

**CONSTRUCTION SPECIFICATION FOR BRICK GUTTER**

**INDEX**

<b>TS 3.55.01</b>	<b>SCOPE .....</b>	<b>3</b>
<b>TS 3.55.02</b>	<b>REFERENCES.....</b>	<b>3</b>
<b>TS 3.55.03</b>	<b>DEFINITIONS .....</b>	<b>3</b>
<b>TS 3.55.04</b>	<b>SUBMISSION AND DESIGN REQUIREMENTS .....</b>	<b>3</b>
<b>TS 3.55.04.01</b>	<b>General.....</b>	<b>3</b>
<b>TS 3.55.04.02</b>	<b>Brick Gutter .....</b>	<b>4</b>
<b>TS 3.55.04.03</b>	<b>Materials .....</b>	<b>4</b>
<b>TS 3.55.05</b>	<b>MATERIALS .....</b>	<b>4</b>
<b>TS 3.55.05.01</b>	<b>Supply of Materials.....</b>	<b>4</b>
<b>TS 3.55.05.02</b>	<b>Bricks .....</b>	<b>4</b>
<b>TS 3.55.05.03</b>	<b>Brick Sand .....</b>	<b>5</b>
<b>TS 3.55.05.04</b>	<b>Mortar Cushion.....</b>	<b>5</b>
<b>TS 3.55.05.05</b>	<b>Grout Mix .....</b>	<b>5</b>
<b>TS 3.55.06</b>	<b>EQUIPMENT - Not Used.....</b>	<b>5</b>
<b>TS 3.55.07</b>	<b>CONSTRUCTION.....</b>	<b>5</b>
<b>TS 3.55.07.01</b>	<b>Mortar Cushion.....</b>	<b>5</b>
<b>TS 3.55.07.02</b>	<b>Placing Brick .....</b>	<b>5</b>
<b>TS 3.55.07.03</b>	<b>Ramming.....</b>	<b>6</b>
<b>TS 3.55.07.04</b>	<b>Spraying Surface.....</b>	<b>6</b>
<b>TS 3.55.07.05</b>	<b>Joint Filling.....</b>	<b>6</b>
<b>TS 3.55.07.06</b>	<b>Curing .....</b>	<b>6</b>
<b>TS 3.55.07.07</b>	<b>Protection of Brick Gutter .....</b>	<b>6</b>
<b>TS 3.55.07.08</b>	<b>Brick Gutter Tolerances.....</b>	<b>6</b>
<b>TS 3.55.07.08.01</b>	<b>Grade.....</b>	<b>6</b>
<b>TS 3.55.07.08.02</b>	<b>Cross-Fall.....</b>	<b>7</b>
<b>TS 3.55.08</b>	<b>QUALITY ASSURANCE .....</b>	<b>7</b>
<b>TS 3.55.08.01</b>	<b>Acceptance Sampling and Testing.....</b>	<b>7</b>
<b>TS 3.55.08.02</b>	<b>Acceptance Criteria .....</b>	<b>7</b>
<b>TS 3.55.08.02.01</b>	<b>General.....</b>	<b>7</b>
<b>TS 3.55.08.02.02</b>	<b>Visual Inspection of Brick Gutter .....</b>	<b>7</b>

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<b>TS 3.55.08.02.03</b>	<b>Surface Tolerance of the Grade.....</b>	<b>7</b>
<b>TS 3.55.08.03</b>	<b>Visibly Defective or Damaged Brick Gutter.....</b>	<b>7</b>
<b>TS 3.55.09</b>	<b>MEASUREMENT FOR PAYMENT .....</b>	<b>8</b>
<b>TS 3.55.09.01</b>	<b>Brick Gutter .....</b>	<b>8</b>
<b>TS 3.55.10</b>	<b>BASIS FOR PAYMENT .....</b>	<b>8</b>
<b>TS 3.55.10.01</b>	<b>Brick Gutter - Item .....</b>	<b>8</b>

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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 specifications and publications:

**Ontario Provincial Standard Specifications, Material**  
OPSS 1004 –           Aggregates – Miscellaneous

**City of Toronto Specifications**  
TS 13.00 –           Specification for Non-Structural Concrete

**Canadian Standards Association (CSA)**  
CAN3-A82.1 –       Burned Clay Brick  
CAN3-A82.2 –       Methods of Sampling and Testing Brick

**American Society for Testing and Materials**  
ASTM C 902 –       Pedestrian and Light Paving Brick

## **TS 3.55.03           DEFINITIONS**

For the purposes 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           SUBMISSION AND DESIGN REQUIREMENTS**

### **TS 3.55.04.01       General**

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

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### **TS 3.55.04.02          Brick Gutter**

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

- (i) The source of each material to be incorporated into the work.
- (ii) Certification that all materials incorporated into the work meet or exceed this specification.
- (iii) The results of all pertinent tests for each material to be incorporated into the work, supplied by an independent testing laboratory.
- (iv) Five (5) samples, from each pallet, of each type of brick to be used for review and approval by the City.

The requirements for submission and design requirements are given in TS 13.00.

### **TS 3.55.04.03          Materials**

Prior to starting the work, the Contractor shall supply the City 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          Supply of Materials**

Unless otherwise specified in the Contract, the Contractor shall supply all materials necessary for the execution and completion of the work.

#### **TS 3.55.05.02          Bricks**

Bricks shall be solid, provided with lugs and be red in colour. All bricks shall be grade SS 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 Specification 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 5 bricks, when tested on the narrowest side.

All bricks shall conform to the additional requirements that the saturation coefficient (C/B), in accordance with CAN/CSA A82.1, shall not exceed 0.80.

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As an alternative to the saturation test, the bricks shall be subjected to the 50 cycle freeze thaw test specified in CAN3-A82.2. The maximum breakage or loss in dry weight shall be 3 percent.

**TS 3.55.05.03          Brick Sand**

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

<u>Canadian Standard Sieve Size</u>	<u>Percent Passing</u>
2.36 mm	100
300 µm	15-40
150 µm	0-10
75 µm	0-5

**TS 3.55.05.04          Mortar Cushion**

The mix design for the mortar cushion shall consist of a dry mix of three parts brick sand and one part Type 30 High-early strength Portland cement, proportioned by volume.

**TS 3.55.05.05          Grout Mix**

The grout mix shall consist of one part brick sand to one part Type 30 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 manholes, catch basins or the ends of each row.

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**TS 3.55.07.03            Ramming**

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.

**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, or as directed by the City. 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 percent, but shall not be less than 130 mm.

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**TS 3.55.07.08.02      Cross-Fall**

The cross-fall on the brick gutter shall be 3 percent, toward the curb, unless otherwise specified.

**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 will be performed by the City. Sampling and testing will conform to the requirements of CAN3-A82.2. 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 burned, 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 metre 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, as directed by the City.

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**TS 3.55.09                    MEASUREMENT FOR PAYMENT**

**TS 3.55.09.01                Brick Gutter**

Measurement for the above item 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 FOR PAYMENT**

**TS 3.55.10.01                Brick Gutter - Item**

Payment at the contract price for the above item shall be full compensation for all labour, equipment, materials and incidentals to do the work. Payment shall include, but not be limited to, 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.