DENSO VISCOTAQ™ TANK CHIME SEALING SYSTEM

ULTIMATE VISCO-ELASTIC COATING & SEALANT

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REVISION: 1

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1. PRODUCT DESCRIPTION

VISCOTAQ™ is a non-crystalline a-polar viscous elastic (viscoelastic) solid polyolefin coating for corrosion prevention of underground and aboveground substrates. VISCOTAQ's molecular chemistry is unique and designed in such a way that the viscosity gives it permanent wetting characteristics and the elasticity of the product provides the strength and feeling of a solid. The VISCOTAQ™ compound bonds to the substrate by means of Van der Waals principals, penetrating the pores and anomalies of the substrate. The coating remains in intimate contact with the substrate creating an impermeable
homogeneous corrosion prevention coating.

2. GENERAL INFORMATION

The VISCOTAQ™ Chime Sealant System is based upon the use of VISCOTAQ® EZ WRAP in combination with the VISCOTAQ™ VISCOSEALANT & VISCOMASTIC. VISCOTAQ™ is a viscous elastic synthetic material that remains flexible and tacky during its entire life. Since the floor plate of a tank is constantly moving during the filling and emptying process, flexibility and aggressive adhesion is of utmost importance. The VISCOTAQ® Chime Sealant System is used to prevent water infiltration at the concrete ring wall interface of the tank, a place where corrosion normally occurs. The VISCOTAQ™ Chime Sealant System can be installed on new and existing facilities. The system can be painted immediately after installation and does not interfere with any future paint, inspection and maintenance programs according to API 653.

3. STANDARDS, REFERENCES, DEFINITIONS AND ABBREVIATIONS

SSPC: Steel Structure Painting Council (the Society of Protective Coating)
NACE: Nation Association of Corrosion Engineer
ASTM: America Society for Testing and Materials
ISO: International Standard Organization
AWWA: American Water Works Association
AS: Australian Standards

3.1 SSPC/NACE (Reference most current edition) SSPC/NACE

SSPC-SP1: Solvent Cleaning
SSPC-SP11: Power Tool Cleaning to Bare Metal
SSPC-VIS 3: Visual Standard for Power and Hand Tool Cleaned Steel

3.2 ASTM

ASTM D149-09: Standard Test Method for Dielectric Breakdown Voltage and Dielectric Strength of Solid Electrical Insulating Materials at Commercial Power Frequencies

3.3 ISO

ISO 21809-3: Petroleum and natural gas industries — External coatings for buried or submerged pipelines used in pipeline transportation systems
ISO 8504-3:2018: Preparation of Steel Substrates

3.4 AS

AS4822:2018: External Field Joint Coatings for Steel Pipelines

4. REFERENCE DOCUMENTS

- ViscoMastic Ver 2112.10
- ViscoMastic XHT Ver 2112.10
- ViscoSealant Ver 2112.13
- Viscotaq EZ Wrap Ver 2112.13
- Viscotaq EZ Wrap XHT Ver 2112.16
- DENSO VISCOMASTIC SDS REV 02
- DENSO VISCOMASTIC XHT SDS REV 01
- DENSO VISCOSEALANT SDS REV 02
- DENSO VISCOTAQ EZ WRAP SDS REV 02
- DENSO VISCOTAQ EZ WRAP XHT SDS REV 02
- Technical Manual Viscotaq Ver 220203
- DENSO_VISCOTAQ_COATING SYSTEMS_2304REVA

5. APPLICATORS

All applicators are to be Trained and Certified by DENSO Australia for the application of VISCOTAQ™ coating systems. Applicators shall have all certification confirmed against the VISCOTAQ™ Training register and record their individual VISCOTAQ™ Certification Number to all relevant documentation, ITR/DAR, ITP etc.

6. APPLICATION OF COATING SYSTEMS

All coating systems shall be applied in strict accordance with the Manufacturer's written instructions including; approved procedures, application manuals, technical data sheets by trained and certified applicators.

All materials shall be applied as the complete approved systems as outlined in this document and within the time limits of the; pot life, recoat, overcoat or cure times set by the Manufacturer taking full account of the ambient temperatures and or other relevant conditions. No coating is to be carried out outside of the recommended environmental conditions or during unsuitable weather conditions.

All coating application shall be completed in strict accordance with an approved ITP to ensure all mandated QAQC requirements are fulfilled to meet the manufacturer and client requirements.

7. COMPONENTS

VISCOTAQ™ ViscoSealant
VISCOTAQ™ ViscoMastic (XHT*)
VISCOTAQ™ EZ Wrap (XHT*)
Acrylic High Viscosity Topcoat (DESNSO Acrylic Topcoat, Archco 65™) or approved equivalent
**XHT used for applications >70C*

8. FEATURES

- Easy to apply
- Cold applied & Cold Works
- Truly Surface Tolerant
- Environmentally friendly
- No primers or adhesive promotor
- UV resistant
- Permanent flexibility
- Permanent adhesion
- St2/St3 SP 2 cleaning
- Long-term protection
- Nontoxic
- Weather/salt resistant and freeze/thaw resistant
- Up to 125C (High Temp Systems XHT)
- Moulds and forms easily
- Manufactured under ISO 9001 standards.
- Made in the USA
- 70 mils - thick wrap
- Tested to latest ASTM and CSA standards.
- Potable Water approved materials (AS4020: 2018)

9. ENVIRONMENTAL CONDITIONS

<u>Application Environmental Condition</u> shall be in accordance with the information on the Product Data Sheet.

- During application the temperature of the substrate should be at least +3°C above the dew point.
- Relative humidity shall be below 85% RA
- If necessary, heat the surface of the substrate to be coated.
- Reduce the risk of potential condensation by applying the material in one sequence without interruption.
- Apply VISCOTAQ™ material preferably above 15°C; for cold weather applications see Chapter 12. Cold Weather Application Technical Manual Viscotaq Ver220203
- Marginal conditions are not acceptable in locations where conditions rapidly change (due to wind, sea spray, rain, and/or other conditions). Stop work or enclose the application to prevent exposure to moisture.
- Environmental conditions to be monitored and recorded on the ITR/DAR in accordance with the approved ITP.

10. PREPARATION OF SURFACES

10.1 Option for surface preparation

The minimal surface preparation required for the system is St2/SP2 - wire brush. Thorough surface cleanliness will help the system to achieve optimum adhesion and better anti-corrosion performance. To enhance application efficiency the use of rotating mechanical tools (St3) or high-pressure water (WJ4) may be used, provided final clean SSPC SP1 is completed.

Surface preparation shall comply with the relevant section of AS1627.4 / ISO8501.1 and be in strict accordance with the Manufacturer's written instructions for the applicable coating system. Manual cleaning using mechanical cleaning tools to remove all mill scale and rust in accordance with AS1627.2 / ISO8501.3.

It is essential that the surfaces to be coated are dry and free from rust, scale and other foreign matter before the coating is applied. Oil and grease deposits must be removed by effective solvent or detergent washing.

The following Table 10.2 defines the 4 classes of surface preparation by abrasive blasting in accordance with AS1627.4/ISO 8501.1 and AS1627.2 / ISO8501.3.and compares to SSPC/NACE approximations.

10.2 TABLE

Blast Cleaning Class	Description	AS1627.4 / ISO 8501.1 Designation	SSPC	NACE	SSPC / NACE Description
			SP 1		
			SP 3		
ST2					
ST3					
Sa1	Light	Sa1	SP 7	No 4	Brush-Off
Sa2	Thorough	Sa2	SP 14	No 8	Industrial
			SP 6	No 3	Commercial
Sa2 $^{1}/_{2}$	Very Thorough	Sa2 $^{1}/_{2}$	SP 10	No 2	Near White

Refer to Technical Manual Viscotaq Ver220203 Chapter 6. Surface Preparation

- The surface area to be coated should be inspected prior to coating.
- Known defects must be documented and photographed prior to application.
- Any existing damaged coating shall be removed before or as part of the surface preparation process.
- Clean underneath the tank to a depth ≥ 50mm (5 cm). If a "felt base" is present under the tank, remove the felt where the VISCOTAQ™ ViscoSealant is to be applied.
- The surface of the tank where the VISCOTAQ™ is to be applied shall be cleaned to a minimum of St 2/SSPC-SP2 (Hand Tool Cleaned); however, where possible to St 3/SSPC-SP3 (Power Tool Cleaned). Power wash the application area to remove any loose particles.
- Dry the area where VISCOTAQ™ is to be applied.
- Prior to application, surface shall be blown out of dust, abrasives, and other contaminations with clean, dry compressed air.
- Clean all surfaces to be coated to Solvent Clean SSPC-SP1, using an Oil Free Solvent (Acetone, Denatured Alcohol, and Isopropyl alcohol) to remove all mud, mill lacquer, wax, tar, oil, grease, or other foreign particles. NOTE: Industrial grade citrus-based (d-Limonene) products are not approved for use as an oil free solvent.
- Cleaned areas shall have a protective coating applied before the end of the shift. If a cleaned surface does not get coated, it shall be re-cleaned on the next shift.

11. APPLICATION OF TANK CHIME SEALING SYSTEM

11.1 Pay particular attention to the following items during application

- The temperature of steel surface or paint is less than 3℃ below the dew point temperature, or the ambient relative humidity is above 85%.
- When moisture has formed on surface of structure under raining, condensation, and frost etc.
- When temperature is extremely high or low. (Reference to PDS of each product)

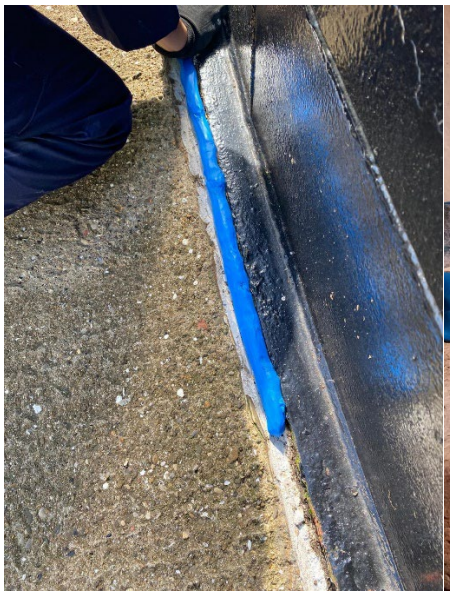
11.2 VISCOTAQ™ ViscoSealant

NOTE: Pneumatic applicator gun is strongly recommended.
NOTE: Warm sealant cartridges when applying in cold environments.

- VISCOTAQ™ ViscoSealant shall be used when there is a gap or void between the tank floor plate and the concrete base. A void of >10mm in height will require ViscoSesalant as per application 'Tank_Chime_Seal_B'.
- VISCOTAQ™ ViscoSealant should be > 18°C (65°F) when applying.
- ViscoSealant shall be applied with an applicator gun at a minimum of 25mm deep into the gap between the base of the tank and the ring wall, s*ee Appendix B page 13.*
- Use a putty knife when needed to smooth the product and to ensure material is packed into the gap. Apply with as few air pockets as possible. (Fig 1.)
- A backer should be used on tanks where the gap between the ring wall/base materials and the floor plate is ≥ 50mm.

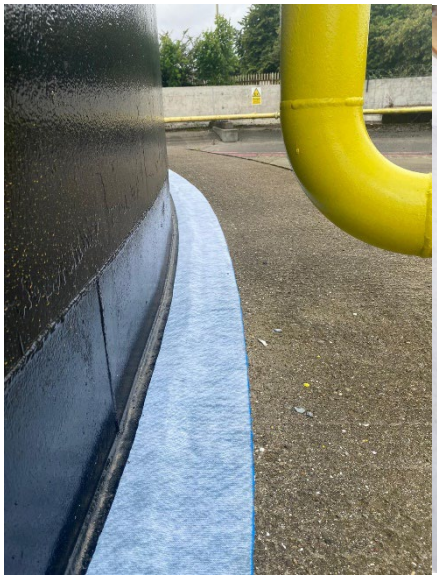
11.3 VISCOTAQ™ ViscoMastic (XHT*)

- ViscoMastic (XHT) shall be applied by hand up to 25mm deep into the gap between the base of the tank and the ring wall.
- Mould the product in place and create a 45° angle or fillet around the perimeter of the wall ring to seal onto the base and to allow a smooth application of the EZ Wrap.




11.4 VISCOTAQ™ EZ Wrap (XHT*)

- EZ Wrap (XHT) is applied by removing the release liner and placing the adhesive side onto the surface to be protected.
- EZ Wrap shall be started at the weld of the shell and the floor plate, also extended over the sealant onto the ring wall or base material.
- Extension of the floor plate from the weld where the shell connects should be ≥ 50mm to ensure proper adhesion.




- If the floor plate does not extend 50mm or greater from the shell, the EZ Wrap can be extended up the shell covering the weld.
- Once the EZ Wrap is applied to the floor plate, apply to the other side to the ring wall/base material.
- A minimum of 50mm of EZ Wrap shall be applied onto the ring wall/base materials. (VISCOTAQ™ EZ Wrap is manufactured in different widths. When selecting materials make sure to choose a width wide enough to ensure a 50mm overlap onto the ring wall/base materials)
- When applying EZ Wrap, remember that the tank can flex, therefore allow for movement.
- The EZ Wrap shall be gently smoothed by hand to ensure there are no wrinkles, folds, or entrapped air.
- Overlap EZ Wrap ≥ 25mm when connecting rolls. When overlapping the EZ Wrap, one may cut slits in the product and alternate the overlap to improve adhesion. If a standard overlap is used (or for any area where overlapping EZ Wrap), add heat and pressure to make sure a proper bond is created between the EZ Wrap products. Use the heat and pressure to make sure the sealing compound is fully impregnated in the polyester backing of the EZ Wrap.
- Use a roller over the EZ Wrap to ensure that it has completely adhered to the substrate.


- Paint EZ Wrap with a latex/acrylic (non-solvent base) paint to prevent any breakdown due to possible UV Rays as well as to add strength to the system. Paint should also prevent possible moulding or fungus growth where the product might stay wet or moist. The Archco 65™ acrylic high viscosity is recommended for use for regular temperatures and the Archco 15™ is recommended for high temperatures.

11.5 UV Topcoat

- DENSO Acrylic Topcoat
- Archco 65™
- Archco 15™
- Or approved equivalent

Refer to the manufacturers TDS

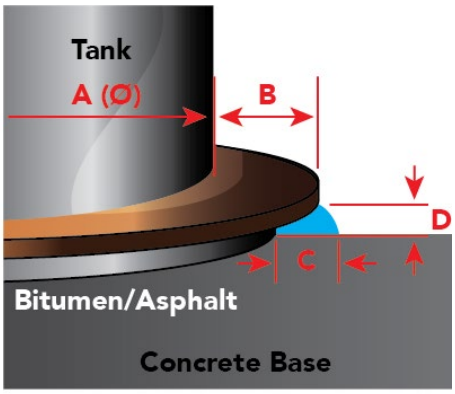
12. TANK DIAMETER – Material Quantities

Diameter (m)	Circumference (m)	VISCOTAQ EZ WRAP # Rolls	*VISCOTAQ ViscoSealant 12.5mm gap*	*VISCOTAQ ViscoSealant 25mm gap*	AVERAGE ViscoSealant # 887ml tubes
6.096	19.15	3.02	*3.30*	*5.50*	4.40
9.144	28.73	4.46	*4.87*	*8.11*	6.49
12.192	38.30	5.90	*6.44*	*10.73*	8.58
15.24	47.88	7.34	*8.01*	*13.35*	10.68
18.288	57.46	8.78	*9.58*	*15.96*	12.77
21.336	67.03	10.22	*11.15*	*18.58*	14.86
24.384	76.61	11.66	*12.72*	*21.20*	16.96
27.432	86.19	13.10	*14.29*	*23.81*	19.05
30.48	95.76	14.54	*15.86*	*26.43*	21.14
33.528	105.34	15.97	*17.43*	*29.05*	23.24
36.576	114.92	17.41	*19.00*	*31.66*	25.33
39.624	124.49	18.85	*20.57*	*34.28*	27.42
42.672	134.07	20.29	*22.14*	*36.90*	29.52
45.72	143.65	21.73	*23.71*	*39.51*	31.61
48.768	153.22	23.17	*25.28*	*42.13*	33.70
51.816	162.80	24.61	*26.85*	*44.75*	35.80
54.864	172.38	26.05	*28.42*	*47.36*	37.89
57.912	181.95	27.49	*29.99*	*49.98*	39.98
60.96	191.53	28.93	*31.56*	*52.60*	42.08
64.008	201.11	30.37	*33.13*	*55.21*	44.17
67.056	210.68	31.81	*34.70*	*57.83*	46.26
70.104	220.26	33.24	*36.27*	*60.45*	48.36
73.152	229.84	34.68	*37.84*	*63.06*	50.45
76.2	239.42	36.12	*39.41*	*65.68*	52.54

VISCOTAQ™ EZ Wrap 150mm x 7.6m part # TX 2166 (4 rolls/case) or

VISCOTAQ EZ Wrap 300mm x7.6m part # TX 21612 (2 rolls/case)

VISCOTAQ Sealant 887ml part # TX4210 (9 tubes /case)



TANK CHIME AREA	
DIMENSION	DESCRIPTION
A	Tank Diameter (m)
B	Rim Width (m)
C	Chime Width (m)
D	Chime Height (m)

13. MATERIALS PROPERTIES

13.1 VISCOTAQ™ EZ Wrap (XHT*)

VISCOTAQTM EZ Wrap is an amorphous, apolar, visco-elastic, semi-solid, polyolefin coating with a paintable backing for corrosion prevention of underground and aboveground substrates. It is part of the VISCOTAQTM coating system which consists of a corrosion protective sealant or mastic covered by the EZ Wrap and a mechanical protective outer layer, if required. This coating system offers exceptional corrosion prevention and waterproofing for a variety of substrates.

13.2 VISCOTAQ™ ViscoMastic (XHT*)

ViscoMastic is an amorphous, apolar, visco-elastic, semi-solid, polyolefin mastic for corrosion prevention of underground and aboveground substrates. It is part of the VISCOTAQ™ coating system which consists of a conformable mastic, a corrosion protective layer EZ Wrap (or ViscoWrap) and a mechanical protective outer layer or coating, if needed. This coating system offers exceptional corrosion prevention and waterproofing for a variety of substrates.

Uses:

- Mastic for concrete, steel, PVC, metal, wood, vinyl, and other coatings
- Soil-to-air transitions
- Pipe, flanges, valves and fittings
- Girth welds
- Buried pipelines with minimal surface preparation
- Waterproofing of gravity-fed pipes
- Sealing manholes, seams, penetrations, and cracks
- CUI applications
- End seal for pipe casing
- Tank chimes
- Waterproofing for bell and spigot joints

13.3 VISCOTAQ™ ViscoSealant

ViscoSealant is an amorphous, apolar, visco-elastic, semi-solid, polyolefin sealant for corrosion prevention of underground and aboveground substrates. It is part of the VISCOTAQ™ coating system which consists of a sealant, a corrosion protective layer (ViscoWrap or EZ Wrap) and a mechanical protective outer layer, if needed. This sealant offers exceptional corrosion prevention and waterproofing for a variety of substrates.

Uses:

- Sealant for concrete, steel, PVC, metal, wood, vinyl, and other coatings
- Seams
- Penetrations
- Cracks
- Waterproofing of gravity-fed pipes, manholes
- Tank base sealant
- Flange and bolt protection

14. REPAIR

Refer to APPENDIX C.
Area to be repaired shall be clean and dry with any loose material removed.
Should an area be removed either ViscoMastic or ViscoWrap shall be used to profile the repair by installing a piece the same size as the repair.
A layer of EZ Wrap with 50mm overlap all the way around the repair shall be installed to seal the repair and restore full integrity to the coating system.
Roll the newly installed EZ Wrap to ensure good adhesion and no air inclusions.
Apply approved topcoat overlapping a further 50mm onto the existing system.

15. INSPECTION

Inspection shall be carried out by suitably trained and certified inspector - VISCOTAQ™ Training and Certification - Module 6.
Ensure that the entire surface is covered with no gaps or air pockets. Examine adhesion by coupon test 24 hours after wrapping. Perform a holiday test using the correct voltages according to the tape and number of layers used where permissible. Inspect the final UV Top coat in accordance with the manufacturer's requirements.

16. STORAGE

- Store correct way up in original packaging.
- Store away from heat and open flames.
- Do not store in direct sunlight.
- In cold conditions, tape may need to be warmed to comply with minimum application temperatures (see above).
- Standard Grades store between: +5°C and +20°C
- XHT Grades store between: +5°C and +35°C

17. HANDLING

- Wear appropriate PPE as per the site requirements
- Wash thoroughly after use and before work breaks to remove compound from the skin.

- Careful attention should be given to personal hygiene.
- Change and clean soiled clothing.

Please refer to Safety Data Sheets for full information.

18. DISPOSAL

Please minimise or avoid waste wherever possible. Please do not discard waste material, including packaging, in the surrounding environment. Follow all relevant legislation for disposal.

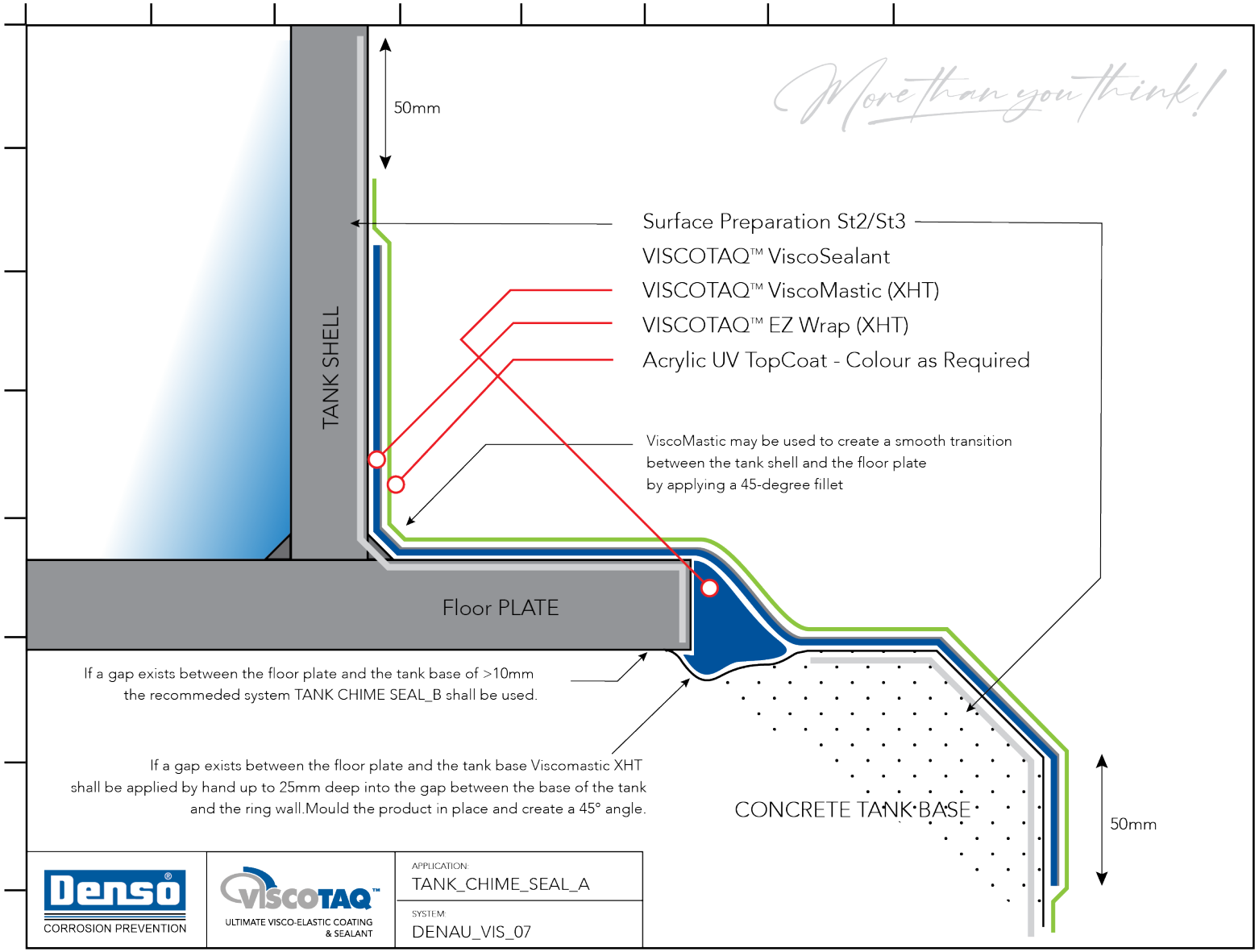
19. REVISION

Any amendments or revisions of this procedure shall be with the requirement of this application document and /or the instruction from manufacturer (Denso) and approved by the owner ultimately.

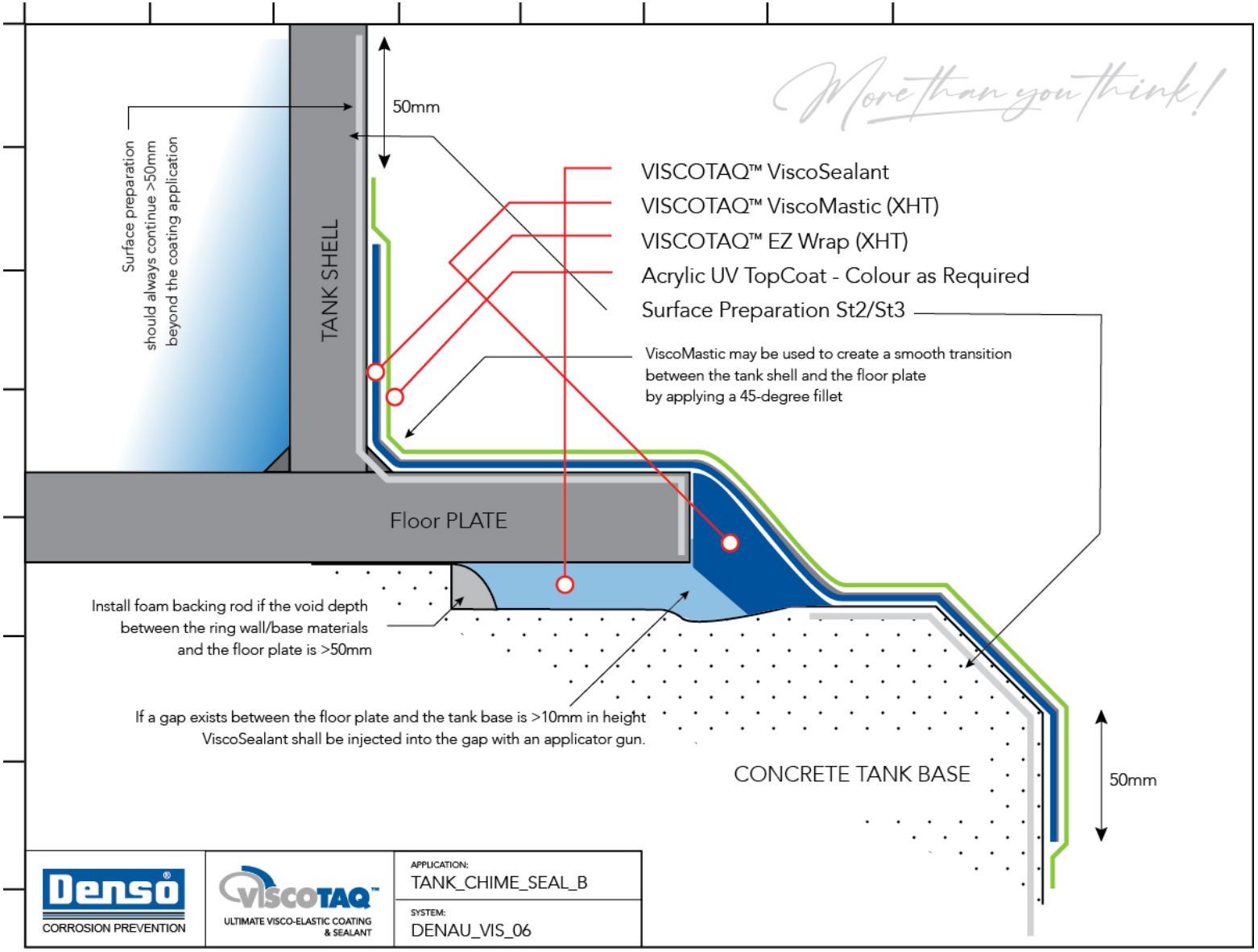
Should any variation from the prescribed approved procedure be required then the onsite supervisor, and or the DENSO Australia representative should be consulted.

Any variations shall be in accordance with Application Technical Manual Viscotaq Ver220203 and relevant Technical Data Sheets and must be recorded on all procedural documentation.

20. APPENDIX A



21. APPENDIX B



22. APPENDIX C

22.1 REPAIR PROCEEDURE

Step 1.

Locate the area of damage or air inclusions.

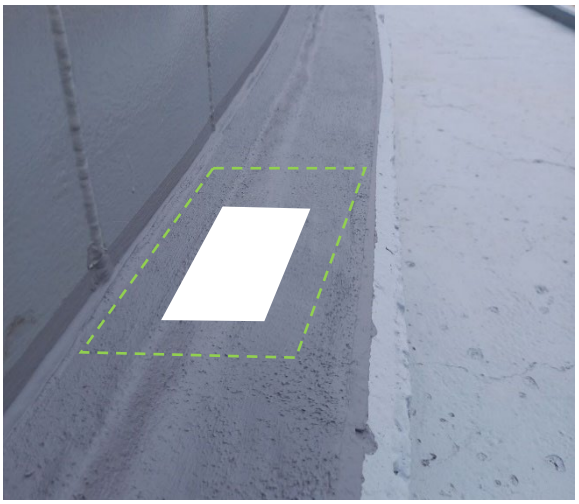
Cut through the EZ Wrap ensuring to cut all the way through to internal mesh so the existing material is not damaged when the damaged material is removed.

Step 2.

Remove the damaged area of EZ Wrap, either by hand or scrapper.

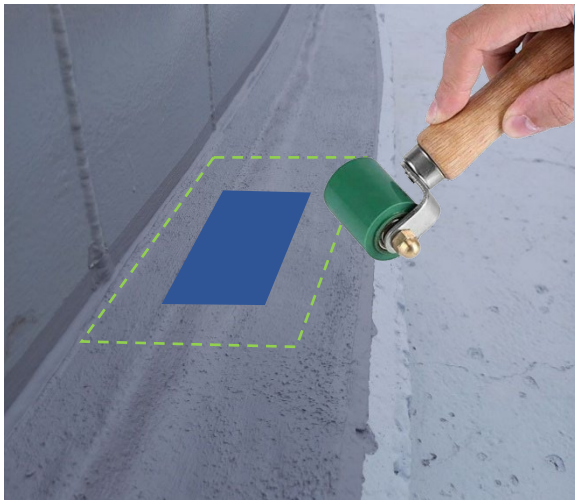
If the residual paste is not contaminated the remailing paste can stay in place for the repair.

If contamination or moisture ingress has occurred remove all remaining material and clean the substrate.



Step 3.

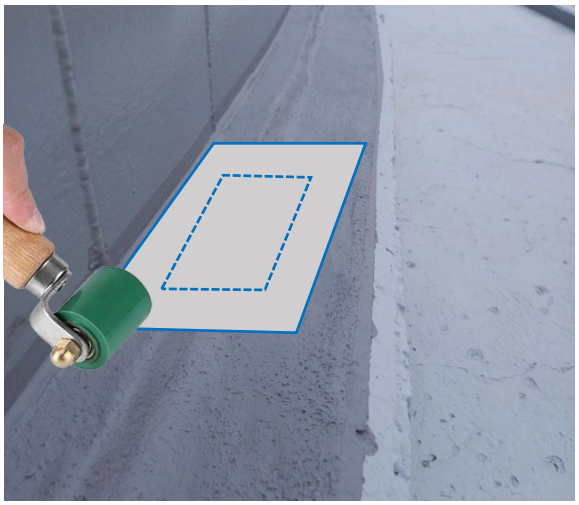
Clean the area around the repair location >50mm



Step 4.

Install a ‘patch’ of VISCOTAQ™ ViscoWrap the same size as the repair area.

Ensure the material is applied without air inclusions and is massaged onto the substrate either by hand or by soft roller.

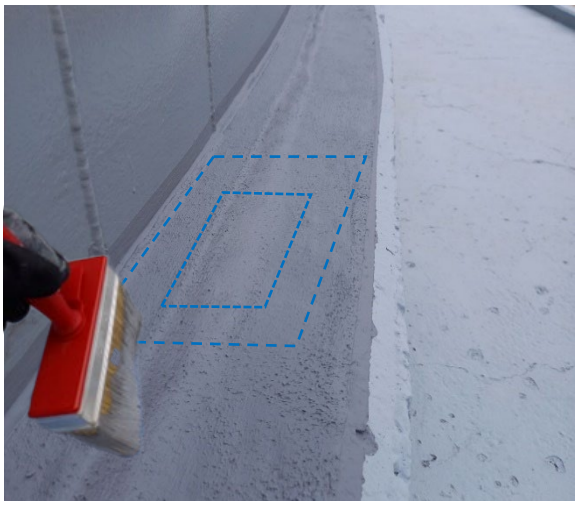


Step 5.

Cut and apply a patch of EZ Wrap 50mm larger than the repair all the way around.

Ensure the material is applied without air inclusions and is massaged onto the underlying coating either by hand or by soft roller.

Ensure good adhesion is to achieved at all times to both the ViscoWrap ST and the Pre coated EZ Wrap.



Step 6.

Apply the UV topcoat over the newly installed EZ wrap extending onto the existing coating >50mm where possible, as per the System Specification and the manufacturers recommendation.

END OF DOCUMENT