TS-750-070 Powder Coating Pregalvanised Tubular Steel Fencing

1. PURPOSE

This specification sets out recommended minimum standards for materials and processes used to manufacture powder coated pregalvanised tubular steel fencing. The specification has been developed to ensure purchasers of this type of fencing receive a product that is fit for purpose, has an extended service life and is aesthetically pleasing. Compliance with this specification will ensure products provided comply with relevant Australian Standards and established industry best practice.

There is no Australian Standard for powder coating tubular steel fencing. As a consequence suppliers in the market can offer fencing materials that vary greatly in terms of the steel tube profile size, the wall thickness (gauge) of the tube, the strength, the design and method of fabrication, the corrosion resistance, the metal pretreatment process used to clean the product and the powder coating regime. These aspects dramatically impact the cost of the fencing materials but also the whole of life cost of the product, including the safety of the product in service. In the absence of an Australian Standard we have developed this pro-forma specification to assist specifiers and to lift and make more uniform the product in the market for various applications.

There is an Australian Standard for steel tube and for powder coating and these are incorporated below.

The italic paragraphs and notes throughout this document serve to highlight the functional or performance requirement of the product that that particular section of the specification sets out. They may also give the reader some background to the reason for a particular requirement. Purchasers using this specification may wish to delete the italic sections from the document before providing it to potential suppliers.

2. STEEL

2.1. PRECISION TUBE

Fencing components as per Section 2.1 Panels, 2.2 Posts, 2.4 Gates and 2.5 Keeper Post shall be manufactured using precision tube which complies with the following standards as a minimum:

- AS 1450 – Steel tubes for mechanical purposes - Product Designation AS 1450/C250/ERW; and
- Tube manufactured using strip in accordance with AS 1397 – Steel sheet and strip – Hot-dip zinc-coated or alu/zinc coated - Product Designation AS 1397/G2/Z275.

Precision Tube shall be coated with a light mill oil or solvent for protection during transportation.

Reference to Australian Standards is not sufficient because the standards allows for numerous grades of product including product below current industry standards for fencing. Imported steel may not comply with Australian Standard and can be of significantly inferior quality.

The material specified above has a zinc coating mass of 275g/m2 (as denoted by 'Z275') which offers the highest corrosion protection in pre-galvanised steel hollow section (SHS) material. Other materials can have dramatically lower zinc mass coatings making the finished product more exposed to corrosion.

2.2. STRUCTURAL STEEL HOLLOW SECTIONS

Gate Posts as per Section 2.6 shall be manufactured using structural steel sections which comply with the following minimum standards:

- AS 1163 – Structural steel hollow sections – Product Designation AS 1163 C350LO.

Galvanized (zinc coated inside and outside) in accordance with:

- AS 4750-2003 – Electro-galvanised (zinc) coating on ferrous hollow and open sections – Product Designation AS 4750 ZE 50/50; or
- AS 4792 Hot-dip galvanized (zinc) coatings on ferrous hollow sections, applied by a continuous or a specialized process AS 4792 IB 50/50; or
- AS/NZS 4680 Hot-dip galvanized (zinc) coatings on fabricated ferrous articles [Only 150 x 150 x 5mm sections and larger shall be coated using the method].

3. FABRICATION AND ASSOCIATED PROCESSES

3.1. CUTTING

Cuts shall be generally free of sharps and burrs.

3.2. GRINDING

Grinding of fencing components during fabrication shall be kept to minimum. Where grinding of weld zone is required care shall be taken to ensure galvanising is not removed from material surfaces.

3.3. WELDING

All welds are silicone bronze. Note hinges and associated parts may use structural weld electrode as required but they must be galvanised or zinc plated after fabrication to prevent corrosion. Welds are to be formed in neat consistent bead with good penetration. Care should be taken to ensure splatter is minimised during welding and any splatter is removed. Silicone based anti spatters shall not be used.

Silicone bronze is used to reduce damage to the galvanised coating on the SHS and enhance the corrosion resistance of the weld zone. Silicone based anti spatters may lead to de-wetting of the powder resulting in poor powder adhesion to the steel substrate.

4. POWDER COATINGS

4.1. CLEANING AND CHEMICAL PRE-TREATMENT

The following applies for all fencing panels, posts and gates prior to application of the specified coating system. New galvanised surfaces are examined for welding flux residues, light roll forming oils, dirt and grit and other foreign matter, all of which are removed prior to powder coating. Surfaces that show local areas of white storage stain (white rust) or other types of corrosion products are to be rejected. Powder application shall occur within 24 hours of substrate pre-treatment.

Pre-treatment systems are maintained and tested in accordance with AS 4506.2005 Metal finishing - Thermoset powder coatings and the pretreatment chemical supplier's recommendations.

White rust can lead to adhesion problems or out-gassing of the powder coating. Leaving products for more than 24hrs after pretreatment increases the likelihood of coating failure.

4.2. OPTION 1 - STANDARD COATING SYSTEM

This option will consist of a polyester powder coating (or other approved exterior grade powder) in the nominated colour and gloss finish, applied in accordance with AS4506.2005 Table 2.1 Atmospheric Classification C2 – Moderate (Exterior) Medium.

Polyester type coatings are the industry standard in Australia for external finishes and are manufactured extensively in Australia specifically for Australian conditions. Atmospheric Classification C2 covers all installation locations except those in tropical, high marine, industrial or worse environments.

Testing of powder coated products shall be carried in accordance with AS 4506.2005 Section 2 for the stated atmospheric classification. In addition to the requirements of AS 4506 products will be required to:

1. Have minimum thickness of 80 micron; and

2. Achieve 500 hrs Neutral Salt Spray Performance.

The 80 micron thickness specification is higher than the 60 micron minimum specified by AS4506.2005 to ensure consistent colour, gloss and an extended coating life in accordance with industry best practice. 500 hrs Neutral Salt performance is the accepted industry standard for Atmospheric Classification C2 conditions.

4.3. OPTION 2 – ANTI GRAFFITI COATING SYSTEM

The coating will consist of polyurethane anti graffiti powder coating in the nominated colour and gloss finish applied in accordance with AS4506.2005 Table 2.1 Atmospheric Classification C2 – Moderate (Exterior) Medium.

Testing of powder coated products shall be carried in accordance with AS 4506.2005 Section 2 for the stated atmospheric classification. In addition to the requirements of AS 4506 products will be required to:

1. Have minimum thickness of 80 micron; and

2. Achieve 500 hrs Neutral Salt Spray Performance.

This coating allows the ready removal of graffiti by way of a prescribed cleaning process. Using anti-graffiti coatings can significantly reduce the maintenance costs of an installation in graffiti prone areas.

4.4. OPTION 3 – CORROSION PROTECTION COATING SYSTEM

This Coating System can be applied as a primer coat in addition to an Option 1 or Option 2 top coat as directed. A epoxy primer is applied to the pre-treated substrate in accordance with AS 4506.2005 Table 2.1 Atmospheric Classification D High Marine / Industrial. Curing (or partial curing) of the epoxy coating shall be carried out prior to application of the top coat in accordance with the powder coating suppliers recommendations.

Testing of powder coated products shall be carried in accordance with AS 4506.2005 Section 2 for the stated atmospheric classification. In addition to the requirements of AS 4506 products will be required to:

1. Have a minimum thickness of 60 micron for the epoxy primer coat;

2. Have minimum thickness of 80 micron for Option 1 or Option 2 top coat; and

3. The combined coating system shall achieve 1000 hrs Neutral Salt Spray Performance.

The addition of an epoxy primer dramatically enhances the corrosion resistance qualities of the product to withstand more corrosive environments like sites in close proximity to large salt water bodies.

5. QUALITY ASSURANCE

5.1. CERTIFICATES OF COMPLIANCE

Certificate of Compliance must be provided by the powder coating applicator at the completion of the supply of the materials as follows.

1. A Certificate of Conformance from the powder coat applicator certifying that all coatings meet or exceed the requirements of AS 4506 – 2005 Metal finishing - Thermoset powder coatings and the specific requirements for the specified coating option as per Section 4 of this document.

When considering the voracity of a Certificate of Compliance the purchaser should consider whether or not the party making the statement is reputable, and has a Quality Assurance System, and its relationship to the supplier of the fencing. Consideration should also be given to whether or not materials used are imported.

6. COPYRIGHT

7. REVISIONS

REV.	DESCRIPTION OF CHANGE	DATE	AUTHORISED BY

A (original)		11/6/13	S. Belfield