|  |  |
| --- | --- |
|  |  |

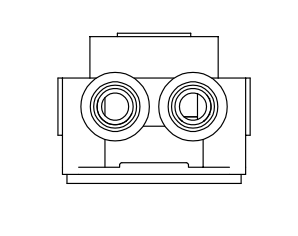
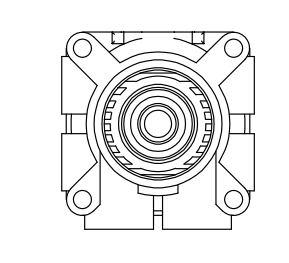
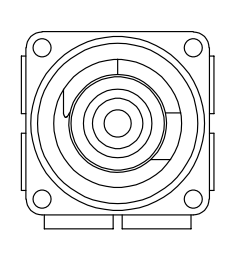
**Indian Institute of Technology Indore**



**Project Assignment**

**Machining Science and Metrology (ME-305)**

COMPONENT DETAILS

H133

H12

H7

H6

F21

F22

F20

H3’

F16

F14

F13

F12

F11

F10

F7

F8

H5

H4

H3

H2

F6

F4

F3

F5

F2

F1

H11

F19

F18

**SURFACES:**

F1 –Bottom Face

F2 –Top Face

F3 –Front Face

F4 –Back Face

F5 –Right Face

F6 –Left Face

**Component Description:**

|  |  |  |  |
| --- | --- | --- | --- |
| **HOLES** | **SIZE** | **LOCATION** | **NO. OF HOLES** |
| H11 | Ø22\*2 | F3( AT F8) | 2 |
| H12 | Ø19.022\*10 | F3( AT F8) | 2 |
| H13 | Ø16\*6 | F3( AT F8) | 2 |
| H2 | Ø12\*12.128 | F3( INSIDE F8) | 2 |
| H3’ | Ø11.097\*10  +  Ø10\*7 | F5 | 1 |
| H3 | Ø10\*10 | F5 & F6 | 2 |
| H4 | Ø12\*15  +  Ø8\*5 | F6 | 1 |
| H5 | Ø8\*42 | F2 | 4 |
| H6 | Ø22\*1.343 | F20 | 1 |
| H7 | Ø12\*6 | F20 | 1 |
| Q1 | Ø30 | F20 | 1 |

Process Sheet for Fuel Pump Component 4 :

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| S.No | Operation description | Operation Description | Machine used | Tool | Location | Clamp | Remark |
| 1. | Screenshot 2023-11-16 111914.png | **Casting**  Material is liquidified and poured into a mold cavity and allowed to be solidified. | Cast Furnance | Sand, Drag, Cope, Shovel, Rammer, Vent Wire, Mallet, etc. | -- | -- | The entire piece is casted as a whole and then facing, milling, drilling and thread-cutting is done to achieve this product |

Process Sheet for Fuel Pump Component 4 :

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| S.No | Operation description | Operation Description | Machine used | Tool | Location | Clamp | Remark |
| 2. | Screenshot 2023-11-16 111914.png | **Drilling**  4 Hole | Vertical Milling Machine | Drill bit of 8 mm  (Tungsten Carbide) | F2 | F7 Vertical Clamp | Milling Fixture |

Process Sheet for Fuel Pump Component 4 :

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| S.No | Operation description | Operation Description | Machine used | Tool | Location | Clamp | Remark |
| 3. | Screenshot 2023-11-16 110927.png | **Boring**  Boring 2 holes | Horizontal Boring machine | Tungsten Carbide | F3 | F5 and F6 | Boring fixture, Special Boring tool for 20 mm. |

Process Sheet for Fuel Pump Component 4 :

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| S.No | Operation description | Operation Description | Machine used | Tool | Location | Clamp | Remark |
| 4. | Screenshot 2023-11-16 110927.png | **Drilling**  Drilling 2 holes | Horizontal Milling machine | Tungsten Carbide | F3  (Two H2 holes) | F5 and F6 | Milling fixture  (12 mm holes) |

Process Sheet for Fuel Pump Component 4 :

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| S.No | Operation description | Operation Description | Machine used | Tool | Location | Clamp | Remark |
| 5. | Screenshot 2023-11-16 110927.png | **Threading**  Threading 2 holes | Horizontal Milling machine | Thread Mills | F3  (Two H12 holes) | F5 and F6  (Bench Vise) | Thread Pitch 1 mm |

Process Sheet for Fuel Pump Component 4 :

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| S.No | Operation description | Operation Description | Machine used | Tool | Location | Clamp | Remark |
| 6. | Screenshot 2023-11-16 134331.png | **Threading** | Horizontal Milling Machine | Thread Mills | F5 (H3’) | F3 and F4  (Bench Vise) | Thread with Pitch of 1 mm |

Process Sheet for Fuel Pump Component 4 :

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| S.No | Operation description | Operation Description | Machine used | Tool | Location | Clamp | Remark |
| 7. | Screenshot 2023-11-16 110927.png | **Surface Finish**  2 Circular Surfaces | Belt Sander | 80 grit Sand Paper (Medium) | F8 | Manual | Both the surfaces have been finished. |

Process Sheet for Fuel Pump Component 4 :

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| S.No | Operation description | Operation Description | Machine used | Tool | Location | Clamp | Remark |
| 8. | Screenshot 2023-11-16 134331.png | **Surface Finish**  2 Circular Faces | Belt Sander | 80 grit Sand Paper | F12 | Manual | Both the surfaces have been finished. |

Process Sheet for Fuel Pump Component 4 :

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| S.No | Operation description | Operation Description | Machine used | Tool | Location | Clamp | Remark |
| 9. | Screenshot 2023-11-16 134337.png | **Surface Finish**  2 Circular Faces | Belt Sander | 80 grit Sand Paper | F6 | Manual | Both the surfaces have been finished. |

Process Sheet for Fuel Pump Component 4 :

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| S.No | Operation description | Operation Description | Machine used | Tool | Location | Clamp | Remark |
| 10. | Screenshot 2023-11-16 113622.png | **Surface Finish** | Internal Grinder | 120 grit (Fine) | F18 | F3, F4, F5, F6 Horizontal Clamp | Both the surfaces have been finished. |

Process Sheet for Fuel Pump Component 4 :

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| S.No | Operation description | Operation Description | Machine used | Tool | Location | Clamp | Remark |
| 11. | Screenshot 2023-11-16 113622.png | **Surface Finish**  2 Circular Faces | Internal Grinder | 80 grit | F19, F20 | F3, F4, F5, F6  Horizontal Clamp | Both the surfaces have been finished. |

Process Sheet for Fuel Pump Component 4 :

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| S.No | Operation description | Operation Description | Machine used | Tool | Location | Clamp | Remark |
| 12. | Screenshot 2023-11-16 113622.png | **Surface Finish** | Grinding Machine | 120 grit (Fine) | F1 | F3, F4, F5, F6  Horizontal Clamping | The surfaces have been finished. |

Process Sheet for Fuel Pump Component 4 :

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| S.No | Operation description | Operation Description | Machine used | Tool | Location | Clamp | Remark |
| 13. | Screenshot 2023-11-16 111914.png | **Surface Finish** | Belt Sander | 100 grit Sand Paper | F11 | Manual | All the surfaces have been finished. |

Process Sheet for Fuel Pump Component 4 :

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| S.No | Operation description | Operation Description | Machine used | Tool | Location | Clamp | Remark |
| 14. | Screenshot 2023-11-16 110927.pngScreenshot 2023-11-16 111914.pngScreenshot 2023-11-16 113622.pngScreenshot 2023-11-16 134331.pngScreenshot 2023-11-16 134337.png | **Surface Finish**  (Grinding on all external surfaces) | Grinder | Grinding Wheel 80 grit | All surfaces | Manual | All the surfaces have been finished. |

Process Sheet for Fuel Pump Component 4 :

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| S.No | Operation description | Operation Description | Machine used | Tool | Location | Clamp | Remark |
| 15. | Screenshot 2023-11-16 154644.png | 3-D Printing | 3-D Printer | Acrylonitrile Butadiene Styrene (ABS) | -- | Printing Bench | The designed component is printed. |

Process Sheet for Fuel Pump Component 4 :

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| S.No | Operation Surface | Operation Description | Machine used | Tool | Location | Clamp | Remark |
| 16. | Screenshot 2023-11-16 154644.png | Press Fit | Vertical Hydraulic Press | Cylindrical Dye | Inside of F13 | F3,F4,F5,F6 | The press is used to tightly press fit. |

COMPONENT :

