

# FINE BLANKING FUNDAMENTALS

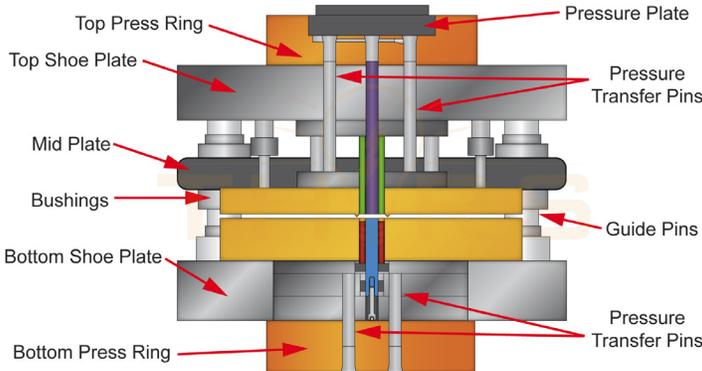
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## Learning Made Simple, Visual, and Interactive

The THORS *Fine Blanking Fundamentals* course introduces learners to fine blanking equipment, such as die assembly components and the press. The course also presents fine blanking process steps, part characteristics, and common process defects.

Presented in THORS' highly visual and interactive learning format, this course equips learners with a foundational knowledge of fine blanking equipment and processes.

Credit Hours **1.5**



## Learning Objectives

- 💡 Identify the important components of the die assembly.
- 💡 Explain the basic functions of the fine blanking press.
- 💡 Recognize the different die assembly types.
- 💡 Differentiate between the various fine blanking process steps.
- 💡 Understand the major part characteristics influencing fine blanking.
- 💡 Determine courses of action for troubleshooting various process defects.

## Table of Contents

### I. Fine Blanking Equipment

- **Die Assembly**
  - ▣ Working Components
    - Blank Punch
    - Counter Punch
    - Pierce Punch
    - Pierce Punch Ejector
    - Guide Plate
    - V-Ring
    - Die Plate
  - ▣ Structural Components
- **Die Assembly Types**
- **Press**

### II. Fine Blanking Process

- **Steps**
  - ▣ Raw Material Selection
  - ▣ Uncoiling and Straightening
  - ▣ Lubrication
  - ▣ Die Cycle
  - ▣ Part Evacuation
  - ▣ Part Slug Separation
- **Part Characteristics**
  - ▣ Part Features
    - Flatness
    - Thickness
  - ▣ Raw Material
  - ▣ Edge and Surface Conditions

### II. Fine Blanking Process (cont.)

- **Special Features**
  - ▣ Holes
  - ▣ Web Sections
  - ▣ Gears
  - ▣ Extruded Parts
  - ▣ Multi-Level Features
  - ▣ Bent Tabs
  - ▣ Coined Features
- **Troubleshooting Defects**

Fine Blanking Equipment > Die Assembly > Working Components

**What are working components?**  
Working components of the die assembly are those components that engage and interact during the fine blanking process. Some working components are designed to move during the process and some directly contact other parts of the die assembly. Working components include the blank punch, counter punch, pierce punch, pierce punch ejector, guide plate, V-ring, and die plate.

**Learning Moment**

**WORKING COMPONENTS**

Fine Blanking Process > Steps > Die Cycle

**What are the steps of the fine blanking process?**  
The steps of the fine blanking process include raw material selection, uncoiling and straightening, lubrication, the die cycle, part evacuation, and part slug separation.

Raw Material Selection   Uncoiling and Straightening   Lubrication   **Die Cycle**   Part Evacuation   Part Slug Separation

**What is the die cycle in fine blanking?**  
The die cycle in fine blanking, also known as the fine blanking die cycle, is one complete sequence of clamping, counter pressure application, precision shearing, return stroke, and raw material strip advancement.

**DIE CYCLE**

Fine Blanking Process > Part Characteristics > Raw Material

**What is raw material?**  
Raw material is the strip, typically metal, that can be efficiently fine blanked.

**How does raw material influence the fine blanking process?**  
Raw material influences the fine blanking process through its hardness. Soft metals are the best materials for fine blanking, since the process depends on the flexibility of the material into the die cavity when sheared. The different types and grades of raw material that are suitable for the fine blanking process are given in the table below.

Raw Material	Grades and Types
Low Carbon Steel	• 1008-1022
Medium Carbon Steel	• 1035-1055
High Carbon Steel	• 1095-1075
Alloy Steel	• 4130 • 5160
Stainless Steel	• High Strength Low Alloy (HSLA) 550-680 • 300 series: 304, 316, 321 • 400 series: 409, 420, 430, 440 (heat treatable, typically) • Precipitation Hardenable (PH): 17-4, 17-7
Aluminum	• Extrusions and Coil Stock • F Condition • O Condition