NATURCYCLE™

End Markets for Finished Compost

By Charles Duprey, President & Founder

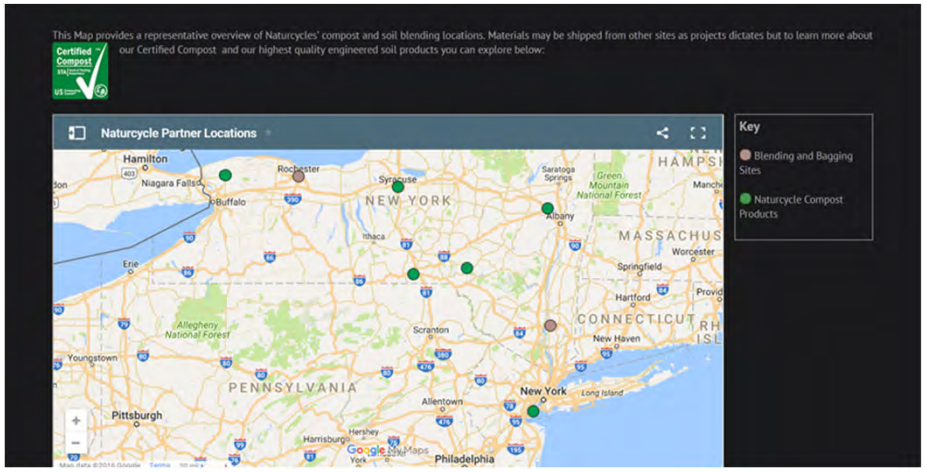
Of Naturcycle, LLC

NERC & NEWMOA Webinar 2.23.2022

www.naturcylce.com

Overview

- Who is Naturcycle, LLC?
- Compost Test Data and Quality Determination
- Top Dressing with Compost
- Specialty Soil Markets
- Green Roof Media



Naturcycle, LLC

- is working with people like you in "Restoring Earth."
- Brokers compost for a number of municipal and private compost producers around the Northeast
- Provide expertise in compost use, manufacturing and end uses.
- Manufactures a variety of quality engineered soils like Green Roof Media, Bio-Retention Mixes and many other blends from multiple sites.
- Offers value engineering on a variety of soil or compost designs

www.naturcycle.com

OR Follow us on

What is Compost ? - Compost Defined

- **A humus-rich soil amendment made by the controlled biological decomposition of organic materials**
- Made from organic wastes like yard trimmings, organic by-products, industrial residuals, food scraps, animal manures, biosolids.
- Must go through an aerobic heating process to be biologically stable and mature.
- Can improve biological, physical and chemical characteristics of soils

The United States Composting Council Seal of Testing Assurance Program

- **Started in 2001 as a research project that was reviewed and published by USDA as an official document called the TMECC – Test Methods for the Examination of Composting and Compost (TMECC)**
- **Like ASTM specifically for compost**
- **Basis of design for many DOT's, Landscape Architects and more**
- **Provides Apples to Apples Comparisons, overcoming laboratory and regional differences in compost analysis. Requires testing based on facility size, approve labs only**

Article …. Biocycle Magazine C. Duprey Dec 2019
https://www.biocycle.net/comparison-compost-laboratory-results/

What is well made compost? Look for STA

- Stable – low biological activity level (Respirometry vs Solvita)
- Mature – aged for optimum plant growth (Bioassay)
- Health & Safety factors for humans (Pathogens Heavy Metals)
- Organic matter content –

  25-75% (Depends on ap)
- Moisture content
- pH – 5.5-8.0 (Depends on ap)
- Soluble Salts - < 6 mmhos/cm

US Composting Council
Seal of Testing Assurance

Certified Compost ™
STA | Seal of Testing Assurance
US Composting Council®

Good Parameters and Current Testing USCC Seal of Testing Assurance Participation

US COMPOSTING COUNCIL
Seal of Testing Assurance

Village of Endicott WWTP
Philip Grayson
1009 E Main Street
Endicott, NY 13700
607-757-2457

Product Name: **Naturecycle Compost "E"**
Sample Date: **9/16/21 11:30 AM**
Receive Date: **9/17/21 12:18 PM**
A & L Lab Number: **38287**
A & L Report Number: **F21260-6516**

COMPOST TECHNICAL DATA SHEET

A & L Great Lakes Laboratories, Inc. 3505 Conestoga Drive Fort Wayne IN 46808

Compost Parameters	*Method*	*Reported as (units of measure)*	*Test Results*	*Test Results*
Plant Nutrients:		%, weight basis	%, wet weight basis	%, dry weight basis
Nitrogen	TMECC 04.02-D	Total N	0.64	2.10
Phosphorus	TMECC 04.03-A	P_2O_5	2.01	6.53
Potassium	TMECC 04.04-A	K_2O	0.17	0.54
Calcium	TMECC 04.05-CA	Ca	1.05	3.42
Magnesium	TMECC 04.05-MG	Mg	0.09	0.29
Moisture Content	TMECC 03.09-A	%, wet weight basis	69.37	
Organic Matter Content	TMECC 05.07-A	%, dry weight basis	62.96	
pH	TMECC 04.11-A	pH units	6.1	
Soluble Salts *(electrical conductivity EC_5)*	TMECC 04.10-A	dS/m (mmhos/cm)	1.80	
Particle Size	TMECC 02.02-B	% < 9.5 mm (3/8 in.), dw basis	98.11	
Stability Indicator *(respirometry)*				***Stability Rating:***
CO_2 Evolution	TMECC-05.08-B	mg CO_2-C/g OM/day	0.7	Very Stable
		mg CO_2-C/g TS/day	1.4	
Maturity Indicator (bioassay)				
Percent Emergence	TMECC 05.05-A	average % of control	100	
Relative Seedling Vigor	TMECC 05.05-A	average % of control	100	
Select Pathogens	TMECC 07.01-B	PASS/FAIL: per US EPA Class A standard, 40 CFR § 503.32(a)	PASS	*FecalColiform*
Trace Metals	TMECC 04.06	PASS/FAIL: per US EPA Class A standard, 40 CFR § 503.13, Tables 1 and 3.	PASS	*As, Cd, Pb, Hg, Mo, Ni, Se, Zn*

US COMPOSTING COUNCIL
Seal of Testing Assurance

MCMUA PARSIPPANY COMPOST FACILI
500 West Hanover Ave
Parsippany NJ 07054
973-285-8389

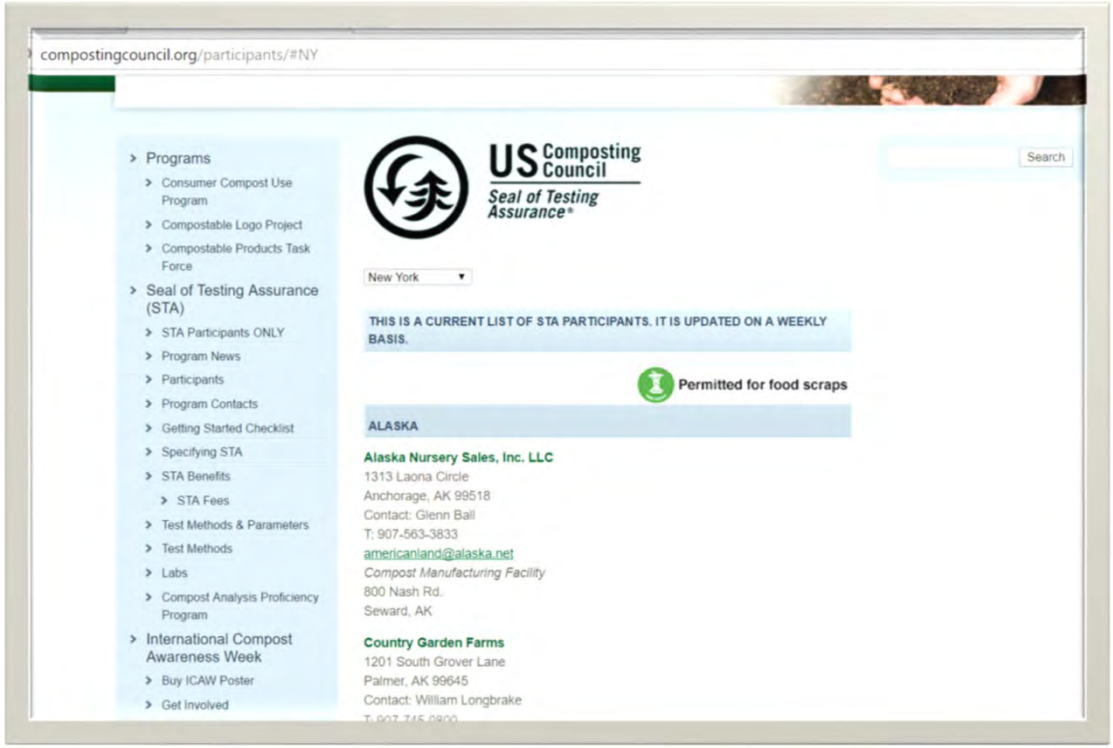
Product Name: **Naturecycle Compost PT**
Sample Date: **6/15/21 12:30 PM**
Receive Date: **6/16/21 10:15 AM**
A & L Lab Number: **36071**
A & L Report Number: **F21167-6505**

COMPOST TECHNICAL DATA SHEET

A & L Great Lakes Laboratories, Inc. 3505 Conestoga Drive Fort Wayne IN 46808

Compost Parameters	*Method*	*Reported as (units of measure)*	*Test Results*	*Test Results*
Plant Nutrients:		%, weight basis	%, wet weight basis	%, dry weight basis
Nitrogen	TMECC 04.02-D	Total N	0.60	1.67
Phosphorus	TMECC 04.03-A	P_2O_5	0.17	0.48
Potassium	TMECC 04.04-A	K_2O	0.21	0.59
Calcium	TMECC 04.05-CA	Ca	1.05	2.90
Magnesium	TMECC 04.05-MG	Mg	0.27	0.74
Moisture Content	TMECC 03.09-A	%, wet weight basis	63.96	
Organic Matter Content	TMECC 05.07-A	%, dry weight basis	53.56	
pH	TMECC 04.11-A	pH units	7.4	
Soluble Salts *(electrical conductivity EC_5)*	TMECC 04.10-A	dS/m (mmhos/cm)	1.27	
Particle Size	TMECC 02.02-B	% < 9.5 mm (3/8 in.), dw basis	94.25	
Stability Indicator *(respirometry)*				
CO_2 Evolution	TMECC-05.08-B	mg CO_2-C/g OM/day	0.2	Very Stable
		mg CO_2-C/g TS/day	0.3	
Maturity Indicator (bioassay)				
Percent Emergence	TMECC 05.05-A	average % of control	100	
Relative Seedling Vigor	TMECC 05.05-A	average % of control	100	
Select Pathogens	TMECC 07.01-B	PASS/FAIL: per US EPA Class A standard, 40 CFR § 503.32(a)	PASS	*FecalColiform*
Trace Metals	TMECC 04.06	PASS/FAIL: per US EPA Class A standard, 40 CFR § 503.13, Tables 1 and 3.	PASS	*As, Cd, Pb, Hg, Mo, Ni, Se, Zn*

Composting Council & Seal of Testing Assurance Program *compostingcouncil.org*



- Nationwide Trade group
  - 1000 plus Members
  - 325 Products in STA
- Sets independent standards and created the TMECC to standardize compost analysis Nationwide in 2001

Best ways to Specify Compost… USCC STA

Specifying United States Composting Council Seal of Testing Assurance Compost

LOW pH Specified

1. Soil Amendments – Compost

Compost is a product manufactured through the controlled aerobic, biological decomposition of biodegradable materials. The product has undergone mesophilic and thermophilic temperatures, which significantly reduces the viability of pathogens and weed seeds, and stabilizes the carbon such that it is beneficial to plant growth. It should meet or exceed all New York State Department of Environmental Conservation standards, and come from a facility that is registered and or permitted by said department.

Physical/Chemical Requirements Property Test Method Requirements for Compost Specifications

Required Ranges	Test	Test Method**	Units
5.0 to 7.0	pH	TMECC 04.11-A	pH
Less than 5.00	Soluble Salts	TMECC 04.10-A	dS/m (mmhos/cm)
25-50%	Moisture Content	TMECC 03.09-A	% Wet Weight Basis
Greater Than 60%	Organic Matter Content	TMECC 05.07-A	% Dry Weight Basis
Emergence: Greater than 90%	Maturity	TMECC 05.05-A	% Relative to Positive Control
Vigor: Greater than 85%	Maturity	TMECC 05.05-A	% Relative to Positive Control

STA Specifications Continued

"Stable or Very Stable"	Stability	TMECC 05.08-B	mg CO2-C/g OM per day
Greater than 96%	Particle Size^^	TMECC 02.02-B	% Dry Weight Basis
Pass	Pathogen	TMECC 07.01-B	Pass/Fail
Pass	Trace Metals	TMECC 04.06	Pass/Fail
Less than 0.50 %	Foreign Material	TMECC 03.08-A	% by Weight

**All methods are from the Test Methods for the Evaluation of Compost and Composting (TMECC).

^^ Particle size is based on passing a 9.5 mm screen roughly 3/8" 95% plus passing is common

Standard of Compost Quality:

1. Standard of quality shall be Naturcycle Compost™ as distributed by:
   Naturcycle, LLC PO Box 97, Plainville, NY 13137
   www.naturcycle.com or 315-707-8955

   Or Architect/Engineer approved equal.

2. Approved compost must demonstrate involvement in the US Composting Seal of Testing Assurance (STA) Program via a certified independent analysis as provided by a laboratory participating in STA Program. Along with being a participant in good standing and the ability to produce the required annual test reports. A recent STA Technical Data Sheet is required to be submitted prior to shipment of compost.

Looking at two compost Markets

Top Dressing (Direct Soil Uses)

Engineered Soils (Indirect)

- **Direct Compost Uses**
  - **Erosion control methods like compost blankets, berms, filer socks, Top Dressing**
- **In-Direct Compost Uses**
  - **Amending soils on or off site, mixes like potting mixes**

Top Dressing with Compost

Top dressing means applying a thing layer of a highly stable, well made compost finely screened on top of existing stands of Turf Grass

- athletic fields
- Golf course (Fairways and rough areas not often on Tee Boxes or Putting Greens)
- - residential lawns
- Commercial lawns

Common Parameters by TMECC

- Ph 6-7.5
- Organic Mater High (More then 25%)
- Low Soluble Salts preferred
- Confirmed stability and maturity
- Screened material is essential to ensure a small size like 3/8 inch , ¼ Inch or smaller
- Dry, friable, easily spread

Can require special equipment

Spreaders or Blower truck applications

Top Dressing Tips

Apply a 1/4 Inch to ½ Inch layer in most cases

Spread to avoid very hot dry conditions can burn turf

Water in, mow in, drag in where possible

Mowing before first use

Engineered Soils as market for Compost

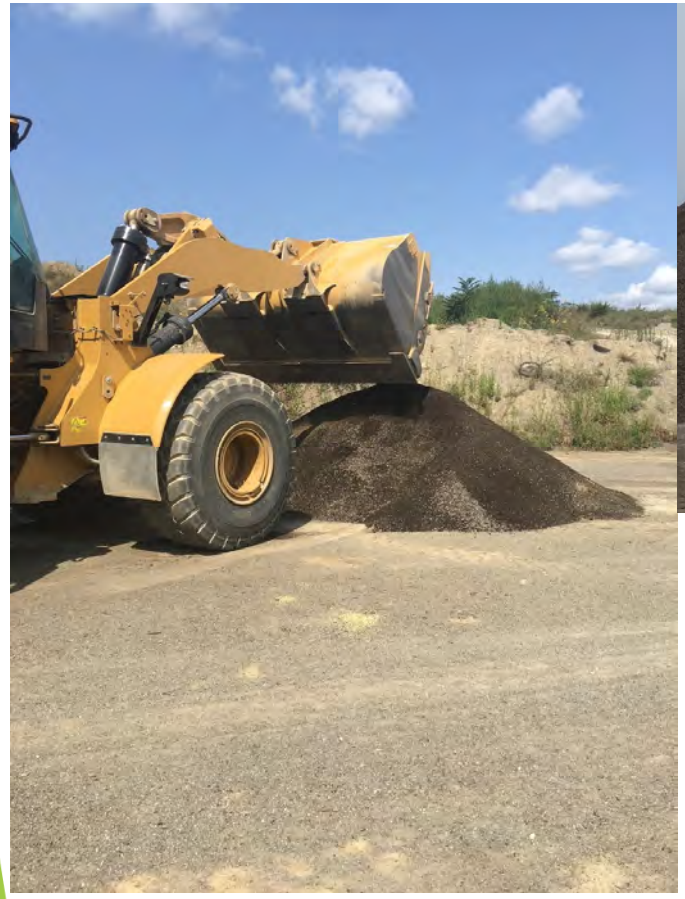
- Often onsite soils aren't suitable (Contaminated, poor characteristics, not enough available)
- Design a soil to meet your needs
- Always included detailed test methodology for each parameter
- Reasonable QC testing frequency
- Request details on amendments

Things to Remember

- requires high level of knowledge
- Can require large volumes
- Can be long lead time
- Compost needs to be consistent
- Cant Make Compost pH 7 this year 8 next !

- **Why Compost**
  - **Provides Organic matter**
  - **Improves soil structure**
  - **Can buffer soil pH**
  - **Increase Cation Exchange (Critical for plant nutrient uptake)**
  - **Can provide Nutrients**

Soil Manufacturing's as a business and compost market (Indirect use)



Customer could be a site work contractor, landscaper, nursery, landscape supply yards

One Specific Example …
Green Roof Media with Compost

- Green Roof media is a mix of in-organic lightweight materials and organic matter
- It is intended to be “Soil” Less
- Mainly researched from European designs
- Highly specialized blends of lightweight aggregates, sand and compost
- Only the highest quality compost is used

FLL Guidelines – Green Roof Media Specifications

Summary of selected FLL* guidelines for green roof media.

Analysis	Unit	Intensive	Single-Course Extensive	Multi-Course Extensive	Drainage Course
Particle size distribution					
< 0.063 mm	mass %	≤20	≤10	≤15	≤10
Water and air management					
Maximum water holding capacity	vol %	45 - 65	20 - 65	35 - 65	-
Air-filled porosity at max water holding capacity	vol %	≥10	≥10	≥10	-
Water permeability Kf	cm/s	0.0005 - 0.05	0.1 - 0.67	0.001 - 0.12	≥0.3
	in/min	0.0118 - 1.18	2.36 - 15.8	0.024 - 2.83	≥7.08
pH value and salt					
pH CaCl2	-	6.0 - 8.5	6.0 - 8.5	6.0 - 8.5	6.0 - 8.5
salt (water extract)	g(KCl)/L	≤2.5	≤3.5	≤3.5	≤2.5, ≤3.5
Organic Matter	g/L	≤90	≤40	≤65	-
Nutrients					
P_2O_5 (CAL)	mg/L	≤200	≤200	≤200	-
K_2O (CAL)	mg/L	≤700	≤700	≤700	-
Mg ($CaCl_2$)	mg/L	≤200	≤200	≤200	-
NO_3 + NH_4 ($CaCl_2$)	mg/L	≤80	≤80	≤80	-

Forschungsgesellschaft Landschaftsentiwicklung Landschaftsbau (FLL). 2008. Guidelines for the Planning Execution and Upkeep of Green-Roof Sites

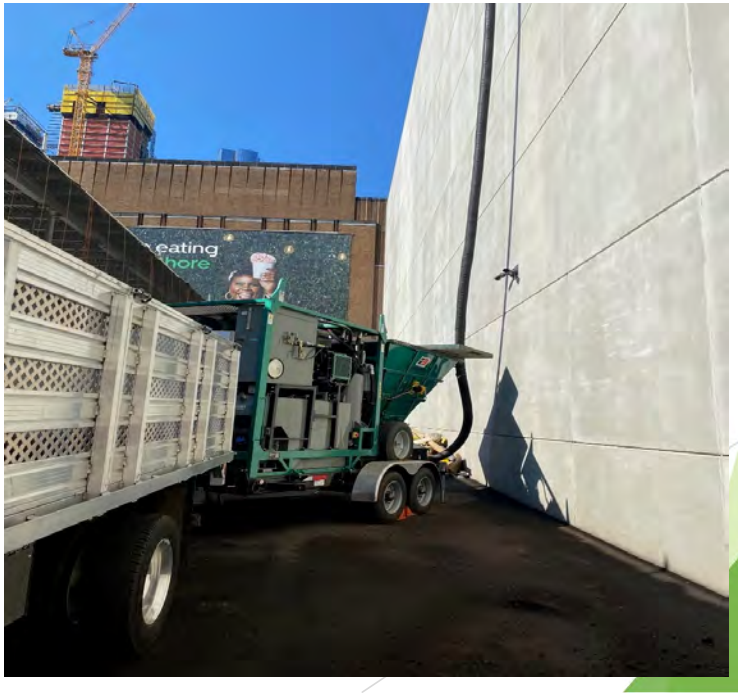
Never just specify ASTM E2399 !!! Need more parameters like OM, Infiltration, pH ect..

All I need is the dead weight calculation ASTM E2399 (about 4 years later)

Javits Center Expansion Summer 2021!

- Intensive Green Roof Media
- Blown in Place
- Plants and Orchard of NYS Apple Trees

- Urban Agricultural Blend
- Tailored with Brooklyn Grange
- Made using NYC made compost
- More Organic rich media then a traditional intensive media



Questions?

Thank You for your time today.

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