Microbiological Monitoring on Gloves

PDA
Parenteral Drug Association

CONNECTING PEOPLE SCIENCE AND REGULATION®

Microbiological Monitoring on Gloves

- What states the Annex 1 to gloves in isolators?
- Why should we know the microbial initial situation?
- What could be the impact of a microbial contamination?
- How to measure the bioburden on gloves?
- How to handle the results of the microbiological monitoring?
- How to avoid / minimize a microbial contamination?

What states the Annex 1 to gloves in isolators?

- 4.20: Effects of a possible loss of integrity of the barrier
- 4.21: Materials used for glove systems should be demonstrated to have appropriate mechanical and chemical resistance
- 4.21: Frequency of glove replacement should be defined within CCS
- 4.22: Glove should be appropriate extended with fingers separated to ensure contact with the agent
- 4.22: Methods used (cleaning and sporicidal bio-decontamination) should render the interior surfaces and critical zone of the isolator free from viable microorganisms
- 7.16: Single use gloves should be regularly disinfected during operations and be changed immediately if they become damaged
- 9.22: The method of sampling used should be justified within the CCS

Why should we know the microbial initial situation?

- Gloves will be used as a manipulator inside the isolator
    - For process interventions
    - To move items inside the isolator
- Without cutting the barrier between the working chamber and the environment
- High bio load of the inner side of e.g., a defective glove does represent a contamination risk for product as well as for the isolator interior

→ Microbial load on the gloves must be as low as possible

What could be the impact of a microbial contamination?

- Microbial risk for contamination as microorganism could enter via gloves inside the isolator

- A production lot or a test result could be rejected when a glove with a pinhole has been found
- Could influence the product quality, validity of a sterility testing

→ Isolator should be kept free from dirt and microorganism

How to measure the bioburden on gloves?

- Define test positions in advance
  - Usually positions with contact to product, e.g., fingertips, palms

- Testing at regular intervals, e.g.
  - Before and after each decontamination
  - Before and after each production session
  - Before and after each batch

pda.org

How to measure the bioburden on gloves?

- With contact plates / settle plates on the outer surface → exposed to the H_2O_2 / product
- With SWABS on the inner surface

- With settle plates (90mm) glove print 5 fingers
  - Underside of the distal phalanx of the thumb for at least 3s on the agar surface and then the same for the 1st phalanxes of the other fingers
  - Clean the fingertips with ethanol 70% or IPA 70%
  - Incubate the plates for 7 days at 32.5±2.5°C, counting cfu after 3 and 7 days (or every day)

- With SWABS
  - Swab the defined position on the glove
  - Spread the SWAB on a settle plate
  - Incubate the plates for 7 days at 32.5±2.5°C, counting cfu after 3 and 7 days (or every day)

  Practical Part

How to measure the bioburden on gloves?

- Contact plates best method even if surface is not flat
- Swabs need additional laboratory handling before sample incubation

- Recovery not very high for both options

- The longer the contact time between sample position and agar surface the better the transfer of microorganism
- Contact pressure is also important for the transfer

- Sample of non-dominant hand may be more important than sampling of dominant hand
  - Non-dominant hand could touch tip of a syringe or needle or hold ampoules, vials, syringes, …

How to handle the results of the microbiological monitoring?

- Limits depending on cleanroom class
  - Usually grade A in the isolator

Grade	Air sample cfu/m^3	Settle plates (diam. 90 mm) cfu/4 hours [a]	Contact plates (diam. 55mm), cfu/ plate [c]	Glove print, Including 5 fingers on both hands cfu/ glove
A	No growth[b]			
B	10	5	5	5
C	100	50	25	-
D	200	100	50	-

- Actions need to be defined by each company individual
- Could depend on the following:
  - Size of leakage
  - Timepoint of the result (before or after production)
  - Amount of contamination
- Decision needs to made for manufactured product
- Risk assessment

How to avoid / minimize a microbial contamination?

- Keep integrity of gloves
  - Avoid leakages
  - Keep microbial contamination of glove port as less as possible
- Right behavior by working with gloves
  - Aseptic working technique
  - Move slow and calm in gloves
  - Be careful with sharp items, e.g., scissors, broken vials, …
- Control of bio load by disinfection of hands and glove's inner side as well as microbiological environmental monitoring
- Operator should use additionally single gloves for entering the isolator gloves
- Change of isolator gloves in defined time intervals (customer SOP)

→ Tight gloves are an effective barrier for microbiological contamination

How to avoid / minimize a microbial contamination?

- Reducing bioburden on outer surface of glove
- Current good practice:
    - Sanitization of non-isolator surfaces of isolator gloves
    - Sanitization of operator gloves
    - Wearing sterile gloves when using an isolator glove
    - Wearing a second pair of gloves

pda.org

Theresa Ladwig (theresa.ladwig@skan.ch)
strategic Product Management

pda.org