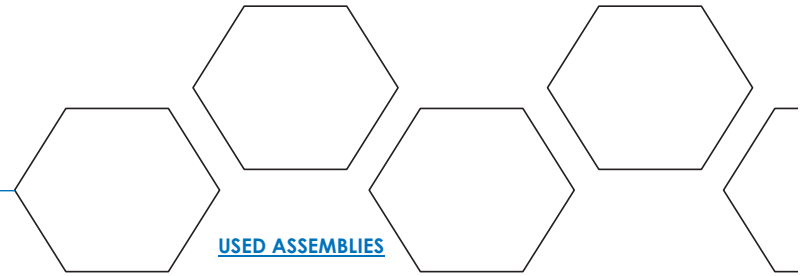
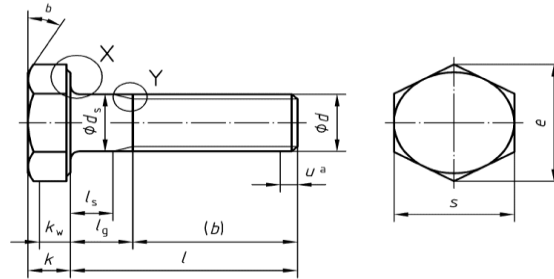


**EN14399-3 PRELOADED FRICTION GRIPS BOLTS
CLASS 8.8 ASSEMBLIES**

INTRODUCTION

Preloaded bolted assemblies are very sensitive to differences in manufacture and lubrication. Therefore it is important that the assembly is supplied by one manufacturer who is always responsible for the function of the assembly.



USED ASSEMBLIES

In some cases, connections are disassembled. In these circumstances, the assembly should not be re-used, because some of the bolt's (limited) elongation will have been irreversibly used. Preloading an assembly for a second time may take the assembly to (or very close to) it's breaking point.

EN 14399-3 BOLT DIMENSIONS (HR)				COMPARED TO DIN 931 / 933 HEAD DIMENSIONS			
Thread Size <i>d</i>	M16	M20	M24	M16	M20	M24	
P pitch of thread	2	2.5	3				
b	Bolt ≤ 125	38	46	54			
	Bolt 125 ≥ 200	44	52	60			
c	min.	0.4	0.4	0.4			
	max.	0.8	0.8	0.8			
ds	min.	15.30	19.16	23.16			
	max.	16.70	20.84	24.84			
e	min.	29.56	35.03	45.2	26.75	33.53	39.98
	nom.	10	12.5	15	10	12.5	15
k	min.	9.25	11.6	14.1	9.82	12.28	14.78
	max.	10.75	13.4	15.9	10.18	12.72	15.22
kw	min.	6.5	8.1	9.9			
	max.	26.16	31	40	23.67	29.67	35.38
s	min.	27	32	41	24	30	36
	max.						

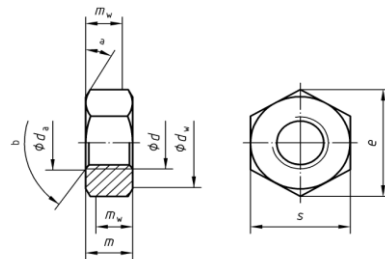
EN 14399-3 BOLT LENGTH AND THREAD TOLERANCES (HR)								
Thread Size <i>d</i>			M16		M20		M24	
nom	min	max	ls min	lg max	ls min	lg max	ls min	lg max
40	38.75	41.25	8	14				
45	43.75	46.25	8	14	10	17.5		
50	48.75	51.25	8	14	10	17.5		
55	53.5	56.5	8	14	10	17.5		
60	58.5	61.5	12	22	10	17.5	12	21
65	63.5	66.5	17	27	10	17.5	12	21
70	68.5	71.5			11.5	24	12	21
75	73.5	76.5			16.5	29	12	21
80	78.5	81.5			21.5	34	12	21
90	88.25	91.75			31.5	44	21	36
100	98.25	101.75			41.5	54	31	46
110	108.25	111.75					41	56
120	118.25	121.75					51	66

EN 14399-3 MECHANICAL PROPERTIES 8.8 BOLTS (HR)				
Bolt thread dia.	Proof Load min	Tensile Strength min	Hardness Rockwell HRC	
	kN	Mpa	min	max
M16	94.5	830	23	34
M20	147	830	23	34
M24	212	830	23	34

EN 14399-3 TORQUE DATA (2 STEPS)					
Bolt thread dia.	1st Step: Tightening (Nm)	2nd Step Rotational(°)		2nd Step Rotational(°)	
		Bolt Length		Bolt Length	
M16	190	≤ 50	60°	≥ 55	90°
M20	370	≤ 60	60°	≥ 65	90°
M24	642	≤ 70	60°	≥ 75	90°

EN 14399-3 NUT DIMENSIONS (HR)				COMPARED TO DIN 934 NUT DIMENSIONS			
Thread Size <i>d</i>	M16	M20	M24	M16	M20	M24	
P pitch of thread	2	2.5	3				
Mw	min.	11.3	13.5	16.2			
	min.	24.9	29.5	38			
e	min.	29.56	35.03	45.2	26.75	32.95	39.55
	max.	14.8	18	21.5	13	16	19
m	min.	14.1	16.9	20.2	12.3	14.9	17.7
	max.	27	32	41	24	30	36
s	min.	26.16	31	40	23.67	29.16	35
	max.						

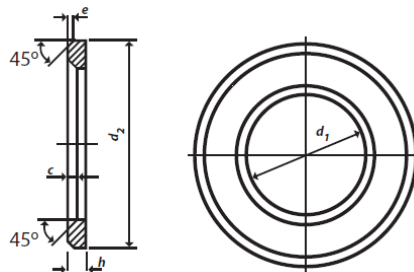
The maximum value of **dw** shall not exceed the actual width across flats



EN 14399-3 PROOF LOAD VALUES AND HARDNESS (HR)				
Nut thread Dia.	Stress Area Test Mandrel	Property Class		
		Tolerance class		Rockwell HRB / HRC
		Proof Load kN	min	max
M16	157	157	91.5 HRB	30 HRC
M20	245	245	18 HRC	36 HRC
M24	353	353	18 HRC	36 HRC

EN 14399-6 WASHER DIMENSIONS (H)				
Normal Size <i>d</i> *)	M16	M20	M24	
d₁	min	17	21	25
	max	17.27	21.33	25.33
d₂	min	29.48	36.38	43.38
	max	30	37	44
h	nom	4	4	4
	min	3.7	3.7	3.7
e	min	4.3	4.3	4.3
	max	0.75	0.75	0.75
c	min	1.6	2.0	2.0
	max	1.9	2.5	2.5

*) Nominal thread diameter of associated bolts



EN 14399-6 MECHANICAL PROPERTIES WASHER (H)		
Normal Size	Vickers Hardness (HV)	
	min	max
M16	300	370
M20	300	370
M24	300	370