Cold rolled steel sheets and coils
Weathering steel COR-TEN® A

The anticorrosive properties of weathering steel grades are in many applications better than those of other structural steels. At first, the steel surface becomes rusty, but gradually a patina is formed and corrosion slows down. The weathering steel protects itself.

Applications
- External claddings
- Containers
- Transportation tanks

Ruukki is a metal expert you can rely on all the way, whenever you need metal based materials, components, systems or total solutions. We constantly develop our product range and operating models to match your needs.

The anticorrosive properties of the COR-TEN® A steel are in many applications better than those of other structural steels. The use of unprotected weather resistant steel in outdoor applications requires that the surface is exposed to normal atmospheric conditions, i.e. becomes wet and dry regularly. At first, the surface becomes rusty, but gradually during use the rust layer becomes denser and protects the steel underneath from further corrosion. Corrosion slows down, meaning that weather resistant steel protects itself.

Weather resistant steel can be used in many applications as such, and thus additional surface treatments during manufacturing and use are avoided. Using weathering steel for weather-proof applications lowers the cost and impact on the environment during the product's life-cycle.

The cold rolled, weather resistant steel COR-TEN® A is produced under licence from the United States Steel Corporation.

- **Delivery condition**
  The products are delivered with a mineral oil-based rust preventive applied on the surfaces unless otherwise agreed in the order. If rusting is permitted during transport or storage, it is preferable to order the steel without protective oil to promote the formation of a uniform patina. Unprotected deliveries are at the customer's risk.

- **Formability**
  The COR-TEN® A steel can be cold formed in the same manner as general structural steels of the same strength. The minimum bending radius is 0.5 x t.

- **Surface quality**
  Minor surface defects and slight colouring are permitted for the COR-TEN® A steel.

- **Surface finish**
  The surface finish is normal, the roughness value R_a is approx. 0.6 – 1.9 µm.

- **Weather resistance**
  The atmospheric corrosion resistance of weather resistant sheet and strip is based on the chemical composition of the steel. As a result of alloying elements, a dense protective patina layer composed of corrosion products is formed on the surface of the COR-TEN® A steel under the influence of weather conditions, which significantly slows down the rate of rusting. The protective layer develops within 18 to 36 months under normal atmospheric conditions provided that the steel surface becomes wet and dry regularly. At first, the protective layer is reddish-brown, but gains a darker hue with time. In an industrial atmosphere the patina is formed quicker and becomes darker in colour than in a rural atmosphere.

  Thanks to the patina, unprotected COR-TEN® A steel can be used in outdoor applications regularly exposed to changes in weather. However, the protective layer does not form if the steel surface is constantly wet.

  COR-TEN® A withstands corrosion caused by exhaust gases from sulphur-containing fuels better than normal structural steels. Resistance to scaling at high temperatures is also better.

  Unusually high rates of corrosion may occur in chlorine-containing or marine atmospheres. It is recommended that weather resistant steel is painted under such conditions.

- **Design issues**
  In structures where the steel is not directly exposed to the atmosphere the patina may become less uniform. The surface layer may also become uneven in structures exposed to considerable local variations in temperature or when exposure to the elements is uneven in different parts of the structures, such as steel surfaces under eaves.

  When using weather resistant steel, it is important that the design provides adequate ventilation on the reverse side of the sheet to avoid corrosion. To ensure a uniform colour of the patina, any oil, mortar, paint marks and dirt must be removed from the surface. Any markings should be made with chalk or water-soluble pigments. The use of acidic detergents should be avoided.

  Before the protective layer has developed, some rust from the surface will dissolve in rain water. The structures should therefore be designed so that the drain water will not discolour any objects underneath.

- **Welding**
  Weather resistant steel is well suited for welding by conventional methods. When using methods requiring welding consumables, the consumable can be selected for either its welding technique or aesthetic properties. In the latter case, the colour of the weld is aimed to match with the colour of the plate to be welded. Recommendations for welding consumables can be obtained from the manufacturers.

- **Paint coating**
  If required, the COR-TEN® A steel can be painted by methods similar to those applied for other cold rolled grades. Painting is recommended for applications where the formation of the patina may become obstructed.

- **Inspection**
  Each basic coil is an inspection lot of its own.
  The maximum coil weight is 30 t. One tensile test (acc. to EN 10002-1) per inspection lot is carried out with transversal samples.

- **Inspection documents**
  An inspection document of the required type acc. to EN 10204 is provided when agreed in the order.

Chemical composition

Table 1

		Content % C	Si	Mn	P	S	Cr	Cu	Ni	Al
COR-TEN© A	Minimum	–	0.25	0.20	0.07	–	0.50	0.25	–	0.015
	Maximum	0.12	0.75	0.50	0.15	0.030	1.25	0.55	0.65	0.060

Mechanical properties

Table 2

	Yield strength $R_{p0.2}$ N/mm² Minimum	Tensile strength R_m N/mm² Minimum	Elongation A_{80} % Minimum
COR-TEN© A	310	450	22

Tensile testing is carried out transverse to the rolling direction.

Our Customer Service is happy to give you further information

Sales, technical support info.metals@ruukki.com

Rautaruukki Corporation, P.O. Box 138, FI-00811 Helsinki, Finland. tel. +358 20 5911 www.ruukki.com