

Green Cleaning Program at Massachusetts Institute of Technology



Knowledge Center

APPA – An organization that provides information, training, and research For educational facilities professionals to develop and sustain the physical Environment of the institutions they serve. <https://www.appa.org/>

Carpet and Rug Institute – An institution that tests carpet cleaning solutions and equipment. Their CRI Seal of Approval program identifies the Effective ones that clean carpet right and protect a facility's carpet investment. <http://www.carpet-rug.org/>

Department of Facilities – MIT Facilities Custodial Services Department. <http://web.mit.edu/facilities/services/cleaning.html>

Eco Logo™ – The mark of Environment Canada's Environmental Choice program. It consists of 3 doves in the shape of a maple leaf. <http://www.ecologo.org/>

Green Seal™ –Green Seal is a non-profit organization that uses science-based programs to empower consumers, purchasers and companies to create a more sustainable world. <http://www.greenseal.org/>

EPA -Encourages partners to reformulate products to be environmentally safer, cost competitive, and effective. <http://www.epa.gov/>

Forest Stewardship Council U.S –FSC is an independent, non-governmental, not for profit organization established to promote the responsible management of the world's forests. <https://us.fsc.org/>

U.S. Green Building Council (USGBC) -Is a non-profit trade organization that promotes sustainability in how buildings are designed, built and operated. <http://www.usgbc.org/>

PURPOSE

Provide a Standard Operating Procedure which insures consistent, Environmentally responsible and sustainable janitorial maintenance services.

The intent of this SOP is to minimize exposure of building occupants, vulnerable occupants (occupants with asthma, pregnant women, occupants with sensitivities and allergies to certain chemicals and products, etc.), and cleaning personnel to potentially hazardous chemical, biological and particle contaminants which may adversely impact air quality, health, building finishes, facility systems or the environment. The intent is to balance each need with the cost/ quality of the SOP to provide a sustainable approach to janitorial services.

GOALS

Purchase and utilize the following within 5 years of policy implementation:

- 100% sustainable cleaning chemicals, floor care products, and carpet cleaning products meeting purchasing requirements as outlined below.
- 100% sustainable cleaning equipment meeting requirements outlined within purchasing program.

Greatly reduce hazardous spill events by implementing a useful and effective training program for maintenance personnel.

SCOPE

The scope of this document covers all normal janitorial duties that are Undertaken in the course of cleaning. This SOP includes the following:

- 1) Isolation and storage of cleaning chemicals
- 2) Sustainable Cleaning Chemicals
- 3) Sustainable Cleaning Equipment
- 4) Vulnerable Building Occupants
- 5) Use of Concentrates from Dispensing Equipment
- 6) Low impact pest-control policy – provided by *MIT*
- 7) Incident Reporting, Customer Feedback and Improved Services
- 8) *Appendix I: Specific Materials, Cleansers, Equipment*

Responsibilities

MIT's Custodial Team will maintain implement and update this document for the cleaning and maintenance of all buildings in MIT's Academic portfolio. In the event that it needs to be updated, it will be reviewed by the manager of Custodial Services for the campus and filed officially. This will be used a training guideline for the annual training for all Facilities custodial services employees.

MIT is committed to enforcement of this policy for the foreseeable future and the custodial team will actively research and update with new innovations and strategies as they arise.

REQUIREMENTS

1. The facility manager is responsible for janitorial maintenance services which reduce overall risk and provide a safe and effective work environment, while minimizing environmental impact. The attached guidelines are provided to produce this result in the area of all janitorial services including chemical usage.
2. All operations must meet local regulatory requirements at a minimum.
3. Green janitorial requirements shall be used by all the staff employed by MIT custodial services.
4. These green cleaning requirements will apply to all areas of the facility e.g. private offices, classrooms, work area, kitchen, training area, warehouse and lobbies.
5. Results of this program shall be documented by the Operations Manager and reviewed on an annual basis with *MIT Operations*. An annual report will at a minimum include chemical use listing, safety/incident review, and performance/inspection documents.
6. Standards, product registrations, and janitorial practices are constantly evolving. The MIT Operations Department will keep abreast of developments and strive for continuous improvement in performance and environmental achievement.
7. The janitorial maintenance policy is defined by the 'Green Janitorial Plan' included in this standard.

CONTACTS & REFERENCES

MIT Facilities, Custodial and Repair and Maintenance Staff

U.S. Green Building Council, "LEED for Existing Buildings: Operations and Maintenance, 2009. <http://www.greenseal.org/>

Green Janitorial Plan

The purpose and intent of the Green Janitorial Plan is to avoid exposure of building occupants and maintenance personnel to potentially hazardous chemical, biological and particle contaminants which may adversely impact indoor air quality, health, building finishes and systems, and to minimize the impact of the building janitorial program on the environment. Additionally, this Plan is intended to reduce the risk of both occupants and the company from injury and/or health problems. The promotion of high quality indoor environment will have positive beneficial effects on employee health and productivity, life-cycle building maintenance costs, and overall environment.

1) Isolation and Storage of Cleaning Chemicals

Proper isolation, storage and handling of chemicals will reduce the risk of occupant exposure to potentially hazardous materials.

- All cleaning chemicals shall be stored in isolated areas of the building.
- Hot and cold water supplies and sink drains plumbed for appropriate disposal of liquid wastes.

Only authorized cleaning personnel and the Facility Manager shall have access to the chemical storage and mixing areas.

The Facility Manager shall maintain building plan drawings indicating all areas where chemical storage and mixing occurs in the building, and shall document appropriate design and maintenance of the supporting building systems. Cleaning practices shall be reviewed annually to insure continued compliance as well as providing opportunities to incorporate improved tasks.

Custodial service has a Chemical Management System that facilitates the proper dilution of Chemical products which limits the employee exposure to chemical concentrates. Secure wall mounted Chemical dilution systems are available through the institute in custodial closets. Portable devices are available for areas where wall mounted dilution systems are not installed. Some ready-to use products are used for safety and efficiency.

Custodial Services has established a partnership with the Institute EHS (Environmental Health and Safety) that provides training to New and current employees on steps to take when encountering a Chemical Spill. The department retrains all employees yearly and gathers feedback to make improvements. The plan can also be obtain online; <https://ehs.mit.edu/site/content/chemical-spills>

2) Sustainable Cleaning Chemicals

Janitorial maintenance includes floor care, restroom care, and general cleaning. 'Sustainable Cleaning' encompasses more than the concept of minimizing exposure of personnel to potentially hazardous chemicals. To achieve leadership in environmental responsibility within janitorial maintenance systems, the Facility Manager must consider the life cycle of the building materials and maintenance methods, and incorporate concepts of total cost of performance, safety in use and application, and overall environmental impact. All stages of sustainable building maintenance can be measured for environmental performance, including product selection, installation, operation, long-term maintenance, and eventual disposal.

Environmental and safety aspects of sustainable janitorial maintenance are defined in this plan as follows:

- Facility safety, health & environmental practices must be compliant with applicable local regulatory requirements.
- The Janitorial Manager shall develop and communicate proper disposal methods for all janitorial wastes, including floor care stripping wastes

- All janitorial personnel shall be properly trained in the use, maintenance and disposal of cleaning chemicals, dispensing equipment, and packaging. Training records certifying each person's specific training dates shall be kept by the Facility Manager.
- Supplier's Material Safety Data Sheets and Technical Bulletins for all cleaning chemicals shall be provided by suppliers. The suppliers of cleaning products shall provide full disclosure of ingredients on Material Safety Data Sheets. Additionally, suppliers must provide training materials on the hazards and proper use of janitorial chemicals for workers.

"Full Disclosure" for products which are not formulated with listed suspect carcinogens is defined as (i) disclosure of all ingredients (both hazardous and non-hazardous) that make up 1% or more of the undiluted product and (ii) use of concentration ranges for each of the disclosed ingredients. "Full Disclosure" for products which are formulated with listed suspect carcinogens is defined as (i) disclosure of all ingredients (both hazardous and non-hazardous) that make up 0.1% or more of the undiluted product and (ii) use of concentration ranges for each of the disclosed ingredients. Suspect carcinogens are those which are listed on authoritative lists available for MSDS preparation: IARC, NTP, and California Proposition 65 lists. Concentration range definitions are available from the Canada WHMIS regulation.

The intent of the above disclosure requirement is to have a facility disclosure policy that is responsive to the needs of health and safety personnel. If, however, the above disclosure requirement is not met on the MSDS, then disclosure can be provided by suppliers through other means that are easily accessible to health and safety personnel.

- Low environmental impact cleaning products shall be used in accordance with the Green Seal GS-37 or Green Seal GS-40 standard and/or nationally recognized green certification (such as listed in LEED for Existing Buildings: Operations and Maintenance, EQ 3.3-3.6).

Disposable Janitorial paper products and trash liners meet all minimum requirements of one or more of the standards below.

- Plastic Trash Can liners contain 10% post-consumer recycled content.
- Green Seal GS-9 Paper Towels
- Green Seal GS-1 Standard
- Green Seal FS-1 Sanitary Paper Products
- Eco Logo CCD-082
- Janitorial paper products derived from rapidly renewable resources or made from free tree fibers.
- US EPA Comprehensive Procurement Guidelines for Paper and Plastic Liners

- **Products**

- **SCOTT® SCOTTFOLD* M Towels** 40% Post-Consumer recycled content , GS-9 certification, FS-1 Certification.
- **Scott® 2-ply Standard Roll Bath Tissue** 40% Post-Consumer recycled content , GS-9 certification, FS-1 Certification.
- **Compact® Coreless 2-Ply Bathroom Tissue** 25% Post-Consumer recycled content , GS-1 certification, Eco Logo CCD-082, LEED EB&OM MR,IEQ,IO

- We do not support the use of antibacterial hand soaps as there is now considerable research showing that the use of antibacterial agents contained in soap kill off normal bacteria, creating an environment

for resistant, mutated bacteria that can become impervious to antibiotics. No antibacterial hand soap or similar type products will be used in our facility. All of our hands soap will meet one or more of the following standards.

- Green Seal GS-41 Hand Cleaners for Industrial and Institutional Use
- Environmental Choice CCD-104 Hand Cleaners- Industrial and Institutional.

- **Products**

- - GOJo Soap certified by GS-41 and CCD-104
 - Affinity Soap by Hilliard GS-41
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- A log shall be kept that details all cleaning chemicals used or stored on the premises (stored products include those that are no longer used, but still in the building). Attachments to the log shall include manufacturer's Material Safety Data Sheets and Technical Bulletins. In locations where Green Seal is a nationally recognized standard, the log shall identify:
 - An MSDS and/or label from the manufacturer specifying that the product meets the VOC content level for the appropriate product category as found in the California Code of Regulations.
 - A copy of the Green Seal Certification.
 - When available, chemical concentrates dispensed from closed dilution systems must be used as alternatives to open dilution systems or non-concentrated products.

- Selection of flooring used in the facility, whether a new installation or replacement, shall consider all potential environmental impacts over the full life of the floor system, including raw material extraction and use, installation practices, maintenance requirements, overall useful life, hygiene, appearance and safety attributes, and eventual disposal.
- All staff and managers are encouraged to use proper hygiene throughout the space and all bathrooms are now equipped with alcohol-based, water-free cleaners for optimal, convenient hand hygiene.

3) Sustainable Cleaning Equipment

Use of sustainable cleaning equipment reduces the exposure and potential impact on building occupants from hazardous chemical, biological, and airborne particulate contaminants from standard cleaning equipment. This can potentially affect occupant health, air quality, and the building systems and indoor environment.

A sustainable cleaning equipment purchasing program will be implemented that outlines certification and performance requirements (*see Appendix for Certifications/Performance requirements*) for various pieces of cleaning equipment, including but not limited to:

- Vacuum Cleaners
- Carpet Cleaning and Extraction Equipment
- Electric- and Propane-Powered Floor Maintenance Equipment
- Automated Scrubbing Machines
- Battery-Powered Equipment

Ergonomic design will be accounted for during the purchase evaluation process, to ensure staff and maintenance personnel have minimized exposure to excess vibration, noise, and user fatigue that is potentially harmful.

Equipment will be evaluated in regards to safety (such as rollers and rubber bumpers) to both maintenance personnel and the building surfaces.

A log shall be kept that details all powered cleaning equipment purchased immediately following the program's implementation.

Janitorial personnel shall be properly trained in the use and maintenance of cleaning equipment.

4) Vulnerable Building Occupants

In order to address and protect potentially vulnerable building occupants (occupants with asthma, pregnant women, occupants with sensitivities and allergies to certain chemicals and products, etc.) MIT has established a set of SOPs that takes into account methods to minimize impacts on these groups of occupants including any potential adjustments necessary to provide a comfortable, safe environment for all building occupants.

- Building cleaning and maintenance personnel will restrict cleaning procedures and chemical use to off-peak occupancy and hours when the building will be closed to the public.

- If necessary, the frequency of cleaning and chemical use will be adjusted to meet the needs of the building's occupants, in order to minimize the exposure to potential hazards during normal occupancy hours.

5) Use of Concentrates from Dispensing Equipment

Use of chemical concentrates has several positive environmental benefits:

1. Significantly lower transportation costs between manufacturer and end-user.
2. Significantly lower use of packaging materials.
3. Lower real chemical use to obtain same performance.
4. Potentially lower exposure of maintenance personnel to hazardous chemicals.

Chemical concentrates may present higher hazards upon exposure. Proper containment, storage and dispensing are critical to avoid employee exposures. Exposure to hazardous chemicals is minimized by using closed dispensing systems. Concentrates sold for manual dilution in buckets or bottles can actually increase the risk of employee exposure.

Chemical concentrates dispensed from closed dilution systems shall be used preferentially to open dilution systems or non-concentrated products. Chemicals and their use shall comply with all directives shown in section 3.

If equipment is used to control the dilution of concentrated cleaning chemicals then a log shall be kept which includes the equipment manufacturer's technical information, as well as the date of installation, maintenance and repairs. The log shall also contain the desired dilution rates for each cleaning product and a plan for maintaining the desired dilutions on an annual basis

Janitorial personnel shall be properly trained in the use, maintenance and disposal of cleaning chemicals, dispensing equipment, and packaging.

6) Low Impact Pest-control Policy

A low-impact integrated pest management (IPM) plan will be used in the facility with the following guidelines:

- Use the least toxic chemical pesticides
- Use the minimum amount of pest control chemicals to be effective
- Use pest control chemicals only in targeted locations and for targeted species

- Use of integrated methodology is mandatory and has the following elements:
 - Site inspections
 - Pest population monitoring
 - Control evaluation for multiple control methods
 - Sanitation (cleaning chemical must meet EQ 3.4-3.6)
 - Structural repair
 - Mechanical and living biological control
 - Other non-chemical methods
 - After exhaustion of all other methods then the least toxic pesticide
 - A universal notification must be given to building occupants of no less than seventy-two (72) hours under normal circumstances and twenty-four (24) hours in emergencies before a pesticide is applied in a building or on surrounding grounds

An IMP program employs common sense strategies to reduce sources of food, water and shelter for pests in buildings and on the immediate grounds in order to minimize the use of pesticides.

7) Incident Reporting, Customer Feedback and Improved Services

In order to ensure robust accounting of any incidents, complaints or feedback from building occupants, MIT facilities has made a website to report directly to custodial services specifically regarding cleaning procedures:

https://insidemit-apps.mit.edu/apps/building_services/CreateCleaningOrder.action?sapSystemId=PS1 It is available to building occupants and all community members of MIT's campus.

This feedback mechanism ensures the highest available level of cleaning for all occupants including special populations, which may be disproportionately affected by cleaning practices. In order to encourage communication, the building occupants have all been trained in using the website and custodial hotline to ensure that their safety and wellbeing is a priority for the custodial staff.
















Appendix I: Specific Uses, Needs and Maintenance









M.I.T. Custodial Services is committed to a program of healthy, high performance cleaning. Listed below is an outline of our existing products, equipment and procedures, which make up this program.

* **Entryway systems** - all building entrances are provided with walk off mats (minimum of 10') which are vacuumed nightly and extracted on a monthly basis.

* **Cleaning Chemicals** - All cleaning chemicals are super concentrates. These chemicals are dispensed through a command center where the chemical is pre-diluted and dispensed into a spray bottle or mop bucket, as needed. This dispensing method minimizes any chemical contact with our custodial workforce. Spray bottles are color coded and number coded.

Green Approved Products

| <u>Products Name</u> | <u>Green Seal</u> | <u>Eco Logo</u> | <u>Carpet Rug Institute</u> |
|--|---|---|---|
| <u>GoJo</u> |  |  | |
| <u>Pro Strip</u> |  | | |
| <u>EvolveO2</u> |  | | |
| <u>Super Shine-All</u> |  | | |
| <u>Gloss Mate</u> | |  | |
| <u>Scrub Mate</u> | |  | |
| <u>Rest Stop Bowl Cleaner</u> | |  | |
| <u>G-Force Stripper</u> |  | | |
| <u>Purge</u> |  | |  |
| <u>Affinity Soap</u> |  |  | |
| <u>Environ star Green Floor Coatings</u> |  |  | |

| <u>Products</u> | <u>EPA</u> | <u>Eco Logo</u> | <u>Forest Stewardship Council U.S</u> |
|--|---|--|---|
| Compact® Coreless 2-Ply Bathroom Tissue |  |  | |
| Scott® 2-ply Standard Roll Bath Tissue |  |  |  |
| SCOTT® SCOTTFOLD* M Towels |  |  |  |

Environmentally Preferable Cleaning Equipment

O'Dell Echo Mop – Floor mop made from recycled PET Bottles

- Earthspun Certified Recycle

Microfiber Floor Mops – Made from microfiber

Microfiber cleaning cloth

Microfiber floor dust mops

Tennant ec-H2O – Floor Scrubbing Machine

- Electrically converted water technology, cleans floors with water only. Scrubbers equipped with ec-H2O technology use 70% less water than conventional scrubbing methods.
- Registered by NSF International
- First chemical-free scrubbing system to achieve NFSI High-Traction Certification

Tennant ReadySpace - Carpet Machine

- Low moisture carpet extraction
- Carpet and Rug Institute Certification

ProForce 1500XP – Upright Vacuum

- HEPA filter exhaust
- Carpet and Rug Institute Certification
- American Lung Association partnership

Cleaning Equipment Purchasing Requirements:

- Vacuum Cleaners: must be certified by Carpet and Rug Institute “Green Label” Testing program; sound level of less than 70dBA
- Carpet Extraction Equipment (used for restorative deep cleaning): must be certified by Carpet and Rug Institute’s “Seal of Approval” Testing program for deep-cleaning extractors.

- Powered Floor Maintenance Equipment (battery and electric powered): must be equipped with devices for capturing fine particulates; sound level of less than 70dBA.
- Propane-Powered Floor Maintenance Equipment: must have high-efficiency, low-emissions engines with catalytic converters and mufflers that meet the California Air Resources Board (CARB) or Environmental Protection Agency (EPA) standards for specific engine size; sound level of less than 90dBA.
- Automated Scrubbing Machines: must be equipped with variable-speed feed pumps and on-board chemical metering to optimize the use of cleaning fluids. Alternatively, machines must only use tap water with no added cleaning products.
- Battery Powered Equipment: must be equipped with environmentally preferable gel batteries.

Training

- All employees receive training when hired and on a yearly basis. Every employee receives a minimum of 24 hours of training per year.
- All training sessions will address: the hazards of the use, disposal, and recycling of cleaning chemicals, dispensing equipment, and packaging; in addition to the Standard Operating Procedures specific to the building and potentially vulnerable occupants.

Quality Control

- Daily Quality control Inspections

Customer Feed Back

- Customer Service Center
- Cust-Coach email

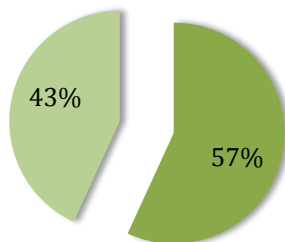
Recycling

In partnership with the Department of Facilities Sustainability a recycling program is in place, such as Single Stream Recycling and Techno Trash.

Purchasing Commitment

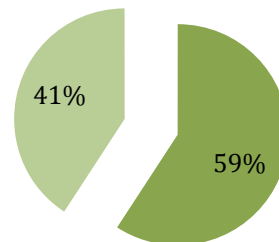
Product Usage FY 12

■ Green Products ■ Non Green Products



Product Usage FY13

■ Green Products ■ Non Green Products



Appendix II Material:

Green Cleaning

MIT has completed the following updates to our Campus Wide Green Cleaning Program:

- Incorporated a new line bio renewable cleaning products. Our current line of products (except for our disinfectant) are all Green Seal approved. The new products are Green Seal and bio renewable.
- Purchased 20 of the Activation – Ionators. These are spray bottles which take tap water and dispense electrically charge water that is a cleaning “solution”. Water holds a charge for about 40 seconds and then returns to being just water. The System is effective, safe and needs no chemicals. These units will be used by our day shift and depending on performance, the program may be expanded.
- Replaced existing scrubbers with Tennant EC H2O scrubbers. These scrubbers do not use any chemical in cleaning our floors. The EC H2O utilizes a similar technology to ActiveIon which converts tap water to a cleaning “solution” by applying an electrical charge. We currently have four of these machines and will be replacing our existing machines as they wear out.
- Replaced the standard lead acid batteries in our scrubbers with AGM (absorbent glass mat batteries). When these batteries charge there is no venting of harmful fumes. The batteries are sealed so there is no chance of any spillage. They are also more resistant to puncture and corrosion. Again, as funding allows, we will be replacing existing batteries with the AGMs.