

Specifications for a Battery Powered Combination Rider Sweeper/Scrubber with 61” (154 cm) Sweep Path and 48” (122 cm) Scrub Path

INTENT: The intent of these specifications is to describe a dedicated sweeper scrubber combination rider machine offering dry cylindrical sweeping and wet disk scrubbing. This machine is to be battery operated with all systems being electric motor based. This machine is capable of sweeping and scrubbing surfaces such as concrete, asphalt, tile, marble, or terrazzo flooring.

To minimize labor costs, the capacities of this machine are critical as well the design of dedicated front dry sweeping and wet rear scrubbing functions. The dedicated sweeping and scrubbing functions avoid unnecessary clean-up and maintenance costs associated with cylindrical scrubber/sweeper technologies that sweep wet debris into a common hopper.

All exceptions to the Specifications must be clearly identified and submitted, in writing, on a separate sheet of paper marked "Exceptions". Bidders who fail to submit their exceptions will not be considered.

POWER SOURCES: Machine shall be powered by a 36 V battery capable of providing 4.0 to 5.5 hours of cleaning operation on a single charge. For optimal energy efficiency all systems are to be electronically controlled and powered using electric motors and actuators. Minimal use of hydraulics also provides leak-free, environmentally friendly operation. This includes an intermittently operated self-contained electrically driven hydraulic power unit and cylinder for the hopper raise and lower function.

Battery power allows using the machine for sweeper/scrubbing in areas where noise and exhaust emissions would be unacceptable including confined spaces, areas in close proximity to workers or other noise and exhaust sensitive environments. Due to the battery and electric design, machine will require lower routine maintenance than a machine that contains an engine and extensive hydraulics.

Battery Configuration	36V, 770Ah
Propulsion System	36V A/C Brushless
Water Ingression Rating	All electric drive motors and actuators rated IP55 for water wash-down
Sound Level (IEC60335-2-72)	72 dBA

SWEEPING SYSTEM: Must include a complete standalone dry sweep system with single direct throw main broom and hopper located at the front of the machine that can be used independently of components of the scrub system. Debris must be captured dry for easy handling and dumping of debris. Dual side broom sweeping path must be 61” (154 cm) with an independent cylindrical style main broom of 36” (90 cm) with minimum 12” (31 cm) diameter. The sweep path must fully sweep the squeegee path to prevent debris from breaching the squeegee seal. The hopper

must have minimum capacity of 7 cubic feet (198 L) and have variable dump height up to 60" (152 cm).

Sweeping system must include system that increases safety and reduces broom wear by disengaging entire sweep system and dust control system when the machine is stopped. When set to active, the sweep system must start and stop with the machine's motion.

Full sweep and dust control system activation through the touch of a single switch in the operator area. Both main broom and side broom height are adjustable from the operator's seat providing convenience plus simplified and safe operation of the machine. Relative main broom height is displayed graphically on a LCD screen providing the operator indication when main broom is near wear limits and needs to be replaced.

When in sweep and scrub mode, when the machine is propelled backwards, the sweep system main broom will automatically be raised momentarily for a programmable time interval to prevent sweeping water from the scrub system into the dry hopper.

Independent switches must be clearly labeled for hopper dumping tasks and for other sweeper based operations like filter shaker cycle, wet sweep bypass, side broom on/off and height adjust.

DUST CONTROL SYSTEM: A full dust control system must be employed that starts at the side brooms with water mist dust suppression to keep fugitive dust emissions at a minimum. System must utilize skirting at the main broom chamber and a vacuum system to prevent dust leaving the broom chamber to atmosphere. Must include a dust filter that is of fluted (not pleated) technology for 10 percent greater dust capacity prior to plugging and more consistent filter dust shake out with surface area no less than 115 ft² (10.7 m²). The dust filter must have an efficiency >98% on 0.3 – 1.0 micron particles to assure excellent dust control. The filter must be located in the dry debris hopper away from the water areas of the scrub system since water on a dust filter greatly reduces its performance. Captured dust must be shaken directly back into the dry debris hopper with a 15 second timed vibratory shaker system that is in direct contact with the filter media and provides vibration energy at variable frequencies to assure maximum liberation of dust from filter. Filter shaker cycle must be programmable to all shake cycle to last up to 40 seconds. Filter shaker system must execute by activation by the operator or automatically each time the main broom is raised.

SCRUBBING SYSTEM: Must contain a complete, independent scrub system with disc brushes. Scrub deck must utilize a three 17" (43 cm) disc brush design to provide an effective 48" (122 cm) scrub path. Right side of the scrub deck must project outside the frame profile of the machine to provide edge scrubbing capabilities and minimizes need for secondary scrubbing/cleaning operations. Right side of scrub deck must be allowed to pivot inward such that impact with solid objects will not damage the deck, machine, or facility and will not compromise operator safety. Deck pivot tension mechanism can be manually released to allow operator easier access to center disc brush.

Whenever the scrub function is activated, brush rotation shall begin automatically whenever the machine is propelled in either forward or reverse direction. Solution flow and optional detergent dispensing is also automatically initiated only when propelling the machine. Solution flow rate is automatically increased in response to operator demanded increases in brush pressure to provide more effective cleaning. Solution flow rate is also independently adjustable from other scrubbing parameters. Machine must provide protection to floor by ceasing brush rotation whenever machine is stationary as well as stop all solution flow to prevent solution puddles.

The machine shall be able to operate at five preprogrammed flow rates ranging from 1.0 - 3 GPM (3.79 – 11.36 L/min). This allows sufficient flexibility for cleaning a wide range of surfaces to both minimize water use and dump/refill cycles.

With optional detergent dispensing, four distinct scrubbing modes are possible to minimize water, detergent, and energy consumption, while extending scrub brush life.

Single switch activates full scrub, vacuum and solution system which does not begin operation until machine is in motion and stops again when machine stops to prevent floor damage, increase safety and prevent flooding.

Three programmed scrub settings are preset with down pressure up to 400 lbs. (182 kg) of down force at maximum setting. Each setting has a preset solution flow, increased flow for higher down pressure, for the pressure setting that can be manually overridden. Down pressure and water flow for each of the scrub settings is programmable if customer wished to deviate from factory settings.

Rear squeegee and vacuum system can be used independent of scrub system for picking up standing water.

Double scrubbing is possible by raising the rear and side squeegees and using scrub system on any down pressure setting.

Cleaning cycles can be extended by utilizing the Extended Scrub functionality. Extended Scrub will take water from the recovery tank, add proper dilution of cleaning chemical and apply it to the scrub deck after the solution tank is empty. Extended scrub system shall not introduce reclaimed water from the floor into the solution tank system to minimize cleaning requirements and risk of microbial formation.

ONBOARD DETERGENT SYSTEM: Machine shall be capable of dispensing detergent into the clean water solution flow using any suitable manufacturer's liquid detergent placed into a refillable reservoir having a minimum capacity of 5 gallons (19 L) split between 2.5 gallon (9.5 L) containers that can contain different detergents for different applications. A single switch shall be provided to provide a momentary 60 second increase in brush pressure and solution flow rate with increased chemical strength. This allows more effective cleaning of floor areas with higher soil levels. After 60 seconds the machine will automatically revert back to green cleaning

mode without operator input to reduce detergent and water consumption as well as minimize brush wear.

System must be capable of purging all detergent from the supply line. Rapid interchange of multiple detergent reservoirs for varied cleaning applications without need for tools. Shall incorporate separate detergent pump for dispensing solution to the scrub brushes. Detergent system bottles must be refillable bottle and shall be able to accommodate and be compatible with various liquid detergents and concentrations from multiple manufacturers.

Green cleaning characteristics include:

1. Low concentration detergent (programmable by user)
2. Maximum concentration detergent (programmable by user)
3. One touch 60 second momentary increase in cleaning power by increasing brush pressure, solution flow rate, and detergent concentration (resumes to Green cleaning mode automatically after 60 seconds.)
4. Cleaning with pure water

Three programmable cleaning options combining brush pressure, solution flow rate, and detergent concentration that can be selected with a single switch to optimize the cleaning performance to support various application areas and levels of cleanliness within a particular facility.

VACUUM RECOVERY SYSTEM: To be equipped with dual vacuum fan motors capable of delivering 54” (137 cm) of water lift and high velocity air flow to permit the use of a 3” (7.6 cm) diameter recovery hose. This combination provides superior water recovery capabilities, reduces plugging, and assures safe dry floors.

Vacuum motors are protected with a ball float and full recovery tank vacuum fan shutoff. Vacuum fan shall continue to operate for 10 seconds after squeegee is lifted from floor to clear the vacuum hose of excess water.

SQUEEGEE DESIGN: Shall have a minimum width of 53” (135 cm) from roller end to roller edge with four-sided wiping blades, quick-release mechanism, and “break-away” design. Shall be constructed using corrosion resistant material and require no tools for adjustment or blade replacement.

Squeegee design must be wide enough to capture water from scrub deck and shift during turns to better capture water. Squeegee frame width must contain guide wheels at outer edge of squeegee to guide squeegee along walls.

SOLUTION / RECOVERY TANKS: Two separate tanks with fixed volume must handle the solution and recovered water. Solution tank must have minimum capacity of 75 gal. (285 L) and solution tank must be equal to solution tank volume. Tanks must be capable of handling solution up to 150° Fahrenheit (65° C), with construction consisting of roto-molded polyethylene or equivalent. Solution tank shall be refillable from the rear of the machine.

Recovery tank must contain drain hose with threaded cap for proper seal and pinch style flow control near end to prevent overflowing drain system. The tank drain location and design must ensure the majority of recovered debris and all water will exit the tank. To prevent tank odor, all inner surfaces of the recovery tank must be easily accessible for final rinse out with no captive or blind corners. Recovery tank shall require no tools to lift off for deeper cleaning when desired.

DRIVE SYSTEM: High efficiency A/C brushless drive motor coupled directly to a planetary gear box with no belts or chains allowed. Maximum transport speed is achievable at minimum engine speed and power minimizing fuel consumption and noise levels below maximum published levels.

Propel Speed - Transport: 5.5 mph (8.9 km/h)
 Scrubbing: 3.5 mph (5.6 km/h) with override up to max. transport speed

Gradeability - Transport (Full): 12°/21%
 Scrubbing and Sweeping (Full): 10°/17.6%

SOUND LEVEL: Sound Level per IEC60335-2-72 is not to exceed 72 dBA at operator position

MACHINE DIMENSIONS: For optimal maneuverability the overall maximum machine dimensions for each given capacity shall not exceed the following:

Scrubber Model	CS7000
Length	103" (262 cm)
Width	
Without Squeegee	48" (122 cm)
Squeegee	53" (135 cm)
Height	
Standard	59" (150 cm)
Standard Overhead Guard	82" (208 cm)
Low Clearance Overhead Guard	79" (201 cm)
Weight (GVW)	5716 lbs (2593 kg)

WHEELS: All wheels shall utilize non-marking urethane or similar material. Shall have two front wheels that are 16" (40.5 cm) diameter, deep lug vulcanized solid tire design. Rear drive wheel shall be 12.2" (31) diameter with over 5.5" (14 cm) width and have 4 mm siping (thin cuts) for increased traction.

WHEEL LOADING: Shall not exceed maximum wheel loading when fully loaded as noted for weight and contact pressure

Scrubber Model	CS7000
Static Wheel Load Maximum Weight	1917 lbs. (870 kg)
Static Wheel Load Maximum Pressure	148 psi (.10.41 N/m ²)

MINIMUM AISLE U-TURN: Shall have minimum aisle U-turn left or right that does not exceed 104" (264 cm)

OPERATING SYSTEM: Machine shall have integrated solution flow and scrub pressure into one-touch pre-calibrated scrub settings. After selecting a scrub setting the machine will adjust solution flow and scrub pressure accordingly.

CONTROLS: Simple membrane touch pad interface for all cleaning functions.

Motion: Machine shall have a rocker foot-pedal motion control interface allowing multiple foot locations during operation for comfort and to reduce cumulative stress. Control shall provide proportional speed control based on pedal position. During scrubbing mode, speed will be limited to 3.5 mph (5.6 km/h) but can be overridden to the full 5.5 mph (8.9 km/h) speed.

Other user interface requirements:

- Master Key Switch
- Full recovery tank indicator
- Empty solution tank indicator
- Hour Meter
- Battery Level Indicator
- Onboard Diagnostics
- Solution On/Off Switch
- Vacuum Delay Shut Off
- Vacuum On/Off Switch
- Pre-wetting Brush Switch

APPROVALS: Shall have certification from ETL and CE and clearly displayed labels showing as such.

MANUFACTURING LOCATION: Machine must be designed and built in the United States.

WARRANTY: The warranty must provide the following minimum coverage:
2 years labor, 6 months travel, 3 years parts, 8 years roto-molded components