

PHYSICAL ENVIRONMENT SERVICE UNIT

PART "TA"

DEPARTMENTAL SPECIFICATION

FOR

ROAD SIGNS

INDEX TO PART "TA" : ROAD SIGNS

<u>CLAUSE</u>	<u>HEADING</u>	<u>PAGE</u>
TA.1	SCOPE	TA.1
TA.2	INTERPRETATIONS	TA.1
TA.3	MATERIALS	TA.1
TA.3.1	STRUCTURAL STEEL	TA.1
TA.3.2	BOLTS, NUTS AND RIVETS	TA.1
TA.3.3	CHROMADEK STEEL PLATE	TA.2
TA.3.4	OTHER PLATE MATERIAL	TA.2
TA.3.5	ALUMINIUM	TA.2
TA.3.6	PAINT	TA.2
TA.3.7	RETRO-REFLECTIVE MATERIAL	TA.2
TA.3.8	TIMBER POSTS FOR ROAD SIGN SUPPORTS	TA.3
TA.3.9	CORROSION PROTECTION TAPE	TA.3
TA.4	PLANT	TA.3
TA.5	CONSTRUCTION	TA.3
TA.5.1	MANUFACTURING OF ROAD SIGN BOARDS AND SUPPORTS	TA.3
TA.5.1.1	Road Sign Boards	TA.3
TA.5.1.2	Welding	TA.4
TA.5.1.3	Structural Steel	TA.4
TA.5.1.4	Aluminium Sections	TA.4
TA.5.1.5	Galvanising	TA.4
TA.5.1.6	Road Sign Support	TA.5
TA.5.1.7	General	TA.5
TA.5.2	ROAD SIGN FACES AND PAINTING	TA.5
TA.5.2.1	Colours, Symbols and Legends	TA.5
TA.5.2.2	Preparation of Surfaces and Applying Paint	TA.5
TA.5.2.2.1	General	TA.5
TA.5.2.2.2	Applying the Paint	TA.6
TA.5.2.2.3	Protecting the works during painting operations	TA.7
TA.5.2.2.4	Preparing surfaces for painting	TA.8
TA.5.2.2.5	Painting structural steel	TA.8
TA.5.2.3	Time of Manufacture	TA.10
TA.5.3	STORAGE AND HANDLING	TA.10
TA.5.4	ERECTING ROAD SIGNS	TA.10
TA.5.4.1	Position	TA.10
TA.5.4.2	Excavation and Backfilling	TA.10
TA.5.4.3	Erection	TA.11
TA.5.4.4	Field Welding	TA.11
TA.5.4.5	On-site Painting	TA.11

<u>CLAUSE</u>	<u>HEADING</u>	<u>PAGE</u>
TA.5.4.6	Time of Erection	TA.11
TA.5.4.7	General	TA.11
TA.5.5	PROTECTION AND MAINTENANCE	TA.11
TA.5.6	DISMANTLING, STORING AND RE-ERECTING EXISTING ROAD SIGNS	TA.12
TA.6	TOLERANCES	TA.12
TA.6.1	GENERAL	TA.12
TA.6.2	STRUCTURAL STEEL	TA.12
TA.6.3	MEASURING PAINT THICKNESSES	TA.12
TA.7	TESTING	TA.12
TA.8	MEASUREMENT AND PAYMENT	TA.12
TA.8.1	ROAD SIGN BOARDS	TA.12
TA.8.2	ROAD SIGN SUPPORTS	TA.13
TA.8.2.1	Structural Steel	TA.13
TA.8.2.2	Steel Tubing	TA.13
TA.8.2.3	Aluminium Sections	TA.13
TA.8.2.4	Timber	TA.13
TA.8.3	EXCAVATION AND BACKFILLING FOR ROAD SIGN SUPPORTS	TA.14
TA.8.4	CONCRETE FOR ROAD SIGN FOOTINGS	TA.14
TA.8.5	STEEL REINFORCEMENT	TA.14
TA.8.6	SHUTTERING AND FORMWORK	TA.14
TA.8.7	DISMANTLING AND STORING ROAD SIGNS	TA.15
TA.8.8	RE-ERECTING ROAD SIGNS STORED ON SITE	TA.15

PART "TA" : ROAD SIGNS

TA.1 SCOPE

This specification covers the manufacture, supply and erection of permanent road traffic signs alongside and over the carriageway, ramps and cross roads at intersections and interchanges and at the locations indicated on the drawings or as directed by the Engineer.

The signs shall be of the standard regulatory, warning and information signs as detailed on the drawings and shall be fabricated in accordance with the South African Road Traffic Signs Manual, except where otherwise indicated on the drawings.

TA.2 INTERPRETATIONS

The following standards are referred to in this specification:-

SABS 05, SABS 79, SABS 134, SABS 135, SABS 141, SABS 538, SABS 539, SABS 657, SABS 673, SABS 679, SABS 684, SABS 754, SABS 763, SABS 772, SABS 1143, BS 1470, BS 1474, BS 4360, BS 5135, CKS 191, CKS 193, CKS 279, SIS. 05/59/00, SABS Code of Practice 064 and the South African Road Traffic Signs Manual.

TA.3 MATERIALS

TA.3.1 STRUCTURAL STEEL

Structural steel shall comply with the requirements of BS 4360 for the type of steel specified or shown on the drawings. Where specified, all structural steel, including tubes shall be galvanised in accordance with the requirements of SABS 763 for type A1 or B1 articles, as may be applicable.

Steel tubes shall comply with the requirements of SABS 657.

TA.3.2 BOLTS, NUTS AND RIVETS

Steel bolts and nuts shall comply with SABS 135 or SABS 1143, aluminium bolts and nuts shall be manufactured from alloy B51S or D65S.

All steel bolts, nuts and washers shall have a hot-dip (galvanised) zinc coating which complies with the requirements of SABS 763 for coatings on type C1 articles.

Blind rivets used for fixing road sign boards to square-tubing framework shall be 4,76 mm rivets manufactured from or coated with a material that will not cause corrosion through electrolytic action. Hardened blind or aluminium rivets shall be used for attaching aluminium sections.

TA.3.3 CHROMADEK STEEL PLATE

Steel plate for road signs shall be 1,40 mm thick chromadek G275 galvanised Iscor steel plate, which has been treated on both sides with an epoxy primer followed by a silicon polyester top coat. The total dry thickness of the treatment shall be at least 25 um.

Where a reflectorised road sign is required, its reverse side shall be painted with a dull grey prime coat and the face with only the specified top coat.

TA.3.4 OTHER PLATE MATERIAL

Other plate material shall be as specified in the project specifications.

TA.3.5 ALUMINIUM

Aluminium sections shall be of the sizes detailed on the drawings, shall be manufactured from grade 6063.T.5 alloy and shall comply with the provision of BS 1474.

Aluminium plate shall be manufactured from grade 5251.H.3 alloy and shall conform to the requirements of BS 1470 and shall be 2,0 mm in thickness.

TA.3.6 PAINT

All paints used shall comply with the requirements of CKS 193, and also with the standards mentioned therein.

Except where reflecting surfaces are specified, the surface of painted road signs shall be semi-mat. The 60 degree specular gloss measured in accordance with SABS method 134 shall, if possible, not exceed 50. No thinners shall be added to the paint.

The reference numbers of the colours to be used are in accordance with CKS 193.

TA.3.7 RETRO-REFLECTIVE MATERIAL

Retro-reflective material shall be supplied in the following grades and shall comply with the requirements of CKS 191 :

- Class I - Engineering-grade retro-reflective material.
- Class II - Super-engineering-grade retro-reflective material.
- Class III - High-intensity grade retro-reflective material.

The specified commercial product used under class III shall be approved by the Engineer.

The material shall be supplied with a pressure sensitive or heat applied adhesive backing protected by a removable lining.

TA.3.8 **TIMBER POSTS FOR ROAD SIGN SUPPORTS**

Timber posts for road sign supports shall conform to the requirements of SABS 754, shall be equal to or better than strength group B timber posts and shall be stamped with the SABS mark. The posts shall be treated in accordance with SABS 05 with a copper-chrome-arsenic compound for timber preservation, which complies with SABS 673, or with a creosote which complies with SABS 53 or SABS 539. The preservative specified in the project specifications shall be used after the posts have been treated, they shall not be sawn, drilled or shaped.

Where, however, the cutting of posts is unavoidable after having been treated, the engineer may permit the required length to be cut off from the bottom of a post, provided that the exposed area is subsequently thoroughly treated with creosote.

Timber posts shall not exhibit excessive cracking at the ends. Posts which, in the opinion of the Engineer, exhibit a degree of cracking that would render them unfit for service during a much shorter than normal life shall not be used.

The exposed surface of the cut shall be given two coats of the applicable preservative. Any holes drilled in the timber posts after creosote treatment shall be retreated with two coats of creosote.

TA.3.9 **CORROSION PROTECTION TAPE**

Corrosion protection tape used between aluminium and steel shall be a black PVC tape not less than 0,25 mm in thickness, shall be resistant to ultra-violet rays, and shall have an adhesive backing. The breaking strength of the material shall be not less than 3,5 kN/m.

TA.4 **PLANT**

Not applicable to this specification.

TA.5 **CONSTRUCTION**

TA.5.1 **MANUFACTURING OF ROAD SIGN BOARDS AND SUPPORTS**

TA.5.1.1 **Road Sign Boards**

Road sign boards shall be manufactured strictly in accordance with the details tabulated on the drawings. They shall be manufactured from either steel plate (chromadek), aluminium plate or aluminium sections according to what is specified on the drawings.

Road sign boards shall be manufactured by a recognised manufacturer of road signs.

TA.5.1.1 Road Sign Boards (Cont'd)

In so far as is possible, road sign boards shall be manufactured as one unit. Where road signs are manufactured in more than one unit, the completed units shall be assembled in the workshop prior to delivery to ensure that all sections and legends fit together properly. Joints in road sign boards shall be provided only at locations and to details as shown on the drawings. Where rivets are used, their spacing shall not exceed 150 mm, and the rivet heads shall be painted in the same colour as the sections which are being joined.

Direct contact between the aluminum and any supporting steel framework shall be avoided by adhering corrosion-protection tape to the parts of the board in contact with the steel frame.

TA.5.1.2 Welding

All welding of steelwork shall be carried out in accordance with the standards laid down in BS 5135. All welding shall be done before painting.

TA.5.1.3 Structural Steel

The relevant provisions of Part L, Structural Steelwork, shall apply to all steel-supporting structures for road signs.

TA.5.1.4 Aluminium Sections

Aluminium sections for road sign boards shall be jointed together by blind aluminium rivets or bolts. They shall not be joined longitudinally.

Where aluminium sections are to be faced with retro-reflective background material, it shall be applied in advance to individual sections before assembly, with the material taken around the face edges of each section for at least 10 mm. Retro-reflective material shall be heated to facilitate adhesion around the edges and to prevent damage being done to the material.

Where possible, letters across the joint between two sections shall be avoided. If it cannot be avoided, the letters concerned shall be bisected on the joint.

TA.5.1.5 Galvanising

Where the galvanising of structural-steel frames and sign board supporting structures is specified, it shall be done as far as is practicable after welding. Where, however, this is not practicable, the steel sections shall be galvanised before assembly and then welded. All welds shall be thoroughly cleaned, loose material removed, and dressed, after which the welds shall be coated with two coats of an approved zinc-rich paint.

TA.5.1.5 Galvanising (Cont'd)

Unless otherwise specified in the schedule of quantities or the project specifications, galvanised steel will not require painting.

TA.5.1.6 Road Sign Support

Road sign supports shall be constructed in accordance with the details shown on the drawings.

TA.5.1.7 General

Where details for the construction of road sign boards, the framework of the road sign boards and their attachment to the supporting steel framework are not shown on the drawings, the contractor himself shall design them and submit the details to the engineer for approval before manufacture.

TA.5.2 ROAD SIGN FACES AND PAINTING

TA.5.2.1 Colours, Symbols and Legends

Paint colours, symbols, legends and borders used on road signs shall comply with the applicable statutory provisions, and also with the requirements of the South African Road Traffic Signs Manual.

The colours and shades shall conform to the colours and shades specified in CKS 193 and shown in CKS 279.

TA.5.2.2 Preparation of Surfaces and Applying Paint

TA.5.2.2.1 General

- a) No paint shall be applied to surfaces containing physically adhering contaminants such as oils, grease, dirt, marking material, water-soluble salts, wax, paint and temporary protectives, or to surfaces containing chemically bonded contaminants such as rust, mill scale, slag and flux.
- b) All surfaces which are painted shall be dry.
- c) All traces of soluble salts and corrosive airborne contaminants shall be thoroughly washed from the surface prior to painting, and the surface shall be dried and painted immediately afterwards.
- d) Where surfaces are to be welded, unless otherwise specified, any paint shall not be applied within 75 mm of the welded position.

TA.5.2.2.1 General (Cont'd)

- e) After the welding has been completed, the welds and adjacent parent metal shall be completely deslagged and the surfaces shall then be inspected and approved. All spatter shall be removed prior to the surfaces being painted. The weld area shall be abrasive-blasted and/or ground and all contaminants such as flux shall be removed prior to the surface being painted.
- f) Surfaces which are to rest on concrete or other floors shall receive all the prescribed coats of paint prior to the member being erected.
- g) Damaged paint areas shall be cleaned, rut spots removed and the surface again be primed so that the patch painting covers the damaged areas and extends over a strip of 20 mm beyond each damaged area.
- h) Where the shop coat is allowed to age for a few months before the next layer of paint is applied, light sanding with sandpaper or rubbing with steel wool and scrubbing with clean water with a bristle brush shall be carried out.
- i) Steel embedded in concrete shall be entirely painted to a distance of 75 mm within the concrete measured from the concrete outer surface.
- j) The paint manufacturer's instructions shall be strictly adhered to.
- k) Painted steel members shall be stacked so as to be off the ground.
- l) Friction-grip surfaces shall not be painted but shall be treated in accordance with the project specifications.
- m) The surface of structural steel for the frames and supports of road signs shall be prepared by it being cleaned with a wire brush and shall then be painted as specified in Clause TA.5.2.2.5.
- n) Unless otherwise specified, aluminium road signs, with the exception of painted road sign boards, will not require painting.

TA.5.2.2.2 Applying the Paint

Unless otherwise specified, paint may be applied either by brush, spray or roller methods, or by any combination of these three methods.

Where brushes are used, they shall have sufficient body and length of bristle for spreading the paint in a uniform coat. Paint shall be evenly spread and thoroughly brushed out. If brush marks are visible, it will be considered that the paint has been improperly applied, and the paint will not be accepted.

TA.5.2.2.2 Applying the Paint (Cont'd)

On all surfaces which are inaccessible to painting by regular painting equipment, the paint shall be applied by bottle brushes, sheepskin daubers, or by any other acceptable method so as to render the required coating of paint.

If spray methods are used, the operator shall be thoroughly experienced.

Runs, sags, thin areas in the paint coat, or where air bubbles have formed or the paint has delaminated, or any skips shall be considered as being unsatisfactory, and the contractor will be required to repaint the surface by brush.

A water trap and an air-regulating valve acceptable to the Engineer shall be furnished and installed on the equipment used for spray-painting.

Mechanical mixers shall be used for mixing paint properly when no ready-mixed paints are used. Prior to application, the paint shall be remixed for a sufficient length of time to mix the pigment and vehicle thoroughly. Paint shall be constantly kept well stirred to keep the pigments in suspension during its application. All skins in the paint shall be removed by screening. If it cannot be removed effectively, the paint and paint work already completed may be condemned at the discretion of the Engineer.

Paint shall not be applied when the temperature of the steel is not at least 3°C above dew point or when the temperature of the steel is below 5°C or above 35°C, unless otherwise prescribed by the Engineer.

Paint shall not be applied in fog or mist, when it is raining or when rain is expected, or when the relative humidity is above 85%.

TA.5.2.2.3 Protecting the works during painting operations

The contractor shall protect all parts of the structure against disfigurement by spatters, splashes and/or smirches of paint or of paint materials. The contractor shall be responsible for any damage to or paint on or contamination to vehicles, persons or property, including plants and animals, as a result of his operations, and he will be required to provide protective measures at his own cost to prevent such damage.

Any unsightly paint stains shall be removed by the contractor at his own cost.

TA.5.2.2.3 Protecting the works during painting operations (Cont'd)

If passing traffic creates sufficient dust to harm or spoil the appearance of painted surfaces, the contractor shall sprinkle the adjacent roads and shoulders with water at his own cost, for a sufficient distance on each side of the location where the painting is being done, to keep the dust away from freshly painted surfaces. The contractor shall, at his own cost, also furnish and post DRIVE SLOWLY signs and take other necessary precautions to prevent dust and dirt from adhering onto freshly painted surfaces.

TA.5.2.2.4 Preparing surfaces for painting

Before paint is applied to any surface, the appropriate specified surface preparation shall be carried out in accordance with the relevant sections of SABS Code of Practice 064 or as specified herein.

TA.5.2.2.5 Painting structural steel

- a) The surface preparation, priming and application of an undercoat shall be carried out under cover at the fabricator's works. Where possible, all painting shall be done at the fabricator's works but where this is unfeasible, the Engineer may permit the application of the finishing coats on the site, in which case an undercoat shall be applied at the fabricator's works prior to the members being despatched to the works.

Unless otherwise specified, the protection described in subclauses TA.5.2.2.5 (c), (d) and (e) shall be applied to all steel work. Corrosion protection of steel work exposed to aggressive or severe conditions shall comply with the requirements of the project specifications.

- b) After all cutting, drilling, welding and punching have been completed, it shall be ascertained that all sharp edges have been uniformly rounded off and smoothed down. All physically adhering contaminants shall be removed and the surface shall then be abrasive-blasted to Sa 2,5 finish in accordance with the Swedish Standards SIS.05/59/00. The profile limit of the surface finish shall be between 30 and 60 µm. The abrasive-blasting profile shall be measured in accordance with SABS method 772 and shall comply with SABS Code of Practice 064.

No abrasive-blasting shall be done during rainy weather or when corrosive air conditions prevail.

Unless the application of a primer follows within 4 hours of abrasive blasting and before any oxidation of the prepared surface takes place, the abrasive-blasted surface shall immediately after abrasive blasting be given one coat of a wash primer.

TA.5.2.2.5 Painting structural steel (Cont'd)

- c) The prepared surface shall be given two coats of a zinc-chromate primer in accordance with SABS 679, type 1, grade II. The first coat shall be applied within 12 hours in the case of wash-primed surfaces and within 4 hours, but before any oxidation of the surface takes place, in the case of abrasive-blasted surfaces that have not been wash-primed. A fast-drying zinc chromate in accordance with SABS 79, type II, grade II, may be used as primer. In all cases the dry-film thickness shall not be less than 30 µm per coat.

When steel has to be welded after the primer has been applied, the steel shall be left unpainted for a distance of 75 mm from the weld joint unless a weldable type of paint has been used. The welds shall be treated in accordance with the instructions of clauses TA.5.2.2.1 and TA.5.2.2.5.

- d) Where the finishing coats are to be applied on the site, the primed surfaces shall be given one coat of a universal undercoat with a suitable colour in the fabricator's shop before despatch. The undercoat shall be applied as soon as the prime coat has dried sufficiently. The dry-film thickness shall not be less than 25 µm.
- e) Two finishing coats of high-gloss structural paint (SABS 684, type A) of the specified colour shall be applied to leave a dry-film thickness of not less than 25 µm per coat.

Where the finishing coats are applied on the site, the undercoat shall be lightly sanded and the members washed and cleaned of all contaminants. The first finishing coat shall be applied as soon as the structural members are dry.

Where specified in the project specifications, the second finishing coat shall consist of a micaceous iron-ore-pigmented structural paint of the specified colour to a dry-film thickness of not less than 30 µm. In all cases the second finishing coat shall be applied within 48 hours of the application of the first finishing coat.

The dry-film thickness of the total paint system shall not be less than 110 µm when no undercoat is used and not less than 135 µm when an undercoat is used. Where the second finishing coat is an iron-ore-pigmented paint, these thicknesses shall be increased by 5 µm.

- f) When mating surfaces are brought together, both surfaces shall already have been covered with all the specified coats of paint, but where this is impossible, each surface shall be given a copious coating of primer and the surfaces drawn up while the paint is still wet.

TA.5.2.2.5 Painting structural steel (Cont'd)

- g) Back-to-back members and areas not easily accessible shall be fully coated with all the specified coats of paint up to and including the finishing coats before erection.
- h) Damaged areas shall be treated as follows:-

Sand down to bright metal and clean. Spot prime with two coats and sand down lightly when hard. Rinse off with water and allow to dry. Apply two finishing coats.
- i) Those parts of structural-steel members to be embedded in soil and all bases to a height of 500 mm shall be given two coats of an epoxy-tar prime instead of the zinc-chromate prime specified for other surfaces.

TA.5.2.3 Time of Manufacture

The faces and backs of road sign boards and the legend shall not be painted more than six months prior to their erection.

TA.5.3 STORAGE AND HANDLING

All road signs or parts of road signs shall be so handled and so stored in a weather-proof storeroom as to prevent any damage and deformation.

TA.5.4 ERECTING ROAD SIGNS

TA.5.4.1 Position

Road signs shall be erected in the positions shown on the drawings or indicated by the Engineer.

TA.5.4.2 Excavation and Backfilling

Excavations for the erection of road signs shall be made according to the dimensions shown on the drawings. Where the excavations are to be backfilled with soil, a 1:12 cement soil mixture shall be made if so required by the Engineer. The soil or soil-cement mixture shall then be placed at optimum moisture content in 100 mm thick layers in the excavation and shall be compacted to a minimum of 95% of modified AASHTO density.

Where posts or structures are to be fixed in concrete, or where concrete footings are to be cast, the concrete, formwork and reinforcement shall comply with the requirements of Part C : Concrete. The holes shall be completely filled with concrete up to the level shown on the drawings or indicated by the Engineer. The upper surface of the concrete shall be neatly finished with sufficient fall to ensure proper drainage.

TA.5.4.3 Erection

Road signs shall be erected as shown on the drawing or as directed by the Engineer. During erection the structural steelwork shall be firmly bolted and protected to prevent buckling or damage from being caused during erection, or by the equipment used for erection.

Posts to which road signs are to be fixed shall be vertical and the undersides of road signs shall be horizontal after having been erected.

Where timber posts are used for erecting the signs, all holes that are drilled in the timber shall be impregnated with hot creosote.

TA.5.4.4 Field Welding

All welding done during erection shall comply with the requirements for welding during manufacture.

TA.5.4.5 On-site Painting

All painting done after the road signs have been erected shall comply with the requirements for painting during manufacture.

All places where the paintwork has been damaged during erection shall be repaired by the contractor at his own cost to the satisfaction of the Engineer.

TA.5.4.6 Time of Erection

Road signs shall be erected immediately prior to the road being opened to public traffic, unless otherwise decided by the Engineer.

TA.5.4.7 General

All destinations and route numbers shown on the drawings shall be subject to amendment, and confirmation of the details shall be obtained from the Engineer before any particular signs may be made. Such particulars may be available only at a late stage, for which allowance shall be made by the contractor in his programme.

TA.5.5 PROTECTION AND MAINTENANCE

The contractor shall protect the completed road signs against damage until they have been finally accepted by the employer, and he shall maintain the road signs until the maintenance certificate has been issued. Damage or defects caused by negligence or faulty workmanship shall be rectified by the contractor at his own cost to the satisfaction of the Engineer.

TA.5.6 **DISMANTLING, STORING AND RE-ERECTING EXISTING ROAD SIGNS**

Where ordered by the Engineer, the contractor shall dismantle existing road signs, store them, and re-erect them at new positions indicated. This work shall be done with as little damage as possible to the signs.

Where required by the Engineer, the signs shall be repainted or repaired and new materials shall be used for part or all of the supporting structure.

TA.6 **TOLERANCES**

TA.6.1 **GENERAL**

Unless otherwise stated, all tolerances shall be in accordance with those stated elsewhere in this specification.

TA.6.2 **STRUCTURAL STEEL**

Tolerances for structural steel shall be those specified in Part L : Structural Steel.

TA.6.3 **MEASURING PAINT THICKNESSES**

The dry-film thickness of paint shall be determined in accordance with SABS method 141.

At least 90% of all thickness measurements shall comply with the minimum specified requirements. The thickness shall not in any case be less than 70% of the specified thickness.

TA.7 **TESTING**

Acceptance testing to ensure compliance with the specification will be undertaken by, and at the discretion of, the Engineer.

TA.8 **MEASUREMENT AND PAYMENT**

TA.8.1 **ROAD SIGN BOARDS**

The unit of measurement shall be the square metre (m²) of completed road sign board.

Separate items will be scheduled for each type of material specified and shall differentiate between :-

- a) Area not exceeding two square metres (2 m²).
- b) Area exceeding two square metres (2 m²) but not ten square metres (10 m²).
- c) Area exceeding ten square metres (10 m²).

TA.8.1 ROAD SIGN BOARDS (CONT'D)

The tendered rates shall include full compensation for providing the completed road sign board, frame, fixing brackets, including painting, galvanising if specified, reflective lettering, symbols, legends, backgrounds and borders, attaching the road sign board to the road sign support, and for all other materials and workmanship, brackets, bolts, nuts, etc., for the completion of the road sign boards as specified.

TA.8.2 ROAD SIGN SUPPORTS

TA.8.2.1 Structural Steel

Measurement and payment for structural steel road sign supports shall be in accordance with the relative items in Part 2 : Structural Steel.

TA.8.2.2 Steel Tubing

The unit of measurement of supporting structures manufactured from steel tubing shall be the metric ton (t) of steel tubing used. Separate items will be scheduled for each type of steel section.

The tendered rates shall include full compensation for manufacturing, delivering to site and erecting the road sign supporting structures, including all bolts, screws, rivets, welding and accessories, together with the required painting.

TA.8.2.3 Aluminium Sections

The unit of measurement shall be the linear metre (m). Separate items will be scheduled for each type of section.

The tendered rates shall include full compensation for manufacturing, delivering to site and erecting the road signs supporting structures, including all bolts, screws, rivets, welding and accessories.

TA.8.2.4 Timber

The unit of measurement shall be the linear metre (m). Separate items will be scheduled for each type and diameter of post used.

The tendered rates shall include full compensation for manufacturing, delivering to site and erecting the posts, including all bolts, screws, rivets, welding and accessories with the painting required and the provision of breakaway holes in timber supports.

TA.8.3 EXCAVATION AND BACKFILLING FOR ROAD SIGN SUPPORTS

The unit of measurement shall be the cubic metre (m³) of excavation measured in place according to the neat dimension of the footings or excavations as shown on the drawings or directed by the Engineer. In the case of timber or aluminium posts not in concrete, the plan area of the excavated hole shall be taken as 0,15 m² irrespective of the actual size of the excavated hole.

The rate shall be in full compensation for excavating, backfilling and compacting the backfill material, for the disposal of all surplus excavated material, and for providing the backfill material and mixing it with cement. The supply of the cement will be measured extra over to this payment item.

TA.8.4 CONCRETE FOR ROAD SIGN FOOTINGS

The unit of measurement shall be the cubic metre (m³) for the net amount of concrete cast into the forms and the rates shall include for all necessary materials, labour and use of plant and for compacting and bringing to the required finish, for any protective works against rain and hot weather, curing and for hacking, cleaning and bonding.

Unless specifically indicated to the contrary, all horizontal concrete surfaces are to be finished with a wooden float.

Separate items will be scheduled for different grades of concrete.

TA.8.5 STEEL REINFORCEMENT

The unit of measurement shall be the metric ton (t), and shall include for all supply, cutting, bending, hooked ends and binding at laps and intersections and including annealed wire of suitable gauge and hoisting and maintaining in position in an approved manner whilst concreting. The weights given are net and do not include for rolling margins or binding wire for which allowance must be made in the rates.

TA.8.6 SHUTTERING AND FORMWORK

The quantities for shuttering and formwork are measured by the square metre (m²) of surface area of concrete work in contact with the forms and rates are to include for all necessary falsework materials, labour and plant used for the erection and stripping thereof and shall include keyed joints and chamfers.

TA.8.7 DISMANTLING AND STORING ROAD SIGNS

The unit of measurement shall be the number (No.) of signs and shall include for carefully dismantling and disassembling the road signs, loading, transporting, off-loading and carefully stacking all the materials as required by the Engineer. It shall also include for restoring the site where the road signs have been dismantled.

Separate items will be scheduled for :-

- a) Area not exceeding 2 m².
- b) Area exceeding 2 m² but not 10 m².
- c) Area exceeding 10 m².

TA.8.8 RE-ERECTING ROAD SIGNS STORED ON SITE

The unit of measurement shall be the number (No.) of signs and shall include for loading, transporting and re-erecting the road signs including workmanship, brackets, bolts, nuts, etc., for the completion of the road sign boards as specified.

Payment for excavation, concrete, formwork, steel reinforcing and new materials shall be made under the appropriate item.

Separate items will be scheduled for :-

- a) Area not exceeding 2 m².
- b) Area exceeding 2 m² but not 10 m².
- c) Area exceeding 10 m².