

Cleanroom and Cleanroom Rules



What is a Cleanroom:

A room in which the concentration of airborne particles is controlled, and which is constructed and used in a manner to minimise the introduction, generation, and retention of particles inside the room and in which other relevant parameters, e.g. temperature, humidity, and pressure, are controlled as necessary.

ISO 14644 Cleanrooms and Associated Controlled Environments

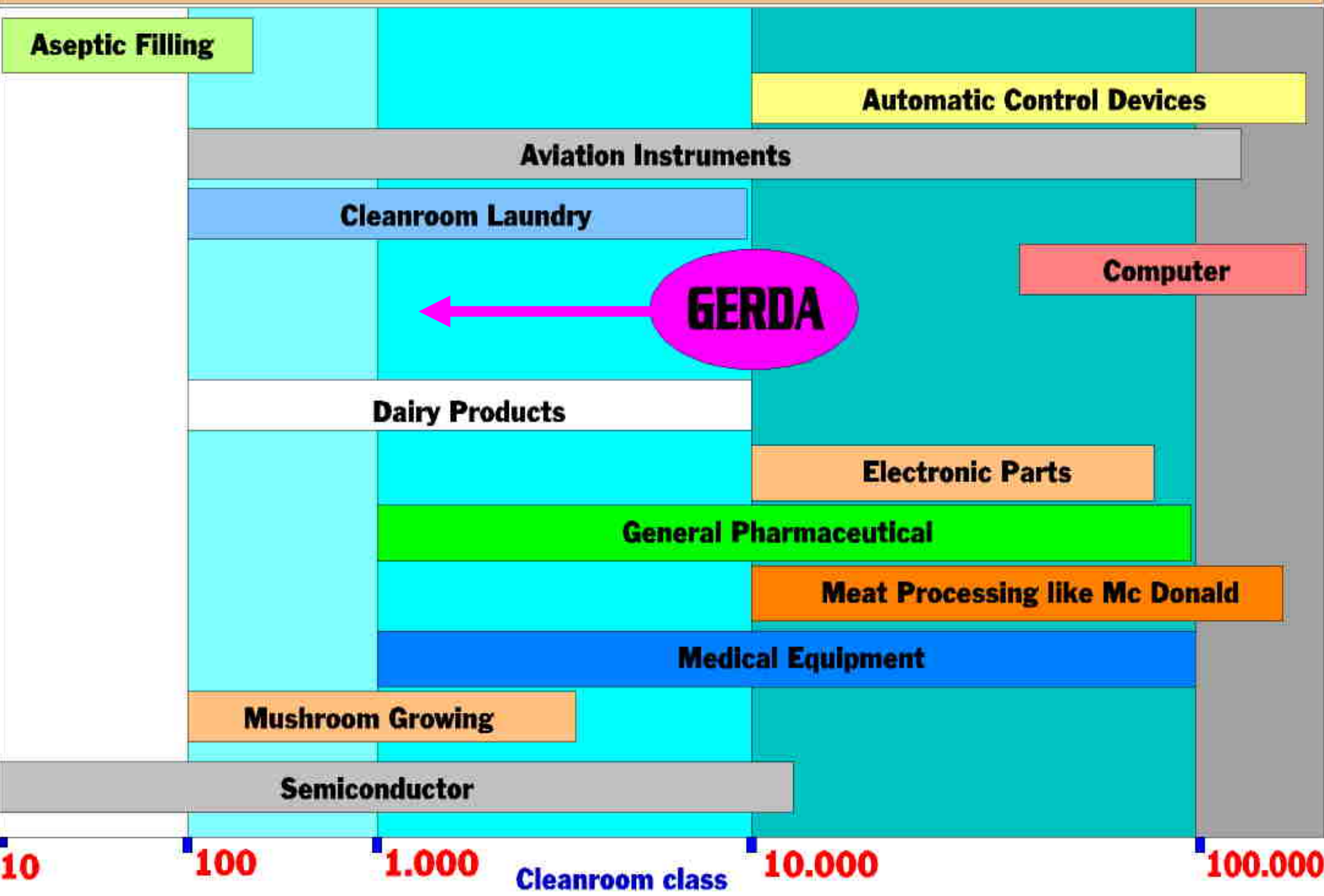
Cleanroom Class Comparison

ISO Classification Number	US FED 209E
ISO 1	
ISO 2	
ISO 3	CLASS 1
ISO 4	CLASS 10
ISO 5	CLASS 100
ISO 6	CLASS 1,000
ISO 7	CLASS 10,000
ISO 8	CLASS 100,000
ISO 9	



ISO 7 / CLASS 10,000 US FED 209E = 10,000 particles/ft³ per minute

Examples of Required Cleanliness for Various Manufacturing Industries



turbulent

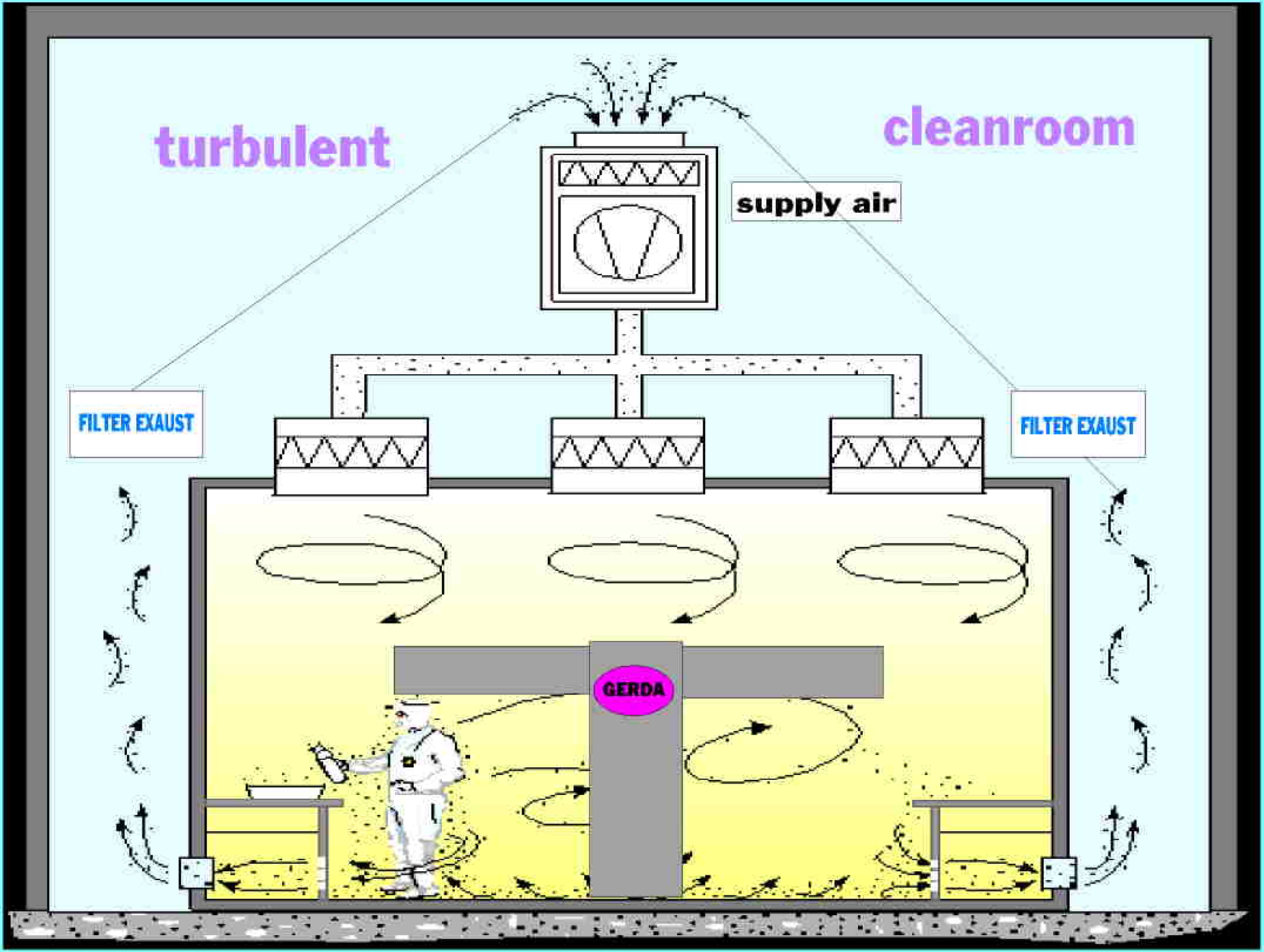
cleanroom

supply air

FILTER EXHAUST

FILTER EXHAUST

GERDA



VACUUM PUMP

HEPAFILTER

HEPAFILTER

HEPAFILTER

HEPAFILTER

HEPAFILTER

HEPAFILTER

S
I
T
O
V
E
R

HEPAFILTER

EMERGENCY STOP

20 PASCAL

GRAY ROOM

LOCK

EMERGENCY STOP

CLEANROOM



30 PASCAL

ELECTRONIC

HEPAFILTER

HEPAFILTER

HEPAFILTER

HEPAFILTER

HUMANS IN CLEANROOMS

There are both physical and psychological concerns when humans are present in cleanrooms. Physical behavior like fast motion and horseplay can increase contamination. Psychological concerns like room temperature, humidity, claustrophobia, odors and workplace attitude are important.

Below are several ways people produce contamination:

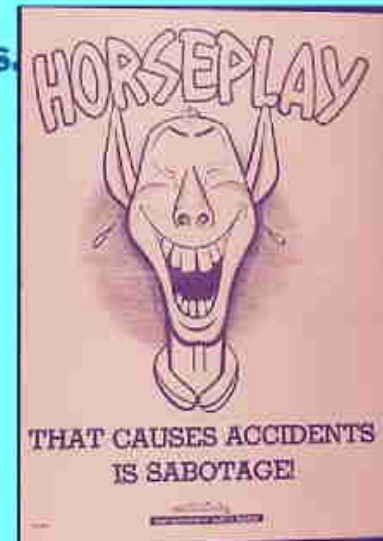
1. **Body Regenerative Processes**– Skin flakes, oils, perspiration and hair.
2. **Behavior**– Rate of movement, sneezing and coughing.
3. **Attitude**– Work habits and communication between workers.

People are a major source of contamination in the cleanroom.

Look at the people activities listed below.

Notice the number of particles produced per minute during these activities.

PEOPLE ACTIVITY	PARTICLES/MINUTE (0.3 microns and larger)
Motionless (Standing or Seated)	100,000
Walking about 2 mph	5,000,000
Walking about 3.5 mph	7,000,000
Walking about 5 mph	10,000,000
Horseplay	100,000,000



Personal Actions Typically Prohibited in Cleanrooms

- 1. Fast motions such as running, walking fast or horseplay.**
- 2. Sitting or leaning on equipment or work surfaces.**
- 3. Writing on equipment or garments.**
- 4. Removal of items from beneath the cleanroom garments.**
- 5. Wearing the cleanroom garment outside the cleanroom.**
- 6. Wearing torn or soiled garments.**

RULES FOR WORKING IN THE GERDA CLEANROOM



- **All cleanroom users are required to pass a cleanroom training**
- **You are not permitted do eat or drink in the cleanroom**
- **Clean any item you bring inside the cleanroom**
- **Your cleanroom clothes must be put on in the correct order- cap, coat shoes, if it is necessary gloves.**
- **Please ensure that your cleanroom clothes fit before you leave the changing area**
- **Close all buttons of the clean room coat, close the zips completely**

RULES FOR WORKING IN THE GERDA CLEANROOM



- **Cleanroom clothes must be washed or changed at least once a week.**
- **Do not leave your cleanroom clothes hanging in the changing area for weeks (if you are leaving), put it out to wash or throw it away!**
- **Always leave your cleanroom clothes on the coat-hanger.**
- **Keep the workplace clean.**
- **Horizontal surfaces must be cleaned frequently by every user!**
- **The cleanroom is no storage room...so please put back items to their storage place before you leave the cleanroom!**
- **Never leave the personell lock with your clean room garment on (except for emergency).**

In Case of Emergency

- Always follow the rules set forth by **LNGS**
- If an emergency requires evacuation, leave the cleanroom immediately, **do not stop to un-gown**
- Inform other users before leaving