SOUTH AFRICAN BUREAU OF STANDARDS

STANDARDIZED SPECIFICATION

for

CIVIL ENGINEERING CONSTRUCTION

LF : ERF CONNECTIONS (WATER)

Approved by the
COUNCIL OF THE
SOUTH AFRICAN
BUREAU OF STANDARDS
on 8 June 1983

Obtainable from the
SA BUREAU OF STANDARDS
Private Bag X191
Pretoria
0001 Republic of South Africa

Telegrams: Comparator, Pretoria

Published and printed in the Republic of South Africa by the
South African Bureau of Standards

ISBN 0-626-06479-1
1. SCOPE

1.1 This specification covers the construction of connections from a water reticulation main to the boundaries of (or other specified points on) individual erven. It covers the pipework, meters, and the making of the connections.

NOTE
a) Sewer connections are covered by SABS 1200 LD.
b) The standards referred to in the specification are listed in Appendix A.

2. INTERPRETATIONS

2.1 SUPPORTING SPECIFICATIONS. Where this specification is required for a project, the following specifications shall, inter alia, form part of the contract document:
   a) Project specification;
   b) SABS 1200 A or SABS 1200 AA, as applicable;
   c) SABS 1200 D or SABS 1200 DA, as applicable;
   d) SABS 1200 DB;
   e) SABS 1200 L.

2.2 APPLICATION. This specification contains clauses that are of general application to the construction of erf connections. Interpretations and variations of this specification are set out in Portion 2 of the project specification which precedes this specification in a contract document.

2.3 DEFINITIONS AND ABBREVIATIONS. For the purposes of this specification the definitions and abbreviations given in the applicable of the specifications listed in 2.1 and the following definitions shall apply:
   Ferrule. A short metal tube that is screwed or plugged into the wall of a pipe or into a saddle to form a connection.
   Leading connection (or service connection or erf connection). A short pipeline used for conveying water from a reticulation main to a consumer's meter.
   Saddle. A metal ring split into two semi-circular halves that are clamped round a pipe and used with a ferrule to form a connection.
   Stop tap (stop valve). A shut-off device installed in a pipeline to control the flow of water.

3. MATERIALS

3.1 PIPES, FITTINGS, AND COUPLINGS

3.1.1 Copper Pipes. Copper pipes shall comply with the relevant requirements of SABS 460, and fittings for copper pipes shall be of corrosion-resistant brass. Couplings shall be of an approved loose cone type.

3.1.2 Galvanized Iron Pipes. Galvanized iron pipes and fittings shall comply with the relevant requirements of SABS 62 for medium class pipes.

3.1.3 Malleable CI Pipe Fittings. Malleable CI pipe fittings shall comply with the relevant requirements of SABS 509.

3.1.4 Polyethylene Pipes. Polyethylene pipes shall comply with the relevant requirements of SABS 533 for the type and class scheduled or stated in the project specification. Couplings used to join polyethylene pipes shall be of galvanized malleable iron and threaded.

3.1.5 uPVC Pipes. uPVC pipes and fittings shall comply with the relevant requirements of SABS 966 for, in the case of pipes, the class scheduled or stated in the project specification and shall have suitable approved flexible joints.

3.1.6 Ferrules. Ferrules shall be manufactured from leaded gunmetal and shall be of a standard pattern
   a) screw-in type, or
   b) plug-in type, as scheduled.
   The outlets of ferrules shall be such that they are compatible with the pipes used for the erf connections.

3.1.7 Saddles. Unless saddles of any other style or material are scheduled or required in terms of the project specification, each saddle shall
   a) be of malleable or ductile iron with an ultimate tensile strength of 310 MPa,
   b) be fitted with M16 bolts and nuts that have been bitumen dipped, and
   c) have a boss of diameter 75 ± 1.0 mm, and
   1) for pipe diameters not exceeding 300 mm, of thickness 13 ± 1.5 mm; and
   2) for pipe diameters exceeding 300 mm, of thickness 16 ± 1.5 mm.
STOP TAPS AND METERS

3.2.1 Stop Taps. Stop taps shall be of screw-down pattern, clockwise closing, and shall comply with the requirements for Class 1 water taps of SARS 226. Each stop tap shall be fitted with a crutch for hand operation.

3.2.2 Meters

3.2.2.1 General. Meters shall be of the type, size, and manufacture specified in the project specification. The meters shall be suitable for installation in horizontal, vertical, or inclined pipelines without their accuracy being affected, and shall be supplied with couplings suitable for connecting them to pipes of the type and class specified in the project specification or scheduled.

3.2.2.2 Range of volume registration. Each meter shall, subject to the provisions of 5.2, be capable of registering the volumes of water stated in the project specification under the conditions specified in it.

3.3 ALTERNATIVE MATERIALS FOR PIPES, FITTINGS, AND COUPLINGS. The Contractor shall use pipes and fittings of the materials scheduled. Should he propose to use pipes and fittings of materials other than those specified in 3.1 and 3.2.1, he shall submit for approval detailed specifications including details of the types of couplings he proposes to use with such pipes and fittings. The Contractor shall not use pipes or fittings of such other materials unless and until he has obtained written approval for their use from the Engineer.

3.4 BEDDING. Bedding shall be a light sandy material.

3.5 VALVE AND METER CHAMBERS

3.5.1 Bricks. The requirements of Subclause 3.11.1 of SARS 1200 L shall apply.

3.5.2 Mortar. Mortar for brickwork and plasterwork shall be composed of 1 part of cement, 3 parts of sand, and 1/5th part of lime, by volume.

3.5.3 Surface Boxes. Surface boxes and covers may be of CI or, provided that they conform to the relevant shapes and internal dimensions given in SARS 558 or approved by the Engineer, of materials that comply with the applicable requirements of Subclause 3.11.2 of SARS 1200 L. CI surface boxes shall comply with the requirements of SARS 566 for the type given on the drawing or scheduled. All CI surface boxes shall have been hot dipped in an acceptable bituminous or other approved compound before despatch from the manufacturer's works.

3.6 MARKINGS AND MARKER POSTS. Markings and marker posts shall comply with the applicable requirements of the project specification.

4. PLANT

4.1 SETTING OUT. The apparatus used for the line, level, and positional control of pipelaying shall be accurate, sturdy, and in good operational condition. The Contractor may use any acceptable device for such control.

4.2 TESTING. In addition to the pumps, gauges, storage tank, tools, pipes, fittings, specials, and bracing necessary for the tests required in terms of 7.3.2, the Contractor shall provide all plugs for the temporary stopping off of pipelines for the purpose of testing.

5. CONSTRUCTION

5.1 TRENCH BOTTOM. The trench bottom shall be prepared as specified in SARS 1200 DB. Trenches shall be kept sufficiently dry to allow proper and safe bedding, laying, and jointing of pipes and kept dry until the pipeline has passed the required tests and construction of the selected fill blanket over the pipes has been completed.

5.2 LAYING FROM MAIN TO ERF

5.2.1 Access to Properties in Built-Up Areas. Before commencing operations the Contractor shall deliver to the owner or occupier, as appropriate, of each house or building, a printed notice provided by the Employer informing the owner or occupier that any existing water supply may be interrupted at short notice. When an erf connection is to be disconnected or shut off, the Contractor shall give reasonable warning to the consumer, and should it be necessary to shut off the main supply, the Contractor shall make arrangements in good time with the Employer. Where any part of an erf connection is to be installed within the boundaries of an erf, the Contractor shall arrange with the Employer to ensure that the Contractor's employees have access to private properties at all reasonable hours for the purpose of installing each such erf connection, but shall regulate his work in such a way as to cause the least inconvenience to consumers. The Contractor shall endeavour to cause the least possible damage to private property and shall, after backfilling, make good and maintain those portions of lawns, flower beds, driveways, and pathways (gravel, tar, paving, or concrete), etc., that have been disturbed by his operations.

5.2.2 Pipe Laying. Pipes shall be laid and bedded as shown on the drawings, to straight lines and, as far as possible, to uniform grades. All metal and other chips shall be removed from the inside of a pipe by reaming after it has been cut or bent, or both, and each section of pipeline shall be flushed with water until all sand, sediment, and other foreign matter have been removed.

5.2.3 Service Connections

5.2.3.1 General. The first 2 m of a service connection shall be of flexible piping. Holes for ferrules shall be drilled, not punched. On pipes in which ferrules are intended to be fitted while the pipes are under pressure, an approved special drilling and tapping machine shall be used. Any connection showing leakage when tested under the test pressure specified for the water supply main will be considered defective and the pipe length with the defective connection shall be replaced and retested by the Contractor at his own expense.
5.2.3.2 **AC pipes.** Except where plug-in type (expanding) ferrules are scheduled, and except where the water main is of Class 10 (CID) or better and has a wall thickness of 3.0 mm, or as otherwise specified, plug-in type ferrules shall be used for service connections to AC pipes. The nominal diameter of ferrules used for direct tapping in AC pipes shall not exceed 20 mm for pipes of nominal diameter 100 mm and 150 mm, and shall not exceed 25 mm for pipes of nominal diameter greater than 150 mm.

A service connection to an AC pipeline may be made

a) by a joint by using

1) a long collar detachable joint, or
2) a CI detachable coupling that is longer than the standard sleeve and incorporates a platform with a tapped hole to which a service connection can be attached, or

b) on a pipe section at a position not less than 300 mm from the end of the pipe by one of the following methods:

1) The pipe shall be drilled at the take-off point to a diameter greater than that of the threaded portion of the ferrule. A suitable saddle complete with rubber washer having a hole that has been clearly punched to the size of the ferrule beforehand, shall then be accurately centred over the hole, and bolted round the pipe, the boss being drilled and tapped to the size required for the ferrule. A ferrule of the appropriate size shall then be installed.

2) A saddle complete with rubber washer shall be bolted round the pipe at the take-off point. The hole for the connection shall then be drilled and tapped through the saddle, washer, and pipe and a ferrule of the appropriate size installed.

3) Where plug-in type ferrules for AC pipes are scheduled or specified in the project specification, the pipe shall be drilled to the correct size, and a ferrule of the type and dimensions appropriate to the wall thickness of the pipe shall then be installed in accordance with the ferrule manufacturer's instructions.

In each method given in (b) (1), (2), and (3) above the ferrule shall be so installed that, when the connection is tested in terms of 7.1, there is no sign of visible leakage.

5.2.3.3 **CI pipes.** On CI pipes a service connection shall be made by drilling and tapping the pipe at the take-off point and then fitting a ferrule of the required size in the manner specified in 5.2.3.2 (2).

5.2.3.4 **Steel pipes.** Where a service connection is required to be taken off a steel pipe, the Contractor shall observe the special procedures specified in the project specification to ensure that any pipe lining or coating is not damaged by the connection.

5.2.3.5 **uPVC pipes.** On uPVC pipes service connections shall be made using special saddles in strict accordance with the method recommended by the pipe manufacturer. Pipes shall be cut in such a way that each cut end is smooth and clean.

5.2.4 **Pipes of Different Materials.** Pipes and fittings of different materials shall be jointed only with special adaptors recommended by the pipe manufacturer(s) and approved by the Engineer.

5.3 **BRICKWORK.** Except where a manhole is constructed to the relevant requirements of Subclause 5.8 of SARS 1200 L for a service connection to a major consumer or where surrounds of other materials are required in terms of the contract, brickwork shall be so placed around each stop tap and meter as shown diagrammatically on the drawings that

a) there is enough room for an operator to operate the stop tap easily;

b) the cover, if any, on the meter can be opened or removed to enable the meter to be read; and

c) the surrounding soil does not seep into the space required for operating the stop tap and reading the meter.

Mortar shall be used between courses of bricks, and on the top to hold the frame of the surface box or cover in place (see 5.6).

5.4 **CONNECTING POINTS**

5.4.1 **Markings and Marker Posts.** If so scheduled, markings or marker posts shall be placed to mark the position of the end of each future pipe connection in the manner specified in the project specification.

5.4.2 **Recording of Locations.** In addition to placing any markings or marker posts required, the Contractor shall record the following data in respect of each connection and, at the time of recording, shall make the data available to the Engineer to enable him to check their accuracy:

a) The name of the street;

b) the number of the plot or erf;

c) the location measurements of the stop tap in relation to the nearest erf peg(s);

d) the position of the connection on the supply main relative to lateral erf boundaries and all such other information as the Engineer may require;

e) the size of the connection.

On completion of the contract, or from time to time, as directed, the records shall be handed to the Engineer.

5.5 **INSTALLATION OF METERS AND STOP TAPS**

5.5.1 **Meters.** Each meter shall be installed in the position shown on the drawings and in such a manner that the meter can be removed easily after unscrewing the couplings and slightly springing the pipes apart.

Paint or joint compound shall be used sparingly on threads as not to clog the working parts of the meter or, alternatively, PTFE sealing tape shall be used at couplings. The inlet and outlet of each meter shall be kept securely covered until the meter is installed.

Before being installed, each meter shall be blown through carefully in the direction of the arrow on the meter to ensure that it works freely. The meter shall then be set in position with the arrow pointing in the correct direction.

5.5.2 **Stop Taps.** Each stop tap shall be installed with the arrow on the body of the tap pointing in the direction of flow.

5.6 **INSTALLATION OF SURFACE BOXES.** Each surface box shall be set according to the ground slope, clear of, and in such a way as to afford adequate protection for the meter and stop tap. The inside of the box shall be backfilled to the underside of the meter.
5.7 COMMISSIONING OF METERS AND MAINTENANCE

5.7.1 Commissioning. When turning on the water at each erf connection, the Contractor shall slowly expel all air from the meter by opening the highest tap on the premises and then SLOWLY opening the stop tap. Any damage traced to failure on the part of the Contractor to observe this precaution shall be made good by the Contractor at his expense.

5.7.2 Maintenance. Until the expiry of the period of maintenance, the Contractor shall replace at his own expense (except where a meter has been supplied by the Employer) all damaged or defective parts and shall replace or repair and adjust, to the satisfaction of the Engineer, all meters delivered in a defective condition. If that become defective under the conditions specified in the contract, or that do not register within the limits of accuracy specified in 6.2.

6. TOLERANCES

6.1 GENERAL. The relevant terms of Subclauses 6.1, 6.2, and 6.3 of SABS 1200 L shall apply.

6.2 METER READINGS. Each meter shall record to an accuracy of within 2\% over the range specified in the project specification.

7. TESTING

7.1 GENERAL. The terms of Subclause 7.3 of SABS 1200 L shall apply, where relevant.

7.2 ACTION TO BE TAKEN DURING AND AFTER TESTING. The Contractor shall make good any defects that may be found while the erf connection is under test. Thereafter the tests shall be repeated at his expense until the connection complies with all the other relevant requirements of the specification.

7.3 METER TESTING

7.3.1 Manufacturer's Test. Except where a meter is supplied by the Employer, the Contractor shall ensure that each meter has been tested by the manufacturer to twice the working pressure specified in the project specification, and, if so requested by the Engineer, shall submit to him a certificate stating that each meter supplied has successfully withstood the test pressure.

7.3.2 Site Test. The Engineer may order each meter to be tested on Site after installation to verify that the meter has not been damaged during installation and to determine the accuracy of the readings. Such tests shall be carried out by the Contractor under the direction of the Engineer using approved testing equipment and methods specified in the project specification.

8. MEASUREMENT AND PAYMENT

8.1 GENERAL. The provisions for measurement and payment for excavation and backfilling given in SABS 1200 DB shall apply. No extra payment will be made for bedding material. The relevant items for erf connections will be scheduled in the section covering medium-pressure pipelines. The operations of supplying the bedding material and placing it under, round, and over the top of the erf connection will be regarded as part of the pipe-laying operation.

8.2 SCHEDULED ITEMS

8.2.1 Provide Erf Connections Complete (approximate length of a connection or drawing number stated) ........................................................................................................... Unit: No.
Where the materials to be excavated, the depth of cover over the water main and the erf connections, and the lengths of the erf connections are reasonably consistent, separate items will be scheduled only for connections and stop taps of different sizes and, if applicable, for meters of different sizes or types. The rate shall cover the cost, as applicable, of providing the pipes, saddles, ferrules, stop taps, meters, surface boxes, marker posts, and excavating, connecting to the water main, laying in light sandy material, jointing, backfilling, testing, and completing the service connection.

8.2.2 Supply, Lay, and Test Erf Connections ............................................................................................................ Unit: m
The length of erf connections will be measured on slopes overall as laid. No deductions will be made for specials, stop taps, and meters. Separate items will be scheduled for erf connections of each diameter and type. The rate shall cover the cost of providing the pipes, saddles, and ferrules, connecting to the water main, laying in light sandy material, jointing, and testing.

8.2.3 Extra-Over items 8.2.2 for Specials (if any) .......................................................... Unit: No.
Separate items will be scheduled for each type and diameter of special.
The rates shall cover the cost of supplying, laying in light sandy material, jointing, and testing.

8.2.4 Supply and Install Meters Complete with Couplings .......................................................... Unit: No.
Meters will be measured separately by number of each type and size. The rates shall cover the cost of supplying all materials (including works tests) and of handling, transporting, installing, jointing, cutting, commissioning, listing, and submitting a record of installations to the Engineer.

8.2.5 Site Testing of Meters, when ordered (Provisional) .......................................................... Unit: No.
The rate shall cover the cost of testing in terms of Subclause 7.3.2.

8.2.6 Supply and Install Stop Tape Complete with Special Fittings .......................................................... Unit: No.
Stop taps and special fittings will be measured separately by number of each type and size. The rates shall cover the cost of supplying all materials, handling, transporting, installing, jointing, cutting, and commissioning.

8.2.7 Supply and Install Surface Boxes ......................................................................................... Unit: No.
Surface boxes will be measured separately by number of each type. The rate shall cover the cost of supplying the surface box, bricks, and other materials and for installing as shown on the drawings or as specified.

8.2.8 Markings or Marker Posts ............................................................................................ Unit: No.
The rate shall cover the cost of painting identification marks or manufacturing, installing, and painting marker posts and, in both cases, the cost of listing and submitting a record of the installations to the Engineer.
APPENDIX A. APPLICABLE STANDARDS

Reference is made to the latest issues of the following standards:

SABS 62 Steel pipes and pipe fittings up to 150 mm nominal bore suitable for screwing to ISO R7 pipe threads
SABS 226 Water taps (metallic)
SABS 460 Copper and copper alloy tubing
SABS 509 Malleable cast-iron pipe fittings
SABS 533 Black polyethylene pipes for the conveyance of liquids
SABS 558 Cast iron surface boxes and manhole and inspection covers and frames
SABS 966 Components of unplasticized polyvinyl chloride (upVC) pressure pipe systems

SABS 1200 A Steel pipes and pipe fittings up to 300 mm nominal bore suitable for screwing to ISO R7 pipe threads
SABS 1200 AA Civil engineering construction - General (small works)
SABS 1200 DA Civil engineering construction - Earthworks (small works)
SABS 1200 DA Civil engineering construction - Earthworks (pipe trenches)
SABS 1200 L Civil engineering construction - Medium-pressure pipelines
SABS 1200 LS Civil engineering construction - Sewers