

## SECTION 625

### DESIGN, SUPPLY AND INSTALLATION OF WELDED WIRE WALL

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##### **625.01 SCOPE**

This work shall consist of Welded Wire Retaining Wall constructed in accordance with these specifications and in reasonably close conformity with the lines, grades, design and dimensions shown on the plans or established by the Owner's Representative. The wall shall be a Hilfiker Retaining Wall or an approved equal. The design life for the wall must be a minimum of 75 years.

## **625.02 MATERIALS**

### **625.02.01 Wire Reinforcement and Cap Mesh**

Welded wire fabric for facing shall be formed by a 90 degree bend of the soil wire reinforcement mesh and a prong to interlock with the soil reinforcing mesh above. The reinforcing mesh shall be shop fabricated of cold drawn steel wire and shall be welded into the finished mesh fabric conforming to the minimum requirements of ASTM A1064, with a yield strength minimum of 450 MPa [65 ksi]. Welded Wire Mesh for the welded wire wall shall be as per project specifications, and will be hot dip galvanized (2.0 oz./SF, ASTM A123; 605 g/m<sup>2</sup> ). Any damage done to the mesh galvanization prior to installation shall be repaired in an acceptable manner and in a galvanized coating comparable to that provided.

### **625.02.02 Backing Materials**

#### **625.02.02.01 Backing Mats**

Where required, as shown on the plans, steel backing mat shall be W5 vertical x W2.5 horizontal minimum (.2582" [6.6 mm] x .178" [4.5 mm] nom. dia.) welded wire fabric meeting ASTM A1064 and hot dip galvanized (2.0 oz./SF, ASTM A123; 605 g/m<sup>2</sup> ) in accordance with paragraph 2.1.

#### **625.02.02.02 Hardware Cloth**

Where required, as shown on the plans, 20-Gauge metallic hardware cloth screen, or 23-Gauge PVC coated (Brown or Green) hardware cloth screen with openings not exceeding  $\frac{1}{4}$  inch (6.4 mm) and a roll width of 660 millimetres. The hardware cloth screen shall be in accordance with ASTM A740 and shall be placed between the backfill and steel backing mat. A minimum vertical lap of 50 millimetres and horizontal lap of 25 millimetres must be maintained to retain the wall backfill.

#### **625.02.02.03 Filter Fabric**

Where required, as shown on the plans, geotextile filter cloth shall be utilized to retain the soil as required by the welded wire wall designer.

## **625.03 SELECT GRANULAR BACKFILL MATERIALS**

### **625.03.01 Select Backfill Material Requirements**

As shown on the plans, select granular backfill materials for the welded wire wall structure shall be reasonably free from organic and otherwise deleterious materials and shall conform to the following gradation limits as determined by ASTM D6913:

| SIEVE SIZE                  | PERCENT PASSING |
|-----------------------------|-----------------|
| 152.4 mm                    | 100             |
| 76.1 mm                     | 100 – 75        |
| 75 $\mu\text{m}$ (0.075 mm) | 0 – 25          |

The backfill shall conform to all of the following additional requirements:

1. The Plasticity Index (P.I.), as determined by ASTM D4318 (AASHTO T90), shall not exceed 6.
2. The fraction finer than 15 microns (0.015 mm), as determined by ASTM D7928 (AASHTO T88) shall not exceed 15 percent.
3. The material shall exhibit an angle of internal friction of not less than 34 degrees, as determined by the standard direct shear test ASTM D-3080-72 (AASHTO T236), utilizing a sample of the material compacted to 90% percent of ASTM D1557-92. No testing is required for backfill where 80 percent of the material is greater than  $\frac{3}{4}$  inch (19mm). Before construction begins, the borrow selected shall be subject to show conformance with this frictional requirement.

| ELECTRO-CHEMICAL PARAMETER       | ELECTRO-CHEMICAL REQUIREMENT | TEST METHOD |       |
|----------------------------------|------------------------------|-------------|-------|
| Resistivity                      | > 3000 ohm-cm (Min)          | G187        | T 288 |
| pH                               | 5 - 10                       | D4972       | T289  |
| Chlorides ( $\text{Cl}^-$ )      | <100 mg/kg (ppm)             | D4327       | T 291 |
| Sulphates ( $\text{SO}_4^{2-}$ ) | < 200 mg/kg (ppm)            | D4327       | T 290 |
| Max Organic Content              | < 1%                         |             |       |

If the resistivity is greater than or equal to 5,000 ohm-cm, the chlorides and sulfates requirements may be waived.

### 625.03.02 Acceptance of Select Backfill Material

The Contractor shall furnish to the Owner's Representative a Certificate of Compliance certifying that the select granular backfill material complies with this section of the specifications. A copy of all test results performed by the Contractor, which are necessary to assure compliance with the specifications, shall also be furnished to the Owner's Representative and the welded wire wall designer.

The frequency of sampling of Select Granular Backfill necessary to assure the above-mentioned requirements shall be directed by the Owner's Representative.

Backfill not conforming to this specification shall not be used without written consent of the Owner's Representative.

## **625.04 CONSTRUCTION REQUIREMENTS**

### **625.04.01 Wall Excavation**

Wall excavation shall be in accordance with the requirements of general specifications and in reasonably close conformity with the limits and construction stages shown on the plans.

### **625.04.02 Foundation Preparation**

The foundation for the structure shall be graded level for a width equal to or exceeding the length of the reinforcement mat or as shown on the plans. Prior to wall construction, the foundation, if not in rock, shall be compacted, as directed by the Owner's Representative.

Any foundation soils found to be unsuitable shall be removed and replaced, as directed by the Owner's Representative.

The maximum calculated applied bearing pressure at the foundation level is as shown on the elevation view for each wall. It is the responsibility of the Owner's Representative to determine that this calculated applied bearing pressure is allowable for that location.

### **625.04.03 Welded Wire Retaining Wall Erection**

Standard wire mesh reinforcement mats, and applicable facing materials, shall be placed in 600 millimetres successive horizontal lifts in the sequence shown on the shop drawings as backfill placement proceeds. Each standard lift must have the ability to compress a minimum of 50 millimetres without creating any outward bulge of the facing elements. Vertical tolerance (plumbness) and horizontal alignment tolerance shall not exceed 51 millimetres when measured at the junction of the wire facing and soil reinforcement along a 3 metre straight edge.

The overall vertical tolerance of the wall (top and bottom) after construction shall not exceed 25 millimetres per 3 metres of wall height, unless the wall design requires a battered facing. For battered facing structures, the overall tolerance from the theoretical battered locations shall not exceed 13 millimetres per 3 metres of battered wall height.

#### **625.04.04 Backfill Placement**

Backfill placement shall closely follow erection of each course of reinforcement mats. Backfill shall be placed in such a manner as to avoid any damage or disturbance to the wall materials or misalignment of the facing. Any wall materials, which become damaged or disturbed during backfill placement, shall be either removed and replaced at the Contractor's expense or corrected, as directed by the Owner's Representative. The Contractor, at their expense, shall correct any misalignment or distortion of the wall facing due to placement of backfill outside the limits of this specification.

Backfill shall be compacted to 95 percent of the maximum density as determined by ASTM D1557 (AASHTO T99 method C or D), with oversize correction, at optimum moisture content ( $\pm 2\%$ ).

The moisture content of the backfill material prior to and during compaction shall be uniformly distributed throughout each layer. Backfill material shall have a placement moisture content equal to or within two percentage points of optimum moisture content ( $W_{opt} \pm 2\%$ ). Backfill material with placement moisture content in excess or less than  $W_{opt} \pm 2\%$  shall be removed and reworked until the moisture content is uniformly acceptable throughout the entire lift. The Contractor shall decrease the percentage of deviation from optimum moisture, if necessary, to obtain the specified density. The optimum moisture content shall be determined in accordance with AASHTO T99 Standard Proctor Method A, with coarse particle correction according to ASTM D4719.

Backfill shall be placed in complete horizontal lifts. The maximum lift thickness after compaction shall not exceed 305 millimetres. The Contractor shall decrease this lift thickness, if necessary, to obtain the desired density.

Compaction within 1 metre of the backface of the wall facing shall be achieved by at least three passes of a lightweight mechanical tamper, roller or vibratory system. Soil density tests are not generally required within this area.

At the end of each day's operation, the Contractor shall slope the last level of backfill away from the wall facing to rapidly direct run-off of rainwater away from the wall face. In addition, the Contractor shall not allow surface run-off from adjacent areas to enter the wall construction.

#### **625.05 MEASUREMENT FOR PAYMENT**

The unit of measurement for wall erection will be the square metres, rounded to one decimal place, of wall surface area complete and in place.

## **625.06 BASIS OF PAYMENT**

Payment shall include compensation for all labour and materials and equipment use required to prepare the wall foundation, place the reinforcement mats, position the backing mats and screens as shown on the plans. Backfill material shall be paid for in accordance with Section 206, 207 or 403, as appropriate, but any additional requirements for backfilling, including materials testing and compaction, shall be considered compensated for in the contract price for the welded wire wall. Excavation required to provide a level surface for the wall shall be paid for in accordance with Section 403.