the silicone mirror adhesive provides the perfect solution for the bonding of mirrors and their substrates.



## Wall panels

Panels made of plastic, wood and wooden materials and various metals can be quickly and invisibly mounted using a special adhesive from the OTTOCOLL® S series.



## Coated glass

Enamelled and additionally coated glass plates can be mounted without screws using OTTO silicone adhesives.



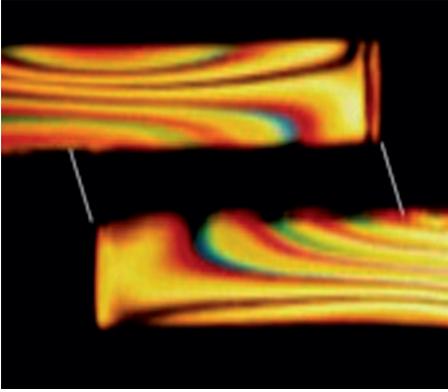
## Robust through elasticity

Silicone adhesives combine permanent resistance with high elasticity. They are therefore perfect for applications which will be subsequently subjected to tension or even submerged under water. If thrust, shear and compressive forces are applied to the bonded areas, due to their compensating properties silicone adhesives return to their original position after being subjected to such temporary loads.

# A gripping choice: elastic or rigid bonding

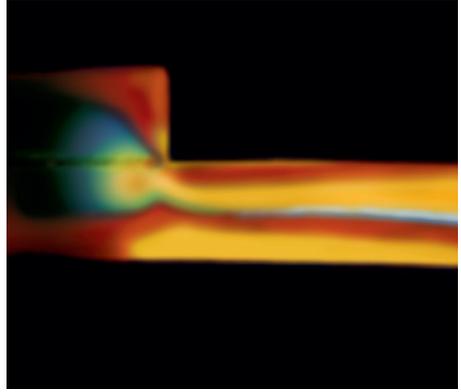
## Photoelasticity is brought to light

In so-called photoelastic processes, applied forces and lines of force can be made visible through the use of light.



Elastic bonding:  
the complete bonding surface is used

With elastic bonding, even lines of force can be detected across the entire overlapping area. This lets you verify that the bonding surface is fully utilised. In practical terms, the extension of the bonded surface also leads to a higher transmission of force.



Rigid bonding:  
the bonding surface is not fully utilised

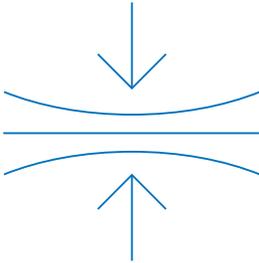
It can be clearly seen in a rigid adhesive – with its thin adhesive layers with a depth of only tenths of millimetres – that tension peaks occur at the ends. The complete bonding surface is therefore not evenly utilised in this case.



## Which adhesive is stronger?

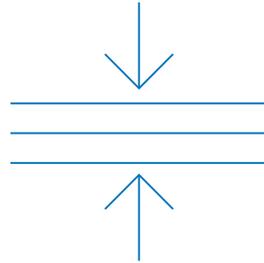
In the search for the strongest form of adhesive bonding, the adhesives which are placed on the short list are usually those that are nominally able to transmit the highest forces. However, high-strength adhesives have a decisive disadvantage: their thin, hard and brittle adhesive layers permit less expansion. It is worthwhile making a comparison to see which adhesive is really the stronger – rigid or elastic?

## Elastic adhesives are stronger here



- ✓ Interior and exterior applications
- ✓ Temperature variations
- ✓ Various materials
- ✓ Uneven bonding surface

## Rigid adhesives are stronger here



- ✓ Interior applications
- ✓ Stable temperatures
- ✓ Wooden materials
- ✓ Same materials



### Conclusion

Although rigid adhesives nominally possess a great deal of force (up to 40 MPa = 40 N/mm<sup>2</sup>), a thick layer of elastic adhesive with significantly less tensile strength (approx. 5 MPa) can better withstand loads. Simply because elastic adhesives distribute forces evenly instead of selectively. It should be ensured during application that the adhesive layer is sufficiently thick.

# The differences between single-component and two-component adhesives

## What is a single-component adhesive?

This adhesive consists of a single component that, after being sprayed from the cartridge, physically dries or chemically reacts with the ambient moisture. They harden from the outside inwards and therefore the load-bearing capacity of the bonding is dependent on the amount of the adhesive applied. Some single-component adhesives, such as hybrid and PU, can be directly sprayed after application in order to accelerate hardening.

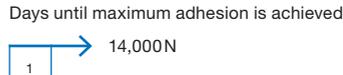
OTTOCOLL®  
P 86  
(single-  
component)



## What is a two-component adhesive?

This adhesive combination consists of two differing components that are combined in a specified mixing ratio when pressed out using static mixing nozzles, react with each other and harden completely within a defined period, irrespective of the amount of adhesive applied.

OTTOCOLL®  
P 520  
(two-  
component)



## The speed is the difference

While single-component adhesives are only able to harden under certain conditions, two-component adhesives are mixed with a reactant that leads to quicker and complete hardening. Two-component adhesives thus have a clear advantage in actual use.

### Two paths, one goal: quick working

Single-component adhesives with high initial bonding are a possible alternative to rapidly hardening two-component adhesives. They are typically highly viscous and can be perfectly processed using well-combined guns. Subsequent fixation of the materials to be bonded is also not necessary. However, the following should be noted: the bonding must be protected on all accounts against mechanical impacts until hardening is complete. Here is an overview of how you can most quickly obtain your desired result:

### Adhesives with high initial adhesion



- ✔ Single-component adhesives such as OTTOCOLL® A 265 TopFix, OTTOCOLL® M 550 HiTack or OTTOCOLL® M 560
- ✔ No fixation necessary
- ✔ Resilient after complete hardening

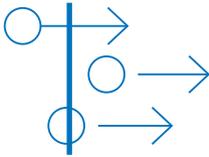
### Adhesives with rapid hardening



- ✔ All two-component adhesives
- ✔ Single-component adhesives that harden quickly in thin layers
- ✔ Fixation until the adhesive has completely hardened

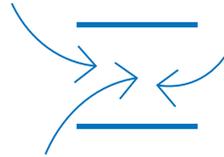
# How to make the right choice

## For vapour permeable materials



Single-component acrylate adhesives need at least one vapour-permeable substrate for “drying”.

## Where the air supply is assured



Single-component adhesives from the hybrid, silicone and PU groups may be also used for materials which are impermeable to vapour, however an air supply must be assured. This ensures that moisture can reach the adhesive and the fission product can escape.

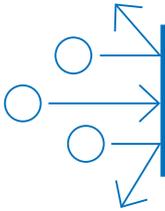
Two-component adhesives from the hybrid and silicone groups are similarly “condensation-curing”. In these cases, the relevant B-component is a moisturiser. Therefore, it should be noted that, during application, fission products are generated which must escape.



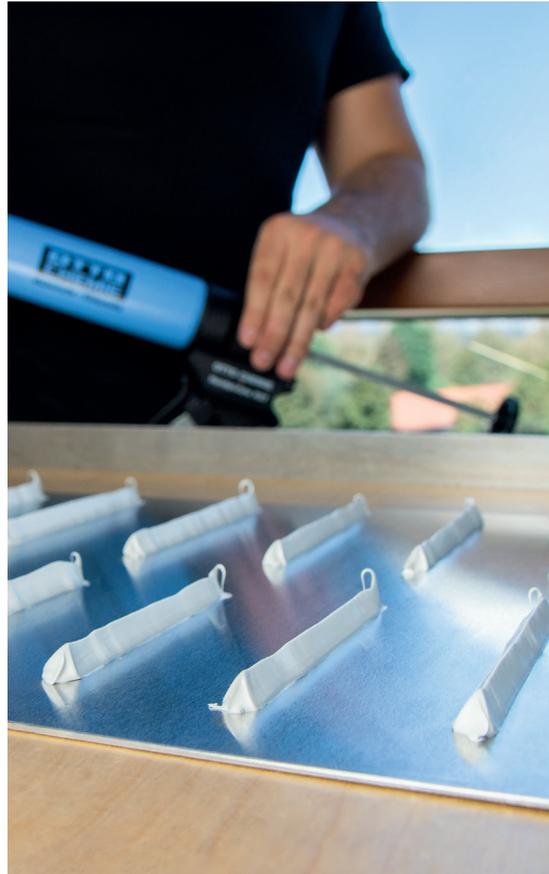
### The correct tool

Various types of discharge unit are used for the application of single-component and two-component adhesives. Here you see two examples from the varied range on offer to you at specialist stores.

## For materials which are impermeable to vapour



If bonding takes place in an air-tight system using materials which are impermeable to vapour, two-component PU adhesives are the perfect solution. They are “addition curing”, i.e. the A component reacts with the B component without the need for moisture or without a fission product being generated.



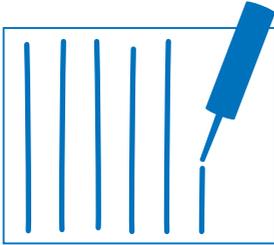
Hand-operated gun for the use of single cartridges (single-component)



Compressed air gun for the use of twin cartridges (two-component)

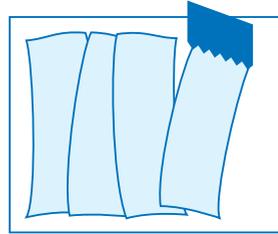
# Strip and surface bonding in comparison

## Strip-shaped bonding



In strip-shaped bonding the adhesive may be applied in a short period onto a very large surface. Another benefit of this type of processing is low product consumption per square metre as a result of the strip-shaped application in the form of beads of adhesive. In addition, the fission products can escape more easily in strip-shaped bonding, ensuring the hardening of the adhesive and thus the functionality of the bonding.

## Full-surface bonding



Cavities can be perfectly compensated for during full-surface bonding, ensuring impressive results with a very high-quality feel to the bonding. Higher loads can also be withstood using full-surface bonding, as significantly more points of adhesion are generated between the materials being bonded. The overall adhesive forces are thus higher and a stronger form of adhesive bonding is created. It should be ensured that the spatula lines are always even and are drawn in one direction for perfect hardening. The fission products generated during hardening can thus better escape.



### The processing method is decisive

Whether the adhesive is applied in a strip shape or as surface bonding frequently depends on the preferred processing method: While some people prefer to use a cartridge gun, others would rather have a toothed spatula in their hands. Below we explain which method makes sense in particular situations.

## Benefits of strip bonding

- ✔ Bond a big surface in a short period
- ✔ Lower product consumption per m<sup>2</sup>
- ✔ Fission products can perfectly escape



## Perfect for strip bonding

- ✔ Wall panels
- ✔ Mirrors
- ✔ Skirting boards

## Benefits of surface bonding

- ✔ Compensates for cavities
- ✔ High-quality feel to the bonding
- ✔ Higher bonding load



## Perfect for surface bonding

- ✔ Wall panels
- ✔ Floor coverings
- ✔ Sandwich elements

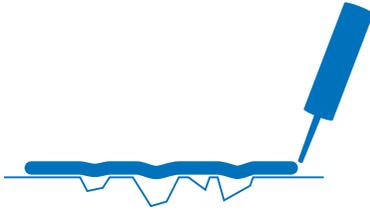


### Always a good solution

The comparison shows that you can essentially decide between savings in time/product and a benefits in terms of extra power. The OTTOCOLL® adhesives always offer a good solution – from inexpensive acrylate adhesive to high-strength PU adhesive, from hybrid adhesive applied by spatula to highly elastic silicone adhesive.

# Correct pre-treatment of bonding surfaces

## A question of viscosity



Acrylate, hybrid and silicone adhesives can often not penetrate into the created unevenness due to their high viscosity. The intended contact surface cannot be fully reached even using the rapid-hardening two-component adhesives. Roughening the surface is therefore generally not helpful.

## Exceptions prove the rule



The exception in the case of roughening are single-component PU adhesives. They foam slightly when applied, expand into the depths of roughened surfaces and anchor themselves in the material during hardening. In this case, you can use fine sandpaper very gently to ensure that no cavity of more than 1 mm is generated between the materials, and thin layer bonding is still possible.



**Acrylate adhesive**  
**Hybrid adhesive**  
**Silicone adhesive**  
**Two-component adhesive**



**Cleaning the bonding surface**

Clean smooth surfaces using OTTO Cleaner T and a clean cloth which is free of dust.

Free porous surfaces of loose particles and unevenness.

**Further pre-treatment**

Mineral substrates may give rise to restrictions in bonding due to their alkaline nature. Pre-treatment is therefore necessary for some adhesives. Appropriate information can be found in the relevant "technical data sheet".

**Single-component PU adhesive**



**Roughening the bonding surface**

Lightly roughen the bonding surface of materials such as wood, metal or plastic using sandpaper (grade 180 or finer) in order to increase the size of the contact surface for the foaming single-component PU adhesive.

**Removing abrasion**

Remove loose particles from the roughened area.

**Moistening the adhesive**

Moistening of the adhesive is recommended, especially for materials which are impermeable to vapour, in order to achieve quicker hardening.

# As versatile as the issues involved: Advice from OTTO



Did you know? The experts from the Product Development and Application Consulting departments at OTTO have been combined to provide quick and sound solutions to your questions. This expertise from OTTO is available to you in many forms, in addition to personal telephone discussions.



## Adhesive compass

You only need to take three steps to easily find the best adhesive for your application: Simply select Substrate 1, Substrate 2 and the type of bonding – and our adhesive compass presents you with the matching product. Try it out:

[www.otto-chemie.com/en/adhesive-compass](http://www.otto-chemie.com/en/adhesive-compass)





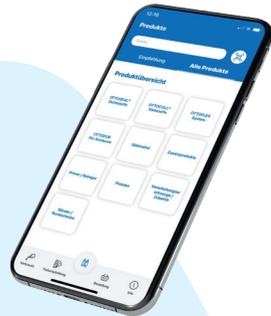
### The OTTO adhesives knowledge platform

Do you wish to further expand your knowledge about adhesives? Then take a look at our OTTO adhesives knowledge platform and follow interesting blog articles, tips & tricks from our Adhesive Andi and useful additional knowledge about the subject of bonding:

[www.otto-chemie.com/en/ottocoll-adhesives](http://www.otto-chemie.com/en/ottocoll-adhesives)

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