

Standard Operating Procedure

Title: SOP-006 Lathe

PI: Art Erdman Lab Location: Mayo G217

Issue Date: 7/2/13 Revision Date: NA

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Hazard Identification:

Physical Danger

Exposure Assessment:

Motions

- Rotating Motion
In lathe operation, the chuck is a source of rotating motion. Rotating elements could grip loose clothing, gloves, hair, or appendages which could result in severe injury. Rotating elements can also propel poorly secured items across a room.
- In-Running Nip Points
The assembly and table surrounding the chuck area is a source of in-running nip points. Clothing, hair, or appendages could get caught and pinched in these points resulting in severe injury.

Actions

- Cutting
The cutting action of the lathe is performed by the cutting head when the chuck rotates. This cutting action produces material chips that could be sharp. These chips may be propelled into the air by the rotating motion of the chuck and cause injury.

Control Plan:

- Read and become familiar with machine's operating procedures before operating
- Always know where the power off switch is located in case of emergency
- Always turn switch to off position when not operating machine
- Always disconnect the machine from the power source before servicing, repairing, or making any adjustments
- Wear safety glasses at all times while operating the lathe to protect eyes from any dust or debris
- Wear a dust or face mask to prevent the inhalation of dust from operating the machine

- Do not wear gloves, necktie, jewelry, or loose clothing, as they could get caught in the rotating elements of the machine
- Tie up long hair or wear protective hair covering to prevent hair from getting caught in the rotating elements of the machine
- Always clamp work piece. Never operate on loose work. Never secure the work piece with your hands.
- Always use guards in the appropriate position when operating the lathe.
- Always use recommended speed and specifications for lathe and accessories

Experimental Procedures:

- Put on all safety equipment and tie back loose hair or clothing before operating machine
- Check to make sure all parts of machine are working and functioning properly
- Double check all measurements for operating machine on work piece
- See chart below for recommended cutting speed, angle, and lubricant. This chart can also be found in the User Manual (p. 51) in Appendix

Workpiece material	Tensile strength in kp/mm^2	Tool	Cutting angle clearance/top		Feed in mm/rev.				Coolant and Lubricant	
			α°	γ°	0,1	0,2	0,4	0,8	Roughing	Finishing
					cutting speed v m/min					
Steel St 34, St 37, St 42	up to 50	SS	8	14		60	45	34	E	E or P
		S ₁	5	10	280	236	200	170		
St 50, St 60	50...70	SS	8	14		44	32	24	E	E or P
		S ₁	5	10	240	205	175	145		
St 70	70...85	SS	8	14		32	24	18	E	E or P
		S ₁	5	10	200	170	132	106		
Cast steel	50...70	SS	8	10		34	25	19	E	dry
		S ₁	5	6	118	100	85	71		
Alloyed steel	85...100	SS	8	10		24	17	12	E	E or P
		S ₁	5	6	150	118	95	75		
Mn-Steel, Cr-Ni-steel, Cr-Mo-steel	100...140	SS	8	6		16	11	8	E	E or P
		S ₁	5	6	95	75	60	50		
other alloyed steels	140...180	SS	8	6		9,5	6		E	E or P
		S ₁	5	6	60	48	38	32		
Tool steel	150...180	SS	8	6					E	Colza oil or P
		S ₁	5	6	50	40	32	27		
C.I.20,C.I.25	hardness Brinell 200...250	SS	8	0		32	18	13	dry or E	dry
		H ₁	5	0	106	90	75	63		
Copper alloys	hardness Brinell 80...120	SS	8	0		125	85	56	dry,EorL	dry
		G ₁	5	6	600	530	450	400		
Cast bronze		SS	8	0		63	53	43	E or L	dry
		G ₁	5	6	355	280	236	200		
Light alloys aluminium		SS	12	30		400	300	200	E or P	E or P
		G ₁	12	30	1320	1120	950	850		
Aluminium alloys (11...13%Si)		SS	12	18		100	67	45	E	Oil S II or P
		G ₁	12	18	224	190	160	140		
Magnesium alloys*		SS	8	6		1000	900	800	dry or with non-combustible oil	dry or with non-combustible oil
		G ₁	5	6	1800	1500	1250	1060		
Plastics and hard rubber		SS	12	10					dry	dry
		G ₁	12	10	300	280	250	224		
Bakelite, Novotext, Pertinax hard plastic		SS	12	14					dry	dry
		G ₁	12	14	280	212	170	132		

- Adjust machine to correct speed for machining process
- Put work piece into chuck

- Use chuck key to loosen and tighten the chuck
- Remove chuck key from chuck and place out of chuck path of rotation
- Make sure all safety equipment is on correctly and put safety guards into position
- Start machine by turning black knob into on position
- During operation, keep hands a safe distance away and only use adjustment tools on lathe to maneuver work piece.
- When finished, turn off the lathe right away
- Wait until rotating chuck has completely stopped before handling work piece
- Clean machine after use and dispose of debris (see Waste Management Procedures)

For other inquiries, see link to EMCO Compact 10 Manual.

<http://www.scribd.com/doc/33541919/Emco-Compact-10-Instruction-amp-Service-Parts>

Waste Management Procedures:

When finished with the lathe, always clean the area. There should be no chips filings, or dust on the work table or floor. Dustpan, handbroom, regular broom, paper towels and cleaning solution can be found in G217-09.

Place all wrenches, clamps, raw materials, and vice grips back in the appropriate place.

Spill and Accident Procedures:

If an accident occurs, report immediately to the lab supervisor (G217-05) or other appropriate staff member. If no one is around, dial 911 on the landline phone near the door of G217-09 to reach the campus police. The lab first aid kit is located on the wall near the sink. A first aid pamphlet from DEHS is located in all of the MDC's first aid kits.