



# Compost Testing Standards and Increasing Compost Demand

By Charles Duprey,  
President

Of Naturcycle, LLC

For VORS 2020

# Overview

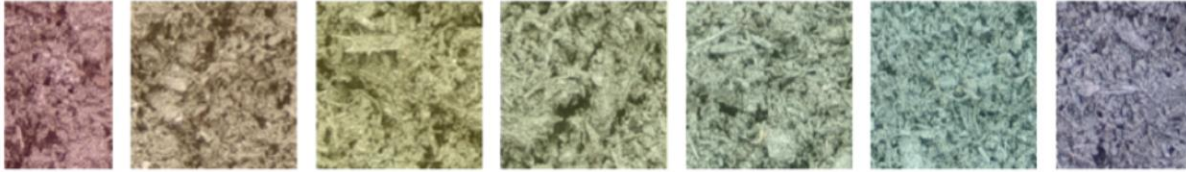
- ▶ Why develop standards?
- ▶ A brief overview of STA program
- ▶ Naturcycle Research on Compost testing
- ▶ Examples of programs to develop standards and cause growth

# Why develop standards at all...

- Use of or Marketing a product successfully requires a “common language.”
- If each Tire manufacturer had a different way to measure a tire P 255 / 35 / R20 how could we buy or use safely as consumers?
- Creating Nationwide, universal standards tailored to the product is key to growth.
- Provides regulators, and consumer the tools, repetition and ease of use that is **key to wider adoption.**
- **What options are there for Compost???**



# Comparison Of Compost Laboratory Results



**I**N August 2001, many years of work came to fruition with the formal completion of the Test Methods for the Examination of Composting & Compost (TMECC). Nearly 20 years after publication of this document, more than a dozen laboratories formally adhere to the nationwide TMECC standards. As compost use increases, compost manufacturers, architects, engineers, and other users, along with regulators, recognize and accept these testing methods as the basis of understanding of compost composition and appropriate use.

All compost test results and lab analyses, however, are not based on the same standards. The TMECC standards are widely adopted, but are not truly universal. Many laboratories around the country use different standards to evaluate important compost parameters that are critical to soil, plant health and the successful use of compost. These methods are neither

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*Identical samples of  
two composts were  
sent to 6 labs for  
testing and analysis.  
Results highlight  
differences between  
using the national  
TMECC standards  
versus other test  
methods.*

*Charles Duprey*

the Compost Analysis Proficiency (CAP) Testing Program. To this day, the CAP program operates behind the scenes to "provide the compost laboratory analysis industry with an inter-laboratory Quality Analysis/Quality Control program." It is currently managed by Dr. Robert Miller of Colorado State University and provides the comparative data needed to measure the performance and precision of the TMECC analytical methods. The US Composting Council's Seal of Testing Assurance Program and Certified Compost emerged from the TMECC standards as an independent analysis of finished compost by participating TMECC labs that are regulated by the CAP Testing Program.

The CAP concept operates on split blind samples collected by sites nationwide. Samples are sent to Colorado State, where Dr. Miller does the splits and then sends them to the participating laboratories on a regular basis. He evaluates and compares test results on

# BIOCYCLE

► <https://www.biocycle.net/comparison-compost-laboratory-results/>

# Three key parameters: pH, Soluble Salts, Organic Matter

**Table 1. A&L Great Lakes Lab<sup>1</sup>**

	A1	A2	B1	B2
Moisture (%)	24.38	24.07	58.85	58.59
Solids (%)	75.62	75.93	41.15	41.41
pH	7.10	7.10	7.80	7.80
Soluble salts (dS/m)	6.76	6.93	1.38	1.35
Organic matter (%)	76.32	76.88	50.84	50.86

<sup>1</sup>Participates in TMECC Compost Analysis Proficiency Testing Program

**Table 2. Lab #1**

	A1	A2	B1	B2
pH	7.00	7.00	8.10	8.20
Soluble salts (dS/m)	4.63	4.81	0.92	0.82
Organic matter (%)	33.60	30.60	18.24	26.42

**Table 3. Lab #2**

	A1	A2	B1	B2
Moisture (%)	26.60	26.60	60.00	59.90
Solids (%)	73.40	73.40	40.00	40.10
pH	6.85	6.84	7.08	7.10
Soluble salts (mmho/cm)	11.50	10.89	2.88	2.90
Organic matter (%)	71.20	72.70	40.50	44.20

**Table 4. Lab #3**

	A1	A2	B1	B2
Moisture (%)	26.06	26.01	59.60	60.87
Solids (%)	73.94	73.99	40.40	39.13
pH	7.40	7.40	7.50	7.60
Soluble salts (mmho/cm)	3.20	3.10	0.50	0.40
Organic matter (%)	73.71	73.32	45.18	45.05

**Table 5. Lab #4**

	A1	A2	B1	B2
Moisture (%)	22.60	22.60	52.20	58.80
Solids (%)	77.40	77.40	47.80	41.20
pH	7.09	7.11	7.51	7.63
Soluble salts (dS/m)	10.10	9.90	8.00	8.20
Organic matter (%)	72.80	71.40	46.30	43.70

**Table 6. Lab #5**

	A1	A2	B1	B2
Moisture (%)	26.30	25.40	58.30	60.70
Solids (%)	73.70	74.60	41.70	39.30
pH	7.39	7.48	8.18	8.18
Soluble salts (mmho/cm)	19.50	15.90	1.93	1.91
Organic matter (%)	75.50	75.20	43.40	49.90



# *Other standard concepts?*

- ▶ OMRI or NOFA Standards
  - ▶ Non-standardized testing
  - ▶ No required testing interval
- ▶ Just use one dedicate testing site
  - ▶ Ties all producers to one facility
  - ▶ Doesn't necessarily provide data relevant to other labs
  - ▶ IE Dedicating a State University
  - ▶ Also could cause backlogs and delays due to volume of testing
- ▶ Field testing options as a standard
  - ▶ Solivita maturity - field test, expensive and takes some expertise to use
- ▶ Focus only on finished soils?
- ▶ Develop own testing methods?





# The United States Composting Council Seal of Testing Assurance Program

- ▶ Nine working groups in the late 1990's reviewed existing science and methods to develop the TMECC.
- ▶ Completed in 2001 after peer review of *Test Methods for the Examination of Composting & Compost* (TMECC).
- ▶ Nationwide standard of compost testing methods and laboratory proficiency testing for universal standards (CAP)
- ▶ These test methods then become the basis for the Seal of Testing Assurance Program and the Compost Technical Data Sheet (ASTM for compost).



**US Composting  
Council**  

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***Seal of Testing  
Assurance***





**US COMPOSTING  
COUNCIL**

*Seal of Testing  
Assurance*

**Morris Co NJ Mun. Utilities Authority**

ATTN: Charles Duprey  
500 West Hanover Ave  
Parsippany NJ 07054  
315-707-8955

*Product Name:* Naturcycle Compost "PT"

*Sample Date:* 6/29/20 10:00 AM

*Receive Date:* 6/30/20 10:20 AM

*A & L Lab Number:* 26171

*A & L Report Number:* F20182-6506



# COMPOST TECHNICAL DATA SHEET

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

<i>Compost Parameters</i>	<i>Method</i>	<i>Reported as (units of measure)</i>	<i>Test Results</i>	<i>Test Results</i>
Plant Nutrients:		%, weight basis	%, wet weight basis	%, dry weight basis
Nitrogen	TMECC 04.02-D	Total N	0.54	1.45
Phosphorus	TMECC 04.03-A	P <sub>2</sub> O <sub>5</sub>	0.17	0.46
Potassium	TMECC 04.04-A	K <sub>2</sub> O	0.20	0.53
Calcium	TMECC 04.05-CA	Ca	1.23	3.27
Magnesium	TMECC 04.05-MG	Mg	0.38	1.02
Moisture Content	TMECC 03.09-A	%, wet weight basis	62.50	
Organic Matter Content	TMECC 05.07-A	%, dry weight basis	55.24	
pH	TMECC 04.11-A	pH units	7.5	
Soluble Salts <i>(electrical conductivity EC<sub>s</sub>)</i>	TMECC 04.10-A	dS/m (mmhos/cm)	1.16	
Particle Size	TMECC 02.02-B	% < 9.5 mm (3/8 in.), dw basis	89.77	
Stability Indicator <i>(respirometry)</i>			Stability Rating:	
CO <sub>2</sub> Evolution	TMECC 05.08-B	mg CO <sub>2</sub> -C/g OM/day	1.2	Stable
		mg CO <sub>2</sub> -C/g TS/day	1.6	



Maturity Indicator (bioassay)



# The USCC

## Seal of Testing Assurance Program

- ▶ Don't have to be a USCC Member to enroll (some savings)
- ▶ Allows for a small facility fee that produces less than 2500 tons annually of compost
- ▶ Everyone is required to test at least 3 times per year (4 minus 1 quarter winter exemption)
- ▶ Number of tests depends on size of compost production
- ▶ A number of laboratories to choose from Penn State, Delaware, A&L
- ▶ Dozens of state adopt this standard
- ▶ Could Vermont DEP and DOT adopt one standard
- ▶ Could local municipalities adopt a standard to drive compost use?

# Flexibility and Standardization

If we are to adopt a common language of testing and analysis on a regular basis then we can distribute and speed use of said compost

Local or Regional Specifiers like a project Engineer can review a standard amendment plan, to a written guidance, like a cake baking recipe.

Compost can address a number of soil characteristics or stormwater control aspects that are very important

- Improve Soil Organic Matter
- Buffer pH
- Add Nutrients
- Capture Stormwater
- Reduce Erosion, Stabilize Slopes - IE Compost Blanket
- Increase Cat Ion Exchange



**COMPOST provide Physical, Chemical and Biological Soil benefits and that's the American Association of Plant Food Control Officials**

# New York State Department of Transportation September 1, 2018 Specification

2 Micron

0 to 20

## 2. Topsoil -Lawn

-The pH of the material shall be between 5.5 and 7.6.

-The organic content shall be not less than 6% or more than 12%

<b>Gradation:</b>	
Sieve Size	Percent Passing by Weight
1 inch	100
No. 10	90 to 100
No. 40	45 to 80
No. 200	25 to 70
2 Micron	5 to 35

# NYS DOT allows for a soil amendment plan to achieve performance goal

- ▶ Add % of compost by volume to achieve final soil organic matter target without re-testing
- ▶ Requires STA Compost participation and or tested to TMECC Standards. That's how you can do this state wide with many different soils and composts
- ▶ An expert in the field like a soil laboratory, compost producer or soil scientist can calculate a recommended rate
- ▶ It does not address infiltration, nutrients or other important Bio-retention factors

## Infiltration

- ▶ Lab verse Field analysis
  - ▶ Directly relates to compaction
  - ▶ ASTM F1815 is a common analysis for Saturated Hydraulic Conductivity should be paired with compaction rate ASTM D698 like 85% at proctor
- ▶ Sand particle shape effects results often (Rounded vs angular)

# Other states Compost Use Goals

## ▶ Colorado - Focus on Water Savings

### ▶ Fort Collins

- ▶ Adopted land use code in 1998 requiring use of compost at new building and development sites and expanded rule to municipal code in 2003
- ▶ Ordinance NO 084, 2003 - Requirements for soil amendments
  - ▶ [https://citydocs.fcgov.com/?cmd=convert&vid=3&docid=580208&dt=ORDINANCE&doc\\_download\\_date=JUN-03-2003&ORDINANCE\\_NO=084](https://citydocs.fcgov.com/?cmd=convert&vid=3&docid=580208&dt=ORDINANCE&doc_download_date=JUN-03-2003&ORDINANCE_NO=084)
- ▶ The ordinance requires building permit holders to incorporate soil amendments into at least 6 inches of soil in any turfed or landscaped area, at a min rate of 3 cu yds/1000 sq ft of area to be planted.
- ▶ Greeley, Boulder, Castle Rock, Colorado Springs and Westminster have also adopted this ordinance

Denver Water also implemented rule in 2008 (though not legally able to do so)

- ▶ Operating rule 14.02.4
- ▶ Soil amendment for irrigation of turf at newly licensed premises
- ▶ All new residential, commercial, government and industrial properties within Denver Water's service area are required to amend soils with 4 cy of composter per 1000 sq ft of permeable area incorporated to a depth of 6 inches
- ▶ Denver Water hasn't been able to quantify the impact of the rule on water savings (no study done/no measurements monitored), however they assume that compost-amended soils end up using 25% less water.
- ▶ <https://www.denverwater.org/contractors/construction-information/soil-amendment-program>





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## SB 1383 Procurement Factsheet

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*The following is based on the April 20, 2020 proposed CalRecycle regulations for SB 1383.*

### **Key Facts:**

- Starting January 1<sup>st</sup>, 2022, each jurisdiction in California must procure products generated from recovered organic waste
- The product procurement requirement is 0.08 tons of organic waste per person
- Jurisdictions (according to Article 12 of SB1383, is a city, a county, or a city and county) must directly procure products for use or giveaway, AND/OR require a contracted service provider to procure products
- Eligible products are:
  - Renewable Gas (transportation, electricity, or heat)
  - Electricity from biomass conversion
  - Compost
  - Mulch



# Common Language Leads to Compost use growth

The latest Vermont Transportation Department call out the TMECC as a method of testing standards

Texas went from 10-15 STA Producers to over 100 with TXDOT adoption

NYS has seen steady growth of 1-2 new enrollees per year to about 20 currently

Better applications for Agriculture, Transportation and more

# Questions?

Thank You for your time today.

Charles D. Duprey, President

[cduprey@naturcycle.com](mailto:cduprey@naturcycle.com)

315-707-8955 Office

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



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