

BULLETIN 99 - 03**Date: December 9, 1998**

U.S. Department of Labor Employment and Training Administration Office of Apprenticeship Training, Employer and Labor Services (OATELS) Washington, D.C. 20210	<u>Distribution:</u> A-541 Headquarters Staff A-544 All Field Tech A-547 SD + RD + SAC; Lab. Com.	<u>Subject:</u> New Apprenticeable Occupation -- Mold Designer (plastics industry) <u>Code:</u> 200
Symbols: DNIP/FDK		Action: Immediate

PURPOSE: To inform the Office of Apprenticeship Training, Employer and Labor Services (OATELS), Bureau of Apprenticeship and Training (BAT) Staff of a new apprenticeable occupation:

MOLD DESIGNER (plastics industry)
 O*NET Code: 17-3013.00
 RAIS Code: 1030
 Training Term: 4 years (8000 hours)
 Type of Training: Time - based

BACKGROUND: This occupation was submitted by ATR Kathleen Sokolowski on behalf of Hewitt Tool & Die, Inc., Oakford, IN.

The occupation, mold designer, develops designs for plastic injection molds used to produce plastic parts, based on customer's defined requirements.

A suggested work process schedule and outline of related instruction are attached for your information.

Attachment

NOTE: State Directors, please share this information with our SAC partners where appropriate.

ON-THE-JOB TRAINING OUTLINE
MOLD DESIGNER (plastics industry)
RAIS CODE: 1030 O*NET CODE: 17-3013.00

DESCRIPTION: Develops designs for plastic injection molds used to produce the plastic parts required by the customer, according to working knowledge of plastics technology and mold construction techniques, including: shuttle molds, three-plate molds, companion molds, compression molds, and prototype molds. Makes efficient use of available CAD systems to develop workable concept from customer's initial blueprint or computer math data (wire-frame on disc) by developing all preliminary tool drawings required for detailed, buildable, mold design. Engineers individual mold components. Applies working knowledge of all relevant design concepts such as shrink, draft, cooling, and ejection of the plastic part to create efficient mold design. Drafts mold components and makes all detailed working drawings required by the mold maker/builder or machinist. Creates good geometry files from which cutter paths can be created for mold builder. May change previous designs according to revisions or other updates.

Competencies list: (Functions in which apprentices must demonstrate proficiency)

1. Generate mold designs
2. Computer (graphic) operation
3. Perform mathematical calculations for blueprint development
4. Match mold design to specified molding equipment
5. Customer interface on plastic part/mold requirements
6. Maintain departmental records, security, design standards, housekeeping in all
7. phases of mold design process.
8. Use knowledge of mold making to improve efficiency and quality in mold design processes.

ON-THE-JOB TRAINING OUTLINE

WORK PROCESS	APPROXIMATE HOURS
A. DESIGN UPDATES	800
Update geometry and drafting files on CAD system when engineering changes occur.	
B. PRELIMINARY DESIGNS	800
Execute the early stage of design. Plan and develop concepts and components of a mold using Unigraphics II software.	
C. DETAILED DESIGN	2300
Construct 3D geometry on the CAD. Detail each individual component, placing views and dimensions on various sheets.	
D. PROTOTYPE LAYOUTS	1200
Separate the 3D geometry which describes the part into two workable halves of the mold, enabling mold maker to machine it.	
E. PRODUCTION FLOOR	200
Mold set-up, processing and troubleshooting.	
F. MOLD DESIGN CHECKING	1500
Check other designs on the computer for proper concept, functionality and design standards. Check same for dimensional accuracy.	
G. MOLD DETAIL PROGRAMMING	800

Program cutter paths, drill routines and electrodes utilizing the 3D CAD system and its geometry

- H. CUSTOMER INTERFACE.....200
Act as liaison between customer and toolroom; Exhibit good verbal and written communication skills to ensure customer satisfaction.
- I. RECORD KEEPING.....200
Comply with all paper and electronic record keeping procedures.

TOTAL **8,000**

RELATED INSTRUCTION OUTLINE (SUGGESTED*):

COURSE TITLE **	CREDIT HOURS*	CONTACT HRS*
INDUSTRIAL SAFETY	1.5	24
BASIC MOLD MAKING	1.5	24
MOLD DESIGN FUNDAMENTALS I	3	64
MOLD DESIGN FUNDAMENTALS II	3	64
COMPUTER INTEGRATED MANUFACTURING	3	64
DESCRIPTIVE GEOMETRY	3	64
STATICS	3	48
STRENGTH OF MATERIALS	3	64
INTRODUCTION TO PLASTICS	3	48
INTRODUCTION TO POLYMER SCIENCE	3	48
INJECTION MOLDING	3	64
QUALITY CONTROL CONCEPTS AND DESIGN	3	48
ADVANCED INJECTION MOLDING 3	64	
PLASTIC MATERIAL TESTING	3	64
COMPUTER APPLICATIONS IN PLASTICS	3	64
MANUFACTURING OF PLASTICS PRODUCTS	3	64
TOTALS	45	880
<u>ELECTIVES**</u>		
CAD I	3	64
CAD II	3	64
CNC I	3	64
CNC II	3	64
TURNING AND MILLING PROCESSES I	3	64
TURNING II	3	64
MILLING II	3	64
ABRASIVE PROCESSES	3	64
EXTRUSION PROCESSES	3	64
ADVANCED EXTRUSION	3	64

* The suggested courses can be taken at a State College, or Community College.

**3 credit hours equals approximately 48 contact hours when course consists of lecture only and 64 contact hours when course requires both lecture and lab.

SUGGESTED REFERENCE MATERIALS:

Injection Molds: 102 Proven Designs, Gastrow, Hans, Hanser Publishers (distributed in USA by Scientific and Technical Books-Macmillan Publishing Co., 1983.

Designing Machines and Dies for Polymer Processing with Computer Programs, Rao, Dr. N.S., Hanser Publishers, 1981, ISBN 3-446-13500-6.

Mold Making Handbook for the Plastics Engineer, Stoeckhert, Dr. K. (ed.), Hanser Publishers, 1983, ISBN 3-446-13629-0.

Plastics Analysis Guide, Krause, Dr. A., Lange, Dynamit, Troisdorf, Nobel and Ezrin, Dr. M., Hanser Publishers, 1983, IABN 3-446-13587-1.

Injection Molding Machines, A User s Guide, Johannaber, Dr. F., Hanser Publishers, 1983; ISBN 3-446-13575-8.

Identification of Plastics, Braun, Dr. Dietrich, Hanser Publishers, 1982; ISBN 3-446-13573-1.

Plastics Flammability Handbook, Troitzsch, Dr. J., Hanser Publishers, 1983; ISBN 3-446-13571-5.