

ONLINE TRAINING

for Blow Molders



**EXTRUSION
BLOW MOLDING**



**MATERIALS &
HANDLING**



**BLOW MOLDING
MAINTENANCE**



**PRINT READING
AND GD&T**



**LEAN MFG.
AND QUALITY**



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COMPREHENSIVE ONLINE TRAINING FOR EXTRUSION BLOW MOLDING

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All our online courses can be viewed on virtually any computer, tablet or smartphone with an internet connection

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Extrusion Blow Molding Series

Our online **Extrusion Blow Molding** training courses were developed in collaboration with The Society of Plastics Engineers (SPE) and are designed to provide participants with a thorough understanding of what's involved in the Extrusion Blow Molding process.

The topics covered in this training series include a wide range of extrusion blow molding information and common procedures. All three courses use standard industry terms and practices with an emphasis on safety, and will enhance the knowledge base of all personnel.

Part 1: Primer

- ▶ Material Handling
- ▶ Extrusion Blow Molding
- ▶ Product Testing
- ▶ Basic Terminology
- ▶ Understanding Polymers

Part 2: Machinery

- ▶ Material Preparation
- ▶ Part Forming
- ▶ Flash Removal, Product Testing & Regrind
- ▶ Startup, Color Change and Shut Down
- ▶ Emergency Situations

Part 3: Problems and Solutions

- ▶ Troubleshooting
- ▶ Part Defects
- ▶ Preventive and Corrective Actions
- ▶ Scrap, Regrind and Rework
- ▶ Product Tracking

🕒 3 Online Courses (3-5 hours)†

product id: [rt_2021_us](#)

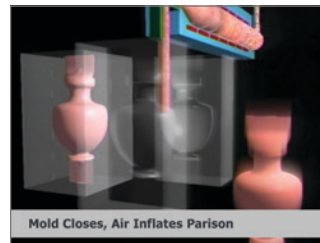
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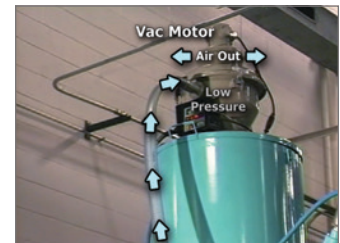
Material Preparation



Extruder Melts and Extrudes Parison



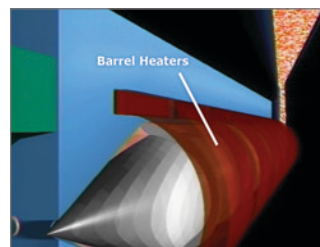
Mold Closes, Air Inflates Parison



Vac Motor
Air Out
Low Pressure



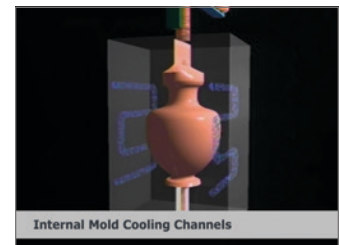
Excess Material (Flash) is Removed



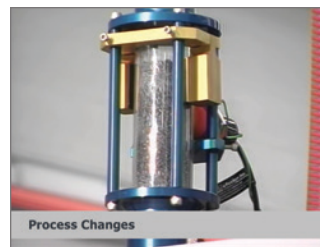
Barrel Heaters



Starting up with unmelted material in barrel can cause injury or damage the machine



Internal Mold Cooling Channels



Process Changes



Always seek the ROOT CAUSE of the problem

Single Screw Extrusion

Our **Single Screw Extrusion** series is designed to provide training for anyone working in a production environment. These programs use animation and actual production footage to demonstrate complex concepts. Important safety precautions are stressed throughout these training programs.

Tailored for Single Screw Extruders, these training courses provide specific information for all extruders from blown film to profile extrusion. Whether you use single stage or vented extruders, the information will relate to the equipment, materials, and processes operating at your facility.

This training series will help teach any employee on the concepts relating to the machine, material, process, quality, startup, shutdown, problem solving, material handling as well as the correct terminology associated with Single Screw Extrusion.

Part 1: The Extruder

- ▶ Discusses the drive system of the extruder including the motor and gearbox
- ▶ Introduces the material feed systems used in Single Screw Extrusion
- ▶ Covers the entire screw and barrel assembly including screw design and venting
- ▶ The die and adaptor are presented along with the extruder's control system

Part 2: Plastic Materials

- ▶ Introduces the plastics industry and the nature of plastic materials
- ▶ Explains complex concepts such as melt viscosity and polymer flow
- ▶ Provides detailed explanations of both shear and shear heating with plastics
- ▶ Covers the behavior of both amorphous and semi-crystalline polymers
- ▶ Gives an understanding of shrinkage, orientation, and degradation

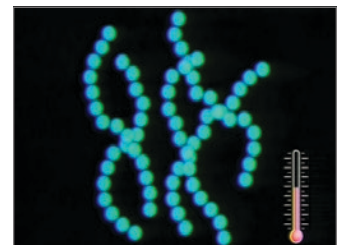
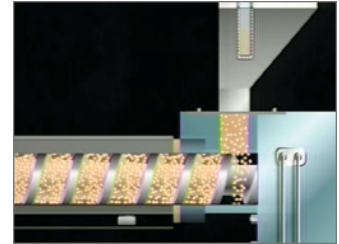
Part 3: The Extrusion Process

- ▶ Explains the mechanics of Single Screw material feeding and conveying
- ▶ Melting processes for standard and barrier screw designs are covered in detail
- ▶ Describes the commonly used types of dispersive and distributive mixing systems
- ▶ Covers the pumping, shaping, cooling, and cutting of the extrudate
- ▶ Cites important safety precautions for working around extrusion equipment

Part 4: Preventive and Corrective Actions

- ▶ Covers common extrusion defects and their typical causes
- ▶ Explains the importance of accurate process monitoring
- ▶ Differentiates between open and closed loop process control systems
- ▶ Ways to adjust the process and detect equipment problems are also covered

continued on next page...



Part 5: Startup, Changeover and Shutdown

- ▶ Provides common procedures to start-up and shut-down an extruder
- ▶ Details both upstream and downstream changeovers
- ▶ Die, material, and color change considerations are also covered
- ▶ The importance of safety and cleanliness are stressed throughout this series

Part 6: Quality

- ▶ Defines quality and its importance to the success of extrusion operations
- ▶ Explains the concepts of quality assurance vs. quality control
- ▶ Covers the form, fit, and functionality of the extruded product
- ▶ Critical vs. non-critical extrudate defects are compared and contrasted
- ▶ The importance of meeting the customer's needs is stressed throughout the course

Part 7: Material Handling

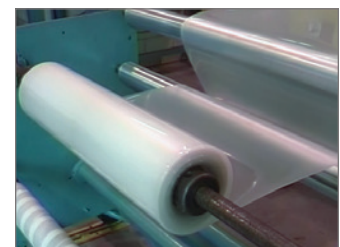
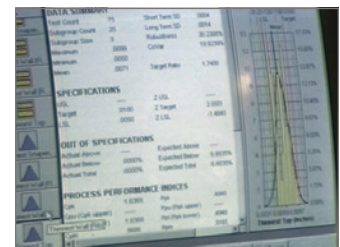
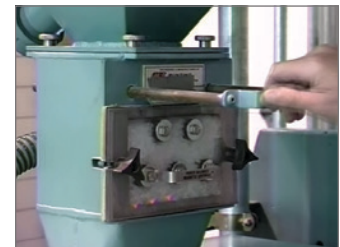
- ▶ Stresses the importance of proper material handling – from delivery to feedthroat
- ▶ Covers various vacuum conveyance and hopper loader systems
- ▶ The problems associated with not drying hygroscopic materials
- ▶ Details ways to blend materials while avoiding material contamination

Part 8: Problem Solving and Troubleshooting

- ▶ Focuses on getting the right answer in the shortest time
- ▶ Easy to follow problem solving steps and rules are detailed
- ▶ The importance of documentation and procedure

🕒 8 Online Courses (6-10 hours)[†]

product id: **rt_3021_us**



THE PROBLEM SOLVING METHOD:

| | |
|--|-----------------------------|
| 1 Identify Isolate Ignore | 2 Pick A Solution |
| 3 Take Action | 4 Check Results |



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Math for Blow Molders

This two-part online training program was created for all personnel within the blow molding industry who would like to expand or fine-tune their math skills.

Part 1

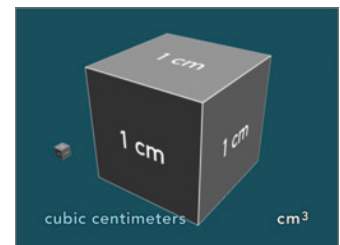
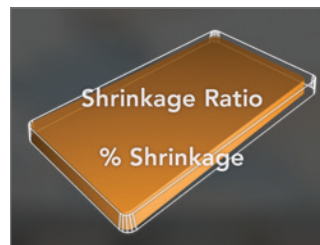
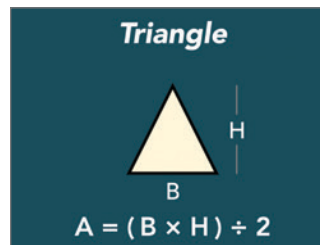
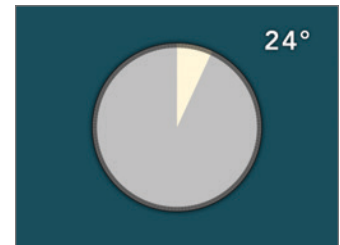
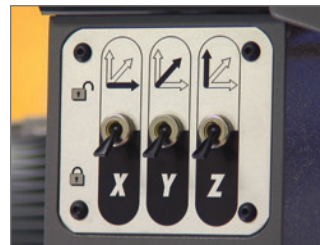
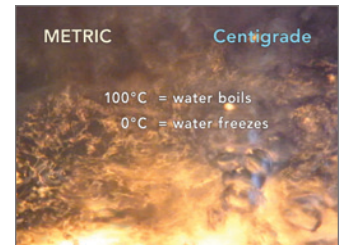
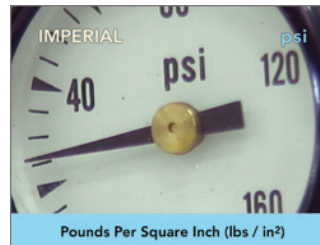
- ▶ Whole Numbers, Negative Numbers and Decimals
- ▶ Using a Calculator
- ▶ Addition, Subtraction, Multiplication and Division
- ▶ Rounding Numbers and Significant Figures
- ▶ Formulas, Equations and Order of Operations

Part 2

- ▶ Metric and Imperial Units
- ▶ Length and Distance
- ▶ Area, Volume & Flow
- ▶ Weight, Mass and Force
- ▶ Conversions
- ▶ Understanding Percentages
- ▶ Calculating Tolerances

🕒 2 Online Courses (3-4 hours)†

product id: **rt_2011_us**



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Understanding Plastics

This program explains how and why plastics are different and cites several different types of polymers and processing considerations.

Understanding Plastics emphasizes material handling, explains regrind, and covers the effects that moisture can have on molded part properties during processing.

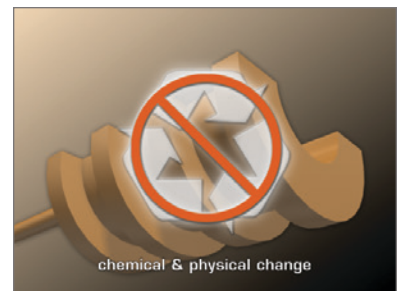
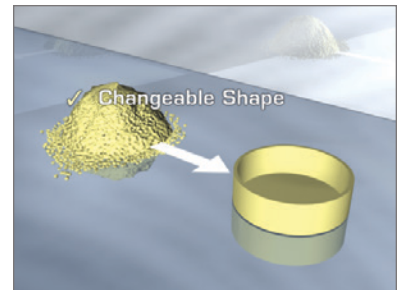
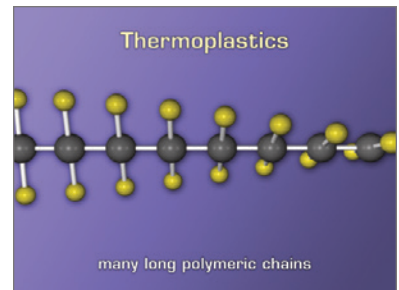
- ▶ The definition of plastics
- ▶ Polymer classification
- ▶ Material properties affected by processing
- ▶ Proper material handling techniques
- ▶ Processing characteristics of virgin and regrind

🕒 1 Online Course (1-2 hours)[†]

product id: **rt_0131_us**

🌐 Language Options

| | |
|------------|-----------------------------------|
| rt_0131_us | American English |
| rt_0131_uk | UK / International English |
| rt_0131_sp | Spanish |
| rt_0131_fr | French |
| rt_0131_bp | Brazilian Portuguese |
| rt_0131_mc | Mandarin Chinese |
| rt_0131_my | Bahasa Malaysia |



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Material Drying Technology

Routsis Training's two **Material Drying Technology** online courses provide participants with a better understanding of how different polymers are best dried and prepared for reliable processing. These courses show participants how proper plastics material handling and drying is critical to produce a consistent product and process.

Course One reviews polymer basics, as well as both hygroscopic and non-hygroscopic polymers — to better convey the importance of properly drying water-sensitive materials, while **Course Two** discusses material drying systems commonly used in industry, as well as common calculations to aid in proper material drying.

Material Drying Technology, Course 1

- ▶ Polymer Basics
- ▶ Hygroscopic vs. Non-Hygroscopic Polymers
- ▶ Hydrolysis
- ▶ Purposes of Drying
- ▶ Dewpoint
- ▶ Dewpoint Measurement
- ▶ Dewpoint Sensors
- ▶ Drying Procedures

Material Drying Technology, Course 2

- ▶ Hot Air Dryers
- ▶ Compressed Air Dryers
- ▶ Desiccant Dryers
- ▶ Vacuum Dryers
- ▶ Calculating Material Consumption
- ▶ Calculating Residence Time
- ▶ Calculating Dryer Capacity

🕒 2 Online Courses (1-3 hours)[†]

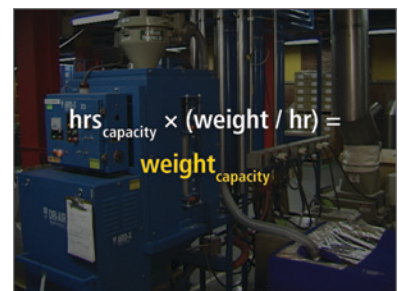
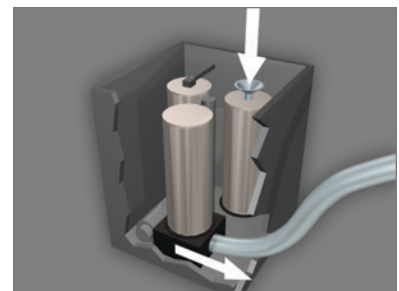
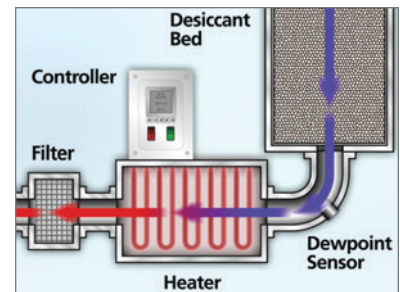
product id: **rt_0223_us**

🌐 Language Options

rt_0223_us **American English**

rt_0223_sp **Spanish**

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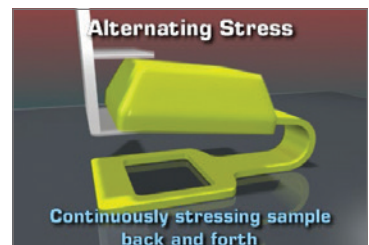
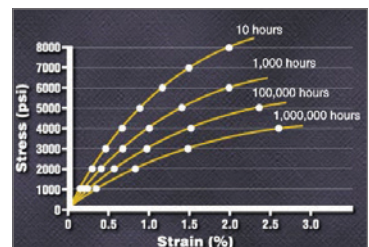
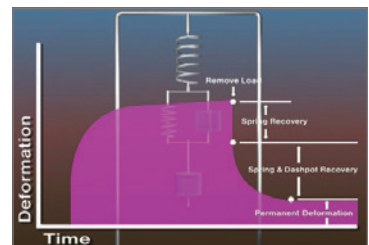
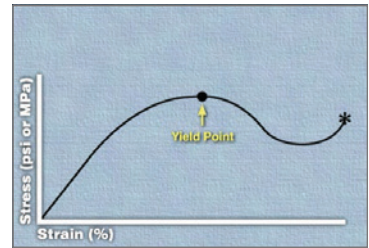
Mechanical Behavior of Polymers

This course details the mechanical properties and behaviors of plastic materials.

- ▶ The mechanical behavior of polymers
- ▶ Stress/strain curves
- ▶ Visco-elastic behavior of polymers
- ▶ Creep and stress relaxation
- ▶ Fatigue and cyclic stress

🕒 1 Online Courses (1-2 hours)[†]

product id: **rt_1332_us**



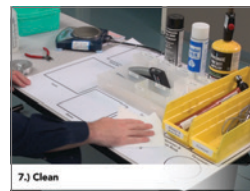
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The 5S System

5S is a critical component of Lean Manufacturing. The 5S system is used by successful manufacturing facilities worldwide. It consists of 5 simple and concise steps — Sorting, Straightening, Sweeping, Standardizing, and Sustaining — that can help your facility reduce clutter and waste and, ultimately, increase efficiency and productivity.

Our online **5S System** training courses are built on Routsis Training’s exclusive **SkillSet™** model. These courses combine clear online training videos and hands-on worksheets. This approach allows companies to perform the same type of classroom learning found in popular seminars in the comfort of their own production environment.

Like all our online training programs, the **5S System™** courses are cross-platform and are compatible with most modern web browsers and popular handheld devices, such as tablets and smartphones. This provides exceptional flexibility, allowing technicians to train at their own pace on the production floor.



Each unique training course is a blend of the following components:

| | |
|-------------------|--|
| BACKGROUND | <i>Your personnel understand the goal of each Production SkillSet™</i> |
| PURPOSE | <i>Employees learn specifically how each Production SkillSet™ applies to their job</i> |
| EQUIPMENT | <i>Items are detailed to ensure participants have the tools they need to succeed</i> |
| PROCEDURE | <i>Each step is demonstrated so personnel can proceed with confidence</i> |
| WORKSHEET | <i>Contains all the information needed to complete each lab</i> |

continued on next page...

Step 1: Sorting

In the 5S System, the Sorting step's goal is to eliminate all unnecessary items from the immediate workplace. This is done by sorting the workplace to determine what to keep, what to toss, and what to store. This helps prevent clutter from interfering with everyday production activities.

Step 2: Straightening

At the end of the Straightening step, everything in the workplace is neatly organized; resulting in a more convenient and more efficient workplace.

Step 3: Sweeping

In the Sweeping step, the best method for cleaning each selected area in the workplace is determined. A reasonable cleaning schedule should also be determined to ensure the workplace remains efficient, clean and organized.

Step 4: Standardizing

The goal of the Standardizing step is to achieve consistency. A similar appearance and layout should be applied to all workstations whenever possible. This step is often performed after a similar workplace or area within the plant has already been straightened.

Step 5: Sustaining

The purpose of the Sustaining step is maintenance. This is achieved by a review of the workplace and the existing Sorting and Straightening documentation — to ensure the workplace is efficient and up-to-date. This helps identify necessary materials or equipment that have been added to the workplace but have not yet been incorporated into the 5S documentation.

🕒 5 Online Courses + Worksheets (3-6 hours) †

product id: **rt_1501_us**

🌐 Language Options

rt_1501_us **American English**

rt_1501_sp **Spanish**

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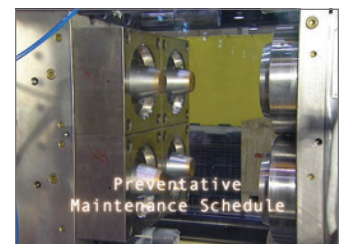
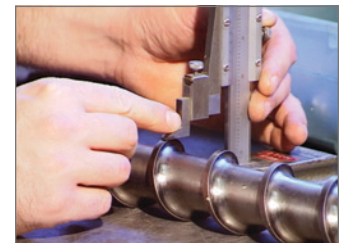
Molding Machine Maintenance

This online course is designed to introduce the many maintenance considerations for molding machines. Participants are also shown newer technologies; such as laser leveling, ultrasonic tie bar stretch measuring, and portable machine process monitors.

- ▶ Basic machine maintenance and safety concerns
- ▶ Fluid maintenance
- ▶ Platen maintenance
- ▶ Screw and barrel maintenance
- ▶ Preventative maintenance and logging

🕒 1 Online Course (1-2 hours)[†]

product id: **rt_0521_us**



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Molding Hydraulics

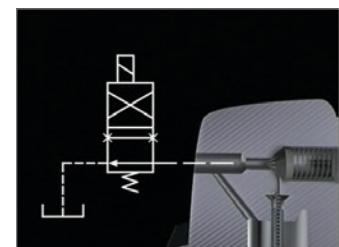
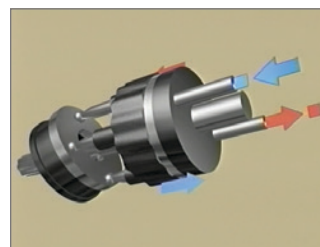
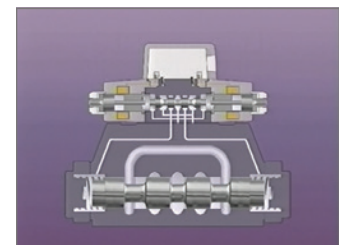
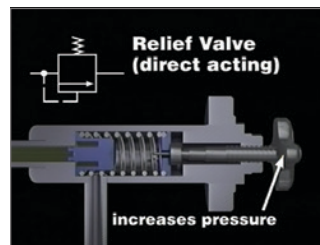
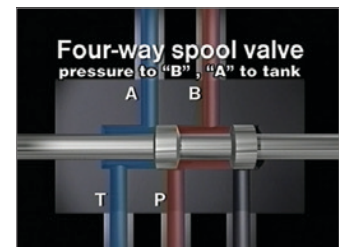
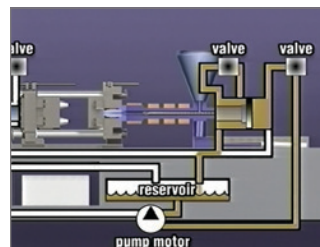
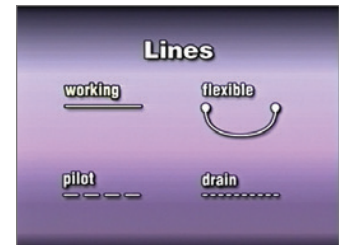
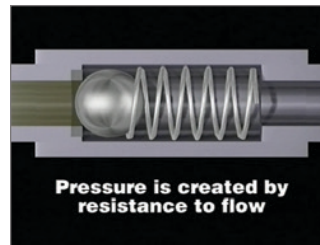
These courses demonstrate the importance of hydraulics and the proper maintenance of hydraulic components.

Machine operators will learn ways to reduce wear on hydraulic components, while more advanced employees concentrate on hydraulic print reading and theory.

- ▶ Basic hydraulic theory
- ▶ The role of hydraulics in molding plastic parts
- ▶ The function and purpose of hydraulic components
- ▶ Recognition of hydraulic symbols
- ▶ Directional valves and flow controls
- ▶ Hydraulic pumps and motors
- ▶ Proportional valves and servo valves
- ▶ Hydraulic fluid management

🕒 2 Online Courses (2-4 hours) †

product id: [rt_0531_us](#)



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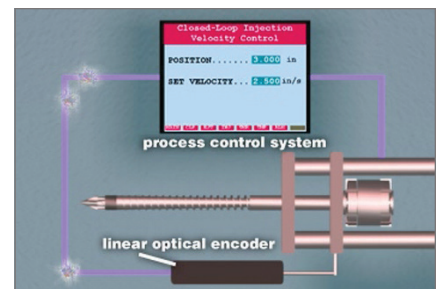
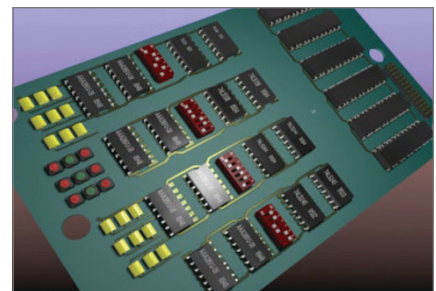
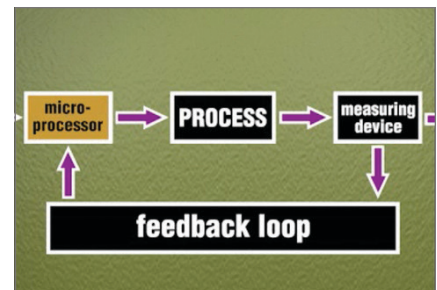
Process Control Systems

This training program details process control systems and is designed to help molders make more educated choices. Process Control Systems is a must for any facility which employs (or plans to employ) closed loop process control.

- ▶ Open loop vs. closed loop process control
- ▶ How process control reduces variation
- ▶ Closed loop controllers
- ▶ Proper use of process control

🕒 1 Online Course (1-2 hours)[†]

product id: **rt_0533_us**



[†] Course titles, descriptions, and images are provided for reference purposes only. Our courses are regularly updated and their contents may change without notice. The durations listed for courses are estimates only; actual completion time may vary. All text and images are the copyrighted property of Routsis Training.

Measuring Tools: Basic

Our **Basic Measuring Tools** training labs teach participants the correct usage and procedures for verifying the accuracy of measuring devices commonly used at your facility, including Go/No-Go Gauges, Pin Gauges, Linear Indicators, Depth Gauges, and Height Gauges. These basic gauges are used by most quality, machining, & tooling departments.

Each video/worksheet combination focuses on a particular measuring tool. The steps outlined in each course ensure the tool is being used properly and providing reliable measurements. Users will learn best-practices for handling and storing measuring equipment, stabilizing tools and part features for improved accuracy, and how to perform a simplified verification (also known as a “Field Check”) for each tool covered in the training series.

Based on Routsis Training’s exclusive SkillSet™ training model, these labs combine online instructional videos with hands-on training exercises — covering the background, purpose, required equipment, and operating procedures required to use each tool properly. Participants will practice inspecting the compliance of particular part features and documenting the results of these inspections — useful skills for ensuring consistent delivery of high-quality parts to your customers.



This product consists of 7 essential training labs:

- ▶ **Using a Go / No-Go Gauge**
Determine whether a part is acceptable or not; using a go / no-go gauge
- ▶ **Using Pin Gauges**
Determine if a part feature is within specification by taking pin gauge measurements
- ▶ **Using a Linear Indicator**
Determine if a part feature is within specification; based on a linear indicator measurement
- ▶ **Using a Depth Gauge**
Determine if a part feature is within specification; based on a depth gauge measurement
- ▶ **Using a Height Gauge**
Determine if a part feature is within specification; based on a height gauge measurement
- ▶ **Field-Checking a Depth Gauge**
Determine if a depth gauge is functioning properly by performing a field check
- ▶ **Field-Checking a Height Gauge**
Determine if a height gauge is functioning properly by performing a field check

⊙ **7 Online Courses + Worksheets**
(5-7 hours)[†]

product id: **rt_5101_us**

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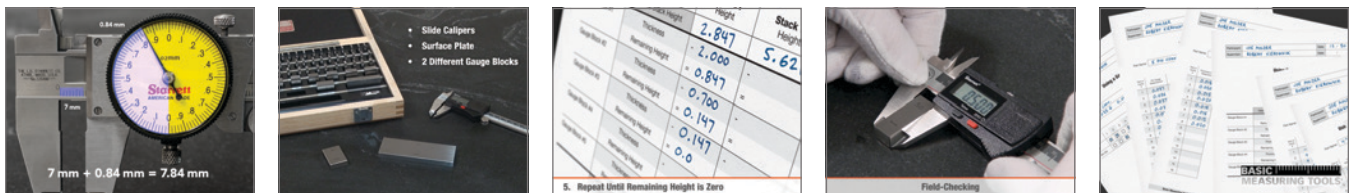
Measuring Tools: Intermediate

Further developing the knowledgebase established the basic-level courses, **Intermediate Measuring Tools** introduces three additional measuring devices: Gauge Blocks, Slide Calipers, and Outside Micrometers. These intermediate tools are commonly used by quality, production, engineering, tooling, machining, and maintenance personnel.

These Intermediate Measuring Tools labs cover Slide Calipers in particular detail. Participants will practice using these tools for taking outside, inside, and depth measurements. An additional lab also demonstrates field-checking procedures that can be used to verify proper calibration and functionality — ensuring accurate slide caliper measurements of part features.

Micrometer techniques and field-checking procedures are also introduced. This series contains 2 labs dedicated to the correct usage of an outside micrometer.

Built on Routsis Training's exclusive SkillSet™ training model, these unique courses combine instructional videos with hands-on learning and skills-development worksheets.



This product consists of 7 essential training labs:

- ▶ **Using Gauge Blocks**
Create three specific heights using multiple gauge blocks — and then verify these heights through measurement
- ▶ **Using Slide Calipers for Outside Measurement**
Determine if a part feature is within specification; based on an outside measurement taken with slide calipers
- ▶ **Using Slide Calipers for Inside Measurement**
Determine if a part feature is within specification; based on an inside measurement using slide calipers
- ▶ **Using Slide Calipers for Depth Measurement**
Determine if a part feature is within specification; based on a depth measurement using slide calipers
- ▶ **Using an Outside Micrometer**
Determine if a part feature is within specification; based on an outside micrometer measurement
- ▶ **Field-Checking Slide Calipers**
Determine if a slide caliper is functioning properly by performing a field check
- ▶ **Field-Checking an Outside Micrometer**
Determine if an outside micrometer is functioning properly by performing a field check

🕒 **7 Online Courses + Worksheets
(5-7 hours)[†]**

product id: **rt_5201_us**

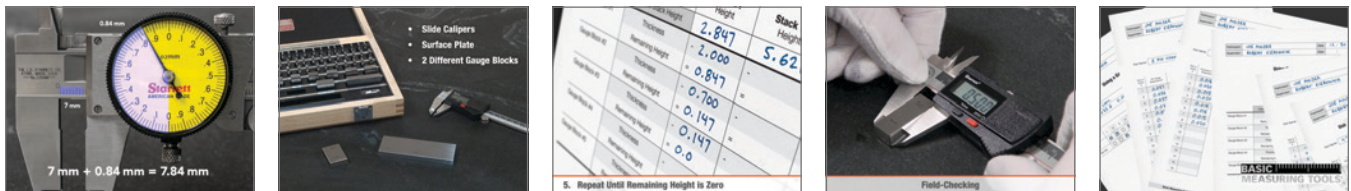
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Measuring Tools: Advanced

Expanding upon the measuring devices introduced in our basic and intermediate-level courses, **Advanced Measuring Tools** covers techniques for the proper usage of Thickness Gauges, Inside Micrometers, Depth Micrometers, Dial Bore Gauges, and Hole Gauges. These advanced tools are used by most quality, tooling, machining, and maintenance personnel.

Over the course of 7 intensive training labs, participants learn the background, purpose, required equipment, and procedures for the correct usage of various measuring devices. Proper handling and storage of these sensitive tools is stressed throughout the training. Several of these labs cover field-checking procedures, which can be used to ensure your facility's measuring devices are in proper operating condition.

These courses are built on Routsis's SkillSet™ training model, which combines instructional videos with hands-on learning and skills-development worksheets.



This product consists of 7 essential training labs:

- ▶ **Using Thickness Gauges**
Determine if a part feature is within specification by taking thickness gauge measurements
- ▶ **Using an Inside Micrometer**
Determine if a part feature is within specification, based on an inside micrometer measurement
- ▶ **Using a Depth Micrometer**
Determine if a part feature is within specification; based on a depth micrometer measurement
- ▶ **Using a Dial Bore Gauge**
Determine if a part feature is within specification; based on a dial bore gauge measurement
- ▶ **Using a Hole Gauge or Telescoping Gauge**
Determine if a part feature is within specification; based on a measurement taken with a hole gauge or telescoping gauge
- ▶ **Field-Checking an Inside Micrometer**
Determine if an inside micrometer is functioning properly by performing a field check
- ▶ **Field-Checking a Depth Micrometer**
Determine if a depth micrometer is functioning properly by performing a field check

⦿ **7 Online Courses + Worksheets
(5-7 hours)[†]**

product id: rt_5301_us

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Blueprint Reading

The six programs in our online **Blueprint Reading** training course develop workers' abilities to accurately locate and interpret dimensions on engineering drawings. These training programs are based on ANSI standards and incorporate input from a broad industrial cross-section.

The primary audience is production and inspection personnel, supervisors, group leaders, set-up personnel, and anyone who wishes to read engineering drawings.

Course 1: Introduction to Engineering Drawings

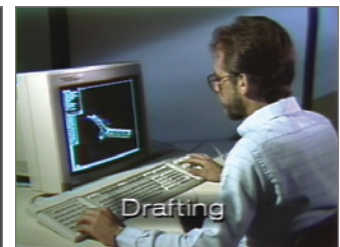
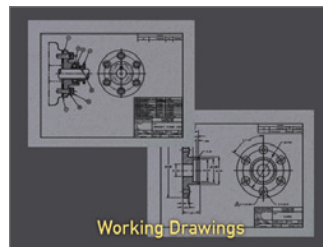
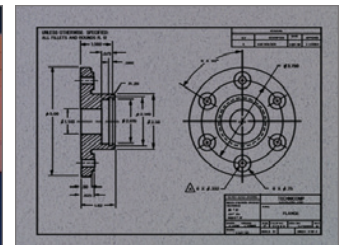
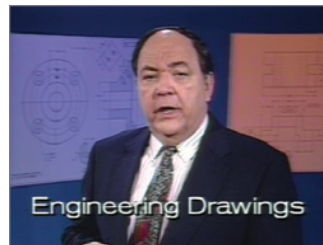
- ▶ Explains the purpose of an engineering drawing
- ▶ Distinguish between a detail drawing and an assembly drawing
- ▶ Interpret the drawing scale
- ▶ Explains the purpose of dimensions and tolerances

Course 2: Multiview Drawings

- ▶ The six principal views of a third-angle projection
- ▶ Identify the ISO symbols for third-angle and first-angle projections
- ▶ Auxiliary views, partial views, and enlarged views
- ▶ Determine which line takes precedence over another

Course 3: Sectional Views

- ▶ Determine which portion of the part is shown in section
- ▶ Explain the purpose of section lines and identify the ways in which they are used
- ▶ Identify and interpret the common drafting conventions applied to sectional views



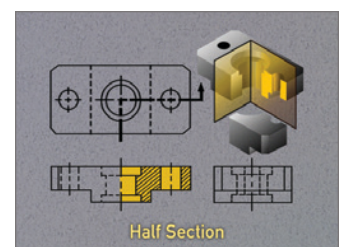
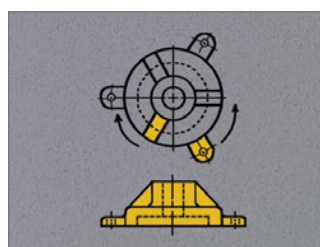
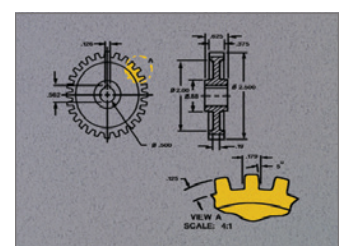
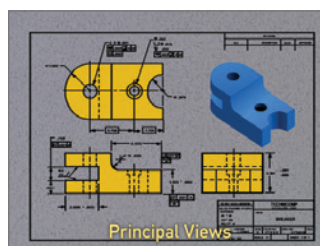
American National Standards Institute (ANSI)

| | |
|-------------------|-----------------------------------|
| ANSI Y 14.1-1980 | Drawing Sheet Size and Format |
| ANSI Y 14.2M-1979 | Line Conventions and Lettering |
| ANSI Y 14.3-1975 | Multi and Sectional View Drawings |
| ANSI Y 14.5M-1982 | Dimensioning and Tolerancing |
| ANSI Y 14.6-1978 | Screw Thread Representation |
| ANSI Y 14.36-1978 | Surface Texture Specifications |

| ITEM | QTY | DESCRIPTION | MATERIAL | PART NO. |
|------|-----|----------------|----------|-------------------|
| 8 | 1 | WOODRUFF KEY | STEEL | #308 |
| 7 | 1 | GASKET | BRASS | 573005 |
| 6 | 2 | WASHER | STEEL | 332 STANDARD |
| 5 | 8 | HEX HD BOLT | STEEL | 312-90 X 1.50 LG. |
| 4 | 1 | RETAINING RING | STEEL | 573004 |
| 3 | 1 | BALL BEARING | STEEL | 573003 |
| 2 | 1 | SPROCKET | STEEL | 573002 |
| 1 | 1 | HOUSING | CL | 573001 |

| DO NOT SCALE DRAWING | | TECHNICOMP CLEVELAND, OHIO | |
|--|--|-------------------------------|--|
| UNLESS OTHERWISE SPECIFIED TOLERANCES | | | |
| TITLE | | FLANGE | |
| XXI R 81 | | SIZE C 27XXXX | |
| 3/8" X .015" | | DWG NO. 573001 | |
| DRAWN: J. LAYNE | | CHECKED: J. CORNER | |
| REVISED: 6 SEPT 881 | | SCALE: 1:1 | |
| | | SHEET 2 OF 3 | |

Federal Supply Code for Manufacturers



continued on next page...

Course 4: Dimensions and Tolerances, Part 1

- ▶ Identify the size and/or location for a given part feature
- ▶ Correctly calculate the tolerance specified for a given part feature

Course 5: Dimensions and Tolerances, Part 2

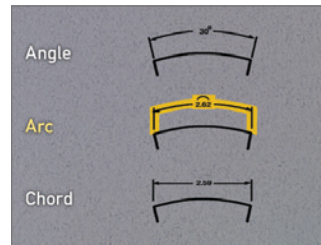
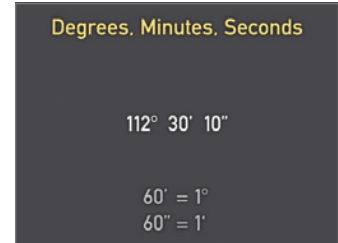
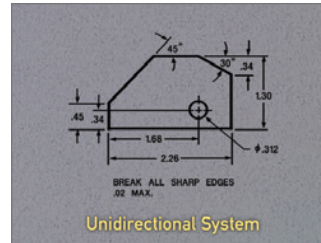
- ▶ Locate and interpret dimensions specified by chain, baseline and direct dimensioning methods
- ▶ Identify a datum feature and explain its purpose
- ▶ Explain how maximum material condition (MMC) and least material condition (LMC) apply to internal and external features
- ▶ Calculate allowance
- ▶ Identify a surface finish specification

Course 6: Part Feature Specifications

- ▶ Identifies twelve of the most common part features on a drawing
- ▶ How to correctly interpret part specifications

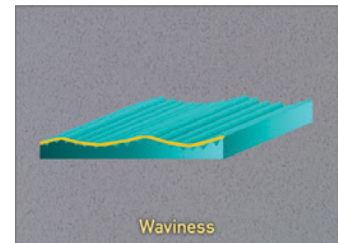
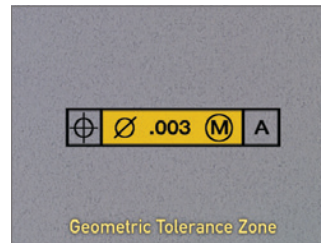
6 Online Courses (6-10 hours)[†]

product id: **rt_1011_us**



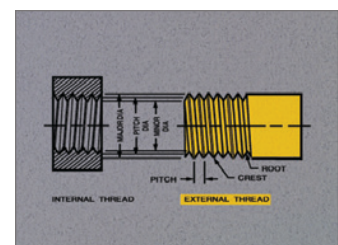
| Dimension (in.) | Tolerance |
|---------------------|-----------|
| Up to 4.00 | ± .004 |
| From 4.01 to 10.00 | ± .010 |
| From 10.01 to 20.00 | ± .020 |
| Over 20.00 | ± .050 |

7.25 ± .010



Tolerance Position
Defines max. limits of the major diameter

| EXTERNAL | | INTERNAL | |
|----------|-----------------|----------|-----------------|
| e | large allowance | ----- | |
| g | small allowance | G | small allowance |
| h | no allowance | H | no allowance |



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Geometric Dimensioning & Tolerancing

This four-course online training series builds the ability to read and interpret GD&T symbols.

Understanding the international engineering language of Geometric Dimensioning & Tolerancing is essential for communicating in the global marketplace.

Course 1: Basic Principles

- ▶ Definition and benefits of GD&T
- ▶ Basic Terminologies
- ▶ Maximum and Least material condition
- ▶ Clearance, interference and transition fits

Course 2: Interpreting GD&T Symbols

- ▶ Diameter symbol
- ▶ Coordinate vs. position system tolerance zones
- ▶ Effect of material condition on size of geometric tolerance

Course 3: Form and Orientation Tolerances

- ▶ Flatness, straightness, circularity, and cylindricity
- ▶ Orientation tolerances; perpendicularity, angularity and parallelism
- ▶ Application of maximum material condition principle and inspection procedures

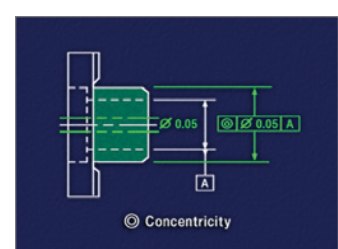
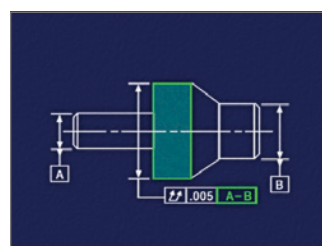
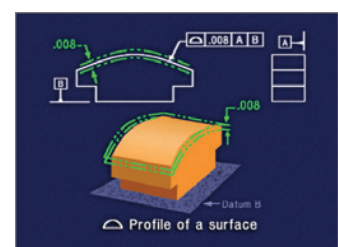
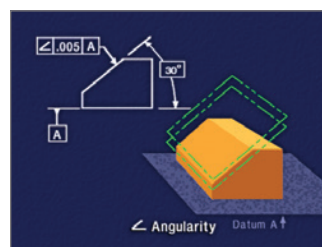
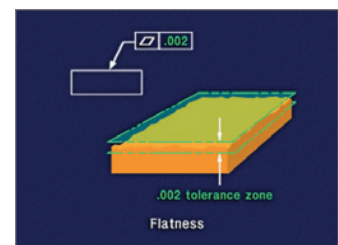
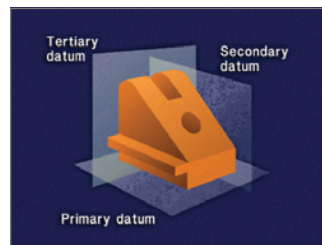
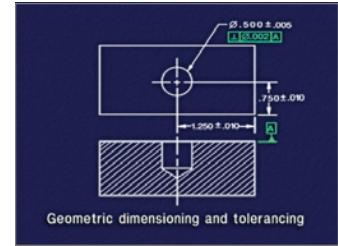
Course 4: Profile, Runout and Location Tolerances

- ▶ Profile tolerances
- ▶ Runout tolerances; position, concentricity, and symmetry

🕒 4 Online Courses (4-8 hours)†

product id: **rt_1021_us**

† Course titles, descriptions, and images are provided for reference purposes only. Our courses are regularly updated and their contents may change without notice. The durations listed for courses are estimates only; actual completion time may vary. All text and images are the copyrighted property of Routsis Training.



Certification Exam for Extrusion Blow Molding Professionals

Routsis Training's globally recognized Professional Certification demonstrates a broad-spectrum understanding of the blow molding industry. In order to attain certification, candidates must have a working knowledge of blow molding safety, machinery, processing, materials, and basic part quality — and must demonstrate a solid understanding of the industry's best practices.

Who Should Consider Professional Certification?

Design Certification is ideal for injection mold & part designers, process engineers, project managers, and quality engineers. Individuals can use this certification to help advance their careers and industry standing. Engineering managers can use this certification to benchmark their team's knowledge and capabilities. Certified engineers are more confident in their ability to meet the challenges of today's ever advancing designs and applications.

How to Get Certified:

This exam is conducted entirely online — requiring approximately 1.5 hours to complete, with a time limit of 3 hours. Upon completion of the exam, participants are immediately notified whether they've passed or not, via email.

Those who attain a passing score will receive their certificate. Those who do not pass receive a detailed report indicating areas in which further improvement is needed, prior to retaking the exam.

How the Exam is Structured:

A series of True/False questions are used to cover a wide range of topics. The exam also uses multiple choice questions to provide stronger indication of the candidate's understanding of more complex concepts.

The questions in this exam cover the following categories:

- ▶ Blow Molding Safety
- ▶ Basic 5S & Housekeeping
- ▶ Extrusion Blow Molding
- ▶ Basic Troubleshooting
- ▶ Plastics Material Basics
- ▶ Basic Quality & Mathematics
- ▶ Basic Equipment & Machinery Maintenance

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How to Prepare for this Certification Exam:

Although preparatory training is not necessary to achieve certification, participation in Routsis's structured training programs can greatly increase a candidate's chances of successfully completing the examination.

We offer an online training package specifically geared toward helping individuals prepare for this exam. For small and mid-sized companies, our Professional Certification Portals provide a convenient, cost-efficient way to train, benchmark, and certify your employees. Larger companies should consider our exclusive RightStart™ in-house training system.

🕒 **Online Exam (1-3 hours) †**

product id: rt_3103_us

Certification Exam for Extrusion Blow Molding Quality

Delivering high-quality plastic parts to your customers is the main goal of any blow molding operation. In order to pass this exam, the candidate must demonstrate a working knowledge of extrusion blowmolding quality — including safety, processing, plastics materials, mathematics, and the usage of common measuring tools for quality assurance.

Who Should Consider Quality Certification?

Quality inspectors, technicians, managers, and engineers should consider taking this certification exam. Quality managers should strongly consider using this certification program for benchmarking; to ensure they have a confident, capable team.

How to Get Certified:

This exam is conducted entirely online — requiring approximately 1.5 hours to complete, with a time limit of 3 hours. Upon completion of the exam, participants are immediately notified whether they've passed or not, via email.

Those who attain a passing score will receive their certificate. Those who do not pass receive a detailed report indicating areas in which further improvement is needed, prior to retaking the exam.

How the Exam is Structured:

A series of True/False questions are used to cover a wide range of topics. The exam also uses multiple choice questions to provide stronger indication of the candidate's understanding of more complex concepts.

The questions in this exam cover the following categories:

- ▶ Extrusion Safety
- ▶ Extrusion Blow Molding
- ▶ The Blow Molding Process
- ▶ Molded Product Quality
- ▶ Plastics Material Basics
- ▶ Blueprint Reading
- ▶ Quality & Mathematics
- ▶ Slide Calipers & Outside Micrometers



How to Prepare for this Certification Exam:

Although preparatory training is not necessary to achieve certification, participation in Routsis's structured training programs can greatly increase a candidate's chances of successfully completing the examination.

We offer an online training package specifically geared toward helping individuals prepare for this exam. For small and mid-sized companies, our Professional Certification Portals provide a convenient, cost-efficient way to train, benchmark, and certify your employees. Larger companies should consider our exclusive RightStart™ in-house training system.

🕒 **Online Exam (1-3 hours) †**

product id: **rt_5403_us**

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