

COATING SPECIFICATION

HEAT SHRINK SLEEVE REQUIREMENTS

COATING SPECIFICATION: L2

ISSUE: 5

Date: March 2022

1.0 SCOPE

This Technical Specification shall apply to operations required for the application of heat shrink material to straight weld banded/butt joints and large radius welded elbow joints for the purposes of corrosion protection.

This specification is not intended for the corrosion protection of valve flanges and complex shapes such as pipe tees and crotch plate connections, the requirement for these are covered in the Corporation's Standard DS 95. This specification is additional to the requirements imposed by the manufacturer.

2.0 DEFINITIONS

In this Technical Specification unless the context requires otherwise:

Contractor: The service provider or its subcontractor who will undertake the works;

Corporation: The Water Corporation and the Principal for the purposes of externally contracted asset delivery;

ITP: The detailed inspection and test plan(s) for the works;

Pilot Joint: first production joint completed on site;

Superintendent : The superintendent for the contract, as defined in the conditions of contract, who is appointed by the Water Corporation to manage/oversee the work under the contract on behalf of the Water Corporation.

Technical Specification: This technical specification;

Works: For the purpose of this Technical Specification means the joint preparation and heat shrink sleeve application or repairs to be undertaken by the contractor to which this Technical Specification applies.

3.0 STANDARDS / CODES

3.1 All heat shrink sleeves shall comply with the Australian Standard(s) or Code(s) of practice (including amendments) specified in the Contract Specification or stated on the Contract Drawings.

3.2 The applicable edition(s) of standards/codes are those current two weeks prior to tender close date.

3.3 The relevant standard/code is deemed the minimum standard applicable unless otherwise stated in the specification.

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4. GENERAL

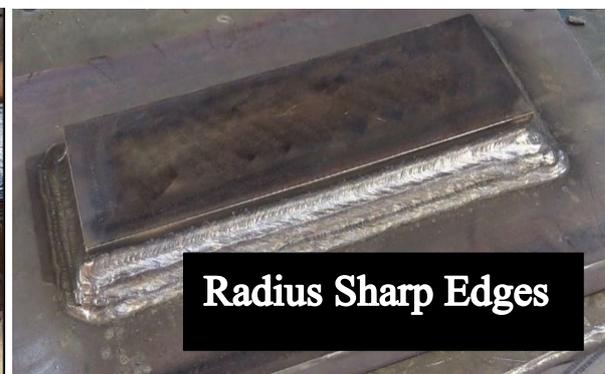
- 4.1 The Contractor shall supply all necessary plant, equipment, materials and labour, prepare the surface and apply the protective coating system to steel and/or cast iron surfaces in accordance with this Specification.
- 4.2 Work shall only be carried out by companies with experience.
- 4.3 Only personnel who have been suitably accredited as per Water corporation requirements and by the shrink wrap product supplier shall apply the sleeves.
- 4.4 In accordance with Steel Mains “Handling and Installation Steel Pipeline Systems” Manual, where a Sintakote pipe is cut for welding, the minimum distances as shown in **Figure 1 below** shall be adhered to.
- 4.5 The contractor shall submit a proposal for the application of heat shrink sleeve at their factory location and on site. The proposal shall be forwarded to the Corporation for acceptance 10 working days prior to the commencement of work. The proposal shall include an ITP, application procedure and the operator(s) certification.

5. MATERIALS

- 5.1 Canusa CPC[®], AQW-HS[®] has been approved and accepted by the Corporation. Where the contractor intends using other than the stated Canusa[®] product, full product documentation shall be forwarded to the Corporation via the Superintendent for approval.

6. JOINT PREPARATION AND APPLICATION

- 6.1 All weld splatter, slag and sharp edges on the internal and external welded joints shall be removed prior to the reinstatement of the cement mortar lining and application of the external protective system.



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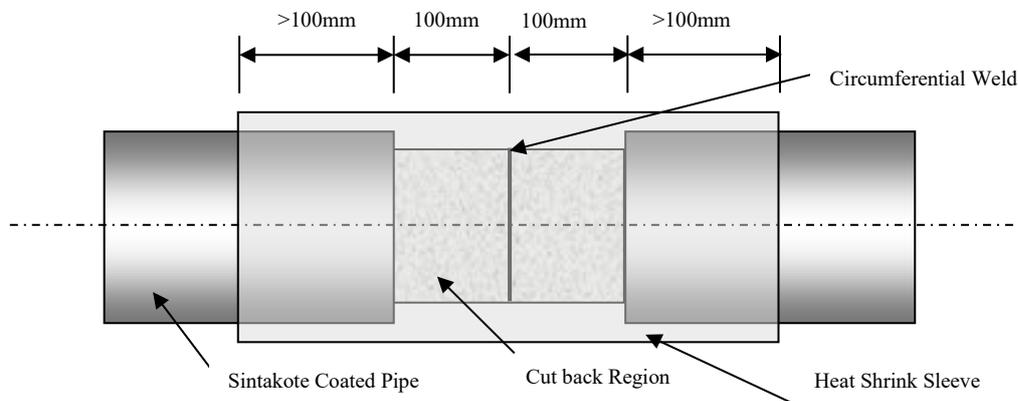


Figure 1 – Heat Shrink Sleeve Application.

- 6.2 With reference to Figure 1, the *contractor* shall provide a minimum of **100mm** cut back on both of the pipe sections proposed to be joined. This clearance must be provided in order to eliminate the damage to the Sintakote[®] coating due to excessive heat exposure. The edges of the Sintakote[®] coating shall be bevelled so that there shall be a tapered transition of a minimum of **10mm** between the full coating thickness and the exposed steel.
- 6.3 Where the heat shrink overlaps the Sintakote, light roughing of the Sintakote[®] surface using a sanding disc or coarse emery paper shall be performed.
- 6.4 The heat shrink sleeve will overlap a minimum of **100mm** onto the existing Sintakote[®] coated piping. It is critical to ensure the desired overlap due to the poor adhesive properties of Sintakote[®] and to ensure a waterproof seal. This width is in addition to the previously mentioned minimum 100mm cut back required from the edge of the weld. This result in a minimum heat shrinks sleeve width of **400mm** (100+100+100+100).
- 6.5 Butyl mastic profiling roll in conjunction with manufactures recommended primer if applicable. Typically used for contouring of flat band weld seams and where the HSS may not provide adequate adhesion where voids form on irregular profiles.
See **Appendix 1** below – HSS What Can Go Wrong

7. INSPECTION & TESTING

- 7.1 After the sleeve has been applied, a number of observations shall be made to confirm that the desired results are achieved. The main concerns are;
- Adequate bonding of the adhesive and
 - To ensure that there are no voids that will allow a path for moisture to get under the sleeve.
- 7.2 During shrinking and subsequent cooling, the adhesive shall seep out on both side edges of the sleeve. This adhesive discharge shall be examined to ensure that it has wetted out and adequately bonded to the entire coating surface.

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- 7.3 There shall be no holes, punctures or cracks in the backing. Holiday testing shall be performed with the voltage set as per table 12 in DS-95. Any defects shall be repaired following UCC procedure CRP65 Repair Patch and UCC Butyl Mastic Filler.
- 7.4 Adhesion test of the sleeve shall be conducted in accordance with the manufacturer's recommendation and generally in accordance to AS/NZS4822. Before commencement of the project 3 pre-production trial (PPT) joints shall be adhesion tested. Following the testing of the PPT joints, the testing frequency shall be 1 in 100 joints or 1 joint per week thereafter in accordance with AS/NZS4822, Table 6.5 and to be witnessed by the Superintendent. Peel testing values and testing requirements shown Figure 2 below.

Figure 2 – Peel Testing Heat Shrink Sleeve

**Water corporation DS95 reference L2 Heat Shrink Sleeve Specification for Field Joint Coatings.
Reference: Appendix B Peel Strength Test - AS/NZS4822 and EN 12068.**

The following shows the peel strength testing results (higher better, minimum to pass is 20N/cm):

- Peeled strip evaluation 200mm x 25 mm using a constant peeling rate of 100 mm/min.
- The peel force on the perpendicular (90°) shall be recorded over an incremental measured distance of 10mm every 6 seconds.
- Canusa -CPS, AQW-HS Sleeves require wait time of 24 hours prior to peel test.

Manufacturers Recommendations	Canusa -CPS, AQW-HS Sleeves
Preheat Temperature.	40-60 ° C
On steel surface (N/cm)	30
On Sintakote surface (N/cm)	30
Test Voltage (min)	11 KVa
Minimum Surface Cleanliness	St2
Supplier Training and Accreditation Required	Yes

- 7.5 If a joint fails to pass inspection due to what may have been lack of heat, light reheating and rolling can be attempted. If defects fail to pass subsequent inspections, remove and replace shrink sleeves.
- 7.6 All plant, equipment, materials and methods used may be subject to inspection by the Superintendent.

8. PROCESSES & CONSUMABLES

- 8.1 All materials used in the heat shrink process shall comply with the relevant standards/codes.

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9. CONTRACTOR'S RESPONSIBILITY

- 9.1 The Contractor shall supply all necessary plant, equipment, materials and labour, prepare the surface and apply and maintain the protective coating in accordance with this specification.
- 9.2 The preceding inspection clauses shall not relieve the Contractor of their responsibility to supply materials and perform work in accordance with the requirements of any overriding contract documentation.

Appendix 1. HSS Voids.

The scenarios identified below indicate two separate defects.
Lack of heating and lack of profiling mastic along weld seams and flat bands.



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Application of HSS Sleeve.



Following removal of Sintakote, all residue must be removed from steel during surface preparation.



Steel surface prep: St2.0 surface finish to be achieved with 40 grit flapper wheel or emery cloth.



Sintakote surface prep: Lightly abraded surface finish to be achieved with emery cloth.



Pre-heat steel to 40-60°C using a propane torch with 50mm diameter burner head. For optimum HSS outcomes an auto ignition torch should be used, pictured below.



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Chamfer leading edge of sleeve 25mm x 50mm lead in approx.



Pre-warm adhesive on sleeve leading edge to ensure good initial bond to steel and Sintakote.



Place the closure patch centrally on the sleeve overlap and pat down firmly.



Shrink the sleeve in complete concentric bands starting at the middle of the sleeve and gradually work to the edge of the sleeve.



Continue middle to edge.



Finished sleeve with adhesive oozing.

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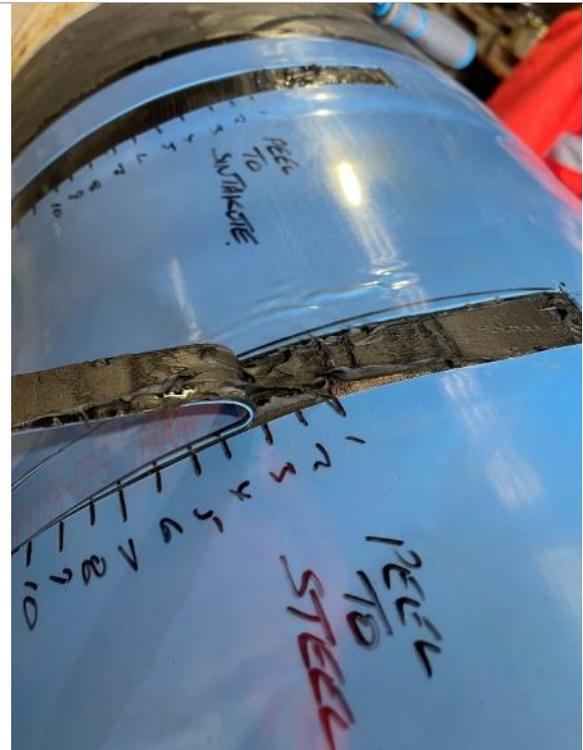
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Peel Test set out in accordance with Appendix B of AS 4822;2018. Pass level is 5 kg.f (50 N) for a 25mm wide test sample.



Peel Test being performed with spring gauge and custom clip in accordance with AS4822;2018.

Conversion Table for Spring Gauge values kg.f – N for 25mm Wide Test Sample (Red is unacceptable, Green is acceptable as per AS 4822 requirement)

Kg.f	Newtons	Result
3 kg.f	30 N	Fail
4 kg.f	40 N	Fail
5 kg.f	50 N	Pass
6 kg.f	60 N	Pass
7 kg.f	70 N	Pass
8 kg.f	80 N	Pass

To be read in conjunction with Canusa Aqua- Shield HSS ITP.

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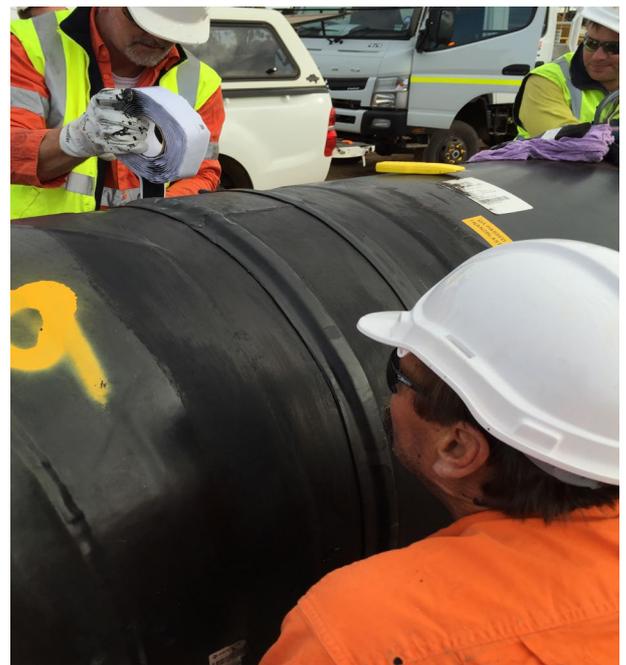
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Application of HSS Sleeve – Mastic Band Profiling. Applied to weld collars.



Apply Butyl Primer.



Apply Mastic Strip

Application of HSS Sleeve – General Surface Preparation ST2.

