



Standard Part

Flanged 12 Point Screws Metric - Non-Preferred

STPC540

87355938

Rev BP

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1. SCOPE

The fastener defined by this standard is a metric flanged 12 point machine screw.

2. GENERAL

The specifications are based upon ASME B18.2.5M, supplier information and user requirements. The inclusion of dimensional data is not intended to imply that all the screws described are stock production sizes. Flanged 12-point screws are interchangeable with hex socket head cap screws. Because of larger gripping surfaces, which permit better wrenching, 12-point screws from 12mm size and up are preferred over hex socket head cap screws.

3. RELATED DOCUMENTS

- STPA020—Fastener Finishes and Material Specifications
- STPA110—Fastener Finishes and Design Considerations
- STPA120—Hydrogen Embrittlement
- ASME B18.2.5M – Metric 12-Point Flange Screws
- ISO 898-1—Mechanical Properties of Fasteners
- ISO 888—Nominal Lengths and Thread Lengths for General Purpose Bolts
- ISO 261—General Purpose Metric Screw Threads
- ISO 724—Metric Screw Threads-Basic Dimensions

4. REQUIREMENTS

4.1 TOP OF HEAD

The top of head may be full form or indented at the option of the manufacturer. If full form, the top of the head shall be chamfered or rounded with the diameter of chamfer circle or start of rounding being equal to the specified maximum width across flats within a tolerance of -15%. If the top of head is indented, the periphery may be rounded.

4.2 CORNER FILL

The rounding due to lack of fill at all 12 corners of the head shall be reasonably uniform.

4.3 WRENCHING HEIGHT

The wrenching height shall be measured, parallel to the axis of screw, from the intersection of the top contour of flange with any corner of head to the top of the head.

ISSUED BY	APPROVED BY	ECO NO.	CNH INDUSTRIAL NUMBER
D RAVI 22JUL25	A KHAN 22JUL25	35514664	87355938

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4.4 BEARING SURFACE

The outer periphery may be rounded or chamfered to the extent permitted by (H) as shown in the dimensional chart. The plane of the bearing face shall be perpendicular to the axis of screw within the runout limits. Measurement of runout shall be made as close to the periphery of bearing face as possible while the screw is held in a collet or other gripping device at a distance equal to one screw diameter from the underside of the head.

4.5 SCREW LENGTH

The nominal length (L) as shown in the dimensional chart is the distance from the underside of the head to the furthest end of the thread portion including any chamfer or radius. Tolerances for nominal screw lengths are shown in the following table. Refer to ISO 888 for details.

Nominal length		Tol.	Nominal length		Tol.
Over	Thru		Over	Thru	
6	10	0.29	120	180	0.8
10	18	0.35	180	250	0.93
18	30	0.42	250	300	1.05
30	50	0.5	300	400	1.15
50	80	0.6	400	500	1.25
80	120	0.7			

4.6 BODY DIAMETER

On screws threaded full length, the diameter of the screw under the head shall not be less than the minimum pitch diameter of the thread.

4.7 THREAD

Thread form, diameters, and associated pitches are in accordance with ISO 261. Threads shall be tolerance class 4g6g for class 12.9 and 6g for other classes, before plating. Threads with tolerance class 5g6g are an acceptable alternate for class 12.9.

4.8 THREAD LENGTH

The length of the thread shall be the distance from the end of the screw, including any chamfer or radius to the leading face of a screw ring gage with no internal chamfer which has been screwed as far as possible onto the screw by hand. Refer to ISO 724 for details.

4.9 MARKING

Screws shall be identified with property class designation embossed on the top of the head per ISO 898-1. The manufacturer's symbol shall also be embossed or indented on the top of the head.



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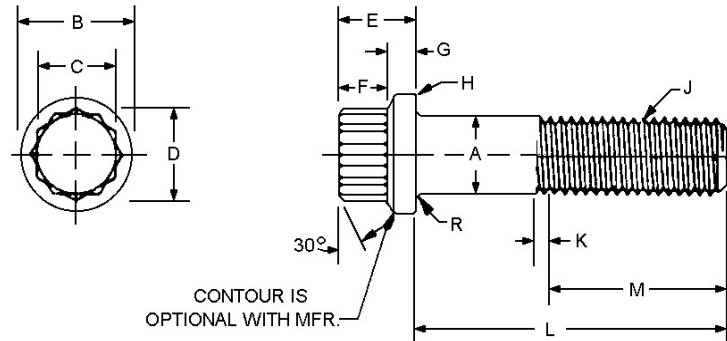
4.10 MATERIAL

Property class 10.9 and class 12.9. Certain zinc electroplated and mechanical plated high hardness fasteners have been identified as being highly susceptible to Hydrogen Assisted Cracking (HAC). Use of these fasteners is restricted: they shall not be used in new designs after 01OCT2011.

5. CROSS REFERENCE

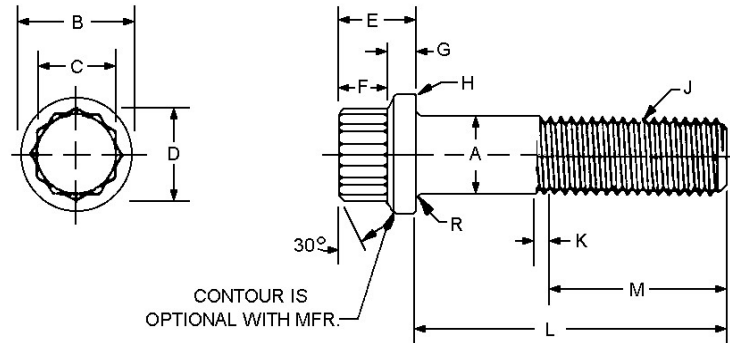
For cross reference listing of company part numbers, go to [PARTsolutions](#).

**Table 1: Flanged 12 Point Screws Dimensions
Metric Series**



Nominal Size		M6	M8	M10	M12	M14	M16	M20
A	Body Diameter, Max.	6.0	8.0	10.0	12.0	14.0	16.0	20.0
	Body Diameter, Min.	5.79	7.76	9.73	11.70	13.68	15.68	19.62
B	Flange Dia, Max.	9.95	12.95	15.95	17.95	20.95	23.92	29.92
	Flange Dia, Min.	9.77	12.72	15.69	17.67	20.67	23.62	29.55
C	Width Across Flats, Max.	6.05	8.05	10.05	12.05	14.05	16.05	20.05
	Width Acrs Flats, Min.	5.79	7.78	9.78	11.79	13.79	15.81	19.82
D	Width Acrs Cornr, Min.	6.7	9.0	11.2	13.5	15.8	18.0	22.5
E	Head Height, Max.	6.0	8.0	10.0	12.0	14.0	16.0	20.0
	Head Height, Min.	5.82	7.78	9.78	11.73	13.73	15.73	19.67
F	Wrenching Height, Min	3.12	4.18	5.28	6.33	7.43	8.53	10.67
G	Height of Flg, Max.	2.7	3.6	4.5	5.4	6.3	7.2	9.0
	Height of Flg, Min.	2.45	3.35	4.13	5.03	5.93	6.83	8.5
H	Chamfer or Radius, Max.	0.2	0.2	0.2	0.25	0.25	0.25	0.25
R	Fillet Radius, Max.	0.4	0.6	0.6	1.1	1.1	1.1	1.2
	Fillet Radius, Min.	0.25	0.4	0.4	0.6	0.6	0.6	0.8
J	Pitch, Nom Coarse Thread	1	1.25	1.5	1.75	2	2	2.5
K	Transition Thread Length (ref.)	5.0	6.25	7.5	8.75	10.0	10.0	12.5
M	Up to and includg 125	18	22	26	30	34	38	46
	Over 125 up to and including 200	-	28	32	36	40	44	52
	Over 200	-	-	-	-	-	57	65
Shortest Bolt with Shank		25	30	35	40	45	45	55
Drill Size for Shank		6.5	9	11	14	16	18	22
Drill Size for Head		11	14	17	19	22	25	31
Runout of Bearing Surface, FIM, Max.		0.18	0.2	0.25	0.33	0.37	0.41	0.51

Table 1: Flanged 12 Point Screws Dimensions (Cont'd)
Metric Series



Nominal Size		M22	M24	M30	M36
A	Body Diameter, Max.	22.0	24.0	30.0	36.0
	Body Diameter, Min.	21.62	23.58	29.67	35.61
B	Flange Dia, Max.	32.92	35.92	45.39	54.46
	Flange Dia, Min.	32.55	35.52	44.52	52.75
C	Width Across Flats, Max.	22.05	24.05	30.05	36.05
	Width Acrs Flats, Min.	21.75	23.75	29.72	35.70
D	Width Acrs Cornr, Min.	24.8	27.0	33.8	40.5
E	Head Height, Max.	22.0	24.0	30.0	36.0
	Head Height, Min.	21.67	23.67	29.67	35.57
F	Wrenching Height, Min	11.67	12.87	16.17	16.37
G	Height of Flg, Max.	9.9	10.8	13.50	16.20
	Height of Flg, Min.	9.4	10.3	13.00	15.60
H	Chamfer or Radius, Max.	0.4	0.4	0.4	0.4
R	Fillet Radius, Max.	1.2	1.2	1.33	1.60
	Fillet Radius, Min.	0.8	0.8	0.61	0.73
J	Pitch, Nom Coarse Thread	2.5	3	3.5	4
K	Transition Thread Length (ref.)	13.5	15.0	17.5	20.0
M	Up to and includg 125	50	54	66	--
	Over 125 up to and including 200	56	60	72	84
	Over 200	-	73	85	97
Shortest Bolt with Shank		85	90	110	120
Drill Size for Shank		24	26		
Drill Size for Head		34	37		
Runout of Bearing Surface, FIM, Max.		-	0.66		



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Table 2: Flanged 12 Point Screws Metric – Non-Preferred

Diameter	Pitch	Length	Thread Length	Material	Finish	Part Number
6	1	15		10.9	ZND	47666416
8	1.25	20		10.9	ZND	47666340
8	1.25	20		12.9	DOR	48145043
8	1.25	25		12.9	DOR	84417255
8	1.25	30		10.9	ZND	1265072
10	1.25	20		10.9	ZND	87021705
10	1.25	30		10.9	ZND	87019767
10	1.5	20		12.9	PHC	86639301
10	1.5	30		10.9	ZND	1183269
10	1.5	30		12.9	PHC	87016486
10	1.5	35		10.9	ZND	1741263
10	1.0	40		10.9	PHC	86979017
10	1.5	40		10.9	ZND	1220631
10	1.5	45		10.9	ZND	974642
10	1.5	45		10.9	DOR	48106248
10	1.5	45		12.9	PHC	87017891
10	1.25	50		10.9	ZND	87021704
10	1.5	55		10.9	ZND	974643
10	1.5	65		12.9	PHC	87016487
10	1.5	70		10.9	ZND	1265319
10	1.5	80		10.9	ZND	974644
10	1.5	85		10.9	ZND	2247109
10	1.5	90		12.9	PLN	91804799
10	1.5	100		10.9	ZND	974645
10	1.5	110		10.9	ZND	2247493
10	1.5	120		10.9	ZND	1247535
12	1.75	30		10.9	ZND	1183270
12	1.75	35		10.9	ZND	1234306
12	1.75	35		12.9	PHC	87016488
12	1.75	35		12.9	DOR	87035075
12	1.75	40		10.9	ZND	1265079
12	1.75	40		12.9	PHC	87016489
12	1.75	40		12.9	DOR	87343643
12	1.75	45		12.9	PHC	86634191
12	1.75	45		12.9	DOR	87035076
12	1.75	45		10.9	ZND	1220477
12	1.75	50		12.9	PHC	87013798
12	1.75	50		12.9	DAC	51535943
12	1.75	50		12.9	DOR	87026652
12	1.75	50	FULL	12.9	PHC	87375426
12	1.75	50		10.9	ZND	974646
12	1.75	55		10.9	DOR	90479200
12	1.75	55	FULL	10.9	DOR	92096980
12	1.75	65		10.9	ZND	974647
12	1.75	70		10.9	ZND	47958123
12	1.75	75		10.9	ZND	47625117
12	1.75	80		10.9	ZND	1265320

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Diameter	Pitch	Length	Thread Length	Material	Finish	Part Number
12	1.75	85		12.9	DOR	87026653
12	1.75	90		10.9	ZND	974648
12	1.75	100		10.9	ZND	1188358
12	1.75	105		10.9	ZND	1598812
12	1.75	115		10.9	ZND	1271899
12	1.75	120		10.9	ZND	974649
12	1.75	160		10.9	ZND	3007639
14	2.0	35		10.9	DAC	92033142
14	2.0	45		10.9	ZND	1265073
14	2.0	45		10.9	DOR	48005141
14	2.0	45		12.9	DOR	87680393
14	2.0	50	FULL	10.9	DOR	51620546
14	2.0	60		10.9	ZND	974650
14	2.0	80		12.9	DOR	87680391
14	2.0	85		10.9	ZND	1187089
14	2.0	90		10.9	ZND	1268708
14	2.0	90		10.9	DOR	48064874
14	2.0	90		12.9	DOR	87680392
14	2.0	105		10.9	ZND	974651
14	2.0	135		10.9	ZND	1283123
14	2.0	150		10.9	ZND	1129496
14	2.0	165		10.9	ZND	1542262
14	2.0	180		10.9	PLN	1717052
16	2.0	35		10.9	PHC	84553351
16	2.0	35		10.9	DAC	90331320
16	2.0	40		10.9	ZND	269245
16	2.0	45	41	10.9	PHC	47380615
16	2.0	45	41	10.9	DAC	90489133
16	2.0	45		10.9	DAC	92244471
16	2.0	45	FULL	12.9	PHC	84375322
16	2.0	50		10.9	ZND	1283117
16	2.0	50		10.9	DAC	90331323
16	2.0	50		10.9	DOR	47389484
16	2.0	60		10.9	DAC	92723133
16	2.0	70		10.9	ZND	87557423
16	2.0	70		12.9	PHC	47435271
16	2.0	75		10.9	DAC	92244665
16	2.0	75		10.9	ZND	47745336
16	2.0	80		10.9	DAC	92723137
16	2.0	90	38	10.9	ZND	941458
16	2.0	90	38	10.9	DAC	90331329
16	2.0	90	38	10.9	DOR	47389505
16	2.0	90	20	10.9	ZND	990145
16	2.0	90		12.9	PLN	87308873
16	2.0	100		10.9	DAC	92723139
16	2.0	100		10.9	ZND	269244
16	2.0	120		10.9	DAC	92253370

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Table 2: Flanged 12 Point Screws Metric – Non-Preferred (Continued)

Diameter	Pitch	Length	Thread Length	Material	Finish	Part Number
16	2.0	120		10.9	ZND	974653
16	2.0	120		12.9	PHC	47485575
16	2.0	150		12.9	PHC	47481964
16	2.0	190		10.9	ZND	996167
16	2.0	210		10.9	ZND	996168
16	2.0	210		10.9	DAC	92309631
16	2.0	260		10.9	DAC	92253371
18	2.5	95		10.9	ZND	990144
18	2.5	140		10.9	ZND	2455068
20	1.5	70		10.9	ZND	87742368
20	2.5	45	FULL	10.9	DOR	90347024
20	2.5	55		10.9	DOR	90347023
20	2.5	60		10.9	ZND	47558110
20	2.5	60		10.9	DAC	92317737
20	2.5	60		12.9	DOR	87682412
20	2.5	65		10.9	ZND	47950137
20	2.5	70		10.9	ZND	47558111
20	2.5	70		10.9	DOR	47937795
20	2.5	80		10.9	BGM	92052298
20	2.5	80		10.9	DAC	51461434
20	2.5	80		10.9	DOR	90347022
20	2.5	80		12.9	ZND	84574191
20	2.5	100		10.9	ZND	257954
20	2.5	100		12.9	PHC	87028366
20	2.5	100		12.9	ZND	#84281053
20	2.5	100	50.3	12.9	DOR	87268646
20	2.5	120	50.3	12.9	DOR	90359941
20	2.5	120		10.9	PHC	47574102
20	2.5	120		10.9	ZND	2417924
20	2.5	120		12.9	DAC	92688728
20	2.5	140		10.9	ZND	1122621
20	2.5	140		12.9	DAC	92688730
20	2.5	230		10.9	DOR	92735076
20	2.5	240		10.9	DOR	91707971
20	2.5	270		10.9	DOR	91776167
20	2.5	310		10.9	DOR	92735077
22	2.5	100		10.9	ZND	978791
22	2.5	140		10.9	ZND	268852
22	2.5	160		10.9	ZND	4525663
24	3	55		10.9	DOR	92735078
24	3	80		10.9	DAC	47774572
24	3	85		10.9	DOR	92735079
24	3	100		10.9	ZND	253709
24	3	100		12.9	BLO	90334992
24	3	115		10.9	DOR	92735080

#Do not use on new designs after 01OCT2011 (Hydrogen Assisted Cracking–HAC)



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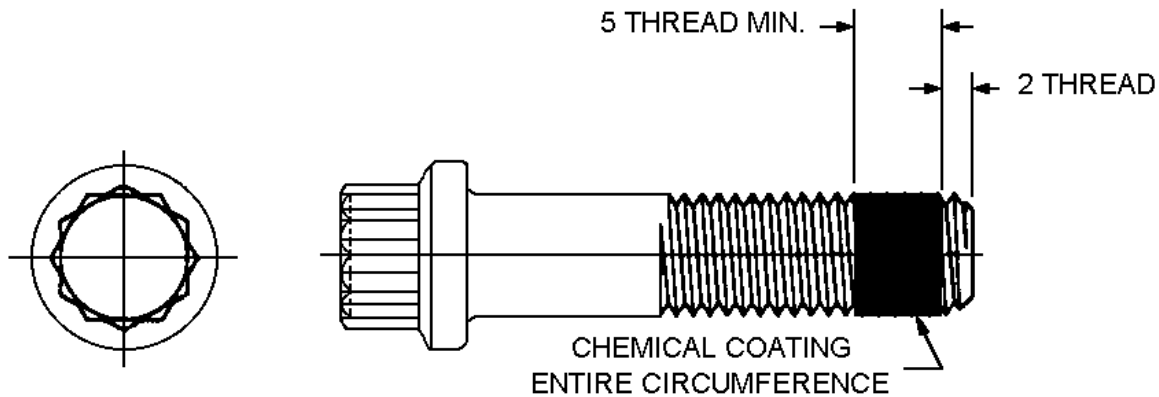
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Diameter	Pitch	Length	Thread Length	Material	Finish	Part Number
24	3	120		10.9	ZND	978790
24	3	130		10.9	ZND	4525324
24	3	140		10.9	ZND	994227
24	3	160		10.9	DAC	92642991
24	3	160		10.9	PHC	92207499
24	3	160		10.9	ZND	268281
24	3	160		12.9	DOR	92239673
24	3	180		10.9	ZND	1121567
24	3	240		10.9	DOR	92735081
30	3.5	150		10.9	DOR	92733660
30	3.5	280		10.9	ZND	47556768

Flanged 12 Point Screws Metric W/ Chem Lock – Non-Preferred



6. LOCKING TYPE FEATURE

6.1 When locking feature is specified, the location and size of the chemical coating must comply with the illustration shown above. Screws shall assemble a minimum of one full turn by hand into any mating internally threaded component that is accepted by a properly selected GO thread plug gage.

The locking type feature shall be free from visible porosity, voids and cracks, and shall be uniform in color without streak, dark areas, or other indicators of contamination or degradation. It shall be firmly attached to the screw and shall not loose under normal handling. It shall be chemically inert to the fluids per CNH Material spec listed below:

CNH Material Spec

MAT3505	COMBINATION HYDRAULIC AND TRANSMISSION FLUID
MAT3506	TRANSMISSION, CONVERTER AND HYDRAULIC FLUID (TCH)
MAT3511	GEAR LUBRICANTS
MAT3520	STANDARD DUTY DIESEL ENGINE OIL
MAT3620	ETHYLENE GLYCOL BASE ENGINE COOLANTS

6.2 SOURCE APPROVAL: Source approval by Materials Engineering is required for this coating.

Approved Coating: ND Microspheres 593S (Blue) or Precote 85



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Table 3: Flanged 12 Point Screws Metric W/ Chem Lock – Non-Preferred

Diameter	Pitch	Length	Thread Length	Material	Finish	Part Number
8	1.25	20		10.9	ZND	92720349
10	1.5	35		10.9	ZND	91716006
10	1.5	35	FULL	12.9	PHC	91789996
10	1.5	45		10.9	ZND	91716007
10	1.5	45		12.9	PHC	90486040
12	1.75	50		12.9	PHC	47865224
16	2	45	41	10.9	PHC	47865274
20	2.5	100	50.3	12.9	DOR	47865280
16	2	60		12.9	PHC	47481263
16	2	70		12.9	PHC	47581829
16	2	80		12.9	PHC	47581836
16	2	90		12.9	PHC	47481269
22	2.5	60		10.9	ZND	47859874