

Leseprobe

Christiani

est.1931

Operational training · Metal working

Machine-based material processing

Part: Milling



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Time (h)	Goals – Content – Schedule – Notes	Media
0.5	<p>Course introduction</p> <ul style="list-style-type: none"> ▶ Welcome, introductions ▶ Schedule and organisation ▶ Getting to know the workplace (workshop tour) 	Flip chart
	<p>Course content:</p> <ul style="list-style-type: none"> ▶ Milling ▶ Milling machines ▶ Milling processes ▶ Milling tools ▶ Clamping workpieces and tools ▶ Process parameters/materials ▶ Milling techniques ▶ Reading and using technical documents ▶ Work planning and presenting work results ▶ Self-check of work results ▶ Maintaining milling machines ▶ Work safety, environmental protection and energy efficiency ▶ Drill stands <p>Note:</p> <p>To secure a machine vice to the base plate of the drilling machine stand, two clamping bolts are listed under item 10 in the list of supply parts. We recommend manufacturing these supply parts as part of the Turning section, and replacing exercise 11 under Turning, if appropriate. A workshop drawing for manufacturing these clamping bolts is included in the trainee section (see page 16).</p>	Flip chart Pin board Slide 1
	Trainer manual	Metal working
	Milling	

Time (h)	Goals – Content – Schedule – Notes	Media
0.5	<p>Learning objectives – exercise 1</p> <ul style="list-style-type: none"> ▶ Classify milling processes ▶ Explain the design and function of a milling machine ▶ Establish the operational readiness of a milling machine ▶ Distinguish between milling tools ▶ Select and fit appropriate toolholders ▶ Clamp and align workpieces ▶ Determine and set process parameters ▶ Measure clamped workpieces ▶ Identify and apply health and safety regulations, and environmental protection measures ▶ Exercise 1: Manufacture a fork guide 	Flip chart
2.5	<p>Briefing/discussion (exercise 1)</p> <ul style="list-style-type: none"> ▶ Review / follow-up Training sections: Turning, drilling Vocational school (knowledge of material removal) ▶ Classifying milling Manufacturing/cutting processes Material-removal processes/milling processes ▶ Milling machine design Machine frame Knee Main drive Feed device Vertical milling head 	Library Libraries: - Turning - Drilling Slide 2, 3 Slide 4 - 7
	Trainer manual	Metal working
	Milling	

Time (h)	Goals – Content – Schedule – Notes	Media
	<ul style="list-style-type: none"> ▶ Milling machine functions <ul style="list-style-type: none"> Power flow Switching the machine on/off Emergency stop Motions on a milling machine Manual feed ▶ Criteria for operational readiness <ul style="list-style-type: none"> Lubrication/cooling Feed limit switch Workplace lighting Sources of danger when switching on ▶ Milling tools <ul style="list-style-type: none"> Shell-type milling cutter ▶ Toolholders <ul style="list-style-type: none"> Shell-type mill arbor Draw-in collet chuck Toolholder with morse taper ▶ Clamping and aligning workpieces <ul style="list-style-type: none"> Machine vice Edge finder ▶ Determining and setting process parameters <ul style="list-style-type: none"> Cutting speed/rotational speed Cutting depth/cutting width Effects on surface finish Effects on service life Setting procedure 	<p>Slide 4, 8</p> <p>Flip chart</p> <p>Sample</p> <p>Slide 9, 10 Sample</p> <p>Slide 11 Sample</p> <p>Slide 12 Manufacturer documents (milling cutter) Library: Turning</p>
	Trainer manual	Metal working
	Milling	

Time (h)	Goals – Content – Schedule – Notes	Media
1.0	<ul style="list-style-type: none"> ▶ Checking the dimensions on the clamped workpiece Work safety Measuring procedure Reference temperature ▶ Safety and accident prevention guidelines Personal protective equipment Operating instructions ▶ Environmental protection Dosing operating fluids Disposing of cooling lubricant, chips and rags Location of disposal containers ▶ Consolidation questions (oral) Summary from the trainer ▶ Review the instructions, taking into account the milling machine at hand and the associated operating material The trainer demonstrates the procedures on the milling machine 	Library Checking: Measuring and gauging
	Trainer manual	Metal working
	Milling	

Time (h)	Goals – Content – Schedule – Notes	Media
3.5	<p>▶ Exercise 1: Lower fork guide</p> <p>Task/assignment</p> <p>The trainees should manufacture the "lower fork guide" in accordance with the engineering data provided.</p> <div data-bbox="568 689 887 1111" data-label="Image"> </div> <p>▶ Trainee sets up the milling machine</p> <p>Clamping the workpiece/tool</p> <p>Setting the process parameters</p> <p>Review with the trainer</p> <p>▶ Complete exercise 1</p>	Engineering data
0.5	<p>Evaluate exercise 1 with each trainee</p>	Evaluation sheet
Trainer manual		Metal working
Milling		