

Mild Steel Surface Preparation

1.1.2

Surface Preparation - The Critical Step

To begin with, steel is a relatively flat and non-porous surface.

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 surface area per square metre in order to maximise the adhesion capacity of the steel.

The correct surface preparation of steel is critical to achieve a clean substrate and uniform profile to allow the new coating system to adhere to. Contaminants can cause failure of the coating by way of preventing a bond from developing, and also may contribute to the rusting of the steel substrate. Inadequate surface profile may result in the coating having lower bond strength and this may cause the coating to delaminate.



The Australian Surface Preparation Standards

There are a number of surface preparation processes possible. These are covered in the Australian Standard AS1627 series. Some of these are referred to below. In this Tech Note, our aim is to cover the most common type of cleaning process used in preparing structural steel for long-term corrosion protection.

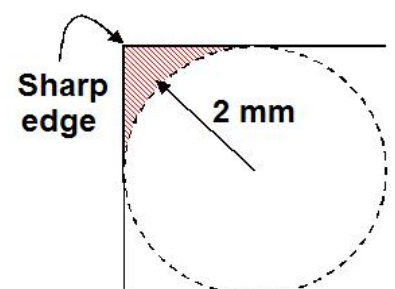
Within the AS1627 series, the standard AS1627.4 - **Abrasive Blast Cleaning** specifies abrasive blast cleaning to achieve a Class 2½ "Near White Metal" blast cleanliness, to replicate visual standard Sa 2½ in AS1627.9, and to generate an angular surface profile of 30 to 60 microns. This is the best way to produce a very clean steel surface, and the method preferred for the use of Dulux Protective Coatings. This method provides a **profile** that offers a **vastly superior key** for primers to adhere to (far more quickly and cost-effectively than hand or power tool cleaning), and provides **maximum contact** between the zinc metal and the steel. The tenacious adhesion between the primer and the steel ensures that oxygen, water and salts are excluded from the steel surface. 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.

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



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Shop Preparation

1. Wash and degrease all surfaces to be coated in accordance with AS1627.1 with a free-rinsing, alkaline detergent, such as Gibson F310B or 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 blast cleaning or before surface becomes 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 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.