

Metal Spray Suppliers NZ LTD

Standardised Coating Recommendation

Category: C3 (As defined in SNZ TS 3404:2018)

Longevity: 40 years to first Maintenance
 (As defined in SNZ TS 3404:2018)

Macroclimate Corrosion Category (from ASNZ 2312.1:2014)	Typically	Location	Characterised by	Surface specific atmospheric category
C3	Within 20Km of breaking surf	West and south coasts of South Island	Minor salt deposits	External exposed = C3 External sheltered = C5-M
	Within 5km of salt water	East coast of both islands West and south coasts of North Island, and all harbours	Occasional smell of salt in the air	External Wet = C5-M Internal dry = C1 Internal damp =C3

This is a coating recommendation for steel structures in atmospheric conditions in New Zealand, it is written in accordance with, and should be read in conjunction with the guiding document SNZ TS 3401:2018.

The document SNZ TS 3404:2018 will be the overriding document for any potential conflict in meanings or descriptions.

Application guide

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LEVEL 3 #34017**

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Summary:

- 1. Ensure substrate is clean (free of contaminants)**
- 2. Abrasive blast to SA2.5 (95% white) with a minimum 50µm sharp angular surface profile**
- 3. Apply 150µm nominal thickness of Zinc Metal Spray**
- 4. Seal with penetrating sealer (typically less than 35% volume solids when thinned)**

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1. SCOPE

- 1.1 The successful contractor is to be the main contractor (hereafter called the contractor) but may employ competent subcontractors for support activities. These sub contractors, if any, shall be approved by the owner or his representatives.**
- 1.2 The contractor shall have the sole responsibility for the work of its personnel and its subcontractors during all phases of the coating application and be responsible for the overall quality of the work.**
- 1.3 This specification covers the preparation for and the application of protective coatings to all designated surfaces of the Steel.**
- 1.4 The thermal metal sprayed coating shall be applied to the requirement of SNZ TS 3404:2018 Durability requirements for steel structures and components.**
- 1.5 The contractor must not deviate from these specifications, without the written consent of the owners' representatives.**
- 1.6 A pre job meeting is strongly advised with the coating contractor (and any subcontractors) and the engineers representative along with the 3rd party inspector, to clarify and agree on the implementation of this spec along with methodology and inspection procedures.**

2. SURFACE PREPARATION

2.1.2 PRIOR TO ABRASIVE BLASTING

All surface imperfections such as sharp edges, weld splatter, weld folding and slag shall have been removed from surfaces. Plasma cut edges must be ground to remove the hardened scale. All edges shall have a radius of curvature of no less than 2.0mm.

2.1.2 Solvent clean areas as necessary in accordance with: SSPC-SP1 Solvent Cleaning.

2.1.3 Water clean to remove chlorides and contaminants in accordance with: NACE WJ-4/SSPC-SP WJ-4 Waterjet Cleaning of Metals—Light Cleaning (WJ-4) Chloride measurement must be 50mg/m² or lower.

2.2.1 ABRASIVE BLAST CLEANING METHOD

Clean, dry, compressed air shall be used for blasting. Moisture separators, oil separators, traps or other equipment may be necessary to achieve this requirement. Any of the following methods of surface preparation may be used to achieve a Near White Metal Blast Cleaned Surface:

2.2.2 Dry abrasive blasting using compressed air, blast nozzles and abrasive.

2.2.3 Dry abrasive blasting using closed cycle, recirculating abrasive system with compressed air, blast nozzle, and abrasive, with or without vacuum for dust and abrasive recovery.

2.2.4 Dry abrasive blasting, using a closed cycle, recirculating abrasive system with centrifugal wheel and abrasive.

2.2.5 A surface cleanliness will be achieved of no less than Class SA 2½ as stated in: SNZ TS 3404:2018 Durability requirements for steel structures and components.

2.3.1 SURFACE PROFILE REQUIREMENTS

The surface profile (anchor pattern) shall, when measured in accordance with ASTM D4417-93 Method C, produce an angular profile of minimum average 50µm (peak to trough dimension). Care shall be taken to ensure that metallic particles do not become magnetically charged and possibly attracted to the work area.

2.3.2 The abrasive shall be angular grit of a standard grade to ensure development of profile, environmental compliance and dust generation, and to take account of recyclability.

2.3.3 Any visible rust that forms on the surface of the steel after blast cleaning shall be removed by re-blasting the rusted areas to meet the requirements of this specification before metal spraying. In any case blasted surfaces shall not be left for more than 4 hours. Any extension of this time limit would be dependent on ambient conditions and subject to the approval of the supervisor.

3. QUALITY CONTROL

3.1 After Abrasive Blasting, the following checks should be made and recorded.

3.1.1 Surface Temperature

3.1.2 Ambient Temperature

3.1.3 Relative Humidity

3.1.4 Dew Point.

3.2 Surface Temperature shall be measured at minimum of 4 hourly intervals

3.3 Ambient Temperature shall be measured at minimum of 4 hourly intervals.

3.4 Relative Humidity shall be measured at minimum of 4 hourly intervals.

3.5 Dew Point shall be calculated before metal spray commences. Surface temperature shall be at least 3 degrees C above the dew point for the top coats.

- 3.6 **Mixing of the coating materials (sealer) shall be in accordance with the manufacturers instructions and no unauthorised thinning or other alterations shall take place.**
- 3.7 **Records shall be kept of the coating material used and the manufacturers batch numbers.**
- 3.8 **Testing of final surface coating shall be carried out by the manufacturers representative and or a registered coating inspector.**

4. APPLICATION OF ZINC (MINIMUM 99.99% PURITY)

- 4.1 **The ZINC Metal Spray Coating shall be applied to a minimum of two passes to achieve a nominal thickness of 150 microns (no spot reading under 120µm)**
- 4.2 **The Metal Spray Coating shall be applied in accordance with ISO 2063 or NACE No. 12/AWS C2.23M/SSPC-CS 23.00 Specification for the Application of Thermal Spray Coatings (Metallizing) of Aluminium, Zinc, and Their Alloys and Composites for the Corrosion Protection of Steel.**
- 4.3 **The sprayed metal coating shall overlap on each pass. The two or more coats shall be sprayed alternatively in vertical and horizontal passes to ensure a uniform coverage.**
- 4.4 **First apply a stripe coat to all areas where overspray may prevent adequate adhesion, e.g in corners and holes.**
- 4.5 **The first metal spray coat shall be applied within 4 hours after the last cleaning and before any discolouration of the prepared surface occurs.**
- 4.6 **The Zinc wire shall have 99.99% minimum purity of Zinc. A batch certificate must be obtained and kept with the documentation.**

5. SEALING OF ALL METAL SPRAYED SURFACES

- 5.1 If the area to be sealed goes below the dew point at any stage prior to sealing care must be taken to ensure no moisture remains in the metal sprayed coating before applying the sealer
- 5.2 Apply at least two coats of thinned sealer to saturate the metal spray. The sealer must be suitable for application on zinc metal spray. The target DFT for the sealer is 10µm although the build is not critical as long as the metal spray is fully saturated.

NOTE: Sealer coating application and thinning shall be strictly in accordance with manufacturer's specifications and product data sheets.

- 5.3 The metal spray coating must have a surface profile of no more than 75µm. If sanding is required to achieve the 75µm it should take place after the first thinned coat of sealer and before the final coat of sealer.

6. SUMMARY OF COATING THICKNESS

- 6.1 **ZINC METAL SPRAY:** 100µm average (no spot reading under 75µm)
SEALER: Minimum 2 thinned coats to saturate metal spray

7. INSPECTION

- 7.1 Daily in house inspection reports are to be filled out and supplied to the third party coating inspector.
- 7.2 NACE Level 2 (or higher), ACA, SSPC or recognised equivalent Qualified coating inspector

Note: All Quality Control measures should be documented and a copy supplied to the client.

8. REPAIR OF DEFECTS

If a damaged or out of spec area is found during initial inspection additional testing is required to define the area of under built or improper adhesion.

Defective areas will be removed and the area will be reblasted, feathered into the existing coating and reapplied in accordance with the specification.

9. MAINTENANCE

- 9.1 The structure owner has the responsibility to ensure the exposed exterior steelwork is fresh-water washed down annually.**
- 9.2 Any mechanical damage must be repaired as outlined in:
SNZ TS 3404:2018 Durability requirements for steel structures and components.**

REFERENCES

SNZ TS 3404:2018 Durability requirements for steel structures and components

AS/NZS 2312:2002: Guide to the protection of iron and steel against exterior atmospheric corrosion.

NZS/AS 1627: Metal Finishing- Preparation and Pre-treatment of surfaces.

PART 1:1989: Degreasing of Metal Surfaces using Solvent or Alkaline solutions.

PART 4:1989: Abrasive blast cleaning.

ASTM D4417-93: Standard Test Methods for Field Measurements of surface profile blast Cleaned steel.

ISO8502-3: Preparation of Steel Substrates before application of Paint and related products Tests for the Assessment of Surface cleanliness Part 3: assessment of Dust On Steel surfaces prepared for painting (Pressure-Sensitive Tape Method).

ISO8502-4: Preparation of Steel Substrates before application of Paint and related products, Tests for the Assessment of Surface Cleanliness Part 4: Guidance on the Estimation of the Probability of condensation Prior to Paint Application.

BSEN22063-1994: Metallic and Other Organic Coatings - Thermal Spraying Zinc, Aluminium and their Alloys.

SSPC-SP1: Steel Structures Painting Council Surface Preparation Specification No 1 Solvent Cleaning.

SIS 05-99-00: Pictorial Surface Preparation Standards for Painting Steel Structures.

ANSI/AWS C218.93: Guide to the Protection of Steel with Thermal Sprayed Coatings.

BS 22063-1994: British Standard Thermal Spraying Zinc, Aluminium and their Alloys.

HERA Report R4-133:2011: Heavy Engineering Research Association – New Zealand Steelwork Corrosion and Coating guide.

ISO/FDIS 14713: Protection against corrosion of iron and steel in structures – zinc and aluminium coatings guidelines

NOTES: