

Technical Textile

Medical Textiles

(Unit 2)

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Introduction to medical textiles

- Medical textile is an emerging sector of technical textiles industry and its growth is fuelled by the constant improvements in healthcare as well as the innovations in the textile field.
- Advanced medical textile is significantly developing area because of the major expansion in the fields like wound healing and controlled release, bandaging and pressure garments, implantable medical devices, and development in healthcare and hygiene products.

Introduction (cont...)

- In today's textile industry, traditional products are facing tough competition and the manufacturers are upgrading their business into more value added areas.
- In current scenario consumers are becoming more and more health conscious, medical textile materials that focus on the human health are a new discipline encompassing textile technology, medical science, material engineering.
- Medical textile is one of the most technically sophisticated and rapidly advancing fields in functional textile materials.

Introduction (cont...)

- The Association of Operating Room Nurses recommended that the fabrics used in Operating Room (OR) such as surgical gowns, masks, gloves and drapes must prevent/ minimize the possibility of passage of bacteria from non-sterile to sterile areas.
- The Hospital Association states that while the average visit to a community hospital has become shorter due to an aging population, more and more people are being admitted into hospitals.

Introduction (cont...)

- It is recognized that achieving a maximum protective effect on surgical gowns against liquids is a major challenge. The nature of activities in the surgical environment creates an opportunity for gowns to be challenged by body fluids such as blood, perspiration and other liquids such as alcohol or iodine.
- Usually clothing is a product that is used only by one end user, the wearer. However patient gowns are unique because they have two types of end users - the patients and the caregivers.
- In addition, the surgical gowns should also aid in resisting the liquid transmission, abrasion and punctures.

Future Challenges

- The cost of providing a modern healthcare system is also increasing year by year. For making of barrier protective single use gowns and drapes, there is necessity of the adherence to federal regulation and professional guideline.
- Fluid resistance clothing needs to be used, if there is a possibility of splashing or spreading of blood on the fabric.

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- The impact of AIDS and other contagious diseases creates the need of such protective clothing. The protective material also needs to be water proof but breathable to provide comfort to the user.
- Association for the Advancement of Medical Instrumentation (AAMI) has suggested standard PB 70:2003 Liquid barrier performance and classification of protective apparel and drapes intended for use in healthcare facilities which is equal to the standard ASTM 1671 intended for healthcare.

History

- Surgical gowns were introduced in the late 1800's, because the blood from patients would splatter on the surgeons clothing and skin and any bacteria in the blood could cause an infection to the surgeon.
- The use of traditional cotton gowns has decreased significantly due to their lack of protection.



Late 1900's Medical staff wearing cotton gowns

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- Surgical gowns are used as protective clothing in the operating theatre to prevent the spread of bacteria from patients to surgical staff and therefore reduce the incidence of hospital acquired infections.
- Moreover, during the surgical process, surgeons may be exposed to sprays of blood or other body fluids that contain blood borne pathogens.

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- There is an increasing need to protect medical staff from the infectious blood borne pathogens such as HIV and HBV.
- Smith and Nichols defined that an aseptic barrier is any type of material placed between the operative incision and the possible source of bacteria.
- The first sterilized surgical gowns made up with 140-count cotton and were considered to be acceptable because of their good permeability to air, softness, light weight and comfort.

List of various organizations

- Center for Disease Control (CDC)
- The Association of Operating Room Nurses (AORN, 1992)
- the Association for the Advancement of Medical Instrumentation
(AAMI, 1978)

Suggestions given by different organizations

- CDC- Surgical gowns and drapes, either disposable or reusable, should be impermeable to liquids and viruses and be comfortable to the wearer.
- AORN- The fabrics used for gown and drapes must minimize passage of bacteria from non-sterile to sterile areas and resist liquid transmission, abrasion, and punctures.

- AAMI- In 1978 the Association for the Advancement of Medical Instrumentation (AAMI) established a committee to develop guidelines for selecting and processing aseptic barrier materials. The classification system established by this standard is intended to set a common foundation for the different levels of barrier protection available but does not take into account potential variations in specific procedures and techniques used in healthcare facilities.

AAMI protection levels for surgical gowns

Level	Test	Results
1	Spray impact penetration test (AATCC 42)	≤ 4.5 g
2	Spray impact penetration test (AATCC 42)	≤ 1 g
	Hydrostatic head test (AATCC 127)	≥ 20 cm
3	Spray impact penetration test (AATCC 42)	≤ 1 g
	Hydrostatic head test (AATCC 127)	≥ 50 cm
4	Synthetic blood test (ASTM F1670)	Pass
	Bacteriophage test (ASTM F1671)	Pass

Thanks

(Next lecture will be uploaded soon)