



## LEED Research and Analysis for Somat DeHydrator System

The intent of this report is to provide an analysis of the Somat DH equipment produced by Somat Company, a division of ITW, with regard to USGBC's LEED program. Somat Company produces equipment designed for institutional and commercial kitchens and food preparation facilities where organic waste is processed in a manner that diverts waste from landfills.

### **What is LEED?**

Leadership in Energy and Environment Design (LEED) is a program started by the United States Green Building Council (USGBC) to certify buildings that exhibit and incorporate sustainable design.

LEED 2009, also referred to LEED version 3, has significantly revised the methodology and requirements for LEED certification from its previous incarnations. This new LEED system has five primary rating systems:

1. LEED Building Design and Construction
2. LEED Interior Design and Construction
3. LEED Building Operations and Maintenance
4. LEED HOMES
5. LEED Neighborhood Development

The research and analysis in this document for the Somat DH system includes only the first three rating systems. This is based on a review of the product data for the Somat DH equipment which indicates that the primary function of the Somat DH is for commercial entities, and not for home or community use.

## **1. LEED Building Design and Construction**

LEED Building Design and Construction 2009 consists of three sub-categories: New Construction, Schools and Core and Shell. New Construction applies to the majority of new commercial and institutional construction and major renovations. Schools apply to all new construction and major renovation projects that involve schools for Kindergarten through twelfth grade. Core and Shell applies to new construction and major renovation projects where an Owner or Developer is providing a speculative project and has control of the exterior shell of the building and the primary systems but has little or no power over the tenancy that will actually occupy the building. It is anticipated that sometime in 2010, LEED will implement two additional sub-categories that will address Retail and Healthcare. At this time, however, these two new paths are not fully implemented and are not addressed in this report.

LEED Building Design and Construction credits are broken into seven categories: Sustainable Sites, Water Efficiency, Energy and Atmosphere, Material and Resources, Indoor Environmental Quality and Innovation in Design. The seventh category is Regional Priority; this awards additional credits for earning certain credits in the previous categories based on the needs of the region. An analysis of each of these categories and the potential impact of the Somat DH system on them is described below.

### **Sustainable Sites (SS)**

The Sustainable Sites category primarily involves issues regarding site selection, storm drainage, occupant transportation and exterior lighting. The Somat DH system does not have any impact on any credits in the Sustainable Sites category.

### **Water Efficiency (WE)**

The Water Efficiency Category involves the overall reduction of potable water for various uses, including landscaping and sewage conveyance. The Somat DH system can contribute to the credits noted below:

WE Prerequisite 1- used in conjunction with gray water system, the estimated quantity of reusable water extracted from material processed in the Somat DH machine and drained into a gray water system may be subtracted from the total annual volume of water usage. This will help the project meet this prerequisite for water use reduction.

WE Credit 1 - used in conjunction with gray water system or rainwater collection system for landscaping purposes. Water extracted from material processed in the Somat DH system may contribute to a reduction in potable water use for landscaping irrigation.

WE Credit 2 - used in conjunction with a gray water system for sewage conveyance. Water extracted from material processed in the Somat DH system may contribute to a reduction in potable water use for sewage conveyance.

WE Credit 3 - used in conjunction with gray water system, the estimated quantity of reusable water extracted from material processed in the Somat DH machine may be subtracted from the total annual volume of water usage. This Credit is an extension of the prerequisite for this category.

#### Water Efficiency (cont.)

WE Credit 4(for Schools) - Use of a Somat DH system will allow for the elimination of garbage disposals which is one of the requirements of this credit.

#### Energy and Atmosphere (EA)

The Energy and Atmosphere category concentrates on the reduction of energy usage and refrigerant management. Due to the high power requirements of the Somat DH system, it is likely that the use of this system could negatively impact credits in this category. As such, the Somat DH system will not contribute to earning any of the credits in this category.

#### Materials and Resources (MR)

The Materials and Resources category involves the use of renewable materials and waste disposal during construction. The credits in this category that involve redirecting waste away from landfills reference waste created during construction only and do not involve the waste generated by occupants of the building once it is complete. Based on this analysis, the Somat DH system will not contribute to attaining any credits in the Materials and Resources category.

#### Indoor Environmental Quality (IEQ)

The Indoor Environmental Quality category involves ventilation systems, low emitting materials, occupant comfort, daylight and acoustics. The Somat DH system will not contribute to earning any credits in this category.

#### Innovation in Design (ID)

The Innovation in Design category allows for the proposal of sustainable ideas or systems that are not addressed in any of the other categories. It is the responsibility of the design team on each project to justify the achievement of an Innovation in Design credit. It is possible that with proper documentation the Somat DH system can achieve more than one credit in this category.

ID Credit 1 - Implementation of a Somat DH system may be considered for an Innovation in Design credit. The Innovation in Design Credit is for new technologies that may not be addressed by any of the other LEED credits. There are no specific guidelines for the submission of this credit. A design team must establish that the implementation of a Somat DH system will have a beneficial impact on the environment. Each project will need to provide differing information depending on the overall size of the Somat DH system being utilized and the amount of waste processed. It is recommended that the design team provide the following information:

1. Baseline Information:

- a. Estimated amount of waste created by the facility, preferably broken into categories of recyclable and non-recyclable. The non-recyclable material must then be broken into material that the Somat DH can process and materials it cannot (i.e. metals). Case studies provided by Somat from existing facilities would be beneficial in estimating the net decrease in volume based on the material being processed.
- b. Number of trips required by a waste hauler annually based on the volume of material per trip for the quantities of non-recyclable materials indicated above. Also, the distance a waste hauler is required to travel to pick up the waste and dump it. If the project would be part of a route and is only one stop, identify any savings in mileage. Identify the typical mpg of a garbage truck. Identify the number of gallons of gas required for each trip by the waste hauler.

2. DH Impact Information:

- a. Identify the quantity of material that can be processed by the Somat DH as noted in item 1a. Based on the type of material, identify the anticipated reduction in volume and tonnage annually. If the material processed by the Somat DH system is being diverted from a landfill, whatever the preprocessed tonnage of waste going through the Somat DH will be the quantity of waste diverted from a landfill. If the processed material will be going to a landfill, utilize the anticipated volume and tonnage reduction figured above to identify the revised quantity of waste going to a landfill. Add this number to the material that cannot be processed by the Somat DH system. Subtract this number from the baseline figured in 1a; this is the total reduction of material going to a landfill.

- b. Based on the reduction in volume identified in 2a, figure the number of trips required by a waste hauler. Multiply this number by the number of miles traveled by the waste hauler per trip as figured in 1b and divide by the average miles per gallon of a waste hauler's truck. This is the reduction in gasoline consumed because of the Somat DH system. This may need to be modified based on 2c.
      - c. If the processed material is to be utilized as agricultural biomass or composted naturally, identify the recipient of the processed material. Based on distance and number of trips, factor this mileage into the potential gas savings above. A nearby recipient will provide the most benefit to attaining LEED credit.
      - d. Identify the benefit, if any, the alternative use of the processed material provides.
3. The Innovation in Design Credit can attain up to five credits for New Construction and Core and Shell projects, and four credits for School projects. Depending on the final use of the biomass material, the total amount of material diverted from landfill and the potential annual gasoline usage reduction, the number of points awarded for the use of a Somat DH system may vary.

## **2. LEED Interior Design and Construction**

LEED Interior Design and Construction is the system that is used for small renovation or tenancy situations where the scope of the project does not involve a new building or major addition. Typically, projects that occupy or modify only a portion of a building qualify for this system. For example, a shop or restaurant in a mall or the renovation of a cafeteria in a school would be suited to pursuing this LEED path because the project is unable to affect the overall building systems and can only affect what is within the confines of the space. Like LEED Building Design and Construction, this system has seven categories: Sustainable Sites, Water Efficiency, Energy and Atmosphere, Material and Resources, Indoor Environmental Quality and Innovation in Design. The seventh category is Regional Priority; this gives additional credits for earning certain credits in the previous categories based on the needs of the region. An analysis of each of these categories and the potential impact of the Somat DH system on them is described below

## Sustainable Sites (SS)

The Sustainable Sites category for interior design primarily involves selecting spaces that have incorporated the issues regarding site selection like storm drainage and occupant transportation. It does also include wastewater technologies and water use reduction, but credits may only be attained if the overall building has incorporated these items. As such, the Somat DH system does not have any impact on any credits in this category.

## Water Efficiency (WE)

The Water Efficiency category, like in the Building Design and Construction system, involves the reduction of water use. However, because the scale of a tenancy versus a whole building is significantly smaller, the impact of this credit is smaller than in Building Design and Construction. The Somat DH system may contribute to earning the credits below.

WE Prerequisite 1- Implementation of a Somat DH System used in conjunction with a gray water system will help to obtain this Prerequisite through water use reduction.

WE Credit 1 - used in conjunction with a gray water system, the estimated quantity of reusable water extracted from material processed in the Somat DH machine may be subtracted from the total annual volume of water usage.

## Energy and Atmosphere (EA)

The Energy and Atmosphere category concentrates on the reduction of energy usage and refrigerant management. Due to the high power requirements of the Somat DH system, it is likely that the use of this system could negatively impact credits in this category. As such the Somat DH system will not contribute to earning any of the credits in this category.

## Materials and Resources (MR)

The Materials and Resources category for the Interior Design system is very similar to that of the Building Design and Construction system. As such, the Somat DH system will not contribute to any credits in this category.

## Indoor Environmental Quality (IEQ)

The Indoor Environmental Quality category for the Interior Design system is very similar to that of the Building Design and Construction system. As such, the Somat DH system will not contribute to any credits in this category.

## Innovation in Design (ID)

The Innovation in Design category allows for the proposal of sustainable ideas or systems that are not addressed in any of the other categories. It is the responsibility of the design team on each project to justify the achievement of an Innovation in Design credit. It is possible that with proper documentation the Somat DH system can achieve more than one credit in this category.

ID Credit 1 - As in the LEED Building Design and Construction category for Innovation in Design, the Somat DH system may earn credits under this category; however, it is unlikely that mileage or gas reduction will play a significant role as it might in the Building Design and Construction system, since most tenancies share waste disposal with other tenants.

### **3. LEED Building Operations and Maintenance**

Unlike the two systems previously addressed, LEED Building Operations and Maintenance is not for construction projects. This system is for existing buildings who want to be recognized as environmentally friendly in their day-to-day operations. A significant portion of this system involves creating and implementing plans to prevent potential environmental hazards. As in the previous two systems, LEED Building Operations and Maintenance is broken into seven categories: Sustainable Sites, Water Efficiency, Energy and Atmosphere, Material and Resources, Indoor Environmental Quality and Innovation in Design. The seventh category is Regional Priority; this gives additional credits for earning certain credits in the previous categories based on the needs of the region. An analysis of each of these categories and the potential impact of the Somat DH system on them is described below.

#### Sustainable Sites (SS)

The Sustainable Sites category involves the implementation of maintenance procedures to improve the existing site in and around a building, including creating plans that allow for the management of pests, landscaping, and storm water management. Implementation of a Somat DH system will not contribute to attaining any credits in this category.

#### Water Efficiency (WE)

The Water Efficiency category involves implementing fixtures that reduce water use and metering to document and track water use. The Somat DH system may contribute to one credit in this category.

WE Credit 4 - Utilize the Somat DH system water discharge to provide liquid to the cooling tower. This would reduce the amount of potable water required to run the cooling tower and would contribute to achieving this credit.

#### Energy and Atmosphere (EA)

The Energy and Atmosphere category primarily involves commissioning of existing systems to verify optimal performance, measuring the performance of these systems and improving refrigerant management. The Somat DH system will not contribute to any of the credits in this category.

#### Materials and Resources (MR)

The Materials and Resources category involves two primary components, purchasing and disposal. The purchasing establishes plans to only purchase environmentally suitable products and the disposal involves the reduction of waste to landfills and recycling. The implementation of a Somat DH system will help to achieve one credit in this category.

MR Credit 7 - In conjunction with a recycling plan, a Somat DH system will greatly reduce the amount of consumable material transported to a landfill; if a 50% reduction is achieved, one credit can be obtained.

#### Indoor Environmental Quality (IEQ)

The Indoor Environmental Quality category for this system involves implementing management practices to optimize air ventilation and quality. Also involved is the implementation of environmental cleaning practices and products. The Somat DH system will not contribute to any credits in this category.

#### Innovation in Design (I D)

The Innovation in Design category allows for the proposal of sustainable ideas or systems that are not addressed in any of the other categories. It is the responsibility of the design team on each project to justify the achievement of an Innovation in Design credit. It is possible that the implementation of a Somat DH system will contribute to the achievement of a credit under this category.

ID Credit 1 - MR Credit 7 identifies the primary credit for the implementation of the Somat DH system; however, exceeding the 50% reduction required in MR Credit 7 will allow for an exemplary performance credit under ID Credit 1 if the total amount of waste diverted from landfills is 95%. Also, it is possible to propose the mileage and gas reduction as an Innovation in Design credit as noted in the LEED Building Design and Construction. Additionally, an on-site composting program could contribute to this credit.

## **General Observations**

The USGBC does not certify any manufacturers, materials or equipment and will not pre-approve credits for any situation. All credits are awarded on a per project basis. The information contained in this document is an analysis of the credits that could be obtained if the Somat DH system is properly implemented and is not a guarantee of receipt of any credits on any project pursuing LEED certification.

## **Conclusion**

The research and analysis performed for the Somat DH equipment has identified several credits that may be obtained with the installation of a Somat DH depending on the project type and the method of installation, as well as the possible installation of complimentary systems.

The following page contains a summary of the potential LEED credits that can be achieved with the implementation of the Somat DH system.

## **LEED**

### **For the Somat DH System**

**The Somat DH system may contribute to the following credits:**

#### **LEED Building Design and Construction**

1. Water Efficiency Prerequisite 1 with the implementation of a gray water system.
2. Water Efficiency Credit 1 with the implementation of a gray water system for landscaping.
3. Water Efficiency Credit 2 with the implementation of a gray water system for sewage conveyance.
4. Water Efficiency Credit 3 with the implementation of a gray water system.
5. Water Efficiency Credit 4 with the implementation of a Somat DH machine in lieu of garbage disposals. (Schools Only)
6. Innovation in Design Credit 1 with the documentation of waste diverted from landfills, reduced waste hauler travel, and the use of biomass for composting or filler material.

#### **LEED Interior Design and Construction**

1. Water Efficiency Prerequisite 1 with the implementation of a gray water system.
2. Water Efficiency Prerequisite 2 with the implementation of a gray water system.
3. Innovation in Design Credit 1 with the documentation of waste diverted from landfills, reduced waste hauler travel, and the use of biomass for composting or filler material.

#### **LEED Building Operation and Maintenance**

1. Water Efficiency Credit 4 for cooling tower liquid replacement, used in conjunction with a rainwater or gray water system.
2. Materials and Resources Credit 7 if at least 50% of waste is diverted from landfills.
3. Innovation in Design Credit 1 with exemplary performance for MR Credit 7 to divert 95% of waste from landfills. Also, the documentation of reduced waste hauler mileage and gas use and potential on-site composting of material.

All credits are awarded by the USGBC on a per project basis with appropriate supporting documentation.

Appendix 1

Somat Company Test Results and Research:

For all Water Efficiency Credits:

Below is a report of average condensate quality. These are the typical results from processing standard food wastes to include vegetables and fruit matter, breads and meat products. These results were tested against the maximum contaminant level (MCL) that has been established by state and federal authorities. The MCL is the maximum quantity of a substance allowed in safe drinking water.

Reuse of condensate from the Somat DH system for irrigation, storage, and domestic watering purposes should not pose an issue.



**Water Analysis Report**

Somat Company  
165 Independence Court  
Lancaster PA 17601

Lab Number: **169233-01**  
Date Reported: 2/25/2010  
Fax Number:

Analyte	Result	Pass/Fail	Maximum Contaminant Level	Date Analyzed	Analyst
Source: Condensate Pump Somat Company 165 Independence Court Lancaster Sampled: 2/18/2010 09:30					
Color	11 unit(s)	Pass	15 unit(s)	<sup>1</sup> 2/18/2010	rch
Detergents (MBAS)	0.15 mg/L	Pass	0.5 mg/L	<sup>1</sup> 2/18/2010	rch
Total Dissolved Solids	73 mg/L	Pass	500 mg/L	<sup>1</sup> 2/18/2010	afh
Turbidity	1.3 NTU	Pass	5 NTU	<sup>1</sup> 2/18/2010	afh
Total Suspended Solids	1 mg/L	N/A	N/A mg/L	2/18/2010	rch

***This sample was not collected by an authorized sampler.***



The Maximum Contaminant Level (MCL) has been established by state and federal authorities. The MCL is the maximum quantity of a substance allowed in safe drinking water. Some parameters have no established MCL.  
Pure-Test is certified #38-00338 by the Pennsylvania Department of Environmental Protection.

Emailed

<sup>1</sup> This parameter is not covered under PADEP accreditation. See [www.puretest.com](http://www.puretest.com) for current accreditation.

Report Approved By:  
  
Randall C High, Lab Technician

For Innovation in Design Credits:

1. Tests performed at Somat have found repeated reduction results with the Somat DH.

February 13, 2008: Test to include waste stream of raw fruits and vegetables. Waste stream provided by local distributor for testing purposes. Waste was fruits and vegetables that were past their sell-by date, but by no means rotten. The total weight of the produce was 186 lbs. The raw waste was added to the Somat DH system and was allowed to run for a full cycle. Upon completion of the cycle, weight of amendment was at 38 lbs; 15.5 gallons of condensate water was collected from this test.

February 15, 2008: Test to include waste stream of pulped raw green beans, cardboard and compostable plates and flatware. Mix percentages were 80% produce, 15% cardboard, and 5% compostable plates and flatware. Total weight of test material was 210 lbs. The waste was added to the Somat DH system and was allowed to run for a full cycle. At completion of the cycle, weight of amendment was at 47 lbs; 16 gallons of condensate water was collected from this test.

March 3, 2008: Test to include waste stream of pulped raw green beans and cardboard with a mix percentage of 60% green beans and 40% cardboard. Total weight of test material was 110 lbs. The waste was added to the Somat DH system and was allowed to run for a full cycle. Upon completion of the cycle, weight of amendment was at 23 lbs with 11.5 gallons of condensate water collected.

2. For a full list of certified composters in your area, please go to:  
[www.findacomposter.com](http://www.findacomposter.com).