

MILD STEEL – SURFACE PREPARATION

THE CRITICAL STEP

In this Tech Note, our aim is to cover the most common type of surface preparation used in preparing structural steel for long-term corrosion protection.

The purpose of surface preparation of steel prior to application of a protective coating system is two- fold:

- To remove contaminants on the steel that may cause initiation or continuation of the oxidation (rusting) process, and/or prevent adhesion of the first coat to the steel and
- To increase the profile and hence the surface area per square metre in order to maximise the adhesion between the steel and the primer.

Contaminants can cause failure of the coating by preventing an adequate bond from occurring, and also may contribute to the rusting of the steel substrate.

A lower than desirable surface profile compromises the ability of the coating to key into, and adhere to, the substrate resulting in lower bond strength.

Furthermore, zinc rich primers rely on direct contact of the zinc metal with the steel, and the higher the surface profile, the greater the contact.

SURFACE PREPARATION STANDARD AS1627

The Australian Standard AS1627 series covers a number of surface preparation processes.

The method preferred by Dulux Protective Coatings within the AS1627 series is the standard AS1627.4 - Abrasive Blast Cleaning. A Class 2½ “Near White Metal” blast cleanliness, to match visual standard Sa 2½ in AS1627.9, and to generate an angular surface profile of 30 to 60 microns will be suitable for all types of steelwork except perhaps steel for immersion. This method is far quicker and more cost-effective than hand or power tool cleaning, and provides maximum contact between the primer and the steel.

This method is also by far the most effective way to remove millscale. (Refer to Tech Note 1.1.4 – Millscale)

SHARP EDGES ON STEELWORK

Sharp edges, laminations, burr marks and welds must all be attended to during surface preparation.

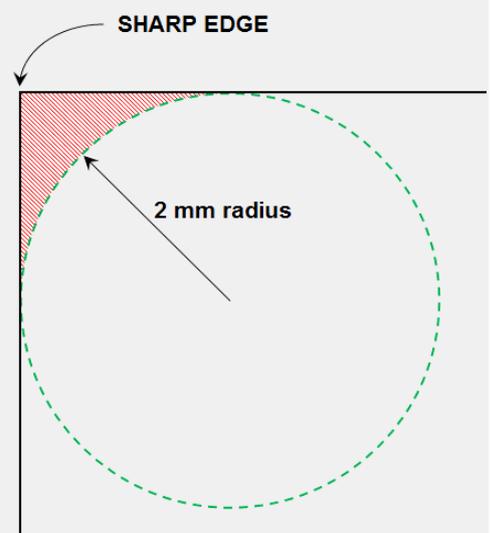
Sharp edges cannot be painted over, as coatings will always pull away from the sharp edge and pond on either side. The result is that the edge will carry a far lower film build than is necessary for adequate corrosion protection, and will exhibit edge corrosion. To overcome this problem, sharp edges must be ground off to achieve a radius of at least 2 mm to ensure that the film build of the applied coating will be uniform on the rounded edge.



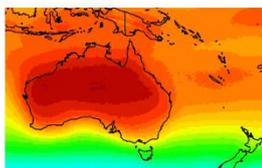
Abrasive blast cleaning is the most effective and fast way of removing millscale and other contaminants



Millscale is a common cause of premature rust and must be removed prior to painting



Sharp edges must be ground off prior to painting



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Sharp edges are of particular concern on perforated steel or expanded sheet steel, as the sharp edges are so extensive that rounding them off is impractical. (See Tech Note 1.1.5 – Perforated Metal).

SHOP PREPARATION

1. Wash and degrease all surfaces to be coated in accordance with AS1627.1 with a free-rinsing, alkaline detergent, such as Gamlen CA No. 1 in strict accordance with the manufacturer's written instructions and all safety warnings.
2. Wash with fresh potable water and ensure that all soluble salts are removed in accordance with AS 3894.6 methods A&D.
3. Grind all sharp edges with a power tool to a minimum radius of 2 mm.
4. Power tool clean welds to AS1627.2 Class 2 to remove roughness. Remove filings, preferably by vacuum or compressed air.
5. Abrasive blast clean all steel surfaces to be painted in accordance with AS1627.4 to visual standard AS1627.9 Class 2.5 (equivalent to ISO8501-1, Sa 2.5: Very Thorough Blast-Cleaning). Use a non-metallic medium that will generate a surface profile of 35 to 65 microns (as tested to AS3894.5 Method A.)

APPLICATION OF COATING

1. Commence application within 4 hours of abrasive blasting or before surface is contaminated, otherwise repeat abrasive blasting step.
2. Stripe coat welds, bolts, boltholes and all edges with primer before application of full primer coat nominated in the Coating System section of the specification.
3. Prior to application, ensure that the surface is free of contaminants including oil, grease, dirt, dust, salt and any other deleterious materials that will interfere with coating performance.

TREATMENT OF ON SITE WELDING

1. Remove weld spatter.
2. Power tool clean welds to AS1627.2 Class 2 to remove roughness. Remove filings, preferably by vacuum or compressed air.
3. Prime welds immediately with the nominated primer before contamination can reoccur. Ensure that the primer overlaps the sound adjacent coating by not less than 25mm or greater than 50mm.
4. Apply intermediate and topcoats over the primed welds to match the surrounding coating system, overlapping the sound adjacent coating by not less than 25mm or greater than 50mm.

ALTERNATIVE STANDARDS

In addition to the Australian Standard AS1627.4, there are similar global standards. These are offered below for reference:

DESCRIPTION	AUSTRALIAN STANDARDS	NACE	SSPC	SWEDISH STANDARD (St, Sa)
Brush-Blast	AS1627.4 Class 1	NACE 4	SSPC – SP 7	Sa1
Commercial Blast	AS1627.4 Class 2	NACE 3	SSPC –SP 6	Sa2
Near White Blast	AS1627.4 Class 2.5	NACE 2	SSPC – SP10	Sa 2 – ½
White Blast	AS1627.4 Class 3	NACE 1	SSPC- SP 5	Sa3

For more information, please contact the Dulux Protective Coatings Technical Consultant in your state.



Spot abrasive blast cleaning is a practical method of removing rust in situ.



MBX® Bristle Blaster® is ideal in awkward or difficult to access places.



Ultra high pressure water jet will not create a new profile, but will reveal the original profile of a blast cleaned surface.