

Hydraulic Press Brake Die Changeover And Tonnage Setting

1.0 Maintenance Objective & Frequency

The objective of this procedure is to safely change the top punch and bottom die on a hydraulic press brake and to set the correct tonnage for the new tooling. Proper die changeover and tonnage setting prevent tool damage, ensure bend angle accuracy, and extend the life of the press brake and tooling. This procedure is performed whenever a job change requires different tooling, or at minimum every 500 operating hours to inspect and clean tooling interfaces.

2.0 Lockout/Tagout (LOTO) & Safety

- Electrical Isolation: Disconnect main power to the press brake control cabinet and apply a personal lock and tag.
- Hydraulic Isolation: Close the hydraulic isolation valve on the pump unit and bleed residual pressure by cycling the foot pedal (with power off) until no movement occurs.
- Pneumatic Isolation (if applicable): Disconnect and lock out the compressed air supply to the back gauge or clamping system.
- Mechanical Lockout: Install a mechanical stop or block under the ram to prevent accidental descent during die change.
- Mandatory PPE: Safety glasses with side shields, steel-toed boots, cut-resistant gloves, and hearing protection.

3.0 Required Tools, Parts & Lubricants

- Overhead crane or hoist with rated lifting capacity for the die set
- Die cart or roller table
- Set of die handling clamps or lifting straps
- Brass hammer or soft-faced mallet
- Clean lint-free rags
- Solvent-based degreaser (e.g., isopropyl alcohol or approved parts cleaner)
- Light machine oil (ISO 32 or equivalent) for tooling interfaces
- Torque wrench (range 0-100 Nm) with appropriate hex or square drive socket
- Feeler gauge set (0.001-0.010 inch)
- Dial indicator with magnetic base (0.001 inch resolution)
- Press brake tonnage calibration block or load cell (if available)
- Manufacturer's tooling chart or bend allowance calculator

4.0 Step-by-Step Maintenance Procedure

1. Perform full LOTO as described in Section 2.0. Verify zero energy state by attempting to start the press brake and observing no movement.

2. Remove the existing die set: Using the overhead crane or hoist, attach lifting straps to the top punch. Loosen the punch clamping bolts (typically 2-4 bolts) using the appropriate socket and torque wrench. Remove the punch and place it on the die cart. Repeat for the bottom die, loosening the die holder clamps and removing the die.
3. Clean the ram and bed mounting surfaces: Wipe down the ram clamping area and the bed T-slots with a clean rag and degreaser. Remove any metal chips, burrs, or old lubricant. Inspect for cracks or wear; if damage is found, report to maintenance supervisor before proceeding.
4. Install the new bottom die: Position the bottom die on the press brake bed, aligning its key slots with the T-slots. Tighten the die holder clamps evenly to 45 Nm using the torque wrench. Verify the die is seated flat using a feeler gauge; maximum gap allowed is 0.002 inch.
5. Install the new top punch: Lift the punch into position under the ram. Align the punch shank with the ram clamping groove. Tighten the clamping bolts evenly in a crisscross pattern to 50 Nm. Check punch alignment by lowering the ram (with power still locked out) until the punch just touches the die; visually confirm the punch tip is centered in the die V-opening.
6. Set the ram stroke depth: With the ram at top dead center, adjust the stroke limit switch or CNC parameter to the desired depth based on the material thickness and bend angle. Use the manufacturer's chart or bend allowance calculator to determine the correct depth. Set the depth to within 0.010 inch of the calculated value.
7. Calibrate the tonnage setting: Refer to the tooling chart for the maximum allowable tonnage for the new die set. On the press brake controller, set the tonnage limit to 80% of the die's rated capacity to allow a safety margin. If a load cell or calibration block is available, perform a test bend on a scrap piece at low tonnage and verify the actual force matches the set value within 5%.
8. Check back gauge alignment (if applicable): Using a dial indicator on the back gauge fingers, verify the gauge is parallel to the die within 0.005 inch across the full width. Adjust the back gauge stops if necessary.
9. Lubricate tooling interfaces: Apply a thin film of light machine oil to the punch shank and the die holder clamps. Wipe off any excess to prevent contamination of the workpiece.
10. Remove all tools, rags, and lifting equipment from the press brake area. Verify that no foreign objects remain on the bed or ram.

5.0 Verification & Return to Service

1. Remove LOTO devices and restore power to the press brake. Ensure all safety guards and light curtains are in place and functioning.
2. Perform a dry cycle (no material) at low speed to confirm smooth ram movement and no unusual noises. Observe the punch-die clearance throughout the stroke.
3. Run a test bend on a scrap piece of the same material and thickness as the production job. Measure the bend angle with a protractor or angle gauge; it should be within ± 0.5 degrees of the target. Check for any marks or damage on the workpiece indicating tool misalignment.
4. If the bend angle is out of tolerance, adjust the ram depth in 0.005 inch increments and retest until the angle is correct. If tonnage readings deviate from the set value by more than 5%, recheck the hydraulic system pressure and recalibrate the load cell.
5. Once the test bend passes, record the final tonnage setting, ram depth, and die identification in the press brake logbook or ServiceGrid work order. Sign off on the PM work order and notify production that the machine is ready for service.

Regulatory Disclaimer: This document is a generic maintenance template provided for educational and informational purposes only. It does not constitute professional engineering or reliability advice. The end-user assumes all liability for validating all step sequences, torque specs, and LOTO protocols against specific machinery OEM manuals before deployment to a live production floor.