



# standotheek

**Perfect substrate preparation  
for brilliant results.**



**The Art of Refinishing.**

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## Good preparation avoids expensive re-working.

**Preparing panels before refinishing is a routine exercise in all bodyshops. However, problems can arise if the substrate is wrongly assessed and therefore wrongly prepared, despite the routine nature of the job.**

A perfect refinish starts with careful prepping, given that a brilliant finish can only be achieved on a properly prepared substrate. The most important tasks include sanding, stopper and filler application as well as priming. The first step towards a perfect result is the correct assessment of the existing substrate. This allows easy planning of all the work steps which follow.

Even at this early stage, the assessment of the substrate decides the processes,

tools and materials to be used. This means that any carelessness in assessing and prepping the substrate will result in expensive defects such as shrinkage, sanding marks, edge mapping, blistering, wrinkling, lifting, dulling and so on.

This Standothek provides you with easily accessible information about proper substrate preparation. Everyone from an experienced refinisher to a young trainee will benefit from this comprehensive guide.



# Identifying and determining substrates.

**Car manufacturers today use a wide variety of metals and plastics. Every material requires a specific treatment. Thorough knowledge of these different substrates is indispensable – otherwise panel preparation becomes a game of chance.**

## **Metallic substrates.**

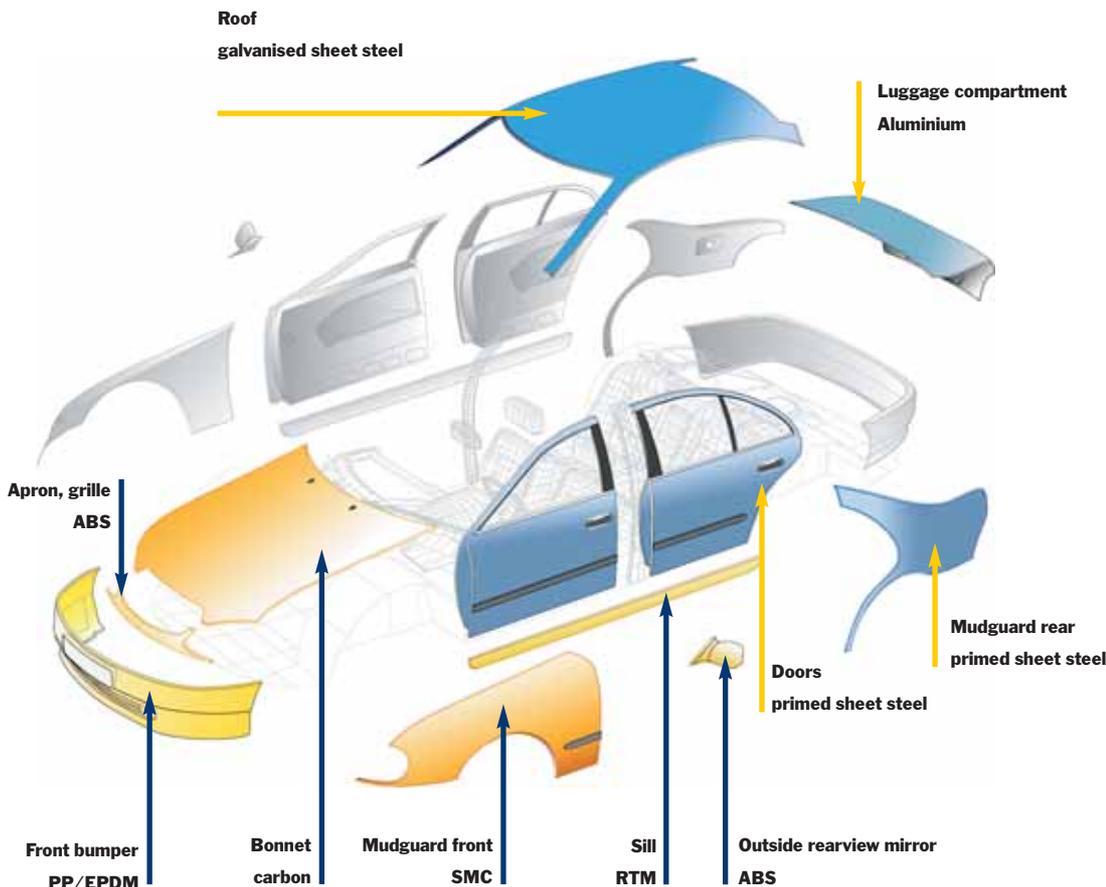
Most body panels consist of metallic substrates ranging from uncoated steels, galvanised or coated steels through to stainless steels. In the case of coated or untreated steels, corrosion is the biggest problem you will encounter. The best procedure to remove corrosion is described on page 10.

In the past few years, aluminium has become more and more popular as an car body material. Galvanic corrosion may occur on aluminium due to direct connections (e.g. bolts and screws) between aluminium with steel. These areas need to be insulated.

Such areas are frequently found on modern vehicles, which is why auto

manufacturers specify special repair processes to avoid corrosion.

**Important:** Bodyshops carrying out aluminium repairs need a separate area for this purpose. This means that tools and sanding materials must be used exclusively for aluminium repairs. Otherwise there is a risk of the mixture of steel and aluminium dust particles igniting and causing fires.



## **Info.**

**A wide variety of different materials is used on modern vehicles.**

Correct identification of substrates is essential before work begins. A superb finish is only possible once the substrate is identified and the right preparation process is used.

for illustration only

### Plastics.

Modern vehicles would hardly be conceivable without the use of plastics. Plastics have many helpful characteristics for car manufacturers because they are easily shaped, weigh less than metal and are stable.

The most important prerequisite for plastic refinishing is proper identification of the material. Manufacturers use standardised labels to simplify this identification. For detailed information about processing plastic parts, please see the Standothek **Plastics** from Standox.

Special attention must be paid to composite materials including carbon fibre. The important thing with regard to these

materials is that damage is often not visible on the surface. An experienced expert should be consulted before the repair especially when it comes to load-bearing components or parts that are relevant for the safety of the car.



## Materials used in vehicle construction

Construction types	Materials	Characteristics
<b>Metals</b>	Steel	magnetic
	Aluminium	non-magnetic
	Zinc-coated	visual film (after sanding)
	Stainless steel	non-magnetic
<b>Plastics</b>	PP, PVC, ABS, PE, PP/EPDM, RTM	inside reference non-magnetic
	<b>Carbon and composites</b>	Carbon Glass-fibre
SMC (Sheet Moulding Compound)		non-magnetic structure not visible

# Sanding machines and tools.

**From roughing to fine-sanding: there are machines and tools for virtually every application.**

Sanding machines have become an indispensable aid in every bodyshop. Different machines are suitable for different types of work.

Planetary and rectangular sanding machines are used e.g. for roughing as they are ideal for large polyester stopper layers. In contrast, eccentric sanding machines tend to be used for general sanding work.

In spite of all the support from machines, manual sanding is still required. Especially with regard to minor repairs, it is often not worthwhile to start up a large machine. Also, sanding blocks are ideally suited for reworking edges and profiles.

Sanding blocks make manual sanding work easier and help to avoid mistakes. Their size and shape distribute the pressure evenly and allows for accurate work.

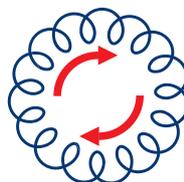
Be sure to inspect both the surface and your tool at regularly during the process.

## Orbital sanders



Rectangular sanders swing on the substrate.

## Planetary sanders



Planetary sanders swing and rotate simultaneously on the substrate.



**WRONG**  
Incomplete contact between sanding area and substrate.



**RIGHT**  
The flat sanding area distributes the pressure perfectly, hollows and holes are avoided, the abrasive is fully used.



**WRONG**  
Wrong abrasive or the abrasive is not positioned squarely on the sanding block.

## Tips.

Please use the Technical Data Sheets from Standox to obtain information about a recommended sanding procedure.

When using sanding machines and sanding blocks, be sure to use dust extraction to stop the abrasive clogging.

Ensure machine sanders are used flat to the surface and not on the edge of the pad.

Try to use clean water if you must use a wet sanding system – dirt can easily be sanded into the surface causing scratches.

Do not use electrical machines for wet sanding.

Replace worn abrasives regularly for the best sanding results.

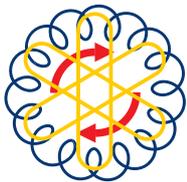
**Important:** Always wear gloves as well as a protective mask and eye protection to protect your health.

### Sanding blocks



Sanding blocks with dust extraction are particularly suited for small or poorly accessible areas.

### Random orbital sanders



Random orbital sanders swing and rotate simultaneously on the substrate. The eccentric construction eliminates sanding traces.



#### RIGHT

The right abrasive is precisely positioned for full dust extraction and a reduction in scratching.



#### WRONG

A tilted position of the disk may easily result in sanding through the surface.



#### RIGHT

The full disk surface rotates on the surface for the best sanding results.

# The abrasives.

## The right abrasive is needed for the best result.

Commercial abrasives or sanding papers differ with regard to

- the shape and type of the abrasive.
- the grade.

## Shape and type of the abrasive.

Sanding heads are either round or rectangular. For larger areas and rough preparatory work, belt sanders are better suited than orbital sanders. The latter tend to be used for smaller area sanding work.

## The grade.

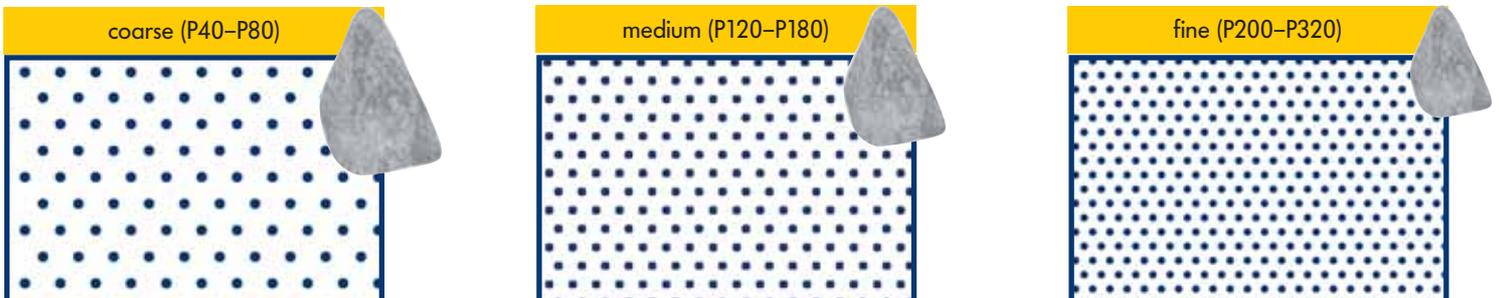
The grade of an abrasive refers to the size, quantity and distribution of the individual grains on its surface. Corundum or silicon carbide are most commonly used to give the abrasive its "cut". The size of the individual grains

and their distribution on the abrasive is indicated by the "P" number on the back of the sanding paper.

The lower the number, the coarser the grain and the finish. The higher the number, the finer the finish.

Cheap abrasives can soon become expensive. Used properly, high-quality abrasives last longer than cheap products.

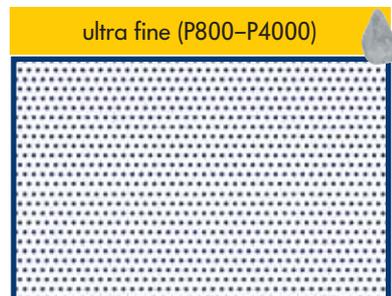
However, even the best abrasive will wear. This is why it is important that you replace the abrasive regularly in order to avoid damaging the surface, for instance through friction and burning.



## Correct sanding: from coarse to fine.



	Damaged panels	New panels	Fehlerbeseitigung
Paint removal / metal surface sanding	P40-80		Levelling of surface P1500-2000
Keying of area prior to polyester stopper	P120-180		Pre-polishing of blend-out zone P2000-4000
Stopper sanding	P120-240		
Keying surrounding area	P240-320	P280-320	
Filler sanding	P320+P400-600		
Matting of surrounding surface incl. filler	P800-1000/ultra fine pad		
Fade-out zone sanding	P2000-4000		



Each grade of abrasive leaves deeper or shallower sanding traces on the surface. To remove these traces, it is important to sand in successive stages from coarse to fine.

To achieve the best result, a maximum of only one grade may be left out. For example: coarse sand (rough) with grade P80, followed by P120 or P150.

The same applies to the subsequent sanding work.

## Tip.

Particularly deep scratches can be removed faster and more easily if you do not leave out any grades. This way, the surrounding material is removed perfectly and efficiently.

# Removing rust.



## Rust is formed by the oxidation of steel with oxygen in combination with water.

Rust is a major problem particularly with regard to steel sheet. The chemical properties of rust increase the penetration of oxygen. Unless rust is removed thoroughly, it will penetrate deeper and deeper into the material. In contrast, galvanised steel or aluminium corrode only on the surface.

This is why a sound substrate preparation must include thorough rust removal. Rust that has eaten its way deep inside the material is virtually impossible to remove by sanding. Sand-blasting is the only technique that can help here. The abrasive, a granulated material from sand, corundum or glass, is shot onto the surface, thereby simply chipping off the rust particles.

Advantages of sand-blasting:

- Rust can be easily removed even from deep holes.
- In contrast to sanding, the substrate is hardly exposed to heat.
- The sanded area is immediately ready for further treatment.

Nevertheless, the substrate should be sanded before being sand-blasted, so that the abrasive is not contaminated with paint and rust particles. It also reveals exactly which areas have to be sand-blasted. And that saves abrasive, energy and time.

As an alternative to sand-blasting, wire brushes can be used for a mechanical removal of rust from the surface.

**Important:** Be sure to protect your eyes during rust removal. Rust and other particles move with surprising force during removal and may cause eye injuries. In addition, you will need a protective mask, given that abrasives may damage your lungs.



Rust which has penetrated deep inside the metal is removed by blasting.



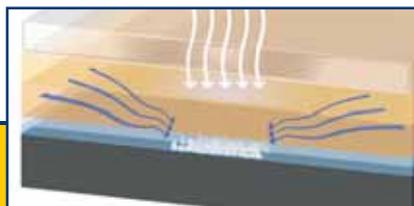
Rust pitting must be sand-blasted before the prepared area is ready for further treatment.



Attachments for mechanical rust removal.



**Rust caused by impurity:**  
Rust can even be caused by a fingerprint on bare sheet metal.



Salt crystals from human sweat can remain on the substrate and become trapped in the paintcoat. The salt binds with humidity from the metal and draws oxygen through the paint.



**The consequence:**  
Rust starts to form under the paint coat.

**The prevention:**  
Contamination from skin can be prevented by simply wearing gloves.

# Recommended tools and machines.



**Professional brand-name machines may cost a little more – but the higher price is often worth paying when it means quick service, long-term availability of replacement parts and accessories and ultimately also a longer service life.**

Care should be taken to ensure that the machines conform to the latest test standards (GS/TÜV/SUVA/VDE/interference suppression, etc.). The CE mark, by the way, has nothing whatsoever to do with the safety of a machine. It merely indicates that a machine meets the European minimum standard.

### Other features to be observed:

- The power cable attached to the machine should be sufficiently long and checked regularly for damage.
- Wherever possible, use sanding machines with an external dust extractor.
- While electricity from a socket outlet is always cheaper than compressed air from a compressor, pneumatic machines are often lighter and handier than electric machines.

- Ensure that the abrasive can be fitted and changed quickly, easily and above all safely.
- Right-angle sanders and rotary sanders should be equipped with a brake.
- Adhesive sprays for securing the sanding disc are not good for the health of your employees and bad for the environment too. You can do without them.
- Sanding machines should be easy to clean and look after.
- After use machines and tools should be stored safely and not left on the floor or benches.



### Causes of rust

- Penetration of humidity through cracks in the paint
- Unprotected bare metal
- Climate and time influence the rate of rust damage

### Removal

- Thorough sanding of painted areas
- Sand-blasting rusted areas
- Treating rusty areas with a neutralising acid
- Refinish the area with an approved refinishing system

# Step by step

## Cleaning and stopper application.



### Cleaning (pre-work)

Typical minor damage.  
The work starts with thorough cleaning using Standox Silicone Remover.

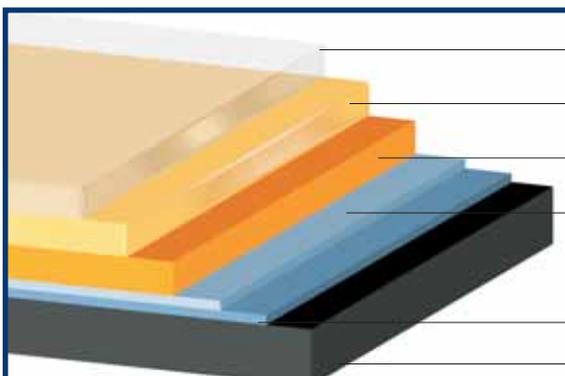
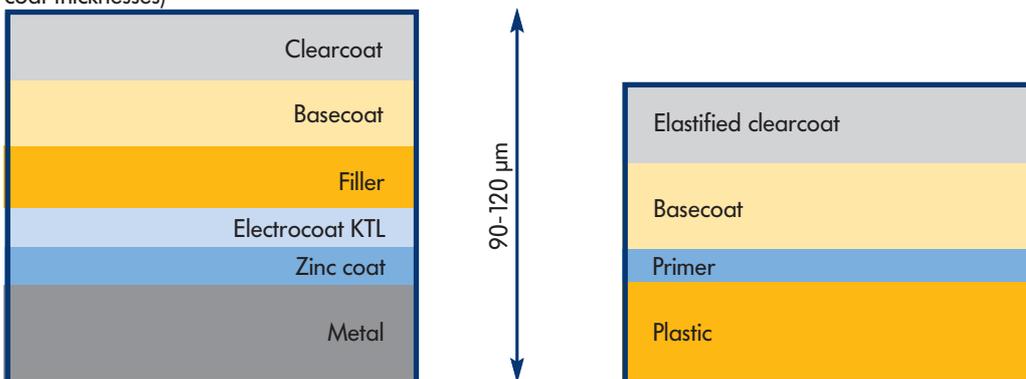


### Sanding (preparatory work)

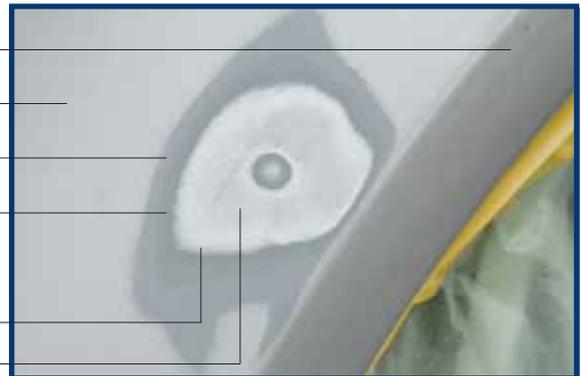
Sand the damaged area with an orbital sander and P80 or P120 abrasive. Use P150 or P180 for final sanding.

### Typical paint coat layers on factory-finished vehicles.

(Approximate coat thicknesses)



Clearcoat  
Basecoat  
Filler  
Electrocoat KTL  
Zinc coat  
Metal





### Stopper application

Remove sanding dust and clean the damaged area with Standox Silicone Remover. Apply Standox Polyester Stopper.

### Sanding

When the Polyester Stopper has dried, sand the damaged area down to the bare metal with a manual sanding block, sanding file or sanding machine with P80–P150. Use P180–P240 for final sanding. Apply additional stopper if necessary.

## Function

## Quality

### Polyester products



- To restore deep indentations in surface

- Adhesion to modern substrates
- Fast drying
- Easy sanding
- Fine smooth surface

### Primers



- Provide adhesion for filler
- Provide corrosion protection

- Adhesion to modern substrates
- Fast drying
- Fine smooth surface
- Environmentally compatible/  
VOC compliant

### Fillers



- Fill out minor surface irregularities
- Provide chip resistance
- Base for topcoat system
- Isolating PE products
- Filling of pores and sanding traces

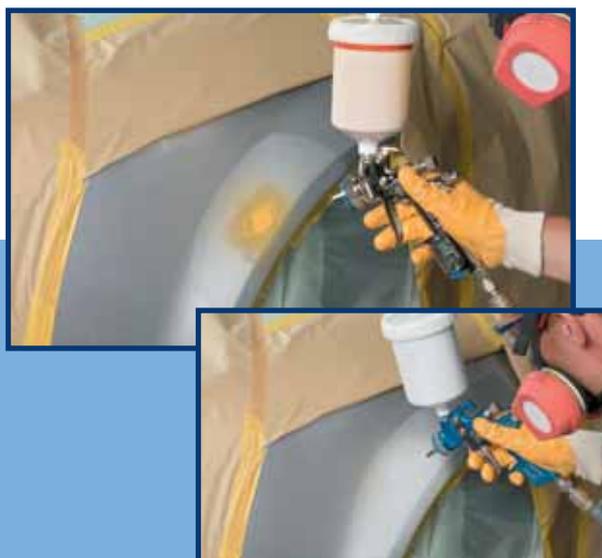
- Adhesion to modern substrates
- Fast through drying
- Smooth and easy to sand surface
- High coat thickness possible
- No shrinkage

## Step by step Filler application.



### Cleaning

Thoroughly remove all sanding dust and clean with Standox Silicone Remover. Mask the area around the damaged part.



### Filler application

Areas which have been sanded right down to the bare metal must be treated with anti corrosion primer (e.g. Standox Etching Adhesion Primer). Apply Standox 2K Filler after allowing the acid primer to flash off.

## Professional products for professional refinishing.

**Standox is one of the world's leading manufacturers of automotive refinishing paints, offering innovative and environmentally compatible product systems for modern bodyshops.**

The quality of a refinish starts with the use of the right preparation materials. Standox offers a wide range of primers, fillers and polyester products for any area of application.

No matter which substrate has to be coated or which application technique is used – Standox has a practical and efficient solution for any application.

Standox products meet the environmental regulations of the EU and feature great user friendliness and great efficiency.

Offering a wide product range that is constantly being supplemented and improved, Standox gives you high-performance products to meet every need.





### Sanding

After applying a guide coat dry sand with P400–500. Light sanding of the rest of the repair area with an ultrafine sanding pad or ultrafine abrasive.

### End of preparation

The repair area is kept to the smallest possible area and is ready for topcoat application.

### Quality made in Standox

Standox products are frequently recommended for guarantee and repair work by automotive manufacturers. In fact, Standox has more approvals than other paint manufacturers. Standox preparation materials such as stoppers, primers and fillers are the basis of brilliant results.

Standox offers practical training to show you how to make more of the products and meet the needs of car makers and insurance companies even better.



## Step by step Topcoat and clearcoat.



### Topcoat application

Apply Standox Basecoat or Standohyd Basecoat. Consider the information given in the Technical Data Sheets.



### Clearcoat application

After a suitable flash-off time, a Standox 2K Clearcoat can be applied.

## Drying techniques.

The basis of good work is the choice of the right tool and the right technique as described in detail on the previous pages. For better efficiency, forced drying can also be used in substrate preparation.

Infrared and UV devices save time and money. They enable you to complete several stages of a job on the same day, ensure the fastest curing of materials and can cut energy consumption too.

Infrared drying is advantageous because it saves energy and is very efficient. The required heat is available immediately after starting and can be used exactly in the place where it is needed.

UV-drying products such as Standox UV Stopper or Standox UV Filler are ideally suited for minor repairs. These products through-harden when exposed to a special UV light. The advantage of UV drying is the extremely short drying time (< 1 minute). Also, the surface does not heat up so that hardly any flash-off time is required.





### Polishing

After a suitable drying time, minor defects such as dust inclusions or sagging can be removed.



### A perfect result

Proper preparation is the best way to obtain a brilliant finish.

## Average drying times in minutes

Advantages of IR drying	Standex products	Air drying	Oven	IR	UV	Time saved over air drying	Time saved over oven
Increased throughput, excellent through-drying	PE Stopper	15	12	<b>3</b>	-	80%	75%
	2K Filler (low coat thickness)	90	15	<b>10</b>	-	89%	33%
Time saving	2K Filler (thick coat)	960	40	<b>15</b>	-	98%	63%

### Advantages of UV drying

Energy saving	UV-Filler	<b>30 s</b>
Greater efficiency		
Increased throughput, excellent through-drying	UV-Stopper	<b>30 s</b>
Time saving		
Energy saving		
Greater efficiency		
Surface does not heat up		

# Stay healthy.

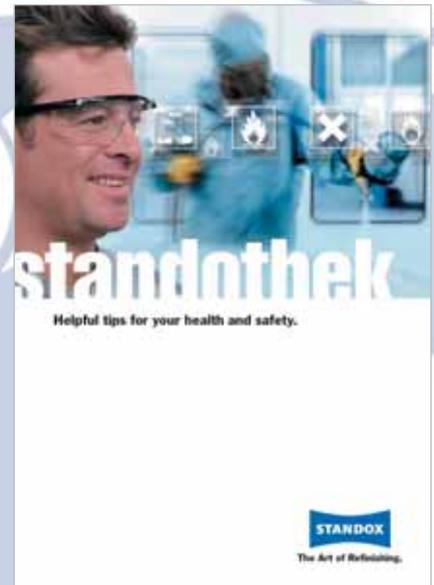
**We take your health seriously and you should do so too. This is why you should take health and safety measures in your daily work.**

Especially with regard to substrate preparation you should consider the following:

- The manufacturers' instruction manuals should be read carefully. All other employees using the machines must also be familiar with them!
- Always wear goggles and gloves as required by local accident prevention regulations when working with sanders. Wear ear protection at all times!
- Loose "working" clothes are a hazard – especially wide sleeves!
- Before starting work, always check that cutting wheels, roughing and sanding discs, etc. are in perfect working order and have been mounted correctly!
- Never lay down a machine without switching off first. Be aware that on some models the exposed tools can run on (coast) after switching off!
- Sparks always fly when sanding. It is therefore important to ensure that there are no inflammable liquids or other flammable materials within range! The same also applies to vehicles on which work has not yet started (also risk of rust films).

- When working, ensure that there is no risk of colliding with the power cable or compressed air hose!
- A dust extractor must be used wherever possible, otherwise a filter mask must be worn!
- Ensure that rotating roughing or sanding discs in particular cannot catch and be pulled into corners or pockets on the car body or into door gaps!
- There is no such thing as a "universal sander" with which all sanding jobs can be completed in a single operation. The various machines must therefore be used exclusively for their intended purpose!
- Guards, etc. are of no use whatsoever if they are not correctly mounted and remain on the machine all the time while working! The position of the guards can and should be adjusted to match the working angle of the machine.

If you want to know more about health and safety, please ask for the Standothek brochure on **Helpful tips for your health and safety**.



# Conclusion.

**Sound, correct preparation of the substrate is indispensable in order to obtain a perfect and brilliant result. And also a very important way of avoiding defects and customer complaints from the outset.**

The need to prepare the vehicle, and that includes the substrate, is still considered a necessary evil in many bodyshops. Practical experience has shown, however, that proper preparation is half the job.

However, if such important skilled work is carried out by unqualified workers or with low-quality products to save costs, the potential "savings" are counter-productive. The problems which will invariably arise are merely shifted downstream – and that is when things become really expensive.

At the end of the day, your work will be judged on your results - good preparation will help you get the job right first time.



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