



**HALCO PRODUCTS COMPANY**

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SECTION 01 74 13.13

**CLEAN ZONE CLEANING PROCEDURES**

**PART 1 GENERAL**

1.1 SUMMARY

a. Section Includes:

1. Section Intent.
2. Responsibilities.
3. Quality Control.
4. Submittals, Samples, and Method Statements.
5. Cleaning Procedures:
  - (a) Stage 1.
  - (b) Stage 2.
  - (c) Stage 3.
  - (d) Stage 4.
  - (e) Stage 5.

1.2 SECTION INTENT

This Section specifies the cleaning requirements to be performed during the critical stages of construction to control contamination within the Clean Zone.

The work required by this Section to be performed by firms specializing in this occupation.

The work of this Section will commence with the beginning of Stage 3 of the Clean Zone construction as defined in Section 01 35 13.46, CLEAN ZONE GENERAL REQUIREMENTS.

1.3 RESPONSIBILITIES

- a. The cleaning contractor to be responsible for:
1. Continuous cleanup of construction activities to meet cleanliness levels for Construction Stages 3 and 4.
  2. Special cleanup procedures at the end of Construction Stages 3 and 4.
  3. Full-time cleaning supervisor.
  4. Portable HEPA-filtered vacuum cleaners and shoe cleaners to be transferred to the Owner's Agent and tacky mats to be replaced during construction activities.



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- 5. Cleaning schedule showing tasks and locations.
- b. The Contractor is responsible for a schedule that will enhance the work of the cleanup crew.
- c. Other contractors will be required to perform the following:
  - 1. Wipe down of all incoming materials within the staging areas that are to be installed in the Clean Zone.
  - 2. Spot cleanup of respective construction areas by defined cleaning requirements.
  - 3. Re-clean of all spot areas deemed contaminated by the cleaning supervisor.
  - 4. Maintaining the area free of debris and cleaning up after themselves on an ongoing basis.

1.4 QUALITY CONTROL

The Contractor's personnel who perform the work required by this Section to have a minimum of 5 years' experience in cleanroom cleaning with at least two cleanroom projects similar in size and scope to the referenced project.

The cleaning supervisor to continuously monitor the procedures and work performed by all contractors to verify compliance with these Specifications. Deviations to be corrected to the satisfaction of the cleaning supervisor prior to further work in the affected area or brought to the attention of the Owner's Agent and Clean Zone Director.

All cleaning personnel to attend Stage 3 and 4 protocol, as well as hazardous material safety training classes.

All cleaning personnel to be properly gowned and badged for entry into the Clean Zone in accordance with the posted cleanliness stage.

1.5 SUBMITTALS

a. Architect approval is required for submittals with an "A" designation; submittals not having an "A" designation are for information only. When used, a designation following the "A" designation identifies the office that will review the submittal for the Architect. Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance to Section 01 33 29, SUSTAINABILITY REPORTING. Submit the following in accordance with Section 01 33 00, SUBMITTAL PROCEDURES.

SD-01 Preconstruction Submittals

Method Statements; A, AE

SD-02 Shop Drawings

Layout of Protocol Control Measures; A, AE



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Section 01 33 00, Submittal Procedures: Requirements for submittals.

Refer to the Submittal Schedule at the end of Part 3 for a list of submittal requirements for this Section.

### PART 2 PRODUCTS

#### 2.1 MATERIALS AND EQUIPMENT

**Cleanroom Filtered Vacuum Cleaners:** Individual canister dry-vacuum units affixed with four-stage filtration, including 0.3 micron HEPA filter rated at 99.97 percent efficiency on the air discharge, wheeled cart, 10 foot hose, and selection of wands. Change microfilter paper at least once a month. Vacuums to be Hako, Nil Fisk, or Minuteman vacuum cleaners.

**Motorized Shoe Cleaners:** Packaged portable shoe cleaner with integral vacuum cleaner, 0.3 micron HEPA filter cartridge rated at 99.97 percent efficiency on the air discharge, and five scrub brushes. Change microstatic filter cartridge as described in Part 3 of this Section.

**Tacky Rags:** Lint free, particulate free, sticky surface rag.

**Lint-Free Towels:** Lint-free, particulate-free wipes rated for cleanroom use.

**Wipes:** Nylon tricot 1068 or similar material suitable for cleanroom duty.

**Tacky Mats:** Removable sticky mats of 2 mil polyethylene, 120 pack.

**Masslinn wipe towels, sweep tool, and mop handles.**

**Mops and Sponges:** Cellulose material.

**Hydrowash Equipment:** A 200 psi water jet nozzle hose and pump system providing a constant flow of 60 gpm using potable water.

**Water:** Deionized water.

**Wastewater Pumps:** Pumps and hose as required to evacuate wastewater during the hydrowash procedures.

**Black and White Felt:** 24 inches square, 10 inches square when folded, black and white, static free natural fiber felt folded with cut edges inside.

**Buckets:** Stainless steel in Clean Zone. No substitutes will be accepted. One will be labeled for floor mopping, the other for wiping equipment. All buckets to be thoroughly cleaned and dried after each use.

**Ladders:** Aluminum or fiberglass.

#### 2.2 CLEANING SOLUTIONS

- a. **Cleaning Solution:** A mixture of deionized water, filtered with 10 minute circulation through DI mixed bed and 0.2 micron final filters, and then mixed with a 10 percent dilution of staticide surfactant cleaning solution.

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- b. Solvents: Filtered to 0.2 micron. An aprotic mixture formulated with a low residue level for use in cleanrooms. The solvent to be suitable for clean, hard surfaces including plastic, PVC, and laminated surfaces. Only reagent and transistor-grade solvents to be used. When possible, denatured alcohol to be used because of its lower toxicity level.
- c. Bactericidal Solution: Filtered to 0.2 micron. A solution formulated for use in cleanrooms. The product to be noncorrosive, low toxicity using a bactericidal liquid in deionized water.
- d. Low-Residue Antistatic Detergent: A low-foam antistatic neutral detergent that contains less than 1 ppm sodium and potassium.
- e. Soap Wash: Nonionic, non-phosphate liquid detergent.
- f. Wax or Soap Granules: Not permitted in the Clean Zone.

### PART 3 EXECUTION

#### 3.1 CLEANING PROCEDURES

##### 3.1.1 Stage 1

- a. Continuous Cleaning Procedures During Stage 1: Performed by contractors in accordance with Section 01 35 13.46, CLEAN ZONE GENERAL REQUIREMENTS.
- b. Special Cleaning Procedures at Completion of Stage 1: Performed by contractors in accordance with Section 01 35 13.46, CLEAN ZONE GENERAL REQUIREMENTS.

##### 3.1.2 Stage 2

- a. Continuous Cleaning Procedures During Stage 2: Performed by contractors in accordance with Section 01 35 13.46, CLEAN ZONE GENERAL REQUIREMENTS.
- b. Special Cleaning Procedures at Completion of Stage 2: Performed by contractors in accordance with Section 01 35 13.46, CLEAN ZONE GENERAL REQUIREMENTS.

##### 3.1.3 Stage 3

- a. Continuous Cleaning Procedures During Stage 3:
  - 1. Remove trash and debris, sweep, and vacuum all surfaces continuously.
  - 2. Remove trash by removing the polyethylene liners with the trash contained. Do not transfer trash from one container to another. Insert new polyethylene liners inside trash containers and secure by turning the top of the bag over the lip of the container.
  - 3. Wipe down ceiling components, wall panels and studs, ducting,

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plenums, VLF ceiling modules, and equipment being introduced into the Clean Zone with wipes moistened with cleaning solution. Clean at an interval determined by Owner's Agent.

4. Clean all construction and cleaning tools and equipment used inside the Clean Zone with wipes moistened with cleaning solution prior to entry into the Clean Zone.
5. Vacuum all floor surfaces in the Clean Zone at the end of every workday with cleanroom-filtered vacuum cleaners or with the built-in house vacuum system.
6. Replace tacky mats daily and shoe cleaner filter cartridges every 2 weeks or as necessary.
7. The installing contractor will wipe down all concealed wall studs, floor stanchions, and concealed cavities immediately before the finish wall and floor panels are installed so no foreign material remains sealed inside hidden recesses
8. Wipe down all vertical wall surfaces installed inside the Clean Zone once each week with wipes moistened with cleanroom cleaning solution.
9. Vacuum and wet mop the personnel gowning area and equipment staging area during each break and at the end of each construction shift so the areas are always clean when the work crews return to the Clean Zone.

b. Special Cleaning Procedures at Completion of Stage 3:

1. Vacuum all surfaces in the Clean Zone with cleanroom-filtered vacuum cleaners or with the built-in house vacuum system using special wands as required to protect finishes of all materials and equipment.
2. The installing contractor will remove all protective wraps and coatings from wall panels, floor, ceiling components, ducts, and plenums to expose final finish. Take care to protect all finished surfaces during each cleaning operation.
3. Prepare special cleaning solution using deionized water and staticide surfactant cleaning solution.
4. Wipe down all interior and exterior surfaces of air ducts and plenums, access walkways, structure, utility piping, electric raceways, support stanchions and hangers, pass-throughs, ceiling grid runners, interior and exterior surfaces of the lights, and any special appurtenances anywhere within the Clean Zone. Use damp wipes moistened with cleanroom cleaning solution.
5. Clean all finished wall surfaces and exposed structure using an organized wipe down procedure with block sponges moistened in cleanroom cleaning solution. Wipe each section of wall with three passes in one direction, rinse the sponge, and wipe again with three passes in a direction 90 degrees opposed to the first pass.



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6. Using a foam strip sponge and cleanroom cleaning solution, wet mop the floor in overlapping sections. Change the water often. Perform mopping from the cleanest end toward the dirtiest end of each area.
7. Vacuum the floor after all other surface cleaning activities are completed.
8. Vacuum with cleanroom-filtered vacuum cleaner, and then wipe down the inside surfaces of all cleanroom makeup and recirculation air handlers with wipes moistened with cleanroom cleaning solution.
9. Discard sponges and cleaning solution.

### 3.1.4 Stage 4

#### a. Continuous Cleaning Procedures During Stage 4:

1. Monitor cleanup of process equipment at the staging area to ensure the outer clean wrap is removed and the equipment cleaned by the Contractor.
2. Protect all finished surfaces during each cleaning operation.
3. Vacuum all floor surfaces in the Clean Zone at the end of every workday with cleanroom-filtered vacuum cleaners or with the built-in house vacuum system.
4. Replace tacky mats weekly and shoe cleaner filter cartridges every month or as required.
5. Clean all cleaning tools and equipment used inside the Clean Zone with wipes moistened with cleaning solution prior to entry into the Clean Zone.
6. Clean all external and internal surfaces of ceiling plenum module, filter grid, walls, light fixtures, etc., with wipes moistened with cleanroom cleaning solution. Wipe each section in three passes in one direction, then three passes in a direction 90 degrees opposed to the first pass.
7. At this point, request operation of the air-handling system and permit the recirculation fan systems to operate continuously for 24 hours in order to flush the system with air.
8. Following the 24 hour fan purge period, all internal surfaces of the ceiling assembly to be cleaned again with wipes moistened with cleanroom cleaning solution. Wipe down inside and outside of all light fixtures, the edges and lips of the filter grid, and other ceiling appurtenances.
9. At this point, the continuous foam gasket or ceiling liquid gel filter sealant can be prepared and placed in the ceiling filter grid trough by the manufacturer. Full cure time to be reserved



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before proceeding with cleaning procedures.

10. Clean all finished wall surfaces and exposed structures using an organized wipe down procedure with block sponges moistened in cleanroom cleaning solution. Wipe each section of wall with three passes in one direction, rinse the sponge, and wipe again with three passes in a direction 90 degrees opposed to the first pass.
11. Using a foam strip sponge and cleanroom cleaning solution, wet mop the floor in overlapping sections that do not exceed 25 square feet between rinses of the mop. Change the water often. Perform mopping from the cleanest end toward the dirtiest end of each area.
12. Perform random black and white felt rubdown tests on all surfaces. Use only one side of cloth.
13. Vacuum the floor after all other surface cleaning activities area completed. Replace the felt pads on the vacuum head whenever necessary to prevent scratching and scraping of the floor surface.
14. Never open the vacuum cleaner in the Clean Zone to change filter, bags, or to perform other maintenance.
15. Monitor the contractor responsible for the ceiling installation to ensure outer wrap is removed from HEPA or ULPA filter cartons and the inner packing box is wiped down prior to entry into cleanroom.
16. Perform black and white felt rubdown test on each HEPA or ULPA filter module as it is unpacked by the ceiling contractor and installed in the ceiling grid. Notify Owner's Agent and Clean Zone Director when filter modules do not comply with CleanZone standards specified.
17. At this point, HEPA or ULPA filter modules can be installed in the ceiling grid.

b. Special Cleaning Procedures at Completion of Stage 4:

1. At this point, request operation of the recirculation fans with ULPA ceiling filters in place in order to flush the system with clean air. Allow room conditions to stabilize for a minimum of 24 hours prior to entering the Clean Zone.
2. Following the 24 hour fan purge period, clean all internal surfaces of the Clean Zone again using wipes moistened with cleanroom cleaning solution. This includes the rated areas of cleanroom service aisles and circulation aisles, as well as all spaces used for air migration such as under floor plenum, subfab, air shafts, interstitial, and fan deck.
3. Protect all finished surfaces during each cleaning operation.
4. Clean the outside of all light fixtures, the edges of the filter grid, and other ceiling components. Take care not to touch any



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filter media.

5. Clean all finished wall surfaces and exposed structures using an organized wipe down procedure with block sponges moistened in cleanroom cleaning solution. Wipe each section of wall with three passes in one direction, rinse the sponge, and wipe again with three passes in a direction 90 degrees opposed to the first pass.
6. Using a foam strip sponge and cleanroom cleaning solution, wet mop the floor in overlapping sections that do not exceed 25 square feet between rinses of the mop. Change the water often. Perform mopping from the cleanest end toward the dirtiest end of each area.
7. Vacuum the floor after all other surface cleaning activities are completed.
8. Secure the area so no traffic occurs in cleaned area for a 4 hour drying period.

3.1.5 Stage 5

- a. Continuous Cleaning Procedures During Stage 5: Cleaning will be performed by the Contractor.
- b. Special Cleaning Procedures at Completion of Stage 5: Cleaning will be performed by the Contractor.

3.2 SUBMITTAL SCHEDULE

ITEM NO.	SUBMITTAL REQUIREMENT	CLASSIFICATION	AS INDICATED
01 74 13.13-021	Method Statements: Prepare method statements for cleaning procedures to be used for each cleanliness stage and for each Clean Zone classification. Indicate size of cleaning crew, steps each crew will perform, the sequence of work steps, cleaning procedures to be followed, preparation of solutions, and the like; Describe frequency with which cleaning solutions are changed, wipes and sponges are replaced, and tacky mats are removed; Describe facility utilities and services that must be operational in order to perform cleaning operations;	SD-01	
01 74 13.13 -024	Layout of Protocol Control Measures: Provide layout of the Clean Zone showing locations of shoe brush cleaners, tacky mats, and other devices required to maintain protocol for each cleanliness stage.	SD-02	

-- End of Section --