

**Construction Specification for
Brick Gutter**

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TS 3.55.01 SCOPE

This specification covers the requirements for the construction of brick gutters.

TS 3.55.02 REFERENCES

This specification refers to the following standards, specifications or publications:

City of Toronto Standard Specifications

- TS 310 Construction Specification for Hot Mixed, Hot Laid Asphaltic Concrete Paving
- TS 1101 Amendment to OPSS.MUNI 1101 – Material Specification for Performance Graded Asphalt
- TS 1151 Material Specification for Superpave, Stone Mastic and Warm Mix Asphalt

Ontario Provincial Standard Specifications

- OPSS 1004 Material Specification for Aggregates – Miscellaneous

Canadian Standards Association

- A82-06 (R2011) Fired Masonry Brick Made from Clay or Shale

American Society of Testing and Materials

- C 902 Standard Specification for Pedestrian and Light Traffic Paving Brick

TS 3.55.03 DEFINITIONS

For the purpose of this specification, the following definitions apply:

Grout means a mixture of cementing materials, with or without admixtures, and water. The consistency varies from stiff to fluid.

Mortar means a mixture of cementing materials, sand and water, with a butter-like consistency.

Saturation Coefficient (C/B) means the ratio of absorption by a 24-hour submersion in cold water to that after a 5-hour submersion in boiling water.

Slurry means a pourable mixture of cementing materials, sand and water.

TS 3.55.04 DESIGN AND SUBMISSION REQUIREMENTS

TS 3.55.04.01 General

Any required submissions shall be in writing. All submissions shall be submitted to the Contract Administrator at least three weeks prior to the beginning of the work.

TS 3.55.04.02 Brick Gutter

Submissions required by the City regarding brick gutter and materials shall provide at least the following information:

- a) The source of each material to be incorporated into the work.

- b) Certification that all materials incorporated into the work meet or exceed this specification.
- c) The results of all pertinent tests for each material to be incorporated into the work, supplied by an independent testing laboratory.
- d) Five samples, from each pallet, of each type of brick to be used for review and approval by the Contract Administrator.

TS 3.55.04.03 Materials

Prior to starting the work, the Contractor shall supply the Contract Administrator with material safety data sheets (MSDS) for all the materials to be incorporated in the work.

TS 3.55.05 MATERIALS

TS 3.55.05.01 Bricks

Bricks shall be solid, provided with lugs and be red in colour. All bricks shall be grade S and stamped to indicate their grade.

Brick shall have smooth surfaces, square corners and shall be 60 mm high x 100 mm wide x 212 mm long.

Individual bricks shall not vary from the size requirements by more than + 3 mm in either thickness or width or by more than + 6 mm in length.

Gutter bricks shall be moulded from clay or shale or a combination thereof, kiln dried, burned and cooled on a controlled schedule and shall meet the requirements of ASTM C 902, except that the compression and absorption requirements shall be as specified hereafter.

They shall have a compressive strength of not less than 70 MPa for any individual brick, and not less than 80 MPa for the average of five bricks, when tested on the narrowest side.

All bricks shall conform to the additional requirements that the saturation coefficient (C/B), according to CSA A82, shall not exceed 0.80.

As an alternative to the saturation test, the bricks shall be subjected to the 50 cycle freeze thaw test specified in CSA A82. The maximum breakage or loss in dry weight shall be 3 per cent.

TS 3.55.05.02 Brick Sand

Sand for mortar cushion and mortar slurry shall be according to OPSS 1004 for mortar sand, except that the following gradation shall apply:

Table 1: Brick sand gradation

Canadian standard sieve size	Per cent passing
2.36 mm	100
300 µm	15-40
150 µm	0-10

TS 3.55.05.03 Mortar Cushion

The mix design for the mortar cushion shall consist of a dry mix of three parts brick sand and one part Type HE high-early strength Portland cement, proportioned by volume.

TS 3.55.05.04 Grout Mix

The grout mix shall consist of one part brick sand to one part Type HE high-early-strength Portland cement, proportioned by volume. Water shall be added to the mixture in sufficient quantity to enable the mixture to easily fill the joints.

TS 3.55.06 EQUIPMENT – Not Used**TS 3.55.07 CONSTRUCTION****TS 3.55.07.01 Mortar Cushion**

The mortar cushion shall be placed to a minimum thickness of 20 mm and a maximum thickness of 50 mm. The mortar cushion shall be placed to a minimum width of 150 mm.

TS 3.55.07.02 Placing Brick

The bricks shall be placed within 48 hours of placing the concrete base. The bricks shall be parallel to the face of the curb and shall tightly butt up against each other and the face of the curb. No broken or half bricks will be allowed, except at maintenance holes, catch basins or the ends of each row.

TS 3.55.07.03 Ramping and Protection

After sufficient bricks have been laid, a plank shall be placed on the top of the bricks and struck with sufficient force, to seat the bricks in the mortar and to provide the required grade and cross-fall. Superpave 19.0 with PGAC 58S-28 asphalt shall be placed and compacted in places at entrances, exits, walkways and ramps.

TS 3.55.07.04 Spraying Surface

After the above work has been completed, the brick surface shall be sprayed with water.

TS 3.55.07.05 Joint Filling

The edge of the joints at the side of the gutter shall be filled with a stiff grout mix. The grout shall be constantly stirred in the box, and shall be removed and applied to the gutter in scoop shovels and rapidly swept into all joints. The filling shall be performed in not less than two operations. In the first operation, as far as possible, the joints are not to be filled to more than half their depth. In the second operation, a thicker grout is to be used, and the remaining half of the joint thoroughly filled. The second operation shall be repeated as often as required, to fill all joints. All surplus grout shall be removed from the surface of the gutter by means of a rubber squeegee.

TS 3.55.07.06 Curing

As soon as any portion of the grouting has been completed satisfactorily, and has sufficiently hardened so that the surface will not be affected by water, the brick surface shall be covered with burlap or 25 mm of wet sand. The bricks, mortar and burlap or wet sand shall be kept saturated for a period of at least 48 hours.

TS 3.55.07.07 Protection of Brick Gutter

No vehicular traffic shall be allowed on the newly laid brick gutter for a period of at least 48 hours.

TS 3.55.07.08 Brick Gutter Tolerances

TS 3.55.07.08.01 *Grade*

The bricks shall be placed to the required grade, providing a 150 mm face on the curb. The grade shall not be altered at catch basins or other utilities. The height or face of the curb may be varied where false grading is required to maintain a minimum grade of 0.35 per cent.

TS 3.55.07.08.02 *Cross-Fall*

The cross-fall on the brick gutter shall be 3 per cent, toward the curb.

TS 3.55.08 QUALITY ASSURANCE

TS 3.55.08.01 Acceptance Sampling and Testing

All acceptance sampling and quality assurance testing necessary to determine conformance with the contract requirements shall be performed by the City. Sampling and testing shall be according to CSA A82. The City will determine the lot sizes. The Contractor shall assist, as necessary, in obtaining samples of materials for testing.

TS 3.55.08.02 Acceptance Criteria

TS 3.55.08.02.01 *General*

The acceptance of brick gutter will be based on a visual inspection of the construction, and testing of the surface tolerance of the grade.

TS 3.55.08.02.02 *Visual Inspection of Brick Gutter*

The bricks used in the construction shall be inspected visually to determine that they are thoroughly and uniformly coloured, and where broken, show a fracture of uniform and compact texture. Bricks shall be free from checks or cracks extending into the body of the brick in a manner that would affect their serviceability or strength, and shall be free from stones, pebbles, and visible grains or masses of lime.

TS 3.55.08.02.03 *Surface Tolerance of the Grade*

The gutter shall be tested with a 3 m straightedge. Any unevenness shall be removed and replaced to the required grade, level and cross-slope. The maximum acceptable deviation shall be 3 mm in 3 m.

TS 3.55.08.03 Visibly Defective or Damaged Brick Gutter

Brick gutter that is visibly defective, loose or damaged shall be removed and replaced.

TS 3.55.09 MEASUREMENT FOR PAYMENT

TS 3.55.09.01 Brick Gutter

Measurement of brick gutter shall be the length of actual brick placed, in metres, along the base of the curb face.

No measurement will be made through catch basins, maintenance holes or any other appurtenance that lies in the gutter or prohibits the placement of gutter brick.

TS 3.55.10 BASIS OF PAYMENT

TS 3.55.10.01 Brick Gutter – Item

Payment at the Contract Price for the above tender item shall be full compensation for all labour, Equipment and Material to do the work. Payment shall include the supplying, placing and seating of the brick and mortar, the supplying and placing of the grout mix, and the curing and protection of the brick gutter.

No payment will be made for any brick gutter that is visibly defective, loose or damaged.