



LEED Research and Analysis

for

Somat Shredder

The intent of this report is to provide an analysis of the Somat Shredder equipment produced by The Somat Company, a division of ITW, with regard to USGBC's LEED program. The 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 Shredder equipment includes only the first three rating systems. This is based on a review of the product data for the Somat Shredder equipment which indicates that the primary function of the Shredder 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 3 sub-categories: New Construction, Schools and Core and Shell. New Construction applies to the majority of new commercial and institutional construction and major renovations. A school applies 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 sixth 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 Shredder equipment 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 Shredder Equipment 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 credits under this category are based on baseline cases that include only certain fixture types such as toilets, lavatories and pre-rinse spray valves. Since the Shredder does not fit into any of these categories, it cannot be used to help obtain any of the general water-use reduction credits.

Energy and Atmosphere (EA)

The Energy and Atmosphere category concentrates on the reduction of energy usage and refrigerant management. LEED uses ASHRAE 90.1-2007 to identify baseline information for all energy requirements. It is possible that the use of a Somat Shredder may contribute to the credits indicated below:

EA Credit 1 – Use of a Shredder may contribute to option 1 of this credit if the Shredder is being used in lieu of another piece of equipment that would accomplish a similar task at a higher energy consumption. Because the Shredder does not fit precisely into any of the LEED or ASHRAE categories, it should be considered kitchen equipment under process energy items. ASHRAE allows comparisons in process energy items if documentation is provided that identifies a clear reduction in energy consumption versus conventionally used equipment. EA Credit 1 also has prescriptive options for following the ASHRAE Advanced Energy Design Guidelines. Based on a review of the ASHRAE guidelines, the Shredder does not fit easily into any of the categories listed. However, a design team may be able to submit the Shredder as part of these credit options under plug loads and appliance efficiency.

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 Shredder equipment 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 Shredder equipment will not contribute to earning any credits in this category. Also, Credit 5 of Indoor Environmental Quality may be negatively impacted because a housekeeping operation may be open to a public space. Design Teams pursuing this credit may need to provide enclosures around the shredder or provide sufficient documentation that the Shredder will not impact the surrounding air quality.

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 Shredder system can achieve a credit in this category.

ID Credit 1 – Implementation of a Somat Shredder 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 Shredder will have a beneficial impact on the environment beyond the scope of the credits listed in the LEED Reference Guide. Each project will

need to provide differing information depending on the implementation of the Shredder 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 that the Shredder is able to process.
- b. Estimated amount of water consumed by the Shredder annually.
- c. Number of trips required by a waste-hauler annually based on the volume of material per trip for the quantities of materials indicated above that would be removed by a waste-hauler. 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. Shredder Impact Information:

- a. Identify the quantity of material that can be processed by the Shredder as noted in item 1a for general waste to a waste hauler. Based on the type of material, identify the anticipated reduction in volume and tonnage annually that the use of the Shredder will provide. If the material processed by the Shredder is being diverted from a landfill, whatever the preprocessed tonnage of waste going through the Shredder 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. 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 Shredder. 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. Based on the amount of water utilized in 1b, subtract the amount of water that would be utilized annually for a similar operation and this will provide the amount of water saved through use of the Shredder.
- e. Identify the benefit, if any, the alternative use of the processed material provides.

3. The Innovation in Design Credit can attain up to 5 credits for New Construction and Core and Shell projects, and 4 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 Shredder 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 are 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 sixth 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 Shredder equipment 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 Shredder equipment 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. Also, the Shredder does not fit into any categories for water use reduction and therefore cannot be considered for this credit. As such, the Somat Shredder will not contribute to earning any credits in this category.

Energy and Atmosphere (EA)

The Energy and Atmosphere category concentrates on the reduction of energy usage and refrigerant management. The Shredder does not contribute to any credits under this category because unlike the Building Design and Construction category, the Interior Design category does not look at an overall reduction in power, only specific areas such as lighting, lighting controls, HVAC and energy star equipment.

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 Shredder 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 Shredder will not contribute to any credits in this category. However, there should be no negative impact on 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 Shredder can achieve one credit in this category.

ID Credit 1 – As in the LEED Building Design and Construction category for Innovation in Design, the Shredder equipment 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 tenancy's 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 sixth 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 Shredder 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 Shredder 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 Shredder may contribute to 1 credit in this category.

WE Credit 2 – Water use reduction calculation for the prerequisite of this category and the levels of this category include only typical fixture types, toilets, lavatories, etc. However, if exemplary performance levels can be attained, non-typical fixtures may be counted in this credit. As such the Shredder may contribute to an additional credit if this credit is already being attained.

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 Shredder may contribute to one credit in this category.

EA Credit 1 – EA Credit 1 involves whole building electrical metering. As such, if a building already contains similar equipment, implementation of a Somat Shredder may help to obtain this credit if the Somat Shredder has lower energy consumption than the existing equipment.

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 Shredder will help to achieve 1 credit in this category.

MR Credit 7 – In conjunction with a recycling plan, a Shredder 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 Shredder will not contribute to any credits in this category. However, there should be no negative impact on 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 the implementation of a Shredder 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 Shredder, 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 Shredder equipment 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 Shredder equipment has identified several credits that may be obtained with the installation of a Somat Shredder 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 Shredder.

References

USGBC. LEED Reference Guide for Green Building Design and Construction, 2009 Edition. 2009.

USGBC. LEED Reference Guide for Green Interior Design and Construction, 2009 Edition. 2009.

USGBC. LEED Reference Guide for Green Building Operations and Maintenance, 2009 Edition. 2009.

LEED for the Somat Shredder

The Somat Shredder may contribute to the following credits:

LEED Building Design and Construction

- 1 Energy and Atmosphere Credit 1 as a part of the process energy reduction.
- 2 Innovation in Design Credit 1 with the documentation of waste diverted from landfills, reduced waste-hauler travel, water-use reduction and the use of Pulped material for composting or filler material.

LEED Interior Design and Construction

1. Innovation in Design Credit 1 with the documentation of waste diverted from landfills, reduced waste-hauler travel, water-use reduction and the use of Pulped material for composting or filler material.

LEED Building Operation and Maintenance

- 1 Water Efficiency Credit 2 for exemplary performance only.
- 2 Energy and Atmosphere Credit 1 if the implementation of the Somat Shredder provides a reduction in energy consumption over existing equipment, the annual metering required for this credit would be positively impacted.
- 3 Materials and Resources Credit 7 if at least 50% of waste is diverted from landfills.
- 4 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

For all Water Efficiency Credits:

1. Test data performed at Somat and in the field has shown that water consumption with the Eco-Shred is minimal. Compared to a food waste disposer or a pulper, the Eco-Shred uses about 60GPH whereas a food waste disposer uses 8-12GPM and, respectively, a pulper will use 1-3GPM. Gallons saved with the Eco-Shred can be as much as 660GPH.

For Energy and Atmosphere Credits:

2. Test Data and Case Studies have shown that the Somat Eco-Shred uses about 40% less energy than that of a Somat SPC-75 pulper.

For Innovation in Design Credits:

1. Provide Case Studies identifying minimum, maximum and average waste reduction by volume and weight if possible.
2. Biomass users who can contract with owners' to accept the processed material can be found at www.findacomposter.com. This would include those who compost or utilize the material for other uses.
3. Test data performed at Somat and in the field has shown that water consumption with the Eco-Shred is minimal. Compared to a food waste disposer or a pulper, the Eco-Shred uses about 60GPH whereas a food waste disposer uses 8-12GPM and, respectively, a pulper will use 1-3GPM. Gallons saved with the Eco-Shred can be as much as 660GPH.
4. Organic, microbial based additives can be used in both pulper and Eco-Shred to reduce/eliminate odors to the extent that additional venting is not required.