Performance Standards
Surface Grinding

Material

Common mild steel or low carbon steel 1.0 x 1.5 x 2.0 (rough milled)

Duty

Setup and operate manual surface grinders with a 8" and smaller diameter wheel. Perform routine surface grinding, location of surfaces, and squaring of surfaces. Perform wheel dressing.

Performance Standard

Given a block squared up on a mill, part print, hand and precision tools, and choice of a grinding wheels, as well as access to a surface grinder and its accessories, dress the wheel, produce a part matching the print specifications using appropriate trade techniques. The part specified will be in the semi-finished state having been squared up and milled. Finishing the part will require the precision finishing of the six faces of the block to tolerances common to precision grinding for squareness, size, and surface finish characteristics.

Other Evaluation Criteria

1. Finishes are at least 32 Ra microinches or better.
2. Free of sharp edges.

Accuracy Level: +/- .001 on all decimals unless otherwise specified on the print. Square within .001 over 4".

Assessment Equipment and Material

Workstation: A common workbench with a precision surface plate, a surface grinder with a suitable magnetic chuck..

Material: A part matching the material requirements of the surface grinding part print, material: Mild steel.

Tooling: A magnetic chuck, assorted parallels, a suitable angle plate or precision grinding vise, and assorted clamps, composition hammer, assorted grinding wheels suitable for mounting to the spindle, files, magnetic base for indicators, surface gage of sufficient size, and diamond dresser.

Measuring Instruments: Required micrometers, combination set, dial test indicator, 6" rule, a 6" vernier, dial, or electronic caliper, adjustable parallels, depth micrometer set, master square or magnetic square, surface finish comparison gages.

Reference: Machinery's Handbook

Gage blocks
V block
Sine chuck
Sine plate

Performance Assessment Worksheet
Surface Grinding

INSTRUCTIONS: Rate the candidate's performance for the Surface Grinding job according to the eleven (11) criteria below. The checklist below only represents a listing of 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 must correct or redo the project.

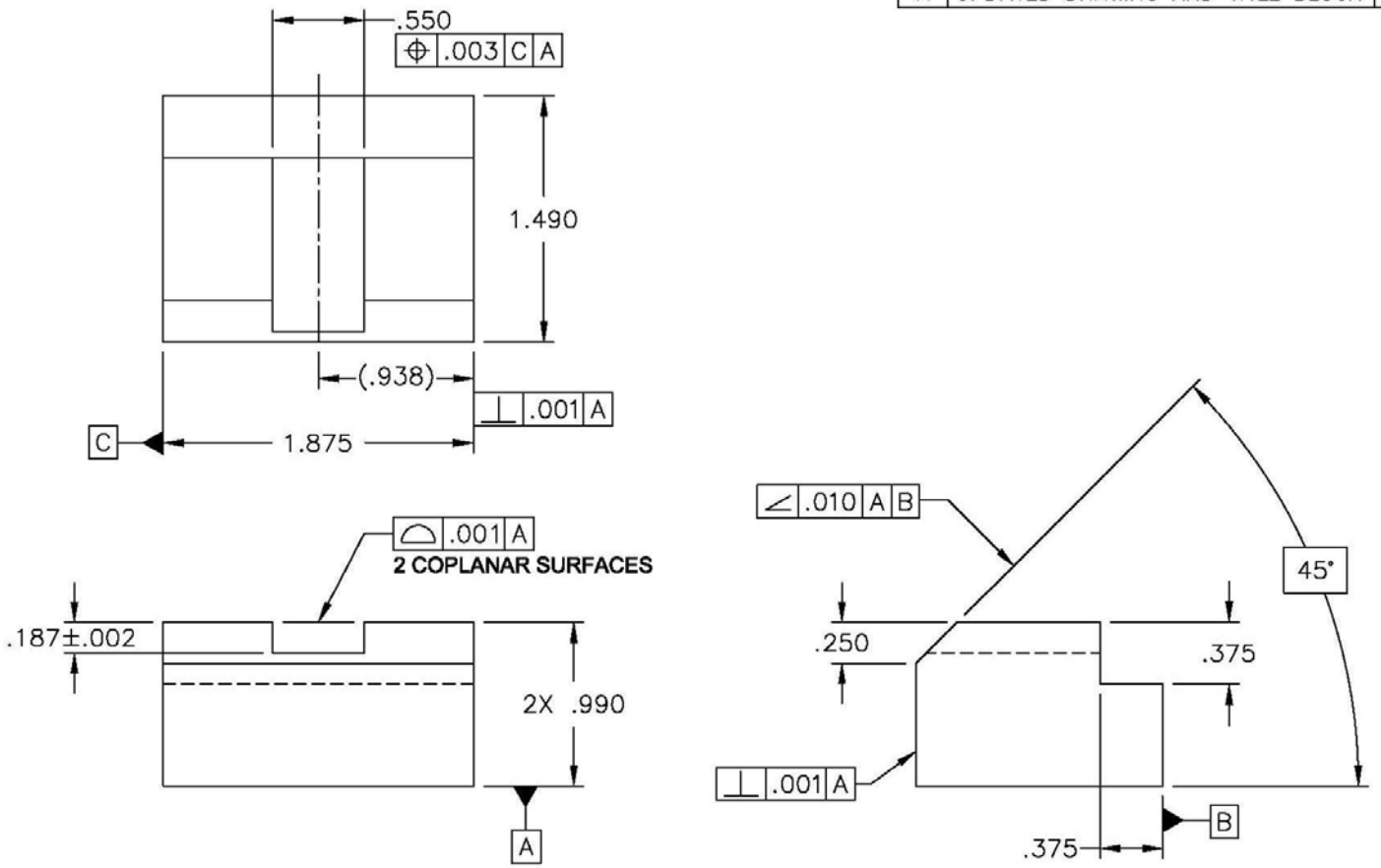
Candidate Name Evaluation Date

Performance Project -Surface Grinding **Evaluation Criteria**		**Pass**	**Fail**
1. .990 ± .001	Pass = within tolerance Fail = out of tolerance	❒	❒
2. 1.490 ± .001	Pass = within tolerance Fail = out of tolerance	❒	❒
3. 1.875 ± .001	Pass = within tolerance Fail = out of tolerance	❒	❒
4. .187 ± .002 slot depth	Pass = within tolerance Fail = out of tolerance	❒	❒
5. Perpendicularity & profile per GD&T call outs within specified tolerance zones	Pass = within specifications Fail = out of specifications	❒	❒
6. .550 ± .001 Position tolerance .003 to datum C & A	Pass = within tolerance Fail = out of tolerance	❒	❒
7. .375 ± .001 Width .375 ± .001 Depth	Pass = within tolerance Fail = out of tolerance	❒	❒

Performance Project -Surface Grinding **Evaluation Criteria**		**Pass**	**Fail**
8. Angularity of 45° within .010 .250 ± .001 depth of 45°angle	Pass = within tolerance Fail = out of tolerance	❒	❒
9. Surface finish	Pass = 32 Ra microinches or better Fail = over 32 Ra microinches	❒	❒
10.Fillet radii .015 max.	Pass = less than .015 Fail = greater than .015	❒	❒
11. Sharp edges broken .015 max.	Pass = below max. Fail = above max.	❒	❒
END OF SURFACE GRINDING 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.*

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
A	UPDATED DRAWING AND TITLE BLOCK	3/7/05	LW



Notes:
1. GRIND ALL OVER 32 MICROINCH
2. BREAK ALL SHARP EDGES .015 MAX
3. FILLET AND RADII .015 MAX

DO NOT SCALE DRAWING

NIMS®

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

TOLERANCES
.X ±.032 .XXX ±.001
.XX ±.015 ANGLES ± 1 DEG.
FRACTIONS ± 1/64

MACHINING SKILLS LEVEL I

Job Duty 2.7b
Surface Grinding Operation

DESIGNER	DK	11/11/01	MATERIAL
DWG CHK			COLD ROLL STEEL OR MILD STEEL
DWG APPD			
SCALE FULL	DWG.#98501 I	SHEET 1 OF 1	

NIMS PROCEDURAL REQUIREMENTS

1. SUBMIT THIS PRINT AND WORKPIECE ALONG WITH THE PERFORMANCE AFFIDAVIT FOR EVALUATION