PROFESSIONAL BONDING

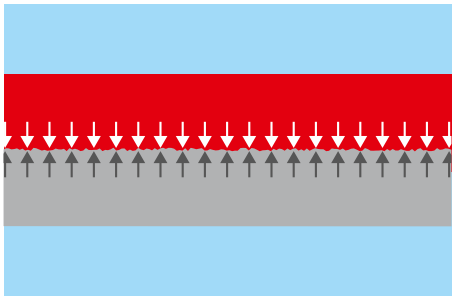
Theory and practical knowledge:
Adhesive tape selection and processing instructions for the professional use of adhesive tapes

Contents

Basics of bonding

An adhesive bond always depends on the interplay between adhesion and cohesion.

Adhesion



Adhesion refers to the sum of all forces which occur at the interfaces between two substrates, e.g. a surface to be bonded and a pressure-sensitive adhesive. The measurable bond strength of adhesion results from the combination of these physical interactions and the energy dissipation from the pressure-sensitive adhesive's viscoelastic properties.

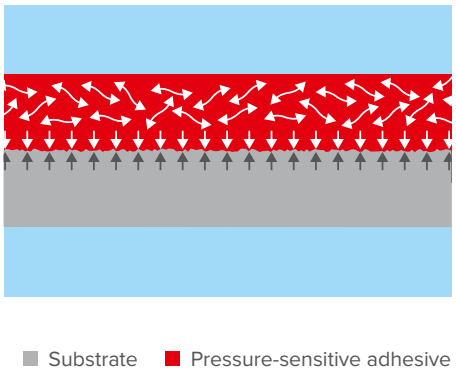
A particular form of adhesion is the tack, which determines whether an adhesive mass can quickly wet a surface with which it comes into contact with virtually no pressure. But the tack does not ultimately correlate with the actual bond strength of a pressure-sensitive adhesive. Pressure-sensitive adhesives with a low tack are capable of withstanding high stresses when high final adhesive strength and/or high shear strength are formed.

Therefore, the thumb test (or even finger tack) is not suitable for drawing conclusions about the bond strength of a pressure-sensitive adhesive.

Cohesion

For the adhesive bond to stay intact, sufficient cohesion (internal strength) of the pressure-sensitive adhesive is required. The cohesion of a pressure-sensitive adhesive describes the elastic behaviour of the adhesive, which in turn has an impact on the shear strength or restoring forces of a bond.

Adhesive strength



Adhesive strength is described by the interplay of adhesion and cohesion, i.e. only through a certain combination of adhesion and internal strength is an adhesive bond able to withstand the stresses that act on it.

Surface tension and energy

In order to achieve sufficient contact points for the formation of high adhesion forces, the pressure-sensitive adhesive must be able to sufficiently wet the substrate to be bonded. Wetting largely depends on the surface tension or energy of the substrate and the pressure-sensitive adhesive.

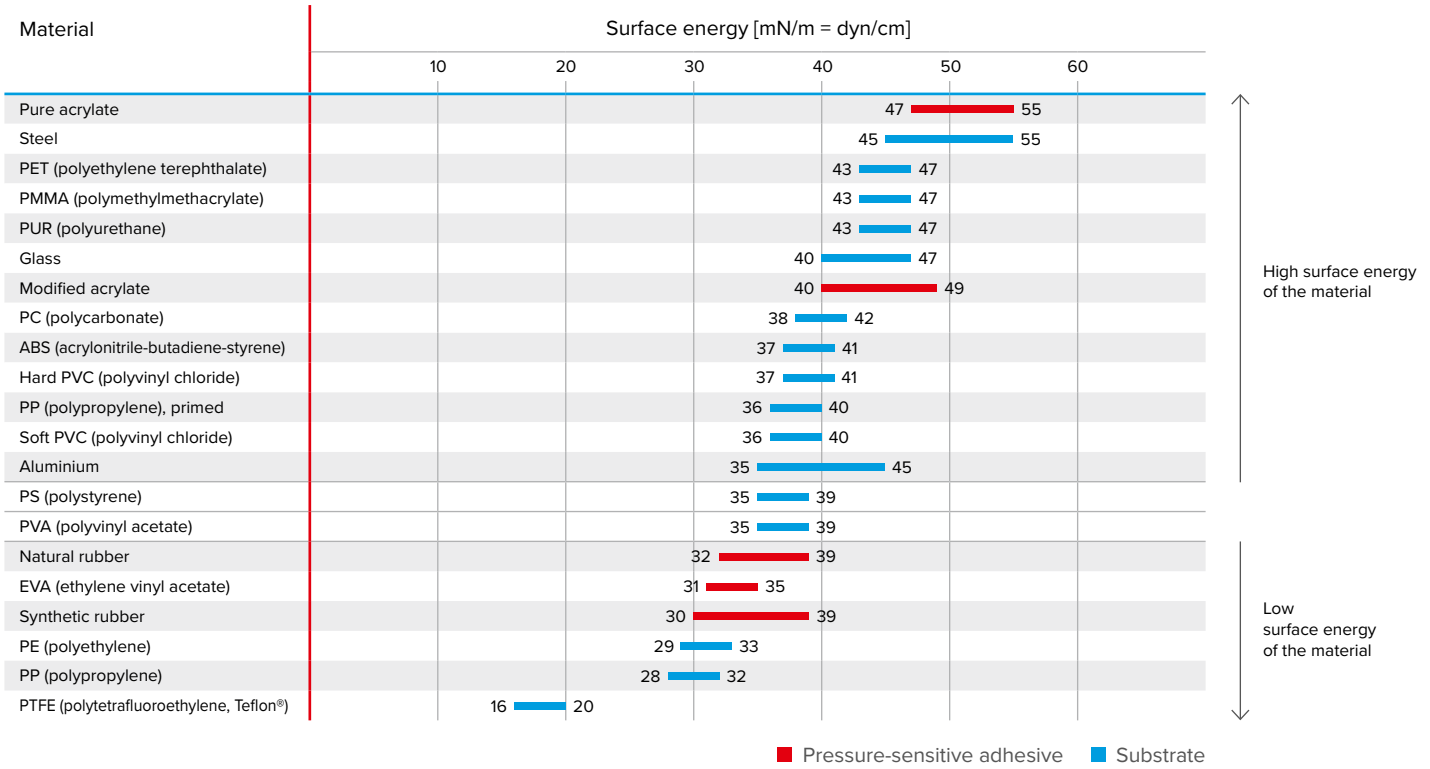
A pressure-sensitive adhesive is generally able to wet-out a substrate if the substrate's surface energy is greater than or equal to that of the adhesive. The higher the wet-out, the more contact points are available to form a bond between two surfaces. As a first indication one can use a water droplet to differentiate between high and low surface energy substrates. If the droplet forms a film, this points to a high surface energy. On the other hand, if it stays a droplet or drips off, it points to a lower surface energy than water. In this case, bonding to the substrate may be difficult.

More accurate results are achieved with so-called test inks, which are also available in pen form. The surface energy is given in mN/m, dyn/cm or sometimes also in mJ/m^2, whereby: 1 mN/m = 1 dyn/cm.

The boundary between low-energy and high-energy surfaces is usually drawn in the range of a surface energy of 36 – 38 mN/m. Therefore, the bondability for surface tensions above this range is usually problem-free, whereas at values below this range a pretreatment of the surface to be bonded should be considered.

Test inks

	Poor	Good	Very good
Wettability			
Surface energy	Pressure-sensitive adhesive > Substrate	Pressure-sensitive adhesive = Substrate	Pressure-sensitive adhesive < Substrate

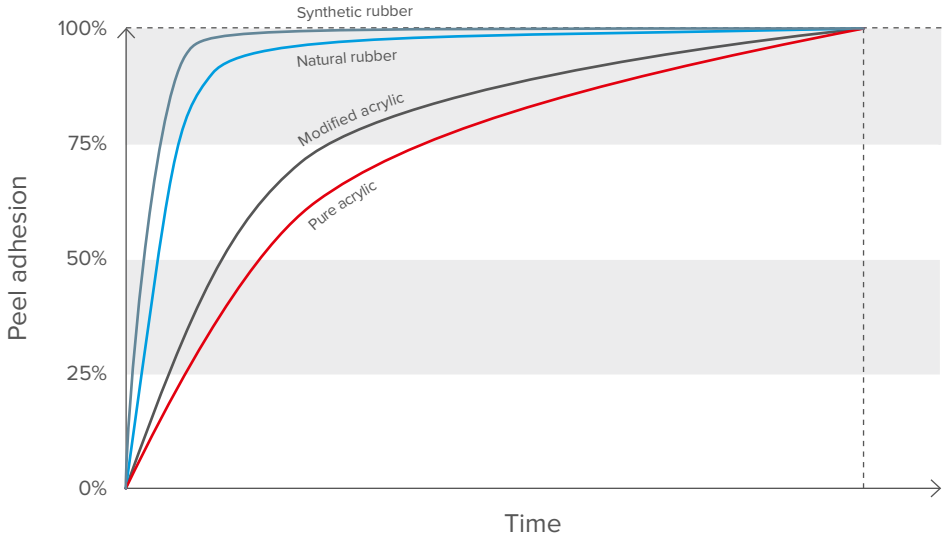


Initial and ultimate peel adhesion

Due to the viscoelastic character of an adhesive tape the peel adhesion increases over time. The time needed to achieve the ultimate peel adhesion strongly depends on factors such as the type of adhesive mass, temperature, contact pressure and substrate. This behavior is described as the initial and ultimate peel adhesion.

The figure on the right shows, both synthetic and natural rubber pressure-sensitive adhesives require less time to reach the ultimate peel adhesion than acrylic-based pressure-sensitive adhesives. As a rule of thumb, it takes 72 hours to achieve the ultimate peel adhesion of acrylic adhesives. With the use of a bonding agent (adhesion promoter) the time needed to achieve the ultimate peel adhesion is typically reduced.

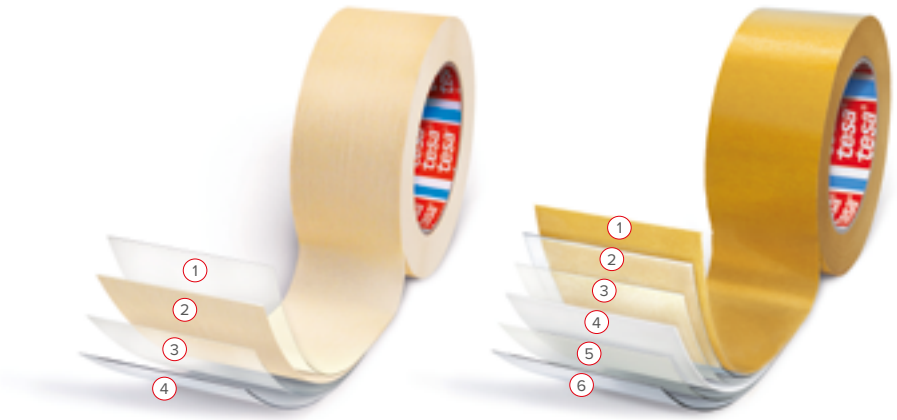
Higher temperatures also significantly reduce the time needed to achieve the ultimate peel adhesion. At lower processing temperatures, a much longer time is once again required to achieve the ultimate peel adhesion.



Product structure

All adhesive tapes consist essentially of a backing material and at least one self-adhesive layer of adhesive. The product structures shown on the right are typical for single-sided and double-sided adhesive tapes.

The adhesive and backing materials are adapted to the specific application requirements of each tesa® adhesive tape solution. Examples of adhesive masses are acrylics, natural rubber and synthetic rubber. Examples of backings are film, paper, tissue and foam. In order to help you choose the appropriate adhesive tape, we offer product ranges for the various fields of application. These include, for example, adhesive tapes for surface protection, masking, bundling and permanent bonding in the automotive, electronics, construction or furniture industries.



Product structure
single-sided adhesive tape:

1. Rear surface release coating
2. Backing
3. Primer
4. Pressure-sensitive adhesive

Product structure
double-sided adhesive tape:

1. Separation cover (siliconized)
2. Pressure-sensitive adhesive (covered side)
3. Primer
4. Backing
5. Primer
6. Pressure-sensitive adhesive (open side)

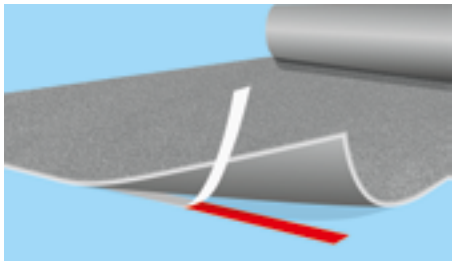
Selecting the right adhesive tape

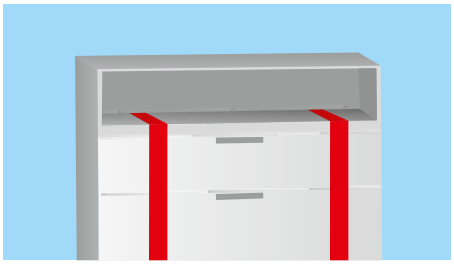
Application

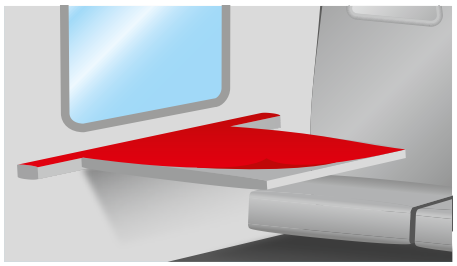
The requirements for an adhesive solution are extremely diverse and vary greatly between different applications. Therefore, it is important to use the most suitable adhesive tape for each individual case. The following general information applies to all tesa® adhesive tape applications and is intended to help you to select suitable tesa® products. For more technologically advanced applications and product groups, there are also far more detailed, application-specific processing instructions that you can receive both through our technical customer service and our sales department.

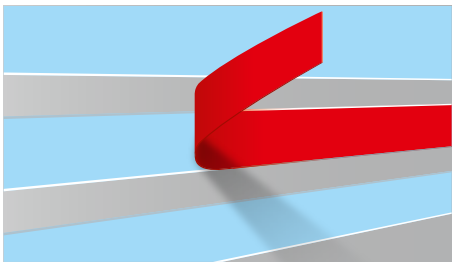
Double-sided adhesive tapes are used for joining parts and attaching objects, while single-sided adhesive tapes are used, e.g. for sealing packaging, covering and protecting surfaces and colour-marking objects.

Bonding should either be temporary or permanent. If the first is the case, residues or surface changes such as discolouration after detachment are undesirable.









Factors for determining the right product

When choosing an appropriate adhesive tape for your specific application the following factors play a role and should always be taken into consideration:

- Type of material to be bonded
- Surface structure
- Bondability
- Weathering/environmental influences
- Thermal stress
- Mechanical/chemical stresses
- Duration of bonding

These factors are described in more detail below to help you to select the appropriate adhesive tape for your application. Please do not hesitate to ask our application consultants for assistance during the selection process. Our technical customer service (application technology) will be consulted in case of more complex issues.

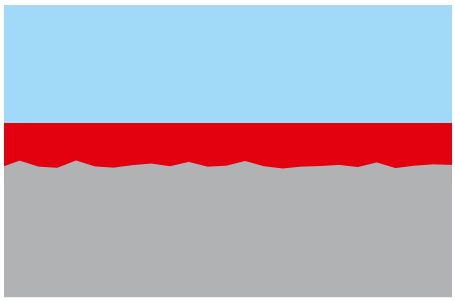
Surfaces to be bonded

Material type

First, it is important to consider the type of materials to be bonded. Adhesive tapes are suitable for the bonding of many different materials, such as metals, glasses, plastics or woods. Nowadays, more and more surfaces are being coated, either for aesthetic reasons or to protect them against corrosion and other damage. These coatings are often low-energy surfaces and are as a result more difficult to be wetted by a pressure-sensitive adhesive and therefore to bond.

In the case of such low-energy surfaces (see page 5), they can be treated with surface pretreatment methods, e.g. bonding agents, corona and plasma, in order to improve the wetting and thus the adhesion. In these cases, our application consultants are on hand to assist you in selecting the right pretreatment method.

Surface structure



The structure of the surface to be bonded is another important factor when it comes to achieving sufficient adhesion – i.e. bonding strength – on the substrate. Roughnesses and structures in surfaces can be compensated by adhesive tapes that have high viscous properties and are conformable to the surface, so as to be able to follow the structure of the substrate. This may be achieved by using one or more of the following tape characteristics: a soft pressure-sensitive adhesive, a higher adhesive coating weight, or an adhesive tape with a soft, flexible carrier material, such as soft PVC or a foam.

Bondability

The bondability of metallic surfaces is generally very good. Testing the surface energy is always recommended in the case of plastic surfaces. As described in the Material Type section, many surfaces these days are coated or otherwise finished. For example, a powder coating of an aluminium frame changes its bondability because the surface energy of a powder coating differs greatly from the surface energy of the aluminium. In this case we would still speak of an aluminum window frame but with a coating to be bonded to.

As already mentioned, the surface energy of a material can be measured by various methods. A practical way to determine the surface tension are test inks, which are also available in the form of testing pens (see also chapter: Basics of bonding).

Requirements for the adhesive bond

Long-term durability

When selecting an adhesive tape, the required long-term durability must be taken into account. All adhesive tapes are suitable in principle for short-term bonding up to a duration of a few days. Aging resistance of adhesive tapes is important if the product is to be removed without residue or if it will be permanently bonded. Aging processes are mainly caused by the influence of heat, light (UV radiation) and air (oxygen). An aging-resistant adhesive tape is characterized by the fact that despite these influences – even over a long period of time – the characteristics of both the backing and the pressure-sensitive adhesive mass remain virtually unchanged. For long-term or permanent bonding, we therefore highly recommend adhesive tapes based on acrylate adhesive masses, since these are very resilient against aging processes. For specific problems, tesa® products based on other adhesive types for long-term bonding are also available. The technical tesa customer service will assist you with your product selection. You can also find information in our product and application catalogs.

Temperature resistance

Each tape has an individual maximum application temperature, which should not be exceeded during use. This limit for each tesa® adhesive tape can typically be found on the product information sheet. The limit value describes the temperature resistance of the adhesive tape in a typical application. We differ between short- and long-term temperature resistance and test the different ways the tape fails. For example, the temperature resistance of a masking tape illustrates its residue-free removability after one hour of thermal stress. On the other hand, a double-sided adhesive tape is evaluated with regard to its shear strength under the influence of temperature. In general, unless the specified temperature is exceeded, the adhesive tapes retain their original properties and thus guarantee faultless performance in the typical field of application.

Temperature range of the application

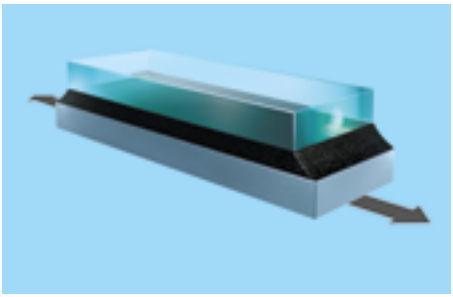
Type of pressure-sensitive adhesive	Typical maximum temperature resistance
Synthetic rubber	40 °C
Natural rubber	60 °C
Acrylate	100 °C
Silicone	200 °C

At too high temperatures, the pressure-sensitive adhesive becomes soft; it loses bond and shear strength, which can cause the bond to fail. Acrylic and silicone adhesives generally have sufficient bond and shear strengths even at temperatures up to 100 °C.

At too low temperatures, the adhesive mass becomes hard and loses its plastic and elastic deformability. While this may not have any negative effect on the temperature resistance, the shock-absorbing property of a bond is lost, such that an impact load can result in a brittle fracture of the compound.

If no additional dynamic stresses occur during application, many adhesive tapes can be used at temperatures down to -40 °C. The bond itself is ideally always formed in a temperature range of 10 °C to 40 °C.

Thermal expansion



In the case of a composite of two materials with differing thermal expansion coefficients exposed during use to changes in temperature, the adhesive tape should compensate for possible changes in the material dimensions. As a rule of thumb, the maximum thermal expansion difference should not exceed 0.5 times the adhesive tape thickness. For individual cases, tesa® products with higher thermal expansion compensation are also available with up to three times the adhesive tape thickness. Our application consultants will be happy to help you choose the right product.

Weather/UV resistance

Above all, adhesive bonds used outdoors are exposed to additional climatic stresses due to moisture and UV radiation.

Moisture can penetrate into the adhesive joint and greatly reduce the adhesion. Therefore, we recommend preparing the adhesive surface with an adhesion promoter for these cases – this will permanently protect the adhesive joint (see section Pretreatment with bonding agent).

UV radiation can damage the backing material or the adhesive mass in the case of single-sided adhesive tapes, so that the adhesive tape can no longer be removed after the recommended maximum bonding time.

Adhesive tape products with PVC backings or backings made from other opaque UV-stabilized materials generally have good UV resistance.

When bonding transparent materials, UV radiation can alter the pressure-sensitive adhesive mass and cause deterioration (meaning softening or embrittlement), which reduces the adhesive strength such that the adhesive tape can no longer be removed without residue. Products with acrylic or silicone adhesives are more resilient to weathering and UV radiation compared to products based on natural or synthetic rubber.

Typical UV and weathering resistance of individual backing types

Carrier	Time
Paper	3 months
Polyolefin films (PE, PP)	1–3 months
PVC	1 year
PET	1 year

Typical UV and weathering resistance of individual adhesive systems

Pressure-sensitive adhesive	Time
Synthetic rubber	Weeks
Natural rubber	Months
Acrylate	Months to years
Silicone	Months to years

Solvent resistance

Adhesive tapes are sensitive to solvents as the polymeric pressure-sensitive adhesives and/or the backing material material can swell or be loosened by solvents. The solvent resistance of the bond also depends on the bonded substrates and can only be evaluated on a case-by-case basis. Our application consultants will be happy to help you with these questions.

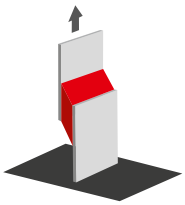
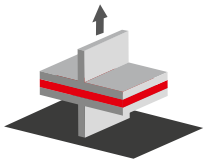
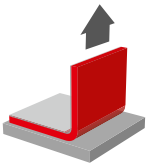
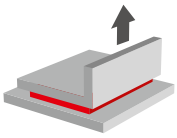
Stress types and their effect on the bond

In principle, all adhesive bonds shall be designed so that only shear or tensile loads occur. Splitting loads must be minimised and peeling loads avoided.

The load capacity of the adhesive joint is greater or smaller depending on which forces act on the bond. Adhesive tapes generally do well with standing shear and tensile forces due to the large load bearing area.

The bond should not be subjected to peeling forces as adhesive tapes only oppose these with low resistance. Splitting forces also contain a peeling force component and should therefore be avoided. For example, if you attach two non-interlocking parts (e.g. a straight profile to a bent frame) the cleavage stress and proportionally the peeling stress occurs at the ends due to the tendency of the straight profile to return to its original shape. If the peeling stress is too high the profile will detach from the frame.

Stress types and their effect on the bond

	 Shear stress	 Tensile stress	 Peeling stress	 Cleavage stress
Action surface	Large	Large	Small	Small
Resilience of bonding	High	High	Low	Low

Surface preparation

The surfaces to be bonded must be clean, dry and free of dust, grease, oil and release agents. For cleaning, only use clean cloths and material-compatible cleaning agents. The components must be adapted to the ambient climate for a sufficient period to prevent the formation of condensation on the surfaces.

Surface cleaning

Prior to bonding, the surfaces are cleaned and thus all impurities removed. These include:

- Dust
- Release agents
- Greases
- Waxes
- Plasticisers
- Oxidation layers, e.g. rust

Coarse, dusty or grainy impurities can best be removed with a brush or a white lint-free cloth.

Cleaning with water and solvent

Cleaning with tesa® 60040 Industry Cleaner

Water-soluble impurities can be removed with water and detergents. Other impurities, e.g. oil traces, grease, wax, and release agents, can strongly reduce the bonding capacity of the surface. Special care must be taken to remove such impurities. Suitable solvents for this are:

- tesa® 60040 Industry Cleaner
- Isopropanol
- Isopropanol + water (1:1)
- Acetone or methyl ethyl ketone (butanone)

Determining which solvent is required is ultimately dependent on the surface to be cleaned. It is recommended to follow the manufacturer's cleaning recommendations. During cleaning, please make sure to work with lint-free cloths (such as TechniCloth® from Texwipe®) and always wipe in one direction. The rags should be changed several times until complete removal of all impurities. Thereafter, the solvent must evaporate completely.

Mechanical cleaning

Sanding the surface

If the above cleaning agents are not sufficient, the surface can be prepared for bonding by means of mechanical treatment. Loose oxides (such as rust) and poorly adhering coatings are removed with a suitable abrasive, e.g. Mirlon Sanding Fleece VF 360. The surface should only be roughened slightly and remain flat. Corrosion protection coatings must not be damaged.

Thereafter, the surface must be cleaned again to remove the grinding dust.

Pretreatment with bonding agents (adhesion promoter)

For bonding – especially outdoors and on surfaces that are difficult to bond – we recommend the use of a bonding agent (adhesion promoter). Bonding agents form a layer on the surface to which the pressure-sensitive adhesive adheres particularly well. This layer also prevents water from entering the adhesive joint and thus enables consistent outdoor bonding.

tesa® bonding agents are available for different types of surfaces.

When using these adhesion promoters, the following instructions should be observed:

Surface	Plastic and metal surfaces (PP, EPDM, zinc, paints)	Glass	PUR/hard PVC/PVC-U
tesa® Adhesion Promoter	tesa® 60150, tesa® 60153	tesa® 60151	tesa® 60152
Repositionability	tesa® 60150: Yes tesa® 60153: No (high initial bond strength)	No	Yes
Application	Apply thinly	Apply thinly and wipe with a clean cloth	Apply thinly
Tools	Lint-free cloth, brush, application pen	Lint-free cloth, brush, application pen	Lint-free cloth or brush
Evaporation time	30 sec to 5 min	30 sec to 5 min	2 to 5 min
Time window for subsequent bonding	Several hours/days	5 min	Several hours/days

Physical pretreatment

The surfaces of the material to be bonded and the pressure-sensitive adhesive ideally have a similar surface energy. By means of physical methods such as flame treatment, corona discharge or plasma treatment, the surface energy of an object is increased short-term by the attachment of polar and reactive molecular groups.

However, such activated surfaces can easily and quickly become deactivated by contact with gases and dust of the ambient climate. The application of physical methods to increase the surface energy should therefore take place immediately before the bonding. It is especially suitable for continuous processing operations.

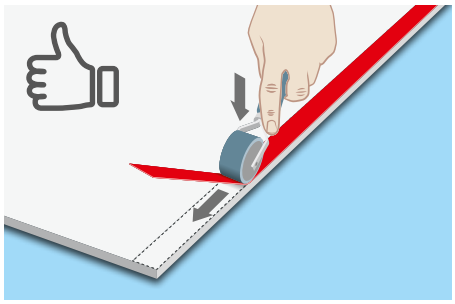
Ask your application consultant for our technical customer service, who will gladly assist you in implementing physical pretreatment methods.

Processing/Application

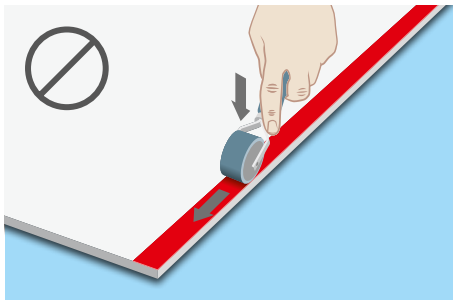
A high pressure application promotes the full-surface contact of the pressure-sensitive adhesive with the surface. This can be carried out with a tool such as a tape application roller. The most favourable processing temperature (ambient and material) ranges between approx. 10 °C and 40 °C.

Applying the adhesive tape

When applying the adhesive tape, care must be taken to avoid air traps. To do this, put the adhesive tape on one end and then press it gently and continuously to the other end by means of a roller, your thumb or a squeegee.



Correct: simultaneous application and gentle pressing using an application tool for wrinkle-free, bubble-free bonding.



Wrong: full-surface application of the adhesive tape and subsequent pressing (risk of air traps and wrinkles).

Pressure

An optimal bond strength is achieved if the closest possible contact between the pressure-sensitive adhesive and the substrate is produced. For this, the adhesive tape must be pressed with a sufficiently high pressure. This is generally ensured when the adhesive tape is rolled with a weight of 1 kg per 10 mm of adhesive tape width. For a 5 cm wide adhesive tape, therefore, the weight of a 5 kg roll is required, which is guided evenly over the adhesive strip (see also section Equipment and processing tools).

When masking for painting, the adhesive tape edge must be pressed along the entire length to achieve a clean and sharp paint edge.

When joining two components, a contact pressure of at least 0.5 bar (equivalent to 5 N/cm^2 or 50 kPa) must be ensured in the adhesive joint. Pressures of 2 bar or higher are ideal. Especially when joining rigid components, the actual pressure under the adhesive tape should be determined experimentally. For this purpose, electronic or colour-changing pressure measuring foils are suitable, e.g. Fujifilm Prescale.

Processing temperature

At room temperature, a pressure-sensitive adhesive has a low enough viscosity and can, with sufficient pressure, optimally wet the surface to be bonded. At lower temperatures (below 10 °C), the viscosity of the adhesive, which is needed to wet the surface, is significantly increased. Hence, for certain very specific applications we offer products that can be bonded at low temperatures (even sometimes below 0 °C). You can find this data in the product information for the corresponding adhesive tapes. In addition, our technical customer service will be happy to assist you.

If you cannot find any additional information on the processing temperature on the product data sheet, the adhesive tape should be applied with the ambient and substrate temperatures between 10 °C and 40 °C.

Equipment and processing tools

For almost every application we offer a suitable processing device. These manual, semi-automatic and fully automatic applicators can also be adapted to specific requirements and thus optimized for special demands.

Dispensing/Cutting

Manual, semi-automatic and fully automatic dispensers enable dispensing, cutting and positioning of the adhesive tape adapted to the needs of the user.

Pressing

Pressure testers from the tesa® product range ensure that – as described in the chapter Pressure – the closest possible contact between the adhesive mass and the substrate is produced.

Bonding agent

With the refillable tesa® 60690 PV1 application pen, the bonding agent can be applied manually in an even manner. Furthermore, as mentioned in the section Pretreatment with bonding agent (adhesion promoter), lint-free cloths or even brushes can be used.

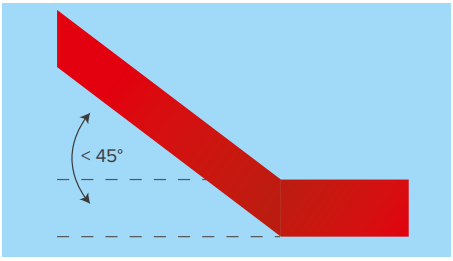
Removing adhesive tapes

The product information sheet provides detail about the time after which the adhesive tape can be removed without residue from the surface.

If the specified time period has been exceeded, influences of the weather have been greater and/or temperatures significantly higher or lower than expected, residue-free detachment may no longer be possible or only partly possible.

Detaching a single-sided adhesive tape

When removing single-sided adhesive tapes, you should proceed as follows:



- Peel off adhesive tape at an acute angle to the substrate. Ideal: 45° angle. Then the risk that residues will be left behind is at its lowest.
- Always pull slowly and evenly. Thus, residue and tearing of the adhesive tape can be avoided.
- When peeling off, the substrate temperature should be >10 °C. The carrier material and the adhesive mass will otherwise become brittle and the tendency of the adhesive tape to tear increases.
- If an adhesive tape is difficult to remove, it may help to heat the tape briefly with a hair dryer.

Detaching a double-sided adhesive bond

Double-sided adhesive tapes are most commonly used for permanent applications. As a result, removing such tapes may be very difficult.

If the adhesive joint is sufficiently accessible, then interconnected surfaces can be separated again by cutting the adhesive tape. This is especially possible with thick products such as foam adhesive tapes or tesa® ACX^{plus}.

For this we recommend, for example, the use of an automatic sealing compound cutter or a knife with a sharp and stable blade in combination with a lever tool. Carefully cut through the adhesive tape with these tools.

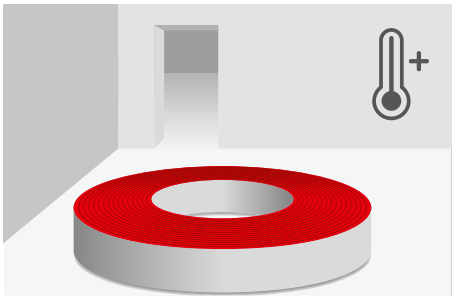
Removing pressure-sensitive adhesive residues

In practice, adhesive mass residues may remain if it occurs that an unsuitable adhesive tape is used or one has waited too long to remove the tape. In this case, proceed as follows:

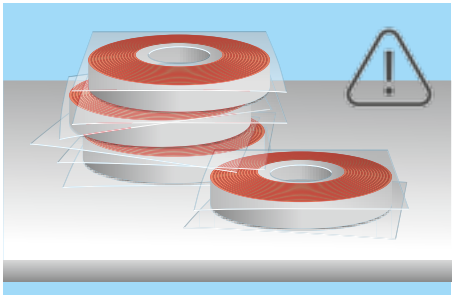
- Dab residues with the adhesive side of a more adhesive product, such as tesa® 4651. Repeat the process if necessary.
- Use tesa® 60042 Adhesive Remover. Removes most adhesive residues on glass, metal and plastic surfaces reliably.
- Alternatively use mineral spirits, isopropanol or similar: Thoroughly soak and expel the adhesive mass with a plastic spatula to avoid damage. Please test solvent on concealed area first.

Storage and transport

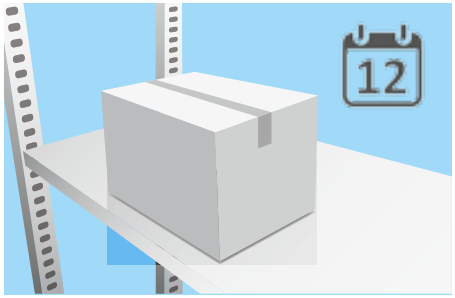
The storage or transport of adhesive tapes is best done at normal room temperature and low air humidity. The rolls are to be covered individually with release film.



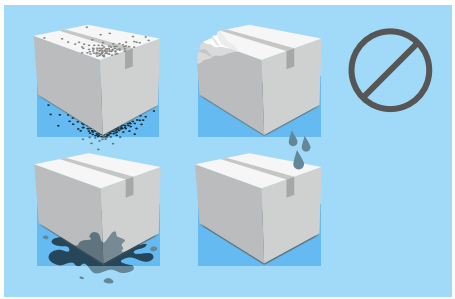
tesa® adhesive tapes are best stored at temperatures between 15–35 °C and at normal relative humidity between 50–70 %.



In the case of side-tacky products, the side surfaces of the rolls must be covered with appropriate silicone-coated release sheets. When stacking several rolls on top of each other, a double layer of release sheets is recommended.



If all transport and storage recommendations are adhered to, the minimum shelf-life of tesa® products is usually twelve months from the date of delivery.



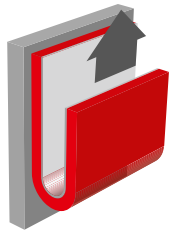
Ensure during transport and storage that the packaging is not damaged or deformed.

The packaging should be resealed after parts removal so that the adhesive tapes are protected against dust, moisture and dirt.

Typical characteristics and test methods

The tests are carried out at a default climate of 23 °C ± 1 °C, 50 % ± 5 % relative humidity. Test conditions deviating from this must be documented.

Bond strength



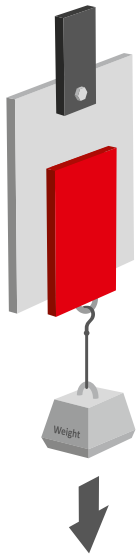
The force required to peel an adhesive tape strip from a standardized test substrate at a defined speed at an angle of 180°/90°.

Comparable international standards are:

ASTMD3330/D3330M,
Afera TM-5001, ISO 29862,
PSTC 101, DIN EN 1939 : 2003

	Test conditions
Climate	23 °C ± 1 °C, 50 % ± 5 % relative humidity
Attachment time	Immediately: max 1 min, final bond strength: 14 d
Rolling	4 kg, 5 strokes, 10 m/min, Width: ≤ 25 mm
Reinforcement	Product-dependent, PET 25 µm, PVC 38 µm ...
Removal speed	300 mm/min
Unit	N/cm

Static shear test



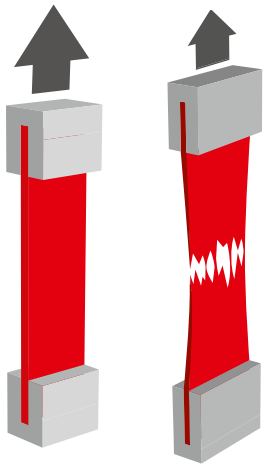
An adhesive tape is applied under defined conditions to a predetermined, rigid adherent surface and exposed to a constant shear stress. The holding period is determined in minutes.

Comparable international standards are:

ASTM D3654/D3654M, PSTC 107,
Afera TM 5012, DIN EN 1943 : 2003
and ISO 29863 : 2007

	Test conditions	
	Reinforcement film	Plate/Plate
Climate	23 °C ± 1 °C 50 % relative humidity	23 °C ± 1 °C 50 % relative humidity
Attachment time	10–15 min	3 d 23 °C
Rolling/Pressing	2 kg, 1 stroke, 300 mm/min, Width: ≤ 13 mm	1 min, 100 N/cm²
Area	2.6 cm²	2.6 cm²
Reinforcement	Aluminium film 50 µm	–
Unit	min	min

Tensile test



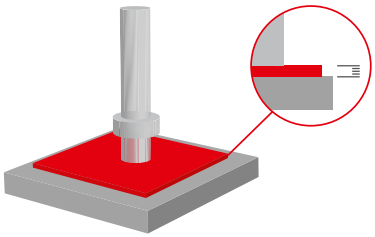
The material tested is stressed under predetermined conditions on a tensile testing machine with a defined clamping speed in a longitudinal or transverse direction until it tears. Expansion parameters, tensile and tear strengths can be determined.

Comparable international standards are:

- ASTM D3759/D3759M, ASTM D1000, PSTC-131, Afera 5004, DIN EN 14410, ISO 29864 : 2007

	Test conditions
Climate	23 °C ± 1 °C, 50 % relative humidity
Clamping length	100 mm
Test speed	300 mm/min
Unit	Maximum tensile force N/cm, tear strength N/cm^2, elongation at break %

Thickness



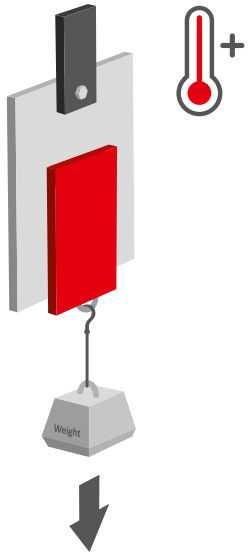
The thickness of adhesive tapes is measured by means of a probe which rests on the adhesive tape with a predetermined force.

Comparable international standards are:

- ASTM D3652/3652M-01, Afera TM 5006, DIN EN1942 : 2003, PSTC-133

	Test conditions
Climate	23 °C ± 1 °C, 50 % relative humidity
Contact pressure	5 N/cm^2
Measurement time	≤ 1 s
Button surface	Sample-specific (Specification of pressure and shape and size of the probe)
Unit	µm

Temperature resistance



Double-sided adhesive tapes

For double-sided adhesive tapes the temperature resistance is determined in a static shear test under the influence of temperature.

This test yields a value for the short- and long-term temperature resistance.

Samples adhered together between aluminum film (19 × 21 mm) are rolled with a 4 kg roller at a speed of 0.3 m/min and subsequently loaded with an 80 g weight (corresponds to 0.2 N/cm^2).

The temperature is determined at which three specimens achieve a holding time of at least 15 minutes (short-term) or 90 days (long-term temperature resistance) and a maximum shear distance of 1 mm is not exceeded.

Single-sided adhesive tapes

For single-sided adhesive tapes the temperature resistance is determined depending on their typical applications.

For masking tapes in each case two strips are glued to black painted aluminum sheets. Then the test sheets are loaded for one hour at a specific temperature.

Following temperature stress, one strip is peeled off at high exposure temperature, the other at room temperature. In the process, the first half of the strips is peeled off at a 90° angle, while the second half is peeled off at an 180° angle and faultless removability is assessed.

This is an application test that is subject to the subjective judgement of the person performing the test, both because of the manual removal and the quantification of the observations.

10/2018

Our management system is certified in accordance with the quality standards ISO 9001, ISO/TS 16949 and ISO 14001. All products are listed in the International Material Data System (IMDS).

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