



GS-20 Program Response to Comments

Draft Criteria Document for 3M Chemical Dispensing Systems

April 13, 2020

Green Seal is committed to transparency in standard development, which includes maintaining a platform for stakeholder input. The Environmental Innovation Program, within which Green Seal develops Criteria for Environmental Innovation, also includes critical public engagement, in which Criteria is published for public comment.

The Proposed Criteria Document for 3M Chemical Dispensing Systems was published for public comment from June 6 to June 27, 2019. We appreciate those who participated in this process and provided valuable input, which resulted in improvements and clarifications to the Criteria Document.

Green Seal appreciates those individuals and companies that submitted input, which has strengthened and improved 3M's Chemical Dispensers Criteria Document. The following stakeholders submitted comment.

Buckeye International
Diversey
Hydro Systems

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Overview of Comments and Green Seal’s Responses

Below is an overview of Green Seal’s responses by category and the details of any actions taken in response to stakeholder input.

1. Performance Test Methodology and Sample Size

Commenters raised questions regarding the comparative performance testing methodology, the process for selecting water pressure test ranges, whether blind testing was conducted, the number of data points collected for each constant to ensure statistical significance, and related comments.

Green Seal Response: The Criteria Document has been revised. Green Seal clarified several requirements including the number of chemical products included in the testing, the water pressures tested, the procurement and handling of competitor products, the number of data points collected during testing, and included data collection and testing methodology requirements as specified in certain ASTM standards.

2. Competitor Selection and Product Differentiation

Commenters raised questions regarding the selection of competitor products, Green Seal’s definition of an “industry leading” product, considerations around wall-mounted versus portable chemical dispensing systems, and requests for clarification for how products are differentiated via innovation claims.

Green Seal Response: Green Seal provided clarifications on the selection of competitor products and the innovative attributes of the applicant products within the Criteria Document. Green Seal has further defined our process for identifying “industry leading” products within this Response to Comments document.

3. First to Market Claims

Commenters stated concern about the “first to market” claims.

Green Seal Response: Green Seal has further clarified the concept of “first to market” within the Criteria Document. Green Seal has further elaborated on this concept within this Response to Comments document.

1. PERFORMANCE TEST METHODOLOGY AND SAMPLE SIZE

Comment Summary:

Commenters raised questions regarding the test methodology used to compare the applicant products to competitor products, the process for selecting water pressure test ranges, whether blind testing was conducted, the number of data points collected for each constant to ensure statistical significance, and related comments.

Comment Excerpts:

“We support certification of dispensing and dosing systems that eliminate packaging waste, prevent chemical over-consumption, reduce shipping, and prevent exposure to concentrated chemicals. The human and environmental benefits of efficient dosing and dispensing systems have been well documented and warrant 3rd party certification. However, 3M’s application for certification of Twist ‘n Fill™, Flow Control (Locking Cabinet), and Flow Control (Portable) does not provide sufficient documentation that the tests are impartial, representative, statistically significant, and reliable enough to claim those products are more accurate than the industry standard.”

“Following the selection of comparison samples, the test methods are the second most critical part of the application. Water pressure is a key factor to ensure the accuracy of dosing and dispensing systems. Manufacturers not only specify PSI for their dosing and dispensing technologies but will recommend and even install devices to modify water pressure. Given the importance of water pressure, why is the distribution of test PSI (20, 25, 30, 40, 60, 80, 100, 120) skewed toward lower pressure? Wouldn’t a normal distribution across the manufacturer’s specifications be more unbiased? How was each product, both Twist ‘n Fill™ and competitors, handled during testing? Some systems are more susceptible to over dispensing based on how the units are being held. For instance, normal ‘squeezing’ of portable units, depending on how they are held, can over-dispense chemicals. Viscosity over various pressures can also skew results. How did the viscosity compare between the 3 chemical formulas from each competitor? Similarly, the dilution rate will have an impact on accuracy range. How did the dilution factors compare? Finally, what parts of the test were conducted ‘blind’?”

“The statistical strength of the testing needs to be evaluated since this is a comparative claim. Two units per competitive system appears to be low, even if tested at 8 water pressures and in 3 unique products. A statistical test should be performed to determine if a N=2 is sufficient. Although pg 9 of the application indicates there are 192 data points per competitor, is that the case since the page also indicates that accuracy results are only used from specified pressures? For the ‘Improvement’ calculation, is there any “pairing” of the calculations by water pressure, dilution rate, bucket fill, or bottle fill? Or is the calculation performed a single time based on the average dilution error for each system?”

RESPONSE:

Test Reliability, Validity and Impartiality

Green Seal requires data and test results to validate any performance claim within any of its standards and has internal protocol for ensuring validity, impartiality, and reliability of the test data received. Data is collected, reviewed, and validated during the Certification Process, which begins once a Final Criteria Document is published.

The Green Seal Environmental Innovation Standard (GS-20) is unique in that it requires additional transparency in test methodology within the Criteria Document so that this information is accessible for review by stakeholders and public commenters.

For Chemical Dispensing Systems, in order to provide acceptable and sufficient test data, the applicant must provide the following to Green Seal during the Certification Phase, which has been clarified in the Criteria Document in response to comments received:

- A complete set of raw data collected from the tests including calculated outlier observations¹ (approximately 6,720 data points for wall-mounted systems, 5,760 data points for portable systems);
- Summarized test results, organized by chemical tested, that includes:
 - the High/Low/Average Dilution Accuracy of 40 data points at each tested PSI for each chemical product per dispensing system tested,
 - the % improved dilution accuracy at each tested PSI for each 3M Chemical Dispensing System relative to the competitor systems,
 - the average % improved dilution accuracy across pressures, per each chemical tested, for each 3M Chemical Dispensing System relative to the competitor systems

Green Seal validates performance claims for all certifications with in-house or independent performance testing to ensure the standard’s requirements are met and does not require that tests be conducted blind for any of its standards.

Sample Size / Statistical Significance

Green Seal takes seriously the comments regarding ensuring that the statistical strength of the tests is appropriately validated and significant revisions to the requirements have been incorporated to address and resolve this feedback. Below are relevant revisions to the Criteria Document.

Test Results

Results shall be calculated and interpreted adhering to the following reference standards:

- ASTM 2586: Standard for Calculating and Using Basic Statistics
- ASTM E456-13a: Standard Terminology Relating to Quality and Statistics
- ASTM E178: Standard Practice for Dealing With Outlying Observations

Conclusions from test results for improved functional performance for Dilution

¹ Outlying Observations are defined as *an extreme observation in either direction that appears to deviate markedly in value from other members of the sample in which it appears*, as listed in ASTM E456-13a, Standard Terminology Relating to Quality and Statistics, and calculated by following ASTM E178 Standard Practice for Dealing With Outlying Observations.

Accuracy, Dilution Error, and Relative Improvement in Accuracy must be statistically significant at the 95% confidence interval.

To ensure test repeatability,² the applicant must hold as many factors constant as possible when conducting the test. In this application, constants shall include:

- the laboratory where tests are conducted,
- the qualified technician conducting the tests,
- the days on which the tests are conducted (i.e., over the course of as few days as possible),
- the instruments used,
- the chemicals tested,
- the water pressures tested, and
- whether the chemicals are dispensed into a bottle or bucket.³

The Criteria Document now specifies that the applicant must include the latest model of five competitor Chemical Dispensing Systems in the test group (in addition to its own systems), and test two dispensers for its own system and each identified competitor system.

In addition, the Criteria Document has been revised to clarify that wall mounted systems must be tested against five competitor wall mounted systems, and portable systems must be tested against five competitor portable systems.

Green Seal has incorporated the following revisions to address comments regarding water pressure selection and the variety of chemicals tested. These concepts are further discussed in the Response to Comments Sections *Chemicals Tested* and *Water Pressures*.

Applicant shall conduct tests on the following chemicals for each Chemical Dispensing System:

- General Purpose Cleaner
- Disinfectant
- Glass Cleaner
- Floor Cleaner

Applicant shall test each dispenser for each chemical at the following PSIs to represent a distribution of low-, mid-, and high-end ranges of competitors' typical stated pressure ranges:

- 30
- 50
- 80

² This approach is consistent with the principles of a Repeatability (r) Test defined in ISO 5725-1: Accuracy (Trueness and Precision) of Measurement Methods and Results – Part 1: General Principles and Definitions (1994), where variables are limited and constants are maximized.

³ Each chemical shall be filled in the proper container per its typical/common use. For example, floor cleaning chemicals should be filled in a bucket whereas hard surface cleaners should be filled in a bottle.

Using the above constants and variables, the performance tests will use an N of 40 and produce approximately 6,720 data points for wall-mounted systems and 5,760 data points for portable systems. Green Seal expects that the data set will be sufficient to meet the statistical significance at the 95% confidence interval as defined within the requirements of the aforementioned standards. However, if this is not the case, additional testing to ensure statistical strength will be required.

Product Handling

To address comments regarding product handling, Green Seal made the following clarifications to the Criteria Document.

All tests must use brand new dispensers and chemical concentrate bottles, purchased as close to the beginning of testing as feasible. Common wear & tear on the dispensing units/bottles was not considered. All tests performed in corporate R&D laboratory by technical personnel, thus not factoring in common user error and wear & tear on the dispensing units/bottles.

New dispensers delivered by the manufacturer and distributor provides a procurement and delivery method similar to that of a typical customer. All new dispensers are to be used and installed per manufacturer directions and void of defects and malfunctions at the time of testing. Any observed leaks, defects, or other malfunction is grounds for removing the unit from testing and replacing with a new properly functioning dispenser. A complete data set shall be gathered from a dispenser free of defects and malfunctions.

[...]

Test measurements and readings shall be performed by qualified Laboratory personnel.

For all standards, Green Seal validates performance claims for all certifications with in-house or independent performance testing to ensure the standard's requirements are met, and does not require that tests be conducted blind.

Chemicals Tested

Green Seal has revised the requirements for the required chemicals to be tested in order to demonstrate improved dilution accuracy. The applicant must test four chemicals that incorporate the most commonly used chemicals within this market segment. A 2014 study by Kline, *Janitorial and Housekeeping Cleaning Products USA: Market Analysis and Opportunities*, 8th Edition, cites (1) General Purpose Cleaners, (2) Disinfectants & Sanitizers, (3) Glass Cleaners, and (4) Floor Cleaners as the most commonly used chemicals relevant to this application.

It is possible that basing the chemical selection on maximizing the variance of viscosity, consistency of dilution rate, or other factor would lead to a selection of different chemicals for the test; however, viscosity and dilution rate are not the driving factors for how Green Seal has determined the chemicals to be tested. Green Seal believes that ensuring the conclusions and results are relevant to a typical user of a chemical dispensing system are of paramount importance for determining an appropriate sample

set. This has led Green Seal to prioritize selecting four of the most commonly used chemicals within dispensing systems.

Water Pressures

Water pressures tested initially included PSI values within and outside competitor product ranges, though the pressures outside operating range were not included in the calculations for dilution accuracy and dilution error. This approach created confusion and has been addressed in the Final Criteria Document. Green Seal agrees with the sentiment that “*a normal distribution across the manufacturer’s specifications be more unbiased,*” and has revised the requirements within the Final Criteria Document to ensure that all test water pressures are within competitors’ stated operating ranges. Green Seal has selected PSI values at the low, midpoint, and high end of all included manufacturers’ specified pressure ranges (i.e., 30, 50, and 80 PSI) for required water pressures to be included in the dataset.

Dilution Accuracy Improvement Calculation

The Dilution Accuracy Improvement Calculation is conducted multiple times within the data set. The applicant must provide the following improvement calculations, paired in two ways:

- **PSI:** the % improved dilution accuracy at each tested PSI for each 3M Chemical Dispensing System relative to the competitor systems,
- **Chemical:** the average % improved dilution accuracy across pressures, per each chemical tested, for each 3M Chemical Dispensing System relative to the competitor systems
- **System:** the average % improved dilution accuracy across the entire 3M Chemical Dispensing System relative to the competitor systems

2. COMPETITOR SELECTION AND PRODUCT DIFFERENTIATION

Commenters raised questions regarding the selection of competitor products, Green Seal’s definition of an “industry leading” product, the attributes considered in wall-mounted and portable devices and requested clarification on product differentiation via environmental innovation claims.

Comment excerpts:

“The fundamental premise of this certification is that Twist ‘n Fill™ is more accurate than other ‘industry leading’ dosing and dispensing systems. Therefore, the method of selection of the competitive systems is a crucial element lacking description of how the competing systems were chosen or obtained. To make a valid claim that Twist ‘n Fill™ is more accurate than ‘industry-leading’ competitors, there must be a full, extensive definition of what is ‘industry-leading’. For instance, what percent of the market do the 5 competitive systems represent? How were they selected? How do we know there is no bias in the selection method? What is the representation of various dilution technologies (ie. Venturri or gravity fed) and why? When was each competitive system manufactured? How were they obtained and what was done to ensure proper handling during transport to the test facility? How many of the competitive units were dispensed from wall mounted cabinets vs portable?”

“Without knowing the exact systems 3M is comparing their system to it’s hard to know if these percentages are even realistic. If I were to compare these claims against [REDACTED] System I would say this is false. I have included a sample of a test on one of our [REDACTED] Products. This same form of testing is conducted throughout when we develop a new concentrated product. As you can see from this example, the variance from the desired dilution rate is primarily below 12%.”

“We would like to know which systems have been tested. As the world’s largest manufacturer of chemical dispensing systems, [REDACTED] is very familiar with the competitive offerings in this space. As such, we have tested the 3M systems against other systems and have not found their claims to be accurate. ... [We] will perform the same testing as outlined in this section on the identified units.”

“Finally, parts of the application appear arbitrary and capricious. The stated benefits of a more accurate dosing and dispensing system are agreed upon, but it’s not clear why there should be stipulations for ‘at least 33’ products or ‘no moving parts’ on pg 6. If a system can deliver accuracy benefits, the number of products or the means by which to do so are not relevant.”

“In many sections of the application, 3M mentions similar or comparable chemical dispensers, and that the accuracy of the 3M systems is much greater. We would like to get a list of what are considered to be the comparable dispensers.”

RESPONSE:

Nationally Recognized or Market-Leading Product Selection

Across its standards, Green Seal references “nationally recognized or market-leading product of its type” as the basis for determining competitor products appropriate for functional performance comparisons.

In general, Green Seal defines “nationally recognized” and “market-leading” as products that are commonly used, widely available, and most comparable in design and function. For all Green Seal standards, an applicant must disclose the competitor products to Green Seal to determine that the comparison set is appropriate. The competitor products selected are not publicly disclosed.

In line with Green Seal’s approach, the competitor products were selected based on a market share analysis. It is estimated that, excluding private labels, the total market share of products tested (including the applicant products) is approximately 85 percent. The selection of test products included both Venturi style and Gravity-fed products.

Product Procurement and Handling

The Criteria Document has been revised to clarify that all tests are restricted to previously un-used dispenser systems and chemical concentrate bottles. New dispensers delivered by the manufacturer and distributor provides a procurement and delivery method similar to that of a typical customer. All new dispensers are to be used and installed per manufacturer directions and void of defects and malfunctions at the time of testing. Any observed leaks, defects, or other malfunction is grounds for removing the unit from testing and replacing with a new properly functioning dispenser.

The Criteria Document has been revised to clarify that the applicant must include the latest model of five competitor Chemical Dispensing Systems in the test group, in addition to its own systems. In addition, the applicant must test two dispensers for its own system and each identified competitor system. Finally, Green Seal has clarified that wall mounted systems must be tested against five competitor wall mounted systems, and portable systems must be tested against five competitor portable systems. All systems included in the test set must be approved by Green Seal.

Product Attributes

In regard to the comment, “... *The stated benefits of a more accurate dosing and dispensing system are agreed upon, but it’s not clear why there should be stipulations for ‘at least 33’ products or ‘no moving parts’ on pg 6...*,” including the description of these attributes is not meant to communicate that the attributes are preferable and should be implemented across chemical dispensing systems in the market. Green Seal considers the referenced product attributes (described on page 4 of the Final Criteria Document) to be sufficiently relevant to the functional performance of the product. In other words, if the applicant were to alter these attributes within their products, then the functional performance test data associated with the product would no longer apply.

3. “FIRST TO MARKET” CLAIMS

Commenters cited concerns with the specifics of the first to market claims within the Criteria Document.

Comment excerpts:

“Another claim in this section states that ‘there is no system available other than the 3M Twist n Fill Chemical Management System that can offer quick interchangeability across numerous concentrates from the same device. This is not true as there are several systems on the market that perform the same function. [REDACTED].”

“3M also mentions that the use of a metering orifice in each bottle can be considered an innovation. This has been commonplace in the market for more than 10 years...As mentioned above, the 3M system is neither the first nor the only product within its functional class and use application to claim this innovation. Venturi flow control in the form of a flow washer which is used on the 3M system has been used by [REDACTED] and others for more than 10 years.”

RESPONSE:

Green Seal has revised the Final Criteria Document to clarify the first to market aspect of the innovation claim.

Regarding the comment, *“Another claim in this section states that ‘there is no system available other than the 3M Twist n Fill Chemical Management System that can offer quick interchangeability across numerous concentrates from the same device. This is not true as there are several systems on the market that perform the same function. [REDACTED],”* Green Seal does not view quick interchangeability across numerous concentrates from the same device as relevant to the innovation of significantly improved dilution accuracy. For clarity, this statement has been removed from the Final Criteria Document and its validity will not be explored or considered as part of the Phase III Certification Evaluation.

Regarding the comment, *“3M also mentions that the use of a metering orifice in each bottle can be considered an innovation. This has been common place in the market for more than 10 years...As mentioned above, the 3M system is neither the first nor the only product within its functional class and use application to claim this innovation. Venturi flow control in the form of a flow washer which is used on the 3M system has been used by [REDACTED] and others for more than 10 years,”* Green Seal has clarified within the Final Criteria Document that the first to market aspect of the innovation is the dilution accuracy itself. Importantly, the improved performance characteristics result in reduced water quality degradation and reduced risk to aquatic life, significant lifecycle impacts from the ongoing use of chemical dispensing systems.

Certain product attributes, such as use of Venturi flow or metering orifices, are only cited in the document insofar as Green Seal considers the referenced product attributes (described on page 4 of the Final Criteria Document) to be sufficiently relevant to

validity of the functional performance test data produced and used as a basis for the innovation claim. In other words, if the applicant were to alter these particular attributes of their products, then the functional performance test data associated with the product would no longer apply.