

# Clean Galena

Emission-free cleaning of historic  
natural stone surfaces



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## An extraordinary cleaning method

There may be aesthetic or technical reasons why a building needs to be cleaned. While the aesthetic reasons play a major role in deciding to go ahead with cleaning, they are difficult to evaluate from an objective standpoint. But it's a different story for the technical reasons: The main issue is that dirt deposits tend to act as reservoirs for moisture and harmful substances, reducing the speed at which the substrate can dry out. This means that the stone surface stays damp for longer, which amplifies the impact of the damage over time.

Any time cleaning is carried out, it is important to remember that this activity itself is not without risks – such as damage to the building substance or the release of deposited harmful substances. Clean Galena makes it possible to minimise these risks.

The typical urban dirt that needs removing from facades is generally made up of deposits of particles suspended in the atmosphere, such as dust, diesel soot, tyre and brake wear particles, iron dust from railways, and so on. These particles often contain heavy metals, and can react with the stone and destroy the original surface. Another problem with many types of natural stone is that the dirt particles are bound in gypsum, which is a secondary product that forms on the stone surface.

Whatever the situation, carefully planned cleaning is essential. The processes used must reduce or even completely remove the dirt, release as few harmful substances as possible, and protect the original substance of the building's surface.

**It's a challenging task – but Clean Galena is up to the job.**



In 2019, Clean Galena won a prize at the BAKA award ceremony for product innovation.



**BAKA award**

prize for product innovation

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## Innovative building technology for people, culture and the environment

In recent years, there has been a growing awareness of the emissions that can occur during facade cleaning. A particularly important question is whether cleaning can cause heavy metals to enter the environment in any form.

One good way of trapping hazardous substances during cleaning is to use cleaning compresses.

These are paste-like cleaning agents that contain a carrier material and active cleaning ingredients. Applying the compress causes the impurities to be dissolved and, together with the solvents used, they migrate into the compress where they are trapped. Once the compress has almost entirely dried out, this means that the cleaning process is complete.

### Cleaning and metal ions

The active agents most commonly used for cleaning purposes are surfactants. In many cases, their surface-active properties can be impaired by metal ions which cause hardness. Metal ions make it easier for dirt to cling to surfaces and strengthen the bonds between dirt particles.

Positive metal ions can act as a go-between for the negatively polarised surface and negatively polarised dirt particles. Here's another way of explaining it: Metal ions can form a complex compound with the dirt as the central atom. This inhibits the swelling of protein-containing dirt particles, which is an important part of the cleaning process. This is because the negatively polarised molecule groups of the protein are bound to the metal ion and therefore cannot interact with water. Because of this, it's easier to clean off dirt if the metal ions have been removed.

Originally, Clean Galena was designed for the complexing and emission-free removal of metal ions – in particular, lead ions – from facades. However, a fortunate side effect was also observed in many cases:

Clean Galena was also having a cleaning action, since removing the metal ions has several knock-on effects that are helpful for cleaning:

- Destabilisation of gypsum and lime deposits
- Improvement of the swelling properties of organic dirt
- Easier dispersion of dirt particles.

The dispersing effect of certain complexing agents is based not so much on the removal of metal ions from the dirt, but rather on the adsorption of negatively charged ions on dirt particles, which gives the dirt a negative charge. These negatively charged dirt particles readily break down into smaller components and also repel one another. The dirt is also repelled from negatively charged or polarised surfaces.

Clean Galena makes use of all these active mechanisms for cleaning facades. As a result, in addition to the (invisible) complexing and binding of metal ions – in particular, lead ions – in the material, a cleaning effect is generally also achieved at the same time.



Before



After

## Configuring the cleaning action

In order to adapt the cleaning effect and, if necessary, the drying time of Clean Galena for a specific substrate, the product is available not just in a standard version but also as 'Clean Galena neutral', which has a minimal amount of active ingredients (a formulation with no active agents at all is also possible, but this results in significant changes to the consistency when mixed with the standard material). The two variants can be mixed on site in order to adjust the cleaning intensity of Clean Galena. It is recommended to set up trial areas where the various mixing ratios can be tested. Once a suitable mixing ratio has been chosen, the mixture can be produced on site if it is to be used on a small area. For larger areas, Clean Galena can be prepared to the desired mixing ratio at the factory. This special mixture gives this variant the name 'Clean Galena individual'.

### The benefits:

- No need to use large amounts of water on the building
- No dust
- No emissions of harmful active substances
- Harmful substances are trapped in the compress for easy disposal
- Clean Galena contains no ammonium carbonate and no EDTA. The active substances used are a range of readily biodegradable complexing agents that are used in the food industry (materials that can bind the various metal ions, such as ions of iron, copper, lead and other heavy metals). They are combined in such a way as to further amplify the cleaning effect of each individual active agent. The carrier material is bentonite, a sheet silicate that binds a variety of dissolved substances and colloids through adsorption and electrochemical processes. It also regulates moisture transport activity during the cleaning process, with the aid of a small amount of cellulose.

# The procedure in detail:

- In the first step, any loose substances that could impair adhesion must be removed from the surface. This is generally done by hand using a broom or brush.
- Before the compress is applied, the surface must be pre-wetted so that the capillary-active pores near the surface are filled with water. This prevents the active agents of the compress from penetrating too deeply into the building material, which in the worst case could result in them migrating and not returning to the compress.
- Clean Galena should be mixed again until homogeneous immediately before application.
- Application by machine has proved to be the most cost-effective and technically suitable application method. At layer thicknesses of 2 mm or above, there are no further improvements to the cleaning effect, but the drying time and therefore the waiting time until the compress can be removed often increase significantly.
- After one to three days, even at relatively low temperatures, the compress dries out and detaches from the surface.
- Once the dry compress has been removed, the surface can be rinsed off again if necessary. At this point, any remaining dirt has been destabilised due to the removal of the metal ions and can usually be removed easily.
- Once removed, the dried material must be disposed of according to local regulations. It may be necessary to analyse the level of heavy metals in the compress, but the dried compress material itself is non-critical.



Wet with water



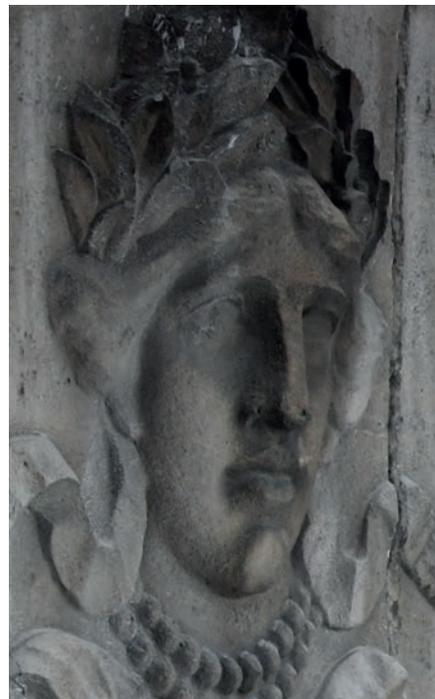
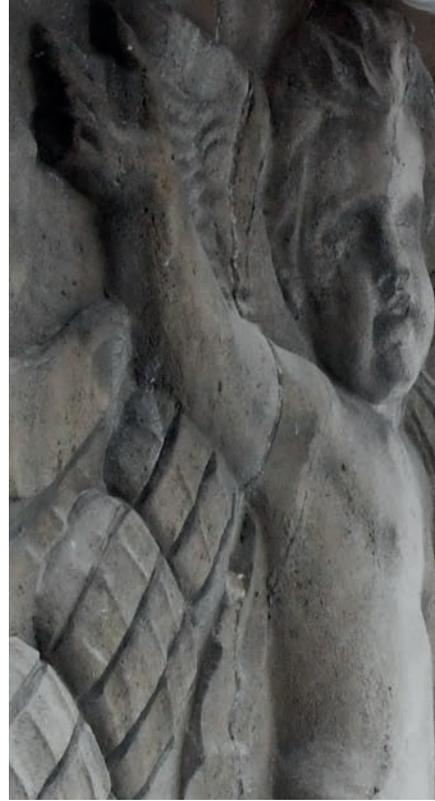
Apply in one or two layers



Drying time (depending on weather conditions)



Remove dried compress





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