

Council Report No: 328/22

# **ITEM NUMBER: 18.3**

# **CONFIDENTIAL REPORT**

# **H-CLASS TRAM OPTIONS**

Pursuant to Section 83(5) of the Local Government Act 1999 the Report attached to this agenda and the accompanying documentation is delivered to the Council Members upon the basis that the Council consider the Report and the documents in confidence under Part 3 of the Act, specifically on the basis that Council will receive, discuss or consider:

b. Information the disclosure of which could reasonably be expected to confer a commercial advantage on a person with whom the council is conducting, or proposing to conduct, business, or to prejudice the commercial position of the council; and would, on balance, be contrary to the public interest.

Recommendation – Exclusion of the Public – Section 90(3)(b) Order

- 1. That pursuant to Section 90(2) of the *Local Government Act 1999* Council hereby orders that the public be excluded from attendance at this meeting with the exception of the Chief Executive Officer and Staff in attendance at the meeting in order to consider Report No: 328/22 H-Class Tram Options in confidence.
- 2. That in accordance with Section 90(3) of the *Local Government Act 1999* Council is satisfied that it is necessary that the public be excluded to consider the information contained in Report No: 328/22 H-Class Tram Options on the following grounds:
  - b. pursuant to section 90(3)(b) of the Act, the information to be received, discussed or considered in relation to this Agenda Item is information the disclosure of which could reasonably be expected to confer a commercial advantage on a person with whom the Council is proposing to conduct business; or would prejudice the commercial position of the Council for the proposed Expression of Interest process for the acquisition of the H-Class 361

In addition, the disclosure of this information would, on balance, be contrary to the public interest. The public interest in public access to the meeting has been balanced against the public interest in the continued non-disclosure of the information. The benefit to the public at large resulting from withholding the information outweighs the benefit to it of disclosure of the information.

3. The Council is satisfied, the principle that the meeting be conducted in a place open to the public, has been outweighed by the need to keep the information or discussion confidential.

Item No:	18.3
Subject:	H-CLASS TRAM OPTIONS
Date:	9 August 2022
Written By:	Team Leader, Sport and Recreation Planning
General Manager:	Strategy and Corporate, Ms P Jackson

#### SUMMARY

Following Council endorsement of the Former Buffalo Site concept, which excluded the H-Class Tram 361, it is necessary to determine what to do with the tram and the cost implications associated with each option. Options for the tram have been collated and presented in this report. It is recommended that Administration undertake an Expression of Interest (EoI) process to assess the potential for the tram to be re-used and repurposed for the enjoyment of the community.

#### RECOMMENDATION

That Council:

- 1. notes the report.
- 2. approves Administration to undertake an Expression of Interest (EoI) process for external stakeholder acquisition of the H-Class Tram 361; and
- 3. notes the results of an EoI will be tabled at Council for consideration in early 2023.

### **RETAIN IN CONFIDENCE - Section 91(7) Order**

4. That having considered Agenda Item 18.3 328/22 H-Class Tram Options in confidence under section 90(2) and (3)(b) of the *Local Government Act 1999*, the Council, pursuant to section 91(7) of that Act orders that the Report, Attachments and Minutes be retained in confidence for a period of 18 months and the Chief Executive Officer is authorised to release the documents when the results of the Expression of Interest process has been completed and that this order be reviewed every 12 months.

#### STRATEGIC PLAN

Our Holdfast 2050+

Wellbeing, Aspirations 2030 – Our beaches and Council-controlled public areas are accessible and inclusive. This project contributes to community wellbeing by establishing community hubs that integrate community support, recreational and commercial services.

Strategic alignments with the following documents: Open Space and Public Realm Strategy 2018-2030 Disability Access and Inclusion Plan 2020-2024

### **COUNCIL POLICY**

Asset Management Policy. Disposal of Land and Assets Policy.

#### STATUTORY PROVISIONS

Local Government Act 1999 and Regulations Disability Discrimination Act 1992 (DDA) Planning Development and Infrastructure Act 2016

#### BACKGROUND

In 2005, the South Australian Government gifted the H Class Tramcar No 361 to the City of Holdfast Bay. Council has considered options for the permanent display of the tram ever since.

In July 2011, (Motion C120711/208) Council resolved that:

1. The Glenelg Historical Society Inc work with Council staff to identify a suitable undercover (not enclosed in corrugated iron) short term location for the H Class Tramcar No. 361 in order to provide time to develop a more permanent solution.

Council considers the restoration and permanent housing of the H Class Tramcar No. 361 in its 2012/13 budget.

If no short term option is available then the H Class Tramcar No. 361 is gifted to the St Kilda Tramway Museum

Significant site scoping was undertaken to find a suitable location for the Tram. In September 2011, Council resolved (Report no. 342/11):

- 1. Subject to positive community feedback, approves a budget of \$65,000 from the 2011/12 budget, to construct an appropriate shelter on Wrigley (sic) Reserve and to return the H Class Tramcar No.361 to Glenelg within the next six months.
- The 2011/12 budget be adjusted at the first quarter review to accommodate this amount.

3. Seek advice on the best method of covering the tram and its structure.

On 11 September 2012, Council then considered the cost of maintenance and design options for a shelter to cover the tram. The resolution (Motion 110912/6046) of this report was:

- 1. That Council approves the design and cost for housing of the H Class tram areas contained on attachment one of this report, subject to the design being raised to ground level.
- 2. That the 2012/13 budget be adjusted at the first quarter review to accommodate the additional \$55,000 in funds required to facilitate the project.

Since the tram was installed on Wigley Reserve in 2012, the tram was repainted at a cost of \$15,000 to Council. Work orders to remove or repair vandalism has been attended to via Council's rapid response operations, however no further works have been undertaken. Given the deteriorating condition of the tram, an external condition assessment was commissioned in August 2021, recommending immediate action for repairs.

On 28 September 2021 Council resolved (Motion C280921/2426):

That Council:

- 1. notes the Phase 2 Engagement Summary Report regarding community consultation on the two concepts for the former Buffalo site;
- 2. notes that Option 1 is the preferred concept with some alterations based on feedback;
- 3. approves Administration to proceed with the finalisation of a concept design based on Option 1 which excludes the tram; and
- 4. notes a report will be tabled with Council with options for Tram relocation.

Following endorsement of the Former Buffalo Site concept, which excludes the H-Class Tram from the design, options for the tram relocation were discussed via Council workshop on 5 July 2022.

### REPORT

### **Condition Assessment**

In August 2021, a condition assessment on the tram was undertaken to better inform future designs for the revitalisation of the former Buffalo site. The assessment reported on:

- The structural integrity of the tram and potential relocation requirements.
- Site information including impacts of the coastal location and future asset deterioration.
- Appropriate ongoing maintenance.

• Recommended prioritisation for remedial works including mitigation of weather damage, refurbishment and restoration, modifications for safety, DDA compliance and approximate costs associated with recommendations.

Refer Attachment 1

#### Steelwork degradation

As outlined in Attachment 1, several external steel components are showing signs of moderate to severe corrosion. The steelwork has deteriorated partly due to inadequate preventative maintenance and partly due to many years of exposure to the elements. The tram has been located at Wigley Reserve since 2012, hence the steelwork has been subjected to high coastal exposure for the last 10 years. If the tram stays at Wigley Reserve, corrosion will continue to develop rapidly, particularly the exposed elements such as the outside plates and fixings.

#### Safety

A number of minor safety hazards were identified, including access to the undercarriage. This poses a significant risk in terms of entrapment within some of the mechanical elements beneath the tram. Given close proximity to the playspace, this risk has higher probability to occur and therefore remedial works is classified as a medium to high priority for Council. It is recommended that a continuous screening around the perimeter of the tram is installed if the tram were to remain onsite.

#### Access

If the tram is to remain publicly accessible, it should be modified as soon as possible to ensure compliance with AS 1428 (Design for Access and Mobility). *Under Disability Discrimination Act 1992* (DDA) regulation/act Council would need to apply accessible design to:

- all new buildings;
- new building work in existing buildings, such as additions and alterations; and
- existing buildings that are to be used for a purpose different from that for which it was originally designed. This is often referred to as "change of use".

Therefore if undertaking significant structural changes to the tram, it would trigger access modifications in addition to the remedial works required, unless it can be shown that access may impose an unjustifiable hardship. Options to renovate the tram that comply with DDA standards have been included in Attachment 1. As it is site dependent, modifications will require detailed design, and would be costed appropriately. Costs are unknown at this stage but can be explored if it is the preferred option.

#### Engagement

Results from community consultation undertaken for the revitalisation of the former Buffalo site indicated that despite the preference of a design that excludes the tram, there is still some historical and community attachment to the tram. In addition, the following table outlines the position of relevant stakeholders towards the options presented in this report for the tram.

Organisation	Stakeholder Response	Considerations
St Kilda Tramway Museum	No interest to acquire, store or display.	Nil
Department of Transport & Infrastructure (DIT)	No interest to acquire the tram. May be interested in leasing an area to Council along the rail corridor on Maxwell Terrace. Council would be responsible for maintenance of the leased area. No interest in managing a lease to an external proponent however a lease direct to Council would be considered.	Work with DIT and Torrens Connect to discuss future opportunities following EoI. Funding implications for Council.
Tram Side Kiosk	Will continue to operate and lease as required. Interested in submitting proposal via EoI. Aware that Council is yet to make a decision regarding the long term future of the tram.	Provide regular updates regarding Eol/outcomes for the tram.
Glenelg Historical Society	Preference of tram remaining open to public.	Eol criteria to include preference towards submissions that keep the tram open to public

#### **OPTIONS**

### 1. Retain H-Class Tram 361 at Wigley Reserve

If the Tram was to be retained onsite, structural and safety issues will need to be addressed within the next 18 months (high priority). These items are listed in the table below

scion.			
Item	Description	Cost	Priority
Steelwork	External repairs, treat steelwork showing corrosion.	\$50,000	High
Entry doors	Remove rot, replace rubber seals (causing water leaks and security issues).	\$5,000	High
Timber wall panels	Fix corroded steel screws, seals and repaint	\$5,000	<b>Low</b> Aesthetic purposes
Internal repairs	Internal repairs, paint, upholstery and flooring.	\$14,000	<b>Low</b> Aesthetic purposes

Item	Description	Cost	Priority
Security and	Security features, lights, removal of	\$6,000	Medium
aesthetic	redundant undercarriage items.		Recommended
			for longevity
DDA access	Implementation of modifications as	\$40,000-	Required if
	per Attachment 1.	\$60,000	significant
			structural
			works occur
Safety	Trip hazards, non-compliant access,	TBD up to	High
	entrapment risks in the	\$20,000	
	undercarriage, particularly for		
	children.		
TOTAL		\$120,000 -	
		\$160,000	

*This table is a summary of recommended works outlined in the Condition Assessment and Concept Report, Magryn Engineering, 2021 (Attachment 1).* 

In addition, ongoing maintenance costs will need to be added to future operational budgets. As outlined in Attachment 1, the 'Atmospheric Corrosivity' category is high. Preventative maintenance (re-painting/servicing), ongoing inspections (by a structural engineer every three years) is required to ensure future corrosion does not compromise the structural integrity of critical components.

*Refer Attachment 1* 

#### 2. Relocate

Relocation of the tram within Wigley Reserve or at any other coastal location will not slow down corrosion, unless the tram is inside a fully encased structure. Relocating the tram more than 1km from the coast has the potential to slightly reduce the rate of corrosion. Locations west of Brighton Road will incur high corrosion rate unless the tram becomes a static display as opposed to interactive as it is currently.

The tram is 3.3m high, 17 metres long and weighs 18 tonnes. A trailer 26 metres long and 3.5 metres wide is required to transport the tram, limiting access and turn around capabilities. Maneuverability is further restricted by crane set down requirements alongside the trailer. A quote provided in 2021 estimated \$6,000 for the removal of the tram, which excludes hourly and kilometre rates. The removal of the shelter above the tram will also need to be considered in addition to the above.

Costs for the retention of the tram will also be incurred as per Option 1, plus site preparation works. Costs of these works require detailed design, and would be costed appropriately. Therefore costs are unknown at this stage, however it is estimated that they could be in excess of \$250,000. This would include modifications and repairs listed in Option 1, following detailed design.

#### 3. Seek Expressions of Interest (EoI)

Tram and train carriages have been increasingly popular to re-use and upcycle for unique tourism experiences. Current examples within the state include the Almond Train in McLaren Vale, The Greenly Carriage on the Eyre Peninsula and the 'Off The Rails' Carriage B&B in Peterborough. Initial confidential conversations about an EoI with the South Australian Tourism Commission have been positive, seeking expressions of interest from South Australia's tourism operators and Holdfast Bay businesses would be worthwhile.

There is a strong preference for community use and/or accessibility to the community. Intended uses may include:

- Static display;
- Pop up, relocatable attraction or information booth;
- Repurposed into a classroom, coffee shop, café, shelter, accommodation;
- Re-use of tram elements for a feature, building, wall or for retail premises; and
- Criteria and weighting will guide the EOI process. Proposed principles of an EOI will include:
  - Community benefit through any future repurposing.
  - Preference towards the tram relocated within the City of Holdfast Bay.
  - Minimal to no cost to Council in relocation or site establishment.

#### 4. Demolish/Remove and Remediate

Removal and disposal will be at the cost of Council. Should an EoI be unsuccessful, or if remediation as per option 1 is rejected, demolition and remediation costs will be incurred. If the revitalisation of the former Buffalo site receives funding, demolition and remediation costs will be absorbed into the project. It should be noted that there will be some salvage or scrap metal value in the tram, to offset cost.

Based on the 4 options presented, it is proposed that Administration test the market to gauge interest through an EOI process for external stakeholder acquisition before exploring other options such as relocation or demolition. A summary of costs with each option can be found in Attachment 2.

Refer Attachment 2

#### Next Steps

An EoI will be drafted and promoted to the general public and Council stakeholders, seeking submissions. Results with the EoI outcomes will be presented to Council with a recommendation early in 2023. If no decision is made regarding the future of the tram following the EoI process, costs to retain or demolish/remove the tram will need to be considered for the 2023/2024 budget.

#### BUDGET

No budget is allocated to the recommendations listed in this report. Should an EoI process be approved, marketing and media costs will be absorbed in Public Realm and Urban Design marketing and operational budgets.

### LIFE CYCLE COSTS

Lifecycle costs will need to be considered should the Tram be retained by Council.



# CONDITION ASSESSMENT AND CONCEPT REPORT

# H-CLASS TRAM 361 ADELPHI TERRACE, WIGLEY RESERVE, GLENELG, SA

for

# **CITY OF HOLDFAST BAY**

Project No: 21377 August 2021

ENGINEERING CONSULTANTS

267 BRIGHTON ROAD SOMERTON PARK SA 5044

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# SCOPE OF REPORT

Magryn & Associates were engaged by City of Holdfast Bay (Council) to assess and report on the following in relation to the existing H-class tram at Wigley Reserve (Adelphi Terrace) in Glenelg:

- The current condition of the tram (including the structural integrity and if relocation of the tram is required off-site)
- Relevant site information such as impacts of the exposed coastal location and likely future asset deterioration if appropriate maintenance is not undertaken
- Recommend remedial works including mitigation of potential weather damage, refurbishment and restoration
- Approximate costs and prioritisation of recommended works
- Concept plans and recommendations for modifications to meet DDA access requirements to and within the tram
- Recommendations for modifications to meet safety requirements
- Required ongoing maintenance



### GENERAL

The historic H-class tram 361 is approximately 90 years old, and travelled from Glenelg to Adelaide before it was retired in 2006. It was located in the St Kilda Tramway Museum before being relocated to Wigley Reserve in Glenelg in 2013. Whilst being situated in Wigley Reserve, the tram doors were closed to the public until early 2021 when it was opened for patrons of the Tram Side Kiosk. There is a steel roof structure over the tram, which appears to have been constructed within the last decade.

The tram is non-operational, and is supported on a concrete slab. It consists of:

- Steel framed undercarriage with timber floor panels and rubber matting.
- Glass windows to the sides and front.
- Timber side wall panels and window frames.
- Curved steel panels at the ends of the tram.
- Curved steel roof.
- Two bifold doors at each end of the tram.
- A row of seats both sides of the tram, with a central walkway.

This report shall be read in conjunction with Magryn drawings 21377-1-2.



Figure 2- Aerial view of the site, from Nearmap.

## SITE INSPECTION AND CONDITION ASSESSMENT

The tram was inspected internally and externally on the 4<sup>th</sup> of August 2021. The inspection was visual only, and no fittings or fixtures were removed for the inspection. Refer to the appendix of this report for photographic records of the defects.

The following damage and points of interest were noted externally:

- Approximately 900mm from external ground level to the tram entry floor level. The step is approximately 450mm from ground level. This is not compliant with current standards for access. (figure 3)
- Moderate corrosion to the hinge assembly for the step. (figure 4)
- Moderate to severe laminated corrosion to the steel plate at each end of the tram. (figure 5)
- The timber floor appears in sound condition, with no signs of rot or structural damage. (figure 7)
- The rubber seals for the bifold doors are damaged, which allows wind and rain to enter the interior of the tram. (figure 6)
- Moderate to severe corrosion to the undercarriage steel chassis members, which are steel I-beams and equal angles. These critical elements form the structural frame for the tram. (figure 7-9)
- Moderate surface corrosion to the undercarriage componentry generally. (figure 7-9)
- Moderate corrosion to the wheels and bogie assembly. (figure 11)
- Corrosion to the screw fixings for the timber around the windows. Appears to be some minor splitting and timber rot present around the fixings in some cases. (figure 10)
- Broken light at the eastern end of the tram. (figure 12)
- The roof of the tram appeared in reasonable condition, with minimal signs of paint failure or corrosion. (figure 13)
- Rotting to the framing adjacent the door frame. (figure 14)
- Detached roof edge fascia at the end of the tram. (figure 15)
- Corrosion to the rear-view mirror frames.
- Although beyond the scope of this report, it was noted that the paint system for the steel canopy structure above the tram has failed, and corrosion has developed in some locations. (figure 16)

The severity of corrosion to the steel elements was estimated visually only. In order to accurately assess the amount of steel thickness lost, the steel must be washed and the corrosion cleaned to bright steel with a power wire brush. Refer to the recommended works section below for further details.

The following was noted internally in the tram:

- Faded yellow paint at the entry step. (figure 19)
- Faded/ splitting seat upholstery (more severe in some areas). (figure 18)
- Generally weathering and paint peeling of the control panels at each end of the tram. (figure 20)
- Paint peeling to the timber ceiling at the entry each end of the tram. (figure 21)
- Lifting of the rubber floor mats in some locations, which may result in a trip hazard.

## DISCUSSION

### Steelwork degradation

As noted above, several external steel components are showing signs of moderate to severe corrosion.

The steelwork has deteriorated due partly to inadequate preventative maintenance and also due to many years of exposure to the elements. The tram has been located at Wigley Reserve since 2012, hence the steelwork has been subjected to high coastal exposure for the last 10 years.

The atmospheric corrosivity category for Wigley Reserve is high (C4, as per AS/NZS 2312), as it is within 1km from the coast. The corrosion rate for steel in this category is 50 to 80 microns (0.05 to 0.08mm) per year. At this corrosion rate, the steelwork may corrode up to 2mm in a 25-year period.

The high build epoxy corrosion protection system outlined in the recommended works section below is anticipated to achieve 25+ years of durability, before further maintenance is required (as per paint system EHB6 in table 6.3 of AS/NZS 2312.1-*Guide to the protection of structural steel against atmospheric corrosion by the use of protective coatings*).

Corrosion to the structural steel framed undercarriage may not be an urgent structural or safety concern at this stage (subject to further investigation and assessment following cleaning of steelwork as outlined in the recommended works section below), and the rate of corrosion may be reduced slightly if the undercarriage is enclosed as discussed below. The costs associated with applying corrosion protection to the steelwork in the undercarriage would be extremely high, due to the quantity of corroded steelwork and limited access. If the steelwork is not treated with corrosion protection, it is possible that the structural steel components may be serviceable and structurally adequate for a long period (up to 10 years, subject to periodic structural maintenance inspections as outlined below). After this period, corrosion protection treatment will need to be carried out as outlined in the recommended works section below.

Corrosion to the door hinge assemblies may eventually inhibit or prevent the door from opening effectively. Hence, this should be rectified.

Corrosion to the steel screw fixings for the external timber window framing is not an urgent structural problem. However, as the screws corrode, they expand and may promote further splitting; which allows moisture to penetrate into the timber and accelerating timber rot. All corroded steel fixings should be removed and replaced with marine grade stainless steel fixings, and any gaps or splits in the timber joints should be sealed to prevent moisture penetration.

If the tram stays at Wigley Reserve, corrosion will continue to develop rapidly, particularly exposed elements such as the outside plates and fixings.

### **Options for Relocation**

Relocation of the tram to an alternative site with a lower corrosivity category would slow down the corrosion process, and reduce required ongoing maintenance.

The atmospheric corrosivity category for inside a building (such as a museum) is low (C2, as per AS/NZS 2312). The corrosion rate for steel in this category is 1.2 to 25 microns (0.0013 to 0.025mm) per year. At this corrosion rate, the steelwork may corrode up to 0.63mm in a 25-year period.

The atmospheric corrosivity category for an exterior environment further than 1km from the coast (in the Adelaide region) is medium (C3, as per AS/NZS 2312). The corrosion rate for steel in this category is 25 to 50 microns (0.025 to 0.05mm) per year. At this corrosion rate, the steelwork may corrode up to 1.25mm in a 25-year period.

As an alternative to relocating the tram, glass walls could be installed around the existing roof canopy structure, enclosing the entire tram inside a building. This option may require extensive design modifications to the existing steel structure (such as additional bracing), and would be expensive.

### Water leaks

As noted above, the primary source of water infiltration into the tram is through the rubber door seals, which have large gaps due to deterioration of the seals. This not only accelerates deterioration of internal components; it also makes the tram significantly less secure (in regards to vandals).

### <u>Safety</u>

There are several safety risks associated with the condition of the current tram. These include:

- Trip hazards internally
- Non-compliant access via the entry step
- Access to the undercarriage, particularly for children. There may be a risk of entrapment within some of the mechanical elements.

### Options to restrict access to beneath the tram

Provide a continuous screening around the perimeter of the tram, from floor level to the slab level. The disadvantage of this option is that the wheels and the chassis will not be visible, which may detract from the aesthetic and heritage appeal.

If ramps and landings are constructed to meet DDA requirements (discussed below), this would also prevent access to the undercarriage.

Alternatively to providing a screening fixed to the side of the tram, it may be more desirable to construct a fence around the perimeter of the tram (except for along the section where the ramp is constructed). This will allow the tram wheels and undercarriage to still be visible.

## **RECOMMENDED WORKS**

All works shall be carried out in accordance with the relevant Australian Standards and WHS requirements current at the time of works.

All products shall be installed strictly in accordance with manufacturer's specifications.

The following works are recommended to be undertaken. The works have been prioritised from high to low. The priority of the works was determined based on the inherent risk associated with the item of work.

The cost estimates should be considered as "order of magnitude" accuracy only, for budgeting purposes. They have been compiled with all due care, however Magryn & Associates Pty. Ltd. accepts no liability for the accuracy of the estimate.

### MAINTENANCE WORKS

### High priority- recommended to be undertaken within the next one year

### <u>Steelwork</u>

Treat all exposed external steelwork showing signs of corrosion. All corrosion protection shall be applied in accordance to manufacturer's specifications. Corrosion protection applied as follows:

- Wash and power wire brush or grit blast (to class 2.5 surface to AS1627), to a bright steel finish.
- Assess the severity of the corrosion to the undercarriage structural steel (chassis), by measuring the wall thickness of the steel using an ultrasonic thickness measurer in at least three locations per member.

**Note:** The urgency of the repairs to the undercarriage structural steel (chassis) depends on the severity of the corrosion. Contact our office for further assessment after the above has been undertaken. Steelwork with minor corrosion may not require urgent maintenance. Steelwork with severe corrosion and section loss may need to be removed and replaced with a new member of equal size and grade (this has not been allowed for in the estimated cost).

- Prime all bare steel with 75 microns zinc rich primer (Jotun Barrier or equivalent).
- Coat with 250 microns high build epoxy (Jotun Jotamastic 90 or equivalent).
- Allow to completely rub down, prepare and coat with 50 microns polyurethane gloss (Jotun Hardtop AX or equivalent, colour selected by client).

The cost of these works are estimated to be **\$50,000**, assuming all undercarriage components treated.

### Entry doors

- Remove the existing entry doors and hinge assembly.
- Inspect the timber framing adjacent the doors, and remove rotted sections of timber. Replace with new hardwood timber and paint to match existing.

- Treat the steelwork for the hinge assembly with new corrosion protection as outlined above.
- Remove the existing rubber door seals and metal strip.
- Install new rubber door seals. Use marine grade stainless steel for the connection strip and fixings.
- If required, replace the entire door and hinge assembly.

The cost of these works are estimated to be **\$5,000**, assuming all doors replaced.

### Medium priority- recommended to be undertaken within the next two years

### Timber wall panels

- Remove existing corroded steel screw fixings (securing the external timbers)
- Replace with marine grade stainless steel screw fixings (countersunk)
- Fill any gaps or splits in the timber as follows:
  - Clean and prepare gap to be dust free.
  - Fill and seal gap with Parchem Nitoseal MS250 sealant.
- Provide externally rated timber filler over the fixings and re-paint timber to match existing

Note: If any rotted timber is found following removal of fixings, replace the rotted section with H3 treated hardwood, size to match existing, paint to match existing.

The cost of these works are estimated to be **\$5,000**, assuming that some timber wall panels will need to be replaced (due to rot).

### Low priority- to be undertaken at any stage

### Internal repairs

- Remove existing paint and re-paint the ceiling, dividing wall and control panel in the entry areas at the ends of the tram.
- Replace seat upholstery
  - Remove existing upholstery and replace with the new to match existing (or to clients selection)
- Replace flooring
  - Remove existing rubber floor mats
  - Replace with new 'non-slip' floor covering (to AS 1428) to clients selection

The cost of these works are estimated to be **\$14,000** (assuming all seats re-upholstered).

### Miscellaneous

- Replace the light at the end of the tram
- Reconnect the steel roof fascia plate at the end of the tram.

- Provide lighting to the tram interior, to make the space more functional, and for aesthetics. This also provides added security during the night, by discouraging break-ins and damage.
- Remove any undercarriage components that are redundant and do not add any heritage or functional value (to be discussed with Council).

The cost of these works are estimated to be **\$6,000** (assuming all seats re-upholstered, and assuming power supply to tram already available).

### MODIFICATIONS TO MEET DDA ACCESS AND SAFETY REQUIREMENTS

If the tram is to remain open to the public, it should be modified as soon as possible to ensure it is compliant with AS 1428 (Design for Access and Mobility).

The following is required to comply with AS 1428 and to meet DDA (Disability Discrimination Act) requirements.

- Ramp access, sloped at 1:14 (1 vertical: 14 horizontal), with a minimum clear width as per AS 1428:
  - 1.2m to allow wheelchair access
  - o 1.5m to allow a wheelchair and a pram to pass
  - 1.8m to allow two wheelchairs to pass comfortably
- Continuous uninterrupted accessible path of travel shall be provided within the tram, to provide access to all accessible facilities.
- Circulation space to enable a wheelchair to turn around and for two wheelchairs to pass if required.
- Circulation space at the entry.

In order to achieve the above requirements as well as safety requirements, the following modifications to the tram are recommended. These modifications are shown on the attached concept plans.

- Increase the floor level in the entry, to match the main floor level. This could be achieved using timber floor battens and particleboard flooring.
- Remove the seating and dividing walls from one side of the tram, to create a pathway with approximately 1.4m of clear width.
- Remove additional seating at the ends and middle of the tram to allow for circulation space for wheelchairs to enter/exit, turn around and/or pass. The internal walls in the entry (adjacent control panel where tram operator seat is) will also need to be removed to comply with circulation requirements at the doorways (it can be retained at one end for option 1 below).
- Construct ramps and landings as shown on the attached plan layouts. Two options have been proposed. The entry/exit landings could be increased in size to create a more usable space, potentially with additional outdoor seating.

**Option 1** has a ramp and entry/exit on one side of the tram only and the internal pathway would require 'two way' travel. The pathway width does not allow wheelchair passing, hence additional seating is recommended to be removed to provide circulation space.

**Option 2** has an entry ramp on one side of the tram and an exit ramp on the other side, hence the internal pathway would only need to facilitate 'one way' travel. Hence, additional circulation space is not required and internal seating could be maximised. The internal walls at each end of the tram will need to be removed for this option.

Options for ramp and landing construction are:

- Timber framed with timber decking, and concrete footings. Screening would be required to prevent access beneath the decking. Highly durable timber such as hardwood would be required.
- Similar to above, but with fibre reinforced polymer (or recycled plastic) framing and decking.
- Mass concrete ramp and landings.
- Install handrails to the ramps and landings as per AS 1428. Marine grade stainless steel or fibre reinforced polymer is recommended for handrails, for durability.
- Install tactile ground surface indicators as per AS 1428.
- Install a continuous screening around the perimeter of the tram, from floor level to the slab level. The recommended material for the screening is aluminium, as it is corrosion resistant and requires minimal ongoing maintenance.

### **ONGOING MAINTENANCE**

If the structural steelwork for the undercarriage is not assessed and treated in the next 12 months, ongoing maintenance inspections are required to ensure further corrosion does not compromise the structural integrity of critical components. Required maintenance can then be identified at the time of inspection.

If the tram remains at Wigley Reserve, it is recommended that a maintenance inspection is undertaken by a structural engineer every **3 years**.

If the tram is relocated to a new location where the corrosivity category is medium (refer discussion above), it is recommended that a maintenance inspection is undertaken by a structural engineer every **5 years**.

If the tram is relocated to a new location where the corrosivity category is low (inside a building, refer discussion above), it is recommended that a maintenance inspection is undertaken by a structural engineer every **10 years**.

For Magryn & Associates Pty Ltd

Will Souter B. Eng.

Attachments:

- Site photos
- Concept drawing 21377-1-2
- Product technical data sheets

# <u>External</u>



Figure 3











Figure 8





Figure 10





Figure 12









Figure 16

## Internal



Figure 17



21377













# <u>LEGEND</u>

TACTILE GROUND SURFACE INDICATOR IN ACCORDANCE WITH AS1428.

NOTE: THE ACCESS RAMP SHALL HAVE A HANDRAIL EITHER SIDE OF THE RAMP IN ACCORDANCE WITH AS1428.





CONCEPT ONLY THE ARRANGEMENT SHOWN IS FOR DISCUSSION PURPOSES ONLY. IT MUST NOT BE USED FOR CONSTRUCTION.

# <u>LEGEND</u>

TACTILE GROUND SURFACE INDICATOR IN ACCORDANCE WITH AS1428.

NOTE: THE ACCESS RAMP SHALL HAVE A HANDRAIL EITHER SIDE OF THE RAMP IN ACCORDANCE WITH AS1428.



# Technical Data Sheet



# **Jotamastic 90**

# **Product description**

This is a two component polyamine cured epoxy mastic coating. It is a surface tolerant, abrasion resistance, high solids, high build product. This product is tintable in a wide range of colours in Jotun's Multicolor Industry (MCI) system. Specially designed for areas where optimum surface preparation is not possible or desired. Provides long lasting protection in environments with high corrosivity. Can be used as primer, mid coat, finish coat or as single coat system in atmospheric and immersed environments. Suitable for properly prepared carbon steel, galvanised steel, stainless steel, aluminium, concrete and a range of aged coating surfaces. It can be applied at sub zero surface temperatures.

#### **Typical use**

General: Primarily designed for maintenance and repair.

Marine: Outside hulls, exterior and interior areas.

Protective:

Recommended for offshore environments, including splash zones, refineries, power plants, bridges, buildings, mining equipment and general structural steel.

#### **Approvals and certificates**

Approved for PSPC for Crude Oil Tanks according to IMO Res. MSC 288(87) NORSOK System 1, Rev.5 Grain, Newcastle Occupational Health

When used as part of an approved scheme, this material has the following certification: - Low Flame Spread in accordance with EU Directive for Marine Equipment. Approved in accordance with parts 5 and 2 of Annex 1 of IMO 2010 FTP Code, or Parts 5 and 2 of Annex 1 of IMO FTPC when in compliance with IMO 2010 FTP Code Ch. 8

Consult your Jotun representative for details.

Additional certificates and approvals may be available on request.

#### **Other variants available**

Jotamastic 90 Aluminium Jotamastic 90 GF Refer to separate TDS for each variant.

#### Colours

black, white and according to Multicolor Industry tinting system (MCI)

Date of issue: 20 April 2018

This Technical Data Sheet supersedes those previously issued.



# **Product data**

Property	Test/Standard	Description
STANDARD GRADE		
Solids by volume	ISO 3233	80 ± 2 %
Gloss level (GU 60 °)	ISO 2813	semi gloss (35-70)
Flash point	ISO 3679 Method 1	35 °C
Density	calculated	1.4 kg/l
VOC-US/Hong Kong	US EPA method 24 (tested) (CARB(SCM)2007, SCAQMD rule 1113, Hong Kong)	270 g/l
VOC-EU	IED (2010/75/EU) (theoretical)	234 g/l
VOC-China	GB/T 23985-2009 (ISO 11890-1) (tested)	246 g/l
VOC-Korea	Korea Clean Air Conservation Act (tested)	273 g/l
WINTER GRADE		
Solids by volume	ISO 3233	80 ± 2 %
Flash point	ISO 3679 Method 1	36 °C
Density	calculated	1.4 kg/l
VOC-US/Hong Kong	US EPA method 24 (tested) (CARB(SCM)2007, SCAQMD rule 1113, Hong Kong)	220 g/l
VOC-EU	IED (2010/75/EU) (theoretical)	213 g/l
VOC-China	GB/T 23985-2009 (ISO 11890-1) (tested)	202 g/l
VOC-Korea	Korea Clean Air Conservation Act (tested)	287 g/l

The provided data is typical for factory produced products, subject to slight variation depending on colour. All data is valid for mixed paint.

Gloss description: According to Jotun Performance Coatings' definition.

Small colour variations may occur when changing between the two curing agents. If exposed to weathering without topcoat, the Wintergrade (WG) version will yellow at a faster rate than the same colour in Standard grade.

# Film thickness per coat

#### Typical recommended specification range

#### STANDARD GRADE

Dry film thickness	100	-	300	µm
Wet film thickness	125	-	375	µm
Theoretical spreading rate	8	-	2.7	m²/l
WINTER GRADE				
Dry film thickness	100	-	300	µm
Wet film thickness	125	-	375	µm
Theoretical spreading rate	8	-	2.7	m²/l

Date of issue: 20 April 2018

Page: 2/6

This Technical Data Sheet supersedes those previously issued.



# Surface preparation

To secure lasting adhesion to the subsequent product all surfaces shall be clean, dry and free from any contamination.

#### Surface preparation summary table

	Surface p	preparation
Substrate	Minimum	Recommended
Carbon steel	St 2 (ISO 8501-1)	Sa 2 (ISO 8501-1)
Stainless steel	The surface shall be hand or machine abraded with non-metallic abrasives or bonded fibre machine or hand abrasive pads to impart a scratch pattern to the surface and to remove all polish from the surface.	Abrasive blast cleaning to achieve a surface profile using approved non- metallic abrasive media which is suitable to achieve a sharp and angular surface profile.
Aluminium	The surface shall be hand or machine abraded with non-metallic abrasives or bonded fibre machine or hand abrasive pads to impart a scratch pattern to the surface and to remove all polish from the surface.	Abrasive blast cleaning to achieve a surface profile using approved non- metallic abrasive media which is suitable to achieve a sharp and angular surface profile.
Galvanised steel	The surface shall be clean, dry and appear with a rough and dull profile.	Light brush blasting using non- metallic abrasive leaving a clean, rough and even pattern.
Shop primed steel	Clean, dry and undamaged shop primer (ISO 12944-4 6.1)	Sa 2 (ISO 8501-1)
Coated surfaces	Clean, dry and undamaged compatible coating (ISO 12944-4 6.1.4)	Clean, dry and undamaged compatible coating (ISO 12944-4 6.1.4)
Concrete	Low pressure water washing to a rough, clean, dry and laitance free surface.	Minimum 4 weeks curing. Moisture content maximum 5 %. Prepare the surface by means of enclosed blast shot or diamond grinding and other appropriate means to abrade the surrounding concrete and to remove laitance.

Optimum performance, including adhesion, corrosion protection, heat resistance and chemical resistance is achieved with recommended surface preparation.

# **Application**

### **Application methods**

The product can be applied by

Spray:	Use airless spray.
Brush:	Recommended for stripe coating and small areas. Care must be taken to achieve the specified dry film thickness.
Roller:	May be used for small areas. Not recommended for first primer coat. Care must be taken to achieve the specified dry film thickness.

Date of issue: 20 April 2018

This Technical Data Sheet supersedes those previously issued.



### Product mixing ratio (by volume)

STA	ND	ARD	GRA	DE
			OIL.	

Jotamastic 90 Comp A	3.5 part(s)
Jotamastic 90 Standard Comp B	1 part(s)
WINTER GRADE	
Jotamastic 90 Comp A	3.5 part(s)
Jotamastic 90 Wintergrade Comp B	1 part(s)

Independent on substrate temperature the minimum temperature of the mixed base and curing agent is 10 °C. Lower temperature may require additional thinner to reach correct application viscosity. Additional thinner gives lower sag resistance and slower curing. If addition of thinner is required, this shall be done after mixing of the two components.

#### **Thinner/Cleaning solvent**

Thinner: Jotun Thinner No. 17

#### Guiding data for airless spray

Nozzle tip (inch/1000):	19-25
Pressure at nozzle (minimum):	150 bar/2100 psi

# **Drying and Curing time**

Substrate temperature	-5 °C	0 °C	5 °C	10 °C	23 °C	40 °C
STANDARD GRADE						
Surface (touch) dry			20 h	12 h	4 h	1.5 h
Walk-on-dry			40 h	20 h	6 h	3 h
Dry to over coat, minimum			30 h	10 h	3 h	1.5 h
Dried/cured for service			28 d	14 d	7 d	2 d
WINTER GRADE						
Surface (touch) dry	24 h	18 h	12 h	8 h	3.5 h	
Walk-on-dry	72 h	30 h	20 h	12 h	4 h	
Dry to over coat, minimum	54 h	20 h	10 h	6 h	2 h	
Dried/cured for service	21 d	14 d	10 d	5 d	3 d	

For maximum overcoating intervals, refer to the Application Guide (AG) for this product.

Drying and curing times are determined under controlled temperatures and relative humidity below 85 %, and at average of the DFT range for the product.

Surface (touch) dry: The state of drying when slight pressure with a finger does not leave an imprint or reveal tackiness.

Walk-on-dry: Minimum time before the coating can tolerate normal foot traffic without permanent marks, imprints or other physical damage.

Dry to over coat, minimum: The recommended shortest time before the next coat can be applied.

Date of issue:	20 April 2018
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This Technical Data Sheet supersedes those previously issued.



Dried/cured for service: Minimum time before the coating can be permanently exposed to the intended environment/medium.

# **Induction time and Pot life**

Paint temperature	23 °C
STANDARD GRADE	
Pot life	2 h
WINTER GRADE	
Pot life	45 min

# **Heat resistance**

	Temperature		
	Continuous	Peak	
Dry, atmospheric	90 °C	-	
Immersed, sea water	50 °C	60 °C	

Peak temperature duration max. 1 hour.

The temperatures listed relate to retention of protective properties. Aesthetic properties may suffer at these temperatures.

Note that the coating will be resistant to various immersion temperatures depending on the specific chemical and whether immersion is constant or intermittent. Heat resistance is influenced by the total coating system. If used as part of a system, ensure all coatings in the system have similar heat resistance.

# **Product compatibility**

Depending on the actual exposure of the coating system, various primers and topcoats can be used in combination with this product. Some examples are shown below. Contact Jotun for specific system recommendation.

Previous coat:	epoxy shop primer, inorganic zinc silicate shop primer, zinc epoxy, epoxy, epoxy mastic, inorganic zinc silicate
Subsequent coat:	polyurethane, polysiloxane, epoxy, acrylic, vinyl epoxy

# Packaging (typical)

	Volume	Size of containers	
	(litres)	(litres)	
Jotamastic 90 Comp A	3.55/15.6	5/20	
Jotamastic 90 Standard Comp B	1/4.4	1/5	
Jotamastic 90 Wintergrade Comp B	1/4.4	1/5	

The volume stated is for factory made colours. Note that local variants in pack size and filled volumes can vary due to local regulations.

Date of issue: 20 April 2018

This Technical Data Sheet supersedes those previously issued.



## Storage

The product must be stored in accordance with national regulations. Keep the containers in a dry, cool, well ventilated space and away from sources of heat and ignition. Containers must be kept tightly closed. Handle with care.

### Shelf life at 23 °C

Jotamastic 90 Comp A	48 month(s)
Jotamastic 90 Standard Comp B	24 month(s)
Jotamastic 90 Wintergrade Comp B	24 month(s)

In some markets commercial shelf life can be dictated shorter by local legislation. The above is minimum shelf life, thereafter the paint quality is subject to re-inspection.

# Caution

This product is for professional use only. The applicators and operators shall be trained, experienced and have the capability and equipment to mix/stir and apply the coatings correctly and according to Jotun's technical documentation. Applicators and operators shall use appropriate personal protection equipment when using this product. This guideline is given based on the current knowledge of the product. Any suggested deviation to suit the site conditions shall be forwarded to the responsible Jotun representative for approval before commencing the work.

# Health and safety

Please observe the precautionary notices displayed on the container. Use under well ventilated conditions. Do not inhale spray mist. Avoid skin contact. Spillage on the skin should immediately be removed with suitable cleanser, soap and water. Eyes should be well flushed with water and medical attention sought immediately.

# **Colour variation**

When applicable, products primarily meant for use as primers or antifoulings may have slight colour variations from batch to batch. Such products may fade and chalk when exposed to sunlight and weathering.

# Disclaimer

The information in this document is given to the best of Jotun's knowledge, based on laboratory testing and practical experience. Jotun's products are considered as semi-finished goods and as such, products are often used under conditions beyond Jotun's control. Jotun cannot guarantee anything but the quality of the product itself. Minor product variations may be implemented in order to comply with local requirements. Jotun reserves the right to change the given data without further notice.

Users should always consult Jotun for specific guidance on the general suitability of this product for their needs and specific application practices.

If there is any inconsistency between different language issues of this document, the English (United Kingdom) version will prevail.

Date of issue: 20 April 2018

This Technical Data Sheet supersedes those previously issued.



# **Barrier**

# **Product description**

This is a two component polyamide cured zinc rich epoxy coating. It is a very high zinc dust containing product. It conforms to the compositional requirements of SSPC paint 20, level 2. It provides very good corrosion protection as part of a complete coating system. To be used as primer in atmospheric environments. Suitable for carbon steel, repair of inorganic zinc silicate coating and damaged galvanised steel substrates. This product complies with ASTM D520 type II zinc dust.

#### **Typical use**

#### Protective:

Suitable for structural steel and piping exposed in corrosivity categories up to CX (ISO 12944-2). Recommended for offshore environments, refineries, power plants, bridges, buildings, mining equipment and general structural steel. Specially designed as a primer for coating systems where extended durability is required.

### **Approvals and certificates**

Pre-qualification testing in accordance with NORSOK M-501, Rev. 5, System 1, suitable for exterior exposure in offshore environment, below 120 °C.

When used as part of an approved scheme, this material has the following certification: - Low Flame Spread in accordance with EU Directive for Marine Equipment. Approved in accordance with parts 5 and 2 of Annex 1 of IMO 2010 FTP Code, or Parts 5 and 2 of Annex 1 of IMO FTPC when in compliance with IMO 2010 FTP Code Ch. 8

Consult your Jotun representative for details.

Additional certificates and approvals may be available on request.

#### Colours

grey

# **Product data**

Property	Test/Standard	Description
Solids by volume	ISO 3233	53 ± 2 %
Gloss level (GU 60 °)	ISO 2813	matt (0-35)
Flash point	ISO 3679 Method 1	27 °C
Density	calculated	2.5 kg/l
VOC-US/Hong Kong	US EPA method 24 (tested) (CARB(SCM)2007, SCAQMD rule 1113, Hong Kong)	456 g/l
VOC-EU	IED (2010/75/EU) (theoretical)	475 g/l
VOC-China	GB/T 23985-2009 (tested)	420 g/l
VOC-Korea	Korea Clean Air Conservation Act (tested)	494 g/l

The provided data is typical for factory produced products, subject to slight variation depending on colour. All data is valid for mixed paint.

Gloss description: According to Jotun Performance Coatings' definition.

Date of issue: 9 November 2018

This Technical Data Sheet supersedes those previously issued.



## Film thickness per coat

Typical recommended specification range

Dry film thickness	25	-	125	μm
Wet film thickness	45	-	235	μm
Theoretical spreading rate	21.2	-	4.2	m²/

# **Surface preparation**

To secure lasting adhesion to the subsequent product all surfaces shall be clean, dry and free from any contamination.

#### Surface preparation summary table

	Surface preparation			
Substrate	Minimum	Recommended		
Carbon steel	St 3 (ISO 8501-1)	Sa 2½ (ISO 8501-1)		
Shop primed steel	Clean, dry and undamaged approved shop primer (ISO 12944-4 6.1.4)	Abrasive swept or alternatively blasted to Sa 2 (ISO 8501-1) of at least 70 % of the surface.		

Optimum performance, including adhesion, corrosion protection, heat resistance and chemical resistance is achieved with recommended surface preparation.

# **Application**

### **Application methods**

The product can be applied by

Spray:

Brush: Recommended for stripe coating and small areas. Care must be taken to achieve the specified dry film thickness.

### Product mixing ratio (by volume)

Barrier Comp A	3 part(s)
Barrier/Barrier 77 Comp B	1 part(s)

Use airless spray.

Date of issue: 9 November 2018

This Technical Data Sheet supersedes those previously issued.



#### **Thinner/Cleaning solvent**

Thinner: Jotun Thinner No. 17

#### Guiding data for airless spray

Nozzle tip (inch/1000):	15-21
Pressure at nozzle (minimum):	150 bar/2100 psi

# **Drying and Curing time**

Substrate temperature		10 °C	23 °C	40 °C	
Surface (touch) dry	50 min	20 min	10 min	4 min	
Walk-on-dry	3 h	2 h	1.5 h	40 min	
Dry to over coat, minimum	3 h	2 h	1.5 h	40 min	
Dried/cured for service	10 d	7 d	5 d	2 d	

For maximum overcoating intervals, refer to the Application Guide (AG) for this product.

Drying and curing times are determined under controlled temperatures and relative humidity below 85 %, and at average of the DFT range for the product.

Surface (touch) dry: The state of drying when slight pressure with a finger does not leave an imprint or reveal tackiness.

Walk-on-dry: Minimum time before the coating can tolerate normal foot traffic without permanent marks, imprints or other physical damage.

Dry to over coat, minimum: The recommended shortest time before the next coat can be applied.

Dried/cured for service: Minimum time before the coating can be permanently exposed to the intended environment/medium.

# **Induction time and Pot life**

Paint temperature	5 °C	23 °C
Induction time	36 h	30 min 24 b
Fot me	5011	24 11

# **Heat resistance**

	Temperature		
	Continuous	Peak	
Dry, atmospheric	120 °C	140 °C	

Peak temperature duration max. 1 hour.

Date of issue: 9 November 2018

This Technical Data Sheet supersedes those previously issued.



The temperatures listed relate to retention of protective properties. Aesthetic properties may suffer at these temperatures.

# **Product compatibility**

Depending on the actual exposure of the coating system, various primers and topcoats can be used in combination with this product. Some examples are shown below. Contact Jotun for specific system recommendation.

Previous coat:	inorganic zinc shop primer
Subsequent coat:	polyurethane, epoxy, epoxy mastic

# Packaging (typical)

	Volume	Size of container		
	(litres)	(litres)		
Barrier Comp A	3/6.75	5/10		
Barrier/Barrier 77 Comp B	1/2.25	1/3		

The volume stated is for factory made colours. Note that local variants in pack size and filled volumes can vary due to local regulations.

# Storage

The product must be stored in accordance with national regulations. Keep the containers in a dry, cool, well ventilated space and away from sources of heat and ignition. Containers must be kept tightly closed. Handle with care.

### Shelf life at 23 °C

Barrier Comp A Barrier/Barrier 77 Comp B 24 month(s) 24 month(s)

In some markets commercial shelf life can be dictated shorter by local legislation. The above is minimum shelf life, thereafter the paint quality is subject to re-inspection.

# Caution

This product is for professional use only. The applicators and operators shall be trained, experienced and have the capability and equipment to mix/stir and apply the coatings correctly and according to Jotun's technical documentation. Applicators and operators shall use appropriate personal protection equipment when using this product. This guideline is given based on the current knowledge of the product. Any suggested deviation to suit the site conditions shall be forwarded to the responsible Jotun representative for approval before commencing the work.

# Health and safety

Please observe the precautionary notices displayed on the container. Use under well ventilated conditions. Do not inhale spray mist. Avoid skin contact. Spillage on the skin should immediately be removed with suitable cleanser, soap and water. Eyes should be well flushed with water and medical attention sought immediately.

Date of issue: 9 November 2018

This Technical Data Sheet supersedes those previously issued.

The Technical Data Sheet (TDS) is recommended to be read in conjunction with the Safety Data Sheet (SDS) and the Application Guide (AG) for this product. For your nearest local Jotun office, please visit our website at www.jotun.com

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# **Colour variation**

When applicable, products primarily meant for use as primers or antifoulings may have slight colour variations from batch to batch. Such products may fade and chalk when exposed to sunlight and weathering.

# Disclaimer

The information in this document is given to the best of Jotun's knowledge, based on laboratory testing and practical experience. Jotun's products are considered as semi-finished goods and as such, products are often used under conditions beyond Jotun's control. Jotun cannot guarantee anything but the quality of the product itself. Minor product variations may be implemented in order to comply with local requirements. Jotun reserves the right to change the given data without further notice.

Users should always consult Jotun for specific guidance on the general suitability of this product for their needs and specific application practices.

If there is any inconsistency between different language issues of this document, the English (United Kingdom) version will prevail.



# Hardtop AX

# **Product description**

This is a two component chemically curing aliphatic acrylic polyurethane coating. It has a high gloss finish with very good gloss retention. It has good chemical resistance. It is a high solids product. This product contains no solvents on the Hazardous Air Pollutants (HAPs) list. Minor amounts of such solvents may come in through tinting of some colours. To be used as topcoat in atmospheric environments.

### **Typical use**

Marine:

Recommended for topside, deck and superstructure.

Protective:

Recommended for offshore environments, refineries, power plants, bridges and buildings. Suitable for a wide range of industrial structures. Used as a topcoat in pre-qualified NORSOK systems.

### **Approvals and certificates**

This product contributes to the Green Buildings Standard credits. Please see section Green Building Standards.

APAS approved to specification 2911

When used as part of an approved scheme, this material has the following certification: - Low Flame Spread in accordance with EU Directive for Marine Equipment. Approved in accordance with parts 5 and 2 of Annex 1 of IMO 2010 FTP Code, or Parts 5 and 2 of Annex 1 of IMO FTPC when in compliance with IMO 2010 FTP Code Ch. 8

Consult your Jotun representative for details.

Additional certificates and approvals may be available on request.

### Colours

selected colours over Multicolour tinting system (MCI)

# **Product data**

Property Test/Standard		Description	
Solids by volume	ISO 3233	63±2%	
Gloss level (GU 60 °)	ISO 2813	gloss (70-85)	
Flash point	ISO 3679 Method 1	28 °C	
Density	calculated	1.4 kg/l	
VOC-US/Hong Kong	US EPA method 24 (tested) (CARB(SCM)2007, SCAQMD rule 1113, Hong Kong)	325 g/l	
VOC-EU	IED (2010/75/EU) (theoretical)	330 g/l	
VOC-China	GB/T 23985-2009 (tested)	287 g/l	
VOC-Korea	Korea Clean Air Conservation Act (tested)	355 g/l	

The provided data is typical for factory produced products, subject to slight variation depending on colour. All data is valid for mixed paint.

Gloss description: According to Jotun Performance Coatings' definition.

Date of issue: 4 December 2018

This Technical Data Sheet supersedes those previously issued.



The VOC values refer to white colour.

# Film thickness per coat

Typical recommended specification range

Dry film thickness	50	-	100	μm
Wet film thickness	80	-	160	μm
Theoretical spreading rate	13	-	6.3	m²/l

Bright colours may need film thickness in the high end of the recommended specification range to achieve opacity.

# **Surface preparation**

To secure lasting adhesion to the subsequent product all surfaces shall be clean, dry and free from any contamination.

#### Surface preparation summary table

	Surface preparation			
Substrate	Minimum	Recommended		
Coated surfaces	Clean, dry and undamaged compatible coating (ISO 12944-4 6.1.4)	Clean, dry and undamaged compatible coating (ISO 12944-4 6.1.4)		

# Application

### **Application methods**

The product can be applied by

Spray:	Use air spray or airless spray.
Brush:	Recommended for stripe coating and small areas, care must be taken to achieve the specified dry film thickness.
Roller:	May be used. However when using roller application care must be taken to apply sufficient material in order to achieve the specified dry film thickness.

### Product mixing ratio (by volume)

Hardtop AX Comp A	4 part(s)
Hardtop AX Comp B	1 part(s)

Date of issue: 4 December 2018

This Technical Data Sheet supersedes those previously issued.



#### **Thinner/Cleaning solvent**

Thinner:Jotun Thinner No. 26/ Jotun Thinner No. 10Jotun Thinner No. 10 can be used where aromatic solvents are accepted.

Thinning is not normally required. Consult the local representative for advice during application in extreme conditions. Do not thin more than allowed by local environmental legislation.

#### Guiding data for airless spray

Nozzle tip (inch/1000):	13-19
Pressure at nozzle (minimum):	150 bar/2100 psi
Guiding data for air spray	
Nozzle tip:	Gravity gun: 1.6-1.8 (mm) / Pressure pot: 1.4-1.6 (mm)
Pressure at nozzle (minimum):	Gravity gun: 3.2 bar / Pressure pot: 3.2 bar
Pressure at pressure pot:	1.6 bar

# **Drying and Curing time**

Substrate temperature	0 °C	5 °C	10 °C	23 °C	40 °C
Surface (touch) dry	4 h	3 h	2 h	1 h	1 h
Walk-on-dry	40 h	24 h	16 h	8 h	4 h
Dry to over coat, minimum	24 h	18 h	10 h	5 h	3 h
Dried/cured for service	20 d	14 d	10 d	5 d	3 d

For maximum overcoating intervals, refer to the Application Guide (AG) for this product.

Drying and curing times are determined under controlled temperatures and relative humidity below 85 %, and at average of the DFT range for the product.

Surface (touch) dry: The state of drying when slight pressure with a finger does not leave an imprint or reveal tackiness.

Walk-on-dry: Minimum time before the coating can tolerate normal foot traffic without permanent marks, imprints or other physical damage.

Dry to over coat, minimum: The recommended shortest time before the next coat can be applied.

Dried/cured for service: Minimum time before the coating can be permanently exposed to the intended environment/medium.

# **Induction time and Pot life**

Paint temperature	23 °C
Pot life	2 h

Date of issue: 4 December 2018

This Technical Data Sheet supersedes those previously issued.



# **Heat resistance**

	Temperature		
	Continuous	Peak	
Dry, atmospheric	120 °C	140 °C	

Resistant to spills of most oils, aliphatic petroleum products and non aggressive chemicals.

Peak temperature duration max. 1 hour.

The temperatures listed relate to retention of protective properties. Aesthetic properties may suffer at these temperatures.

# **Product compatibility**

Depending on the actual exposure of the coating system, various primers and topcoats can be used in combination with this product. Some examples are shown below. Contact Jotun for specific system recommendation.

Previous coat: epoxy, zinc epoxy, epoxy mastic, polyurethane Subsequent coat: polyurethane

# Packaging (typical)

	Volume	Size of containers	
	(litres)	(litres)	
Hardtop AX Comp A	4 / 16	5 / 20	
Hardtop AX Comp B	1 / 4	1/5	

The volume stated is for factory made colours. Note that local variants in pack size and filled volumes can vary due to local regulations.

# Storage

The product must be stored in accordance with national regulations. Keep the containers in a dry, cool, well ventilated space and away from sources of heat and ignition. Containers must be kept tightly closed. Handle with care.

### Shelf life at 23 °C

Hardtop AX Comp A Hardtop AX Comp B 48 month(s) 48 month(s)

In some markets commercial shelf life can be dictated shorter by local legislation. The above is minimum shelf life, thereafter the paint quality is subject to re-inspection.

# **Green Building Standards**

Date of issue: 4 December 2018

This Technical Data Sheet supersedes those previously issued.

# Technical Data Sheet Hardtop AX



This product contributes to Green Building Standard credits by meeting the following specific requirements:

BREEAM® NOR (2016)

- Hea 02: VOC content for Two-pack performance Coatings SB (500 g/l) (EU Directive 2004/42/CE) and emission demands (ISO 16000-series).

- Mat 01: The product Safety Data Sheet confirms that the product does not contain any substances on the Norwegian A20 list.

BREEAM® NOR (2012)

- Hea 9: VOC content for Two-pack performance Coatings SB (500 g/l) (EU Directive 2004/42/CE) and emission demands (ISO 16000-series).

- Mat 1.5: This product Safety Data Sheet confirms that the product does not contain any substances on the Norwegian A20 list.

### Caution

This product is for professional use only. The applicators and operators shall be trained, experienced and have the capability and equipment to mix/stir and apply the coatings correctly and according to Jotun's technical documentation. Applicators and operators shall use appropriate personal protection equipment when using this product. This guideline is given based on the current knowledge of the product. Any suggested deviation to suit the site conditions shall be forwarded to the responsible Jotun representative for approval before commencing the work.

# Health and safety

Please observe the precautionary notices displayed on the container. Use under well ventilated conditions. Do not inhale spray mist. Avoid skin contact. Spillage on the skin should immediately be removed with suitable cleanser, soap and water. Eyes should be well flushed with water and medical attention sought immediately.

# **Colour variation**

When applicable, products primarily meant for use as primers or antifoulings may have slight colour variations from batch to batch. Such products may fade and chalk when exposed to sunlight and weathering.

## Disclaimer

The information in this document is given to the best of Jotun's knowledge, based on laboratory testing and practical experience. Jotun's products are considered as semi-finished goods and as such, products are often used under conditions beyond Jotun's control. Jotun cannot guarantee anything but the quality of the product itself. Minor product variations may be implemented in order to comply with local requirements. Jotun reserves the right to change the given data without further notice.

Users should always consult Jotun for specific guidance on the general suitability of this product for their needs and specific application practices.

If there is any inconsistency between different language issues of this document, the English (United Kingdom) version will prevail.

Date of issue: 4 December 2018

This Technical Data Sheet supersedes those previously issued.

# Fosroc<sup>®</sup> Nitoseal<sup>®</sup> MS250





constructive solutions

# Ultra UV resistant elastomeric joint sealant

### Uses

Seal moving or static joints in high performance applications in building facades and general construction such as;

- Precast or insitu concrete
- Curtain walls and lightweight cladding
- Tilt-up slabs
- Brick and blockwork
- Most building materials

### Advantages

- Easy to extrude even at low temperatures
- 50% joint movement capability
- Outstanding weathering and UV resistance to maintain colour and integrity
- Excellent primerless adhesion to concrete, timber, masonry, aluminium, metal and ceramics
- Will not stain masonry surfaces
- Blister free cure in high humidity or on SSD (Saturated Surface Dry) surfaces
- Low odour and very low VOC 15g/L
- Contains no isocyanate

### Description

Nitoseal MS250 is a high performance elastomeric joint sealant based on Silyl Modified Polymers. Nitoseal MS250 offers the weathering and adhesion performance of a silicone sealant together with the toughness and the stain-free properties of a polyurethane sealant.

### **Technical Support**

Parchem offers a comprehensive range of high performance, high quality construction products. In addition, Parchem offers a technical support package to specifiers, end-users and contractors, as well as on-site technical assistance.

### **Design Criteria**

Nitoseal MS250 may be applied in joints with a minimum width of 5 mm. The sealant Width to Depth ratio should be 1:1 for joints up to 10mm wide, kept at a minimum of 10mm for joint widths between 10mm and 20mm, and 2:1 for joint widths greater than 20mm. Install backing rod in joint to control sealant depth.

### Maintenance

There are no special requirements, however, any damage found during routine inspections should be cut out and replaced.

### **Properties**

Data quoted are typical for this product but do not constitute a specification.

Form:	Smooth, non-slump paste	
Colours:	Concrete Grey	
Skin time:	65 mins @ 23°C and 50% RH	
Tooling Time:	35 mins @ 23°C and 50% RH	
Cure time at 25°C:	>2mm / 24h @ 50% RH	
Typical hardness (shore A):	34	
Joint Movement Capability:	Total 50% (+/- 25%)	
Elongation at break:	520%	
Modulus @ 100%:	0.75 MPa	
Continuous service temperature range:	-15 to 70°C	
Specific Gravity:	1.45	
VOC content:	15g/L	

### **Specification Clause**

Where so indicated on the drawings joints are to be sealed using Fosroc Nitoseal MS250, silyl modified polymer sealant as supplied by Parchem.

The sealant must be capable of +/-25% joint movement, have an elongation at break equal or greater than 520%, Shore A hardness in the range of 30 - 36 and an elastic modulus at 100% elongation of 0.65 - 0.85 MPa. Joints must be prepared and primed where required in accordance with the current technical data sheet.

### **Application Instructions**

#### Preparation

Joint surfaces must be clean, dry (SSD) and free from frost. Remove all dirt, laitance, loose materials and foreign matter. Remove all rust, scale and protective lacquers from metal surfaces. Non-porous surfaces should be degreased using Fosroc Solvent 10. In all joints a bond breaker must be used to prevent sealant contact with the back of the joint, to allow optimum sealant performance. In shallow joints self-adhesive polyethylene tape can be used. Deep joints should incorporate a backing strip such as Expandafoam Backing Rod to support the sealant while also acting as a bond breaker.

#### **Priming requirements**

Excellent adhesion can be gained on concrete, timber, metals, ceramics, brickwork and most coating surfaces without the use of primers. On some surfaces (such as FC sheet) however, adhesion may be improved by the use of a primer such as Primer 10 - refer to your local Parchem office for advice.

#### **Gun Loading**

Nitoseal MS250 is applied using a suitable sausage gun. Insert the sausage into the gun, cut a slit at the top of the sausage, replace the end cap and nozzle and apply the sealant.

#### Application

Extrude the sealant firmly into joint to ensure complete contact with joint faces. Tool the sealant into the joint.

Nitoseal MS250 is easily tooled to a smooth finish without the use of soapy water / tooling aids. If a tooling aid is to be used it must only be applied after the Nitoseal MS250 has been initially tooled into the joint to stop any contamination of the joint faces.

### Cleaning

Clean tools immediately after use with an alcohol based solvent.

#### Limitations

Do not apply to bituminous surfaces nor allow bitumen to contact Nitoseal MS250.

Nitoseal MS250 is not suitable for application under water or continually immersed conditions. Do not apply to wet surfaces (free water present).

#### Paintability

Nitoseal MS250 is paintable with water based paints typically after a thick skin has been allowed to develop. Painting can actually be performed as soon as the sealant has skinned but there is a risk of damaging the sealant. For best results painting should be done no later than 7 days after sealant application. The flexibility of coatings being applied over Nitoseal MS250 should also be taken into consideration to ensure the coating can accommodate the expected movement in the joint.

#### Solvent based paints

Do not paint over Nitoseal MS250 with solvent based paints (eg. enamels).

#### Supply

Nitoseal MS250 is supplied in 600 ml foil sausages.

#### **Material Code**

Nitoseal MS250 Concrete Grey: FC920171-600ML

#### Coverage

One 600 ml sausage will supply 6 metres of 10mm x 10mm sealant bead.

#### Storage

Shelf life 12 months. Store in a cool dry place.

#### Important notice

A Safety Data Sheet (SDS) and Technical Data Sheet (TDS) are available from the Parchem website or upon request from the nearest Parchem sales office. Read the SDS and TDS carefully prior to use as application or performance data may change from time to time. In emergency, contact any Poisons Information Centre (phone 13 11 26 within Australia) or a doctor for advice.

#### **Product disclaimer**

This Technical Data Sheet (TDS) summarises our best knowledge of the product, including how to use and apply the product based on the information available at the time. You should read this TDS carefully and consider the information in the context of how the product will be used, including in conjunction with any other product and the type of surfaces to, and the manner in which, the product will be applied. Our responsibility for products sold is subject to our standard terms and conditions of sale. Parchem does not accept any liability either directly or indirectly for any losses suffered in connection with the use or application of the product whether or not in accordance with any advice, specification, recommendation or information given by it.



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# H-Class Tram 361 - Options Summary

Option	Cost	Description	Considerations
1. Retain tram onsite a) ongoing maintenance	\$120,000 + \$20,000 per year	High / medium priority works \$60,000 to \$80,000 Low priority works \$60,000	<ul> <li>Tram not part of design for the revitalisation of the site</li> <li>Not DDA compliant</li> <li>Budget reconsideration (capital and operational)</li> <li>Outdoor interactive display result in minimum annual budget of \$20,000 to maintain.</li> <li>Temporary until implementation of the former Buffalo site project</li> </ul>
<ul><li>2. Relocate</li><li>a) new site preparation work</li><li>b) ongoing maintenance</li></ul>	\$35,000 + > \$250,000* + \$20,000 per year	<ul> <li>Removal of tram shelter to access tram by crane, transportation (excl. hourly/km rate). Site remediation.</li> <li>To be designed and costed for civil works, shelter, landscaping.</li> <li>Static or Interactive?</li> </ul>	<ul> <li>Relocation of the tram will not slow corrosion, unless the tram is inside a fully encased structure (static display)</li> <li>Design and construction costs unknown</li> <li>Outdoor interactive display minimum annual budget of \$20,000 to maintain.</li> </ul>
3. Seek Expressions of Interest (EOI)	\$0	<ul> <li>Go to market, removal and remediation at cost of proponent.</li> <li>Ideas for re-purposing to be explored through EOI</li> </ul>	<ul> <li>Bay Discovery Centre already has an interactive tram display featured.</li> <li>Community interest unknown. Options 1, 2 or 4 will be required if EOI process is unsuccessful.</li> </ul>
4. Demolish / remove & remediate	\$30,000	<ul><li>Salvage / Disposal Cost</li><li>Site remediation</li></ul>	<ul> <li>Inevitable if EOI unsuccessful, or retaining onsite not considered.</li> <li>Construction timing for revitalisation of the former Buffalo site is unknown.</li> <li>Cost of demolition would be included in the project budget of the revitalisation of the former Buffalo site project</li> </ul>