



PLANT STANDARD

HPBP TIRUCHIRAPALLI

BPS: 41229

PAGE 1 OF 4

Based on IS: 4190-1967

EYE BOLTS WITH COLLAR

(Product grade C)

1.0 SCOPE

Covers the requirements of eye bolts with collar in the size range M10 to M48x3.

2.0 SPECIFICATION AND REFERENCE STANDARDS

Dimensions		Table 1 of this standard
Safe working load		Table 2 of this standard
Tolerance	Product grade	C
	Indian Standard	IS: 1367 (Part 2)
Thread	Pitch	Table 1 of this standard
	Tolerance	6g
	Indian Standard	IS: 4218 (Part 3, 5 & 6)
Material		Steel to class 2 of IS: 1875
Manufacture, marking, mechanical properties and tests		As specified in IS: 4190
Sampling and Acceptability	Indian Standard	IS: 2614
General requirements	Eye bolts shall comply with IS: 4190 in respect of requirements not covered in this standard	

2.1 Referred Standards (Only the relevant parts of current versions are applicable)

- IS: 1367 Technical supply conditions for threaded steel fasteners
- IS: 1875 Specification for carbon steel billets, blooms and slabs for forgings
- IS: 2614 Methods for sampling of fasteners

REVISIONS

DATE

APPROVED

STANDARDS SECTION
ENGINEERING AND DEVELOPMENT CENTRE
HPBP TIRUCHIRAPALLI

PREPARED

HPBP TIRUCHY

ISSUED

STANDARDS
ENGG

DATE

DEC 1986

COPYRIGHT AND CONFIDENTIAL

The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED. It must not be used directly or indirectly in any way detrimental to the interest of the company.



PLANT STANDARD

HPBP TIRUCHIRAPALLI

BPS: 41229

PAGE 2 OF 4

IS: 4190 Specification for eye bolts with collars

IS: 4218 ISO metric screw threads

3.0 DESIGNATION

A Grade C eye bolt with collar to this standard of thread size M12 shall be designated as:

3.1 On drawings:

- i) Material specification column: IS: 4190
- ii) Description column : BOLT EYE COL GR C - M12
- iii) Drawing Number column : 4122912000
- iv) Material code column : 4122900012

3.2 For placing indents, issuing enquiries and on purchase order, the Ordering Description given below shall be followed.

Eye bolt M12 IS: 4190-C

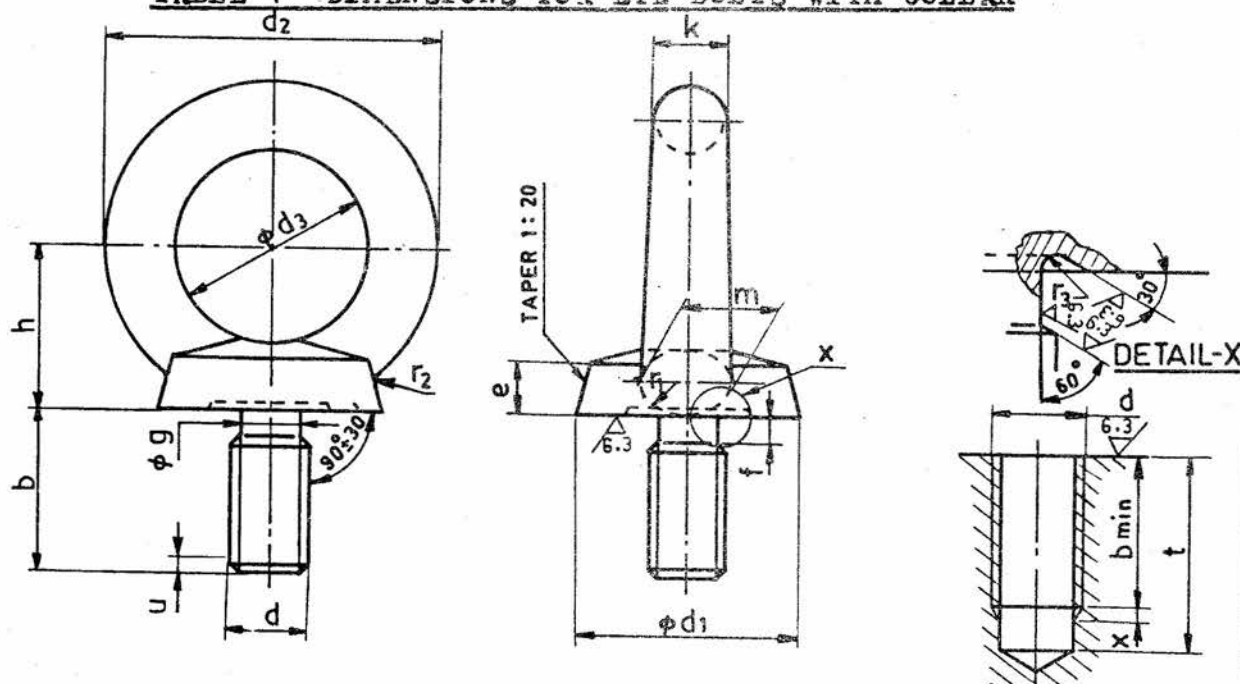
4.0 ADDITIONAL INFORMATION

4.1 Test certificates according to IS: 4190 shall be obtained along with each supply.

COPYRIGHT AND CONFIDENTIAL

The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED. It must not be used directly or indirectly in any way detrimental to the interest of the company.

DEC 1986

TABLE 1 DIMENSIONS FOR EYE BOLTS WITH COLLAR


(All dimensions are in mm)

Thread size d		M10	M12	M16	M20	M24	M30	M36x3	M48x3
b (js15)	Max	18.35	22.42	28.92	30.42	38.50	45.50	55.60	70.60
	Min	17.65	21.58	27.58	29.58	37.50	44.50	54.40	69.40
d1 (js16)	Max	25.65	30.65	35.80	40.80	50.80	65.95	75.95	101.10
	Min	24.35	29.35	34.20	39.20	49.20	64.05	74.05	98.90
d2 (js16)	Max	45.80	54.95	63.95	72.95	91.10	109.10	127.25	167.75
	Min	44.20	53.05	62.05	71.05	88.90	106.90	124.75	164.75
d3 (js16)	Max	25.65	30.65	35.80	40.80	50.80	60.75	70.95	91.10
	Min	24.35	29.35	34.20	39.20	49.20	59.05	69.05	88.90
e	Nom	8	10	12	14	18	22	26	35
f	Nom	3	3	3	4	5	6	8	8
g (h16)	Max	7.70	9.30	13.00	16.00	19.00	24.00	30.00	40.00
	Min	6.80	8.40	11.90	14.90	17.70	22.70	28.70	38.40
h (js16)	Max	22.65	26.65	30.65	35.80	45.80	55.95	65.95	86.10
	Min	21.35	25.35	29.35	34.20	44.20	54.05	64.05	83.90
k* (js16)	Max	10.45	12.55	14.55	16.55	20.55	24.65	28.65	38.30
	Min	9.55	11.45	13.45	15.45	19.35	23.35	27.35	37.20
m (js16)	Max	12.55	14.55	16.55	19.65	24.65	28.65	32.80	46.80
	Min	11.45	13.45	15.45	18.35	23.35	27.35	31.20	45.20
r1	Nom	5	5	6	7	9	11	13	18
r2	Nom	4	6	6	8	12	15	18	22
r3	Nom	1	2	2	2	2	3	3	4
t	Min	24	29	35	38	47	55	66	83
Weight		150	200	300	500		1700		

Note:

1. x according to IS:1368-'Dimensions of screw thread run-outs and under cuts.'
2. u according to CE of IS:1369-'Dimensions of ends of bolts and screws.'
3. Weights are given in Kg per 1000 numbers only.
4. For stocked sizes refer BPS components book-let.



PLANT STANDARD

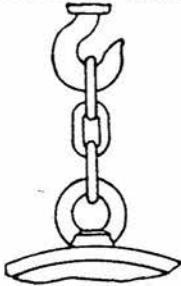
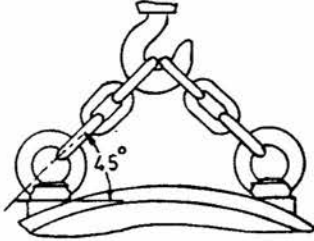
HPBP TIRUCHIRAPALLI

BPS: 41229

PAGE 4 OF 4

TABLE 2 SAFE WORKING LOAD FOR EYE-BOLTS WITH COLLAR

(Maximum safe working load 'W' on the sling hook in Kgs)

Thread size d	Direction of sling legs on eye bolts with collar	
	 Single	 Double
M10	150	—
M12 ✓	220	—
M16	380	—
M20	570	—
M24	1050	1000
M30	1700	1800
M36x3 ✓	2500	2600
M48x3	5200	5200

COPYRIGHT AND CONFIDENTIAL

The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED. It must not be used directly or indirectly in any way detrimental to the interest of the company.

DEC 1986



PLANT STANDARD

HPBP TIRUCHIRAPALLI

BPS: 41237

PAGE 1 OF 4

Based on IS:1364(Part 1)-1983

HEXAGON HEAD BOLTS, PRODUCT GRADE A

(Property Class 8.8)

1.0 SCOPE

Covers the requirements of Hexagon Head Bolts in the size range M6 to M16.

2.0 SPECIFICATION AND REFERENCE STANDARDS

Dimensions and preferred sizes		Table 1 of this standard
Preferred length-size combination		Table 2 of this standard
Tolerance	Product grade	A
	Indian Standard	IS: 1367(Part 2)
Thread	Pitch	Coarse
	Tolerance	6g
	Indian Standard	IS: 4218(Part 3,5&6)
Material		Steel
Mechanical properties	Property class	8.8
	Indian Standard	IS: 1367(Part 3)
Sampling and Acceptability	Indian Standard	IS: 2614
General requirements	Bolts shall comply with IS: 1364 in respect of requirements not covered in this standard	

2.1 Referred Standards (Only the relevant parts of current versions are applicable)

IS: 1364 Specification for hexagon head bolts, screws and (Part 1) nuts of product grade A&B. Part 1 Hexagon bolts.

IS: 1367 Technical supply conditions for threaded steel fasteners

IS: 2614 Methods for sampling of fasteners

IS: 4218 ISO Metric screw threads

REVISIONS

DATE

APPROVED

STANDARDS SECTION
ENGINEERING AND DEVELOPMENT CENTRE
HPBP TIRUCHIRAPALLI

PREPARED

HPBP TIRUCHY

ISSUED

STANDARDS
ENGG

DATE

DEC 1986

COPYRIGHT AND CONFIDENTIAL
The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED.
It must not be used directly or indirectly in any way detrimental to the interest of the company.



PLANT STANDARD

HPBP TIRUCHIRAPALLI

BPS: 41237

PAGE 2 OF 4

3.0 DESIGNATION

A Grade A Hexagon Head Bolt to this standard of thread size M16 and nominal length 60mm shall be designated as:

3.1 On Drawings:

- i) Material Specification column : IS: 1364
- ii) Description column : BOLT HEX GR A 8.8 M16x60
- iii) Drawing Number column : 4123716060
- iv) Material Code column : 4123716060

3.2 Ordering Description

For placing indents, issuing enquiries and on purchase orders, the Ordering Description given below shall be followed.

Hexagon Bolt M16x60 IS: 1364 (Part 1)-8.8

COPYRIGHT AND CONFIDENTIAL

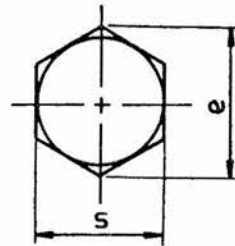
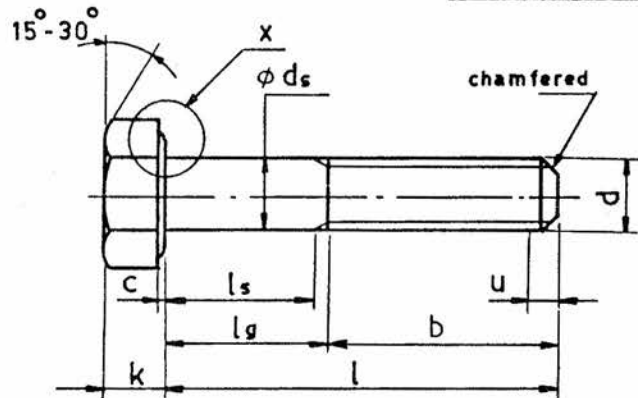
The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED. It must not be used directly or indirectly in any way detrimental to the interest of the company.

DEC 1986

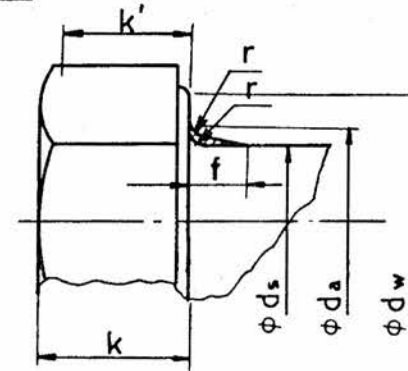
COPYRIGHT AND CONFIDENTIAL

The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED.
It must not be used directly or indirectly in any way detrimental to the interest of the company.

TABLE 1 DIMENSIONS FOR HEXAGON HEAD BOLTS



k' = Effective gaging height.



Maximum & minimum underhead fillet

DETAIL - X

u according to CE of IS:1368 - 'Dimensions of ends of bolts and screws.

lg Max = l Nom - b ; ls Min = l Max - $5 \times \text{Pitch}$. (All dimensions are in mm)

Thread Size d	b			c		d_a	d_s		d_w Min.		e Min.		f	k				k'	r	s		
	1	2	3	Min.	Max.	Max.	Max.	Min.	+	++	+	++	Max.	+		++		Min.	Min.	Max	Min.	
														Min.	Max.	Min.	Max.				+	++
M 6	18	-	-	0.15	0.5	6.8	6	5.82	8.9	8.7	11.05	10.89	1.4	3.85	4.15	3.76	4.24	2.63	0.25	10	9.78	9.64
M 8	22	28	-	0.15	0.6	9.2	8	7.78	11.6	11.4	14.38	14.20	2	5.15	5.45	5.06	5.54	3.54	0.4	13	12.73	12.57
M 10	26	32	-	0.15	0.6	11.2	10	9.78	14.6	14.4	17.77	17.59	2	6.22	6.58	6.11	6.69	4.28	0.4	16	15.73	15.57
M 12	30	36	-	0.15	0.6	13.7	12	11.73	16.6	16.4	20.03	19.85	3	7.32	7.68	7.21	7.79	5.05	0.6	18	17.73	17.57
M 16	38	44	57	0.2	0.8	17.7	16	15.73	22.5	22	26.75	26.17	3	9.82	10.18	9.71	10.29	6.8	0.6	24	23.67	23.16

1) For Nom length $l \leq 125\text{mm}$; 2) For Nom length $l > 125$ and $\leq 200\text{mm}$; 3) For Nom length $l > 200\text{mm}$
+ For $l \leq 10d$ or 150mm ; ++ For $l > 10d$ or 150mm .



PLANT STANDARD
HPBP TIRUCHIRAPALLI

BP 3: 41237
PAGE 3 OF 4

DEC 1986



PLANT STANDARD

HPBP TIRUCHIRAPALLI

BPS: 41237

PAGE 4 OF 4

**TABLE 2 PREFERRED LENGTH-SIZE COMBINATION
FOR HEXAGON HEAD BOLTS**

(All dimensions are in mm)

Nom	Length 'l'				Thread size d				
	For $l \leq 10d$ or 150	For $l > 10d$ or 150	For $l > 10d$ or 150	For $l > 10d$ or 150	M6	M8	M10	M12	M16
	Min	Max	Min	Max					
20	19.58	20.42							
25	24.58	25.42							
30	29.58	30.42							
35	34.5	35.5	33.75	36.25					
40	39.5	40.5	38.75	41.25					
45	44.5	45.5	43.75	46.25	11.8				
50	49.5	50.5	48.75	51.25				58.7	
55	54.4	55.6	53.5	56.5				63.2	
60	59.4	60.6	58.5	61.5		28.2		67.6	123
65	64.4	65.6	63.5	66.5					
70	69.4	70.6	68.5	71.5			53.6		139
75	74.4	75.6	73.5	76.5		35.6			
80	79.4	80.6	78.5	81.5					155
90	89.3	90.7	88.25	91.75					171
100	99.3	100.7	98.25	101.75					
110	109.3	110.7	108.25	111.75					
120	119.3	120.7	118.25	121.75					
130	129.2	130.8	128	132					
140	139.2	140.8	138	142					
150	149.2	150.8	148	152					
160	159.2	160.8	158	162					
180	179.2	180.8	178	182					
200	199.08	200.92	197.7	202.3					
220	219.08	220.92	217.7	222.3					
240	239.08	240.92	237.7	242.3					
260	258.95	261.05	257.4	262.6					
280	278.95	281.05	277.4	282.6					
300	298.95	301.05	297.4	302.6					

WEIGHTS

Note:

1. Preferred lengths are in between the stepped bold lines.
2. Weights are given in Kg per 1000 numbers only.
3. For stocked sizes refer BPS components book-let.



PLANT STANDARD

HPBP TIRUCHIRAPPALLI

BPS 41319

Rev. No. 03

PAGE 1 OF 2

NUTS FOR TEMPERATURE USE

(For medium of temperature upto 425 ° C)

1.0 SCOPE

Covers the requirements of hexagon nuts for use in medium of temperature upto 425 ° C and in the size range M8 to M45x3.

2.0 SPECIFICATION AND REFERENCE STANDARDS

Dimensions and preferred sizes	Fig 1 & Table 1 of this standard	
Tolerance	Product grade	A for nuts with d ≤ M16 B for nuts with d > M16
	Indian Standard	IS 1367 (Part 2)
Thread	Pitch	Table 1 of this standards
	Tolerance	6H
	Indian Standard	IS 4218 (Part 3, 5 & 6)
Material	Steel to ASTM A 194 2H Certified	
Testing	The finished nut shall satisfy the requirements of hardness, proof load and cone proof load, tests as specified in ASTM A194	
General requirements	Nuts shall comply with TDC:5:166 in respect of requirements not covered in this standard, except for cadmium plating	

2.1 Referred standards (Only the relevant parts of current versions are applicable)

IS 1367 (Part 2)	Technical supply conditions for threaded steel fasteners
IS 4218 (Part 3.5 & 6)	ISO metric screw threads
TDC:5:166	Carbon steel nuts for OFE & other applications as per A 194 GR 2H/2HM
ASTM A194	Specification for carbon and alloy steel nuts for bolts for high pressure and high temperature service.

3.0 DESIGNATION

A Grade 'A' hexagon nut to this standard of thread size M8 shall be designated as :

3.1 On Drawings

i) Material Specification column	ASTM A 194 - 2H
ii) Description Column	NUT HEX GR A T425 M8
iii) Drawing Number Column	BPS 41319
iv) Material Code column:	4131900008

Revisions

Brought upto date

Approved

STANDARDS SECTION
CONTRACT ENGINEERING AND CO-ORDINATION
HPBP, TIRUCHIRAPPALLI

Rev. No. 03

Amd. No.

Reaffirmed

Prepared

Issued

Dt of 1st Issue

Dt. JUN 1997

Dt.

Year

STANDARDS

STANDARDS

DEC 1986



PLANT STANDARD

HPBP TIRUCHIRAPPALLI

BPS 41319

Rev. No. 03

PAGE 2 OF 2

3.2 Ordering Description

For placing indents, issuing enquiries and on purchase order, Ordering Description given below shall be followed. (Typical examples)

Hex Nut M8 to BPS : 41319-A-ASTM A194-2H for nuts with $d \leq M16$

Hex Nut M20 to BPS : 41319-B-ASTM A194-2H for nuts with $d > M16$ and $d < M36 \times 3$

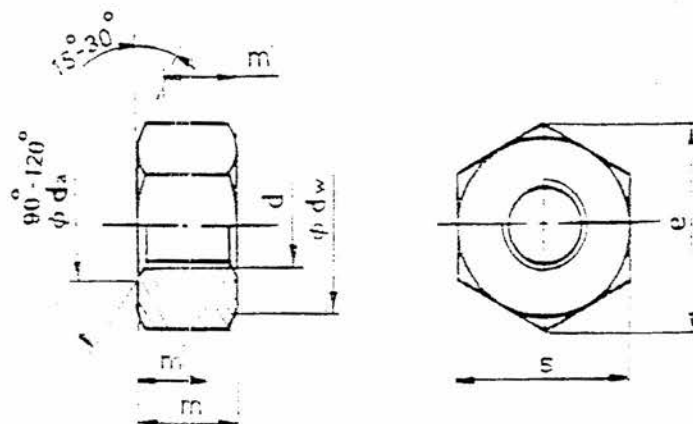
Hex Nut M36x3 to BPS: 41319-B-ASTM A194-2H for nuts with $d \geq M36 \times 3$

4.0 ADDITIONAL INFORMATION

4.1 Copies of this standard and TDC:5:166 shall be enclosed along with the purchase order.

Figure 1 DIMENSIONS FOR HEXAGON NUTS

(All dimensions are in millimetres)



'm' = Effective gauging height

TABLE 1

(All dimensions are in millimetres)

Thread Size d	d _a		d _w	e		m		m'	s		Weight
	Min	Max	Min	Max	Min	Max	Min	Min	Max	Min	
M8	8	8.75	11.6		14.38	8	7.64	6.1	13	12.73	6.0
M10	10	10.80	14.6		17.77	10	9.64	7.7	16	15.73	10.8
M12	12	13.00	16.6		20.03	12	11.57	9.3	18	17.73	16.5
M16	16	17.30	22.5		26.75	17.1	16.40	13.1	24	23.67	33.0
M20	20	21.60	27.7		32.95	20.7	19.40	15.5	30	29.16	64.5
M24	24	25.90	33.2		39.55	24.2	22.90	18.3	36	35.00	110.0
(M27)					45.20	27.6	26.30	21.0	41	40.00	166.0
M30	30	32.40	42.7		50.85	30.7	29.10	23.3	46	45.00	231.0
(M33)					55.37	33	31.40	25.1	50	49.00	299.0
M36x3	36	38.90	51.1		60.79	36.6	35.00	28.6	55	53.80	364.0
(M39x3)					66.44	39	37.40	29.9	60	58.80	485.0
(M45x3)				80.8		45	43.40	34.7	70	68.80	750.0

NOTE:

1. Sizes in brackets are non-preferred.
2. Weights are given in Kg per 1000 numbers only.



PLANT STANDARD

HPBP TIRUCHIRAPALLI

BPS: 41320

PAGE 1 OF 3

Based on IS:1364(Part 3)-83

HEXAGON NUTS, PRODUCT GRADE A

(Property Class 8)

1.0 SCOPE

Covers the requirements of Hexagon Nuts in the size range M3 to M16.

2.0 SPECIFICATION AND REFERENCE STANDARDS

Dimensions and preferred sizes		Table 1 of this standard
Tolerance	Product grade	A
	Indian Standard	IS: 1367 (Part 2)
Thread	Pitch	Coarse
	Tolerance	6H
	Indian Standard	IS: 4218(Part 3,5 & 6)
Material		Steel
Mechanical properties	Property class	8
	Indian Standard	IS: 1367 (Part 6)
Sampling and Acceptability	Indian Standard	IS: 2614
General requirements	Nuts shall comply with IS: 1364 in respect of requirements not covered in this standard	

2.1 Referred Standards (Only the relevant parts of current versions are applicable)

IS: 1364 Specification for Hexagon Head Bolts, Screws & Nut (Part 3) of product grade A & B: Part 3 Hexagon Nuts.

IS: 1367 Technical supply conditions for threaded steel fasteners

IS: 2614 Method of sampling fasteners

IS: 4218 ISO metric screw threads

REVISIONS

DATE

APPROVED

STANDARDS SECTION
ENGINEERING AND DEVELOPMENT CENTRE
HPBP TIRUCHIRAPALLI

PREPARED

HPBP TIRUCHY

ISSUED
STANDARD
ENGG

DATE

DEC 1986

COPYRIGHT AND CONFIDENTIAL

The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED. It must not be used directly or indirectly in any way detrimental to the interest of the company.



PLANT STANDARD

HPBP TIRUCHIRAPALLI

BPS: 41320

PAGE 2 OF 3

3.0 DESIGNATION

A Grade A Hexagon Nut to this standard of thread size M6 shall be designated as:

3.1 On Drawings:

- i) Material Specification column: IS: 1364
- ii) Description column : NUT HEX GR A 8-M6
- iii) Drawing Number column : 4132006000
- iv) Material Code column : 4132000006

3.2 Ordering Description

For placing indents, issuing enquiries and on purchase order, the Ordering Description given below shall be followed:

Hex Nut M6 IS: 1364 (Part 3) - 8

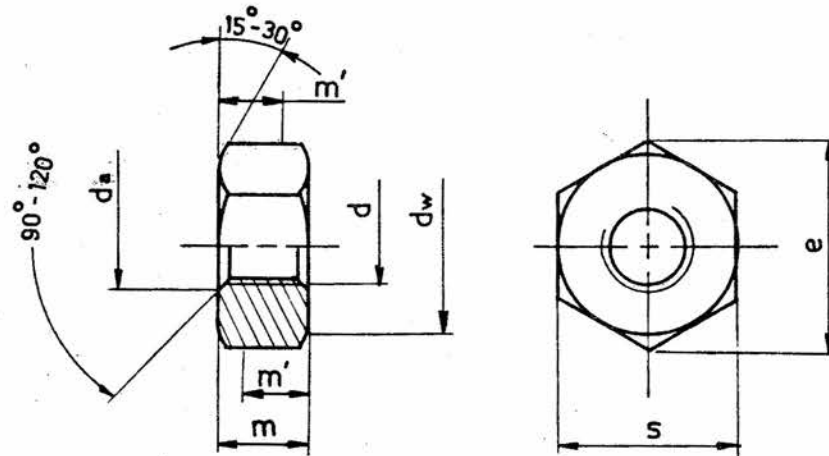
4.0 ADDITIONAL INFORMATION

- 4.1 For nuts of thread size M20 to M48x3, product grade B, refer BPS: 41301.
- 4.2 For Cadmium plated nuts, refer BPS: 41360

--

DEC 1986

TABLE 1. DIMENSIONS FOR HEXAGON NUTS



m' = Effective gauging height

(All dimensions are in millimetres)

Thread size d	d_a		d_w	e	m		m'	s		Weight
	Min	Max	Min	Min	Max	Min	Min	Max	Min	
M3	3	3.45	4.6	6.01	2.4	2.15	1.72	5.5	5.32	0.4
M4	4	4.6	5.9	7.66	3.2	2.9	2.32	7	6.78	0.9
M5	5	5.75	6.9	8.79	4.7	4.4	3.52	8	7.78	
M6	6	6.75	8.9	11.05	5.2	4.9	3.92	10	9.78	2.5
M8	8	8.75	11.6	14.38	6.8	6.44	5.15	13	12.73	6.0
M10	10	10.8	14.6	17.77	8.4	8.04	6.43	16	15.73	11.6
M12	12	13.0	16.6	20.03	10.8	10.37	8.30	18	17.73	17.9
M16	16	17.3	22.5	26.75	14.8	14.1	11.28	24	23.67	33.5

NOTE:

- Weights are given in Kg per 1000 numbers only.
- For stocked sizes refer BPS components booklet.

COPYRIGHT AND CONFIDENTIAL

The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED. It must not be used directly or indirectly in any way detrimental to the interest of the company.



PLANT STANDARD

HPBP TIRUCHIRAPPALLI

BPS 41324

Rev. No. 01

PAGE 1 OF 2

NUTS FOR HIGH TEMPERATURE USE

(For medium of temperature from 525°C to 565°C)

1.0 SCOPE

Covers the requirements of hexagon nuts for use in medium of temperature from 525°C to 565°C and in the size M10 to M48x3.

2.0 SPECIFICATION AND REFERENCE STANDARDS

Dimensions and preferred sizes	Fig 1 & Table 1 of this standard	
Tolerance	Product grade	A for nuts with $d \leq M16$ B for nuts with $d > M16$
	Indian Standard	IS: 1367 (Part 2)
Thread	Pitch	Table 1 of this standard
	Tolerance	6H
	Indian Standard	IS 4218 (Part 3, 5 & 6)
Material	Steel to ASTM A194 Gr 7 certified in quenched and tempered condition	
General requirements	Nuts shall comply with TDS:5:166 in respect of requirements not covered in this standard except for cadmium plating.	

2.1 Referred standards (Only current versions are applicable)

IS 1367 (Part 2)	Technical supply conditions for threaded steel fasteners
IS 4218 (Part 3, 5 & 6)	ISO metric screw threads
ASTM A194	Specification for carbon and alloy steel nuts for bolts for high pressure and high temperature service
TDC:5:166	Carbon steel nuts for O.F.E and other applications as per A 194 Gr 2H/2HM

3.0 DESIGNATION

A Grade 'A' hexagon nut to this standard of thread size M10 shall be designated as :

3.1 On Drawings

i) Material Specification column	ASTM A 194 Gr 7
ii) Description Column	HEX NUT GR A T525 - 565 M10
iii) Drawing Number Column	BPS 41324
iv) Material Code column:	4132400010

COPYRIGHT AND CONFIDENTIAL

The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED. It must not be used directly or indirectly in any way detrimental to the interest of the company.

Revisions 01 Revised			Approved STANDARDS SECTION CONTRACT ENGINEERING AND CO-ORDINATION HPBP, TIRUCHIRAPPALLI		
Rev. No. 01	Amd. No.	Reaffirmed	Prepared	Issued	Dt of 1st Issue
Dt. JUN 1997	Dt.	Year	STANDARDS	STANDARDS	FEB 1990



PLANT STANDARD

HPBP TIRUCHIRAPPALLI

BPS 41324

Rev. No. .01

PAGE 2 OF 2

3.2 Ordering Description

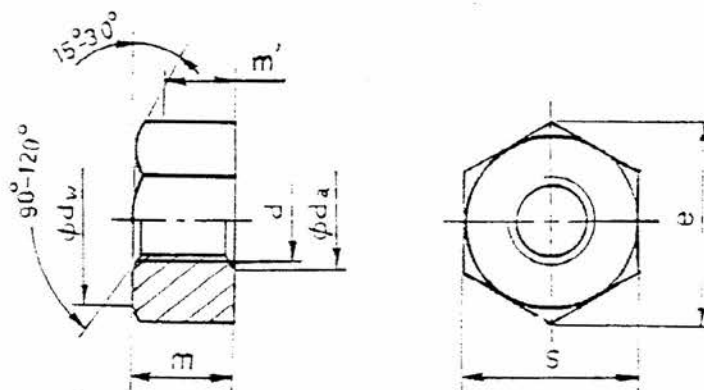
For placing indents, issuing enquiries and on purchase order, Ordering Description given below shall be followed. (Typical examples)

Hex Nut M10 to BPS : 41324-A-ASTM A 194 Gr 7 for sizes upto M16
Hex Nut M30 to BPS : 41324-B-ASTM A 194 Gr 7 for sizes M20 to M30
Hex Nut M36x3 to BPS : 41324-B-ASTM A 194 Gr 7 for sizes M36x3 and above

4.0 ADDITIONAL INFORMATION

4.1 Copies of this standard and TDC: 5:166 shall be enclosed along with the purchase order.

FIG 1 DIMENSIONS FOR HEXAGON NUTS
(All dimensions are in millimetres)



'm' = Effective gauging height

TABLE 1
(All dimensions are in millimetres)

Thread Size d	d _a		d _w	e		m		m'	s		Weight
	Min	Max	Min	Max	Min	Max	Min	Min	Max	Min	
M10	10	10.8	14.6		17.77	10	9.64	7.7	16	15.73	10.8
M12	12	13.0	16.6		20.03	12	11.57	9.3	18	17.73	16.5
M16	16	17.3	22.5		26.75	17.1	16.40	13.1	24	23.67	33.0
M20	20	21.6	27.7		32.95	20.7	19.40	15.5	30	29.16	64.5
M24	24	25.9	33.2		39.55	24.2	22.90	18.3	36	35.0	110.0
(M27)					45.20	27.6	26.30	21.0	41	40.0	166.0
M30	30	32.4	42.7		50.85	30.7	29.10	23.3	46	45.0	231.0
M36x3	36	38.9	51.1		60.79	36.6	35.00	28.6	55	53.8	364.0
(M48x3)				86.5		48	46.40	37.1	75	73.8	935.0

NOTE:

1. Sizes in brackets are non-preferred
2. Weights are given in Kg per 1000 numbers only

COPYRIGHT AND CONFIDENTIAL

The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED. It must not be used directly or indirectly in any way detrimental to the interest of the company.



PLANT STANDARD

HPBP TIRUCHIRAPALLI

BPS: 41405

PAGE 1 OF 3

Based on IS: 3063-1972

SPRING WASHERS - TYPE B

1.0 SCOPE

Covers the requirements for single coil rectangular section spring washers, type B (with flat ends) in the size range 2 to 100mm.

2.0 SPECIFICATION AND REFERENCE STANDARDS

Dimensions and tolerances	Table 1 of this standard
Material	Suitable spring steel of tensile strength 700 MN/m ² Min. according to IS: 4072
Mechanical properties	Hardness 43-50 HRC
Finish	Natural finish
Sampling and Acceptability	According to IS: 6821
General requirements	Washers shall comply with IS: 3063 in respect of requirements not covered in this standard.

2.1 Referred Standards (Only the current versions are applicable)

IS: 3063 Single coil rectangular section spring washers for bolts, nuts and screws

IS: 4072 Steel for spring washers

IS: 6821 Methods for sampling non-threaded fasteners

REVISIONS

DATE

APPROVED

STANDARDS SECTION
ENGINEERING AND DEVELOPMENT CENTRE
HPBP TIRUCHIRAPALLI

PREPARED

HPBP TIRUCHY

ISSUED
STANDARDS
ENGG

DATE

DEC 1986



PLANT STANDARD

HPBP TIRUCHIRAPALLI

BPS: 41405

PAGE 2 OF 3

3.0 DESIGNATION

A Spring Washer to this standard for bolt/screw size M6 shall be designated as

3.1 On Drawings

- i) Material Specification column: IS: 3063-B
- ii) Description column : WASHER SPRING SC 6
- iii) Drawing Number column : 4140506000
- iv) Material code column : 4140500006

3.2 Ordering Description

For placing indents, issuing enquiries and on purchase orders, the ordering description given below shall be followed.

Spring Washer B6 IS: 3063

4.0 ADDITIONAL INFORMATION

4.1 For Cadmium plated spring washers refer BPS: 41445.

4.2 These washers can be used for right hand threaded fasteners only.

4.3 For screws with cylindrical heads intended for use in counter bores, refer spring washers to BPS: 41412

COPYRIGHT AND CONFIDENTIAL

The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED. It must not be used directly or indirectly in any way detrimental to the interest of the company.

DEC 1986



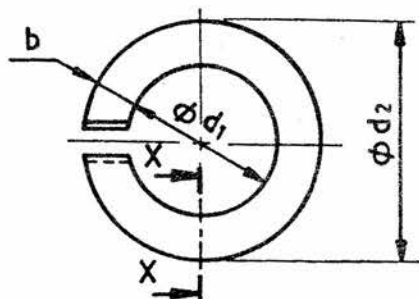
PLANT STANDARD

HPBP TIRUCHIRAPALLI

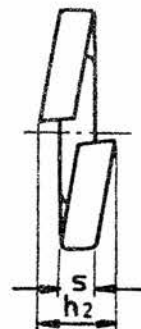
BPS: 41405

PAGE 3 OF 3

TABLE 1 - DIMENSIONS FOR SPRING WASHERS



$$h_2 = 2s$$



SECTION XX

(All dimensions in millimetres)

Nom size	d ₁		d ₂ Max	b		s		r Nom	Weight	For bolt/ screw size
	Basic	Tol ±		Basic	Tol ±	Basic	Tol ±			
2	2.1	0.3	4.4	0.9	0.1	0.5	0.1	0.1	0.033	M2
3	3.1	0.3	6.2	1.3	0.1	0.8	0.1	0.2	0.112	M3
4	4.1	0.3	7.6	1.5	0.1	0.9	0.1	0.2	0.18	M4
5	5.1	0.3	9.2	1.8	0.1	1.2	0.1	0.2	0.36	M5
6	6.1	0.4	11.8	2.5	0.15	1.6	0.1	0.3	0.83	M6
8	8.2	0.4	14.8	3.0	0.15	2.0	0.1	0.5	1.60	M8
10	10.2	0.6	18.1	3.5	0.2	2.2	0.15	0.5	2.53	M10
12	12.2	0.8	21.1	4.0	0.2	2.5	0.15	1.0	3.82	M12
16	16.2	0.8	27.4	5.0	0.2	3.5	0.2	1.0	8.91	M16
20	20.2	1.0	33.6	6.0	0.2	4.0	0.2	1.0	15.20	M20
24	24.5	1.0	40.0	7.0	0.25	5.0	0.2	1.6	26.20	M24
(27)	27.5	1.0	43.0	7.0	0.25	5.0	0.2	1.6	28.70	(M27)
30	30.5	1.2	48.2	8.0	0.25	6.0	0.2	1.6	44.30	M30
(33)	33.5	1.2	55.2	10.0	0.25	6.0	0.2	1.6	63.00	(M33)
36	36.5	1.2	58.2	10.0	0.25	6.0	0.2	1.6	67.30	M36
(39)	39.5	1.2	61.2	10.0	0.25	6.0	0.2	1.6	71.70	(M39)
42	42.5	1.2	68.2	12.0	0.25	7.0	0.25	2.0	111.00	M42
(45)	45.5	1.2	71.2	12.0	0.25	7.0	0.25	2.0	117.00	(M45)
48	49.0	1.5	75.0	12.0	0.25	7.0	0.25	2.0	123	M48
52	53.0	1.5	83.0	14.0	0.25	8.0	0.25	2.0	182	M52
56	57.0	1.5	87.0	14.0	0.25	8.0	0.25	2.0	193	M56
60	61.0	1.5	91.0	14.0	0.25	8.0	0.25	2.0	203	M60
64	65.0	1.5	95.0	14.0	0.25	8.0	0.25	2.0	218	M64
72	73.0	1.5	103.0	14.0	0.25	8.0	0.25	2.0	240	M72
76	77.0	1.5	109.0	14.0	0.25	8.0	0.25	2.0	253	M76
80	81.0	1.5	111.0	14.0	0.25	8.0	0.25	2.0	262	M80
90	91.0	1.5	121.0	14.0	0.25	8.0	0.25	2.0	290	M90
100	101.0	1.5	131.0	14.0	0.25	8.0	0.25	2.0	318	M100

NOTE:

- Weights are given in kg/1000 numbers only
- Sizes in brackets are non-preferred.
- For stocked sizes, refer BPS Components booklet

DEC 1986

COPYRIGHT AND CONFIDENTIAL

The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED. It must not be used directly or indirectly in any way detrimental to the interest of the company.



PLANT STANDARD

HPBP TIRUCHIRAPALLI

BPS: 41406

PAGE 1 OF 4

Based on IS: 2016-1967

MACHINED WASHERS

1.0 SCOPE

Covers the requirements for machined washers in the size range 1.7 to 155mm.

2.0 SPECIFICATION AND REFERENCE STANDARDS

Dimensions and tolerances	Table 1 of this standard	
Material	Suitable Steel	
Finish	Natural finish	
Sampling and Acceptability	Indian Standard	IS: 6821 & IS: 5369
General requirements	Washers shall comply with IS: 2016 in respect of requirements not covered in this standard	

2.1 Referred Standards (Only the current versions are applicable).

IS: 2016 Specification for plain washers

IS: 5369 General requirements for plain washers and lock washers

IS: 6821 Methods for sampling non-threaded fasteners

COPYRIGHT AND CONFIDENTIAL

The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED. It must not be used directly or indirectly in any way detrimental to the interest of the company.

REVISIONS

DATE

APPROVED

STANDARDS SECTION
ENGINEERING AND DEVELOPMENT CENTRE
HPBP TIRUCHIRAPALLI

PREPARED

HPBP TIRUCHY

ISSUED

STANDARDS
ENGG

DATE

DEC 1986



PLANT STANDARD

HPBP TIRUCHIRAPALLI

BPS: 41406

PAGE 2 OF 4

3.0 DESIGNATION

A machined washer to this standard for bolt/screw size M10 shall be designated as:

3.1 On Drawings

- i) Material Specification column: IS: 2016
- ii) Description column : WASHER MCD 10
- iii) Drawing Number column : 4140610000
- iv) Material code column : 4140600010

3.2 Ordering Description

For placing indents, issuing enquiries and on purchase order, the Ordering Description given below shall be followed.

Machined Washer 10.5* IS: 2016 - Steel

4.0 ADDITIONAL INFORMATION

4.1 These washers can be used for product grades A and B of general purpose bolts and screws.

*4.2 While preparing Ordering Description only the actual hole size (corresponding to bolt/screw size) shall be filled in referring to Table.

COPYRIGHT AND CONFIDENTIAL

The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED. It must not be used directly or indirectly in any way detrimental to the interest of the company.

DEC 1986



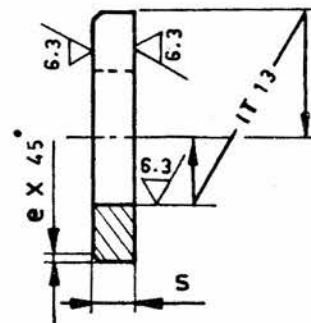
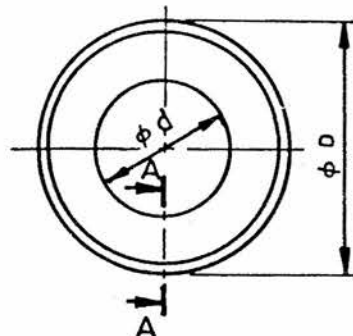
PLANT STANDARD

HPBP TIRUCHIRAPALLI

BPS: 41406

PAGE 3 OF 4

TABLE 1 - DIMENSIONS FOR MACHINED WASHERS



12.5/(6.3/)

SECTION AA

(All dimensions are in millimetres)

d H12	D		s		e Nom	For bolt/ screw size	Weight
	Basic	Tol	Basic	Tol			
1.7	4	0 -0.3	0.3	+0.1	0.1	M1.6	
2.2	5	0 -0.3	0.3	+0.1	0.1	M2	
3.2	7	0 -0.3	0.5	+0.1	0.2	M3	
4.3	9	0 -0.3	0.8	+0.1	0.3	M4	0.3
5.3	10	0 -0.3	1.0	+0.1	0.4	M5	
6.4	12.5	0 -0.4	1.6	+0.2	0.6	M6	1.1
8.4	17	0 -0.4	1.6	+0.2	0.6	M8	
10.5	21	0 -0.5	2	+0.2	0.6	M10	4
13	24	0 -0.5	2.5	+0.3	0.6	M12	6.2
17	30	0 -0.5	3	+0.3	0.6	M16	11.1
21	37	0 -0.8	3	+0.3	1.0	M20	16.7
25	44	0 -0.8	4	+0.3	1.0	M24	31.7
(28)	50	0 -0.8	4	+0.3	1.0	(M27)	41.7
31	56	0 -1.0	4	+0.3	1.0	M30	52.9
(34)	60	0 -1.0	5	+0.6	1.0	(M33)	

NOTE:

1. Sizes in brackets are non-preferred.
2. Weights are given in kg per 1000 numbers only.
3. For stocked sizes refer BPS Components booklet.

DEC 1986

COPYRIGHT AND CONFIDENTIAL

The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED. It must not be used directly or indirectly in any way detrimental to the interest of the company.



PLANT STANDARD

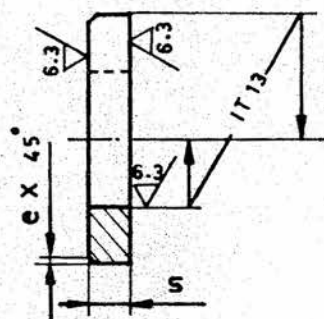
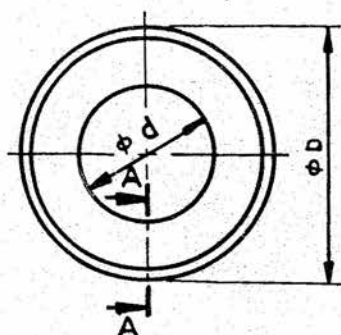
HPBP TIRUCHIRAPALLI

BPS: 41406

PAGE 4 OF 4

TABLE 1 - DIMENSIONS FOR MACHINED WASHERS (Contd.)

12.5/ (6.3/)



SECTION AA

(All dimensions are in millimetres)

d H12	D		s		e Nom	For bolt/ screw size	Weight
	Basic	Tol	Basic	Tol			
37	66	0 -1.0	5	± 0.6	1.6	M36	89.9
(40)	72	0 -1.0	6	± 0.6	1.6	(M39)	
43	78	0 -1.0	7	± 1.0	1.6	M42	180
(46)	85	0 -1.5	7	± 1.0	1.6	(M45)	243
50	92	0 -1.5	8	± 1.0	1.6	M48	291
(54)	98	0 -1.5	8	± 1.0	1.6	(M52)	
58	105	0 -1.5	9	± 1.0	1.6	M56	
(62)	110	0 -1.5	9	± 1.0	2.0	(M60)	
66	115	0 -1.5	9	± 1.0	2.0	M64	486.5
74	125	0 -1.8	10	± 1.0	2.0	M72	
82	140	0 -1.8	12	± 1.2	2.5	M80	
93	160	0 -1.8	12	± 1.2	3.0	M90	
104	175	0 -1.8	14	± 1.2	3.0	M100	
(124)	210	0 -2	16	± 1.2	3.0	(M120)	
(155)	250	0 -2	18	± 1.2	4.0	(M150)	

NOTE:

- Sizes in brackets are non-preferred.
- Weights given are in kg per 1000 numbers only.
- For stocked sizes refer BPS Components booklet.

DEC 1986

COPYRIGHT AND CONFIDENTIAL

The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED. It must not be used directly or indirectly in any way detrimental to the interest of the company.