# INTAKE VALVE PROCESS FLOW DIAGRAM

**Note: Official Process Flow Owned By Eaton Kearney Process/Quality Team**

| **Ford Part Number** **PROCESS STEP** | **JT4E-6507-Ax/Bx** | | **Description Of Process Step** |
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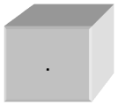
| | | Receive Raw Material<br>Head: Sil Lite / Sil 1, UNS/ISO K14072 / S65007 | |
| **1** |  | **Shear bar** | Cut raw bar stock into appropriate size slug for forging press. |
| **2** |  | **Tumble** | Tumble sheared slugs to clean surface / edges, prepare for forging |
| **3** |  | **Forge / Direct Quench** | Hot forge slug into as-forged specification geometry.<br>Quench part to achieve in-process hardness and microstrucure specification. |
| **4** |  | **Temper / Burn Off** | Heat treatment achieve tempered microstructure and hardness per speciification<br>Burn off forging lubricant. |
| **5** |  | **Jet Wheel Blast (Clean)** | Clean the surface of the valve after heat treatment (remove oxidation, scale, carbon) |
| **6** |  | **Roll Straighten** | Straighten valve stem to attain rough straightness and head perpendicularity spec. |
| **7** |  | **Straightness Inspection (Acco)** | Straightness and perpendicularity 100% measured according to in-process spec. |

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| 8 |  | **Rough Cutoff (Overall Length)** | CBN wheel to cut valve to rough overall length. |
| 9 |  | **Tip Grind** | Refine overall length, finish machine valve tip flatness and surface finish to spec. |
| 10 |  | **Rough Centerless Grind Stem OD** | Refine outer diameter size, surface finish and roundness to in process spec. |
| 11 |  | **Eddy Current Check Material** | Ensure correct material utilized for valve acc. To drawing specification. |
| 12 |  | **Induction Harden Tip End** | Inductive heating, oil quench and inductive tempering to achieve tip hardness and microstructure acc. to specification. |
| 13 |  | **Semi-Finish Centerless Grind Stem OD** | Further refine stem outer diameter size, surface finish and roundness to in-process specification |
| 14 |  | **Centerless Profile Grind (Keeper Grooves, Chamfer, Blend)** | Produce keeper grooves, valve tip chamfer and valve head fillet to stem blend to final drawing specification. |
| 15 |  | **Finish Centerless Grind Seat** | Produce valve seating surface to finished angle, width, surface finish and runout specification |
| 16 |  | **Finish Centerless Grind Stem OD** | Finish stem outer diameter, size and surface finish in preparation for chrome plating. |

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| 17 |  | **Pack as WIP** | Move valves to WIP dunnage for conveyance to chrome plating line. |
| 18 |  | **Chrome Plate Load - Manual** | Move valves from WIP dunnage to chrome plating equipment. |
| 19 |  | **Wash Valve** | Preparation of valve stem for chrome plating. |

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| **20** |  | **Chrome Plate Stem OD** | Chrome plate outer diameter of valve stem to achieve surface hardness and chrome thickness specification. |
| 21 |  | **Finish Polish Stem OD** | Polish valve stem to achieve final stem surface finish specification. |
| **22** |  | **Automated Multi-Inspection** | 100% automated inspection of valve for critical functional characteristics. |
| **23** |  | **Laser Mark Stem OD** | Apply laser marking to stem OD per drawing specification. |
| **24** |  | **Color Code Combustion Face** | Apply paint mark to combustion face for valve identification |
| **25** |  | **Eddy Current Crack Inspection** | 100% inspection for cracks. |
| **26** |  | **Eddy Current Material Confirmation** | 100% inspection for correct material. |
| **27** |  | **Visual Inspection** | 100% operator visual inspection for visually identifiable defects. |
| **28** |  | **Final Pack** | |