

**SECTION 01111**  
**CLEANROOM SPECIAL CONSTRUCTION AND CLEANING PROCEDURES**

**PART 1 - GENERAL**

**1.1 SECTION INCLUDES**

- A. This section includes:
1. Special Construction Procedures
  2. General Cleaning Procedures
  3. Special (Clean Room) Cleaning Procedures
  4. This Section is intended to give the Contractor a general framework for cleanroom cleaning procedures. This Section does not relieve the Construction Manager and/or Contractor from the responsibility to maintain a generally clean, orderly and safe worksite and to develop more stringent cleaning guidelines to ensure an effective cleanroom installation.

**1.2 REFERENCES/PROJECT REQUIREMENTS**

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
1. Section 01110 – Cleanroom Construction Protocol
  2. Section 01112 – Cleanroom Testing And Acceptance
  3. Section 08311 – Manual Cleanroom Doors
  4. Section 08300 – Automatic Cleanroom Doors
  5. Section 09650 – Resilient Flooring
  6. Section 09960 – High-performance Coatings
  7. Section 13019 – Ceiling Grid Support
  8. Section 13020 – Gasketed Cleanroom Ceiling System
  9. Section 13036 – Cleanroom Wall System

**1.3 DEFINITIONS**

- A. Stages of Construction Cleanliness: Defined as clean stages in construction schedule where cleaning requirements in building are more stringent and type and methods of work are more restrictive.
1. Normal Clean.
  2. Very Clean.
  3. Ultra Clean.
- B. Thorough Clean Up: Defined as three passes starting at ceiling framing level and working down to the floor level.
- C. Cleanroom Protocol: Defined as the philosophy of clean construction and the commitment to following the Procedures outlined in this section. Refer to Specification 01110 for activities during each protocol stage.

**PART 2 - PRODUCTS – not used**

**PART 3 - EXECUTION**

### 3.1 CLEANING

#### A. GENERAL

1. The tasks of the specialty cleaning contractor are described as follows:
  - a. Responsible for maintaining cleanliness in the cleanroom area at the beginning of the very clean stage.
  - b. Responsible for maintaining and securing all entrances to the cleanroom at the beginning of the very clean stage.
  - c. Provide all equipment, materials, and manpower required to maintain the building clean.
  - d. Supply trash containers throughout the fab building and emptied regularly as required.

#### B. NORMAL CLEAN STAGE

1. Conduct cleaning and non-hazardous, non-toxic waste disposal operations in compliance with local laws and ordinances. Comply with federal and local environmental and anti-pollution regulations.
2. Complete the following cleaning operations:
  - a. Remove tools, construction equipment, machinery and surplus material from the cleanroom area.
  - b. Remove waste material and rubbish from the cleanroom area.
  - c. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
  - d. Remove debris and surface dust from limited access spaces, including roofs, plenums, trenches, and similar spaces.
  - e. Broom clean concrete floors in unoccupied spaces.
  - f. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other substances that are noticeable vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials.
  - g. Remove labels that are not permanent.
  - h. Touch-up and otherwise repair and restore marred exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored, or that show evidence of repair or restoration. Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.
  - i. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings and other foreign substances.
  - j. Replace air disposable filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills. Clean ducts, blowers, and coils if units were operated without filters during construction.
  - k. Clean light fixtures, lamps, globes and reflectors to function with full efficiency. Replace burned out bulbs and defective and noisy starters in fluorescent and mercury vapor fixtures.
3. Remove temporary protection and facilities installed during construction to protect previously completed installations during the remainder of construction period.

#### C. VERY CLEAN STAGE

1. At the start of the very clean stage a thorough cleaning of the facility should be performed starting at the ceiling support level and working down to the floor level.

Items	Job description
Steel structure	Vacuum and wipe clean
Hepa filter support	Vacuum and wipe clean
Floor	Vacuum and wipe clean
Utilities, ductwork and piping	Vacuum and wipe clean
Other fixtures	Wipe clean
Support areas	Vacuum and wipe clean
Sprinkler mains	Vacuum and wipe clean

2. Daily Cleaning Routine:
  - a. Vacuum floor with dry vacuum cleaner at least twice daily.
  - b. Removal of waste from waste containers at least twice daily.
  - c. Spot clean glass panels to remove finger marks and stains.
  - d. Spot clean wall to remove stains.
  - e. Spot mop floor with solution of chemical as and when necessary.
3. Full time protocol workers will keep the entrances clean and inform the workers and visitors about the clean construction requirements.
4. Cleaning material will be available at the entrances for the workers to wipe down materials before transportation inside the building.
5. Shoe racks are provided at the entrances.
6. During the very clean stage materials will be unpacked in designated areas. The materials are wiped down in the entrance area.
7. This entrance will also act as an air-lock to keep the building with positive pressure, i.e. the entrance is relatively sealed.
8. Special attention will be paid to the housekeeping, to keep the working area in the whole construction site safe, neat and clean.

**D. ULTRA CLEAN STAGE**

1. At the start of the ultra clean stage again a thorough cleaning of the facility should be performed starting at the ceiling support level and working down to the floor level.

Items	Job Description
Repeat all items of first cleaning	
Filter ceiling grid	Vacuum and wipe clean
Make up air units and ductwork	Vacuum and wipe clean
Lighting fixtures	Wipe clean
Sprinkler piping	Wipe clean
Piping	Wipe clean
Exhaust ducts and piping	Vacuum and wipe clean
Walls	Wipe clean
Floors and trenches	Vacuum and wipe clean
Entrances	Vacuum and wipe clean

2. Daily Cleaning Routine:
  - a. Cleaners are to use the Hepa Vacuum cleaner to remove heavier than air particle matter; such particle matter is too heavy to be swept from the room by air treatment system (twice a day).
  - b. All wet cleaning will be accompanied with the use of a 10% IPA/DI water solution within the cleanroom to reduce ionic contamination brought into the area by unfiltered water.
  - c. Use sticky roller to remove particle matter. Such particles are solidly deposited on the floor and cannot be removed by vacuum cleaner (twice a day).

- d. Collect the waste material from the cleanroom area and dispose of it in the designated containers (three times daily).
- e. Vacuum cleaner brush and attachment will be inspected and cleaned outside the cleanroom to prevent contamination within the cleanroom area.
- f. Spot clean glass and wall panels with Crew 2 wiper and 10% IPA/DI water solution.
- g. All incoming material filter, blanks, must be cleaned again just before installation.
3. Weekly Cleaning Routine:
  - a. All glass panels, walls will be wiped with Crew 2 Wiper using cleanroom detergent and dilute with DI water (according to Manufacturing Specification).
  - b. All doors, partition walls, cabinet top and equipment top will be wiped with Crew 2 Wiper using cleanroom detergent diluted with DI water (according to cleaning procedures specification).
  - c. Thorough washing of waste container, such cleaning should be done outside the cleanroom area.
4. Full time protocol workers keep the entrances clean and inform the workers and visitors about the clean construction requirements, which are valid for the ultra-clean stage.
5. Prohibit entrance to the building of staff, which show repeatedly or serious irregular behavior.
6. Materials for the interior of the building will arrive on-site individually packed.
7. Before entering into the ultra clean area following general procedure of cleaning the material will be used:
  - a. The materials will be unpacked outside the building in a designated entrance area. This entrance will also act as an air-lock to keep the building with positive pressure, i.e. the entrance is relatively sealed. The outer box will be removed into trash containers. The material will be wiped down in the designated entrance area.
  - b. For filters and blanks the polyethylene plastic bags will be removed in steps according to the temporary working place storage and final clean/quality check just before installation. Special attention will be paid to the housekeeping, to keep the working area in the whole fab safe, neat and clean.
  - c. Components, which arrive not in clean condition, are cleaned with humid cloths or vacuum cleaner before the assembly.
8. The passenger and material traffic is only allowed via air locks. See section 01110 for Gowning Procedures. Sticky tacky mats are installed at the entries to the clean areas. Humid wiping is the preferred cleaning method using 10% IPA/DI water solution. Surfaces are treated either with an anti-static or blown off with ionized, very fine filtered compressed air.
9. Just before the end of the ultra clean stage the cleaning is performed according to the procedures, which will be used during cleanroom operation. An example of a frequency chart is given below:

<b>Item</b>	<b>Method</b>	<b>Cleaning Frequency</b>
flooring	wet mop and vacuum	every hour, on-going
baseboards	scrub	weekly or at QA request
floor grates	damp wipe	daily
Air vents	vacuum	weekly
door jambs	damp wipe	daily
mats	wet mop	twice a day
plenums	wet mop and vacuum	daily

steel work, pipe racks	damp wipe and vacuum	daily
------------------------	----------------------	-------

10. The cleaning operations shall be documented continuously during all stages of construction.

**END OF SECTION 01111**