

Performance Standards

Grinding: Cylindrical Grinding

Materials:

A2 Tool Steel (55 – 60 Rc) Ø1.2” X 4.12”

Duty:

Set up and perform between centers grinding for straight diameters. Dress the grinding wheel as necessary.

Performance Standard:

Dress the wheel. Given a part rough finished on three diameters, mount the part between centers and grind the required diameters to finish.

Accuracy Level: +/- .015 on fractions, +/- .005 on decimals, +/- .0005 on ground diameters.

Assessment Equipment and Material:

Workstation: A standard workbench and cylindrical grinder.

Material: A part matching the material requirements of the cylindrical grinding part print, material: Cold rolled steel

Tooling: Centers for the headstock and tailstock, assorted grinding dogs, composition hammer, assorted grinding wheels suitable for mounting to the spindle, files, magnetic base for indicators, and diamond dresser.

Measuring Inst: Required micrometers, combination set, dial test indicator, 6" rule, gage blocks, surface condition comparison gages.

Reference: Machinery's Handbook.

Performance Assessment Worksheet

Machining Level II – Grinding: Cylindrical Grinding

INSTRUCTIONS: Rate the candidate’s performance for the *Grinding: Cylindrical Grinding* project according to the criteria below. The checklist below 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 the deviation or redo the project.

Candidate Name _____

Evaluation Date _____

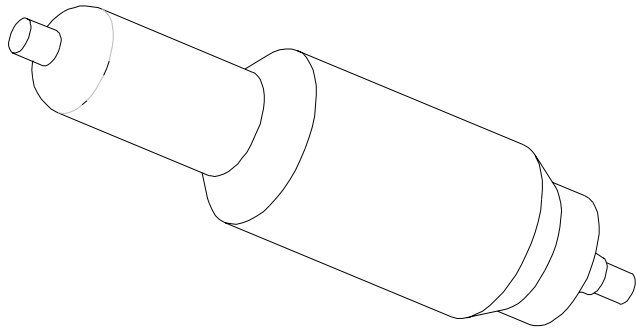
Performance Project – Grinding: Cylindrical Grinding			
Evaluation Criteria		Pass	Fail
1. $\varnothing 1.0000 \pm .0003$ Max: 1.0003 Min: .9997	Pass = within tolerance Fail = exceeds tolerance	<input type="checkbox"/>	<input type="checkbox"/>
2. Profile of a surface $\varnothing .6000$ basic dimension within a .001 tolerance zone to datum D and C (Reference point W to point X)	Pass = within specified tolerance zone Fail = exceeds specified tolerance zone	<input type="checkbox"/>	<input type="checkbox"/>
3. $\varnothing .2000 \pm .0003$ Max: 2.0003 Min: 1.9997	Pass = within tolerance Fail = exceeds tolerance	<input type="checkbox"/>	<input type="checkbox"/>
4. Profile of a surface $\varnothing .7500$ basic dimension within a .001 tolerance zone to datum D and C (Reference point Y to point Z)	Pass = within tolerance Fail = exceeds tolerance	<input type="checkbox"/>	<input type="checkbox"/>
5. $\varnothing .1750 \pm .0003$ Max: .1753 Min: .1747	Pass = within tolerance Fail = exceeds tolerance	<input type="checkbox"/>	<input type="checkbox"/>
6. $\varnothing .2130 \pm .0003$ Max: .2133 Min: .2127	Pass = within tolerance Fail = exceeds tolerance	<input type="checkbox"/>	<input type="checkbox"/>
7. Profile of a surface 45° angle basic dimension with a .001 tolerance zone to datum D and C (Reference point W to point X)	Pass = within specified tolerance zone Fail = exceeds specified tolerance zone	<input type="checkbox"/>	<input type="checkbox"/>
8. Profile of a surface 30° angle basic dimension with a .001 tolerance zone to datum D and C (Reference point Y to point Z)	Pass = within specified tolerance zone Fail = exceeds specified tolerance zone	<input type="checkbox"/>	<input type="checkbox"/>
9. Profile of a surface R .200 basic dimension with a .001 tolerance zone to datum D and C (Reference point W to point X)	Pass = within specified tolerance zone Fail = exceeds specified tolerance zone	<input type="checkbox"/>	<input type="checkbox"/>

Performance Project – Grinding: Cylindrical Grinding

Evaluation Criteria		Pass	Fail
10. Profile of a surface R. 250 basic dimension with a .001 tolerance zone to datum D and C (Reference point Y to point Z)	Pass = within specified tolerance zone Fail = exceeds specified tolerance zone	<input type="checkbox"/>	<input type="checkbox"/>
11. Concentricity of datum D ($\varnothing 1.0000$) to datum A-B within a .0002 tolerance zone	Pass = within specified tolerance zone Fail = exceeds specified tolerance zone	<input type="checkbox"/>	<input type="checkbox"/>
12. Length .200 Max: .2003 Min: .1997	Pass = within specified tolerance Fail = exceeds specified tolerance	<input type="checkbox"/>	<input type="checkbox"/>
13. Profile of a surface: length 1.400 basic dimension with a .001 tolerance zone to datum D and C (Reference point W to point X)	Pass = within specified tolerance zone Fail = exceeds specified tolerance zone	<input type="checkbox"/>	<input type="checkbox"/>
14. Profile of a surface: length 3.317 basic dimension with a .001 tolerance zone to datum D and C (Reference point Y to point Z)	Pass = within specified tolerance zone Fail = exceeds specified tolerance zone	<input type="checkbox"/>	<input type="checkbox"/>
15. Profile of a surface: length 3.567 basic dimension with a .001 tolerance zone to datum D and C (Reference point Y to point Z)	Pass = within specified tolerance zone Fail = exceeds specified tolerance zone	<input type="checkbox"/>	<input type="checkbox"/>
16. Profile of a surface: length 3.817 basic dimension with a .001 tolerance zone to datum D and C (Reference point Y to point Z)	Pass = within specified tolerance zone Fail = exceeds specified tolerance zone	<input type="checkbox"/>	<input type="checkbox"/>
17. Length $4.017 \pm .001$ Max: 4.018 Min: 4.016	Pass = within specified tolerance Fail = exceeds specified tolerance	<input type="checkbox"/>	<input type="checkbox"/>
18. All inside radii .010 maximum	Pass = inside radii .010 or less Fail = inside radii exceed .010	<input type="checkbox"/>	<input type="checkbox"/>
19. Finish all over 32 microinches maximum	Pass = finish 32 microinches or better Fail = finish exceeds 32 microinches	<input type="checkbox"/>	<input type="checkbox"/>
20. Break all sharp edges .015 max.	Pass = no sharp edges, broken edges less than .015 Fail = sharp edges, broken edges exceed .015	<input type="checkbox"/>	<input type="checkbox"/>
21. Evidence that part was ground between centers	Pass = evidence of center holes Fail = no evidence of center holes	<input type="checkbox"/>	<input type="checkbox"/>

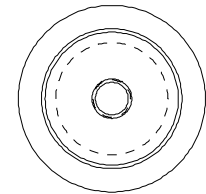
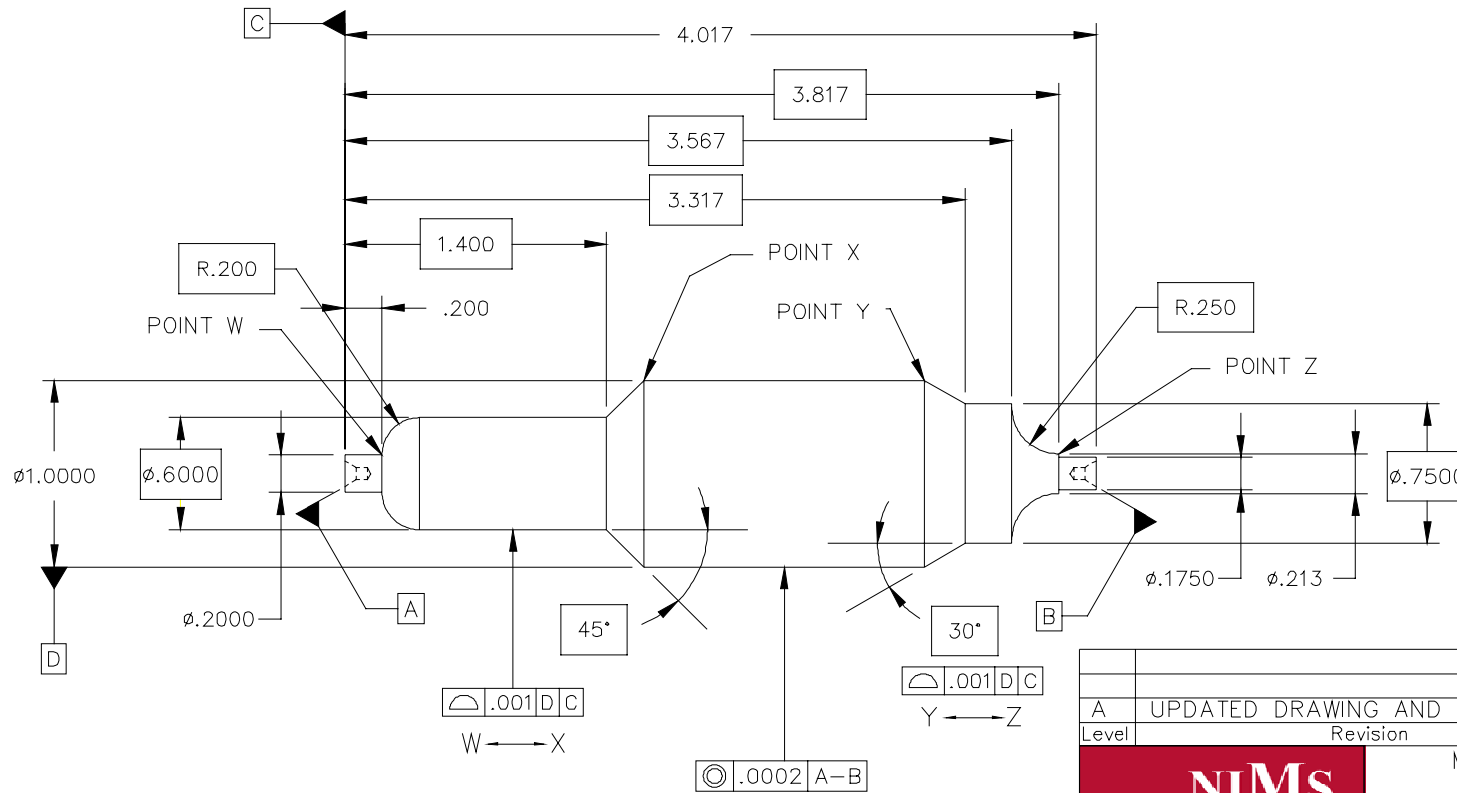
END OF GRINDING: CYLINDRICAL GRINDING EVALUATION

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.



Notes

1. FINISH ALL OVER TO: $\sqrt{32}$
2. BREAK ALL SHARP EDGES .015 MAX
3. INSIDE RADIUS .010 MAX
4. CANDIDATE GIVEN A SHAFT WITH A MIN. GRINDING STOCK .005 PER SURFACE
5. PART MUST BE GROUND BETWEEN CENTERS
6. CENTERS MACHINED TO SUIT THE EQUIPMENT



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

NIMS				
MACHINING SKILLS LEVEL II				
Job Duty 2.18 Cylindrical Grinding				
DESIGNER	DK	11/30/01	MATERIAL	
DWG CHK			HARDENED STEEL	
DWG APPD			55 - 60 Rc	
			1 1/8 DIA. X 4 1/2	
TOLERANCES				
.XX ± .015 .XXXX ± .0003				
.XXX ± .001 ANGLES ± 1 DEG.				
FRACTIONS ± 1/64				
SCALE	FULL	DWG.#005001-1	SHEET 1 OF 1	

DO NOT SCALE DRAWING