

SECTION 31 23 16
EXCAVATION AND BACK FILL FOR TRENCHING

PART 1- GENERAL

1.01 WORK INCLUDED

- A. Excavate trenches for utilities, and for the construction of the new trench.
- B. Compacted bed and compacted fill over utilities.
- C. Compaction requirements for the installation of refrigerant piping.

1.02 RELATED SECTIONS

- A. Section 03 30 53 – Cast In Place Concrete..
- B. Section 23 23 00 – Refrigerant Piping.
- C. Section 26 05 11 – Requirements for Electrical Installation.

1.03 PROTECTION

- A. Protect excavations by shoring, bracing, underpinning, or other methods required to prevent cave-in, or loose soil from falling into excavation.
- B. Underpin adjacent structures that may be damaged by excavation work, including service utilities and pipe chases.
- C. Notify the COTR of unexpected subsurface conditions and discontinue work in affected area until notified to resume work.
- D. Grade excavation top perimeter to prevent surface water runoff into COTR excavation.

PART 2 - PRODUCTS

2.01 BED AND FILL MATERIALS

- A. Imported sand shall be clean, fine aggregate, 100% of which will pass a 3/8-inch sieve, 95% will pass a #4 sieve, and no more than 5% will pass a #200 sieve. Sand shall be free of organic matter.
- B. Clean excavated fill shall be material excavated from the trench, free of organic or other foreign matter, with maximum size of rock or lumps limited to three (3) inches in any dimension.
- C. Imported mineral-aggregate fill shall be clean mineral aggregate, graded such that 100% will pass a one (1) inch sieve and 95% to 100% will pass a 3/4-inch sieve. Material shall have a minimum sand equivalent of 50%. Fill shall be free of organic matter and shall be compactible by vibration.

- D. Imported earth fill shall be any soil-rock material that will compact thoroughly without the presence of excessive voids when watered and rolled, and which has been approved by the COTR. The material shall not contain rocks or lumps over three (3) inches in greatest dimension. The fill shall be granular in appearance and not show excessive shrinkage or swelling when subjected to change in water content
- E. Fill in unpaved areas shall have a plasticity index of 15 or less. Fill under paved areas shall comply with the following requirements:
 - 1. Minimum "R" (Resistance) Value 45
 - 2. Maximum Expansion Pressure 100

PART 3 - EXECUTION

3.01 EXAMINATION BY CONTRACTOR

- A. Verify that stockpiled fill to be reused is approved by COTR.
- B. Verify that foundation perimeter drainage installation has been inspected by COTR.
- C. Verify that areas to be backfilled are free of debris and water.
- D. By starting trenching work herein, the Subcontractor warrants that it has examined and verified that the existing conditions comply with the provisions of the preceding paragraphs of Subpart 3.01.

3.02 PREPARATION

- A. Identify required lines, level, contours, and datum and log the as-built information.
- B. Compact subgrade surfaced to density requirements given below for backfill material.

3.03 EXCAVATION

- A. After obtaining a Dig Permit as specified in the General Requirements, excavate subsoil required for utilities.
- B. Cut sides of trenches as neat, parallel, and vertical as soil conditions permit.
- C. Hand trim excavation and leave free of loose matter.
- D. Remove lumped subsoil, boulders, and rock.
- E. Excavation shall not interfere with normal 45 degree bearing splay of foundations.
- F. Correct unauthorized excavation at no additional cost to the Government.

- G. Bottom of excavation shall be firm, hard, and free from foreign matter.
- H. Bring areas excavated below the depth required by these specifications for indicated by the drawings, to the correct grade with approved excavated material.

3.04 BACKFILLING

- A. Surveying of utilities by the Contractor surveyor will be in accordance with Section 23 05 11 – Common Work Results for HVAC and Steam Generation and Section 26 05 11- Requirements for Electrical Installation. Identification tape shall be installed above utilities as required by COTR.
- B. Buried utilities shall not be covered with backfill without the approval of the COTR. Before backfilling over the identification tape the COTR shall verify that the tape has been installed. The identification tape shall not be covered with backfill without the approval of the COTR.
- C. Support pipe and conduit during placement and compaction of bedding fill. Backfill trenches to contours and elevations. Backfill systematically, as early as possible, to allow maximum time for natural settlement. Do not backfill over porous, wet, or spongy subgrade surfaces.
- D. Place fill materials in continuous layers not exceeding six (6) inches loose depth, and compact fill to 95% maximum density at optimum water content $\pm 2\%$.
- E. Employ a placement method which will not disturb or damage foundation perimeter drainage and foundation damp proofing.
- F. Remove from the project site and dispose of surplus backfill materials.
- G. Leave stockpile areas completely free of excess fill materials.

3.05 TOLERANCES

- A. Top surface of backfilling: \pm one (1) inch.

3.06 FIELD QUALITY CONTROL

- A. Compaction testing shall be performed by an independent testing laboratory employed by the COTR.

END OF SECTION 31 23 16