



TRANSNET
pipelines

Specification

THE MINIMUM STRUCTURAL REQUIREMENTS FOR WALKWAYS, PLATFORMS AND STAIRWAYS

PL 835

March 2014

1. SCOPE

This specification covers the minimum requirements that shall be complied with, for the design, manufacture, erection and supply of walkways, platforms and stairways for Transnet Pipelines' Pumping stations.

2. REFERENCES

- 2.1 South African Steel Construction Handbook
- 2.2 National Occupational Health and Safety Act (NOSA) Act 85 of 1993
- 2.3 Pipework Design Data (D.N.W.Kentish)
- 2.4 SABS 0111 Engineering Drawing Part 1
- 2.5 South African Structural Steelwork Detailing Manual
- 2.6 SABS 0400 – 1990 The Application of the National Building Regulations.
- 2.7 SABS ISO 1461 : 1999 Hot Dip Galvanised Coatings on Fabricated Iron and Steel Articles
- 2.8 SABS 1200 H – Structural Steelwork
 - 2.8.1 Amend subclause 3.1 : 'Structural Steel' as follows :
Hot rolled structural steel sections (I, H, L, and Γ) shall be Grade 300 W. All other structural element, tubular profiles, flat bars, squares, rounds, checker ("vastrap") floor plate etc. shall be Grade 43 or as specified on the drawings.
 - 2.8.2 Amend subclause 5.1 and 5.1.2 : 'Contractor provides shop details' as follows :
The contractor shall furnish Transnet Pipelines with shop-detail drawings within two weeks of having received the design drawings.
 - 2.8.3 Amend Subclause 5.3.4 : 'Welding' as follows :
 - (a) All welders to be coded welders
 - (b) The contractor shall produce evidence acceptable to the engineer that welding procedures and welders have been tested in accordance with the requirements of SABS 044 Parts III AND IV
 - 2.8.4 Amend subclause 6.2.2 : 'Other tolerances' as follows :
Degree of accuracy II shall apply unless indicated otherwise elsewhere
 - 2.8.5 Amend subclause 7.1 : 'Test certificates' as follows :
Test certificates pertaining to the steel to be used shall be submitted to the engineer by the contractor before fabrication commences.
The engineer reserves the right to inspect all structural steel in the workshop

before it is delivered to the site.

- 2.9 SABS 1200 HC – Corrosion Protection for Steelwork
- 2.10 SABS 044 Parts III & IV – Welding of steel and procedures
- 2.11 SABS 684 – Structural steel paint
- 2.12 SABS 934 – Hot dipped (galvanised) zinc coatings on steel sheet and strip
- 2.13 SABS 0155 – Permissible accuracy in building

3. Design

- 3.1 The walkways, platforms and stairways shall be designed and constructed to the requirements as laid down in this specification and related documentation.
- 3.2 The walkways, platforms and stairways shall be designed to withstand 7.5 kN/m².
- 3.3 The design of a walkway, platform and stairway shall be governed by such factors as ease of access, frequency of use and standard of safety requirements.
- 3.4 Design of walkways for use between tanks to include all calculations and certification documentation signed by a registered engineer.
- 3.5 This specification to be read in conjunction with drawing PL. SK. No. 2139.
- 3.6 A satisfactory slope must be provided. For general and regular use the slope shall not exceed 38°. (See PL SK. No. 2139)
- 3.7 Width of a stairway, measured as the clear distance between stringers and handrails, shall not be less than:
 - 750 mm for occasional access purposes
 - 1000 mm for regular two way traffic and
 - 1100 mm for emergency escape route
- 3.8 The clear headroom, measured along the vertical pitch line, shall not be less than 2,1m.
Where walkways, platforms and stairways are erected at a height that enable a person to walk underneath, but do not comply with the stipulated clearance height as mentioned above, clear warning signs shall be erected by the contractor.
- 3.9 Clearance required is 300 mm between existing structures and new walkways, platforms and stairways.

- 3.10 The rise of any step should be:
175 mm for use by general public
190 mm ideal situation and
200 mm max.
- 3.11 Steps forming part of an emergency route shall have solid treads and risers. Where steps do not have solid risers each tread shall overlap the next lower tread by not less than 25 mm.
- 3.12 The variation in the rises and goings of treads shall in any one flight of stairs not exceed 6 mm. The slope, rises and goings should be preferably equal for all flights in a stairway.
- 3.13 Tread for all walkways, platforms and stairways, excluding emergency route, shall be of the open grating type with embossed nosing and side plates welded to each side of the stair tread for bolting to supports.
- 3.14 Steel sections :
- 3.14.1 The steel sections used for stair stringers to be PFC180x70 channel sections for spans up to 4m unless shop drawings demonstrate that treads provide effective lateral support in which case 180 x 10mm thick flats (Gr. 300 W) can be used for spans up to a maximum of 3,35m.
- 3.14.2 The steel section used for columns to be PFC 120x55 channel sections up to a maximum height of 3m and a stairway / walkway width of not more than 1,25m. Centre to centre distance between columns must not exceed 3m for beams as defined in paragraph 3.14.3
- 3.14.3 Steel sections used for beams (other than stringers) in landings and walkways to be PFC 120x55 channel sections up to a max span of 3m.
- 3.14.4 Bracing must be provided for at least one bay in each direction using 60x60x5 angle sections up to a max length of 4,25m, crossed and bolted with 1-M16 Grade 4.8 galvanised bolt.
- 3.14.5 For spans exceeding those above a registered professional engineer shall determine the size of the steel sections.
- 3.14.6 Base plates to be a minimum of 10mm thick and anchored with at least 2-M16 Grade 4.8 galvanised bolts.
- 3.15 Stringers to have their ends terminated as per drawing PL. SK. No. 2139.
- 3.16 Landings shall be used between flights and in a change of direction. The vertical height of a stairway between floors or landings shall not exceed 3000 mm.
- 3.17 Landings to be at least 900 mm long and as wide as the stairway.

- 3.18 Landings to have kick plates made of angle or flat that rise at least 100 mm above finished floor level.
- 3.19 See PL.SK.No. 2139 for typical landing detail.
- 3.20 All walkways, platforms and stairways shall have handrails fitted on both sides. Handrail to comprise of handrail and knee rail and designed to withstand the greater of a concentrated force of 1,0 kN applied over a length of 100mm acting in any direction or a distributed horizontal force of 0,5 kN/m
- 3.21 Top of handrails to be a minimum of 1000mm above platform floor level.
- 3.22 Handrail joints to be located close to the standards, maximum recommended distance as per PL. SK. No. 2139.
Railing shall be prevented from rotating or moving longitudinally.
- 3.23 Only tubular hand and knee rails made of steel tubing shall be used.
Outside diameter 34 mm
Wall thickness 2,5mm
- 3.24 Tubular handrail standards with ball type nodes at handrail and knee rail joints made of steel tubing shall be used.
Outside diameter 43 mm
Wall thickness 3 mm
Base plate 10mm thick
- 3.25 Spacing between standards not to exceed 1800mm
- 3.26 A stair shall not contain more than 15 treads or less than two.
- 3.27 Kick plates to be fixed against platform frames and not to the flooring. Minimum height of kick plates to be 100mm above finished floor level and a 10mm clearance between the lower edge and the floor.
- 3.28 Flooring/grating to be open grating non-slip and secured by a minimum of two securing clips/hooks per section. All grating floor panels shall be fully banded on all sides prior to galvanizing and installation.
Rectagrid RS40 30 x 4,5 by Mentis or similar
- 3.29 Bolting to be grade 4.8 (SABS 0135) galvanised unless otherwise indicated.

4 Fabrication and Erection

- 4.1 The walkways, platforms, and stairways shall be fabricated to ensure easy assembly. Modular designed concept to be used.
- 4.2 The walkways, platforms and stairways shall be furnished complete with bolts,

nuts, hooks and grating.

- 4.3 The walkways, platforms and stairways shall be erected on site and foundations provided to compensate for the gradient that might exist at floor level.
- 4.4 Provision shall be made during manufacturing to anchor walkways, platforms and stairways.
- 4.5 Contractor shall establish the relationship of the walkways, platforms, and stairways to existing structures.
- 4.6 Walkways and platforms must be of a self-supported and braced construction. No attachment to any existing structures allowed. Exceptions are buildings and walkways between tanks.
- 4.7 Positioning/design of walkways, platforms and stairways to be such so as not to impede maintenance. Where no alternative is feasible, provision shall be made for removable sections to accommodate maintenance.
- 4.8 Cut-outs may be provided in the flooring/grating where equipment is an obstruction. Then only shall the kick plate be secured on to the flooring around the cut-out.
- 4.9 Platforms and walkways shall be fabricated and pre-assembled including the fitting and banding of the grating prior to being hot dip galvanised to prevent unnecessary damage to the galvanising during installation.

5. HOT DIPPED GALVANIZING (see also subclause 5.9 in SABS 1200 H)

- 5.1 Steelwork described as "hot dipped galvanised" shall be galvanised after manufacturing and before delivering to site, by means of the hot dipped process, complying with the minimum requirements of SABS ISO 1461 – 1999 latest amendment. Structural steel members shall be given an 85 micron thick galvanised coating or such other thickness as may be specified in accordance with SABS ISO 1461 (Table 1).

Before galvanising, all damaged surfaces shall be thoroughly cleaned and if welding has been carried out, all slag shall be removed, preferably with a chisel hammer. All surfaces of the metalwork shall be thoroughly cleaned of all scale and rust by shot blasting in accordance with SABS 064 or by pickling, and then fluxed ready for galvanising.

The zinc coating shall be even and continuous over all surfaces, free of bare spots, dull or rough patches, blisters or other imperfections. The zinc coating shall show no signs of peeling and shall be uniform in thickness.

All bolts, nuts, screws and other threaded components, shall be hot-dip galvanised

to SABS ISO 1461.

5.2 Repairing of damaged coatings :

5.2.1 Plant Repairs :

Should any black spot or uncoated areas greater than 5mm² (individual) or 25mm² (collective) per m² or per m run be present after galvanising, the coating shall be repaired. This is to be carried out using abrasive blasting followed by zinc metal spray. The zinc metal spray shall be applied at least 25% thicker than that specified and shall overlap the damaged area by 20-25mm. The finished coating shall be wire brushed to remove any excess metal spray.

5.2.2 Site Repairs :

Zinc metal spray as set out above or with a zinc rich paint provided it has at least 90% zinc in the dry film, by mass. The paint should be a zinc rich epoxy in conformance with SABS 926.

6. DOCUMENTATION

6.1 All calculations and drawings to be provided in electronic media. Drawings required in AutoCAD R14 .DWG format.

7. AMENDMENTS

7.1 This specification may not be amended without prior notice or the use of the formal change control process.

I confirm that all information furnished is correct and complies with Transnet Pipelines Specification PL 835.

Signature: _____ Designation: _____

Name: _____ Company: _____

Date: _____

Witness 1: _____

Witness 2: _____