

The handling and protection of galvanised and prepainted material during storage

Galvanised and Chromadek® sheeting performs exceptionally well when exposed to normal atmospheric conditions. Under normal conditions, galvanised and Chromadek® sheet used for the roofing and cladding, forms a natural protective zinc oxide/zinc carbonate layer on the exposed surface. This formation improves the resistance of the zinc coating to premature corrosion. In the case of Chromadek® sheeting, the protective paint system offers an additional physical barrier against the natural elements that Chromadek® is exposed to.

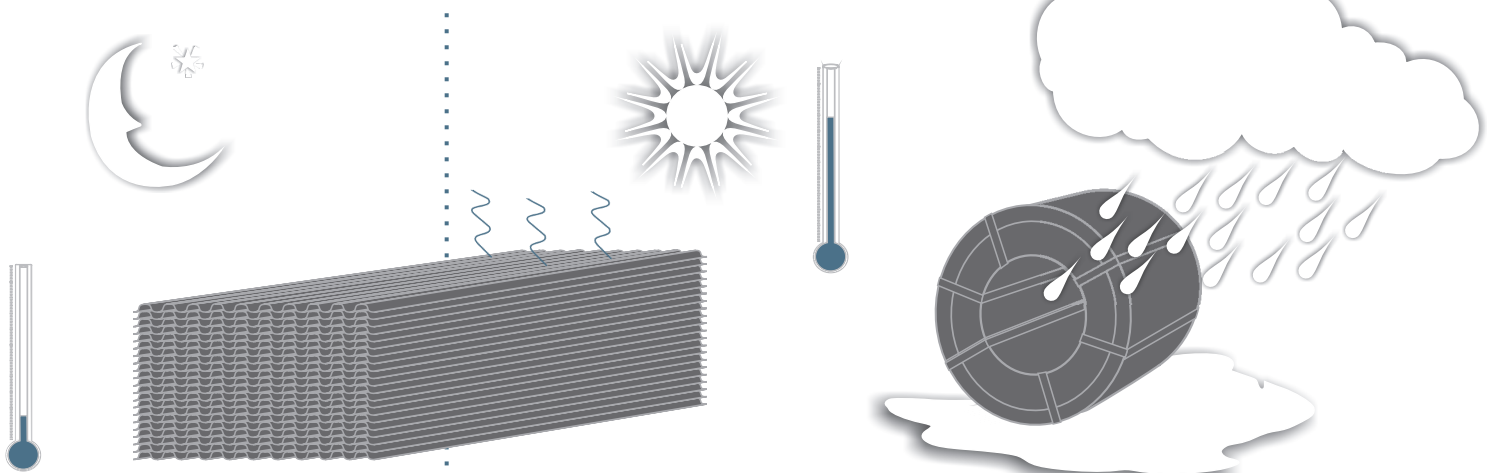
The protective nature of both the zinc and paint coating may, however, be seriously impaired when exposed to wet conditions for extended periods of time in the absence of air. In the absence of air, the zinc surface becomes susceptible to corrosion during prolonged storage without the necessary precautions.

Rainwater or water vapour (condensation) can easily be drawn in between tightly nested profiled sheets or between laps of coils, by capillary action. Without the absence of free circulating air, moisture cannot evaporate resulting in conditions that could lead to wet storage corrosion that is generally described as "white rust" or "wet-storage stain" on galvanised sheeting. In the case of Chromadek® these conditions may cause discolouration of the paint film and in extreme cases may result in wet storage corrosion, similar to galvanised sheeting.

Wet storage corrosion will soon start after nested packs, coils or sheet are exposed to wet conditions. Such conditions affect the expected maintenance-free life of the sheeting unless addressed at an early stage. To prevent wet storage corrosion ensure nested packs, coils or sheet remain exposed to continuous freely circulating air.

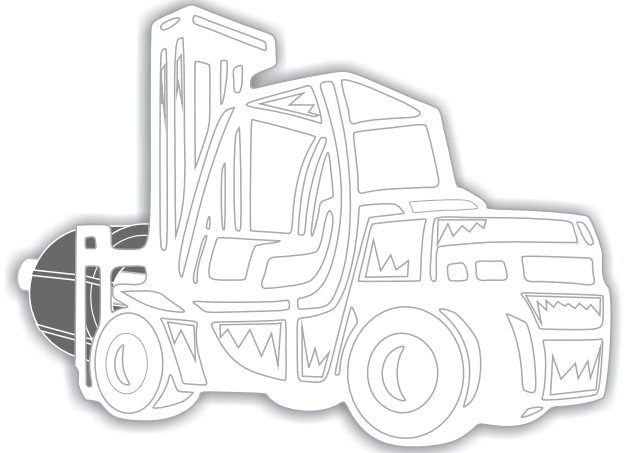
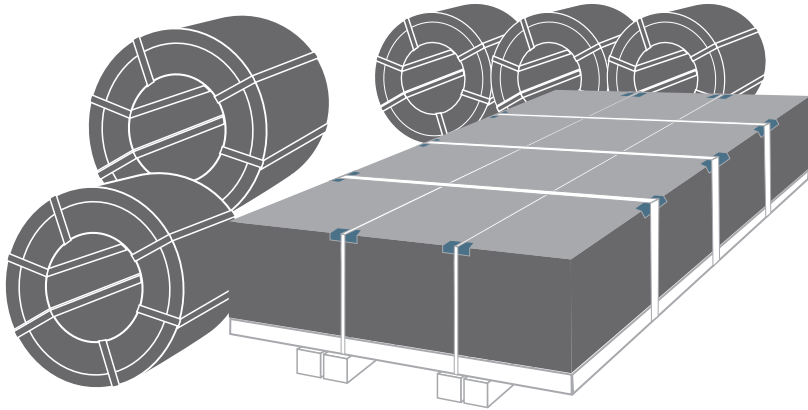
Steps taken by ArcelorMittal South Africa to protect coated sheet against damage by wet storage corrosion

To inhibit the occurrence of wet storage corrosion, it is ArcelorMittal South Africa's standard practice to passivate the surfaces of galvanised sheet through chemical treatment during processing. Furthermore, galvanised sheet can also be ordered with a protective oil coating which is supplementary to the normal passivation and is intended to aid protection during handling and storage. In the event that the precautions as advised are not taken, galvanised sheet cannot be entirely safeguarded against wet storage corrosion, especially when stored under adverse wet storage conditions.



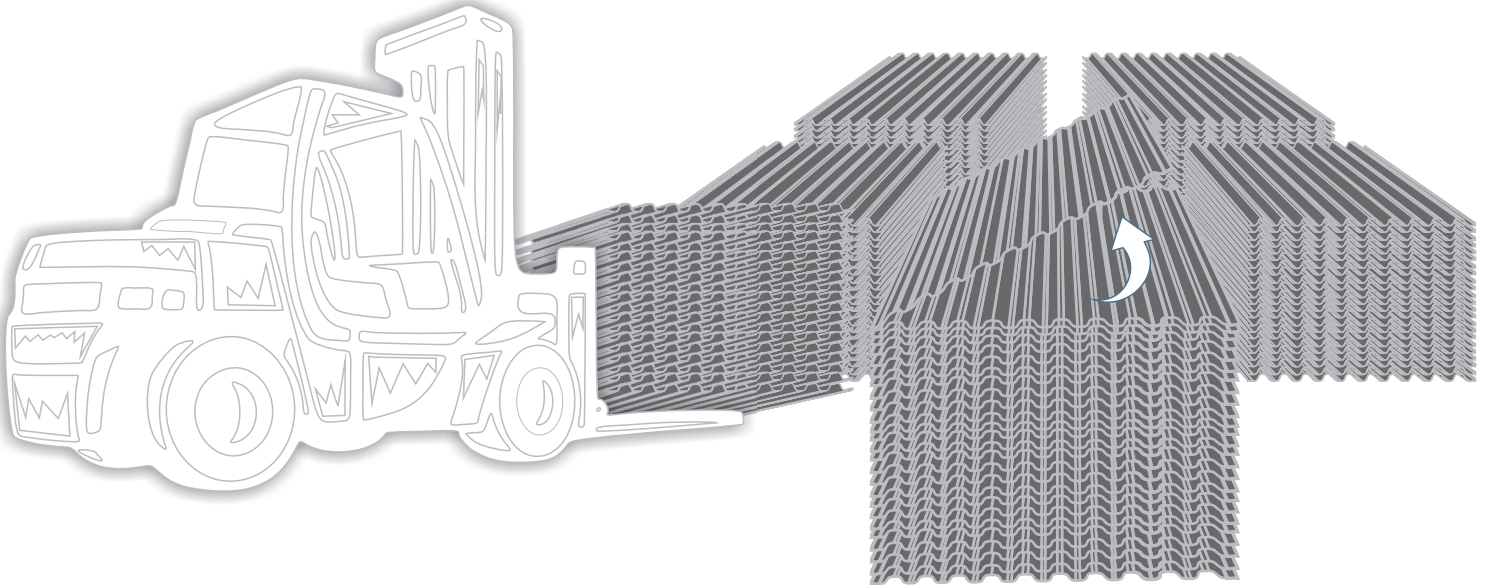
ArcelorMittal South Africa also provides a special type of protective packaging for coils. Customers who do not have the necessary facilities to temporarily prevent the ingress of moisture are advised to specify the protective packaging option when placing orders.

Every precaution is taken by ArcelorMittal South Africa to ensure that galvanised and colour coated sheet products leave the plant dry and in prime condition. These coils are packed, handled and loaded onto transportation trailers inside a warehouse before being covered with either tarpaulins or canopies.



Inspection of material on receipt

Upon receipt of coils and bundles of galvanised or colour coated profiled sheets, from the profile roller, it is important that the condition of the galvanised or colour coated surface is carefully inspected. When galvanised or colour coated coil and profiled sheets have to be stored for more than fourteen days, care must be exercised to keep the material dry during transport and under cover storage. When moisture is found to have penetrated bundles or packs on delivery, a complaint should be registered with the supplier. These packs should be opened without delay and the individual sheets separated and dried before storage.



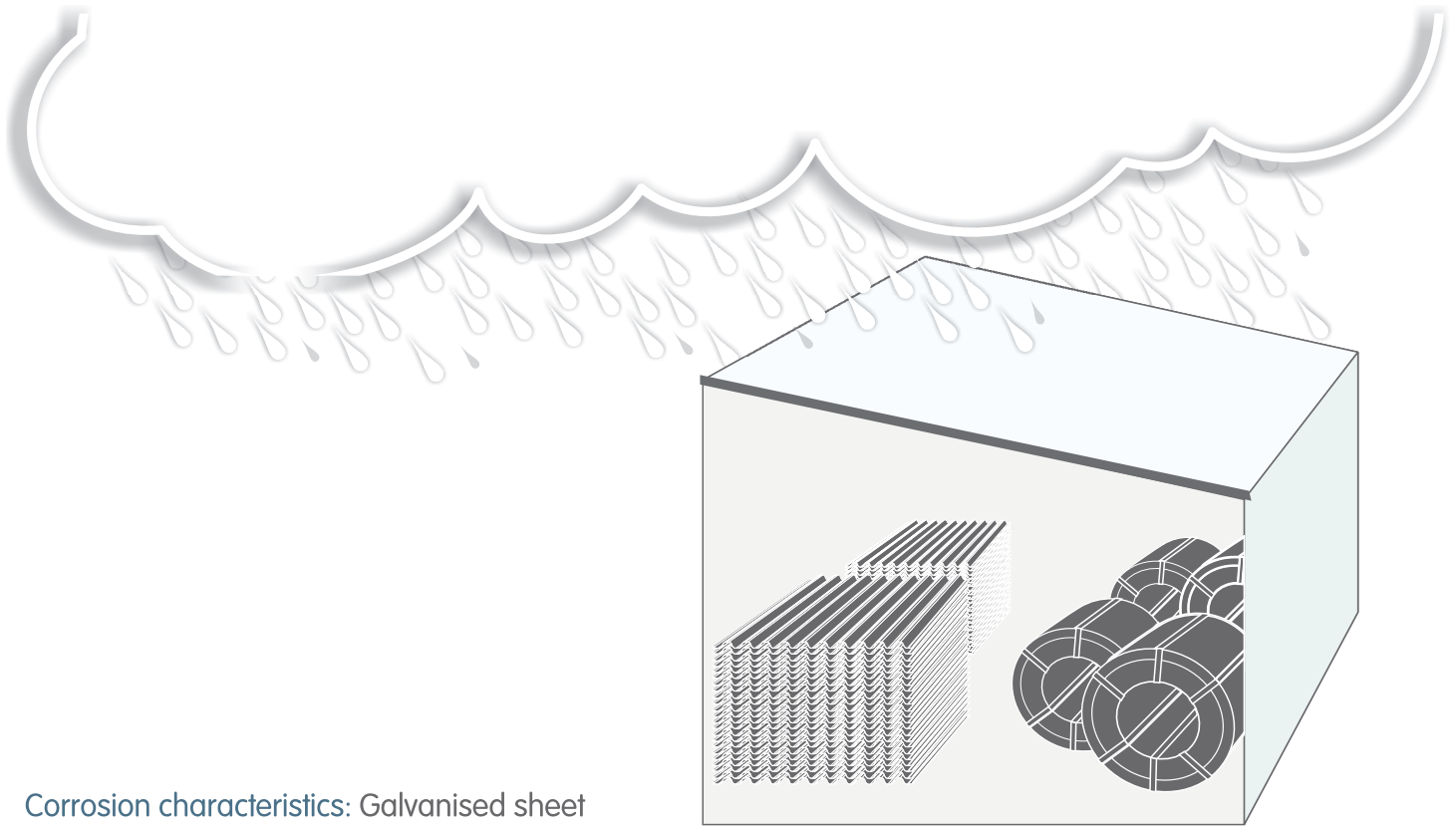
Safe storage

To prevent unnecessary damage to galvanised and colour coated coil or profiled sheets, special precautions should be introduced to eliminate contamination by moisture.

If galvanised and colour coated coil or profiled sheets are not required for immediate use, coils or packs of sheets must be stored off the ground on site under properly designed cover, protected from wind-driven rain. Plastic tarpaulins that completely envelop packs of sheets or coils should not be used, because a

sudden drop in ambient temperature may result in the formation of condensation or water vapour which can easily be drawn in between nested sheeting by capillary action.

Ideally, deliveries of galvanised or colour coated sheet to the building site should be scheduled such that the storage period is not longer than two weeks prior to installation. It is strongly recommended that the storage site is inspected regularly to ensure moisture does not penetrate the stock.



Corrosion characteristics: Galvanised sheet
Stages during the formation of wet storage stain

Visible effect	Cause	Remedial action
<p>Phase 1: Light white discoloration - thin, white powdery deposit.</p>	<p>Caused by moisture trapped between sheets or components during transportation or storage, or by condensation in the absence of adequate ventilation.</p>	<p>None required. The protective properties of zinc are not impaired by the presence of a superficial white discoloration. Existing white discoloration deposits will slowly convert to protective basic zinc carbonate. Not suitable for post painting before removing loosely adhering deposits.</p>
<p>Phase 2: Heavy white discoloration - thick, crusty deposits.</p>	<p>Prolonged adverse storage or inadequate protection during transport, allowing considerable water ingress between closely stacked sheets or components.</p>	<p>Before painting, remove all traces of loosely adhering deposits with a stiff bristle brush (not a wire brush). Check residual zinc coating thickness with a magnetic gauge. If within specification and if the sheet or component is to be used in reasonably dry or freely exposed conditions, no action is required.</p>
<p>Phase 3: Black staining and white discoloration with powdery deposits.</p>	<p>Usually very early stage of superficial zinc corrosion normally due to the formation of complex surface zinc corrosion product. Black staining does not imply that the zinc coating has been destroyed.</p>	<p>Check zinc coating thickness using a magnetic thickness gauge. If in doubt contact a paint consultant recommended by ArcelorMittal South Africa before painting, due to the complex nature of stains.</p>
<p>Phase 4: Red rust.</p>	<p>Corrosion of steel substrate where zinc coating has broken down completely. Should not be confused with superficial staining.</p>	<p>In general, sheet or components showing this defect should not be used</p>

Chromadek®

Where the original gloss and colour has been retained, there is no cause for concern after drying as no further deterioration will occur. However, where discoloration and signs of either white or red rust corrosion products (except on cut edges) is observed, affected sheets should be substituted with new Chromadek® sheets.

Conclusion

The prevention of galvanised and Chromadek® coil or sheet storage staining requires the correct packing, handling and storage practice prior to installation and use. It is important to advise that the presence of white rust is not a reflection of the galvanised or colour coating performance, however it is related to incorrect practices during transportation and storage.

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