

## Sampling and Shipment of Soil/Backfill Samples for Thermal Analysis

### Undisturbed Tube Samples and Bulk Samples

- If cohesive soils (clayey or silty) are encountered, samples should be taken in nominal 3-inch diameter Shelby tubes or large diameter California samplers with brass liners (no rings); otherwise, standard split spoon samples or auger cuttings should be taken (see bulk soil section below).
- Please do not extrude samples from the Shelby tube. Cut the bottom 6" section (+/- 1/2") of the tube, seal both ends with plastic caps, and tape it to prevent any moisture loss.
- Identify the samples with the following details: Project Name, Location, Bore Hole, Depth, Date samples were taken, etc.
- The samples should be representative of the soil at the cable (or duct-bank) burial depth. If the soil above this elevation is different, it should be sampled as well.
- If bedrock is encountered, take core samples (minimum 2 inches in diameter and 5 inches long) or block samples approximately 5 inches on each side of irregular shape.
- **Please include a copy of the borehole logs.**
- Email the details of the shipment—courier name, tracking number, etc.—to [questions@geothermusa.com](mailto:questions@geothermusa.com)

### Bulk Soil or Back-fill Samples

- For all foreign shipments, declare a value of \$10 for the entire package and send it via FedEx or UPS overnight service (or second-day air service).
  - Mark the package "Aggregate samples for laboratory testing only".
  - Request import permit instructions to [info@geothermusa.com](mailto:info@geothermusa.com)
- Provide the Proctor (Standard or Modified) density, starting moisture content, and percent compaction effort.
- Please send approximately 25 pounds of each sample, contained in double heavy-duty plastic (Ziploc) bags or 5-gallon buckets. Each container should be clearly labeled with the Project Name, Sample Location, Bore Hole or Test Pit, Depth, and the Date the samples were taken.
- Email the details of the shipment—courier name, tracking number, etc. to [questions@geothermusa.com](mailto:questions@geothermusa.com)

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7828 Columbia Dr, Katy, TX 77494 | Phone: 281-985-9344

[questions@geothermusa.com](mailto:questions@geothermusa.com)

[www.geothermusa.com](http://www.geothermusa.com)

**Purpose for testing (in-situ vs. construction phase), the following apply:**

For thermal resistivity measurements to determine in-situ values

For soils that are cohesive:

- Undisturbed tube samples
- Bottom 6-inches of Shelby tube or brass/stainless steel liner (minimum diameter of 2-inches) - **must be continuous tube and NOT rings**

Disturbed samples

- Provide the proctor (standard or modified) density, starting moisture content, and percent compaction effort such as 85%, 90%, 95%, etc.
- **In-situ moisture content unless otherwise specified**
- Bottom 6-inches of Shelby tube or brass/stainless steel liner (minimum diameter of 2-inches) - **must be continuous and NOT ring samplers**

**For thermal resistivity measurements to determine construction phase (materials to be used around cables)**

Disturbed samples

- Provide Proctor Density Curve for each sample (Standard or Modified)
- Provide percent (%) compaction (i.e. 85%, 90%, 95%, etc)
- Provide moisture content the sample should be installed at (i.e. in-situ, optimum or specified %)

What's needed:

1. Provide soil descriptions or borehole logs, a business card or contact information with the samples in a separate Ziploc bag.
2. Please issue a PO or a charge to number with the samples
3. Email the tracking number to **questions@geothermusa.com**
4. Turnaround time will vary depending on the current workload in our lab. Please reach out to **questions@geothermusa.com** get the current turnaround times.

Ship all samples to:

**Geotherm USA**  
**ATTN: Lab Manager**  
**7828 Columbia Dr**  
**Katy, TX 77494**  
**Tel: 281-985-9344**

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Company Name: \_\_\_\_\_ Contact Name: \_\_\_\_\_

Contact Number: \_\_\_\_\_ Project Name: \_\_\_\_\_

Project Location: \_\_\_\_\_ Project Number: \_\_\_\_\_

PO/Job Number: \_\_\_\_\_ Company to Invoice: \_\_\_\_\_

A/P Email Address: \_\_\_\_\_ Rush Testing (additional fee)  Yes  No

Thermal Requirements: \_\_\_\_\_

**Testing Instructions** – for bulk samples, all sample testing instructions are required for testing to begin.

**1) Proctor** - (Modified or Standard) Max Dry Density and Optimum Moisture Content

**2) Compaction Effort(s)** – how the material will be placed back in the ground

**3) Test Moisture Content(s)** - Please Select all that apply

**Proctor Type**<sup>1</sup>:  Standard (ASTM D698)  Modified (ASTM D1557)

Material/Sample Information					Proctor Results (Bulk)		Testing Requirements	
Sample ID	Collection Date	Sample Depth (ft)	Sample Type	Soil/Backfill Description	Max Dry Density (lb/ft <sup>3</sup> )	Optimum M/C (%)	Compaction Effort(s) for testing <sup>2</sup> (% of Max Density)	highest Moisture Content for Testing <sup>3</sup> Select all that apply
			<input type="checkbox"/> Tube <input type="checkbox"/> Bulk <input type="checkbox"/> Both					<input type="checkbox"/> Optimum <input type="checkbox"/> In-Situ/As Received: _____ Specified: _____
			<input type="checkbox"/> Tube <input type="checkbox"/> Bulk <input type="checkbox"/> Both					<input type="checkbox"/> Optimum <input type="checkbox"/> In-Situ/As Received: _____ Specified: _____
			<input type="checkbox"/> Tube <input type="checkbox"/> Bulk <input type="checkbox"/> Both					<input type="checkbox"/> Optimum <input type="checkbox"/> In-Situ/As Received: _____ Specified: _____
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			<input type="checkbox"/> Tube <input type="checkbox"/> Bulk <input type="checkbox"/> Both					<input type="checkbox"/> Optimum <input type="checkbox"/> In-Situ/As Received: _____ Specified: _____