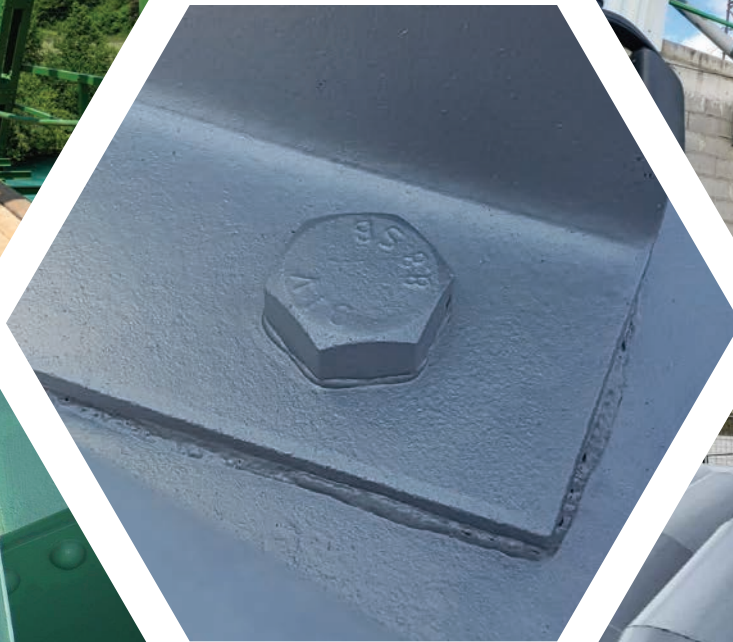


MCU TECHNOLOGY AND REFERENCES



CHEMCOLOR
protective coatings since 1982





CHALLENGES WORKING ON PROJECTS IN NATURE

Statistical data for Slovenia show that, on average, every third day is rainy. long-term statistics for Ljubljana is saying 155 rainy days a year. In addition to rain, there is often also fog, which makes painting impossible. During late autumn, winter and early spring (from November to April), the average daily temperature is below 5°C most of the time, which makes it impossible to use standard epoxy polyurethane systems for the renovation of projects in nature. The requirements for classic epoxy and polyurethane coatings are a temperature between 5 and 30°C and a relative air humidity between 35 and 85%. The dew point, that is the temperature at which condensation can form on the surface, must always be at least three degrees above the ambient temperature.

During the rest of the year, even in very nice and sunny weather, the relative humidity is in the suitable range for painting from 4 to 10 hours a day. Otherwise the risk of condensation on the surface is too high and project should not be ongoing. So that painting with epoxy polyurethane systems can be carried out in suitable conditions for an average of 6 hours on a sunny day.

MCU technology has no limitation due to the dew point and can be applied at temperatures from -20 to +40°C, at relative air humidity from 0 to 99%. It can also be applied on rainy days, as far as after the rain does not fall on the painted surface within 4 hours (using the accelerator MCU Quickcure can speed up the process to an hour).

A simple comparison of working hours according to weather conditions between epoxy/pure and MCU technology shows:

CONDITIONS*	PER YEAR	EPOXY/PUR theoretical - 24/7	MCU practical - 8/5	MCU theoretical - 24/7
cold <5°C	110 days	0 working hours	8 working hours	24 working hours
Rain in months above 5°C	30 days	0 working hours	0 working hours	0 working hours
Showers in months above 5°C	90 days	2 working hours	4 working hours	16 working hours
Appropriate conditions	135 days	6 working hours	8 working hours	24 working hours
Working hours per year		990 working hours	2320 working hours	7320 working hours

*Long-term average statistical data for Ljubljana are used for the calculation



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BRIDGES

Painting bridges is challenging from several aspects.



As a rule, there is water under the bridge, so the protection of the work site is very demanding. In the case of sandblasting, a large amount of dust and additional waste is produced, which greatly burdens the surroundings. Sandblasting noise is very annoying in urban environments. Water washing is a much more environmentally friendly method of surface preparation, as it consumes 50% less energy and does not create additional waste - the waste is only old, removed paint. However, classic epoxy/pur systems do not have a good adhesion to the surface prepared by water washing, whereas MCU technology is the "best friend" of water washing.



Water causes a higher relative air humidity above it, which means an even shorter working time than indicated in the table above. MCU technology has no dew point limitation and can be used to paint the bridge all day, every day (24/7).



Old bridge systems do not degrade at the same rate over the entire surface. Certain areas are completely destroyed, most of the surface on a project may still be in good condition. There is always the question of what to remove and what to leave on the bridge. Epoxy coatings are very rigid and shrink after curing. In this way, great forces are achieved, which tear off old coatings from the surface. MCU technology is more elastic than all known systems and is therefore very surface tolerant of old coatings. It can even be used to repaint alkyd-based lead paint. MCU technology does not affect adhesion.



A closed bridge means big problems for transportation. Detours are long and cause many inconveniences in traffic and extremely high additional fuel consumption as well as other burdens on the environment and the local population (noise, exhausts, delays, crowding, etc.). If we take for example a 10 km detour and 10,000 vehicles per day, one day of closure consumes about 8,000 litres of fuel more than with an open bridge. Thus, the only sensible green criterion for the paint system used on the bridge is a shorter closure time - detour and a longer interval between renovations.

BOROVNICA



Fog



Rain



Snow



Low
Temperatures



Relative
Humidity

Work carried out in winter,
ljubljsko barje 2022-2023





GLOBOKO



Rain



80%
Relative
Humidity

Carried out in April, May and part of
June 2021 - at least 30 rainy days



ŽIROVNICA



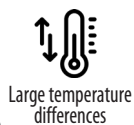
High
Temperatures



Carried out in July and August 2021



KRANJSKA GORA



Large temperature differences



Fog



Rain



Short production time

Carried out in September and October 2021, 11 working days



MOJSTRANA



Favourable Temperatures



JESENICE



Snow



Low
Temperatures

Carried out February, March
2021 - snow, cold, ice



NADVOZ ŠTANJEL



Favourable
Temperatures

Carried out September,
October 2022



ILIRSKA BISTRICA



Favourable
Temperatures

Carried out May, June 2022



TEKAČEVO



Short
production time



Favourable
Temperatures



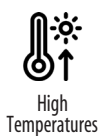
Bridge made in 2013, made
in 4 working days



Taken 10 years after application



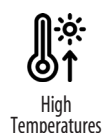
TREMARJE



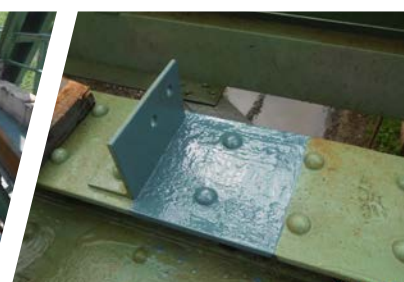
Bridge painted with epoxy
polyurethane system, MCU
system used for details in
extreme weather conditions



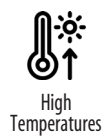
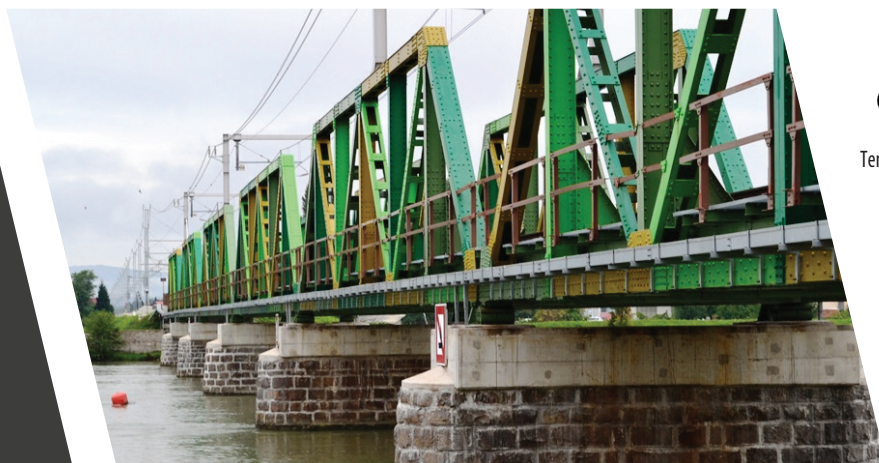
VERŽEJ



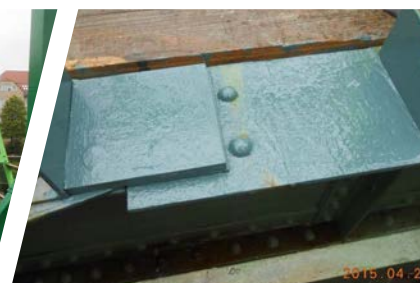
Bridge painted with epoxy
polyurethane system, MCU
system used for details in
extreme weather conditions



PTUJ



Bridge painted with epoxy polyurethane system, MCU system used for details in extreme weather conditions



RIBJA BRV OVER RIVER LJUBLJANICA - 2014

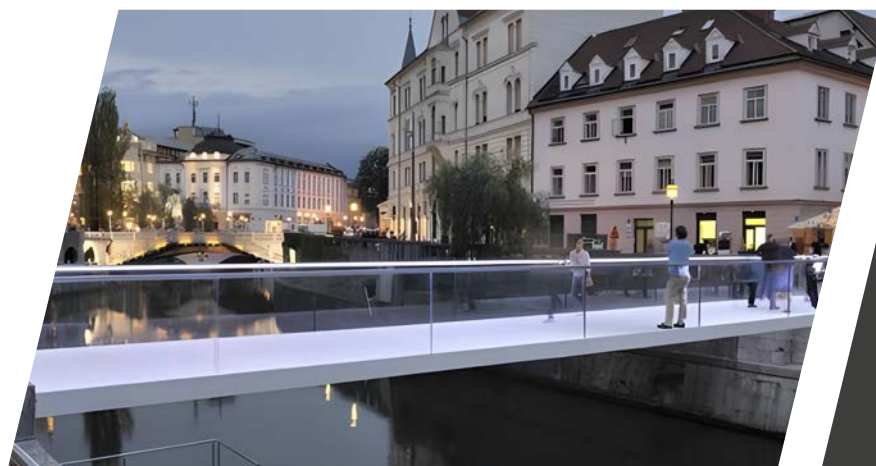


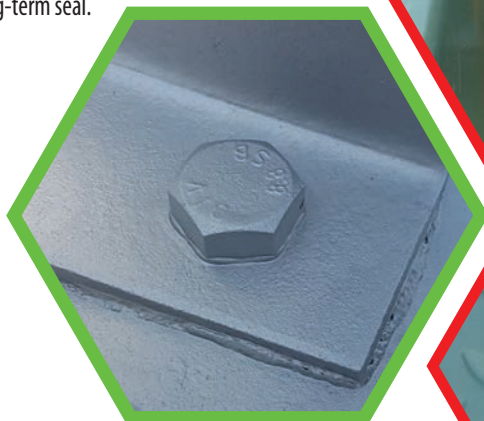
foto: Dismetral



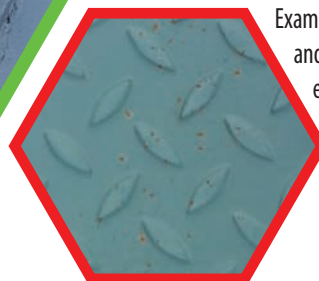


SEALING DETAIL

A thin gap - for example between the nut and the bonding surface - is most often the cause of premature rusting. MCU technology inflates in the presence of moisture in a thicker film (such as purfoam) and effectively seals the gaps. Due to its elasticity, it does not crack over time and is an effective long-term seal.



Epoxy-polyurethane system after 14 days.



Example of poor surface preparation and subsequent rusting through epoxy primer 3 days after application

Tekačevo Bridge 10 years after application



Same bridge, painted with epoxy/polyurethane system, at the same time





ROOFS

Metal roofs are extremely demanding to maintain or repaint. Usually these are thin sheets, which are mostly galvanized. Such surfaces cannot be sandblasted, as this alone destroys it. Thus, preparation is limited to manual tools (up to 4x shorter coating life) or water washing. Water washing is a problem for the adhesion of most systems. MCU is not among them.

The daily range of temperatures is biggest on the roofs. During the day, the temperature rises by more than 50°C, especially on dark surfaces it can exceed 70°C in direct sunlight. This means very variable daily conditions – from condensation in the morning to an overheated surface and too fast drying in the middle of the day. MCU technology has always proven to be a very reliable and easy choice.



Large temperature differences



Sea proximity

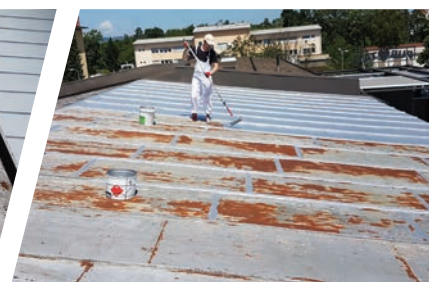


Storms



Relative Humidity

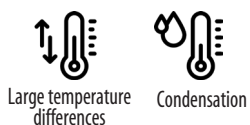
Always condensation,
problems with preparation



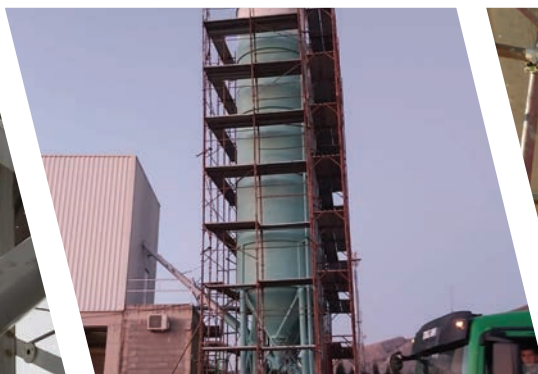
Easy to prepare, imaged 18
months after application

▶ SILOS

Hollow structures in nature are extremely problematic for painting. In different parts of the day, the difference between indoor and outdoor temperature can be very large. For example, in the morning the temperature inside and outside is 10°C. The air in the surroundings starts to warm up quickly and soon reaches more than 20°C. This creates conditions for dew - condensation on the outer surface of the silo. This prevents the paint from adhering or causes immediate rusting when sandblasting the surface. A similar thing happens in the afternoon/evening when the ambient temperature drops faster than the air temperature in the silo and this causes dew on the inside of the silo. Premature failures on such structures are therefore very common. MCU technology has no dew point limitation, has excellent adhesion to a slightly damp surface and is not sensitive to "flash rust" thin-layer corrosion.



Always condensation,
problems with preparation





HIGH HUMIDITY

Areas with constant high humidity, such as basements, underground areas, the vicinity of production processes where water/humidity is included, processes with boiling water, frequent cleaning with water or steam, water pumping stations. Such objects require constant maintenance, since correct or adequate preparation is impossible without stopping production or moving the object into an area with good conditions. Experience with MCU technology shows that application to a moist (not wet) surface results in excellent adhesion and long-term protection.

95%
Relative
Humidity



Power Plant Rudnik Mežica



Hydroelectric power plant on the Neretva



Čakovec Wastewater Treatment Plant

▶ WORK AT HEIGHT

"ALPINIST" PAINTING

In addition to the classic, already described above limitations for the use of classic systems, on such facilities (power lines, electricity, antenna, telecommunication towers, ...) we encounter the impracticality of using two-component systems. Accurate mixing - field weighing is generally not possible. The open time of using 2k systems is very limited and must be strictly respected. In practice, this is difficult to implement, which is why simple one-component systems are used for painting at heights, which in practice do not reach the lifetime of two-component systems. MCU technology is one-component, easy to use and in reality exceeds the lifetime of classic 2K epoxy polyurethane systems.



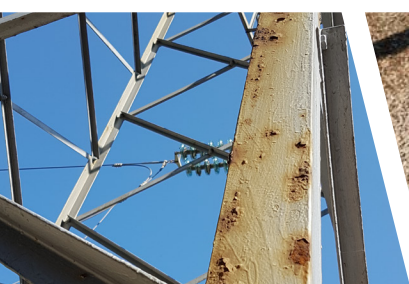
Working at
height



Large temperature
differences



Fog



▶ LOW TEMPERATURES APPLICATION IN WINTER

Low temperatures are not suitable for the use of classical epoxy polyurethane systems. The winter versions allow working at lower temperatures (up to -5°C), but these are very demanding and expensive systems that still dry for several days. However, these systems are not tolerant of fluctuating humidity (frost/fog), which is constant over a two-day period in winter. The adaptation of MCU technology using an accelerator (MCU Quickcure) enables practically the same quick drying at -5°C as at 20°C . This means mastering the conditions for the application, as these do not change drastically in a few hours.



Snow



Low
Temperatures



SUBMERSION SOON AFTER APPLICATION

Painting surfaces that are in the tidal zone or otherwise exposed to immersion in water are extremely demanding for effective protection. MCU technology allows immersion in water only one hour after painting. Even application on a damp surface does not pose too many obstacles. MCU technology is twice as tolerant to residual salts - contamination on the surface than classical epoxy polyurethane systems.



Immersion
in water



Relative
Humidity



▶ PAINTING OVER OLD COATINGS

Old coatings present a special challenge. Usually, paint on an object does not degrade evenly. Certain parts are of course more exposed, certain parts were poorly prepared and made. These parts are the reason for a complete restoration. With MCU technology, we have the opportunity to follow the principle of common sense and remove what is bad and leave what is good. MCU technology is more elastic than all other systems and does not shrink when drying. Thus, it does not create high stresses and does not cause delamination of old, well-adhered coatings from the surface. Such an approach brings great savings for the investor, shortens the implementation and closure time and places a much smaller burden on the environment and the local population.



Bridge piece, painted with alkyd paints and lead minium



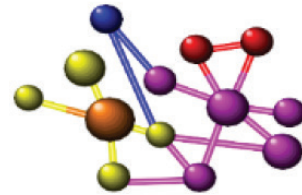
Same piece repainted with MCU



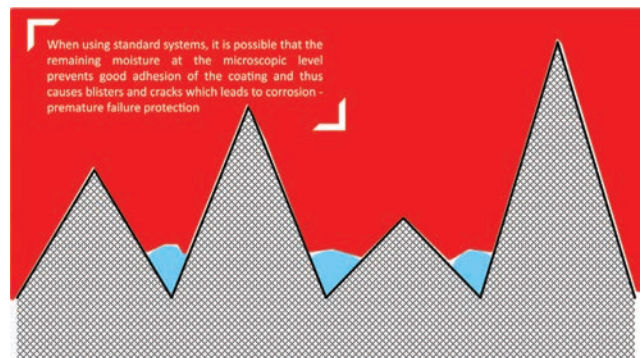
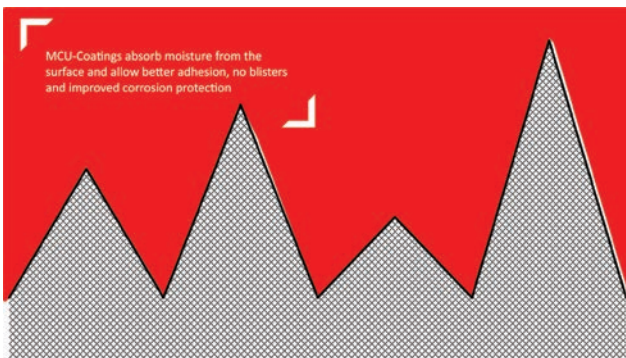
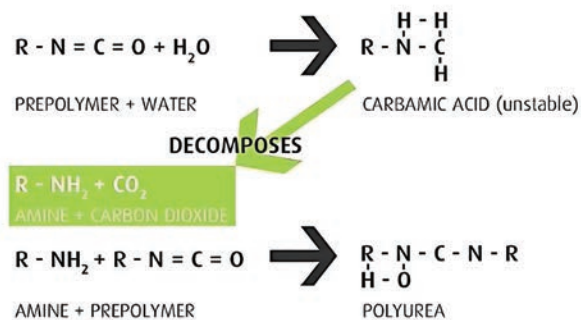
We only remove what is bad

▶ WHAT IS “MCU” TECHNOLOGY?

Moisture Cure Urethane



One-component + Moisture = Polyurea

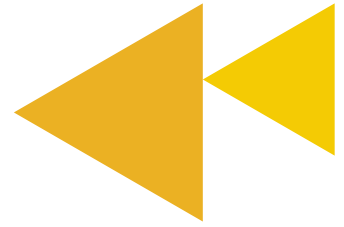


WHILE IT IS **THE ENEMY** IN OTHER SYSTEMS,
MOISTURE IS THIS **SYSTEM'S PARTNER!**



CHEMCOLOR
protective coatings since 1982

MCU TECHNOLOGY AND REFERENCES



WHY WORK WITH US

Chemcolor has been manufacturing coatings since 1982. Over the past 20 years, we have focused primarily on the professional quality required by the industry. The main part of the export program is represented by high-quality protection systems for metal surfaces.

FLEXIBILITY TO YOUR NEEDS

Small team and simple structure give us the possibility of fast response times and easy decision making. Full production and laboratory equipment means great flexibility. We can serve you from 25 to several thousands of litre batches done with precision and care you need and deserve.

TAILOR MADE SOLUTIONS

We pay extra attention to your needs. Our offer does not end with our product portfolio. We listen to your needs and we already start with small quantities. We always seek for best possible solution and price/quality ratio. We use our extensive laboratory equipment and knowledge for development and we work „hand in hand“ with institutes, universities and research labs of our suppliers.

FULL SERVICE IS OUR COMMITMENT

We support our partners from idea to solution. We give education for end users, supervisors, architects, we are helping you with paperwork, we make liquid and solid

samples, lab and field trials and we help in supervising the quality control for your important projects.

INDEPENDENT CERTIFICATION OF PROCESS AND PRODUCTS

We trust in us and our solutions. But we always want to play safe and to bring utmost safety to our partners. This is why we only sell independently certified systems for protection of your products or property. We of course also yearly check our quality management and relationship towards environment in forms of ISO 9001 and 14001.

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verzija 03, february 2024



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