

INT113 LAB 2.1: KNURLING AND THREADING

Student Name: _____

Student ID: _____

LAB OUTCOMES:

Upon completion of this lab procedure, the student should be able to:

1. Cut external threads on a workpiece
2. Perform knurling on a workpiece

LAB PROCESS:

Before entering the machine shop, ensure that you have observed all required safety procedures:

- Safety glasses on
- Closed-toed shoes
- No rings or other jewelry
- No loose-fitting clothing
- Long hair pulled back
- Not under the influence of any substance that dulls reaction time or judgement

Part 1:

1. Review the print on the last page of this lab. You will be continuing to work with the machined part from INT113 Lab 1.1.
2. On the print, identify the two threaded sections. What type of threads are these?

How many threads per inch?

When cutting the threads, when will you need to engage the half-nuts?

3. Check the alignment of the lathe centers by bringing the headstock and tailstock together, and using the witness lines on the tailstock. Does the lathe need realignment?
4. Mount your workpiece in a three jaw chuck, with a center in the tailstock. Set the end of the workpiece that will have the UNC threads closest to the tailstock.

Part 2:

1. Select the appropriate knurling tool. What is this?
2. Consult with the instructor and set the appropriate spindle speed on the lathe. What speed is set? How does this compare to the speeds used for turning?
3. Set the knurling tool in the toolpost, and adjust it so both wheels are making contact with the workpiece. Adjust the compound rest so the knurling tool is perpendicular to the workpiece.
4. Start the lathe and slowly press the knurling tool into the workpiece until the pattern begin to form. Use cutting fluid as needed.
5. Continue knurling until the end of that section. Reverse the feed and repeat as needed. How does your knurling look?

Part 3:

1. Select your cutting tool for cutting the specified UNC threads. What is this?
2. Calculate the RPM for threading. The table in the text gives the recommended cutting speed for mild steel as 160 fpm. For threading, it is recommended to be $\frac{1}{4}$ the speed used for turning.

3. Consult with the instructor and set the appropriate spindle speed on the lathe. What speed is set? How does this compare to your calculated RPM?
4. Adjust the lathe settings for the appropriate number of threads. Adjust the apron so the half-nuts can be engaged. What is the purpose of the half-nuts?
5. Set the compound rest to 29° , with the tool axis perpendicular to the workpiece.
6. Engage the half-nuts and make an initial light cut.
7. Use a screw pitch gage to check your thread pitch. What is your pitch? Are you within the specified tolerance?
8. Finish cutting this thread.

Part 4:

1. Select your cutting tool for cutting the specified UNF threads. What is this?
2. Calculate the RPM for threading. The table in the text gives the recommended cutting speed for mild steel as 160 fpm. For threading, it is recommended to be $\frac{1}{4}$ the speed used for turning.

3. Consult with the instructor and set the appropriate spindle speed on the lathe. What speed is set? How does this compare to your calculated RPM?
4. Adjust the lathe settings for the appropriate number of threads. Adjust the apron so the half-nuts can be engaged. Set the compound rest to 29° , with the tool axis perpendicular to the workpiece.
5. Engage the half-nuts and make an initial light cut.
6. Use a screw pitch gage to check your thread pitch. What is your pitch? Are you within the specified tolerance?
7. Finish cutting this thread.

Questions:

1. Is the knurled section of the workpiece acceptable, based on the print? What are some common causes of poor knurling quality?
2. Are both threads within tolerance?

The outcomes of this exercise (listed on page 1) specifies the skills that the Student must demonstrate to the Instructor. Once the Instructor is satisfied with the demonstration of Knowledge & Skills by the individual student, they will sign this document (for the student), then enter a 100% into the Hands-On Lab grade in Sakai.

I verify that this student has completed all of the requirements of this Hands-On Assessment:

Student Name: _____

Faculty Signature: _____ Date: _____

DOL DISCLAIMER:

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