



NATIONAL PETROCHEMICAL COMPANY
STANDARDS

CONSTRUCTION STANDARD

FOR
SITE GRADING, EARTHWORK IN EXCAVATION & BACK FILLING

NPCS-CS-GC-04

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SCOPE

This standard describes the technical requirements for the materials and construction requirements of the following works in an industrial complex.

- Rough grading of the entire area specified in drawings, which includes stockpiling of top soil, earthwork in cutting and filling, removing unsuitable materials encountered below the finished rough grade, compacting the fill areas, etc.
- Excavation and back filling of earth in construction of concrete works for underground services, underground piping, electrical works, etc., included in the scope of work.
- Earthwork for permanent drainage system, ditches culverts, etc.
- If fill material is not available in the complex then obtaining from borrow pits outside of complex.
- Disposal of /unused/rejected materials from site of construction.

2

STANDARDS AND CODES

The following standards, codes, or specifications including applicable addenda, form a part of this standard to the extent specified herein.

2.1

- AASHTO American Association of State Highway and Transportation Officials.

 AASHTO M 145 The Classification of Soils and Soil-Aggregate Mixtures for Highway Construction Purposes.

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- 2.2 - ASTM American Society for Testing and Materials.
- ASTM D 422 Standard Method for Particle-Size Analysis of Soils.
- ASTM D 698 Standard Test Methods for Moisture-Density Relations of Soil Aggregate and Mixtures Using 5.5 lb (2.5 kg) Rammer and 12" (305 mm) Drop.
- ASTM D 1557 Standard Test Methods for Moisture-Density Relations of Soil and Soil-Aggregate Mixtures Using 10 lb (4.54 kg) Rammer and 18" (457 mm) Drop.
- ASTM D 4318 Standard Test Method for Liquid Limit, Plastic Limit and Plasticity Index of Soils.
- ASTM E 329 Standards of Recommended Practice for Inspection and Testing Agencies for Concrete, Steel and Bituminous Materials as used in Concrete.

3 MATERIALS

3.1 BACKFILL

- 3.1.1 Material for general backfill-granular soils conforming to group classification A-1, A-2-4, A-2-5 or A-3 in accordance with AASHTO M 145. The material shall contain no organic matter, debris, frozen materials or particle size greater than 100 mm in any dimension.
- 3.1.2 Backfill placed against or around piping, culverts or Concrete Encased Ductbanks; same material as specified above, but containing no particle size greater than 50 mm in any dimension within 150 mm of the piping or culverts.
- 3.1.3 Select fill-backfill of the same material as specified in paragraph 3.1.2, but containing no particle size greater than 20 mm in any dimension.

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- 3.1.4 Backfill placed around electrical cables-sand with a maximum of 5% by weight passing a 0.075 mm (No 200) sieve. The material shall contain no plastic clay or organic matter and it shall have no particles retained on 4.8 mm (No 4) sieve.
- 3.1.5 When suitable backfill material from the site is not available in sufficient quantities, it shall be obtained from borrow pits near the job site.
- 3.1.6 All backfill material from the site, borrow pits must be approved by client.
- 3 1 7 Excavated soil from the site shall only be used as **fill material** below roads, dikes for tank areas and **above** foundation base; and shall not be used in any other part of the plant.

4 CONSTRUCTION

4.1 GENERAL

- 4.1 1 The excavation work for each installation shall conform to the elevations and dimensions which will be indicated on the construction drawings.
- 4.1 2 Preserve all benchmarks and stakes for verification and use by others.
- 4 1 3 For excavation, backfill and compaction of roads and storage tanks refer to NPCS-CS-GC-OG and WCS-CS-ST-07 respectively.

4 2 FIELD MEASUREMENTS

- 4 2 1 A minimum of two Permanent benchmarks will be furnished by client.
- 4.2 2 Contractor shall establish the necessary line and grade stakes needed to accomplish the work. Survey reports to be submitted for verification by client prior to implementation of the work.