

# CLEANING AND MAINTENANCE RECOMMENDATIONS FOR GKD ARCHITECTURAL METAL FABRICS



**Our architectural metal fabrics have been setting standards for decades in the design of building shells and interiors, as well as in security systems. They combine functionality with aesthetics in a wide range of applications. Not only are our architectural fabrics fireproof and heat resistant, they can also be used in all climates when the optimal materials are selected. GKD primarily uses stainless steel, aluminum, and copper or other non-ferrous metals in its architectural metal fabrics.**

**Stainless steel** is a resilient metal that contains at least 10.5 % chromium. In the presence of oxygen, this chromium content forms a thin oxide layer just a few molecules thick, known as the passive layer. This passive layer protects the steel from corrosion. Neither protective coatings nor varnishes then need to be used, which could otherwise potentially compromise the natural properties of the material. GKD uses austenitic stainless steel 1.4404 (X2CrNi-Mo17-12-2) or AISI 316L as standard. Before selecting a cleaning agent, please first check the order confirmation or the factory certificate to determine which material you are cleaning.

Where stainless steel fabrics are used for visual design purposes, GKD can apply distinctive colored coatings or prints that have no negative impact on the material and have proven their suitability for outdoor use on façades.

**Aluminum** forms a natural oxide layer in normal atmospheric conditions that protects the surface from further material erosion, similar to the passive layer on stainless steel. However, if the metal is likely to be exposed to increased environmental stresses, for example due to air pollution or the salinity of marine

environments, corrosion resistance can be improved with the anodic oxidizing process – also known as anodizing. With this electrochemical process, a thicker and more corrosion-resistant protective layer is created during the manufacturing process. The anodized layer offers excellent weather resistance and is available in various metallic colors. The standard aluminum alloys are AlMg 1.5 EN AW-5050 or AlMg 3 EN AW-5754.

For customers seeking non-standard colors, GKD also offers surface coatings on bare or anodized aluminum. A durable synthetic coating is applied to the architectural fabric using either wet or powder coating. The powder coating process has established itself in the field of architecture as an effective and reliable method for adding color. Depending on the type of coating, these are suitable for both indoor and outdoor use.

**Non-ferrous metals** such as copper, brass, and bronze also form an oxide layer. In contrast to stainless steel, however, the oxide layer continues to change and becomes darker over time. As the oxidizing process continues, copper carbonates are deposited, which are characterized by their intense green color. This effect can be particularly desirable on façades, such as churches or other timeless buildings. The natural patina that forms in this way also provides the underlying copper with particularly effective protection from further destructive corrosion, such as pitting.

Regular cleaning is necessary to preserve the value of the metal fabric, ensuring that neither the passive layer nor the oxide layer/organic coating on the surface is destroyed by aggressive contaminants. As with many other building materials, initial cleaning is required on site before the handover if the architectural fabric has been exposed to site dirt and dust.

**Technical weavers for industry and architecture**

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Architectural fabrics, especially those produced from **non-ferrous metals** and intended for indoor applications, must always be well protected from dirt and contaminants before, during, and after installation.

**Fabrics** made from **non-ferrous metals** require additional care to avoid unwanted surface effects. For outdoor applications, such as on façades, dust and other dirt can be rinsed or washed off using clear, fresh water (drinking water quality). Steam blasting equipment can also be used, although caution must be exercised. Degreasing agents such as mild hand dishwashing detergents are also suitable.

For other metals, such as **stainless steel** or **aluminum**, the procedure is as follows:

- Rinse off the architectural fabric with clean water (drinking water quality, never salt water) to remove any dirt.



- Then wash down the fabric with a mixture of water and detergent and, if necessary, use a soft brush with long bristles.



Never use a metal brush! When cleaning stainless steel, use a standard commercially available, neutralizing, environmentally friendly universal cleaner that is also capable of removing salts, grease, and dirt. The pH value of the cleaner should fall within the range of

5 to 8. This helps avoid damage in the form of corrosion, discolorations, and material removal.

The safety data sheets of the cleaning agent manufacturer apply both to the handling of the solution and its disposal. Never use regular household cleaners that contain aggressive scouring agents or chlorine compounds. We urgently advise anyone about to perform cleaning to test the cleaner first on a small, non-exposed area.

**When cleaning printed metal fabrics, particular care must be taken to ensure that the exposure time of the cleaner is less than an hour and the ambient temperature is below 25° C/77° F.**

- After cleaning, always rinse off the architectural fabric with a sufficient quantity of clean water. It is important for the dirt and all of the cleaning substances to be fully washed out, so that no acidic or alkaline contaminants are left behind.



- Allow the architectural fabric to dry.

How often regular cleaning should be performed depends both on the environmental conditions and the aesthetic standards of the owner. With outdoor applications, rain can provide efficient cleaning of a well-designed building that is clad in metal fabric. But it can still make sense to supplement this natural rainfall with routine cleaning once or twice a year. However, in areas heavily impacted by environmental factors, such as coastal regions, as well as areas subject to high humidity or heavy air pollution, cleaning just once or twice a year might not be sufficient. In these cases, cleaning should be performed more frequently. A similar approach to the initial cleaning can be adopted here.

Heavier soiling can occur in certain locations, for example caused during winter by water splashed from neighboring streets. In this case, a pressure washer\* and hot water can also be used for cleaning, as long as there is no frost.

Stubborn dirt that refuses to budge using any of the methods described above, such as particles stuck to the surface, can be removed by rubbing with a mild abrasive cleaner\* that is suitable for use with the corresponding metal. Then rinse well with clean water and allow to dry. It is also a good idea to test the cleaner in a small, hidden section of the architectural fabric.

The product **CMP** represents **an exception** when cleaning GKD architectural metal fabrics. This is a composite product that is produced from various materials and must never get wet, i.e. must never come into contact with water. The surface can only be cleaned using alcohol without any water added, such as isopropanol. The manufacturer's safety data sheet must also be observed.

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## Vandalism, damage, and cleaning during renovation work

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**Graffiti** produced with marker pens, spray cans, or paint brushes is a major problem in certain areas. However, our architectural fabrics are unappealing to graffiti artists, as the material is too open. Thanks to the corrosion resistance of stainless steel\* or the anodized aluminum surface, most solvents and chemical ink removers can be used. However, care must be exercised when removing graffiti. After using chemicals, the architectural fabric and all of its joints need to be rinsed thoroughly with clean or, better yet, distilled water. Attempts to scratch off the ink/paint should be avoided, as the surface can be damaged. This can then compromise the passive layer of the stainless steel or the anodized layer of the aluminum. Where necessary, a suitable metal-free abrasive pad can be used in combination with an ink solvent. However, attention must be paid to ensure that the surface is not "polished" here. The use of sponges that are contaminated with regular carbon steel must be avoided at all costs. These carbon steel particles would contaminate the stainless steel surface and lead to rust spots forming.

In the event of **damage caused by vandalism**, scratches in stainless steel or raw aluminum can be removed to a certain degree using suitable scouring cloths and abrasive sponges and rubbing gently in the direction of the structure. However, this is unfortunately not possible with coated metal fabric. Twisted or bent wires can sometimes be bent back into shape using small pliers.

**Cement spatter** or mortar splashes are the most common forms of soiling that occur on a construction site. It is important to remove this soiling with water immediately, before it has the chance to harden. If this has not been done, cleaners for removing grout from tiles should not be used, as these generally contain strong chemicals such as chlorine, which can have a corrosive effect on stainless steel. Instead, the mortar can be removed using a pressure washer and mechanical

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\* When working with coated or printed stainless steel or organically coated aluminum, this type of cleaning with a pressure washer, abrasive sponges, potent cleaning solutions with a pH value outside the range of 5-8, or solvent is not permitted, as it could potentially destroy the actual coating.

cleaning. The surface can then be cleaned using a mild abrasive that is suitable for use with the respective materials or coated materials and a neutralizing universal cleaner that removes salts. The most important thing here is that the architectural metal fabric must then be rinsed off carefully with clean water.

**CONTAMINATION of the stainless steel WITH CARBON-CONTAINING STRUCTURAL STEEL** can occur at the installation site. A typical example is metalworking dust from the construction environment, which must be removed. The dust, with its carbon steel content, oxidizes and causes rust spots on stainless steel. When spread over a large area, this kind of contamination is very difficult to remove. In many cases, however, flash rust spots only occur in small areas and can be removed using special gels or strong acid-based stainless steel cleaners. It is helpful to use a foaming cleaner in order to guarantee a longer exposure time. The safety data sheets from the cleaning agent manufacturer apply with regard to handling and disposal. The surface must then be rinsed off thoroughly using clean or distilled water. Then let it dry.

In the process, it is important to ensure that adjacent components are not exposed to any dust or dirt.

Providing proper attachment and a pre-tensioning, matched to the respective fabric type, is key to ensuring the safety and durability of façades.

The pre-tension for architectural metal fabrics generally ranges from 1.5 kN/m to 3 kN/m, based on the width of the fabric and/or pre-structural calculations. This must be set during installation.

A visual inspection should be carried out at least annually, ensuring that there is no damage to the fabric and that the pre-tension is still in place. It is also a good idea to inspect architectural fabric façades after any severe weather event.

Since not all contractors are familiar with the unique requirements of architectural fabrics, GKD offers TENSIO MESH®, a patented system that provides maximum control and assurance not only for design and construction professionals, but also owners and property managers. With TENSIO MESH®, the pre-

tension can be regularly monitored and adjusted in accordance with applicable regulations for metal fabric façade installations. Climate change is making this adjustment and monitoring feature even more important, as TENSIO MESH® ensures additional assurance and resilience during weather events such as storms and heavy rain.

### Practical guidelines for planning

- Before selecting the grade of stainless steel, first assess the environment to determine the likelihood of deposits and airborne contaminants, such as soot, iron oxide particles, sulfur dioxide, and salt levels. Also, consider potential cleaning processes involved.
- Choose a design that allows rain to wash away surface deposits that may form on the architectural fabric.
- Select a higher grade of stainless steel or anodized aluminum for covered areas that are cleaned regularly.
- Select stainless steel attachments with equal or greater corrosion resistance than the component being attached when using stainless steel architectural fabrics.
- As a general rule, never use carbon steel brushes or steel wool on stainless steel surfaces or our architectural fabrics. Only use soft synthetic brushes or nonwoven cleaning cloths for cleaning.
- Do not use any hydrochloric acid on or in the proximity of stainless steel and aluminum surfaces. Accidental hydrochloric acid spillages/splashes must be rinsed off immediately with a large volume of water before the material is seriously damaged by the acid.
- Only use cleaning agents that are designed for use on the metal in question, observing the manufacturer's safety data sheet. Always test the cleaner on a hidden section first.
- Before beginning, ensure that nearby components cannot be damaged by the cleaner or cleaning method. For example, if a cleaner containing phosphoric acid is used on aluminum profiles, this can lead to removal of the natural oxide layer and/or damage to the surface. Make sure that only neutral cleaners whose pH value is between 5 and 8 are used. Always pay attention to the safety data sheet of the cleaner manufacturer.

- Dissimilar metals need to be galvanically isolated from one another in areas when they could get wet. This isolation can take the form of washers, protective coatings such as paint, and other physical barriers that permanently and consistently prevent direct contact.
- GKD uses austenitic stainless steel 1.4404 (X2CrNi-Mo17-12-2), or AISI 316L, as standard in its architectural metal fabrics. However, other stainless steels such as higher alloy steels and lower cost stainless steels are also available. The sales team at GKD will be happy to go through the options with you. The standard aluminum alloys are AlMg 1.5 EN AW-5050 or AlMg 3 EN AW-5754. Before selecting a cleaning agent, please first confirm the material by checking the order confirmation or factory certificate.
- Protect the metal fabric with paper, removable plastic film, or other means of protection during production, transport, and installation.
- GKD TENSIMESH® is a patented system that provides ultimate control and assurance not only for design and construction professionals, but also the building owners and managers. With TENSIMESH®, the preload can be continuously monitored and maintained in line with the static stipulations for metal fabric façade installations.

## References and resources

(NiDI) Nickel Development Institute

Answers for Architects, Nickel Development Institute.

January 1988

Stainless Steels in Architecture, Building and Construction, Nickel Development Institute, April 2002

Gütegemeinschaft Reinigung von Fassaden GRM e.V., [grm-online.de](http://grm-online.de), Schwäbisch Gmünd

Euro inox – The European Stainless Steel Development Association

Reinigen von Edelstahl Rostfrei, Hg.: Informationsstelle Edelstahl Rostfrei Düsseldorf

Cleaning agent recommendations for coated surfaces can be found at the GRM e.V. website [www.grm-online.de](http://www.grm-online.de)

<https://fassadenreinigung.grm-online.de/fileadmin/Redaktion/Downloads/REINIGUNGSMITTEL/Reinigungsmittelliste.pdf>

or

Manufacturers of stainless steel cleaners	
Bio-Circle Surface Technology GmbH Berensweg 200 33334 Gütersloh Germany <a href="http://bio-circle.de">bio-circle.de</a>	Wide range of stainless steel and aluminum cleaners for all intended applications
Sunshine Makers, Inc. 15922 Pacific Coast Highway Huntington Beach, CA 92649 USA <a href="http://simplegreen.com">simplegreen.com</a>	Simple Green® All-Purpose Cleaner for initial and periodic cleaning