

FUNDAMENTAL MANUFACTURING PROCESSES

Plastics Machining & Assembly

SCENE 1.
CG: Review
white text centered on black
tape 739, 01:22:17-01:25:06
peter carey narration
tape 63, 12:00:15-12:03:49
review music

SCENE 2.
tape 724, 11:01:00-11:03:00
GRAPHIC: sme branding logo
tape 728, 15:06:40-15:06:54
c.u. machining of plastic part

NARRATION (VO):

THE MACHINING OF PLASTICS INVOLVES THE USE OF CUTTING TOOLS TO CUT AND SHAPE WORKPIECES INTO COMPLETED PARTS, OR SUB-ASSEMBLY COMPONENTS.

SCENE 3.
tape 719, 05:22:33-05:22:53
zoom out, drilling of injection molded plastic part
tape 720, 06:25:03-06:25:13
machining of flat plastic sheet
tape 734, 21:10:22-21:10:29
machining of plastic bar/rod stock

NARRATION (VO):

MACHINING PROCESSES ARE USED AS SECONDARY OPERATIONS ON MOLDED AND FORMED PARTS. BUT MACHINING PROCESSES ARE MOST COMMONLY USED IN THE FABRICATION OF FLAT PLASTIC SHEET...,
OR ROD AND BAR STOCK INTO FINISHED PRODUCTS.

SCENE 4.
tape 735, 22:17:15-22:17:57
zoom out, machining of plastic part
CG, SUPER: Thermal Expansion of Plastics is up to Ten Times Greater Than That of Metals
Heat Loss of Plastics is Much Slower Than of Metals
Plastics Are More Elastic & Have Lower Melting Temperatures Than Metals

NARRATION (VO):

THERE ARE SEVERAL KEY DIFFERENCES BETWEEN MACHINING PLASTICS AND MACHINING METALS,
INCLUDING:
THE THERMAL EXPANSION OF PLASTICS IS UP TO 10 TIMES GREATER THAN THAT OF METALS,
THE HEAT LOSS OF PLASTICS IS MUCH SLOWER THAN OF METALS,
AND PLASTICS ARE MORE ELASTIC AND HAVE LOWER MELTING TEMPERATURES THAN METALS.

SCENE 5. continue previous shot	**NARRATION (VO):** BECAUSE OF THESE DIFFERENCES, CUTTING TOOL SPEEDS AND FEEDS ARE ADJUSTED TO MACHINE PLASTIC PARTS.
SCENE 6. **tape 736, 23:17:28-23:17:51** zoom out, plastic part being machined using coolant	**NARRATION (VO):** THE USE OF COOLANT MAY BE REQUIRED TO REDUCE THE FRICTIONAL HEAT THAT BUILDS IN PLASTIC PARTS WHILE BEING MACHINED.
SCENE 7. **tape 728, 15:04:26-15:04:41** zoom out, compressed air being used as coolant **tape 735, 22:04:32-22:04:44** mist spray being used as coolant for pilot hole drilling **tape 735, 22:25:23-22:25:38** zoom in, liquid coolant used to machining of plastics	**NARRATION (VO):** TYPICAL COOLANTS USED FOR MACHINING PLASTICS INCLUDE CLEAN COMPRESSED AIR..., AND THE USE OF MIST SPRAYS, WATER-SOLUBLE OILS, LIGHT CUTTING OILS, AND OTHER SOLUTIONS.
SCENE 8. continue previous shot **tape 729, 16:03:55-16:04:05** sawing plastics CG, SUPER: Sawing **tape 723, 09:21:57-09:22:11** zoom in, milling of plastics CG, SUPER: Milling **tape 720, 06:27:55-06:28:08** routing of plastic part CG, SUPER: Routing **tape 728, 15:21:38-15:21:50** turning of plastics CG, SUPER: Turning **tape 730, 00:00:55-00:01:03** waterjet cutting of plastics CG, SUPER: Waterjet Cutting **tape 716, 01:09:50-01:09:56** laser cutting of plastics CG, SUPER: Laser Cutting **tape 734, 21:25:50-21:25:59** drilling then tapping of plastics CG, SUPER: Drilling CG, SUPER: Tapping **tape 735, 22:12:15-22:12:35** c.u., zoom out, reaming operation CG, SUPER: Reaming	**NARRATION (VO):** THE PRIMARY TYPES OF OPERATIONS USED TO MACHINE PLASTICS INCLUDE: SAWING..., MILLING..., ROUTING..., TURNING..., WATERJET CUTTING..., LASER CUTTING..., DRILLING..., AND SECONDARY HOLE FINISHING OPERATIONS, SUCH AS TAPPING..., AND REAMING. --- TOUCH BLACK ---

SCENE 9.
tape 736, 23:13:43-23:13:53
ultrasonic insertion welding of plastic parts
tape 735, 22:27:36-22:27:49
bonding of plastic parts
CG, SUPER: Part Materials
Product Design
End Use Conditions of the Finished Product

NARRATION (VO):

THERE ARE MANY METHODS OF ASSEMBLING, OR JOINING, PLASTIC-TO-PLASTIC, AND PLASTIC-TO-METAL PARTS TOGETHER. VARIABLES SUCH AS PART MATERIALS, PRODUCT DESIGN, AND END USE CONDITIONS OF THE FINISHED PRODUCT MUST BE CONSIDERED WHEN DESIGNING AN ASSEMBLY METHOD.

SCENE 10.
tape 719, 05:16:21-05:16:36
plastic parts being ultrasonically welded together
CG, SUPER: Snap-Fits
tape 658, 14:05:18-14:05:24
snap-fit components clipped together
CG, SUPER: Hinges
tape 721, 07:23:19-07:23:26
c.u. hinge
CG, SUPER: Mechanical Fasteners
tape 658, 14:01:34-14:01:39
mechanical fastener being tighten on plastic part
CG, SUPER: Adhesive Bonding
tape 719, 05:06:34-05:06:43
adhesive bonding of plastic parts
CG, SUPER: Solvent Bonding
tape 718, 04:25:57-04:26:04
solvent bonding of plastic parts
CG, SUPER: Welding
tape 626, 06:07:22-06:07:43
zoom out, ultrasonically welding plastic parts together
CG, SUPER: Spin Welding
tape 733, 20:06:04-20:06:38
zoom in, spin welding operation
CG, SUPER: Hot-Gas Welding
tape 729, 17:05:42-17:05:49
hot-gas welding operation
CG, SUPER: Ultrasonic Welding
tape 725, 12:14:30-12:14:38
ultrasonic welding operation
CG, SUPER: Vibration Welding
tape 733, 20:16:28-20:16:38
vibration welding operation
CG, SUPER: Heat Staking
tape 732, 19:10:23-19:10:34
heat staking operation
CG, SUPER: Ultrasonic Staking

NARRATION (VO):

THE MOST COMMON METHODS OF ASSEMBLING PLASTIC COMPONENTS TOGETHER INCLUDE THE USE OF:

SNAP-FITS...,

HINGES...,

MECHANICAL FASTENERS...,

ADHESIVE BONDING...,

SOLVENT BONDING...,

AND THE VARIOUS WELDING PROCESSES, INCLUDING:

SPIN WELDING...,

HOT-GAS WELDING...,

ULTRASONIC WELDING...,

VIBRATION WELDING...,

HEAT STAKING...,

AND ULTRASONIC STAKING.

--- FADE TO BLACK ---

tape 733, 20:18:13-20:18:30
zoom out, plastic to plastic
ultrasonic staking operation