# Evaluation Instructions
# Machining Level II – Milling: Precision Locations

## General Instructions

1. Make sure that the candidate has his/her own copy of the part print, job instructions and understands the criteria for performance evaluation. Times indicated are guidelines and will not be part of the assessment.

2. Provide access to the tools, equipment and materials as suggested on the next page.

3. Identify each candidate's work upon completion and permanently mark all parts.

4. Complete the evaluation of the candidate's project as soon as possible after completion. Be sure to complete the SPONSOR portion of the Performance Affidavit for successful projects.

## Monitoring the Performance

1. Make sure that the steel block used to complete the project agrees with the specifications on the part print.

2. Always check to see that the candidate is using the workholding devices and tooling in a safe and secure manner.

3. Check that all personal protection and safety precautions are being employed. Stop any candidate from creating an unsafe condition. A candidate should not be allowed to start, continue, or return to the project until an unsafe condition is resolved. If the unsafe condition is of the candidate's making, the evaluator or sponsor should require that the candidate completely restart the project after the safety issue has been resolved and appropriate instruction has been given.

## Completion of the Performance Evaluation

1. Check to see that the candidate has provided proper cleanup of tools, equipment and work area.

2. Check to see that tools are returned to their proper storage locations.

3. Check to see that equipment is returned to an appropriate condition and setting.

4. Complete the evaluation worksheet and file with your records.

5. Complete the SPONSOR portion of the Performance Affidavit.

6. Send the part, part print and Performance Affidavit to MET-TEC for review**.**

# Performance Standards
# Milling: Precision Locations

## Material:
1015 CRS or Low Carbon Steel 1.25" x 2.5" x 3.12"

## Duty:
Set up and perform boring for location, size, and finish.

## Performance Standard:
Produce three bores to specification. The holes will be between ¾" and 1-1/2" and their locations are to be held within +/-.001 and hold diameters within +/-.0005. One hole is to be counterbored to a decimal depth holding +/-.002" and counterbore diameter within +/-.005".

Accuracy Level: +/- .015 on all fractions, and+/-.005 on all decimals unless otherwise specified on the part print. 63 microinch finish

## Assessment Equipment and Material:

*Workstation:* Standard workbench, a vertical mill

*Material:* Part matching the material requirements of the part print

*Tooling:* 6" drill vises or greater, screws, studs, nuts, washers, and clamps sufficient to secure the vises, or suitable angle plates for the part. Assorted parallels, composition hammer, assorted Morse taper sleeves fitted to the machine spindle, drill chucks, edge finders, drills, centerdrills, and the necessary boring bars and associated cutters. Scriber, layout ink, prick punch, ball peen hammer, angle plate, 6" dividers, and surface gage

*Measuring Inst:* Required micrometers, combination set, 6" rule, 6" vernier, dial or electronic caliper, dial indicators, plug gages, telescoping gages, and layout height gage

*Reference:* Machinery's Handbook

# Performance Assessment Worksheet
# Machining Level II Milling: Precision Locations

**INSTRUCTIONS:** Rate the candidate's performance for the *Milling: Precision Locations* project according to the criteria below. The checklist below represents a listing of the criteria to be evaluated. It is ***not*** a sequence of process steps or a process plan for making the part. For each item, check the box under Pass or Fail accordingly.

Remember, NIMS requires that all specifications must be met within the allowable tolerance limits. If the part does not meet all specifications, the candidate/trainee must correct the deviation or redo the project.

Candidate/Trainee Name Evaluation Date

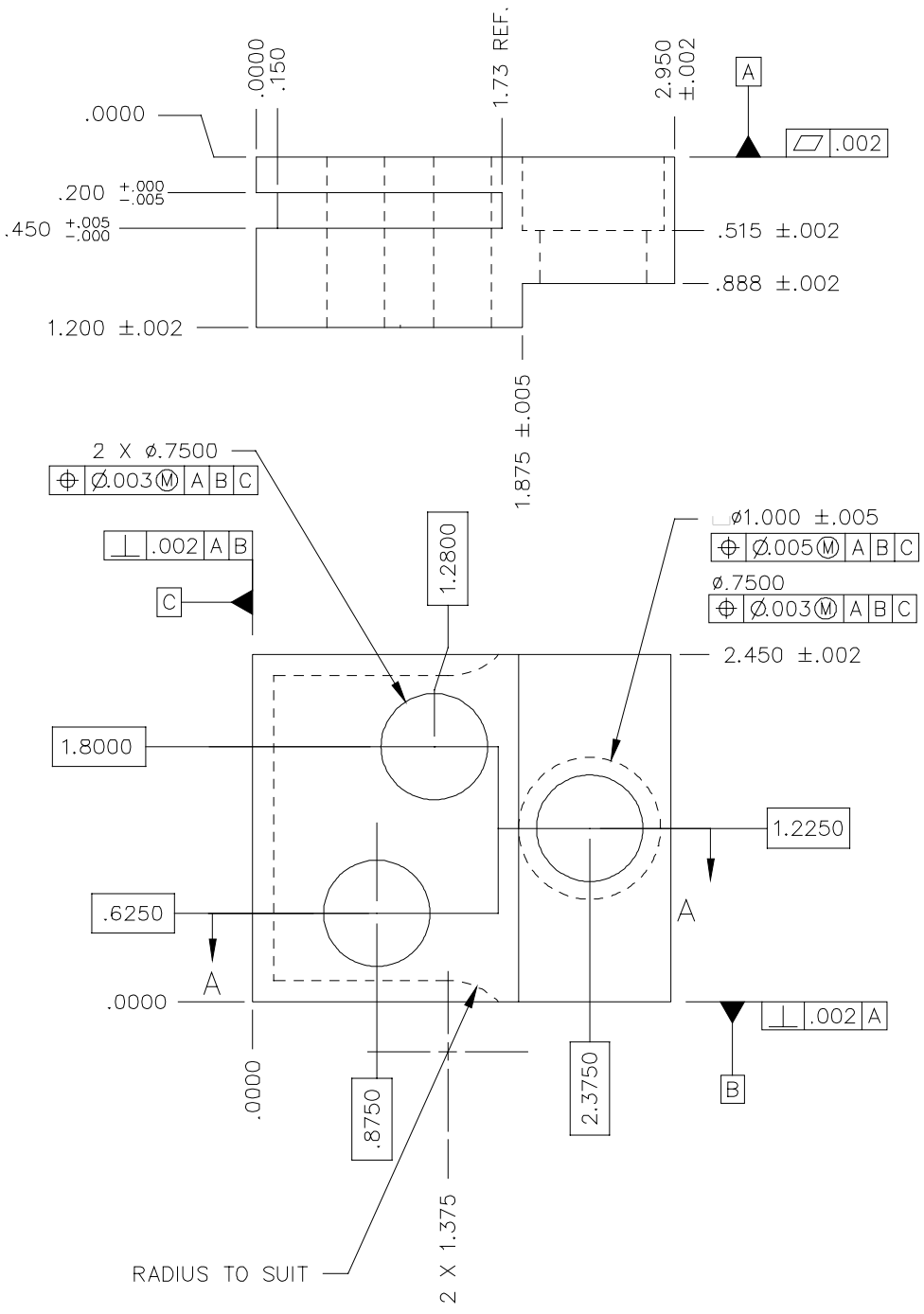
## Performance Project – Milling: Precision Locations

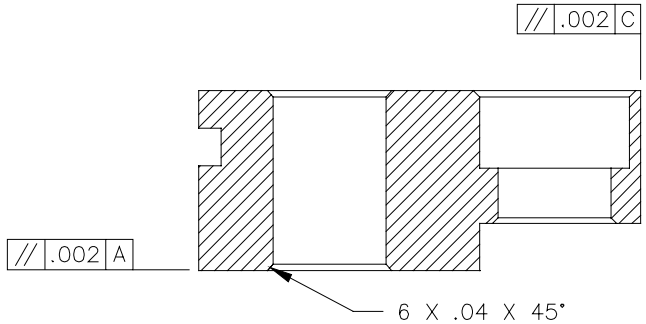
| Evaluation Criteria | | Pass | Fail |
|---|---|---|---|
| 1. Overall lengths<br>Width 2.450 ± .002<br>Length 2.950 ± .002<br>Height 1.200 ± .002 | Pass = within tolerance<br>Fail = exceeds tolerance | ☐ | ☐ |
| 2. Bored holes ∅ .750 ± .0005 (3 places)<br>Max: .7505<br>Min: .7495 | Pass = within tolerance<br>Fail = exceeds tolerance | ☐ | ☐ |
| 3. Step dimensions<br>1.875 ± .005<br>.888 ± .002 | Pass = within tolerance<br>Fail = exceeds tolerance | ☐ | ☐ |
| 4. Counterbore dimensions<br>∅ 1.000 ± .005<br>Depth .515 ± .002 | Pass = within tolerance<br>Fail = exceeds tolerance | ☐ | ☐ |
| 5. Datum A flatness .002 TIR | Pass = within specified TIR<br>Fail = exceeds specified TIR | ☐ | ☐ |
| 6. ∅ .750 bored hole location<br>True position to datum A, B and C within a .003 diameter tolerance zone at MMC<br>Basic dimensions (X and Y axis)<br>.8750 X .6250<br>2.3750 X 1.2250<br>1.2800 X 1.8000 | Pass = within specified tolerance zone<br>Fail = exceeds specified tolerance zone | ☐ | ☐ |
| 7. True position of the counterbore (∅ 1.000) within .003 diameter tolerance zone at MMC to datum D (datum D at MMC) | Pass = within specified tolerance<br>Fail = exceeds specified tolerance | ☐ | ☐ |
| 8. 1.200 surface (as reference) parallel to datum A within a .002 tolerance zone | Pass = within specified tolerance zone<br>Fail = exceeds specified tolerance zone | ☐ | ☐ |

| **Performance Project – Milling: Precision Locations** | | | |
|---|---|---|---|
| **Evaluation Criteria** | | **Pass** | **Fail** |
| 9. Side slot<br>Depth: .150 ± .005<br>Location: .200 +.000/-.005<br>.450 +.005/.000 | Pass = within tolerance<br>Fail = out of tolerance | ☐ | ☐ |
| 12. Datum B parallel to datum C within a .002 TIR | Pass = within tolerance<br>Fail = out of tolerance | ☐ | ☐ |
| 13. Exterior surface finish<br>125 microinches maximum | Pass = 125 microinches or finer<br>Fail = exceeds 125 microinches | ☐ | ☐ |
| 14. Bore diameter surface finish<br>63 microinches maximum | Pass = 63 microinches or finer<br>Fail = exceeds 63 microinches | ☐ | ☐ |
| 15. No sharp edges – break all sharp edges<br>1/64th" inches maximum | Pass = no sharp edges, broken edges under 1/64th"<br>Fail = sharp edges or edges broken greater than 1/64th" | ☐ | ☐ |
| 16. Side slot milled with a milling cutter and not an end mill | Pass = radius at end of the slot<br>Fail = no radius | ☐ | ☐ |
| **END OF MILLING: PRECISION LOCATIONS EVALUATION** | | | |

***It is important to note that the part must be 100% within the tolerances listed on the print. The criteria listed here are a guide for instructors and supervisors. Not every dimension is included in this guide. Nonetheless, the completed part must be 100% within the specifications of the print. The print takes precedence over this guide when the parts are inspected by the MET-TEC committee.*** *The* ***part print*** *and the* ***Performance Affidavit*** *should be sent along* ***with the part*** *to the MET-TEC for evaluation. Send to NIMS only the completed Performance Affidavit, signed by the MET-TEC members. A copy of the Performance Affidavit should be retained in the candidate's file documenting completed performance for this credential.*

NOTES:
1. FINISH ALL OUTSIDE DIMENSIONS TO 125 MAXIMUM
2. FINISH ALL BORE DIAMETERS TO 63 MAXIMUM
3. MAXIMUM TIME TO COMPLETE PART - 9 HOURS
4. BREAK ALL SHARP EDGES: 1/64TH MAXIMUM




SECTION A–A

| Level | Revision | Date | By | Chkd. |
|---|---|---|---|---|
| A | UPDATED DRAWING AND TITLE BLOCK | 5/12/03 | PW | |

NIMS

MACHINING SKILLS LEVEL II

Job Duty 2.6, 2.7, 2.9
Manual Milling

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES INTERPRET DIMENSIONS AND TOLERANCES PER ASME Y14.5M–1994

TOLERANCES
.XX ±.015 .XXXX ±.0005
.XXX ±.001 ANGLES ± 1 DEG.
FRACTIONS ± 1/64

| | | | |
|---|---|---|---|
| DESIGNER | DK | 4/22/02 | MATERIAL: 1015 CRS or LOW CARBON STEEL 1.25 X 2.5 X 3.12 |
| DWG CHK | | | |
| DWG APPD | | | |

SCALE FULL | DWG.#983001 I | SHEET 1 OF 1