ISO Class 7 (Class 10,000) Cleanrooms

CLEANROOM CLEANING PRODUCT GUIDE

A guide designed to outline the process of cleaning and maintaining ISO Class 7 (Class 10,000) Cleanrooms

- **Cleanroom Facts**
- **Cleanroom Classifications**
- **ISO Class 7 Cleaning Tips**
- **ISO Class 7 Garment Tips**
- **Proper Wipe Usage**
- **Recommended Supplies**

By Blue Thunder Technologies

Cleanroom Cleaning

WHAT ARE CLEANROOMS?

- A cleanroom or *clean room* is a controlled environment, typically used in manufacturing processes and scientific research facilities
- A cleanroom is designed to control contamination by monitoring airborne and surface particles, liquid levels, and static electricity.
- Use of filtration systems such as a high-efficiency particulate air (HEPA) and/or ultra-low penetration air (ULPA) filters aids in the removal of airborne particles.
- Two Standards are commonly used to classify cleanrooms. The Federal standard 209E is used domestically and the standard TC 209, established by the International Standards Organization, is recognized worldwide.

CONTAMINATION AND SOURCES

- Contamination can be caused by a number of environmental factors such as people, activities (such as movement), outside contaminants, HVAC systems and more.
- Contamination or particles can be found in the form of fibers, hair, skin flakes, bacteria, cosmetics and more
- A person in a sitting position produces about 100 thousand particles. A person walking 5 miles per hour produces 10 million!
- Ambient air outside in a typical urban environment contains 35,000,000 particles per cubic meter.

CONTAMINATION CONTROL

- Can be achieved by using the proper HEPA filtration system, furniture, procedures, garments, cleaning tools, wipes and more.

CLEANROOM ETIQUETTE

- Wear only cleanroom approved apparel. Depending on the cleanroom class and size, this may vary. Typically, garments such as gloves, lab coats, shoe covers, and eye protection are required.
- It is recommended to clean shoes with a sticky mat unless your cleanroom requires shoe covers.
- No food or water.
- Cosmetics and fragrances are discouraged and sometimes prohibited.
- If you must sneeze, do so in a corner covering your mouth with your arm.
- Do not block exits or fire extinguishers.

Cleanroom Cleaning

APPROVED MATERIALS ONLY!

- Cleanroom approved notebooks, paper and pens
- Wood pulp based materials such as standard paper, books, notebooks, paper-towels and tissue are NOT cleanroom compatible
- Materials such as metal and plastic that can be cleaned with cleanroom wipes are typically approved
- Materials that can trap particles such as wood are NOT cleanroom approved

Minimum Apparel Recommendations					
	ISO 8 (Class 100,00)	*ISO 7 Class (10,000)*	*ISO 6 (Class 1,000)*	*ISO 5 (Class 100)*	*ISO 4 (Class 10)*
Beard Cover	✓	✓	✓	✓	✓
Face Mask				✓	✓
Boots			✓	✓	✓
Coverall			✓	✓	✓
Gloves				✓	✓
Hair Cover	✓	✓	✓	✓	✓
Hood				✓	✓
Frock	✓	✓			

Cleanroom Classification Chart

Class	FED STD 209E Equivalent	*Maximum concentration limits (particles/m³ of air) for particles equal to and larger than the sizes listed below*					
		0.1 micron	0.2 micron	0.3 micron	0.5 micron	1 micron	5 micron
ISO 1		10	2				
ISO 2		100	24	10	4		
ISO 3	1	1,000	237	102	35	8	
ISO 4	10	10,000	2,370	1,020	352	83	
ISO 5	100	100,000	23,700	10,200	3,520	832	29
ISO 6	1,000	1,000,000	237,000	102,000	35,200	8,320	293
ISO 7	10,000				352,000	83,200	2,930
ISO 8	100,000				3,520,000	832,000	29,300
ISO 9					35,200,000	8,320,000	293,000

Industries that use cleanrooms:

Aviation & Aerospace
Biotech
Education
Government
Health Care
Industrial / Electronics Manufacturing
Medical Device Manufacturing
Laboratory
Pharmaceutical
and More!

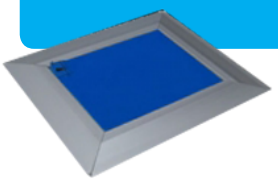
Cleanroom Cleaning

ISO Class 7 (Class 10,000) Cleanrooms

Minimum Apparel Recommendations	
	ISO 7 Class (10,000)
Beard Cover Face Mask	✓
Boots	
Coverall	
Gloves	
Hair Cover	✓
Hood	
Frock	✓

MAINTENANCE

It is very important to prevent contamination and maintain cleanliness by using sticky cleanroom mats before entering the cleanroom area. Replacement HEPA filters should also be changed regularly or as needed.



WHAT TO WEAR

Gloves: Exam grade nitrile gloves should be sufficient unless heavy duty cleaning or very harsh chemicals are being used.

Low Cost Garments: Lab coats with pockets or without pockets are usually acceptable for a class 10000/ISO 7 cleanroom. However a full coverall is sometimes used, without a hood or boots such as this polypropylene coverall or see this option with an attached hood and boots.

Medium priced garments: SMS lab coats are usually acceptable for use in a class 10000/ISO 7 cleanroom. However full coveralls are sometimes used, available without an attached hood and boots (GAS-DCWH-(SIZE)-40EWA), or with an attached hood and boots.

Higher priced Garments: Tyvek lab coats are usually acceptable for use in a class 10000/ISO 7 cleanroom. However a full coverall is sometimes used, with open wrists and ankles or with elastic wrists and ankles.

Of course, quality and durability increases as the price increases.

Bouffants and ***shoe covers*** are recommended in any class cleanroom.

Face masks and ***eye protection*** is not usually necessary to maintain cleanliness in a class 10000/ISO 7 cleanroom.

ISO Class 7 Cleaning Basics

CEILINGS

Cleaning should begin from the top down. Tacky rollers with extended handles can make this task much easier. In some cases it may be necessary to wet mop the ceiling. In this case, a self-wringing sponge mop with an extendable handle can be used. Another option is a flat mop with an extendable handle. Sometimes it is more effective to use a cleanroom wiping material cut to the size that will wrap around the head of an extendable mop handle. Occasionally, vacuum systems equipped with HEPA filters are used.

Di Water, a blend of Di Water and Isopropyl alcohol blends, cleanroom compatible cleaners, and disinfectants are examples of cleanroom compatible cleaning solvents.

WALLS

Walls can all be cleaned using the above mentioned methods. However, hand wiping is often more effective. It's recommended to use a dry cleanroom wipe (which can also be combined with a solvent). A lint-free nonwoven wipe or a polyester knit wipe will work best because both are extremely low in particle generation and chemical extractables.

Di Water, a blend of Di Water and Isopropyl alcohol blends, cleanroom compatible cleaners, and disinfectants are examples of cleanroom compatible cleaning solvents.

ISO Class 7 Cleaning Basics Cont.

SURFACES

Surfaces are typically cleaned by using hand wipes, such as NOVA-TECH™ 1000 Lint Free Nonwoven Wipers. Cleanroom wipe dispensers such as the GRAB-EEZ™ make the storage and distribution of wipes easy. The GRAB-EEZ™ is very useful in eliminating wasteful use of wipes and cross contamination of wipes. These dispensers store wipes until needed and are conducive to good housekeeping practices. Refills for this container are the specially designed 7" x 12" non-woven poly-cellulose wipes.

The use of pre-saturated wipes with a blend of 70% Isopropyl alcohol and 30% Di Ionized water is very effective when "wet cleaning" is necessary. These wipes are packed in user friendly containers and have no loose stringy fibers that are common with wet wipes in round pop-up canisters.

If static charge is a concern, ESD wipes are available such as VISION 5 ESD Wipers, or Vision 1 Pink ESD Wipers.

VISION 5 ESD Wipers employ carbon fibers within the knit fabric. Vision 1 Pink ESD Wipers are a more economical option. The fabric undergoes a multitude of special processes that include cleaning, scouring, cutting, and a special proprietary cleaning process.

FLOORS

The same rules apply for cleaning floors as they do for the ceilings except that an edgeless string mop can be added to your choice of mops. For these mopping systems, an autoclavable bucket and wringer is highly recommended.

* ***It is important to note that all cleanrooms are not created equal when it comes to proper cleaning procedures. It is always recommended to consult your cleanroom procedural manual before attempting any of the following tasks. This guide was intended to demonstrate cleanroom products and the applications for which they are typically used.***