

JOHANNESBURG WATER (SOC) Ltd.

BULK WASTEWATER

PARTICULAR SPECIFICATION

E10 : ELECTRICAL BUSAR TRUNKING



Johannesburg Water (SOC) Ltd.
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Revision 4

August 2019

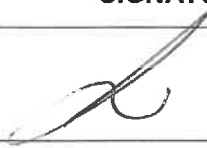
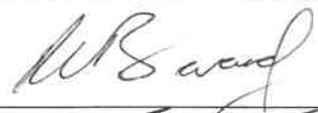

DOCUMENT CONTROL SHEET

Document Title: Particular Specification – E10 : Electrical Busbar Trunking

JW Reference: BWW523C

Document Ref. No: E10

DOCUMENT APPROVAL

ACTION	FUNCTION	NAME	DATE	SIGNATURE
Prepared	Senior Electrical Engineer	B Pieterse	August 2019	
Reviewed	Director	R Baard	August 2019	
Approved	Regional Maintenance Manager	T Thabeng	August 2019	

RECORD OF REVISIONS

Date	Revision	Author	Comments
4	2019-08-20	B Pieterse	Review of Electrical Standards, plus New Design Guidance
3	2014-06-03		Review of Mechanical / Electrical and Control / Instrumentation Standards, plus New Design Guidance
2	2012-05-30		Review of Mechanical / Electrical and Control / Instrumentation Standards, plus New Design Guidance
1	2009-05-12		Review of Mechanical / Electrical and Control / Instrumentation Standards, plus New Design Guidance

PARTICULAR SPECIFICATION: VOLUME E10: ELECTRICAL BUSBAR TRUNKING

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E10.1 SCOPE

This section covers the supply and installation of busbar trunking.

E10.2 STATUTORY DOCUMENTS AND STANDARDS

E10.2.1 Standards

The latest edition of the following particular specifications and Codes of Practice shall be read in conjunction with this section:

- (a) SANS 10142-1 : The wiring of premises Part 1: Low-voltage installations
- (b) SANS 121 : Hot dip galvanized coatings on fabricated iron and steel articles - Specifications and test methods
- (c) SANS 60439-2 : Low-voltage switchgear and controlgear assemblies Part 2: Particular requirements for busbar trunking systems (busways)
- (d) SANS 61439-6 : Low-voltage switchgear and controlgear assemblies Part 6: Busbar trunking systems (busways)
- (e) SANS 1195 : Busbars
- (f) BS 159 : Specification for high-voltage busbars and busbar connections
- (g) BS EN 13601 : Copper and copper alloys. Copper rod, bar and wire for general electrical purposes
- (h) SANS 61439 : Low voltage switchgear and control gear assemblies

E10.2.2 Particular Specifications to be read in conjunction with this specification

The following particular specifications shall be read in conjunction with the Project Specification:

- (a) E26 : ELECTRICAL SPECIFICATION FOR COLOUR CODE
- (b) G02 : PARTICULAR SPECIFICATION FOR CORROSION PROTECTION
- (c) E06 : ELECTRICAL MEDIUM AND LOW VOLTAGE CABLE INSTALLATION

E10.3 BUSBAR TRUNKING

E10.3.1 General

This section covers the supply and installation of trunking and accessories in buildings.

E10.3.2 Materials

Rising and overhead busbar trunking shall be fully enclosed in a metal duct which shall form part of the busbar support. The metal enclosure shall form an integral part of the bus section and shall be of the same length as the conducting sections of the busbar. The covers of the busbar trunking shall be secured to the framework by at least four points per section. Busbar covers shall be so designed that they are easily removable after installation of the trunking. Sections of the busbars which pass through walls and floors shall have separate covers.

Two fire barriers of non-flammable, non-conducting material in the busbar trunking shall form an integral part of each section of rising busbars.

The fire barriers shall be so placed as to prevent the spreading of fire from one floor to another but shall not restrict the ventilation of the busbar.

Overhead busbars shall be equipped with fire barriers where the busbars pass through walls or partitions.

E10.3.3 Rating

Busbars shall be manufactured from either aluminium or solid drawn high conductivity copper with a rectangular cross-section, as specified in the "detail specification". Busbars shall be in accordance with SANS 60439-2, SANS 1195 and BS EN 13601, BS 159 where applicable.

The rating shall be as specified in the detail specification with the maximum allowable temperature of the busbars (including joints) carrying full load current in an ambient temperature as specified not exceeding 80 °C.

Busbars shall not be tapered and the neutral busbar in three-phase, four wire supplies shall have a cross-section equal to 100% of the cross-section of the phase busbars.

An earth busbar shall be installed along the entire length of the busbar trunking and shall be calculated according to SANS 61439 with a minimum cross-section of 6,3 mm x 20 mm.

E10.3.4 Construction

The busbar rating must match that of the transformer with respect to load and fault currents.

The busbars shall be supported at a minimum of two points in each section and shall be supported by a suitable resin bound synthetic material. The surface of these supports shall be treated to prevent surface tracking. The fixing of the busbars shall be designed to withstand the mechanical and thermal stresses during fault conditions at the specified fault level. Where concrete roofs are available, the busbar can be hung from the roof.

Busbar support must not impede with the rest of the electrical installation.

All non-current carrying metal parts of the trunking shall be bonded to the earth busbar.

Expansion joints shall be provided at intervals not exceeding 10 m to allow for a temperature variation of 0 °C to 90 °C. These expansion joints shall have the same current rating as the rest of the busbar trunking.

All accessories shall be purpose-made and shall conform to the same specification as the busbars.

All ratings and the name and address of the manufacturer shall be indicated on a metal label fixed to each section of the busbar trunking.

E10.3.5 Installation

Trunking shall be of the size and type as specified in the detail specification.

The electrical subcontractor shall ensure that the trunking is installed in accordance with the routes indicated on the relevant drawings.

However should the electrical subcontractor discover that the indicated route is not practically possible, or for some other reason the route clashes with other services, he shall immediately contact the engineer for clarification in this regard.

E10.3.6 Testing and commissioning

All busbar trunking must be type tested. A type test certificate must be supplied at tender stage.

The busbar trunking must be subjected to site acceptance tests to verify the integrity and performance prior to commissioning. A schedule of the SAT must be provided and approved by the engineer prior to commencement of manufacture.

The contractor shall supply factory test certificates for all bus trunking supplied under the Contract.

After the installation is complete, the contractor and the Engineer shall inspect the installation. The Engineer must be notified in advance of the inspection dates. The contractor will keep a snag

list, reflecting all items not acceptable to the Engineer. The contractor will correct the snag items as required to the Engineers approval, updating the snag list as the items are completed and signed off by the Engineer.

On completion of his work, the Contractor will issue an Electrical Certificate of Compliance (CoC). All tests deemed necessary to issue the CoC should be included. The Contractor shall make all arrangements, pay all fees and provide all equipment for these tests. The Contractor shall notify the Engineer timeously so that he may witness the tests.

Each installed bus trunking shall be tested in accordance with:

- (a) The Occupational Health and Safety Act (OHSA) 1994;
- (b) The requirements of the Local and Supply Authorities.

Once commissioned the assembly should be scanned and a thermal image obtained. The image should be reviewed after which they will form part of the Operations and Maintenance Manuals to be presented to the engineer.

E10.4

MEASUREMENT AND PAYMENT

<u>Item</u>	<u>Unit</u>
Supply and deliver busbar trunking.....	m

The unit of measurement shall be the linear metre of busbar trunking supplied and delivered.

The tendered rate shall include for full compensation for the supply of the specified busbar trunking including all material needed for the installation of the busbar trunking.

<u>Item</u>	<u>Unit</u>
Supply and deliver busbar trunking end feed units.....	No

The unit of measurement shall be the number of trunking end feed units supplied and delivered.

The tendered rate shall include for the full compensation for the supply and delivery of the specified busbar end feed units including all material needed for the installation of the busbar end feed unit.

<u>Item</u>	<u>Unit</u>
Supply and deliver busbar trunking directional change units	No

The unit of measurement shall be the number of busbar trunking directional change units supplied and delivered.

The tendered rate shall include for full compensation for the supply and delivery of the specified busbar directional change units including all material needed for the installation of the busbar trunking directional change unit.

<u>Item</u>	<u>Unit</u>
Supply and deliver busbar trunking fire barriers	No

The unit of measurement shall be the number of busbar trunking fire barriers supplied and delivered.

The tendered rate shall include for the full compensation for the supply and delivery of the specified busbar trunking fire barriers including all material needed for the installation of the busbar trunking fire barriers.

<u>Item</u>	<u>Unit</u>
Supply and delivery of busbar trunking expansion units	No

The unit of measurement shall be the number of busbar trunking expansion units supplied and delivered.

The tendered rate shall include for the full compensation for the supply and delivery of the specified busbar trunking expansion units including all material needed for the installation of the busbar trunking expansion units.

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<u>Item</u>	<u>Unit</u>
Install busbar trunking	m

The unit of measurement shall be the linear metre of busbar trunking installed.

The tendered rate shall include for full compensation for the installation of the specified busbar trunking including all material needed for the installation of the busbar trunking.

<u>Item</u>	<u>Unit</u>
Install busbar trunking end feed units	No

The unit of measurement shall be the number of busbar trunking end feed units installed.

The tendered rate shall include for the full compensation for the installation of the specified busbar end feed units including all material needed for the installation of the busbar end feed unit.

<u>Item</u>	<u>Unit</u>
Install busbar trunking directional change units	No

The unit of measurement shall be the number of busbar trunking directional change units installed.

The tendered rate shall include for full compensation for the installation of the specified busbar directional change units including all material needed for the installation of the busbar trunking directional change unit.

<u>Item</u>	<u>Unit</u>
Install busbar trunking fire barriers.....	No

The unit of measurement shall be the number of busbar trunking fire barriers installed.

The tendered rate shall include for the full compensation for the installation of the specified busbar trunking fire barriers including all material needed for the installation of the busbar trunking fire barriers.

<u>Item</u>	<u>Unit</u>
Install busbar trunking expansion units.....	No

The unit of measurement shall be the number of busbar trunking expansion units installed.

The tendered rate shall include for the full compensation for the installation of the specified busbar trunking expansion units including all material needed for the installation of the busbar trunking expansion units.