

TUBING EXTRUSION FOR MEDICAL APPLICATIONS

By Polymerupdate Academy



Prepared & Conducted by

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About The Course

- **Lecture 1: Basic Fundamentals**
- **Lecture 2: Plastics and Medical Devices**
- **Lecture 3: Tubing Extrusion – Process and Equipment**
- **Lecture 4: Tubing Extrusion – Materials and Applications**

Summary

This training session is designed to give the audience an introduction to the use of plastics in medical applications, followed by a thorough exposure and knowledge of the extrusion of medical tubing. Selection of the correct material for the device application and the main issues governing the extrusion of small bore and multi-lumen medical tubing will be actively discussed.

As we are aware, medical science continues to advance in both disease treatment strategies and the understanding of medical conditions. Management of the diseased state of the body is frequently done using medical devices. Plastics constitute an important part of medical devices. Plastics have an inherent advantage over traditionally used materials, such as glass and metals, in medical devices. Plastics are lightweight, inexpensive and often compatible with bodily fluids. Most plastics are also comparable in density to the body and thus are easier to be incorporated into the body.

In the tubing form, the plastics used need to display a high degree of resistance to chemicals, both natural and synthetic, that the device will come in contact with. The role of the nature and properties of plastics in the correct functioning of a device is critical. Very often the selection of the plastic can dictate the efficacy of the device and the treatment of the disease.

Many medical devices are also implantable systems. These devices, including the tubing, are implanted inside the human body and perform critical functions in the regulation of some bodily function. The implantable devices are further

divided into short term implantable and long-term implantable devices depending on the duration of the dwell time of the implantable device inside the body. Most devices shorter than a 90-day dwell time are classified as being short-term implants.

This course will discuss the factors that dictate proper selection of the material for the device and the application. For e.g., the factors that are important in deciding the material for a short-term implantable drug delivery catheter are different than the factors that allow one to choose the right material for a long-term implantable insulation tubing for a cardiac pacemaker.

Each material has unique extrusion conditions that one must understand. Importantly there are numerous process issues associated with different materials that one needs to be aware of to obtain a good and acceptable extruded tubing.

The intention at the end of the course is for the audience to gain knowledge of plastics and medical devices, being able to choose the right material for different applications and understanding the issues associated with the tubing extrusion process.

What Will You Learn?

- The fundamentals of polymers, their nature, chemistry, characterization, properties and applications.
- The basics of extrusion, design of extrusion systems, process control and equipment.
- Basics of organ systems and medical device applications.
- Plastics used in different medical applications. Basic requirements of a plastic material to function as a biomaterial.
- The layout of the tubing extrusion process and the equipment used. Effect of process parameters on process and product output. Various equipment used and their process control.
- Terminology of Medical Tubing and the related extrusion parameters.
- Plastics used for medical tubing applications. Their extrusion parameters and characterization requirements.
- Applications of medical tubing and their usage inside and outside the body.

Who Should Attend?

This is a technical training program with an emphasis on linking plastic properties and processing attributes to medical tubing applications.

It will assume that the audience participants have background in chemistry, chemical engineering, materials science, mechanical engineering, bioengineering or a related discipline.

- Engineers, Chemists, Materials Scientists.
- Product and Application Development Professionals.
- Manufacturing Professionals related to the Medical Device Industry.
- Extrusion Equipment Manufacturers.
- Professionals from the Plastics industry looking to broaden/deepen their understanding of Medical Device Technology.
- Marketing and Commercial Professionals looking to broaden/deepen their understanding of applications of Medical Devices.
- Business owners and entrepreneurs with a interest in Medical Device Technology.
- Teachers and students studying plastics in Medical Applications.
- Innovators and start-up founders working on new technologies and solutions involving medical device technologies.

About The Trainer



DR. AJAY D PADSALGIKAR

Bachelor of Engineering, Polymer Engineering, Ph.D.,
Polymer Science & Engineering

Dr. Ajay graduated with a degree in Polymer Engineering from the University of Poona, India in 1990. He then completed a PhD from Clemson University, SC, USA in 1996. In the field of polyurethanes, Ajay has over 20 years of experience. He has worked at different companies, Huntsman Polyurethanes in Belgium, AorTech Biomaterials in Australia, Abbott Labs in Minnesota and DSM Biomedical in Pennsylvania. Ajay has been involved with different aspects of polyurethane chemistry, morphology, and processing for medical devices.

Dr. Ajay joined Biolinq Inc., San Diego, California, as a Technical Director in July 2022, where he is working on a range of material solutions for biosensors in medical devices.

Dr. Ajay has more than 30 published scientific papers and 10 patents. He has also authored two books, 'Plastics in Medical Devices for Cardiovascular Applications' and 'Applications of Polyurethanes in Medical Devices' published

About Polymerupdate Academy

At Polymerupdate Academy, we offer a broad range of courses in the Petrochemical and allied industries, in collaboration with renowned professors from the field of education. The courses address the critical, technical and managerial needs in both the Public and Private sectors and are unique to each individual client.

Learn about the many benefits of cutting-edge, online educational courses for a life-long career in the fields of Polymer Science and Composites. We have ensured that the courses are affordable yet valuable and play a key role in upskilling those who sign up for the training. These courses are carefully designed to help professionals manage everyday challenges with greater confidence and expertise.

The Polymerupdate Academy also provides customised corporate training courses to assist businesses with their specific requirements. We believe that capitalizing on effective training to equip employees with expanded market knowledge, is a key to greater efficiency and achievement, not just for the business alone, but for the industry as a whole. The various courses provided at the academy, address the critical, technical and managerial needs in both the public and private sectors.

The Customised course programmes are created through sessions based on detailed requirements with a balance of theoretical ideas and creative inputs. Mix and match your expertise and build a course that suits you best!

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