



D2111 [2000-N]

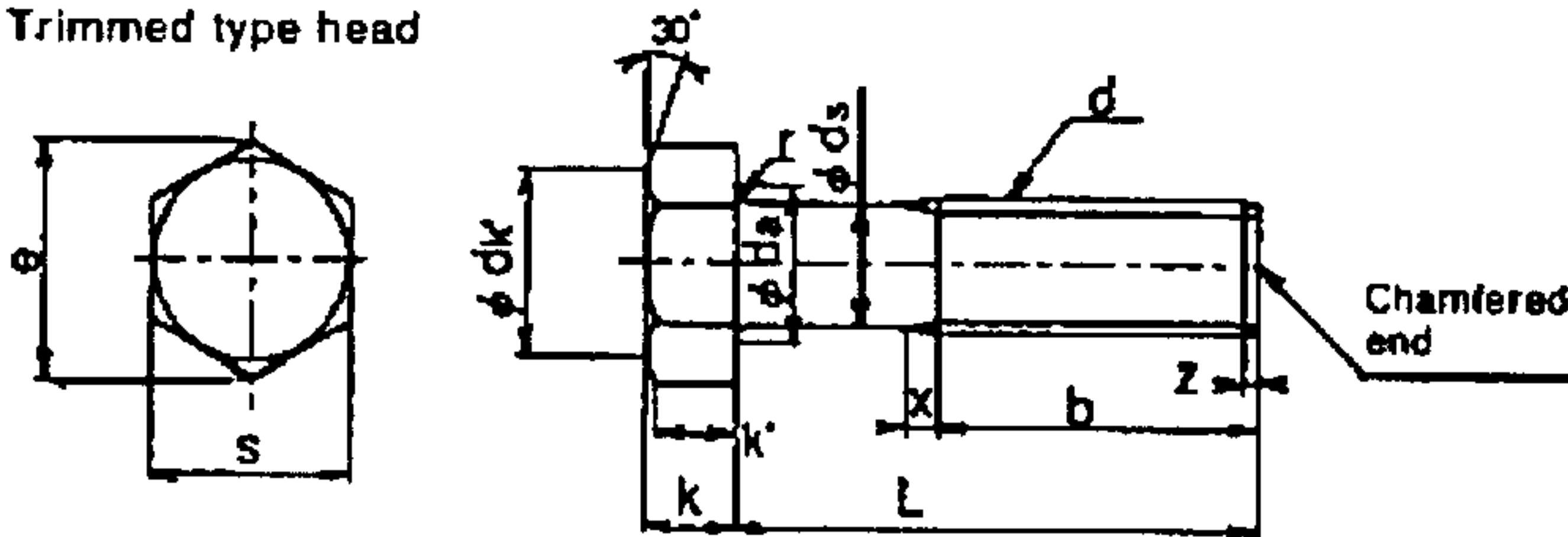
Nissan Engineering Standard

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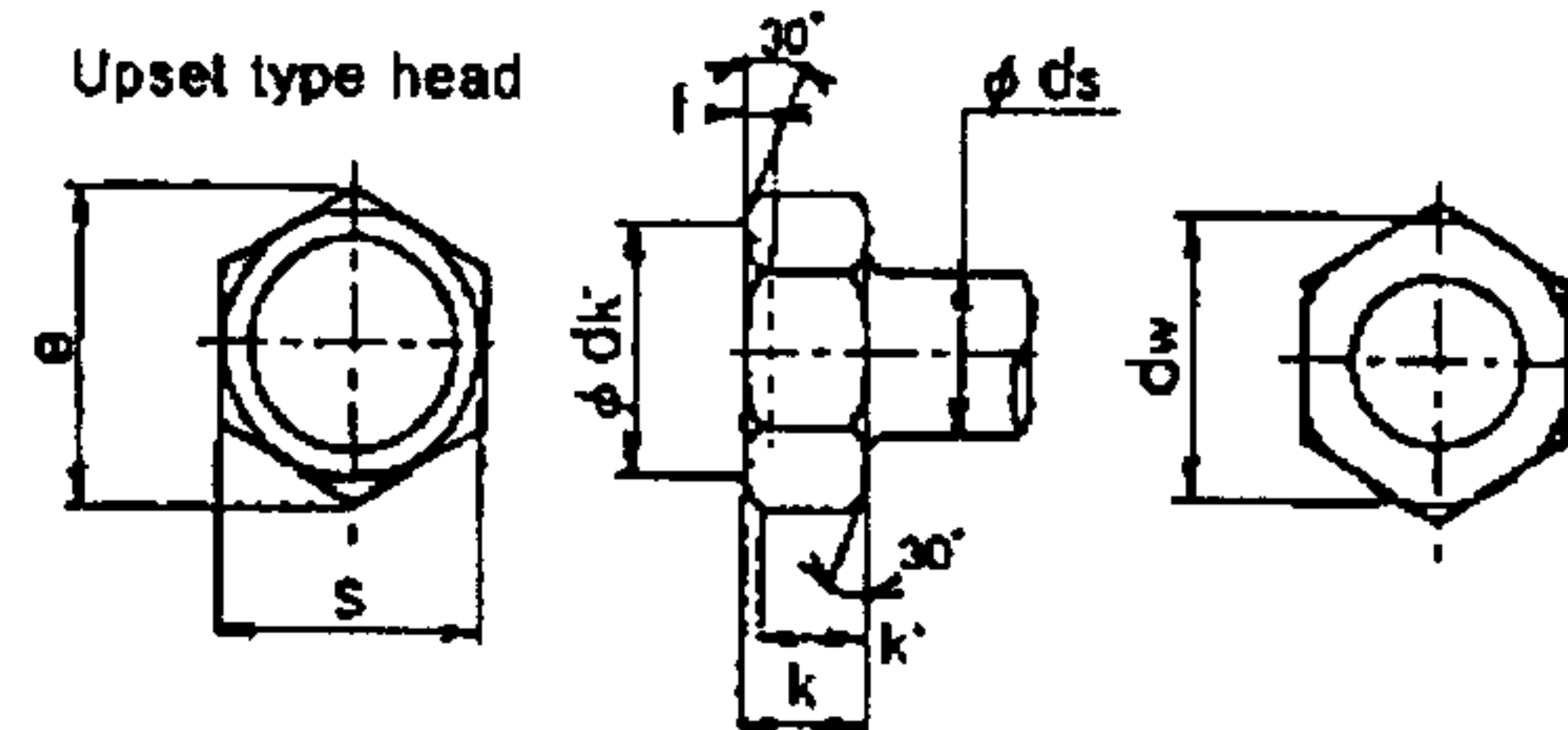
Standard Parts for Automobiles

NES	Bolts – Hexagon Head	D 2111 Revised 2000
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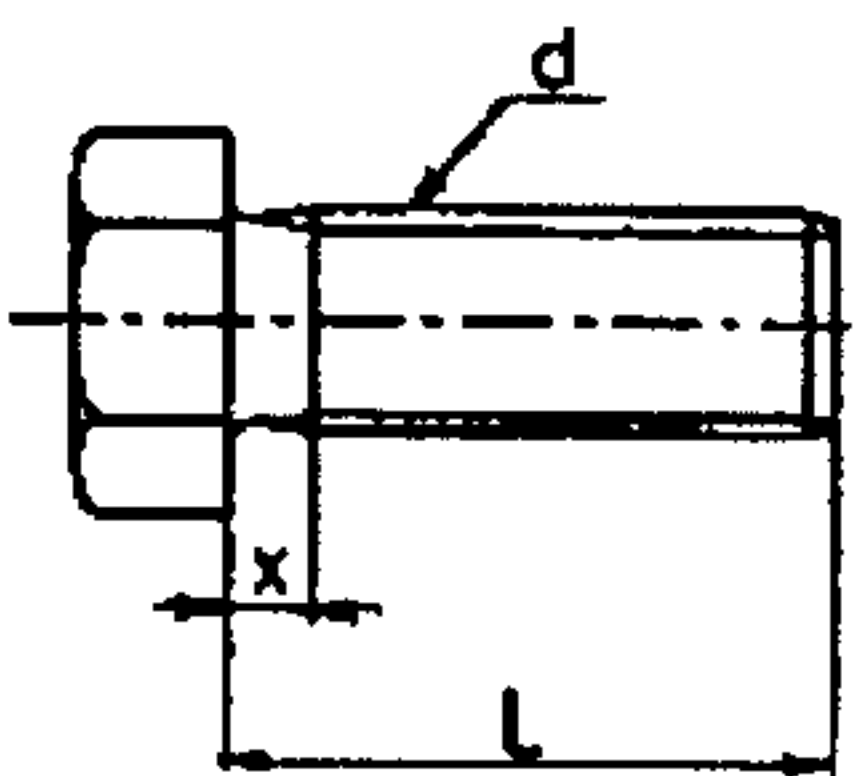
Trimmed type head



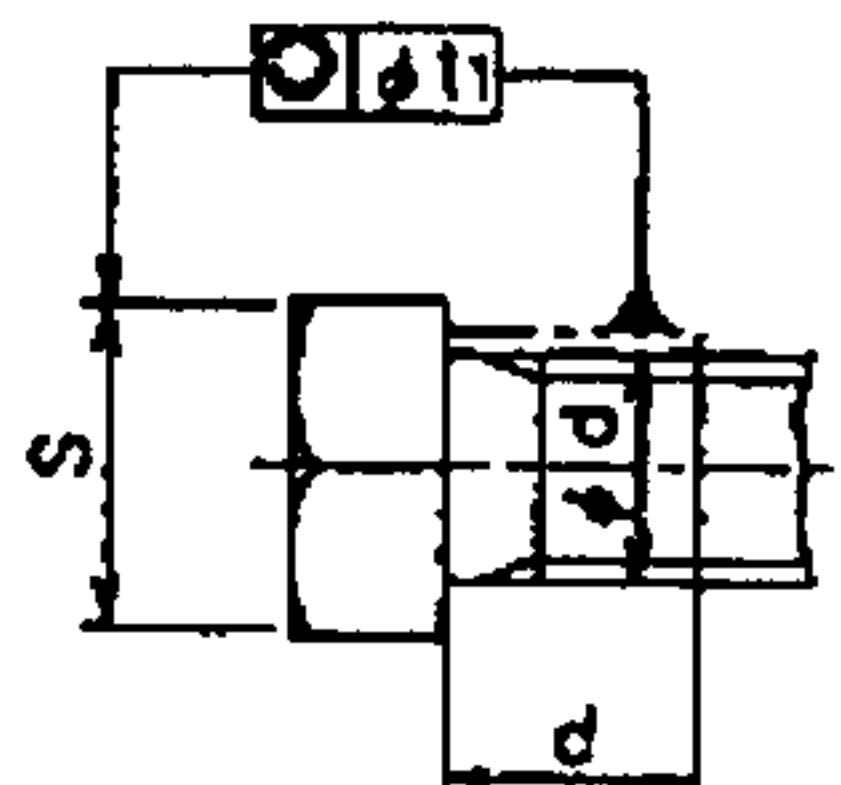
Upset type head



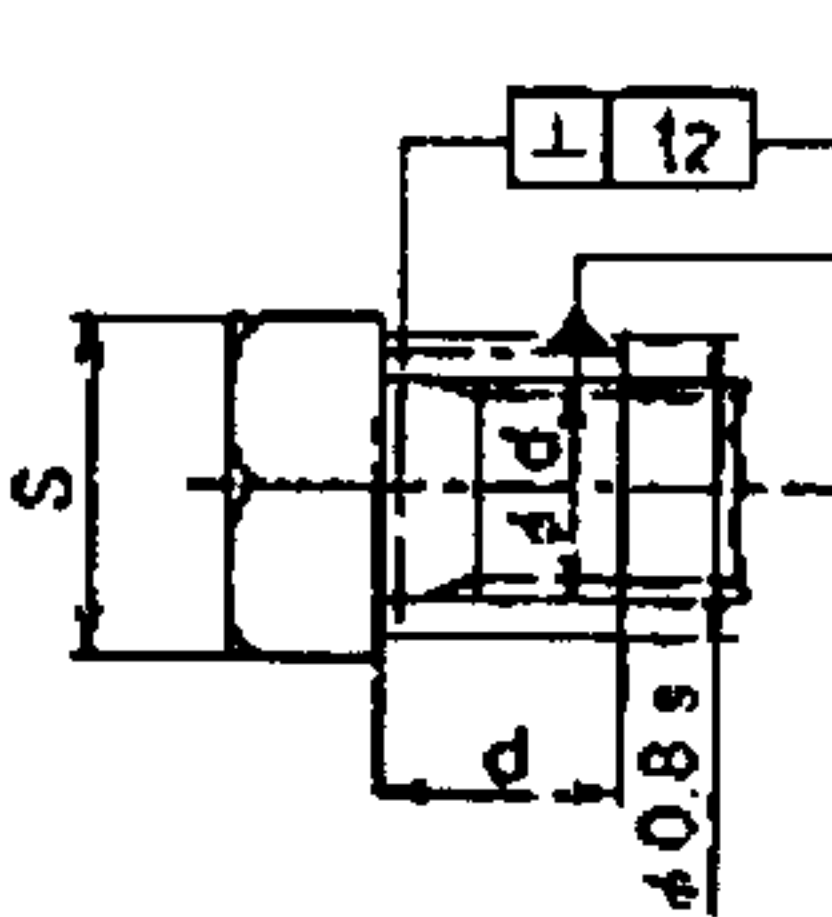
Full threaded shank



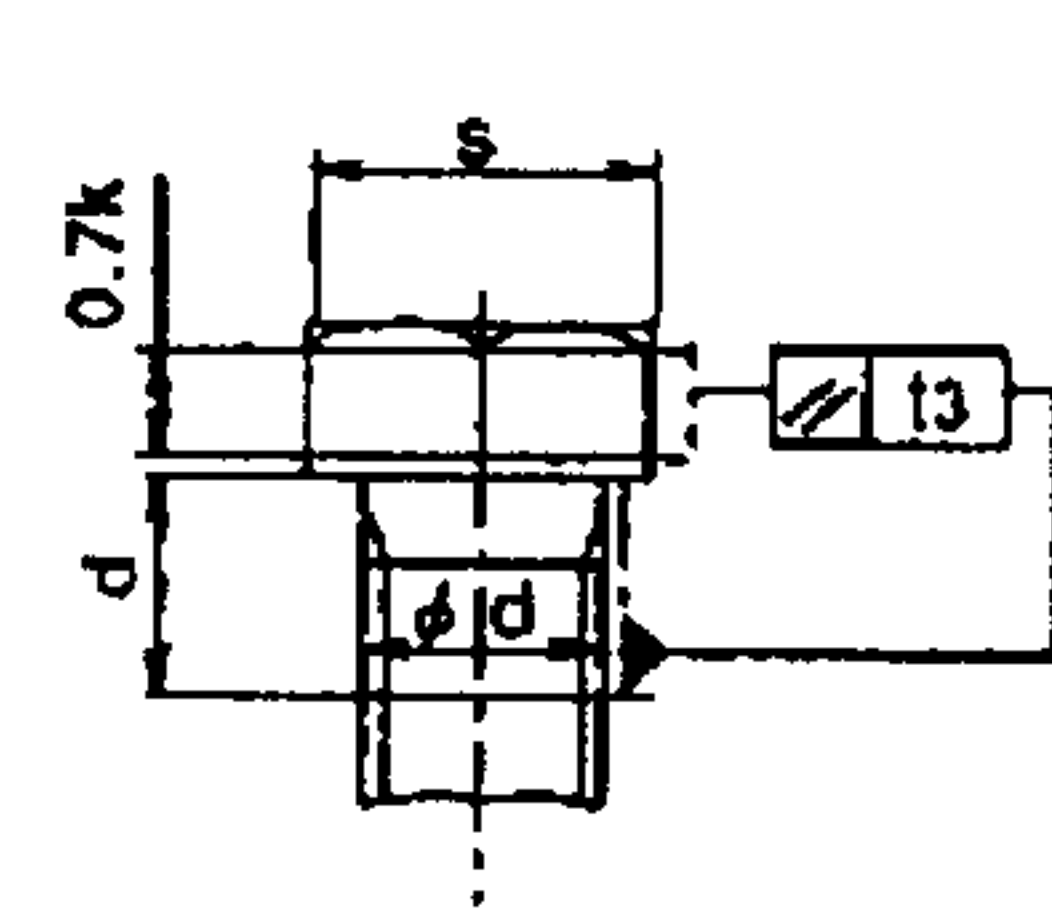
Concentricity



Perpendicularity



Parallelism



Nominal size		M6	M8	M10	M12		
Pitch		1.0	1.25	*1.5	1.25		
Head	s	Basic dimension	10	12	14	17	
		Tolerance	0	-0.2	0	-0.25	
	e	Min.	11.05	13.25	15.51	18.90	
	k	Basic dimension	4	5.5	7	8	
		Tolerance	±0.15			±0.2	
	k' <sup>(1)</sup>	Min.	2.7	3.8	4.8	5.5	
	dk'	Approx.	9.8	11.5	13.5	16.5	
dw <sup>(2)</sup>	Min.	9.5	11.5	13.5	16.5		
Shank	r	Min.	0.25	0.4		0.6	
	da <sup>(3)</sup>	Max.	6.5	8.5	10.5		13.0
	ds	Approx.	5.3	7.1	8.9	9.1	11.1
	z	Approx.	1	1.2	1.5		2.0
Geometrical deviation	t <sub>1</sub>	Max.	0.3	0.4	0.4		0.5
	t <sub>2</sub>	Max.	0.14	0.17	0.2		0.24
	t <sub>3</sub>	Max.	0.05	0.07	0.09		0.10

Unit: mm

- Notes <sup>(1)</sup>: The dimension k' shall be the distance from the point of e (min.) at the top face side of the bolt head to the bearing surface.
- <sup>(2)</sup>: The dimension dw is the external diameter of the bearing surface in the hexagon diagonal direction.
- <sup>(3)</sup>: The dimension da is the diameter of the transitional circle where the radius of underhead fillet (r) contacts the bearing surface.

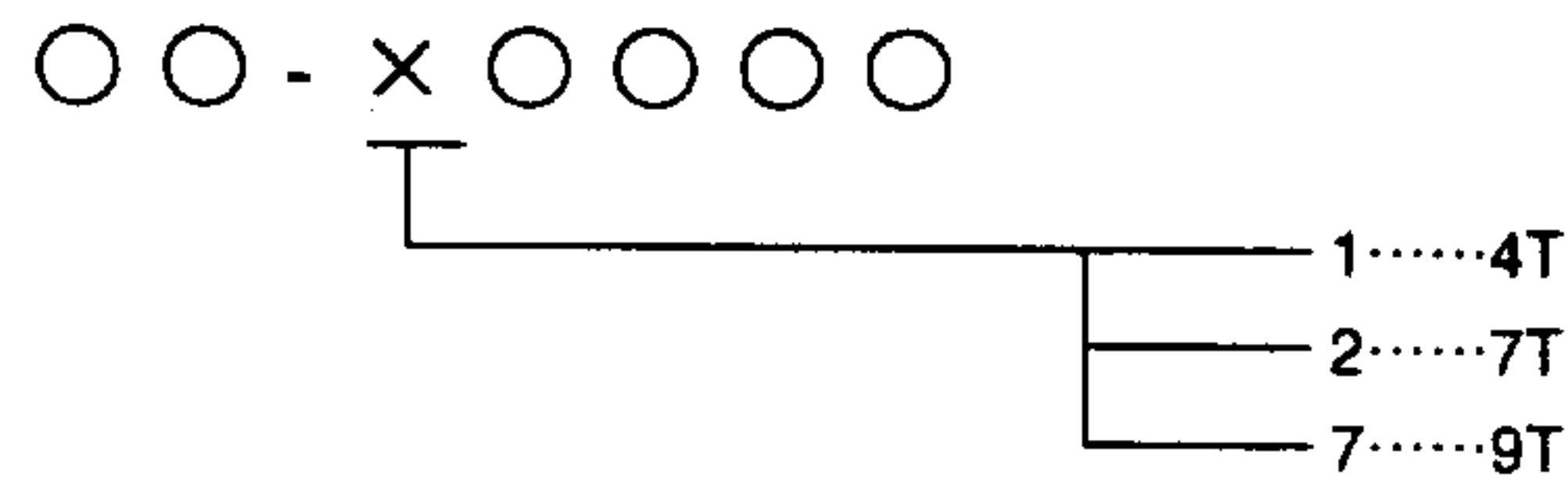
Applicable Standards: See page 5.

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- Remarks:
1. These bolts shall be given high priority for wide usage.
  2. The thread shall conform to Grade 2 as specified in NES D 1402 (Metric Screw Threads).
  3. Shape of the bolt head may be either upset type or trimmed type.
  4. The detailed upset shape shall be in accordance with NES D3102 (Head shape and dimension of upset bolt).
  5. The length "x" of the incomplete threads is generally two threads.
  6. If  $b + x \geq L$ , where "b" is the length of the complete threads, the bolt shall be with full thread shank.  
The length from the bearing surface to the end of complete threads shall generally be three threads.
  7. The end of the bolt is chamfered. However, for bolts M10 and smaller, chamfering may be omitted.
  8. The items marked with an asterisk (\*), in the table above, shall be used in special situations. (Example: For tapped holes in castings.)
  9. The details of the bolt specification shall conform to NES D 2110 (Specifications for Hexagon Bolt).

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Attached table - Nominal length, threaded length, and part number



Nominal size		M6	M8	M10		M12	Unit: mm
Pitch		1.0	1.25	*1.5	1.25	1.25	
Thread length b		23 to 20	23 to 20	23 to 20	23 to 20	25 to 22	
Nominal Length L (mm)	10	81-x0610					
	12	81-x0612	81-x0812				
	16	81-x0616	81-x0816	81-x1016	81-x4016		
	20	81-x0620	81-x0820	81-x1020	81-x4020	81-x4220	
	25	81-x0625	81-x0825	81-x1025	81-x4025	81-x4225	
	30	±0.5	81-x0630	81-x0830	81-x1030	81-x4030	81-x4230
	35		81-x0635	81-x0835	81-x1035	81-x4035	81-x4235
	40		81-x0640	81-x0840	81-x1040	81-x4040	81-x4240
	45		81-x0645	81-x0845	81-x1045	81-x4045	81-x4245
	50		81-x0650	81-x0850	81-x1050	81-x4050	81-x4250
	60	±0.7	81-x0660	81-x0860	81-x1060	81-x4060	81-x4260
	70		81-x0670	81-x0870	81-x1070	81-x4070	81-x4270
	80		81-x0680	81-x0880	81-x1080	81-x4080	81-x4280
	90		81-x0690	81-x0890	81-x1090	81-x4090	81-x4290
	100			81-x0800	81-x1000	81-x4000	81-x4200
	110	±0.9		81-x0802	81-x1002	81-x4002	81-x4202
	120			81-x0804	81-x1004	81-x4004	81-x4204
	130			81-x0806	81-x1006	81-x4006	81-x4206
140			81-x0807	81-x1007	81-x4007	81-x4207	
150			81-x0808	81-x1008	81-x4008	81-x4208	

Remarks: 1. Mechanical properties and material shall be as listed in the table below:

Type	Tensile-strength MPa	Yielding point or Durability MPa	Hardness	Material standard
4T	≥392	≥294	70 to 97 HRB	NES M 1019: WRCH4R
7T	≥686	≥550	20 to 28 HRC	NES M 1019: MnB123H, WRCH7
9T	≥883	≥706	28 to 34 HRC	NES M 1019: MnB123H

2. The bolt shall be surface treated.

Surface treatment shall be specified by adding a hyphen (-) and one of the codes listed below to the end of the parts number.

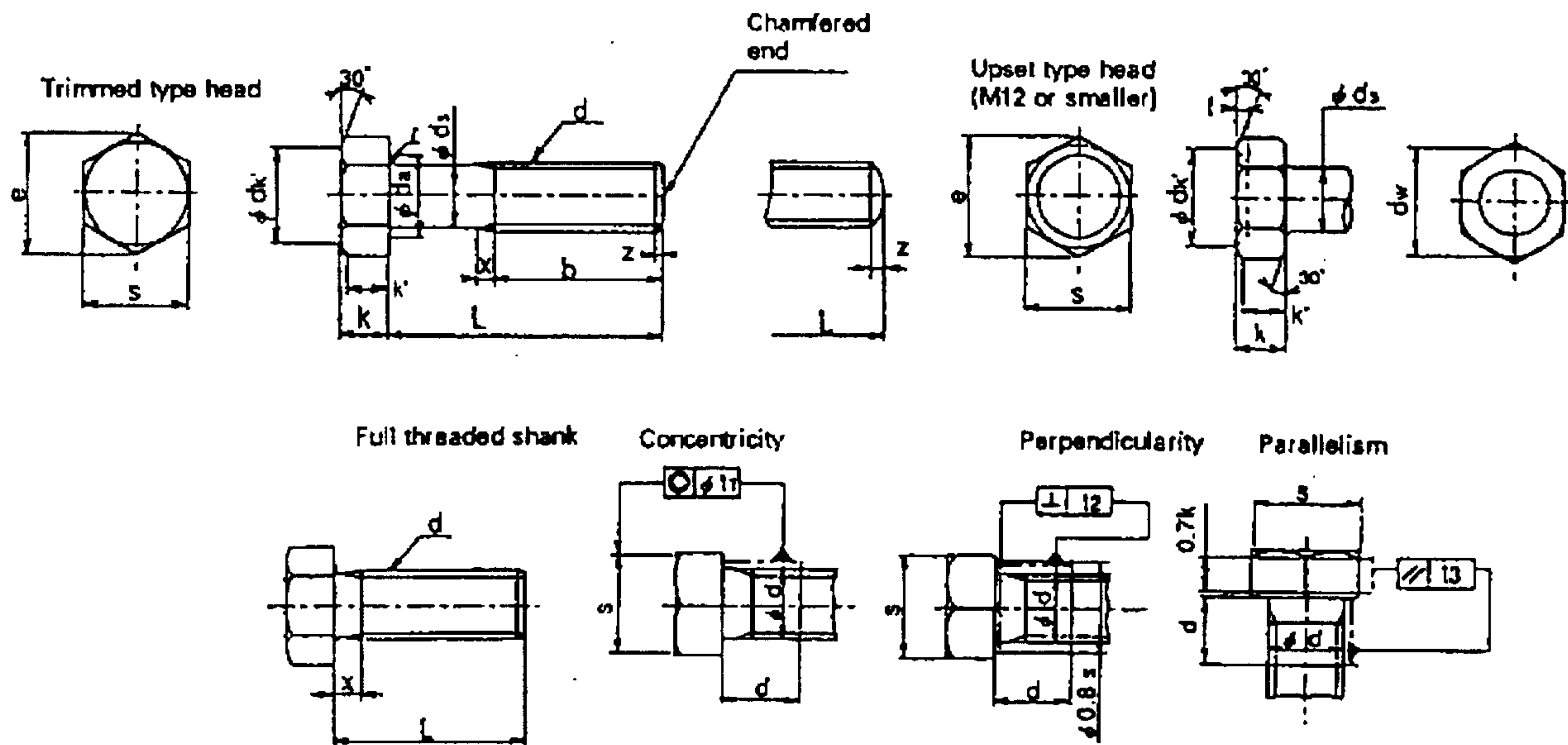
Classification	NES M 4040 (Electrolytic zinc plating)		
	Colored chromate		Olive chromate
	MFZn5C	MFZn8C	MFZn8G
Code number	1	1A	2A
Application area	M6 bolts only (General use)	M8 bolts and higher (General use)	High corrosion resistance (For special applications)

3. Type 9T bolt shall be treated for hydrogen embrittlement removal. This treatment shall be conducted promptly after the zinc surface treatment (and before the chromate treatment). However, if the hydrogen embrittlement rate satisfies the specified rate of the bending test as specified in NES D2110 (Specification of hexagonal bolt), this process may be omitted.

4. Materials and surface treatment of the parts specified in this standard shall meet the requirements of NES M 0301 (Substance Use Restrictions).

Appendix Bolt – Hexagon Head

Scope: This appendix shall not be applied for new designs.



Unit: mm

Nominal size		M6	M8	M10	M12	M14	M16	M18			
Pitch		1.0	1.25	1.0	*1.5	1.25	*1.75	1.25	1.5	1.5	1.5
Head	s	Basic dimensions	10	12	14	17	19	22	24		
		Tolerance	0	0		0		-0.35			
	e	Min.	11.05	13.25	15.51	18.90	21.10	24.49	26.75		
	k	Basic dimensions	4	5.5	7	8	9	10	12		
		Tolerance	±0.15				±0.2				
	k' <sup>(1)</sup>	Min.	2.7	3.8	4.8	5.5	—	—	—		
	dk'	Approx.	9.8	11.5	13.5	16.5	18	21	23		
Shank	r	Min.	0.25	0.4		0.6					
		da <sup>(3)</sup>	Max.	6.8	9.2	11.2	13.7	15.7	17.7	20.2	
	ds	Approx.	5.3	7.1	8.9	9.1	10.7	11.1	12.9	14.9	16.9
	z	Approx.	1	1.2	1.5	2.0					
Geometrical deviation	t <sub>1</sub>	Max.	0.3	0.4	0.4	0.5	0.7	0.7	0.8		
	t <sub>2</sub>	Max.	0.14	0.17	0.20	0.24	0.27	0.31	0.34		
	t <sub>3</sub>	Max.	0.05	0.07	0.09	0.10	0.11	0.12	0.15		
	t <sub>4</sub>	Max.	0.3				0.4				

- Notes <sup>(1)</sup>: The dimension k' shall be the distance from the point of e (min.) at the top face side of the bolt head to the bearing surface.  
<sup>(2)</sup>: The dimension dw is the external diameter of the bearing surface in the hexagon diagonal direction.  
<sup>(3)</sup>: The dimension da is the diameter of the transitional circle where the radius of underhead fillet (r) contacts the bearing surface.

- Remarks: 1. The thread shall conform to Grade 2 as specified in NES D 1402 (Metric Screw Threads).  
 2. Shape of the bolt head may be either upset type or trimmed type.

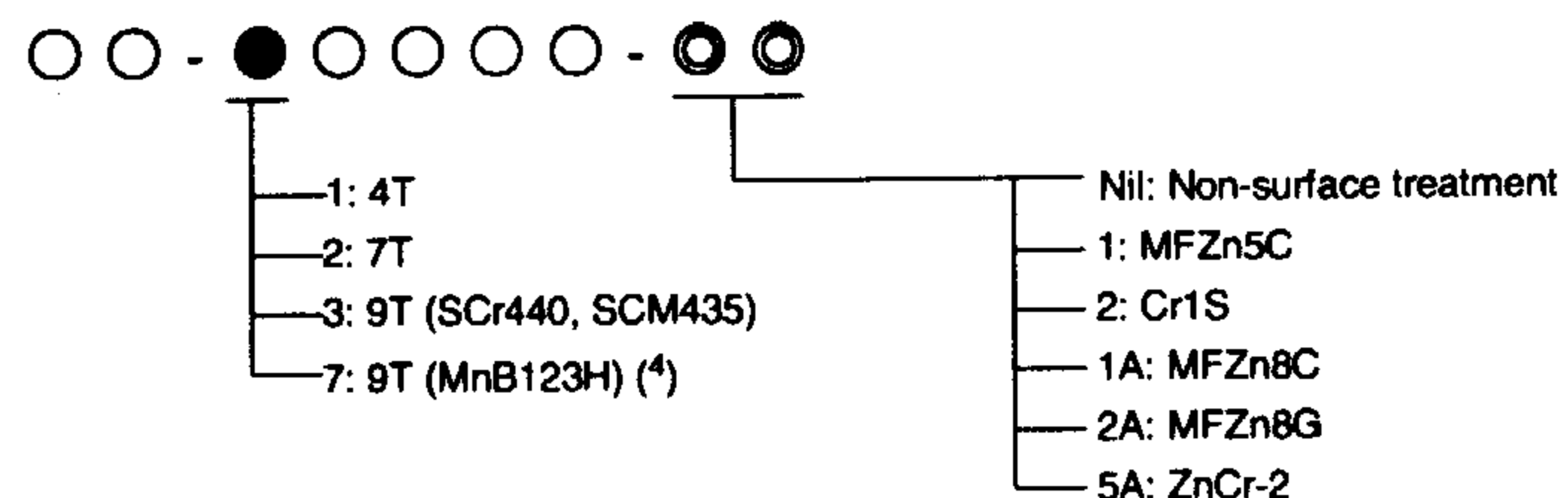
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3. The detailed upset shape shall be in accordance with NES D3102 (Head shape and dimension of upset bolt)
4. The length "x" of the incomplete threads is generally two threads.
5. If  $b + x \geq L$ , where "b" is the length of the complete threads, the bolt shall be with full thread shank. The length from the bearing surface to the end of complete threads shall generally be three threads.
6. The end of the bolt is chamfered. However, for bolts M10 and smaller, chamfering may be omitted.
7. The items marked with an asterisk (\*), in the table above, shall be used in special situations. (Example: For tapped holes in castings.)
8. The details of the bolt specification shall conform to NES D 2110 (Specifications for Hexagon Bolt).

Applicable Standards:	NES D 1402-1970	Metric Screw Threads
	NES D 2110-2000	Specifications for Hexagon Bolt
	NES D 3102-2000	Shape and Dimensions of Upset Bolt Head
	NES M 0301-1999	Substance Use Restrictions
	NES M 1019-1998	Wire Rod for Cold Headed Bolts
	NES M 4040-1998	Specifications – Zinc Plating and Chromate Films on Iron and Steel
	NES M 4052-1999	Zinc Chromate Organic Coating
	NES M 4063-1997	Decorative Chromium Plating

Hexagonal bolt length and part number

This appendix shall not be applied for new designs.



Note <sup>(4)</sup>: Applicable to bolts whose sizes are M14 or smaller.

Nominal size		M6	M8		M10		M12		M14	M16	M18
Pitch		1	1.25	(1.0)	*1.5	1.25	*1.75	1.25	1.5	1.5	1.5
Thread length		23 to 20	23 to 20		23 to 20		25 to 22		28 to 25	31 to 28	33 to 30
Length L mm	10	81-30610-1									
	12	81-10612-2 81-10612-5A 81-20612									
		81-10614-1	81-10814-1A 81-20814-1A 81-20814-2A								
	16	81-20616 81-30616	81-10816		81-31016-1A	81-14016					
		81-10618-1	81-10818-1A 81-20818-1A 81-70818-1A					81-24218-1A			
	20	81-30620-1	81-30820-1A 81-20820		81-31020-1A 81-21020	81-34020-1A 81-14020	81-11220-1A 81-21220-1A 81-11220-2A	81-24220 81-34220-1A 81-74220-1A	81-14420-1A 81-24420-1A 81-74420-1A		
		81-70822-1A				81-24022-1A					
	25	81-30625-1	81-30825-1A 81-30825 81-70825		81-31025-1A 81-21025 81-31025	81-34025-1A	81-11225-1A 81-21225-1A	81-34225-1A	81-14425-1A 81-24425-1A 81-34425-1A 81-74425-1A 81-24425-2A 81-34425-2A 81-74425-2A	81-14625-1A 81-24625-1A 81-24625-2A 81-14625	81-14825-1A

Hexagonal bolt length and part number (cont'd)

Nominal size		M6	M8	M10		M12		M14	M16	M18		
Pitch		1	1.25	(1.0)	*1.5	1.25	*1.75	1.25	1.5	1.5	1.5	
Thread length		23 to 20	23 to 20		23 to 20		25 to 22		28 to 25	31 to 28	33 to 30	
Length L mm	28				81-71028-1A		81-21228-1A	81-74228-1A				
	30	81-30630-1	81-30830-1A		81-31030-1A 81-21030	81-34030-1A 81-14030	81-11230-1A 81-21230-1A 81-31230-1A 81-71230-1A	81-34230-1A 81-24230	81-14430-1A 81-24430-1A 81-34430-1A 81-74430-1A 81-14430-2A 81-24430-2A	81-14630-1A 81-24630-1A	81-14830-1A	
		32	81-20632-1	81-20832-1A		81-11032-1A 81-71032-1A			81-74232-1A			
	35	81-30635-1	81-30835-1A 81-30835-2A		81-31035-1A	81-34035-1A	81-21235-1A 81-31235-1A 81-71235-1A	81-34235-1A 81-24235 81-34235 81-74235	81-14435-1A 81-24435-1A 81-34435-1A 81-74435-1A 81-14435-2A 81-24435-2A 81-24435	81-14635-1A 81-24635-1A 81-34635-1A	81-14635-2A 81-24635-2A 81-34635-2A	81-14835-1A
		38				81-71038-1A			81-74238-1A	81-24438-1A		
		40		81-30840-1A		81-31040-1A 81-21040	81-34040-1A	81-21240-1A 81-31240-1A 81-71240-1A 81-11240-2A	81-74240	81-14440-1A 81-24440-1A 81-34440-1A 81-74440-1A 81-14440-2A 81-24440-2A 81-24440	81-14640-1A 81-24640-1A 81-34640-1A 81-14640-2A 81-24640-2A 81-34640-2A 81-34640	81-14840-1A
	42	81-10642-1			81-71042-1A							
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		48	81-20648-1	81-30850-1A		81-71048-1A						
	50		81-10855-1A		81-31050-1A	81-14050	81-11250-1A 81-21250-1A 81-31250-1A 81-71250-1A		81-14450-1A 81-24450-1A 81-34450-1A 81-74450-1A 81-24450-2A	81-24650-1A 81-34650-1A 81-24650 81-34650	81-24850-1A 81-34850-1A	

Hexagonal bolt length and part number (cont'd)

Nominal size		M6	M8		M10		M12		M14	M16	M18	
Pitch		1	1.25	(1.0)	*1.5	1.25	*1.75	1.25	1.5	1.5	1.5	
Thread length		23 to 20	23 to 20		23 to 20		25 to 22		28 to 25	31 to 28	33 to 30	
Length L mm	±0.7	55	81-10655-1 81-20655-1 81-30655-1 81-10655-2A	81-30855-1A 81-70855-1A 81-10855-2A 81-20855-2A		81-11055-1A 81-21055-1A 81-71055-1A	81-14055-1A 81-24055-1A 81-14055-2A	81-21255-1A 81-71255-1A	81-14255-1A 81-24255-1A 81-74255-1A 81-24255-2A	81-14455-1A 81-24455-1A 81-74455-1A 81-24455-2A	81-14655-1A 81-24655-1A	81-24855-1A 81-34855-1A
		60		81-30860-1A		81-31060-1A		81-21260-1A 81-71260-1A		81-14460-1A 81-24460-1A 81-34460-1A 81-74460-1A 81-24460-2A		81-24860-1A
		65	81-20665-1	81-10865-1A 81-20865-1A 81-70865-1A 81-10865-2A		81-21065-1A 81-31065-1A 81-71065-1A 81-31065	81-14065-1A 81-24065-1A 81-34065-1A 81-74065-1A	81-21265-1A 81-31265-1A 81-71265-1A 81-21265-2A	81-14265-1A 81-24265-1A	81-14465-1A 81-24465-1A 81-74465-1A 81-24465-2A 81-24465	81-14665-1A 81-24665-1A 81-34665-1A 81-24665	81-24865-1A 81-34865-1A
		70	81-30670-1	81-30870-1A		81-31070-1A 81-31070 81-71070		81-21270-1A 81-71270-1A 81-21270-2A 81-31270 81-71270	81-34270-1A	81-24470-1A 81-34470-1A 81-74470-1A	81-24670-1A 81-34670-1A	81-24870-1A
		75		81-10875-1A 81-20875-1A 81-30875-1A 81-70875-1A 81-10875-2A		81-21075-1A 81-71075	81-14075-1A 81-24075-1A 81-74075-1A 81-24075-2A	81-21275-1A 81-71275-1A 81-31275 81-71275	81-14275-1A 81-24275-1A 81-14275-2A	81-24475-1A 81-74475-1A	81-24675-1A	81-24875-1A
		80		81-30880-1A 81-30880-2A		81-31080 81-71080		81-21280-1A 81-31280-1A 81-71280-1A 81-71280		81-14480-1A 81-24480-1A 81-34480 81-74480	81-24680-1A	81-24880-1A 81-34880-1A
		85	81-20685-1	81-10885-1A 81-20885-1A 81-70885-1A 81-10885-2A 81-20885-2A		81-21085-1A 81-71085-1A 81-31085	81-14085-1A 81-24085-1A 81-24085-2A	81-21285-1A	81-24285-1A 81-74285-1A 81-14285-2A 81-24285-2A	81-24485-1A 81-74485-1A	81-24685-1A	81-24885-1A
		90		81-30890-1A 81-20890		81-31090-1A		81-21290-1A 81-31290-1A 81-71290-1A		81-14490-1A 81-24490-1A 81-34490-1A 81-74490-1A 81-24490-2A	81-24690-1A	



Hexagonal bolt length and part number (cont'd)

Nominal size		M6	M8		M10		M12		M14	M16	M18	
Pitch		1	1.25	(1.0)	*1.5	1.25	*1.75	1.25	1.5	1.5	1.5	
Thread length		23 to 20	23 to 20		23 to 20		25 to 22		28 to 25	31 to 28	33 to 30	
Length L mm	95	±0.7	81-10895-1A		81-11095-1A	81-14095-1A	81-21295-1A	81-24295-1A	81-24495-1A	81-24695-1A	81-24895-1A	
			81-20895-1A		81-21095-1A	81-24095-1A	81-31295-1A	81-74295-1A	81-24495-2A			
			81-30895-1A		81-31095-1A	81-24095-2A	81-71295-1A					
			81-70895-1A		81-71095-1A							
			81-10895-2A									
	100			81-30800-1A		81-31000-1A		81-21200-1A		81-24400-1A	81-24600-1A	
										81-34400-1A		
										81-74400-1A		
										81-24400-2A		
										81-34400		
										81-74400		
	105			81-10801-1A		81-21001-1A	81-24001-1A	81-21201-1A	81-24201-1A	81-24401-1A	81-24601-1A	
		81-20801-1A				81-71201-1A	81-24201-2A	81-24401-2A				
		81-10801-2A										
110		81-30802-1A		81-31002-1A		81-21202-1A		81-24402-1A	81-24602-1A	81-24802-1A		
								81-34402-1A				
								81-74402-1A				
115		81-10803-1A		81-21003-1A	81-24003-1A	81-21203-1A	81-14203-1A	81-24403-1A				
		81-20803-1A		81-31003-1A	81-34003-1A		81-24203-1A	81-74403-1A				
		81-70803-1A		81-21003								
				81-71003								
120		81-30804-1A		81-31004-1A		81-21204-1A		81-14404-1A	81-24604-1A			
				81-31004		81-71204-1A		81-24404-1A				
				81-71004								
125		81-20805-1A		81-21005-1A	81-24005-1A	81-21205-1A	81-24205-1A	81-24405-1A				
		81-30805-1A			81-24005-2A		81-24205-2A	81-34405-1A				
								81-74405-1A				
130		81-30806-1A		81-31006	81-34006-1A	81-21206-1A		81-24406-1A				
								81-34406-1A				
140		81-30807-1A		81-21007-1A	81-34007-1A	81-21207-1A		81-24407-1A				
		81-70807-1A		81-31007-1A								
				81-31007								
150		81-30808-1A		81-31008		81-21208-1A	81-14208	81-24408-1A	81-24608-1A			
				81-71008				81-34408-1A				
								81-74408-1A				

Remarks: 1. Mechanical properties and material shall be as listed in the table below:

Type	Tensile strength MPa	Yielding point or Durability MPa	Hardness	Material standard
4T	$\geq 392$	$\geq 294$	70 to 97 HRB	NES M 1019: WRCH4R
7T	$\geq 686$	$\geq 550$	20 to 28 HRC	NES M 1019: MnB123H, WRCH7
9T	$\geq 883$	$\geq 706$	28 to 34 HRC	NES M 1019: MnB123H
				NES M 1019: SCr440, SCM435

2. For details of surface treatment refer to NES M 4040 (Specifications - Zinc plating and Chromate Films on Iron and Steel) or NES M 4063 (Decorative Chromium Plating).
3. Type 9T bolt shall be treated for hydrogen embrittlement removal. This treatment shall be conducted promptly after the zinc surface treatment (and before the chromate treatment). However, if the hydrogen embrittlement rate satisfies the specified rate of the bending test as specified in NES D2110 (Specification of hexagonal bolt), this process may be omitted.
4. Materials and surface treatment of the parts specified in this Standard shall meet the requirements of NES M 0301 (Substance Use Restrictions).