CRITERIA FOR CERTIFICATION

ENVIRONMENTAL INNOVATION, GS-20 Edition 2.0

Sub-Category: Cleaning Equipment – Powered floor maintenance equipment

APPLICANT INFORMATION:	
Company:	Kaivac, Inc.
Product Name:	1. UniVac™ 2. AutoVac™ Stretch™
Website:	https://kaivac.com/p_113-AutoVac-Stretch

Introduction. Green Seal's Environmental Innovation Standard (GS-20) provides a framework for the certification of environmental innovations. This certification demonstrates that an independent third party has verified the innovative aspect(s) of a product results in a significant reduction of human health and environmental impacts compared to products of the same functional class, achieving innovations not previously demonstrated within a product category. Certification neither constitutes the development of a product category standard or benchmark, nor does it require competitors within a product category to use the same innovation strategies in their approach to claiming innovation.

Certification of Environmental Innovation. If the applicant can demonstrate the product conforms to all criteria within this document, Green Seal will provide a Certification of Environmental Innovation.

Innovation Claim. The applicant states that this product is able to achieve significant water use rate reductions as well as cleaning solution use rate reductions through the use of a high-flow fluid extraction method, debris filters and reuse of "grey" cleaning solution. Through this innovation, the product is able to reduce the use impacts of powered floor maintenance equipment through reduced water and cleaning solution usage.

Disclaimer. This Certification is not intended to identify all possible negative impacts and cannot rule out any unknown negative consequences from the use of this product.

Public Comment. A public comment period was held from July 6 to August 6, 2020.

OVERVIEW

1.0 Eligibility

Univac™ and AutoVac™ Stretch™ by the company Kaivac, Inc. is eligible to be certified under the Environmental Innovation Standard (GS-20, Edition 2.0) because the product:

1. Is commercially available,
2. Exists within a market that has comparable options that achieve the same function, and
3. Has lifecycle phases for which there exists published health and environmental impact information from credible sources.

Product Function

When used as intended, UniVac & AutoVac Stretch are used to clean hard surface commercial flooring. UniVac is designed to be used on hard-to-clean, heavily soiled grouted or obstructed floors, such as those found in commercial kitchens and restrooms. AutoVac Stretch is equipped with a trolley bucket and wide-area trailing squeegee to enable cleaning larger open hard-surface flooring (e.g., hallways, lobbies, gym floors, warehouse floors, etc.).

Comparable Alternatives

Comparable alternatives must serve the same function as described above and meet the sub-category definition (i.e., Cleaning Equipment – Powered floor maintenance equipment). This includes high performance floor cleaning machines (e.g., wet vacuums, floor scrubbers and autoscrubbers).

Flat mops do not meet the definition of comparable alternative and are therefore excluded in this review.

Legal Compliance

Manufacturer shall not be in violation of any applicable environmental regulations or laws nor any applicable regulations under the authority of the U.S. Federal Trade Commission, U.S. Food and Drug Administration, or the U.S. Environmental Protection Agency (or equivalent if based outside the United States).

2.0 Product Lifecycle Impact Review

This section documents the anticipated human health and environmental lifecycle impacts associated with powered floor maintenance equipment, noting the most significant (i.e., greatest in negative effect) impact.

Summary of Lifecycle Impact Review

Lifecycle Phase	Impacts Identified
Resource Extraction	No significant impacts identified.
Manufacturing	No significant impacts identified.
Use	1) Water use from normal operation 2) Cleaning solution use from normal operation
Waste Management and Disposal	No significant impacts identified.

Resource Extraction and Manufacturing Phases

No significant impacts identified. The manufacture of powered floor maintenance equipment typically requires the extraction of raw materials used to create plastics, steel, aluminum, brass, copper, and any fiberglass parts. Because powered floor maintenance equipment is designed to have a long service life (i.e., typically 5-10 years) the resource and manufacture phases are less significant than other lifecycle phases.

Teflon tape is used for the purpose of creating water-tight junctions between plumbing fittings and is over the 0.01% threshold for a material containing a CMR substance prohibited under Section 5.2. Alternative options are not prevalent on the market. Since the Teflon tape is critical for the function of this product to provide water-tight plumbing fittings, an exemption is made for this material.

Use Phase

Energy Use

The energy use for both battery and electric versions of the product is expected to be equivalent across comparable powered floor maintenance products. The wattage across comparable floor and auto scrubber alternatives ranges from 750 to 1050 while the Applicant's product has a wattage of 560.

See End of Life recovery section below for more information on the battery.

Water Use Rate

According to the ISSA 612 Cleaning Times & Tasks book,[1] comparable products such as floor scrubbers and autoscrubbers can clean 500 square feet per gallon of water on average depending on soil conditions. The applicant product is reported to clean 1500 to 3500 square feet per gallon of water depending on soil conditions.

Chemical Solution Use Rate

According to the ISSA 612 Cleaning Times & Tasks book,[1] comparable products such as floor scrubbers and autoscrubbers typically use cleaning solution at a rate of 50 oz per 25,000 ft^2. The applicant product is shown to have a cleaning solution use rate of 16 oz per 25,000 ft^2. Cleaning solution metering is accomplished by using packets of pre-measured cleaning solution.

[1] Reference can be found at https://www.issa.com/education/professional-development-center/612-cleaning-times-book

Chemical Hazards

Since the claims made in this certification relate to the efficiency of the product with regard to water use and cleaning solution use, the cleaning solution formulation was not reviewed for human and environmental hazards as part of the product innovation. Therefore, no claims shall be made in association with this certification as to the "safety" or "environmental preferability" of the parts or the cleaning solution formulation.

Cross Contamination

The recontamination of floors with microorganisms after cleaning, particularly in healthcare facilities, is an ongoing challenge for building managers and facility operation teams. According to the CDC[1], floor disinfection does not offer benefits over regular cleaning using a wet mop, wet vacuum, dry dusting with electrostatic materials, or spray buffing, and "floors become rapidly recontaminated from airborne microorganisms and those transferred from shoes, equipment wheels, and body substances." Thus, while minimizing microorganism contamination of cleaning solutions and tools is important, demonstrating the removal of residual organic matter (i.e., soil and chemical residue) that remains after a surface is cleaned, using a measure such as ATP (adenosine triphosphate) removal, is a more direct and reliable demonstration of product functional performance. Therefore, direct measurement of microorganism removal (e.g., bacterial contact plate measurements) on floor surfaces is not included as a functional performance measurement in these criteria due to the likelihood of recontamination as seen with any method of floor cleaning. In addition, no public claims regarding microorganism removal are made related to the Applicant product.

Waste Management and Disposal Phases

End of life recovery

Recyclability of the product components is unknown. Once the product has reached the end of its use phase, some parts may be able to be refurbished or recycled (e.g., batteries) to limit solid waste entering landfill. However, end of life recovery is not expected to be substantially different from what competitors offer at this time.

[1] Reference can be found at https://www.cdc.gov/infectioncontrol/guidelines/environmental/background/services.html

CERTIFICATION REQUIREMENTS

3.0 Environmental Innovation Review

This section details the applicant's proposed innovation claims including:

- Innovation Summary: describes how the applicant claims the product differs from comparable products on the market,
- An Impact Reduction Statement: describes how the applicant claims their product's innovation results in reductions of significant lifecycle impacts identified in the Product Lifecycle Impact Review (Section 2.0 herein),
- Market Analysis: describes the parameters for the applicant to demonstrate their claim that the product is the first and only product of its type to achieve this innovation during the Certification Phase, and
- Drawbacks Analysis: a summary of any potential drawbacks that Green Seal has identified and mitigations necessary.

The applicant has opted to demonstrate innovation through *Option 1: Improved Design,* which states: Demonstrate a minimum of 30% reduction of one or 20% in each of two or more significant environmental or human health impacts, as identified in Section 2.0.

3.1 *Innovation Summary – How does this product differ from others on the market?*

The applicant claims that this product differs from other powered floor maintenance equipment on the market in two primary ways:

1. By reducing the typical water use rate by at least 66%
2. By reducing the typical cleaning solution use rate by at least 70% while maintaining equivalent product performance to comparable alternatives.

The environmental innovation is achieved through the following design elements:

1. The use of a high-flow fluid extraction method that removes soil and cleaning solution via a dual-blade squeegee head powered by a wet vacuum motor,
2. The use of filters for debris and contaminants via a fine mesh filter bag and sedimentation trough, and
3. The reuse of "grey" cleaning solution at least three times and up to seven times.

Note: The hazards of the cleaning solution were not reviewed in the life cycle impact analysis. No environmental innovation claims or effective performance claims shall be made on the basis of the chemical formulation of the cleaning solution. Rather, all claims shall pertain to the *efficiency* of the equipment with respect to water use rate and cleaning solution use rate reductions.

During the Certification Phase, Green Seal will verify these claims through a technical review.

3.2 *Impact Reduction Summary – How does the innovation result in impact reduction?*
The following table summarizes water and cleaning solution use rates and resulting percent reductions for the applicant product.

Table 1: Percent Reduction of Water Use Rate and Cleaning Solution Use Rate

	Water Use Rate	**Cleaning Solution Use Rate**
Applicant Product	1500 to 3500 square feet per gallon of water	16 oz per 25,000 ft^2
Floor scrubbers & Autoscrubbers	500 square feet per gallon of water on average (ISSA 612 Cleaning Times & Tasks book).	50 oz per 25,000 ft^2 (ISSA 612 Cleaning Times & Tasks book)
Total percent reduction →	66% - 88% reduction in water use	65% reduction in cleaning solution use

During the Certification Phase, Green Seal will verify these claims through a technical review.

3.3 *Market Analysis – How unique is this innovation?*
A market review of comparable products conducted in February 2020 did not reveal other products on the North American market that make the following claims:

1. Reduction of the water use rate by at least 65%, and
2. Reduction of the cleaning solution use rate by at least 65%.

The public engagement period did not produce feedback indicating that other products of the same function currently make all of the above claims.

3.4 *Drawbacks Analysis – Has Burden Shifting occurred?*
As a result of a drawbacks analysis, Green Seal has not noted any burden shifting resulting from this product innovation. No mitigation necessary. A product take-back program is recommended but not required for this certification, to increase the recycling of useful materials (e.g., plastic and metal parts, batteries).

4.0 Evaluation of Functional Performance and Fitness for Purpose

This section details the requirements to demonstrate that the applicant product functionally performs at least as well as or better than at least one nationally recognized or market leading product of its type, to be approved by Green Seal, including test methods and test reports to submit during the Certification Phase.

Test Methods

Applicant shall meet the requirements in this section to demonstrate the product functionally performs at least as well as or better than at least one nationally recognized or market leading product of its type, to be approved by Green Seal. The applicant shall use objective, scientifically validated testing methods conducted under controlled and reproducible laboratory conditions to demonstrate functional performance along the following parameters:

1. Soil & Chemical Residue Removal Rate/Cleaning Effectiveness
    a. There is no standardized performance test method to measure the effectiveness of floor cleaning machines; therefore, measurements of residual organic matter (i.e., soil and chemical residue) that remains after a surface is cleaned will be made according to the third-party analytical testing method outlined by the Toxic Use Reduction Institute (TURI) Surface Solutions Laboratory titled "ATP Measurement".[2]
    b. The product shall maintain at least a 90% soil removal rate.

2. Powered floor maintenance equipment shall use environmentally preferable batteries (e.g., gel, absorbent glass mat, lithium-ion) except in applications requiring deep discharge and heavy loads where performance or battery life is reduced by the use of sealed batteries.[3]

[2] This third-party method is outlined in an internal report published by TURI on behalf of the applicant.
[3] This requirement aligns with USGBC LEED O+M criteria for Green cleaning – equipment.

5.0 Environmental and Human Health Requirements

This section describes the Environmental and Human Health requirements with which the applicant product must demonstrate compliance. Green Seal uses the following factors to determine requirements for this section:

- **Product Form**: The applicant product is an assembly of parts, each consisting of solid materials.
- **Potential for Direct Human Exposure**: The intended use of the product does not result in direct, prolonged human exposure via inhalation, ingestion, or skin absorption.
- **Potential for Environmental Releases:** The use of the product does not create environmental releases to air, water, or land.

Disclosure

Applicant shall disclose all product parts through a Bill of Materials, including the part name, type (e.g., raw material, assembly, sub-assembly, component), part function, and material type (e.g., steel, aluminum, resin, nylon, etc.).

Product-Specific Requirements

1. Powered floor maintenance equipment shall operate at a sound level below 70 decibels (dBA).[4]
2. The product shall be designed with materials (e.g., steel, aluminum, brass, copper, etc.) consistent with other products of this type on the market, from reputable suppliers of these materials, to ensure the product does not produce any unforeseen or unique human health exposures or environmental releases to air, water, or land.

Sections 5.2 to 5.20 - Not Applicable. See ANNEX A.

The review of product form, potential for direct human exposure, and potential for environmental releases demonstrates that the requirements outlined in GS-20, Edition 2.0, Sections 5.2 through 5.20 do not apply to this assembly of parts due to low potential for direct, prolonged human exposure or significant environmental releases when used as intended.

Since the claims made in this certification relate to the *efficiency of the product* with regard to water use and cleaning solution use, the cleaning solution formulation was not reviewed for human and environmental hazards as part of the product innovation.

Therefore, no claims shall be made in association with this certification as to the "safety" or "environmental preferability" of the parts or the cleaning solution formulation.

[4] This user impact requirement aligns with Green Seal Standard GS-42 - Commercial and Institutional Cleaning Services.

6.0 Packaging Requirements

Applicant shall meet the following packaging requirements as applicable.

Primary and Secondary Packaging

Primary and secondary packaging shall meet the following requirements, based on the packaging material type:

1. Packaging made from paper or paperboard shall be *recyclable* and made from 100% recovered material.
2. Packaging made from containerboard (corrugated cardboard) shall be *recyclable* and made from at least 30% recovered material.
3. Packaging made from plastic shall be *recyclable*, or source-reduced by 20%, or shall contain 25% recovered material content (pre- or *post-consumer material*).

Plastic Labeling

Not applicable to this product category.

Concentrated Product Packaging

Not applicable to this product category.

Heavy Metal Restrictions

The heavy metals lead, mercury, cadmium, and hexavalent chromium shall not be *intentionally introduced.* Further, the sum of the concentration levels of these metals shall not exceed 100 ppm; an exception is allowed for *refillable packages* or packages that would not exceed this maximum level but for the addition of *post-consumer material*.

Other Restrictions

Phthalates, bisphenol A, and chlorinated packaging material are prohibited from being intentionally introduced to plastic packaging; an exception is allowed for packages that would not have added phthalates, bisphenol A, or chlorinated packaging material but for the addition of post-consumer material.

7.0 Certification Requirements

Applicant shall meet all certification requirements described herein.

Certification Term

The initial Certification Term shall be 4 years. After the Certification Term, the applicant has the option to undergo Recertification.

Site Visit

The applicant shall undergo a site audit of product manufacturing facilities that includes verifying product characteristics and quality manufacturing processes.

Sections 7.3 to 7.6

Not applicable to this product category. See the GS-20 Environmental Innovation Standard for reference.

Certification Mark

The Green Seal® Certification Mark may appear on the product, packaging, secondary documents, and promotional materials, only in conjunction with the certified product. Use of the Mark must be in accordance with Rules Governing the Use of the Green Seal Certification Mark.

The Green Seal Certification Mark shall not be used in conjunction with any modifying terms, phrases, or graphic images that might mislead consumers as to the extent or nature of the certification.

Green Seal must review all uses of the Certification Mark prior to printing or publishing.

Use with Other Claims

The Green Seal Certification Mark shall not appear in conjunction with any human health or environmental claims unless verified and approved in writing by Green Seal.

Statement of Basis for Certification

Wherever the Green Seal Certification Mark appears, it shall be accompanied by a description of the basis for certification. The description shall be in a location, style, and typeface that are easily readable. If online space is limited, a link to the basis of certification may be used. Green Seal shall develop a statement of basis for certification for each product.

ANNEX A (Glossary of Terms)

Note that the defined terms are italicized throughout the Environmental Innovation Standard, GS-20.

Asthmagen. A substance designated as an asthma causing agent by the Association of Occupational and Environmental Clinics (AOEC), which after review by AOEC have met the AOEC sensitization criteria.

Burden Shifting. A concept within product lifecycle review frameworks that defines an unintentional consequence of a change in the system that results in a reduction in one impact category and a significant increase in another impact category, e, g., carbon emissions.

Carcinogen. A chemical listed as a known, probable, reasonably anticipated, or possible human carcinogen by the International Agency for Research on Cancer (Groups 1, 2A, and 2B), National Toxicology Agency (Groups 1 and 2), EPA Integrated Risk Information System (weight-of-evidence classifications A, B1, B2, C, carcinogenic, likely to be carcinogenic, and suggestive evidence of carcinogenicity or carcinogen potential), or by Occupational Safety and Health Administration (as carcinogens under 29 Code of Federal Regulations (CFR) 1910.1003(a)(1)).

Colorant. A product *component*, such as a dye or pigment, whose only function is to change the product's color.

Component. A constituent that is deliberately added at any level for its continued presence in the final product to provide a specific characteristic, appearance, or quality[5] or a contaminant that was not deliberately added but is present above 0.01% by weight in the product.

Exposure Pathway. The way in which a person can be exposed to a hazardous substance. A complete exposure pathway includes (1) the source of chemical and mechanism for release, (2) the exposure point, (3) the transport medium (i.e., from source to exposure point, if different), and (4) the exposure route (e.g., ingestion, inhalation, absorption, etc.).

Fragrance. An additive, often (but not limited to) a multi-*component* additive, used in a product with the purpose of imparting a scent to the product.

Independent Laboratory. A laboratory that (1) has been recognized by a laboratory accrediting organization to test and evaluate products to a related product standard, and (2) is free from commercial, financial, and other pressures that may influence the testing and evaluation process.

Intentionally Introduced. The use of substances for their desired or deliberate presence in the *primary package* for the purpose of providing a specific characteristic or quality. It does not refer to the use of substances as processing aids or the use of an intermediate that imparts certain chemical or physical changes during manufacturing, as long as the substance or intermediate is present in the *primary package* at concentrations below 100 ppm.

Mutagen. A chemical that meets the criteria for Category 1, chemicals known to induce heritable mutations or to be regarded as if they induce heritable mutations in the germ cells of humans, under the GHS.

Natural Colorant. A *colorant* that comes from biological products, forestry or agricultural materials (including plant, animal, and marine materials), or minerals.

Post-Consumer Material. Material that would otherwise be destined for solid waste disposal, having completed its intended end-use and product life cycle. Post-consumer material does not include materials and by-products generated from, and commonly reused within, an original manufacturing and fabrication process.

Primary Package. Package material that physically contains and contacts the product, not including the cap or lid.

Product As Used. The most concentrated form of the product that the manufacturer recommends for a product's intended use.

[5] Naturally occurring elements and chlorinated organics that may be present as a result of chlorination of the water supply are not considered intentional components if the concentrations are below the applicable maximum contaminant levels in the National Primary Drinking Water Standards found in 40 CFR Part 141.

Recyclable. The package can be collected in a substantial majority of communities, separated or recovered from the solid waste stream and used again, or reused in the manufacture or assembly of another package or product through an established recycling program.

Refillable Package. A container that is routinely returned to and refilled by the product manufacturer at least five times with the original product held by the package, and demonstrated in practice. For the purpose of this standard, the product manufacturer or the product manufacturer's agent may refill a package.

Reproductive Toxin. A chemical listed as a reproductive toxin (including developmental, female, and male toxins) by the State of California under the Safe Drinking Water and Toxic Enforcement Act of 1986 (California Code of Regulations, Title 22, Division 2, Subdivision 1, Chapter 3, Sections 1200, et. Seq., also known as Proposition 65).

Respiratory Sensitizer. A substance designated as leading to hypersensitivity of the airways following inhalation of the substance and meeting the classification criteria of Category 1 respiratory sensitization (H334) in accordance with the GHS.

Secondary Packaging. Packaging used to contain *primary package*/s and typically used for merchandizing. This does not include case or shipping packaging or the *primary package*.

Serious Eye Damage. The production of tissue damage in the eye, or serious physical decay of vision, following application of a test substance to the anterior surface of the eye, which is not fully reversible within 21 days of application. Substances identified under Category 1 for Serious Eye Damage/Eye Irritation (H318) under the GHS are also considered to cause serious eye damage.

Skin Corrosion. The production of irreversible damage to the skin, namely visible necrosis through the epidermis and into the dermis, following the application of a test substance for up to 4 hours. Corrosive reactions are typified by ulcers, bleeding, bloody scabs, and, by the end of observation at 14 days, by discoloration due to blanching of the skin, complete areas of alopecia, and scars. Substances designated as Category 1A, 1B or 1C for Skin Corrosion/Irritation (H314) under the GHS are also considered to cause skin corrosion.

Skin Sensitizer. A substance that will lead to an allergic response following skin contact.

Undiluted Product. The most concentrated form of the product produced by the manufacturer for transport outside its facility.

ANNEX B (Environmental and Human Health Requirements that Do Not Apply)

5.2 Carcinogens, Mutagens, and Reproductive Toxins
Not relevant to applicant; this requirement does not apply.

5.3 Prohibited Components
Not relevant to applicant; this requirement does not apply.

5.4 Volatile Organic Compounds
No inhalation exposure pathway present; this requirement does not apply.

5.5 Animal Testing
Not relevant to applicant; this requirement does not apply.

5.6 Acute Toxicity
No inhalation or ingestion exposure pathway present; this requirement does not apply.

5.7 Skin and Eye Damage
No dermal exposure pathway present; this requirement does not apply.

5.8 Asthmagens
No inhalation exposure pathway present; this requirement does not apply.

5.9 Respiratory Sensitization
No inhalation exposure pathway present; this requirement does not apply.

5.10 Skin Sensitization
No dermal exposure pathway present; this requirement does not apply.

5.11 Skin Absorption
No dermal exposure pathway present; this requirement does not apply.

5.12 Chronic Inhalation Toxicity
No inhalation exposure pathway present; this requirement does not apply.

5.13 Combustibility
The applicant product is an article; this requirement does not apply.

5.14 Fragrances
The applicant product does not contain fragrances; this requirement does not apply.

5.16 Bioaccumulating Compounds
No environmental release exposure pathway present; this requirement does not apply.

5.17 Eutrophication
No environmental release exposure pathway present; this requirement does not apply.

5.18 Aquatic Biodegradability
No environmental release exposure pathway present; this requirement does not apply.

5.19 Toxicity to Aquatic Life
No environmental release exposure pathway present; this requirement does not apply.

5.20 Bleaching
Not relevant to applicant; this requirement does not apply.