

Test report: Machinery capability investigation
from industry screwdriver



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Maschine typ : Date :

Model variant :

Manufacturer :

Development No. :

Stage of development

MCI - Typ :

Number of steps : Test bench - ID :

Screw connection class :

1	2	3	4	5	6
5,0%	10,0%	12,0%	15,0%	20,0%	25,0%

Fitting tolerance :

Torque range : $M_{min} =$ Nm $M_{max} =$ Nm

Idle speed : $n =$ min⁻¹ Weight incl. Battery : $m =$ kg

Battery voltage : $U =$ V Sound pressure level : $L_{pA} =$ dB(A)

Battery capacity : $Q =$ mAh Undervoltage detection :



Torque range investigation : Testingmaschine : Stück

30% → M30% = $M_{min} + 30\% \times (M_{max} - M_{min}) =$ 2,50 Nm
 80% → M80% = $M_{min} + 80\% \times (M_{max} - M_{min}) =$ 5,00 Nm
Mmax = 100% → M100% = $M_{min} + 100\% \times (M_{max} - M_{min}) =$ 6,00 Nm

Information on all 3 test items

Load level		30%		80%		100%	
Test torque	$M_d =$	2,50		5,00		6,00	
Joints	hard	soft	hard	soft	hard	soft	
	30°	360°	30°	360°	30°	360°	
$c_{m min} =$		1,812	2,451	2,604	2,525	2,597	3,030
$c_{mk min} =$		1,674	2,069	2,505	2,030	2,307	2,662

		Name :	Date :
Carried out by	:	Mück	29.05.2017
Test report prepared by	:	Mück	04.07.2017

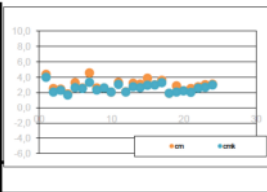
Testbench Measuring			MCS for FEIN-Project : 7021		Homologation		Date: 04.07.2017			
ASW 18-6 / PC			ScrewdriverType ASW		Accuracy-Class 10,0%		Class : 2			
			Variant : 18-6 / PC		M _{range} = 1,00 up to 6,00 Nm		n _{given} = 575 rpm U = 18,00 V			
								cycles: 100		
MCS	M _d [Nm]	Angle [°]	M _q [Nm]	ΔM _{q1/2} [Nm]	s [Nm]	C _m [1]	C _{mk} [1]	n [min ⁻¹]	Remarks	
1	2,50	360°	2,483	0,036	0,034	2,451	2,284	585	2017-05.013224	30%
1	2,50	30°	2,519		0,046	1,812	1,674	584		
1	5,00	360°	4,905	0,114	0,051	3,268	2,647	603		80%
1	5,00	30°	5,019		0,064	2,604	2,505	586		
1	6,00	360°	5,840	0,093	0,044	4,545	3,333	573		100%
1	6,00	30°	5,933		0,077	2,597	2,307	590		
2	2,50	360°	2,479	0,018	0,025	3,333	3,053	570	2017-05.013228	30%
2	2,50	30°	2,497		0,040	2,083	2,058	560		
2	5,00	360°	4,927	0,148	0,052	3,205	2,737	557		80%
2	5,00	30°	5,075		0,054	3,086	2,623	579		
2	6,00	360°	5,860	0,130	0,052	3,846	2,949	581		100%
2	6,00	30°	5,990		0,066	3,030	2,980	564		
3	2,50	360°	2,430	0,067	0,029	2,874	2,069	574	2017-05.013229	30%
3	2,50	30°	2,497		0,037	2,252	2,225	571		
3	5,00	360°	4,902	0,063	0,066	2,525	2,030	597		80%
3	5,00	30°	4,965		0,061	2,732	2,541	589		
3	6,00	360°	5,927	0,093	0,066	3,030	2,662	591		100%
3	6,00	30°	6,020		0,065	3,077	2,974	578		
Start of measurement: 09:00					End of measurement: 16:00					
<p>Homologation : 3 Machines out of a series, each 30%, 80% and 100% the torque-ranges. Waitingtime between Load changes 2 sec. Series of measurement per machine, Nominal Torque and Screwinghardness : each 100 Load changes (LW). Measurement based on VDI 2647 February 2013</p>										
C _{m min} = 1,812		C _{m q} = 2,908		C _{m max} = 4,545		S _{cm} = 0,621				
C _{mk min} = 1,674		C _{mk q} = 2,536		C _{mk max} = 3,333		n _{MFU} = 18				
Name: Mück			Project: 7021 : ASW 18-6 / PC							
			C. & E. FEIN GmbH Schwäbisch Gmünd							
Stage of Development :			Series			S _{cm} = C _m - Minimum Value C _{mk min} = C _m - Minimum Value C _m = Minimum Value C _{m q} = C _m - Mid Value C _{mk q} = C _m - Mid Value C _m = Mid Value C _{m max} = C _m - Maximum Value C _{mk max} = C _m - Maximum Value C _m = Maximum Value S _{cm} = C _m - Standard deviation C _{mk} = C _m - Standard deviation n _{MCS} = No. of Machine Capability Study (MCS) C = correction Value				

Testbench Measuring		MCA for FEIN-Project : 0	Homologation	Date: 04.07.2017
ASW 18-6PC		ScrewdriverType ASW	Accuracy-Class 10,0%	Class : 2
Variant : 18-6PC		f _{mess} = 300 Hz		M _{min} up to 6,00 Nm
		M _{range} = 1,00		n _{given} = 575 rpm U = 18,00 V
				cycles: 100


MCS	M _d [Nm]	Angle [°]	M _q [Nm]	ΔM _{q1/2} [Nm]	s [Nm]	C _m [1]	C _{mK} [1]	n [min ⁻¹]	Remarks
1	2,17	360°	2,140		0,017	4,364	3,960	580	23%
1	2,17	30°	2,200	0,060	0,029	2,526	2,058	582	
1	2,50	360°	2,483		0,034	2,451	2,284	585	30%
1	2,50	30°	2,519	0,036	0,046	1,812	1,674	584	
1	5,00	360°	4,905		0,051	3,268	2,647	603	80%
1	5,00	30°	5,019	0,114	0,064	2,604	2,505	586	
1	6,00	360°	5,840		0,044	4,545	3,333	573	100%
1	6,00	30°	5,933	0,093	0,077	2,597	2,307	590	
2	2,17	360°	2,160		0,028	2,580	2,590	586	23%
2	2,17	30°	2,160	0,000	0,035	2,070	2,057	577	
2	2,50	360°	2,479		0,025	3,333	3,053	570	30%
2	2,50	30°	2,497	0,018	0,040	2,083	2,058	560	
2	5,00	360°	4,927		0,052	3,205	2,737	557	80%
2	5,00	30°	5,075	0,148	0,054	3,086	2,623	579	
2	6,00	360°	5,860		0,052	3,846	2,949	579	100%
2	6,00	30°	5,990	0,130	0,066	3,030	2,980	581	
3	2,17	360°	2,180		0,020	3,600	3,267	589	23%
3	2,17	30°	2,160	0,020	0,038	1,895	1,895	579	
3	2,50	360°	2,430		0,029	2,874	2,069	574	30%
3	2,50	30°	2,497	0,067	0,037	2,252	2,225	571	
3	5,00	360°	4,902		0,066	2,525	2,030	597	80%
3	5,00	30°	4,965	0,063	0,061	2,732	2,541	589	
3	6,00	360°	5,927		0,066	3,030	2,662	591	100%
3	6,00	30°	6,020	0,093	0,065	3,077	2,974	578	

Start of measurement: 09:00
End of measurement: 16:00
Homologation : 3 Machines out of a series, each 0%, 30%, 80% and 100% the torque-ranges.
Waitingtime between Load cycles 2 sec.
Series of measurements per machine, nominal torque and screw joint density per 100 load cycles (LW).
Measurement based on VDI 2647 February 2013

C _{m min} = 1,812	C _{m q} = 2,891	C _{m max} = 4,545	s _{cm} = 0,693
C _{mK min} = 1,674	C _{mK q} = 2,562	C _{mK max} = 3,333	ΔMFU = 24



C_{m min} = C_m - Minimum Value
C_{m q} = C_m - Mid Value
C_{mK q} = C_{mK} - Mid Value
C_{m max} = C_m - Maximum Value
C_{mK max} = C_{mK} - Maximum Value
s_{cm} = C_m - Standard deviation
C_{mK} = C_{mK} - Standard deviation correction value

Name: M. Mueck Project:
 **C. & E. FEIN GmbH** Development Status :
Schwäbisch Gmünd Series