



**CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.
4 IRVING PLACE
NEW YORK, NY 10003**

**DISTRIBUTION ENGINEERING
TOOLS AND STRUCTURES**

**SPECIFICATION EO-1181
REVISION 6
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June 1, 2010**

**GENERAL SPECIFICATION FOR BACKFILLING
OF TRENCH AND SMALL OPENINGS**

FILE: CONSTRUCTION STANDARDS MANUAL NO. 3, SECTION 37

TARGET AUDIENCE	REGIONAL CONSTRUCTION
NESC REFERENCE	NONE

TABLE OF CONTENTS

1.0	<u>PURPOSE</u>	3
2.0	<u>APPLICATION</u>	3
3.0	<u>DEFINITIONS</u>	3
4.0	<u>REQUIREMENTS</u>	4
4.1	<u>Compaction</u>	4
4.2	<u>Density Testing</u>	5
4.3	<u>Procedure For Electric Duct Backfill</u>	5
4.4	<u>Procedure For 138kv Cable Pipe Installation</u>	6
4.5	<u>Procedure For Backfilling Gas Trenches & Small Openings</u>	6
4.6	<u>Backfilling Concrete Coated & Steel Jacketed Steam Main Trenches</u>	7
5.0	<u>PRECAUTIONS</u>	7

Specification	Revision	Rev Date	Effective Date	Copyright Information	Page
EO-1181	6	05/01/2010	06/01/2010	2007-2008 Consolidated Edison Co. of New York, Inc.	2/7
Filing Information		Construction Standards		Manual No. 3, Section 37	

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1.0 **PURPOSE**

This specification details the procedures to be followed in backfilling all Con Edison street openings for electric, gas and steam facilities.

2.0 **APPLICATION**

This specification applies to all Con Edison Customer Service Areas.

3.0 **REFERENCE SPECIFICATION AND DEFINITIONS**

- 3.1 The term "Engineer" used in this specification refers to the Distribution Tools & Structures Engineer or his authorized representative.
- 3.2 The term Construction Representative shall mean the Construction Manager, Contract Construction Manager, or his authorized representative.
- 3.3 The terms "Type 3/8", "Type I" and "Type II" shall be as defined in [EO-8085](#).
- 3.4 The term "small opening" shall refer to street openings which are 6' x 5' or smaller.
- 3.5 The term "suitable backfill" shall refer to in-place material excavated from the trench or opening which satisfies the following requirements:
- 3.5.1 The excavated material shall be free of all broken asphalt pavement, broken concrete, brick, all organic material, and all debris.
- 3.5.2 The excavated material shall be substantially sandy soil gritty and granular in texture and have a small amount of rocks compared to the total volume of soil. It shall have no rocks greater than 2 inches in size.
- 3.5.3 The excavated material shall be substantially free of clay like or clayey soil. Clayey soil shall be determined as soil that is powder like in texture when dry and capable of being molded when wet.

Specification	Revision	Rev Date	Effective Date	Copyright Information	Page
EO-1181	6	05/01/2010	06/01/2010	2007-2008 Consolidated Edison Co. of New York, Inc.	3/7
Filing Information		Construction Standards		Manual No. 3, Section 37	

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- 3.5.4** Frozen backfill material shall either be removed or broken into small particles before being compacted. Excessively wet material shall be mixed with dry material to reduce moisture content before backfilling.
- 3.5.5** Fill materials, known as "Stone Dust", or "Pond Fill", containing crystalline silica shall not be used as backfill material.
- 3.5.6** If there are any questions as to suitability of the excavated material, the Engineer shall be consulted.
- 3.6** The term "mechanical compaction" shall mean the use of equipment, either impact or plate vibratory, which is designed specifically for soil compaction. The term "hand tamping" shall mean compaction of backfill by means of a plate tamper, which will impart sufficient force to compact the backfill material.
- 3.7** The term "wetted backfill" shall mean backfill material containing sufficient moisture so that when molded by hand it will form a firm shape. If the specimen crumbles it lacks sufficient moisture. If water is squeezed from the specimen it contains too much moisture.

4.0 **REQUIREMENTS**

4.1 **Compaction**

- 4.1.1** The term "compacted", for both "mechanical compaction" and "hand tamping", shall mean a minimum level of compaction of 95% of the maximum dry density of the backfill material used as determined by a Standard Proctor Test (ASTM D-698). In lieu of a Standard Proctor Test a "one point" test shall be done by taking a sample of the soil and compacting it using a Standard Proctor mold procedure and determining the maximum in field density that can be obtained and 95% of this value should be used as a comparison to the actual compaction achieved.
- 4.1.2** In lieu of the above, when using "suitable backfill", compaction will be considered adequate if density readings of the compacted fill equal 95% of the readings of the in-place material (i.e. density readings must be taken at the time of excavation to use as reference for compaction). For this type of "before and after" comparison, devices such as the nuclear density tester may be used.

Specification	Revision	Rev Date	Effective Date	Copyright Information	Page
EO-1181	6	05/01/2010	06/01/2010	2007-2008 Consolidated Edison Co. of New York, Inc.	4/7
Filing Information		Construction Standards		Manual No. 3, Section 37	

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4.2 Density Testing

- 4.2.1 The sand-cone test, ASTM D1556 or nuclear density tester may be used for all in place density tests. Other methods may be used upon approval of the Engineer.
- 4.2.2 The Construction Representative or Engineer may order as many in-place density tests as he deems necessary to insure proper compaction. If an in-place density test indicates insufficient compaction, the Contractor shall re-compact the area in question until the backfill is compacted to the requirements set forth in paragraph 4.1.1. The Contractor may elect to take additional tests 5 feet on both sides of the test which failed, and average the values of the three readings. If the average value of the three tests meets the compaction requirements, the area in question will be considered sufficiently compacted and no additional compaction will be required. If the average value does not meet the compaction requirements, the Contractor will be required to pay for the two additional in-place density tests and to re-compact the area, which has been determined to be insufficiently compacted. Test after recompaction.

4.3 Procedure For Electric Duct Backfill

- 4.3.1 The following backfill procedure shall be used for concrete duct, asbestos cement, and plastic and fibre conduit.
- 4.3.2 Where the ducts are in a rock area, a minimum 4" bed of Type 3/8" backfill shall be placed. It shall be wetted and mechanically compacted to form a firm base for the support of the ducts. Suitable backfill shall be free of stones larger than 2 inches.
- 4.3.3 For concrete conduit, asbestos cement conduit, plastic and fibre conduit encased in concrete, the trench shall be filled with suitable backfill as defined in paragraph 3.5 or Type II material (EO-8085) in 12 inch wetted lifts. Each lift shall be mechanically compacted.
- 4.3.4 For direct buried asbestos cement, plastic and fibre conduit, the trench shall be filled with Type 3/8 material to a level of 12 inches above the ducts. It shall be compacted by hand in a no more than 12 inch wetted lifts. The remaining trench shall be backfilled with suitable backfill or Type II material ([EO-8085](#)) in 12 inch wetted lifts mechanically compacted.

Specification	Revision	Rev Date	Effective Date	Copyright Information	Page
EO-1181	6	05/01/2010	06/01/2010	2007-2008 Consolidated Edison Co. of New York, Inc.	5/7
Filing Information		Construction Standards		Manual No. 3, Section 37	

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4.4 Procedure For 138kv Cable Pipe Installation

4.4.1 All installation of 138KV and 345KV cable pipe type feeders shall comply with the requirements set forth in [CE-TS-3352](#).

4.4.2 The requirement for the use of excavated material as "suitable backfill" shall follow the requirements of paragraph 3.5.

4.5 Procedure For Backfilling Gas Trenches & Small Openings

4.5.1 Coated Steel & Plastic Gas Pipe Trenches

- a. A smooth surface shall be excavated in the bottom of the trench and the pipes laid to grade. Where the trench is in a rock area, a minimum of 4 inches of Type 3/8 material shall be placed, wetted and mechanically compacted to form a firm base for the gas pipes.
- b. The trench shall be backfilled with Type 3/8 material to a height of 12 inches above the pipe in a maximum of 12 inch wetted lifts which shall be hand compacted.
- c. The remaining trench shall be backfilled with Type 3/8, Type I, Type II or suitable existing backfill in a maximum of 12 inch wetted lifts, which shall be mechanically compacted.
- d. The density of the compacted backfill shall be tested and accepted or rejected in accordance with paragraph 4.2.2.

4.5.2 Cast Iron, Plastic & Steel Gas Pipe In Small Openings

- a. Backfill material shall be Type 3/8, or suitable existing backfill, which has been segregated to remove all rocks, which may damage the pipe coating.
- b. Openings shall be backfilled to a height of 12 inches above the pipe in a maximum of 12 inch wetted lifts, which shall be hand, compacted. The remainder of the openings shall be backfilled in 12 inch wetted lifts with Type I or Type II or "suitable backfilled" as per paragraph 7 which shall be mechanically compacted.
- c. The density of the compacted backfill shall be tested and

Specification	Revision	Rev Date	Effective Date	Copyright Information	Page
EO-1181	6	05/01/2010	06/01/2010	2007-2008 Consolidated Edison Co. of New York, Inc.	6/7
Filing Information		Construction Standards		Manual No. 3, Section 37	

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accepted or rejected in accordance with paragraph 4.2.2.

4.6 Backfilling Concrete Coated & Steel Jacketed Steam Main Trenches

4.6.1 A smooth surface shall be established in the bottom of the trench and the pipes leveled and laid on a firm base. Where the trench is in a rock area, a minimum of 4 inches of Type I material shall be placed, wetted and mechanically compacted to form a firm base.

4.6.2 The trench shall be backfilled with Type I, or Type II or suitable backfill material in 12 inch wetted lifts, which shall be mechanically compacted.

4.6.3 The backfill shall be tested and accepted or rejected in accordance with paragraph 4.2.2.

5.0 PRECAUTIONS

If a work site is found to contain existing fill material that contains or comprised of “Stone Dust” or “pond Fill”, the contractor shall cover the material with a 3” layer of sand. If this material is found to be stockpiled at a work site, it shall be covered with a tarpaulin or removed from the work site.

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<u>REVISION No. 5</u> Revised section 4.4 (added installation spec.). Due to be reviewed 05/2015	<u>FILE:</u> Construction Standards Manual 3 Section 237 - Subway
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Specification	Revision	Rev Date	Effective Date	Copyright Information	Page
EO-1181	6	05/01/2010	06/01/2010	2007-2008 Consolidated Edison Co. of New York, Inc.	7/7
Filing Information		Construction Standards		Manual No. 3, Section 37	

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