_	Description	Parameter	Unit	Remark						
	·						-	R		
+	Column E2	D ISMC 250						→ b _f →	4	
\bot	Yield Stress of Plate (F _y)	36	ksi					71		
+	Base Plate Size Base Plate Thickness	500 x 500 40	mm	38	Docs				m	
+	base Plate IIIICKNESS		mm	36	Pass		1	, 		
	Flange Width	250	mm				Ţ		1	
1		9.84	inches				d		0.95d N	1
	- · · ·	274	mm							
-	Depth	10.79	inches				1	CLLY-1)—————————————————————————————————————	
+		4.72	inches						ļ mģ ,	
	Base Plate Dimension - N	19.685	inches	500	mm			The server of		
	n	5.91	inches				<u> </u>	 0.80Ь _f -	- n	
+	Base Plate Dimension - B	19.685	inches	500	mm					
+	Area of base plate - A1	387.50	inches	10	11	12	12	1.4	15	1.0
+	Load Case Load Combination	8 SW +DL +LL	9 SW + WX	10 SW +W-X	11 SW+WZ	12 SW+W-Z	13 SW+DL+LL+WX	14 SW+DL+LL+W-X	15 SW+DL+LL+WZ	16 SW+DL+L
\dagger	Fx (Ton)	2.52	-5.92	6.72	2.52	-1.46	-3.92	8.72	4.52	0.54
I	Fy (Ton)	48.78	8.8	29.86	82.59	61.2	29.54	68.19	120.92	22.8
\bot	Fz (Ton)	0.14	0.03	0.01	2.65	-3.41	0.15	0.13	2.77	-3.3
\bot	Resultant shear force	2.5	5.9	6.7	3.7	3.7	3.9	8.7	5.3	3.3
+	-			Allowable Stre	ss Design					
+				Allowable Stre	ss Design					
	Area of base plate A1					387.50				
\bot	Area of concrete A2		†	1	1	387.50	1	1	-	
+	Axial compressive load (Pa) - kips	107.51	19.40	65.81	182.03	134.88	65.11	150.29	266.51	50.3
+	Compressive Strength of concrete- fc (kg/m ²)	107.51	19.40	03.61	102.03	255000		150.29	200.51	50.5
十	Compressive Strength of concrete (ksi)					3.63				
	Required Base Plate area (Ω^* Pa / 0.85 *fc) inches ²	87.183	15.728	53.368	147.611	109.381	52.796	121.874	216.117	40.85
	Delta	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19
_	Base plate Breadth (N) in inches	11	5	8	13	12	8	12	16	8
+	N Considered	19.69	19.69	19.69	19.69	19.69	19.69	19.69	19.69	19.6
+	Base Plate length (B) in inches B considered	19.69	3 19.69	19.69	11 19.69	9 19.69	6 19.69	10 19.69	14 19.69	5 19.6
	B Considered	19.09	19.09	19.09	19.09	19.09	19.09	19.09	19.09	19.0
	Condition (0.85*fc*A1 *VA2/A1)/2.50) > Fy (Kips)	477.9	477.9	477.9	477.9	477.9	477.9	477.9	477.9	477.
\bot	Condition (0.85 IC AT VAZ/AT)/2.30/ > Fy (kips)	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRU
+	Factor V	0.22	0.04	0.14	0.20	0.20	0.14	0.21	0.56	0.11
+	Factor X	0.22	0.04 0.20	0.14 0.38	0.38 0.69	0.28 0.57	0.14 0.38	0.31 0.61	0.56 0.90	0.11 0.33
	λ	0.50	0.20	0.38	0.69	0.57	0.38	0.61	0.90	0.33
	λn'	1.30	0.52	0.99	1.78	1.48	0.98	1.58	2.31	0.86
+	I			 	1	5.9055	Г	Т		
+	Paga Plata Thickness (inches)	0.05	0.40	0.74	1.22	1.06	0.74	1.12	1.40	0.61
	Base Plate Thickness (inches) Base Plate Thickness (mm)	0.95 24.07	0.40 10.22	0.74 18.83	1.23 31.31	1.06 26.96	0.74 18.73	1.12 28.45	1.49 37.89	0.65 16.4
T	base Frace Thickness (IIIII)	24.07	10.22	20.03	51.51	20.30	10.75	20.43	37.03	2014
	Uplift Condition									
	Yield Stress of Plate (F _y)		36			36				36
I	√2 bf		13.92			13.92				13.9
\bot	Guage Distance (Centre to centre) mm		181.00			181.00				181.0
+	Guage Distance (Centre to centre) inches		7.13			7.13				7.13
+				 Allowable Stre	ss Design					
+	Condition 1 (V2 bf < d)			7 monusie stre	Jo Design					
	Plate thickness (inches)		0.525			1.385				0.84
+	Condition 1 (V2 bf > d)		. - ·							
+	Plate thickness (inches)		0.517			1.363			+	0.83
+	Plate Thickness (inches)		0.517			1.363			+	0.83
	Plate Thickness (mm)		13.13			34.62				21.1
	. att induites (init)					J-1102				21.1
\perp	Description	Parameter	Unit			Remarks				
		 								
+	B 10 0 11 15 15 15		<u>-</u>	_	•	•	Ē			
	Bolt Considered M33	IS 2062 E 250 A								
	Bolt material	IS 2062 E 250 A	mm							
+		IS 2062 E 250 A 396 410	mm N/mm²			IS 2062				

	√2 bf Guage Distance (Centre to centre) mm		13.92			13.92
	Guage Distance (Centre to centre) mm			1	1	
\exists			181.00			181.00
	Guage Distance (Centre to centre) inches		7.13			7.13
			I	Allowable Stres	ss Design	_
	Condition 1 (V2 bf < d)					
	Plate thickness (inches)		0.525			1.385
	Condition 1 (√2 bf > d)					
	Plate thickness (inches)		0.517			1.363
	, ,					
	Plate Thickness (inches)		0.517			1.363
	Plate Thickness (mm)		13.13			34.62
	· ····································					
			1			
	Description	Parameter	Unit			Remarks
	2 000.1.p.000.1		0			11011101110
	Bolt Considered M33					
	Bolt material	IS 2062 E 250 A				
+	Minimum Embedment Length	396	mm			
1	Tensile Strength	410	N/mm ²			IS 2062
\dashv			N/mm			
\dashv	Yield Stress	230	N/mm ²		 	Table No 2
_	No of Bolts	8			 	
—	Major/Nominal Diameter	33	mm	ļ		
	Pitch	3.5	mm			
	Core Diameter	28.706	mm			
	Shank Area of bolt	855.299	mm ²			
	Stress Area	694	mm ²			
	Root Area	635.70	mm²			
						1
	Hole diameter	36	mm			
	Edge distance					
	(For Side N)	69	mm			
十	Minimum edge distance	54	mm			IS:800 10.4.2
\dashv	Edge distance					.5.555 10.4.2
	(For Side B)	69	mm			
	Guage Distance between Holes (For Side "B")	181.0	mm			-
_	Guage Distance between Holes (For Side 'B')	181.0	mm			-
+	Guage Distance between Holes (10) side 10)	101.0				_
		ile stress in anchor	l		<u> </u>	
-	Telisi	ile stress in anchor	100			Т
	Deguired tancian in halt	61.2	Tons			
	Required tension in bolt			 	<u> </u>	_
_	Required tension per bolt	7.650	Tons	_		10.000.11.00.0
	Actual tensile stress per bolt	8.94	kg/mm ²	Acce	epted	IS:800 11.6.2.3
_			2			
	Permissible tensile stress per bolt	12.78	kg/mm ²			IS800 11.6.2.3
	Nominal Tensile capacity per bolt	178835.16	N			
	Design Strength due to yielding	178835.16	N	18.22	Tons	
	Design Strength due to rupture at threaded section	204868.80	N	20.88	Tons	
	Shea	ar Stress in anchor r	od			
\neg						
T	Shear force in bolt	8.7	Tons			1
	Shear force per bolt	1.088	Tons			
t			- 55			1
-	Actual shear stress in bolt	1.27	kg/mm ²	Acce	pted	IS:800 11.6.2.1
\dashv	Actual Sileal Stiless III Duit	1.67	vg/IIIIII	Acce	Picu	15.000 11.0.2.1
-	Darmissible Shoar stress war balt	11.74	2			IS:800 11.6.2.1
\dashv	Permissible Shear stress per bolt		kg/mm ²			
\dashv	Nominal shear capacity of bolt	164279.2	N			IS:800 10.3.3
\dashv		- Ct				
\dashv	Bearin	ng Stress of bolt on	piate			
						10.005.11.1
_	Actual Stress of bolt in bearing	0.82	kg/mm ²	Acce	pted	IS:800 11.6.2.2
ļ	Nominal bearing area of bolt on plate	1320.0	mm ²			
ļ						
	Permissible bearing stress of the bolt	62.67	kg/mm ²			IS:800 11.6.2.2
$__$ $]$	Nominal bearing strength of bolt	1353000.0	N			
	Comb	bined Shear and Ten	sion			
	Actual Shear stress in bolt	1.27	kg/mm ²			
\dashv	Permissible Shear stress per bolt	11.74	kg/mm ²			+
\dashv	Actual tensile stress per bolt	8.94	kg/mm ²			+
	Permissible tensile stress per bolt	12.78				+
一门		0.50	kg/mm ²		pted	10.000 44 6 3 =
4	Combined Shear and Tension	11 511		ACCE	:DLEO	IS:800 11.6.2.5

Sr No	Description	Paramter	Unit	Remark
1	Hole diamter	33	mm	
2	No of bolts in X Direction	3		
3	No of bolts in Z Direction	3		
4	Edge distance (Along X Direction)	60	mm	Condition satisfied
5	Minimum edge distance	49.5	mm	As per IS:800
6	Edge distance (Along Z Direction)	60	mm	
7	Distance between Hole centre & channel (Z)	65.00	mm	

	Description	Parameter	Unit	Remark						
	·						-	— в ——	-	
	Column E2	D ISMC 250	1.2					- b _f -		
	Yield Stress of Plate (F _y) Base Plate Size	36 500 x 500	ksi mm						m	ĺ
	Base Plate Thickness	36	mm	34	Pass	1	1	V Z Z Z Z Z	<u>_</u>	
	Flange Width	250	mm				T		i f l	
	riange width	9.84	inches				d		0.95d N	I
	Depth	274 10.79	mm inches				- ↓ .	2020		
	m	4.72	inches			1	-	T T	h m l	
	Base Plate Dimension - N	19.685	inches	500	mm					
	n	5.91	inches				- n -	-0.80b _f	-n - 	
	Base Plate Dimension - B Area of base plate - A1	19.685 387.50	inches inches	500	mm	1				
	Load Case	8	9	10	11	12	13	14	15	16
	Load Combination	SW +DL +LL	SW + WX	SW +W-X	SW+WZ	SW+W-Z	SW+DL+LL+WX	SW+DL+LL+W-X	SW+DL+LL+WZ	SW+DL+LL
	Fx (Ton)	-2.6	-6.96	6.16	-2.78	1.66	-9.01	4.11	-4.83	-0.39
	Fy (Ton)	60.76	31.91	11.2	48.67	27.42	82.29	39.17	99.05	22.96
	Fz (Ton) Resultant shear force	0.05 2.6	-0.04 6.9	0.07 6.1	1.38 3.1	-2.04 2.6	-0.01 9	0.1 4.1	1.41 5	-2.01 2
	Resultant Shear force	2.0	0.9	0.1	5.1	2.0	9	4.1	3	
				Allowable Stre	ss Design					
	Case 1 (Area of base plate = Area of concrete)					207.50				
	Area of base plate A1 Area of concrete A2					387.50 387.50				
	Area of condicte Az		1			307.30	, I			T
	Axial compressive load (Pa) - kips	133.92	70.33	24.68	107.27	60.43	181.37	86.33	218.31	50.60
	Compressive Strength of concrete- fc (kg/m²)					255000	00			
-	Compressive Strength of concrete (ksi)	100 504	F7 022	20.017	00.000	3.63	147.074	70.007	177.029	11.020
	Required Base Plate area (Ω*Pa / 0.85 *fc) inches ² Delta	108.594 1.19	57.032 1.19	1.19	86.986 1.19	49.007 1.19	1.19	1.19	1.19	41.036 1.19
	Base plate Breadth (N) in inches	12	9	6	11	8	13	10	14	8
	N Considered	19.69	19.69	19.69	19.69	19.69	19.69	19.69	19.69	19.69
	Base Plate length (B) in inches	9	7	4	8	6	11	7	12	5
_	B considered	19.69	19.69	19.69	19.69	19.69	19.69	19.69	19.69	19.69
		477.9	477.9	477.9	477.9	477.9	477.9	477.9	477.9	477.9
	Condition (0.85*fc*A1 *VA2/A1)/2.50) > Fy (Kips)	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE
-	Factor X	0.28	0.15	0.05	0.22	0.13	0.38	0.18	0.46	0.11
	λ	0.57 0.57	0.40 0.40	0.23 0.23	0.50 0.50	0.37 0.37	0.69	0.45 0.45	0.78 0.78	0.33
	λn'	1.47	1.03	0.59	1.30	0.95	1.77	1.15	2.00	0.86
	I			1	1	5.9055	5		,	-
	Desc Dieta Thisleron (in shee)	1.00	0.77	0.45	0.05	0.71	1.22	0.05	4.25	0.65
	Base Plate Thickness (inches) Base Plate Thickness (mm)	1.06 26.86	0.77 19.46	0.45 11.53	0.95 24.04	0.71 18.04	1.23 31.26	0.85 21.57	1.35 34.29	0.65 16.51
	Substitute Thieldiess (Thirty	20100	23.40	11.55	24.04	2010-1	01.20	22.07	5-1125	10.51
	Uplift Condition									
	Yield Stress of Plate (F _y)			36		36				
	√2 bf			13.92		13.92				
	Guage Distance (Centre to centre) mm			194.00 7.64		194.00 7.64				+
	Guage Distance (Centre to centre) inches			7.04		7.04				+
		ı	1	Allowable Stre	ss Design	I	1	I	1	
	Condition 1 (V2 bf < d)									
	Plate thickness (inches)			0.613		0.960				
	C									+
-	Condition 1 (V2 bf > d) Plate thickness (inches)	†	†	0.604		0.944				+
	· · · · · · · · · · · · · · · · · · ·			2.30						1
	Plate Thickness (inches)			0.604		0.944				
	Plate Thickness (mm)			15.33		23.99				
\neg						1	1			
	Description	Parameter	Unit			Remarks	1			
-			1				1			
	Bolt Considered M24 Bolt material	IS 2062 E 250 A								

	Plate Thickness (mm)			15.33		23.99
			1	1		_
	Description	Da an an at an	11=:4			Damada
	Description	Parameter	Unit			Remarks
-	Dalk Caraidanad \$424				1	
-	Bolt Considered M24 Bolt material	IS 2062 E 250 A			1	
-	Minimum Embedment Length	288	mm			
		410				16 2062
	Tensile Strength		N/mm ²			IS 2062
	Yield Stress	230	N/mm ²			Table No
	No of Bolts	8				
	Major/Nominal Diameter	24	mm			-
	Pitch	3	mm			-
	Core Diameter	20.32	mm		ļ	
	Shank Area of bolt	452.389	mm ²			
	Stress Area	353	mm ²			
	Root Area	317.31	mm ²			
	Hole diameter	27	mm			
	Edge distance	56	mm			
	(For Side N)					
	Minimum edge distance	40.5	mm			
	Edge distance	56	mm			
	(For Side B)	30				
	Guage Distance between Holes (For Side "B")	194.0	mm			
	Guage Distance between Holes (For Side "N")	194.0	mm			
	Ten	sile stress in anchor	rod			
	Required tension in bolt	27.42	Tons			
	Required tension per bolt	3.428	Tons			
	Actual tensile stress per bolt	7.58	kg/mm ²	Acce	epted	IS:800 11.6.2
	Permissible tensile stress per bolt	12.78	kg/mm ²			IS800 11.6.2.
	Nominal Tensile capacity per bolt	94590.50	N			
	Design Strength due to yielding	94590.50	N	9.64	Tons	
				9.64 10.62	Tons Tons	
	Design Strength due to yielding	94590.50	N			
	Design Strength due to yielding Design Strength due to rupture at threaded section	94590.50 104205.60	N N			
	Design Strength due to yielding Design Strength due to rupture at threaded section	94590.50	N N			
	Design Strength due to yielding Design Strength due to rupture at threaded section Sh	94590.50 104205.60 ear Stress in anchor	N N			
	Design Strength due to yielding Design Strength due to rupture at threaded section Sh Shear force in bolt	94590.50 104205.60 ear Stress in anchor	N N rod			
	Design Strength due to yielding Design Strength due to rupture at threaded section Sh	94590.50 104205.60 ear Stress in anchor	N N			
	Design Strength due to yielding Design Strength due to rupture at threaded section Sh Shear force in bolt Shear force per bolt	94590.50 104205.60 ear Stress in anchor of 1.125	N N N Tons	10.62	Tons	5,000,11,6,3
	Design Strength due to yielding Design Strength due to rupture at threaded section Sh Shear force in bolt	94590.50 104205.60 ear Stress in anchor	N N rod	10.62		IS:800 11.6.2
	Design Strength due to yielding Design Strength due to rupture at threaded section Sh Shear force in bolt Shear force per bolt Actual shear stress in bolt	94590.50 104205.60 207 Stress in anchor 1 9 1.125 2.49	N N N N N N N N N N N N N N N N N N N	10.62	Tons	
	Design Strength due to yielding Design Strength due to rupture at threaded section Sh Shear force in bolt Shear force per bolt Actual shear stress in bolt Permissible Shear stress per bolt	94590.50 104205.60 ear Stress in anchor 9 1.125 2.49	N N N N N N N N N N N N N N N N N N N	10.62	Tons	IS:800 11.6.2
	Design Strength due to yielding Design Strength due to rupture at threaded section Sh Shear force in bolt Shear force per bolt Actual shear stress in bolt	94590.50 104205.60 207 Stress in anchor 1 9 1.125 2.49	N N N N N N N N N N N N N N N N N N N	10.62	Tons	IS:800 11.6.2
	Design Strength due to yielding Design Strength due to rupture at threaded section Sh Shear force in bolt Shear force per bolt Actual shear stress in bolt Permissible Shear stress per bolt Nominal shear capacity of bolt	94590.50 104205.60 29 1.125 2.49 10.15 75111.3	N N N N N N N N N N N N N N N N N N N	10.62	Tons	IS:800 11.6.2
	Design Strength due to yielding Design Strength due to rupture at threaded section Sh Shear force in bolt Shear force per bolt Actual shear stress in bolt Permissible Shear stress per bolt Nominal shear capacity of bolt	94590.50 104205.60 ear Stress in anchor 9 1.125 2.49	N N N N N N N N N N N N N N N N N N N	10.62	Tons	IS:800 11.6.2
	Design Strength due to yielding Design Strength due to rupture at threaded section Sh Shear force in bolt Shear force per bolt Actual shear stress in bolt Permissible Shear stress per bolt Nominal shear capacity of bolt Bear	94590.50 104205.60 ear Stress in anchor 9 1.125 2.49 10.15 75111.3 ing Stress of bolt on	N N N N N N N N N N N N N N N N N N N	10.62 Acce	Tons	IS:800 11.6.2 IS:800 11.6.2 IS:800 10.3.3
	Design Strength due to yielding Design Strength due to rupture at threaded section Sh Shear force in bolt Shear force per bolt Actual shear stress in bolt Permissible Shear stress per bolt Nominal shear capacity of bolt Bear	94590.50 104205.60 ar Stress in anchor 9 1.125 2.49 10.15 75111.3 ing Stress of bolt on 1.30	N N N N N N N N N N N N N N N N N N N	10.62 Acce	Tons	IS:800 11.6.2
	Design Strength due to yielding Design Strength due to rupture at threaded section Sh Shear force in bolt Shear force per bolt Actual shear stress in bolt Permissible Shear stress per bolt Nominal shear capacity of bolt Bear	94590.50 104205.60 ear Stress in anchor 9 1.125 2.49 10.15 75111.3 ing Stress of bolt on	N N N N N N N N N N N N N N N N N N N	10.62 Acce	Tons	IS:800 11.6.2 IS:800 10.3.3
	Design Strength due to yielding Design Strength due to rupture at threaded section Shear force in bolt Shear force per bolt Actual shear stress in bolt Permissible Shear stress per bolt Nominal shear capacity of bolt Bear Actual Stress of bolt in bearing Nominal bearing area of bolt on plate	94590.50 104205.60 ar Stress in anchor 9 1.125 2.49 10.15 75111.3 ing Stress of bolt on 1.30 864.0	N N N N N N N N N N N N N N N N N N N	10.62 Acce	Tons	IS:800 11.6.2 IS:800 10.3.3
	Design Strength due to yielding Design Strength due to rupture at threaded section Shear force in bolt Shear force per bolt Actual shear stress in bolt Permissible Shear stress per bolt Nominal shear capacity of bolt Bear Actual Stress of bolt in bearing Nominal bearing area of bolt on plate Permissible bearing stress of the bolt	94590.50 104205.60 ar Stress in anchor 9 1.125 2.49 10.15 75111.3 ing Stress of bolt on 1.30 864.0 62.67	N N N N N N N N N N N N N N N N N N N	10.62 Acce	Tons	IS:800 11.6.2 IS:800 10.3.3
	Design Strength due to yielding Design Strength due to rupture at threaded section Shear force in bolt Shear force per bolt Actual shear stress in bolt Permissible Shear stress per bolt Nominal shear capacity of bolt Bear Actual Stress of bolt in bearing Nominal bearing area of bolt on plate	94590.50 104205.60 ar Stress in anchor 9 1.125 2.49 10.15 75111.3 ing Stress of bolt on 1.30 864.0	N N N N N N N N N N N N N N N N N N N	10.62 Acce	Tons	IS:800 11.6.2 IS:800 10.3.3
	Design Strength due to yielding Design Strength due to rupture at threaded section Shear force in bolt Shear force per bolt Actual shear stress in bolt Permissible Shear stress per bolt Nominal shear capacity of bolt Bear Actual Stress of bolt in bearing Nominal bearing area of bolt on plate Permissible bearing stress of the bolt Nominal bearing strength of bolt	94590.50 104205.60 ar Stress in anchor 9 1.125 2.49 10.15 75111.3 ing Stress of bolt on 1.30 864.0 62.67 885600.0	N N N N N N N N N N N N N N N N N N N	10.62 Acce	Tons	IS:800 11.6.2 IS:800 10.3.3
	Design Strength due to yielding Design Strength due to rupture at threaded section Shear force in bolt Shear force per bolt Actual shear stress in bolt Permissible Shear stress per bolt Nominal shear capacity of bolt Bear Actual Stress of bolt in bearing Nominal bearing area of bolt on plate Permissible bearing stress of the bolt Nominal bearing strength of bolt	94590.50 104205.60 ar Stress in anchor of the stress	N N N N N N N N N N N N N N N N N N N	10.62 Acce	Tons	IS:800 11.6.2 IS:800 10.3.3
	Design Strength due to yielding Design Strength due to rupture at threaded section Shear force in bolt Shear force per bolt Actual shear stress in bolt Permissible Shear stress per bolt Nominal shear capacity of bolt Bear Actual Stress of bolt in bearing Nominal bearing area of bolt on plate Permissible bearing stress of the bolt Nominal bearing strength of bolt Com Actual Shear stress in bolt	94590.50 104205.60 104205.60 9 1.125 2.49 10.15 75111.3 ing Stress of bolt on 864.0 62.67 885600.0 bined Shear and Ter 2.49	N N N N N N N N N N N N N N N N N N N	10.62 Acce	Tons	IS:800 11.6.2 IS:800 10.3.3
	Design Strength due to yielding Design Strength due to rupture at threaded section Shear force in bolt Shear force per bolt Actual shear stress in bolt Permissible Shear stress per bolt Nominal shear capacity of bolt Bear Actual Stress of bolt in bearing Nominal bearing area of bolt on plate Permissible bearing stress of the bolt Nominal bearing strength of bolt Com Actual Shear stress per bolt Permissible bear stress of the bolt	94590.50 104205.60 104205.60 9 1.125 2.49 10.15 75111.3 ing Stress of bolt on 1.30 864.0 62.67 885600.0 bined Shear and Ter 2.49 10.15	N N N N N N N N N N N N N N N N N N N	10.62 Acce	Tons	IS:800 11.6.2 IS:800 10.3.3
	Design Strength due to yielding Design Strength due to rupture at threaded section Shear force in bolt Shear force per bolt Actual shear stress in bolt Permissible Shear stress per bolt Nominal shear capacity of bolt Bear Actual Stress of bolt in bearing Nominal bearing area of bolt on plate Permissible bearing stress of the bolt Nominal bearing strength of bolt Com Actual Shear stress in bolt Permissible Shear stress per bolt Actual Shear stress per bolt Actual tensile stress per bolt	94590.50 104205.60 104205.60 ar Stress in anchor of the stress of the	N N N N N N N N N N N N N N N N N N N	10.62 Acce	Tons	IS:800 11.6.2 IS:800 10.3.3
	Design Strength due to yielding Design Strength due to rupture at threaded section Shear force in bolt Shear force per bolt Actual shear stress in bolt Permissible Shear stress per bolt Nominal shear capacity of bolt Bear Actual Stress of bolt in bearing Nominal bearing area of bolt on plate Permissible bearing stress of the bolt Nominal bearing strength of bolt Com Actual Shear stress per bolt Permissible bear stress of the bolt	94590.50 104205.60 104205.60 9 1.125 2.49 10.15 75111.3 ing Stress of bolt on 1.30 864.0 62.67 885600.0 bined Shear and Ter 2.49 10.15	N N N N N N N N N N N N N N N N N N N	Acce	Tons	IS:800 11.6.2 IS:800 10.3.3

	Description	Parameter	Unit	Remark				R		
	Column E2	D ISMC 250						- b _f		
	Yield Stress of Plate (F _y) Base Plate Size	36 500 x 500	ksi mm						m	Ī
	Base Plate Thickness	40	mm	38	Pass		1	V77777		
	Flange Width	250 9.84	mm inches				d		0.95d	N
	Depth	274	mm				Ĭ		1 1	Ì
	·	10.79 4.72	inches inches			1	<u> </u>	* LE X Later	m	
	m Base Plate Dimension - N	19.685	inches	500	mm					<u> </u>
	n	5.91	inches	500		-	n •	0.80b _f	-n -	
+	Base Plate Dimension - B Area of base plate - A1	19.685 387.50	inches inches	500	mm	1				
	Load Case	8	9	10	11	12	13	14	15	1
	Load Combination Fx (Ton)	SW +DL +LL 2.51	SW + WX -5.87	SW +W-X 6.67	-1.53	SW+W-Z 2.58	-3.87	SW+DL+LL+W-X 8.66	SW+DL+LL+WZ 0.47	SW+DL-
	Fy (Ton)	50.79	7.81	28.75	62.3	83.55	32.6	69.16	21.89	123
	Fz (Ton) Resultant shear force	-0.16 2.5	-0.06 5.8	0 6.6	4.19 4.4	-3.41 4.2	-0.19 3.8	-0.13 8.6	4.06 4	-3 5
	Resultant shear force	2.5	5.0	0.0	4.4	4.2	3.0	0.0	1	<u></u>
+				Allowable Stre	ss Design					
\dashv	Case 1 (Area of base plate = Area of concrete)									
	Area of base plate A1					387.50				
+	Area of concrete A2				Ī	387.50				Τ
	Axial compressive load (Pa) - kips	111.94	17.21	63.37	137.31	184.14	71.85	152.43	48.25	273
+	Compressive Strength of concrete- fc (kg/m²) Compressive Strength of concrete (ksi)					255000 3.63	0			
	Required Base Plate area (Ω*Pa / 0.85 *fc) inches ²	90.775	13.959	51.384	111.347	149.326	58.265	123.608	39.123	221
4	Delta	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.
	Base plate Breadth (N) in inches N Considered	11 19.69	5 19.69	8 19.69	12 19.69	13 19.69	9 19.69	12 19.69	7 19.69	19
	Base Plate length (B) in inches	8	3	6	9	11	7	10	5	1
	B considered	19.69	19.69	19.69	19.69	19.69	19.69	19.69	19.69	19
	Candition (0.05*fa*A1 */A2/A1\/2.50\ > 5(Vina)	477.9	477.9	477.9	477.9	477.9	477.9	477.9	477.9	47
_	Condition (0.85*fc*A1 *VA2/A1)/2.50) > Fy (Kips)	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TR
	Factor X	0.23	0.04	0.13	0.29	0.38	0.15	0.32	0.10	0.
	λ	0.52	0.19	0.38	0.58	0.70	0.40	0.62	0.33	0.
+	λη'	0.52 1.33	0.19 0.49	0.38 0.97	0.58 1.50	0.70 1.79	0.40 1.04	0.62 1.59	0.33 0.84	0. 2.
	XII	1.55	0.43	0.57	1.30	1.73	1.04	1.55	0.04	2.
	<u> </u>		1		1	5.9055	1	1		
	Base Plate Thickness (inches)	0.97	0.38	0.73	1.07	1.24	0.77	1.13	0.63	1.
	Base Plate Thickness (mm)	24.56	9.63	18.48	27.20	31.50	19.67	28.66	16.12	38
+	Uplift Condition									+
	Yield Stress of Plate (F _y)				36				36	
	V2 bf				13.92				13.92	
	Guage Distance (Centre to centre) mm Guage Distance (Centre to centre) inches				181.00 7.13				181.00 7.13	+
+	Condition 1 (v2 bf < d)			Allowable Stre	ss Design					T
	Plate thickness (inches)				1.397				0.828	
_	Condition 1 (V2 bf > d)									+
	Plate thickness (inches)				1.375				0.815	<u> </u>
_					4 275				0.045	
	Plate Thickness (inches) Plate Thickness (mm)				1.375 34.93				0.815 20.70	
	, ,	<u> </u>		'	'	<u> </u>	1			
	Description	Parameter	Unit			Remarks	_			
	·									
	Bolt Considered M33 Bolt material	IS 2062 E 250 A					-			
	Minimum Embedment Length	396	mm				j			
	Tensile Strength	410	N/mm ²			IS 2062				
_	Yield Stress No of Bolts	230 8	N/mm ²			Table No 2	-			
	Major/Nominal Diameter	33	mm							
	Pitch Core Diameter	3.5 28.706	mm mm				-			
	Shank Area of bolt	855.299	mm ²				1			
	Stress Area	694	mm ²							
+	Root Area	635.70	mm ²				-			
-+	Hole diameter	36	mm							
	Edge distance (For Side N)	69	mm							
\top	r For Side N)	54	mm				-			
<u> </u>		- ·					1			
	Minimum edge distance Edge distance		mm							
	Minimum edge distance Edge distance (For Side B)	69					-			
	Minimum edge distance Edge distance		mm mm mm							
	Minimum edge distance Edge distance (For Side B) Guage Distance between Holes (For Side "B") Guage Distance between Holes (For Side "N")	69 181.0 181.0	mm mm							
	Minimum edge distance Edge distance (For Side B) Guage Distance between Holes (For Side "B") Guage Distance between Holes (For Side "N")	69 181.0	mm mm							
	Minimum edge distance Edge distance (For Side B) Guage Distance between Holes (For Side "B") Guage Distance between Holes (For Side "N")	69 181.0 181.0	mm mm							

kg/mm² N

N

N

Tons

Tons

kg/mm²

kg/mm² N

kg/mm²

kg/mm²

N

kg/mm²

kg/mm²

kg/mm²

kg/mm²

IS800 11.6.2.3

IS:800 11.6.2.1

IS:800 11.6.2.1

IS:800 10.3.3

IS:800 11.6.2.2

IS:800 11.6.2.2

IS:800 11.6.2.5

Accepted

Accepted

Accepted

Tons

Tons

18.22

20.88

12.78

178835.16

178835.16

204868.80

Shear Stress in anchor rod

8.6 1.075

1.26

10.76

150479.6

Bearing Stress of bolt on plate

62.67

1353000.0

Combined Shear and Tension

1.26

10.76

9.11

12.78

0.520923

1320.0

Permissible tensile stress per bolt

Nominal Tensile capacity per bolt

Design Strength due to yielding

Design Strength due to rupture at threaded section

Shear force in bolt

Shear force per bolt

Actual shear stress in bolt

Permissible Shear stress per bolt

Nominal shear capacity of bolt

Actual Stress of bolt in bearing

Nominal bearing area of bolt on plate

Permissible bearing stress of the bolt

Nominal bearing strength of bolt

Actual Shear stress in bolt

Permissible Shear stress per bolt

Actual tensile stress per bolt

Permissible tensile stress per bolt

Description	Parameter	Unit	Remark		-		00000		
Column E3	D ISMC 250						— B — → b _f —		
Yield Stress of Plate (F _y)	36	ksi							T
Base Plate Size Base Plate Thickness	500 x 500 36	mm mm	34	Pass		1	V Z Z Z Z Z Z	m	
Flange Width	250	mm				Ī.		1	
	9.84 274	inches mm				d		0.95d	N
Depth	10.79	inches				1	222		
m Base Plate Dimension - N	4.72 19.685	inches inches	500	mm	1				<u> </u>
n Double Discoving D	5.91	inches	500			→ n+	-0.80b _f	-n -	
Base Plate Dimension - B Area of base plate - A1	19.685 387.50	inches inches	500	mm	1				
Load Case Load Combination	8 SW +DL +LL	9 SW + WX	10 SW +W-X	11 SW+WZ	12 SW+W-Z	13 SW+DL+LL+WX	14 SW+DL+LL+W-X	15 SW+DL+LL+WZ	16 SW+DL+LL+W-Z
Fx (Ton)	-2.52	-6.86	6.1	1.6	-2.69	-8.84	4.12	-0.38	-4.67
Fy (Ton) Fz (Ton)	60.52 -0.05	31.54 0.04	11.16 -0.07	26.84 2.04	47.82 -1.38	81.83 0	39.13 -0.11	23.45 2	98.12 -1.41
Resultant shear force	2.5	6.8	6.1	2.5	3	8.8	4.1	2	4.8
			Allowable Stre	ss Design					
	T			Ü					
Case 1 (Area of base plate = Area of concrete) Area of base plate A1					387.50				
Area of concrete A2			Ι		387.50				I
Axial compressive load (Pa) - kips	133.39	69.51	24.60	59.16	105.40	180.35	86.24	51.68	216.26
Compressive Strength of concrete- fc (kg/m²)					255000	0			
Compressive Strength of concrete (ksi) Required Base Plate area (Ω*Pa / 0.85 *fc) inches²	108.166	56.370	19.946	47.970	3.63 85.467	146.252	69.936	41.911	175.367
Delta	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19
Base plate Breadth (N) in inches N Considered	12 19.69	9 19.69	6 19.69	8 19.69	10 19.69	13 19.69	10 19.69	8 19.69	14 19.69
Base Plate length (B) in inches	9	6	4	6	8	11	7	5	12
B considered	19.69	19.69	19.69	19.69	19.69	19.69	19.69	19.69	19.69
Condition (0.85*fc*A1 *VA2/A1)/2.50) > Fy (Kips)	477.9 TRUE	477.9 TRUE	477.9 TRUE	477.9 TRUE	477.9 TRUE	477.9 TRUE	477.9 TRUE	477.9 TRUE	477.9 TRUE
	TRUE	INUE	INUE	TRUE	INUE	INUE	INUE	INUE	TRUE
Factor X	0.28 0.57	0.15 0.40	0.05 0.23	0.12 0.36	0.22 0.50	0.38 0.69	0.18 0.45	0.11 0.34	0.45 0.77
λ	0.57	0.40	0.23	0.36	0.50	0.69	0.45	0.34	0.77
λn'	1.47	1.02	0.59	0.94	1.28	1.77	1.15	0.87	1.99
I			l		5.9055	<u> </u>			<u> </u>
Base Plate Thickness (inches)	1.06	0.76	0.45	0.70	0.94	1.23	0.85	0.66	1.34
Base Plate Thickness (inches) Base Plate Thickness (mm)	1.06 26.81	0.76 19.35	0.45 11.51	0.70 17.85	0.94 23.83	1.23 31.17	0.85 21.55	0.66 16.69	1.34 34.13
Uplift Condition Yield Stress of Plate (F _y)			11.51 36	17.85 36					
Uplift Condition Yield Stress of Plate (F _y) V2 bf			36 13.92	36 13.92					
Uplift Condition Yield Stress of Plate (F _y)			11.51 36	17.85 36					
Uplift Condition Yield Stress of Plate (F _y) V2 bf Guage Distance (Centre to centre) mm		19.35	36 13.92 194.00	36 13.92 194.00 7.64					
Uplift Condition Yield Stress of Plate (F _y) V2 bf Guage Distance (Centre to centre) mm Guage Distance (Centre to centre) inches Condition 1 (V2 bf < d)		19.35	36 13.92 194.00 7.64 Allowable Stree	36 13.92 194.00 7.64 ss Design					
Base Plate Thickness (mm) Uplift Condition Yield Stress of Plate (F _y) √2 bf Guage Distance (Centre to centre) mm Guage Distance (Centre to centre) inches		19.35	36 13.92 194.00 7.64	36 13.92 194.00 7.64					
Base Plate Thickness (mm) Uplift Condition Yield Stress of Plate (F _y) V2 bf Guage Distance (Centre to centre) mm Guage Distance (Centre to centre) inches Condition 1 (V2 bf < d) Plate thickness (inches) Condition 1 (V2 bf > d)		19.35	36 13.92 194.00 7.64 Allowable Stree	36 13.92 194.00 7.64 ss Design					
Base Plate Thickness (mm) Uplift Condition Yield Stress of Plate (F _y) V2 bf Guage Distance (Centre to centre) mm Guage Distance (Centre to centre) inches Condition 1 (V2 bf < d) Plate thickness (inches)		19.35	36 13.92 194.00 7.64 Allowable Stree	36 13.92 194.00 7.64 ss Design					
Uplift Condition Yield Stress of Plate (F _y) V2 bf Guage Distance (Centre to centre) mm Guage Distance (Centre to centre) inches Condition 1 (V2 bf < d) Plate thickness (inches) Condition 1 (V2 bf > d) Plate Thickness (inches)		19.35	36 13.92 194.00 7.64 Allowable Stres 0.612 0.603	36 13.92 194.00 7.64 ss Design 0.950					
Base Plate Thickness (mm) Uplift Condition Yield Stress of Plate (F _y) V2 bf Guage Distance (Centre to centre) mm Guage Distance (Centre to centre) inches Condition 1 (V2 bf < d) Plate thickness (inches) Condition 1 (V2 bf > d) Plate thickness (inches)		19.35	36 13.92 194.00 7.64 Allowable Stree 0.612	36 13.92 194.00 7.64 ss Design 0.950					
Uplift Condition Yield Stress of Plate (F _y) V2 bf Guage Distance (Centre to centre) mm Guage Distance (Centre to centre) inches Condition 1 (V2 bf < d) Plate thickness (inches) Condition 1 (V2 bf > d) Plate Thickness (inches)		19.35	36 13.92 194.00 7.64 Allowable Stres 0.612 0.603	36 13.92 194.00 7.64 ss Design 0.950					
Uplift Condition Yield Stress of Plate (F _y) V2 bf Guage Distance (Centre to centre) mm Guage Distance (Centre to centre) inches Condition 1 (V2 bf < d) Plate thickness (inches) Condition 1 (V2 bf > d) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (mm)	26.81	19.35	36 13.92 194.00 7.64 Allowable Stres 0.612 0.603	36 13.92 194.00 7.64 ss Design 0.950	23.83				
Base Plate Thickness (mm) Uplift Condition Yield Stress of Plate (F _y) V2 bf Guage Distance (Centre to centre) mm Guage Distance (Centre to centre) inches Condition 1 (V2 bf < d) Plate thickness (inches) Condition 1 (V2 bf > d) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (mm)	26.81	19.35	36 13.92 194.00 7.64 Allowable Stres 0.612 0.603	36 13.92 194.00 7.64 ss Design 0.950	23.83				
Uplift Condition Yield Stress of Plate (F _y) V2 bf Guage Distance (Centre to centre) mm Guage Distance (Centre to centre) inches Condition 1 (V2 bf < d) Plate thickness (inches) Condition 1 (V2 bf > d) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M24 Bolt material Minimum Embedment Length	Parameter IS 2062 E 250 A 288	Unit	36 13.92 194.00 7.64 Allowable Stres 0.612 0.603	36 13.92 194.00 7.64 ss Design 0.950	Remarks				
Uplift Condition Yield Stress of Plate (F _y) V2 bf Guage Distance (Centre to centre) mm Guage Distance (Centre to centre) inches Condition 1 (V2 bf < d) Plate thickness (inches) Condition 1 (V2 bf > d) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M24 Bolt material	Parameter IS 2062 E 250 A	19.35 Unit	36 13.92 194.00 7.64 Allowable Stres 0.612 0.603	36 13.92 194.00 7.64 ss Design 0.950	23.83				
Uplift Condition Yield Stress of Plate (F _V) V2 bf Guage Distance (Centre to centre) mm Guage Distance (Centre to centre) inches Condition 1 (V2 bf < d) Plate thickness (inches) Condition 1 (V2 bf > d) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M24 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts	Parameter IS 2062 E 250 A 288 410 230 8	Unit mm N/mm² N/mm²	36 13.92 194.00 7.64 Allowable Stres 0.612 0.603	36 13.92 194.00 7.64 ss Design 0.950	Remarks IS 2062				
Uplift Condition Yield Stress of Plate (F _y) V2 bf Guage Distance (Centre to centre) mm Guage Distance (Centre to centre) inches Condition 1 (V2 bf < d) Plate thickness (inches) Condition 1 (V2 bf > d) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (inches) Description Bolt Considered M24 Bolt material Minimum Embedment Length Tensile Strength Yield Stress	Parameter IS 2062 E 250 A 288 410 230	Unit mm N/mm²	36 13.92 194.00 7.64 Allowable Stres 0.612 0.603	36 13.92 194.00 7.64 ss Design 0.950	Remarks IS 2062				
Uplift Condition Yield Stress of Plate (F _y) V2 bf Guage Distance (Centre to centre) mm Guage Distance (Centre to centre) inches Condition 1 (V2 bf < d) Plate thickness (inches) Condition 1 (V2 bf > d) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M24 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch Core Diameter	Parameter IS 2062 E 250 A 288 410 230 8 24 3 20.32	Mm N/mm² N/mm² mm mm mm	36 13.92 194.00 7.64 Allowable Stres 0.612 0.603	36 13.92 194.00 7.64 ss Design 0.950	Remarks IS 2062				
Uplift Condition Yield Stress of Plate (F _V) V2 bf Guage Distance (Centre to centre) mm Guage Distance (Centre to centre) inches Condition 1 (V2 bf < d) Plate thickness (inches) Condition 1 (V2 bf > d) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M24 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch	Parameter IS 2062 E 250 A 288 410 230 8 24 3	Unit mm N/mm² N/mm² mm mm	36 13.92 194.00 7.64 Allowable Stres 0.612 0.603	36 13.92 194.00 7.64 ss Design 0.950	Remarks IS 2062				
Uplift Condition Yield Stress of Plate (F _y) V2 bf Guage Distance (Centre to centre) mm Guage Distance (Centre to centre) inches Condition 1 (V2 bf < d) Plate thickness (inches) Condition 1 (V2 bf > d) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (inches) Bolt Considered M24 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch Core Diameter Shank Area of bolt	Parameter IS 2062 E 250 A 288 410 230 8 24 3 20.32 452.389	Mm N/mm² N/mm² mm mm mm mm mm	36 13.92 194.00 7.64 Allowable Stres 0.612 0.603	36 13.92 194.00 7.64 ss Design 0.950	Remarks IS 2062				
Uplift Condition Yield Stress of Plate (F _y) V2 bf Guage Distance (Centre to centre) mm Guage Distance (Centre to centre) inches Condition 1 (V2 bf < d) Plate thickness (inches) Condition 1 (V2 bf > d) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M24 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch Core Diameter Shank Area of bolt Stress Area	Parameter IS 2062 E 250 A 288 410 230 8 24 3 20.32 452.389 353	Mm N/mm² N/mm² N/mm² mm mm mm² mm² mm²	36 13.92 194.00 7.64 Allowable Stres 0.612 0.603	36 13.92 194.00 7.64 ss Design 0.950	Remarks IS 2062				
Uplift Condition Yield Stress of Plate (F _y) V2 bf Guage Distance (Centre to centre) mm Guage Distance (Centre to centre) inches Condition 1 (V2 bf < d) Plate thickness (inches) Condition 1 (V2 bf > d) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M24 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch Core Diameter Shank Area of bolt Stress Area Root Area Hole diameter Edge distance	Parameter IS 2062 E 250 A 288 410 230 8 24 3 20.32 452.389 353 317.31	mm N/mm² N/mm² N/mm² mm mm mm mm² mm² mm² mm²	36 13.92 194.00 7.64 Allowable Stres 0.612 0.603	36 13.92 194.00 7.64 ss Design 0.950	Remarks IS 2062				
Uplift Condition Yield Stress of Plate (F _V) V2 bf Guage Distance (Centre to centre) mm Guage Distance (Centre to centre) inches Condition 1 (V2 bf < d) Plate thickness (inches) Condition 1 (V2 bf > d) Plate Thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M24 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch Core Diameter Shank Area of bolt Stress Area Root Area Hole diameter Edge distance (For Side N) Minimum edge distance	Parameter IS 2062 E 250 A 288 410 230 8 24 3 20.32 452.389 353 317.31	mm N/mm² N/mm² N/mm² mm mm mm mm² mm² mm² mm² mm²	36 13.92 194.00 7.64 Allowable Stres 0.612 0.603	36 13.92 194.00 7.64 ss Design 0.950	Remarks IS 2062				
Uplift Condition Yield Stress of Plate (F _y) Y2 bf Guage Distance (Centre to centre) mm Guage Distance (Centre to centre) inches Condition 1 (V2 bf < d) Plate thickness (inches) Condition 1 (V2 bf > d) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M24 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch Core Diameter Shank Area of bolt Stress Area Root Area Hole diameter Edge distance (For Side N) Minimum edge distance Edge distance Edge distance Edge distance	Parameter IS 2062 E 250 A 288 410 230 8 24 3 20.32 452.389 353 317.31	mm N/mm² N/mm² N/mm² mm mm mm² mm² mm² mm² mm² mm²	36 13.92 194.00 7.64 Allowable Stres 0.612 0.603	36 13.92 194.00 7.64 ss Design 0.950	Remarks IS 2062				
Uplift Condition Yield Stress of Plate (F _V) V2 bf Guage Distance (Centre to centre) mm Guage Distance (Centre to centre) inches Condition 1 (V2 bf < d) Plate thickness (inches) Condition 1 (V2 bf > d) Plate Thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M24 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch Core Diameter Shank Area of bolt Stress Area Root Area Hole diameter Edge distance (For Side N) Minimum edge distance	Parameter IS 2062 E 250 A 288 410 230 8 24 3 20.32 452.389 353 317.31 27 56 40.5	mm N/mm² N/mm² N/mm² mm mm mm² mm² mm² mm² mm² mm²	36 13.92 194.00 7.64 Allowable Stres 0.612 0.603	36 13.92 194.00 7.64 ss Design 0.950	Remarks IS 2062				
Uplift Condition Yield Stress of Plate (F _y) V2 bf Guage Distance (Centre to centre) mm Guage Distance (Centre to centre) inches Condition 1 (V2 bf < d) Plate thickness (inches) Condition 1 (V2 bf > d) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M24 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch Core Diameter Shank Area of bolt Stress Area Root Area Hole diameter Edge distance (For Side N) Minimum edge distance Edge distance Edge distance (For Side B)	Parameter IS 2062 E 250 A 288 410 230 8 24 3 20.32 452.389 353 317.31 27 56 40.5 56	mm N/mm² N/mm² N/mm² mm mm mm² mm² mm² mm² mm² mm² mm²	36 13.92 194.00 7.64 Allowable Stres 0.612 0.603	36 13.92 194.00 7.64 ss Design 0.950	Remarks IS 2062				
Uplift Condition Yield Stress of Plate (F _y) Y2 bf Guage Distance (Centre to centre) mm Guage Distance (Centre to centre) inches Condition 1 (V2 bf < d) Plate thickness (inches) Condition 1 (V2 bf > d) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M24 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch Core Diameter Shank Area of bolt Stress Area Root Area Hole diameter Edge distance (For Side N) Minimum edge distance Edge distance (For Side B) Guage Distance between Holes (For Side "N")	Parameter IS 2062 E 250 A 288 410 230 8 24 3 20.32 452.389 353 317.31 27 56 40.5 56 194.0	mm N/mm² N/mm² N/mm² N/mm² mm mm² mm² mm² mm² mm² mm mm mm mm m	36 13.92 194.00 7.64 Allowable Stres 0.612 0.603	36 13.92 194.00 7.64 ss Design 0.950	Remarks IS 2062				
Uplift Condition Yield Stress of Plate (F _y) V2 bf Guage Distance (Centre to centre) mm Guage Distance (Centre to centre) inches Condition 1 (V2 bf < d) Plate thickness (inches) Condition 1 (V2 bf > d) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M24 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch Core Diameter Shank Area of bolt Stress Area Root Area Hole diameter Edge distance (For Side N) Minimum edge distance Edge distance Edge distance (For Side B) Guage Distance between Holes (For Side "B") Guage Distance between Holes (For Side "N")	Parameter IS 2062 E 250 A 288 410 230 8 24 3 20.32 452.389 353 317.31 27 56 40.5 56 194.0 194.0	mm N/mm² N/mm² N/mm² N/mm² mm mm² mm² mm² mm² mm² mm mm mm mm m	36 13.92 194.00 7.64 Allowable Stres 0.612 0.603	36 13.92 194.00 7.64 ss Design 0.950	Remarks IS 2062				
Uplift Condition Yield Stress of Plate (F _y) Y2 bf Guage Distance (Centre to centre) mm Guage Distance (Centre to centre) inches Condition 1 (V2 bf < d) Plate thickness (inches) Condition 1 (V2 bf > d) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M24 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch Core Diameter Shank Area of bolt Stress Area Root Area Hole diameter Edge distance (For Side N) Minimum edge distance Edge distance (For Side B) Guage Distance between Holes (For Side "N")	Parameter IS 2062 E 250 A 288 410 230 8 24 3 20.32 452.389 353 317.31 27 56 40.5 56 194.0 194.0 194.0 sile stress in anchor	mm N/mm² N/mm² N/mm² N/mm² mm mm² mm² mm² mm² mm² mm mm mm mm m	36 13.92 194.00 7.64 Allowable Stree 0.612 0.603 15.30	36 13.92 194.00 7.64 ss Design 0.950	Remarks IS 2062				

N

N

N

Tons

Tons

kg/mm²

kg/mm² N

kg/mm² mm²

kg/mm²

N

kg/mm²

kg/mm²

kg/mm²

kg/mm²

9.64

10.62

Accepted

Accepted

Accepted

Tons

Tons

IS800 11.6.2.3

IS:800 11.6.2.1

IS:800 11.6.2.1

IS:800 10.3.3

IS:800 11.6.2.2

IS:800 11.6.2.2

IS:800 11.6.2.5

12.78

94590.50

104205.60

Shear Stress in anchor rod

8.8

1.100

2.43

10.15 75111.3

Bearing Stress of bolt on plate

1.27

62.67

885600.0

Combined Shear and Tension

2.43

10.15

7.42

12.78

0.393917

864.0

94590.50

Permissible tensile stress per bolt

Nominal Tensile capacity per bolt

Design Strength due to yielding

Design Strength due to rupture at threaded section

Shear force in bolt

Shear force per bolt

Actual shear stress in bolt

Permissible Shear stress per bolt

Nominal shear capacity of bolt

Actual Stress of bolt in bearing

Permissible bearing stress of the bolt

Nominal bearing strength of bolt

Actual Shear stress in bolt

Permissible Shear stress per bolt

Actual tensile stress per bolt

Permissible tensile stress per bolt

Combined Shear and Tension

	Description	Parameter	Unit	Remark						
	Column A4 Yield Stress of Plate (F _v)	D ISMB 250	ksi			-	-	B	_	_
	Base Plate Size	500 x 500	mm			_			₩,	†
	Base Plate Thickness	16 125	mm mm	11	Pass	-	1	77777		
	Flange Width	4.92	inches				ď		0.95d	N
	Depth	250 9.84	mm inches			_	•			
	m Base Plate Dimension - N	5.17 19.685	inches inches	500	mm	-				<u> </u>
	n	7.87	inches			_	- n	0.80bf	-n-	
	Base Plate Dimension - B Area of base plate - A1	19.685 387.50	inches inches	500	mm	_				
	Load Case Load Combination	8 SW +DL +LL	9 SW + WX	10 SW +W-X	11 SW+WZ	12 SW+W-Z	13 SW+DL+LL+WX	14 SW+DL+LL+W-X	15 SW+DL+LL+WZ	16 SW+DL+LL+W-Z
	Fx (Ton)	-0.01	-0.14	0.16	0	0.01	-0.16	0.14	-0.02	0
	Fy (Ton) Fz (Ton)	5.6	0.77	0.48	1.21 0.04	0.05 -0.04	5.75 0	5.46 0	6.19 0.04	5.03 -0.04
	Resultant shear force	0	0.1	0.1	0	0	0.1	0.1	0	0
				Allowable Stre	ss Design					
	Case 1 (Area of base plate = Area of concrete)									
	Area of base plate A1 Area of concrete A2					387.5 387.5				
	Axial compressive load (Pa) - kips	12.34	1.70	1.06	2.67	0.11	12.67	12.03	13.64	11.09
	Compressive Strength of concrete- fc (kg/m²)					25500	00		3.	
	Compressive Strength of concrete (ksi) Required Base Plate area (Ω^* Pa / 0.85 *fc) inches ²	10.009	1.376	0.858	2.163	0.089	10.277	9.758	11.063	8.990
	Delta	2.71 6	2.71	2.71	2.71	2.71	2.71 6	2.71 6	2.71 6	2.71 6
	Base plate Breadth (N) in inches N Considered	19.69	4 19.69	19.69	4 19.69	19.69	19.69	19.69	19.69	19.69
	Base Plate length (B) in inches B considered	19.69	0 19.69	19.69	1 19.69	0 19.69	2 19.69	19.69	2 19.69	2 19.69
	Beofisiaciea									
	Condition (0.85*fc*A1 *VA2/A1)/2.50) > Fy (Kips)	477.9 TRUE	477.9 TRUE	477.9 TRUE	477.9 TRUE	477.9 TRUE	477.9 TRUE	477.9 TRUE	477.9 TRUE	477.9 TRUE
	Factor X	0.02	0.00	0.00	0.00	0.00	0.02	0.02	0.03	0.02
	λ	0.15 0.15	0.06 0.06	0.04 0.04	0.07 0.07	0.01 0.01	0.15 0.15	0.15 0.15	0.16 0.16	0.14 0.14
	λn'	0.27	0.10	0.08	0.12	0.02	0.27	0.26	0.28	0.25
	I					7.874	0			<u> </u>
	Base Plate Thickness (inches)	0.43	0.16	0.13	0.20	0.04	0.43	0.42	0.45	0.41
	Base Plate Thickness (mm)	10.87	4.03	3.18	5.05	1.03	11.02	10.74	11.43	10.30
	Uplift Condition									
	Yield Stress of Plate (F _y)					36				
	√2 bf Guage Distance (Centre to centre) mm					6.96 194.00				
	Guage Distance (Centre to centre) inches					7.64				
			1	Allowable Stre	ss Design			1		<u> </u>
	Condition 1 (V2 bf < d) Plate thickness (inches)					0.058				
	Condition 1 (√2 bf > d)									
	Plate thickness (inches)					0.056				
	Plate Thickness (inches) Plate Thickness (mm)					0.058 1.47				
	riate rinekitess (illin)		1	1		1.77				
	Description	Parameter	Unit			Remarks				
	Bolt Considered M24									
	Bolt material Minimum Embedment Length	IS 2062 E 250 A 288	mm							
	Tensile Strength	410	N/mm ²			IS 2062				
	Yield Stress No of Bolts	230 4	N/mm ²			Table No 2				
	Major/Nominal Diameter Pitch	24 3	mm mm							
	Core Diameter	20.32	mm							
	Shank Area of bolt Stress Area	452.389 353	mm ²							
	Root Area	317.31	mm ²							
	Hole diameter	27	mm	<u> </u>						
	Edge distance	56	mm							
	(For Side N) Minimum edge distance	40.5	mm							
	Edge distance (For Side B)	56	mm							
	Guage Distance between Holes (For Side "B")	194.0	mm							
	Guage Distance between Holes (For Side "N")	194.0	mm							
	Tensi	le stress in anchor	rod	<u>L</u>						
	Required tension in bolt Required tension per bolt	0.05 0.013	Tons Tons							
	Actual tensile stress per bolt	0.013	kg/mm ²	Acce	epted	IS:800 11.6.2.3				
I		1	1	1	Ī	1				

12.78 kg/mm² 94590.50 N

N

N

Tons

Tons

kg/mm²

kg/mm² N

kg/mm²

kg/mm²

kg/mm²

kg/mm²

kg/mm²

kg/mm²

384.0 mm²

9.64

10.62

Accepted

Accepted

Accepted

Tons

Tons

94590.50

94590.50

104205.60

Shear Stress in anchor rod

0.1 0.025

0.06

10.15

75111.3

Bearing Stress of bolt on plate

0.07

62.67

393600.0

Combined Shear and Tension

0.06

10.15

0.03

12.78

0.000034

IS800 11.6.2.3

IS:800 11.6.2.1

IS:800 11.6.2.1

IS:800 10.3.3

IS:800 11.6.2.2

IS:800 11.6.2.2

IS:800 11.6.2.5

Permissible tensile stress per bolt

Nominal Tensile capacity per bolt

Design Strength due to yielding

Design Strength due to rupture at threaded section

Shear force in bolt

Shear force per bolt

Actual shear stress in bolt

Permissible Shear stress per bolt

Nominal shear capacity of bolt

Actual Stress of bolt in bearing

Permissible bearing stress of the bolt

Nominal bearing strength of bolt

Actual Shear stress in bolt

Permissible Shear stress per bolt

Actual tensile stress per bolt

Permissible tensile stress per bolt

Combined Shear and Tension

			T		1				
Description Column A5	Parameter D ISMB 250	Unit	Remark		-	-	В —	-	
Yield Stress of Plate (F _y)	36	ksi					b _f		T
Base Plate Size Base Plate Thickness	500 x 500 16	mm mm	10	Pass	-	1	(P77777)	m	Ţ
Flange Width	125	mm			1	Ť.		ļ . t	
	4.92 250	inches mm			_	d		0.95d	N
Depth	9.84	inches			-	1	CLLY-LA		
m Base Plate Dimension - N	5.17 19.685	inches inches	500	mm					1
n Base Plate Dimension - B	7.87 19.685	inches inches	500	mm		- n•	0.80bf	- n - -	
Area of base plate - A1	387.50	inches			-				_
Load Case Load Combination	8 SW +DL +LL	9 SW + WX	10 SW +W-X	11 SW+WZ	12 SW+W-Z	13 SW+DL+LL+WX	14 SW+DL+LL+W-X	15 SW+DL+LL+WZ	16 SW+DL+LL+W-Z
Fx (Ton)	0.13	-0.01	0.11	0	0	0.03	0.24	0.13	0.13
Fy (Ton) Fz (Ton)	3.28 0.01	0.68	0.3	1.77 -0.03	0.68 0.02	3.47 0.01	3.08 0.01	4.56 -0.03	2.11 0.02
Resultant shear force	0.1	0	0.1	0	0	0	0.2	0.1	0.1
			Allowable Str	ess Design					
Case 1 (Area of base plate = Area of concrete)									
Area of base plate A1					387.5				
Area of concrete A2					387.5	50			
Axial compressive load (Pa) - kips	7.23	1.50	0.66	3.90	1.50	7.65	6.79	10.05	4.65
Compressive Strength of concrete- fc (kg/m²) Compressive Strength of concrete (ksi)					25500 3.63				
Required Base Plate area (Ω*Pa / 0.85 *fc) inches ²	5.862	1.215	0.536	3.163	1.215	6.202	5.505	8.150	3.771
Delta Base plate Breadth (N) in inches	2.71 5	2.71	2.71 3	2.71 4	2.71 4	2.71 5	2.71 5	2.71 6	2.71 5
N Considered	19.69	19.69	19.69	19.69	19.69	19.69	19.69	19.69	19.69
Base Plate length (B) in inches B considered	1 19.69	0 19.69	0 19.69	1 19.69	0 19.69	1 19.69	1 19.69	1 19.69	1 19.69
	477.9	477.9	477.9	477.9	477.9	477.9	477.9	477.9	477.9
Condition (0.85*fc*A1 *VA2/A1)/2.50) > Fy (Kips)	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE
Factor X	0.01	0.00	0.00	0.01	0.00	0.01	0.01	0.02	0.01
λ	0.12	0.05	0.04	0.09	0.05	0.12	0.11	0.14	0.09
λn'	0.12 0.20	0.05 0.09	0.04 0.06	0.09 0.15	0.05 0.09	0.12 0.21	0.11 0.20	0.14 0.24	0.09 0.16
					7.874	10			
'									
Base Plate Thickness (inches) Base Plate Thickness (mm)	0.33 8.32	0.15 3.79	0.10 2.52	0.24 6.11	0.15 3.79	0.34 8.56	0.32 8.06	0.39 9.81	0.26 6.67
	0.02			0,12	00		0.00	0.02	
Uplift Condition Yield Stress of Plate (F _v)					36				
√2 bf					6.96				
Guage Distance (Centre to centre) mm Guage Distance (Centre to centre) inches					194.00 7.64				
			Allowable Str	ess Design					
Condition 1 ($\sqrt{2}$ bf < d)			Allowable Str	Design					
Plate thickness (inches)					0.214				
Condition 1 ($\sqrt{2}$ bf > d)					0.200				
Plate thickness (inches)					0.208				
Plate Thickness (inches) Plate Thickness (mm)					0.214 5.43				
Trace Trace (Trace)				1	1				
Description	Parameter	Unit			Remarks				
Bolt Considered M24									
Bolt material	IS 2062 E 250 A								
Minimum Embedment Length Tensile Strength	288 410	mm N/mm²			IS 2062				
Yield Stress	230	N/mm ²			Table No 2				
No of Bolts Major/Nominal Diameter	4 24	mm							
Pitch Core Diameter	3 20.32	mm							
Shank Area of bolt	452.389	mm mm²							
Stress Area Root Area	353 317.31	mm ²							
		mm							
Hole diameter Edge distance	27	mm							
(For Side N)	56	mm							
Minimum edge distance Edge distance	40.5	mm							
(For Side B)	56 194	mm							
Guage Distance between Holes (For Side "B") Guage Distance between Holes (For Side "N")	194	mm							
Tensile	stress in anchor ro	d							
Required tension in bolt Required tension per bolt	0.68 0.170	Tons Tons							
Actual tensile stress per bolt	0.38	kg/mm ²	Acce	e <mark>pted</mark>	IS:800 11.6.2.3				
Permissible tensile stress per bolt	12.78	kg/mm ²			IS800 11.6.2.3				
Nominal Tensile capacity per bolt Design Strength due to vielding	94590.50 94590.50	N N	9.64	Tons					

N 9.64 N 10.62

Tons

Tons

kg/mm²

kg/mm²

kg/mm²

kg/mm²

N

kg/mm²

kg/mm²

kg/mm²

kg/mm²

 mm^2

Tons

Tons

Accepted

Accepted

Accepted

IS:800 11.6.2.1

IS:800 11.6.2.1

IS:800 10.3.3

IS:800 11.6.2.2

IS:800 11.6.2.2

IS:800 11.6.2.5

94590.50

104205.60

0.2

0.05

0.11

10.15

0.13

62.67

393600.0

0.11

10.15

0.38

12.78

0.00

Combined Shear and Tension

384.0

75111.3

Bearing Stress of bolt on plate

Shear Stress in anchor rod

Design Strength due to yielding

Design Strength due to rupture at threaded section

Shear force in bolt

Shear force per bolt

Actual shear stress in bolt

Permissible Shear stress per bolt

Nominal shear capacity of bolt

Actual Stress of bolt in bearing

Permissible bearing stress of the bolt

Nominal bearing strength of bolt

Actual Shear stress in bolt

Permissible Shear stress per bolt

Actual tensile stress per bolt

Permissible tensile stress per bolt

Combined Shear and Tension

Description	Parameter	Unit	Remark					19	
Column B1	D ISMB 250						— в — 		
Yield Stress of Plate (F _y) Base Plate Size	36 600 x 600	ksi mm						m m	Ī
Base Plate Thickness	32 390	mm	29	Pass		1	77777	+	
Flange Width	15.35	mm inches				d		0.95d	N
Depth	270 10.63	mm inches				V			
m	6.76	inches				•		΄ ₩	↓
Base Plate Dimension - N n	23.622 5.67	inches inches	600	mm		-n-	0.80bf	-n-	-1 -2
Base Plate Dimension - B Area of base plate - A1	23.622	inches inches	600	mm			,		
Load Case	558.00 8	9	10	11	12	13	14	15	16
Load Combination Fx (Ton)	SW +DL +LL 0.05	SW + WX -0.25	SW +W-X -0.47	SW+WZ 0.02	SW+W-Z 0.05	SW+DL+LL+WX -0.23	SW+DL+LL+W-X -0.45	SW+DL+LL+WZ 0.04	SW+DL+LL+W-Z 0.07
Fy (Ton)	56.52	13.74	31.22	21.05	3.35	33.94	78.91	68.74	44.34
Fz (Ton) Resultant shear force	2.63	0.11	0.2 0.5	4.59 4.5	-5.09 5	2.58 2.5	2.67 2.7	7.06 7	-2.62 2.6
	•		Allowable Str	occ Docign					
			Allowable 5th	ess Design					
Case 1 (Area of base plate = Area of concrete) Area of base plate A1					558.0	00			
Area of concrete A2			Γ	Γ	558.0		1		ı
Axial compressive load (Pa) - kips	124.57	30.28	68.81	46.39	7.38	74.80	173.92	151.50	97.73
Compressive Strength of concrete- fc (kg/m²)					25500				
Compressive Strength of concrete (ksi) Required Base Plate area (Ω^* Pa / 0.85 *fc) inches ²	101.016	24.557	55.799	37.622	5.987	60.660	141.033	122.857	79.248
Delta Base plate Breadth (N) in inches	-1.09 9	-1.09 4	-1.09 6	-1.09 5	-1.09 1	-1.09 7	-1.09 11	-1.09 10	-1.09 8
N Considered	23.62	23.62	23.62	23.62	23.62	23.62	23.62	23.62	23.62
Base Plate length (B) in inches B considered	23.62	6 23.62	9 23.62	7 23.62	23.62	9 23.62	13 23.62	12 23.62	10 23.62
Condition (0.85*fc*A1 *VA2/A1)/2.50) > Fy (Kips)	688.1 TRUE	688.1 TRUE	688.1 TRUE	688.1 TRUE	688.1 TRUE	688.1 TRUE	688.1 TRUE	688.1 TRUE	688.1 TRUE
Factor V	0.18	0.04	0.10	0.07	0.01	0.11	0.24	0.21	0.14
Factor X	0.18	0.04	0.10	0.07	0.01	0.11	0.24	0.21	0.14
λn'	0.44 1.40	0.21 0.67	0.32 1.02	0.26 0.83	0.10 0.33	0.33 1.06	0.53 1.69	0.49 1.56	0.38 1.23
7.01	1.10	0.07	1.02	0.03			1.03	1.50	1.23
					6.76	18			
Base Plate Thickness (inches) Base Plate Thickness (mm)	0.97 24.72	0.48 12.19	0.72 18.37	0.59 15.08	0.24 6.02	0.75 19.15	1.15 29.21	1.07 27.26	0.86 21.89
	24.72	12.13	10.37	13.00	0.02	13.13	23.21	27.20	21.03
Uplift Condition Yield Stress of Plate (F _v)		36		36					
V2 bf		21.71		21.71					
				240.00					
Guage Distance (Centre to centre) mm Guage Distance (Centre to centre) inches		240.00 9.45							
Guage Distance (Centre to centre) mm Guage Distance (Centre to centre) inches		240.00 9.45	All states	9.45					
			Allowable Str	9.45					
Guage Distance (Centre to centre) inches			Allowable Str	9.45					
Guage Distance (Centre to centre) inches Condition 1 (√2 bf < d) Plate thickness (inches) Condition 1 (√2 bf > d)		9.45 0.605	Allowable Stro	9.45 ess Design 0.749					
Guage Distance (Centre to centre) inches Condition 1 (√2 bf < d) Plate thickness (inches)		9.45	Allowable Str	9.45 ess Design					
Guage Distance (Centre to centre) inches Condition 1 (√2 bf < d) Plate thickness (inches) Condition 1 (√2 bf > d) Plate thickness (inches) Plate Thickness (inches)		9.45 0.605 0.538	Allowable Str	9.45 ess Design 0.749 0.666					
Guage Distance (Centre to centre) inches Condition 1 (√2 bf < d) Plate thickness (inches) Condition 1 (√2 bf > d) Plate thickness (inches)		9.45 0.605 0.538	Allowable Str	9.45 ess Design 0.749 0.666					
Guage Distance (Centre to centre) inches Condition 1 (√2 bf < d) Plate thickness (inches) Condition 1 (√2 bf > d) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (mm)	Parameter	0.605 0.538 0.538 13.66	Allowable Str	9.45 ess Design 0.749 0.666	Remarks				
Guage Distance (Centre to centre) inches Condition 1 (\forall 2 bf < d) Plate thickness (inches) Condition 1 (\forall 2 bf > d) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description	Parameter	9.45 0.605 0.538	Allowable Str	9.45 ess Design 0.749 0.666	Remarks				
Guage Distance (Centre to centre) inches Condition 1 (V2 bf < d) Plate thickness (inches) Condition 1 (V2 bf > d) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M27		0.605 0.538 0.538 13.66	Allowable Str	9.45 ess Design 0.749 0.666	Remarks				
Guage Distance (Centre to centre) inches Condition 1 (V2 bf < d) Plate thickness (inches) Condition 1 (V2 bf > d) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M27 Bolt material Minimum Embedment Length	IS 2062 E 250 A 324	9.45 0.605 0.538 0.538 13.66 Unit	Allowable Str	9.45 ess Design 0.749 0.666					
Guage Distance (Centre to centre) inches Condition 1 (V2 bf < d) Plate thickness (inches) Condition 1 (V2 bf > d) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M27 Bolt material	IS 2062 E 250 A	9.45 0.605 0.538 13.66 Unit mm N/mm²	Allowable Stro	9.45 ess Design 0.749 0.666	Remarks IS 2062 Table No 2				
Guage Distance (Centre to centre) inches Condition 1 (V2 bf < d) Plate thickness (inches) Condition 1 (V2 bf > d) Plate thickness (inches) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M27 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts	IS 2062 E 250 A 324 410 230 8	9.45 0.605 0.538 13.66 Unit mm N/mm² N/mm²	Allowable Stro	9.45 ess Design 0.749 0.666	IS 2062				
Guage Distance (Centre to centre) inches Condition 1 (\forall 2 bf < d) Plate thickness (inches) Condition 1 (\forall 2 bf > d) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M27 Bolt material Minimum Embedment Length Tensile Strength Yield Stress	IS 2062 E 250 A 324 410 230	9.45 0.605 0.538 13.66 Unit mm N/mm²	Allowable Stro	9.45 ess Design 0.749 0.666	IS 2062				
Guage Distance (Centre to centre) inches Condition 1 (V2 bf < d) Plate thickness (inches) Condition 1 (V2 bf > d) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M27 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch Core Diameter	IS 2062 E 250 A 324 410 230 8 27 3 23.32	9.45 0.605 0.538 13.66 Unit mm N/mm² N/mm² mm mm mm	Allowable Stro	9.45 ess Design 0.749 0.666	IS 2062				
Guage Distance (Centre to centre) inches Condition 1 (V2 bf < d) Plate thickness (inches) Condition 1 (V2 bf > d) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M27 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch	IS 2062 E 250 A 324 410 230 8 27 3	9.45 0.605 0.538 0.538 13.66 Unit mm N/mm² N/mm² mm mm mm mm mm mm mm² mm²	Allowable Stro	9.45 ess Design 0.749 0.666	IS 2062				
Guage Distance (Centre to centre) inches Condition 1 (\(\forall 2 \) bf < d \) Plate thickness (inches) Condition 1 (\(\forall 2 \) bf > d \) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M27 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch Core Diameter Shank Area of bolt	IS 2062 E 250 A 324 410 230 8 27 3 23.32 572.555	9.45 0.605 0.538 0.538 13.66 Unit mm N/mm² N/mm² mm mm mm mm	Allowable Stro	9.45 ess Design 0.749 0.666	IS 2062				
Guage Distance (Centre to centre) inches Condition 1 (V2 bf < d) Plate thickness (inches) Condition 1 (V2 bf > d) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M27 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch Core Diameter Shank Area of bolt Stress Area Root Area Hole diameter	IS 2062 E 250 A 324 410 230 8 27 3 23.32 572.555 459	9.45 0.605 0.538 0.538 13.66 Unit mm N/mm² N/mm² mm mm mm mm mm mm mm² mm²	Allowable Stro	9.45 ess Design 0.749 0.666	IS 2062				
Guage Distance (Centre to centre) inches Condition 1 (√2 bf < d) Plate thickness (inches) Condition 1 (√2 bf > d) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M27 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch Core Diameter Shank Area of bolt Stress Area Root Area Hole diameter Edge distance	IS 2062 E 250 A 324 410 230 8 27 3 23.32 572.555 459 419.10	9.45 0.605 0.538 13.66 Unit mm N/mm² N/mm² mm mm mm mm mm² mm² mm² mm² mm²	Allowable Stro	9.45 ess Design 0.749 0.666	IS 2062				
Guage Distance (Centre to centre) inches Condition 1 (V2 bf < d) Plate thickness (inches) Condition 1 (V2 bf > d) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M27 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch Core Diameter Shank Area of bolt Stress Area Root Area Hole diameter Edge distance (For Side N) Minimum edge distance	IS 2062 E 250 A 324 410 230 8 27 3 23.32 572.555 459 419.10	9.45 0.605 0.538 13.66 Unit mm N/mm² N/mm² mm mm mm mm mm mm² mm²	Allowable Stro	9.45 ess Design 0.749 0.666	IS 2062				
Guage Distance (Centre to centre) inches Condition 1 (V2 bf < d) Plate thickness (inches) Condition 1 (V2 bf > d) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M27 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch Core Diameter Shank Area of bolt Stress Area Root Area Hole diameter Edge distance (For Side N)	IS 2062 E 250 A 324 410 230 8 27 3 23.32 572.555 459 419.10 30 60	9.45 0.605 0.538 13.66 Unit mm N/mm² N/mm² mm mm mm mm mm² mm² mm² mm² mm² mm	Allowable Stro	9.45 ess Design 0.749 0.666	IS 2062				
Guage Distance (Centre to centre) inches Condition 1 (\(\forall 2 \) bf < d \) Plate thickness (inches) Condition 1 (\(\forall 2 \) bf > d \) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M27 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch Core Diameter Shank Area of bolt Stress Area Root Area Hole diameter Edge distance (For Side N) Minimum edge distance Edge distance (For Side B) Guage Distance between Holes (For Side "B")	IS 2062 E 250 A 324 410 230 8 27 3 23.32 572.555 459 419.10 30 60 45 60 240	9.45 0.605 0.538 0.538 13.66 Unit mm N/mm² N/mm² N/mm² mm mm mm² mm² mm² mm² mm² mm² mm mm	Allowable Stro	9.45 ess Design 0.749 0.666	IS 2062				
Guage Distance (Centre to centre) inches Condition 1 (\(\forall 2 \) bf < d \) Plate thickness (inches) Condition 1 (\(\forall 2 \) bf > d \) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M27 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch Core Diameter Shank Area of bolt Stress Area Root Area Hole diameter Edge distance (For Side N) Minimum edge distance Edge distance (For Side B) Guage Distance between Holes (For Side "B") Guage Distance between Holes (For Side "B")	IS 2062 E 250 A 324 410 230 8 27 3 23.32 572.555 459 419.10 30 60 45 60 240 240	9.45 0.605 0.538 0.538 13.66 Unit mm N/mm² N/mm² N/mm² mm mm mm² mm² mm² mm² mm² mm² mm mm	Allowable Stro	9.45 ess Design 0.749 0.666	IS 2062				
Guage Distance (Centre to centre) inches Condition 1 (\(\forall 2 \) bf < d \) Plate thickness (inches) Condition 1 (\(\forall 2 \) bf > d \) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M27 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch Core Diameter Shank Area of bolt Stress Area Root Area Hole diameter Edge distance (For Side N) Minimum edge distance Edge distance (For Side B) Guage Distance between Holes (For Side "B") Guage Distance between Holes (For Side "B")	IS 2062 E 250 A 324 410 230 8 27 3 23.32 572.555 459 419.10 30 60 45 60 240	9.45 0.605 0.538 0.538 13.66 Unit mm N/mm² N/mm² N/mm² mm mm mm² mm² mm² mm² mm² mm² mm mm	Allowable Stro	9.45 ess Design 0.749 0.666	IS 2062				
Guage Distance (Centre to centre) inches Condition 1 (\(\forall 2 \) bf < d \) Plate thickness (inches) Condition 1 (\(\forall 2 \) bf > d \) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M27 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch Core Diameter Shank Area of bolt Stress Area Root Area Hole diameter Edge distance (For Side N) Minimum edge distance Edge distance (For Side B) Guage Distance between Holes (For Side "B") Guage Distance between Holes (For Side "N") Tensile	IS 2062 E 250 A 324 410 230 8 27 3 23.32 572.555 459 419.10 30 60 45 60 240 240 240 240 13.74	9.45 0.605 0.538 0.538 13.66 Unit mm N/mm² N/mm² N/mm² mm mm mm² mm² mm² mm² mm² mm d mm mm mm	Allowable Stro	9.45 ess Design 0.749 0.666	IS 2062				
Guage Distance (Centre to centre) inches Condition 1 (\forall 2 f < d \text{ d \text{ p \text{ l < d \text{ p \text{ p \text{ c \text{ d \text{ p \text{ p \text{ c \text{ d \text{ p \text{ l < d \text{ p \text{ p \text{ c \text{ d \text{ p \text{ p \text{ l < d \text{ l < d \text{ p \text{ l < d \text{ p \text{ l < d \text{ p \text{ l < d \text{ l < d \text{ p \text{ l < d \text{ p \text{ l < d \text{ l < d \text{ p \text{ l < d \text{ l < d \text{ p \text{ l < d \text{ l < d \text{ p \text{ l < d \text{ p \text{ l < d \text{ p \text{ l < d \text{ l < d \text{ p \text{ p \text{ l < d \text{ p \text{ p \text{ l < d \text{ p \text{ l < d \text{ p \t	IS 2062 E 250 A 324 410 230 8 27 3 23.32 572.555 459 419.10 30 60 45 60 240 240 240 240	9.45 0.605 0.538 0.538 13.66 Unit mm N/mm² N/mm² N/mm² mm mm mm² mm² mm² mm² mm² mm d mm mm mm d mm		9.45 ess Design 0.749 0.666	IS 2062				
Guage Distance (Centre to centre) inches Condition 1 (\(\forall 2 \text{ bf < d} \) Plate thickness (inches) Condition 1 (\(\forall 2 \text{ bf > d} \) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M27 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch Core Diameter Shank Area of bolt Stress Area Root Area Hole diameter Edge distance (For Side N) Minimum edge distance Edge distance (For Side B) Guage Distance between Holes (For Side "B") Guage Distance between Holes (For Side "N") Tensile Required tension in bolt Required tension per bolt Actual tensile stress per bolt	IS 2062 E 250 A 324 410 230 8 27 3 23.32 572.555 459 419.10 30 60 45 60 240 240 240 240 240 3.74 1.718 3.00	9.45 0.605 0.538 0.538 13.66 Unit mm N/mm² N/mm² N/mm² mm mm mm mm² mm² mm² mm² mm² mm d mm m		9.45 ess Design 0.749 0.666 16.90	IS 2062 Table No 2				
Guage Distance (Centre to centre) inches Condition 1 (v2 bf < d) Plate thickness (inches) Condition 1 (v2 bf > d) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M27 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch Core Diameter Shank Area of bolt Stress Area Root Area Hole diameter Edge distance (For Side N) Minimum edge distance Edge distance (For Side B) Guage Distance between Holes (For Side "B") Guage Distance between Holes (For Side "N") Tensile Required tension in bolt Required tension per bolt	IS 2062 E 250 A 324 410 230 8 27 3 23.32 572.555 459 419.10 30 60 45 60 240 240 240 240 33.74 1.718	9.45 0.605 0.538 0.538 13.66 Unit mm N/mm² N/mm² N/mm² mm mm mm² mm² mm² mm² mm² mm d mm mm mm d mm		9.45 ess Design 0.749 0.666 16.90	IS 2062 Table No 2				

N 12.20 N 13.81

Tons

Tons

kg/mm²

kg/mm²

kg/mm²

N

kg/mm²

kg/mm²

kg/mm²

kg/mm²

 1.01
 kg/mm²

 864.0
 mm²

Tons Tons

Accepted

Accepted

Accepted

IS:800 11.6.2.1

IS:800 11.6.2.1

IS:800 10.3.3

IS:800 11.6.2.2

IS:800 11.6.2.2

IS:800 11.6.2.5

135496.80

0.875

1.53

10.59 99205.8

62.67

885600.0

1.53

10.59

3.00

12.78

0.08

Combined Shear and Tension

Bearing Stress of bolt on plate

Shear Stress in anchor rod

Design Strength due to yielding

Design Strength due to rupture at threaded section

Shear force in bolt

Shear force per bolt

Actual shear stress in bolt

Permissible Shear stress per bolt

Nominal shear capacity of bolt

Actual Stress of bolt in bearing

Permissible bearing stress of the bolt

Nominal bearing strength of bolt

Actual Shear stress in bolt

Permissible Shear stress per bolt

Actual tensile stress per bolt

Permissible tensile stress per bolt

Combined Shear and Tension

Description	Dayanatar	Linit	Remark		T.				
Description	Parameter	Unit	Remark			-	— в —	-	
Column D1 Yield Stress of Plate (F _v)	D ISMB 250 36	ksi			-		- b _f -	1	T
Base Plate Size	600 x 600	mm	20	Door				ļ	1
Base Plate Thickness Flange Width	32 390	mm mm	29	Pass	_	†			
	15.35 27 0	inches mm			1	d 		0.95d	N
Depth	10.63	inches			1	•	444		
m Base Plate Dimension - N	6.76 23.622	inches inches	600	mm					<u> </u>
n Base Plate Dimension - B	5.67 23.622	inches inches	600	mm	-	→ n ·	0.80b _f	→ n → l	
Area of base plate - A1	558.00	inches			1	42		1 45	16
Load Case Load Combination	8 SW +DL +LL	9 SW + WX	10 SW +W-X	11 SW+WZ	12 SW+W-Z	13 SW+DL+LL+WX	14 SW+DL+LL+W-X	15 SW+DL+LL+WZ	16 SW+DL+LL+W-Z
Fx (Ton) Fy (Ton)	0.05 57.42	-0.25 14.15	-0.47 31.62	0.04 3.25	0.02 20.81	-0.23 34.45	-0.45 80.21	0.06 45.35	0.04 69.41
Fz (Ton)	-2.63	-0.11	-0.2	5.15	-4.54	-2.58	-2.67	2.68	-7.02
Resultant shear force	2.6	0.2	0.5	5.1	4.5	2.5	2.7	2.6	7
			Allowable St	ress Design					
Case 1 (Area of base plate = Area of concrete)									
Area of base plate A1 Area of concrete A2					558. [.] 558.				
Axial compressive load (Pa) - kips	126.55	31.19	69.69	7.16	45.87	75.93	176.78	99.95	152.98
Compressive Strength of concrete- fc (kg/m²)	120.55	31.13	03.03	7.10	2550	000	170.78	33.33	132.36
Compressive Strength of concrete (ksi) Required Base Plate area (Ω*Pa / 0.85 *fc) inches ²	102.625	25.290	56.513	5.809	37.193	3 61.571	143.357	81.053	124.054
Delta	-1.09	-1.09	-1.09	-1.09	-1.09	-1.09	-1.09	-1.09	-1.09
Base plate Breadth (N) in inches N Considered	9 23.62	23.62	6 23.62	23.62	5 23.62	7 23.62	23.62	8 23.62	10 23.62
Base Plate length (B) in inches B considered	23.62	6 23.62	9 23.62	23.62	7 23.62	9 23.62	13 23.62	10 23.62	12 23.62
B considered									
Condition (0.85*fc*A1 *VA2/A1)/2.50) > Fy (Kips)	688.1 TRUE	688.1 TRUE	688.1 TRUE	688.1 TRUE	688.1 TRUE	688.1 TRUE	688.1 TRUE	688.1 TRUE	688.1 TRUE
Eactor V	0.18	0.04	0.10	0.01	0.06	0.11	0.25	0.14	0.21
Factor X λ	0.18	0.04	0.32	0.10	0.26	0.34	0.23	0.39	0.49
λη'	0.44 1.41	0.21	0.32 1.03	0.10 0.32	0.26 0.82	0.34 1.07	0.53 1.71	0.39 1.24	0.49 1.57
				0.02					1.07
l l					6.76	18			
Base Plate Thickness (inches) Base Plate Thickness (mm)	0.98 24.91	0.49 12.37	0.73 18.49	0.23 5.93	0.59 15.00	0.76 19.30	1.16 29.45	0.87 22.14	1.08 27.39
			20,10	0.00					
		+							
Uplift Condition Yield Stress of Plate (F,)		36		36					
Yield Stress of Plate (F _y) √2 bf		21.71		21.71					
Yield Stress of Plate (F _y)									
Yield Stress of Plate (F _y) V2 bf Guage Distance (Centre to centre) mm		21.71 240.00	Allowable St	21.71 240.00 9.45					
Yield Stress of Plate (F _y) V2 bf Guage Distance (Centre to centre) mm Guage Distance (Centre to centre) inches Condition 1 (V2 bf < d)		21.71 240.00 9.45	Allowable St	21.71 240.00 9.45 ress Design					
Yield Stress of Plate (F _y) V2 bf Guage Distance (Centre to centre) mm Guage Distance (Centre to centre) inches		21.71 240.00	Allowable St	21.71 240.00 9.45					
Yield Stress of Plate (F _y) V2 bf Guage Distance (Centre to centre) mm Guage Distance (Centre to centre) inches Condition 1 (V2 bf < d) Plate thickness (inches) Condition 1 (V2 bf > d)		21.71 240.00 9.45 0.614	Allowable St	21.71 240.00 9.45 ress Design 0.294					
Yield Stress of Plate (F _y) V2 bf Guage Distance (Centre to centre) mm Guage Distance (Centre to centre) inches Condition 1 (V2 bf < d) Plate thickness (inches) Condition 1 (V2 bf > d) Plate thickness (inches)		21.71 240.00 9.45 0.614	Allowable St	21.71 240.00 9.45 ress Design 0.294					
Yield Stress of Plate (F _y) V2 bf Guage Distance (Centre to centre) mm Guage Distance (Centre to centre) inches Condition 1 (V2 bf < d) Plate thickness (inches) Condition 1 (V2 bf > d)		21.71 240.00 9.45 0.614	Allowable St	21.71 240.00 9.45 ress Design 0.294					
Yield Stress of Plate (F _y) V2 bf Guage Distance (Centre to centre) mm Guage Distance (Centre to centre) inches Condition 1 (V2 bf < d) Plate thickness (inches) Condition 1 (V2 bf > d) Plate thickness (inches)		21.71 240.00 9.45 0.614 0.546	Allowable St	21.71 240.00 9.45 ress Design 0.294 0.261					
Yield Stress of Plate (F _y) V2 bf Guage Distance (Centre to centre) mm Guage Distance (Centre to centre) inches Condition 1 (V2 bf < d) Plate thickness (inches) Condition 1 (V2 bf > d) Plate thickness (inches)	Parameter	21.71 240.00 9.45 0.614 0.546	Allowable St	21.71 240.00 9.45 ress Design 0.294 0.261	Remarks				
Yield Stress of Plate (F _y) V2 bf Guage Distance (Centre to centre) mm Guage Distance (Centre to centre) inches Condition 1 (V2 bf < d) Plate thickness (inches) Condition 1 (V2 bf > d) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (mm)	Parameter	21.71 240.00 9.45 0.614 0.546 13.86	Allowable Str	21.71 240.00 9.45 ress Design 0.294 0.261	Remarks				
Yield Stress of Plate (F _y) V2 bf Guage Distance (Centre to centre) mm Guage Distance (Centre to centre) inches Condition 1 (V2 bf < d) Plate thickness (inches) Condition 1 (V2 bf > d) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M27 Bolt material	IS 2062 E 250 A	21.71 240.00 9.45 0.614 0.546 13.86	Allowable St	21.71 240.00 9.45 ress Design 0.294 0.261	Remarks				
Yield Stress of Plate (F _y) V2 bf Guage Distance (Centre to centre) mm Guage Distance (Centre to centre) inches Condition 1 (V2 bf < d) Plate thickness (inches) Condition 1 (V2 bf > d) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M27 Bolt material Minimum Embedment Length Tensile Strength	IS 2062 E 250 A 324 410	21.71 240.00 9.45 0.614 0.546 13.86 Unit	Allowable St	21.71 240.00 9.45 ress Design 0.294 0.261	IS 2062				
Yield Stress of Plate (F _y) V2 bf Guage Distance (Centre to centre) mm Guage Distance (Centre to centre) inches Condition 1 (V2 bf < d) Plate thickness (inches) Condition 1 (V2 bf > d) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M27 Bolt material Minimum Embedment Length Tensile Strength Yield Stress	IS 2062 E 250 A 324 410 230	21.71 240.00 9.45 0.614 0.546 13.86 Unit	Allowable Str	21.71 240.00 9.45 ress Design 0.294 0.261					
Yield Stress of Plate (F _y) V2 bf Guage Distance (Centre to centre) mm Guage Distance (Centre to centre) inches Condition 1 (V2 bf < d) Plate thickness (inches) Condition 1 (V2 bf > d) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M27 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter	IS 2062 E 250 A 324 410 230 8 27	21.71 240.00 9.45 0.614 0.546 13.86 Unit mm N/mm² N/mm²	Allowable Str	21.71 240.00 9.45 ress Design 0.294 0.261	IS 2062				
Yield Stress of Plate (F _y) V2 bf Guage Distance (Centre to centre) mm Guage Distance (Centre to centre) inches Condition 1 (V2 bf < d) Plate thickness (inches) Condition 1 (V2 bf > d) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M27 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts	IS 2062 E 250 A 324 410 230 8	21.71 240.00 9.45 0.614 0.546 13.86 Unit mm N/mm² N/mm²	Allowable Str	21.71 240.00 9.45 ress Design 0.294 0.261	IS 2062				
Yield Stress of Plate (F _y) V2 bf Guage Distance (Centre to centre) mm Guage Distance (Centre to centre) inches Condition 1 (V2 bf < d) Plate thickness (inches) Condition 1 (V2 bf > d) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M27 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch Core Diameter Shank Area of bolt	IS 2062 E 250 A 324 410 230 8 27 3 23.32 572.555	21.71 240.00 9.45 0.614 0.546 13.86 Unit mm N/mm² N/mm² mm mm mm mm mm	Allowable Str	21.71 240.00 9.45 ress Design 0.294 0.261	IS 2062				
Yield Stress of Plate (F _y) V2 bf Guage Distance (Centre to centre) mm Guage Distance (Centre to centre) inches Condition 1 (V2 bf < d) Plate thickness (inches) Condition 1 (V2 bf > d) Plate Thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M27 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch Core Diameter	IS 2062 E 250 A 324 410 230 8 27 3 23.32	21.71 240.00 9.45 0.614 0.546 13.86 Unit mm N/mm² N/mm² N/mm² mm mm mm	Allowable Str	21.71 240.00 9.45 ress Design 0.294 0.261	IS 2062				
Yield Stress of Plate (F _y) V2 bf Guage Distance (Centre to centre) mm Guage Distance (Centre to centre) inches Condition 1 (V2 bf < d) Plate thickness (inches) Condition 1 (V2 bf > d) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M27 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch Core Diameter Shank Area of bolt Stress Area Root Area	IS 2062 E 250 A 324 410 230 8 27 3 23.32 572.555 459 419.10	21.71 240.00 9.45 0.614 0.546 13.86 Unit mm N/mm² N/mm² mm mm mm mm mm mm mm² mm² mm² mm²	Allowable Str	21.71 240.00 9.45 ress Design 0.294 0.261	IS 2062				
Yield Stress of Plate (F _y) V2 bf Guage Distance (Centre to centre) mm Guage Distance (Centre to centre) inches Condition 1 (V2 bf < d) Plate thickness (inches) Condition 1 (V2 bf > d) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M27 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch Core Diameter Shank Area of bolt Stress Area Root Area Hole diameter Edge distance	IS 2062 E 250 A 324 410 230 8 27 3 23.32 572.555 459 419.10	21.71 240.00 9.45 0.614 0.546 13.86 Unit mm N/mm² N/mm² mm mm mm mm mm mm mm² mm²	Allowable Str	21.71 240.00 9.45 ress Design 0.294 0.261	IS 2062				
Yield Stress of Plate (F _y) V2 bf Guage Distance (Centre to centre) mm Guage Distance (Centre to centre) inches Condition 1 (V2 bf < d) Plate thickness (inches) Condition 1 (V2 bf > d) Plate Thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M27 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch Core Diameter Shank Area of bolt Stress Area Root Area	IS 2062 E 250 A 324 410 230 8 27 3 23.32 572.555 459 419.10	21.71 240.00 9.45 0.614 0.546 13.86 Unit mm N/mm² N/mm² mm mm mm mm mm mm mm mm² mm² mm² m	Allowable Str	21.71 240.00 9.45 ress Design 0.294 0.261	IS 2062				
Yield Stress of Plate (F _v) V2 bf Guage Distance (Centre to centre) mm Guage Distance (Centre to centre) inches Condition 1 (V2 bf < d) Plate thickness (inches) Condition 1 (V2 bf > d) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M27 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch Core Diameter Shank Area of bolt Stress Area Root Area Hole diameter Edge distance (For Side N) Minimum edge distance Edge distance	IS 2062 E 250 A 324 410 230 8 27 3 23.32 572.555 459 419.10 30 60	21.71 240.00 9.45 0.614 0.546 13.86 Unit mm N/mm² N/mm² mm mm mm mm mm mm mm² mm² mm² mm²	Allowable Str	21.71 240.00 9.45 ress Design 0.294 0.261	IS 2062				
Yield Stress of Plate (F _V) V2 bf Guage Distance (Centre to centre) mm Guage Distance (Centre to centre) inches Condition 1 (V2 bf < d) Plate thickness (inches) Condition 1 (V2 bf > d) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M27 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch Core Diameter Shank Area of bolt Stress Area Root Area Hole diameter Edge distance (For Side N) Minimum edge distance Edge distance (For Side B) Guage Distance between Holes (For Side "B")	IS 2062 E 250 A 324 410 230 8 27 3 23.32 572.555 459 419.10 30 60 45 60 240	21.71 240.00 9.45 0.614 0.546 0.546 13.86 Unit mm N/mm² N/mm² N/mm² mm mm mm² mm² mm² mm² mm² mm² mm²	Allowable Str	21.71 240.00 9.45 ress Design 0.294 0.261	IS 2062				
Yield Stress of Plate (F _y) V2 bf Guage Distance (Centre to centre) mm Guage Distance (Centre to centre) inches Condition 1 (V2 bf < d) Plate thickness (inches) Condition 1 (V2 bf > d) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M27 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch Core Diameter Shank Area of bolt Stress Area Root Area Hole diameter Edge distance (For Side N) Minimum edge distance Edge distance (For Side B)	IS 2062 E 250 A 324 410 230 8 27 3 23.32 572.555 459 419.10 30 60 45 60	21.71 240.00 9.45 0.614 0.546 13.86 Unit mm N/mm² N/mm² N/mm² mm mm mm² mm² mm² mm² mm² mm² mm² m	Allowable Str	21.71 240.00 9.45 ress Design 0.294 0.261	IS 2062				
Yield Stress of Plate (F _y) V2 bf Guage Distance (Centre to centre) mm Guage Distance (Centre to centre) inches Condition 1 (V2 bf < d) Plate thickness (inches) Condition 1 (V2 bf > d) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M27 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch Core Diameter Shank Area of bolt Stress Area Root Area Hole diameter Edge distance (For Side N) Minimum edge distance Edge distance (For Side B) Guage Distance between Holes (For Side "B") Guage Distance between Holes (For Side "N")	IS 2062 E 250 A 324 410 230 8 27 3 23.32 572.555 459 419.10 30 60 45 60 240	21.71 240.00 9.45 0.614 0.546 13.86 Unit mm N/mm² N/mm² mm mm mm mm mm² mm² mm² mm² mm² mm	Allowable Str	21.71 240.00 9.45 ress Design 0.294 0.261	IS 2062				
Yield Stress of Plate (F _y) V2 bf Guage Distance (Centre to centre) mm Guage Distance (Centre to centre) inches Condition 1 (V2 bf < d) Plate thickness (inches) Condition 1 (V2 bf > d) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M27 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch Core Diameter Shank Area of bolt Stress Area Root Area Hole diameter Edge distance (For Side N) Minimum edge distance Edge distance (For Side B) Guage Distance between Holes (For Side "B") Guage Distance between Holes (For Side "N") Tensile	IS 2062 E 250 A 324 410 230 8 27 3 23.32 572.555 459 419.10 30 60 45 60 240 240	21.71 240.00 9.45 0.614 0.546 13.86 Unit mm N/mm² N/mm² N/mm² mm mm mm² mm² mm² mm² mm² mm² mm² m	Allowable Str	21.71 240.00 9.45 ress Design 0.294 0.261	IS 2062				
Yield Stress of Plate (F _y) V2 bf Guage Distance (Centre to centre) mm Guage Distance (Centre to centre) inches Condition 1 (V2 bf < d) Plate thickness (inches) Condition 1 (V2 bf > d) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M27 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch Core Diameter Shank Area of bolt Stress Area Root Area Hole diameter Edge distance (For Side N) Minimum edge distance Edge distance (For Side B) Guage Distance between Holes (For Side "B") Guage Distance between Holes (For Side "N") Tensile Required tension in bolt Required tension per bolt	IS 2062 E 250 A 324 410 230 8 27 3 23.32 572.555 459 419.10 30 60 45 60 240 240 240 e stress in anchor results in anchor	21.71 240.00 9.45 0.614 0.546 13.86 Unit mm N/mm² N/mm² N/mm² N/mm² mm		21.71 240.00 9.45 ress Design 0.294 0.261 6.64	IS 2062 Table No 2				
Yield Stress of Plate (F _v) V2 bf Guage Distance (Centre to centre) mm Guage Distance (Centre to centre) inches Condition 1 (V2 bf < d) Plate thickness (inches) Condition 1 (V2 bf > d) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M27 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch Core Diameter Shank Area of bolt Stress Area Root Area Hole diameter Edge distance (For Side N) Minimum edge distance Edge distance (For Side B) Guage Distance between Holes (For Side "B") Guage Distance between Holes (For Side "N") Tensile Required tension in bolt Required tension per bolt Actual tensile stress per bolt	IS 2062 E 250 A 324 410 230 8 27 3 23.32 572.555 459 419.10 30 60 45 60 240 240 240 240 240 14.15 1.769 3.09	21.71 240.00 9.45 0.614 0.546 0.546 13.86 Unit mm N/mm² N/mm² N/mm² mm mm mm² mm² mm² mm² mm² mm² mm²		21.71 240.00 9.45 ress Design 0.294 0.261	IS 2062 Table No 2				
Yield Stress of Plate (F _y) V2 bf Guage Distance (Centre to centre) mm Guage Distance (Centre to centre) inches Condition 1 (V2 bf < d) Plate thickness (inches) Condition 1 (V2 bf > d) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M27 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch Core Diameter Shank Area of bolt Stress Area Root Area Hole diameter Edge distance (For Side N) Minimum edge distance Edge distance (For Side B) Guage Distance between Holes (For Side "B") Guage Distance between Holes (For Side "N") Tensile Required tension in bolt Required tension per bolt Actual tensile stress per bolt	IS 2062 E 250 A 324 410 230 8 27 3 23.32 572.555 459 419.10 30 60 45 60 240 240 240 240 240 14.15 1.769 3.09	21.71 240.00 9.45 0.614 0.546 13.86 Unit mm N/mm² N/mm² N/mm² mm mm mm² mm² mm² mm² mm² mm² mm² m		21.71 240.00 9.45 ress Design 0.294 0.261 6.64	IS 2062 Table No 2				
Yield Stress of Plate (F _v) V2 bf Guage Distance (Centre to centre) mm Guage Distance (Centre to centre) inches Condition 1 (V2 bf < d) Plate thickness (inches) Condition 1 (V2 bf > d) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M27 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch Core Diameter Shank Area of bolt Stress Area Root Area Hole diameter Edge distance (For Side N) Minimum edge distance Edge distance (For Side B) Guage Distance between Holes (For Side "B") Guage Distance between Holes (For Side "N") Tensile Required tension in bolt Required tension per bolt Actual tensile stress per bolt Nominal Tensile capacity per bolt Design Strength due to yielding	IS 2062 E 250 A 324 410 230 8 27 3 23.32 572.555 459 419.10 30 60 45 60 240 240 240 240 14.15 1.769 3.09 12.78 119716.10 119716.10	21.71 240.00 9.45 0.614 0.546 13.86 Unit mm N/mm² N/mm² N/mm² mm mm mm² mm² mm² mm² mm² mm² mm²	Acco	21.71 240.00 9.45 ress Design 0.294 0.261 6.64 Tons	IS 2062 Table No 2				
Yield Stress of Plate (F _y) V2 bf Guage Distance (Centre to centre) mm Guage Distance (Centre to centre) inches Condition 1 (V2 bf < d) Plate thickness (inches) Condition 1 (V2 bf > d) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M27 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nomial Diameter Pitch Core Diameter Shank Area of bolt Stress Area Root Area Hole diameter Edge distance (For Side N) Minimum edge distance Edge distance (For Side B) Guage Distance between Holes (For Side "B") Guage Distance between Holes (For Side "N") Tensile Required tension in bolt Required tension per bolt Actual tensile stress per bolt Nominal Tensile capacity per bolt	IS 2062 E 250 A 324 410 230 8 27 3 23.32 572.555 459 419.10 30 60 45 60 240 240 240 240 240 e stress in anchor re 14.15 1.769 3.09 12.78 119716.10	21.71 240.00 9.45 0.614 0.546 0.546 13.86 Unit mm N/mm² N/mm² N/mm² mm mm mm² mm² mm² mm² mm² mm² mm²	Acce	21.71 240.00 9.45 ress Design 0.294 0.261 6.64	IS 2062 Table No 2				
Yield Stress of Plate (F _y) V2 bf Guage Distance (Centre to centre) mm Guage Distance (Centre to centre) inches Condition 1 (V2 bf < d) Plate thickness (inches) Condition 1 (V2 bf > d) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M27 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch Core Diameter Shank Area of bolt Stress Area Root Area Hole diameter Edge distance (For Side N) Minimum edge distance Edge distance (For Side B) Guage Distance between Holes (For Side "N") Tensile Required tension in bolt Required tension per bolt Design Strength due to yielding Design Strength due to rupture at threaded section	IS 2062 E 250 A 324 410 230 8 27 3 23.32 572.555 459 419.10 30 60 45 60 240 240 240 240 14.15 1.769 3.09 12.78 119716.10 119716.10	21.71 240.00 9.45 0.614 0.546 13.86 Unit mm N/mm² N/mm² N/mm² mm² mm² mm² mm² mm² mm² mm² mm² mm²	Acco	21.71 240.00 9.45 ress Design 0.294 0.261 6.64 Tons	IS 2062 Table No 2				

Tons

Tons

kg/mm²

kg/mm²

kg/mm²

kg/mm²

N

kg/mm²

kg/mm²

kg/mm²

Accepted

Accepted

Accepted

IS:800 11.6.2.1

IS:800 11.6.2.1

IS:800 10.3.3

IS:800 11.6.2.2

IS:800 11.6.2.2

IS:800 11.6.2.5

0.875

1.53

10.59

99205.8

1.01

864.0

62.67

885600.0

1.53

10.59

3.09

12.78

0.08

Bearing Stress of bolt on plate

Combined Shear and Tension

Shear force in bolt

Shear force per bolt

Actual shear stress in bolt

Permissible Shear stress per bolt

Nominal shear capacity of bolt

Actual Stress of bolt in bearing

Permissible bearing stress of the bolt

Nominal bearing strength of bolt

Actual Shear stress in bolt

Permissible Shear stress per bolt

Actual tensile stress per bolt

Permissible tensile stress per bolt

Combined Shear and Tension

Description	Parameter	Unit	Remark						
Column B2	D ISMB 350				 	-	В —	-	
Yield Stress of Plate (F _y)	36	ksi			-		b _f -		т
Base Plate Size	600 x 600	mm	22	Dage]			m	1
Base Plate Thickness	36 440	mm mm	32	Pass	1	†			
Flange Width	17.32	inches				d		0.95d	N
Depth	382 15.04	mm inches			1	•			
m Para Plata Pianaria a N	4.67	inches	600					₩	V
Base Plate Dimension - N n	23.622 4.88	inches inches	600	mm	1	-n-	0.80bf	-n-	_
Base Plate Dimension - B	23.622	inches	600	mm			,		
Area of base plate - A1 Load Case	558.00 8	inches 9	10	11	12	13	14	15	
Load Combination	SW +DL +LL	SW + WX	SW +W-X	SW+WZ	SW+W-Z	SW+DL+LL+WX	SW+DL+LL+W-X	SW+DL+LL+WZ	SW+DL
Fx (Ton) Fy (Ton)	1.09 145.08	-5.07 15.63	5 28.98	0.28 17.11	0.08 61.24	-4.16 138.41	5.91 151.75	1.19 105.66	0 18
Fz (Ton)	0.15	0.09	-0.15	13.5	-13.73	0.26	0.03	13.67	-1:
Resultant shear force	1.1	5	5	13.5	13.7	4.1	5.9	13.7	1
			Allowable St	ress Design					
Case 1 (Area of base plate = Area of concrete)									
Area of base plate A1					558.0				
Area of concrete A2					558.0	00			
Axial compressive load (Pa) - kips	319.76	34.45	63.87	37.71	134.97	305.06	334.46	232.87	405
Compressive Strength of concrete- fc (kg/m²) Compressive Strength of concrete (ksi)					25500 3.63				
Required Base Plate area (Ω^* Pa / 0.85 *fc) inches ²	259.297	27.935	51.795	30.580	109.452	247.376	271.218	188.843	328
Delta Base plate Breadth (N) in inches	0.21 16	0.21	0.21 7	0.21 6	0.21 11	0.21 16	0.21 17	0.21 14	0.
N Considered	23.62	23.62	23.62	23.62	23.62	23.62	23.62	23.62	23
Base Plate length (B) in inches	16	5	7	5 23.62	10 23.62	16	16	14	23
B considered	23.62	23.62	23.62	23.02	23.02	23.62	23.62	23.62	23
Condition (0.85*fc*A1 *VA2/A1)/2.50) > Fy (Kips)	688.1	688.1	688.1	688.1	688.1	688.1	688.1	688.1	68
	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TF
Factor X	0.46	0.05	0.09	0.05	0.20	0.44	0.48	0.34	0.
λ	0.78 0.78	0.23	0.31 0.31	0.24 0.24	0.47 0.47	0.76 0.76	0.81 0.81	0.64	0. 0.
λn'	3.17	0.91	1.26	0.96	1.88	3.07	3.27	2.58	3.
l I					4.881	.9			
Base Plate Thickness (inches) Base Plate Thickness (mm)	1.13 28.59	0.37 9.38	0.50 12.78	0.39 9.82	0.73 18.58	1.10 27.93	1.15 29.24	0.96 24.40	1 32
Uplift Condition Yield Stress of Plate (F _v)				36					
v2 bf				24.50					
Guage Distance (Centre to centre) mm Guage Distance (Centre to centre) inches				240.00 9.45					
Guage Distance (Centre to Centre) inches				5.45					
Condition 1 (V2 bf < d)	T	1	Allowable St	ress Design			T 1		
Plate thickness (inches)				0.636					
Condition 1 (V2 bf > d)									
Plate thickness (inches)				0.600					
Dieta Thickness (inches)				0.600					
Plate Thickness (inches) Plate Thickness (mm)				0.600 15.25					
†	1	1							
Description	Parameter	Unit			Remarks				
Polt Considered M27									
Bolt Considered M27 Bolt material	IS 2062 E 250 A								
Minimum Embedment Length	324	mm 2							
Tensile Strength Yield Stress	410 230	N/mm ²			IS 2062 Table No 2				
No of Bolts	8								
Major/Nominal Diameter	27	mm mm							
	3								
Pitch Core Diameter	3 23.32	mm							
Pitch Core Diameter Shank Area of bolt	23.32 572.555	mm ²							
Pitch Core Diameter	23.32								
Pitch Core Diameter Shank Area of bolt Stress Area Root Area	23.32 572.555 459 419.10	mm ² mm ² mm ²							
Pitch Core Diameter Shank Area of bolt Stress Area	23.32 572.555 459 419.10	mm² mm² mm²							
Pitch Core Diameter Shank Area of bolt Stress Area Root Area Hole diameter Edge distance (For Side N)	23.32 572.555 459 419.10 30 60	mm² mm² mm² mm mm							
Pitch Core Diameter Shank Area of bolt Stress Area Root Area Hole diameter Edge distance	23.32 572.555 459 419.10 30 60 45	mm² mm² mm² mm² mm mm							
Pitch Core Diameter Shank Area of bolt Stress Area Root Area Hole diameter Edge distance (For Side N) Minimum edge distance Edge distance (For Side B)	23.32 572.555 459 419.10 30 60 45 60	mm² mm² mm² mm mm mm mm							
Pitch Core Diameter Shank Area of bolt Stress Area Root Area Hole diameter Edge distance (For Side N) Minimum edge distance Edge distance (For Side B) Guage Distance between Holes (For Side "B")	23.32 572.555 459 419.10 30 60 45 60 240	mm² mm² mm² mm mm mm mm mm							
Pitch Core Diameter Shank Area of bolt Stress Area Root Area Hole diameter Edge distance (For Side N) Minimum edge distance Edge distance (For Side B) Guage Distance between Holes (For Side "B") Guage Distance between Holes (For Side "N")	23.32 572.555 459 419.10 30 60 45 60 240 240	mm² mm² mm² mm² mm mm mm mm							
Pitch Core Diameter Shank Area of bolt Stress Area Root Area Hole diameter Edge distance (For Side N) Minimum edge distance Edge distance (For Side B) Guage Distance between Holes (For Side "B") Guage Distance between Holes (For Side "N")	23.32 572.555 459 419.10 30 60 45 60 240	mm² mm² mm² mm² mm mm mm mm							
Pitch Core Diameter Shank Area of bolt Stress Area Root Area Hole diameter Edge distance (For Side N) Minimum edge distance Edge distance (For Side B) Guage Distance between Holes (For Side "B") Guage Distance between Holes (For Side "N") Tensil	23.32 572.555 459 419.10 30 60 45 60 240 240 240 17.11	mm² mm² mm² mm mm mm mm mm mm Tons							
Pitch Core Diameter Shank Area of bolt Stress Area Root Area Hole diameter Edge distance (For Side N) Minimum edge distance Edge distance (For Side B) Guage Distance between Holes (For Side "B") Guage Distance between Holes (For Side "N") Tensil Required tension in bolt Required tension per bolt	23.32 572.555 459 419.10 30 60 45 60 240 240 240 17.11 2.139	mm² mm² mm² mm² mm mm mm mm mm Tod	Acce	pted	IS:800 11 6 2 3				
Pitch Core Diameter Shank Area of bolt Stress Area Root Area Hole diameter Edge distance (For Side N) Minimum edge distance Edge distance (For Side B) Guage Distance between Holes (For Side "B") Guage Distance between Holes (For Side "N") Tensil Required tension in bolt Required tension per bolt Actual tensile stress per bolt	23.32 572.555 459 419.10 30 60 45 60 240 240 240 240 17.11 2.139 3.74	mm² mm² mm² mm mm mm mm mm Tod Tons Tons kg/mm²	Acce		IS:800 11.6.2.3				
Pitch Core Diameter Shank Area of bolt Stress Area Root Area Hole diameter Edge distance (For Side N) Minimum edge distance Edge distance (For Side B) Guage Distance between Holes (For Side "B") Guage Distance between Holes (For Side "N") Tensil Required tension in bolt Required tension per bolt Actual tensile stress per bolt	23.32 572.555 459 419.10 30 60 45 60 240 240 240 17.11 2.139 3.74	mm² mm² mm² mm mm mm mm mm mm mm mm kg/mm²	Acce		IS:800 11.6.2.3				
Pitch Core Diameter Shank Area of bolt Stress Area Root Area Hole diameter Edge distance (For Side N) Minimum edge distance Edge distance (For Side B) Guage Distance between Holes (For Side "B") Guage Distance between Holes (For Side "N") Tensil Required tension in bolt Required tension per bolt Actual tensile stress per bolt	23.32 572.555 459 419.10 30 60 45 60 240 240 240 240 17.11 2.139 3.74	mm² mm² mm² mm mm mm mm mm Tod Tons Tons kg/mm²	Acce						

 N
 12.20
 Tons

 N
 13.81
 Tons

Accepted

Accepted

Accepted

IS:800 11.6.2.1

IS:800 11.6.2.1

IS:800 10.3.3

IS:800 11.6.2.2

IS:800 11.6.2.2

IS:800 11.6.2.5

Tons

kg/mm²

kg/mm²

kg/mm² mm²

kg/mm²

N

kg/mm²

kg/mm²

kg/mm²

Tons

135496.80

13.7

1.7125

2.99

10.59

99205.8

1.76

62.67

996300.0

2.99

10.59

3.74

12.78

0.17

Combined Shear and Tension

972.0

Bearing Stress of bolt on plate

Shear Stress in anchor rod

Shear force in bolt

Shear force per bolt

Actual shear stress in bolt

Permissible Shear stress per bolt

Nominal shear capacity of bolt

Actual Stress of bolt in bearing

Permissible bearing stress of the bolt

Nominal bearing strength of bolt

Actual Shear stress in bolt

Permissible Shear stress per bolt

Actual tensile stress per bolt

Permissible tensile stress per bolt

Combined Shear and Tension

Nominal bearing area of bolt on plate

Design Strength due to yielding Design Strength due to rupture at threaded section

Description	Parameter	Unit	Remark		_		20,000	Line Company	
Column D2	D ISMB 350	1			1	-	— B —		
Yield Stress of Plate (F _y) Base Plate Size	36 600 x 600	ksi mm			1			m	Ā
Base Plate Thickness Flange Width	36 440	mm mm	33	Pass	-	<u>†</u>		0.05.1	
Depth	17.32 382	inches mm				<u> </u>		0.95d	
m	15.04 4.67	inches	500		_	-	[Landan land and a	T m	•
Base Plate Dimension - N n	23.622 4.88	inches inches	600	mm	-	-n-	0.80bf	-n-l	_
Base Plate Dimension - B Area of base plate - A1 Load Case	23.622 558.00	inches inches	10	mm	12	13	14	45	16
Load Combination	8 SW +DL +LL	SW + WX	SW +W-X	SW+WZ	SW+W-Z	SW+DL+LL+WX	SW+DL+LL+W-X	15 SW+DL+LL+WZ	SW+DL+LL+W-Z
Fx (Ton) Fy (Ton)	1.05 148.67	-5.67 15.26	5.6 29.33	0.1 61.58	0.26 17.46	-4.8 141.63	6.47 155.7	0.97 187.95	1.13 108.92
Fz (Ton) Resultant shear force	-0.03 1	-0.16 5.6	0.22 5.6	13.63 13.6	-13.4 13.4	-0.22 4.8	0.16 6.4	13.57 13.6	-13.46 13.5
		A	Allowable St	tress Desigr	1				
Case 1 (Area of base plate = Area of concrete)									
Area of base plate A1 Area of concrete A2					558.0 558.0				
Axial compressive load (Pa) - kips	327.67	33.63	64.64	135.72	38.48	312.15	343.16	414.24	240.06
Compressive Strength of concrete- fc (kg/m²) Compressive Strength of concrete (ksi)					25500 3.63	3			
Required Base Plate area (Ω^* Pa / 0.85 *fc) inches ² Delta	265.713 0.21	27.274 0.21	52.421 0.21	110.060 0.21	31.206 0.21	253.131 0.21	278.278 0.21	335.917 0.21	194.669 0.21
Base plate Breadth (N) in inches N Considered	17 23.62	5 23.62	7 23.62	11 23.62	6 23.62	16 23.62	17 23.62	19 23.62	14 23.62
Base Plate length (B) in inches B considered	16 23.62	5 23.62	7 23.62	10 23.62	5 23.62	16 23.62	16 23.62	18 23.62	14 23.62
	688.1	688.1	688.1	688.1	688.1	688.1	688.1	688.1	688.1
Condition (0.85*fc*A1 *VA2/A1)/2.50) > Fy (Kips)	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE
Factor X	0.47 0.80	0.05 0.22	0.09 0.31	0.20 0.47	0.06 0.24	0.45 0.77	0.50 0.82	0.60 0.95	0.35 0.65
λ λn'	0.80	0.22	0.31 1.26	0.47 1.89	0.24 0.97	0.77 3.11	0.82	0.95 3.82	0.65 2.63
I					4.88				
Base Plate Thickness (inches)	1.14	0.37	0.51	0.73	0.39	1.11	1.17	1.28	0.98
Base Plate Thickness (mm)	28.94	9.27	12.86	18.63	9.92	28.25	29.62	32.54	24.77
Uplift Condition Yield Stress of Plate (F _y)					36				
√2 bf Guage Distance (Centre to centre) mm					24.50 240.00				
Guage Distance (Centre to centre) inches					9.45				
Condition 1 (√2 bf < d)			Allowable St	tress Design	1	<u> </u>			
Plate thickness (inches)					0.642				
Condition 1 (V2 bf > d)									
Plate thickness (inches)					0.606				
Plate Thickness (inches) Plate Thickness (mm)					0.606 15.40				
						1			
Description	Parameter	Unit			Remarks				
Bolt Considered M27 Bolt material	IS 2062 E 250 A								
Minimum Embedment Length Tensile Strength	324 410	mm N/mm²			IS 2062				
Yield Stress No of Bolts	230 8	N/mm ²			Table No 2	<u> </u>			
Major/Nominal Diameter Pitch	27 3	mm mm							
Core Diameter Shank Area of bolt	23.32 572.555	mm mm²							
Stress Area Root Area	459 419.10	mm ²]			
Hole diameter	30	mm]			
Edge distance (For Side N)	60	mm]			
Minimum edge distance Edge distance	45	mm]			
(For Side B) Guage Distance between Holes (For Side "B")	60 240	mm mm	<u> </u>		<u> </u>	1			
Guage Distance between Holes (For Side "N")	240	mm]			
Tensil	e stress in anchor ro	od		 L_]			
Required tension in bolt Required tension per bolt	17.46 2.183	Tons Tons]			
Actual tensile stress per bolt	3.81	kg/mm ²	Acce	epted	IS:800 11.6.2.3	}			
Permissible tensile stress per bolt Nominal Tensile capacity per bolt	12.78 119716.10	kg/mm ²			IS800 11.6.2.3]			
Design Strength due to yielding Design Strength due to rupture at threaded section	119716.10 119716.10 135496.80	N N	12.20 13.81	Tons Tons]			
5 22 2.1.G.L. Sub to repeare at an educa section				. 5113]			
Shea	r Stress in anchor ro	d 	·	·]			
Shear force in bolt Shear force per bolt	13.6 1.7	Tons Tons]			
Actual shear stress in bolt	2.97	kg/mm ²	Acce	epted	IS:800 11.6.2.1]			
Permissible Shear stress per bolt	10.59	kg/mm ²			IS:800 11.6.2.1]			
Nominal shear capacity of bolt	99205.8	N N			IS:800 10.3.3]			
Bearin	g Stress of bolt on pl	ate		·]			
Actual Stress of bolt in bearing Nominal bearing area of bolt on plate	1.75 972.0	kg/mm ²	Acce	epted	IS:800 11.6.2.2]			
Permissible bearing stress of the bolt	62.67	kg/mm ²			IS:800 11.6.2.2]			
Nominal bearing strength of bolt	996300.0	N N]			
Comb Actual Shear stress in bolt	ined Shear and Tensi	kg/mm ²		·]			
Permissible Shear stress per bolt Actual tensile stress per bolt	10.59	kg/mm ²]			
Permissible tensile stress per bolt Combined Shear and Tension	12.78 0.17	kg/mm ²	Aces	epted	IS:800 11.6.2.5]			
Compilied Sheaf and Tension	0.17		ACC	epted	13.000 11.0.2.5	1			

Description	Parameter	Unit	Remark							
Column B3	D ISMB 350						— B —			
Yield Stress of Plate (F _y) Base Plate Size	36 600 x 600	ksi mm]		- 5 1	m	Ŧ	
Base Plate Thickness	36 440	mm mm	31	Pass	1	4				
Flange Width	17.32 382	inches			1	d		0.95d	N	
Depth m	15.04 4.67	inches				•	/////////////////////////////////////	 		
Base Plate Dimension - N n	23.622 4.88	inches inches	600	mm		<u></u> n+	0.80b _f	<u>↓</u>	1	
Base Plate Dimension - B Area of base plate - A1	23.622 558.00	inches inches	600	mm]					
Load Case Load Combination	8 SW +DL +LL	9 SW + WX	10 SW +W-X	11 SW+WZ	12 SW+W-Z	13 SW+DL+LL+WX	14 SW+DL+LL+W-X	15 SW+DL+LL+WZ	16 SW+DL+LL+W-Z	
Fx (Ton) Fy (Ton)	0.8 152.18	-7.2 3.01	6.65 36.66	0.11 9.98	-0.41 28.4	-6.25 135.66	7.6 169.31	1.06 142.62	0.54 161.04	
Fz (Ton) Resultant shear force	0.35 0.8	-0.11 7.2	0.16 6.6	7.43 7.4	-7.49 7.5	0.21 6.2	0.48 7.6	7.75 7.8	-7.17 7.1	
		A	llowable St	ress Design						
Case 1 (Area of base plate = Area of concrete) Area of base plate A1					558.	00				
Area of concrete A2				<u> </u>	558. 558.					
Axial compressive load - kips (Pa)	335.40	6.63	80.80	22.00	62.59 2550	298.99	373.16	314.33	354.93	
Compressive Strength of concrete- fc (kg/m²) Compressive Strength of concrete (ksi)	271 007	F 200	CF F21	17.027	3.6	3	202.602	254.000	207.022	
Required Base Plate area (Ω*Pa / 0.85 *fc) inches ² Delta	271.987 0.21	5.380 0.21	65.521 0.21	0.21	50.758 0.21	0.21	302.603 0.21	254.900 0.21	287.822 0.21	
Base plate Breadth (N) in inches N Considered	23.62	3 23.62	23.62	23.62	7 23.62	16 23.62	18 23.62	16 23.62	23.62	
Base Plate length (B) in inches B considered	16 23.62	2 23.62	23.62	23.62	7 23.62	15 23.62	17 23.62	16 23.62	17 23.62	
Condition (0.85*fc*A1 *VA2/A1)/2.50) > Fy (Kips)	688.1	688.1	688.1	688.1	688.1	688.1	688.1	688.1	688.1	
	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	
Factor X λ	0.49 0.81	0.01 0.10	0.12 0.35	0.03 0.18	0.09 0.31	0.43 0.75	0.54 0.88	0.45 0.78	0.51 0.84	
λn'	0.81 3.27	0.10 0.40	0.35 1.42	0.18 0.73	0.31 1.24	0.75 3.03	0.88 3.53	0.78 3.13	0.84 3.41	
I		<u> </u>	<u> </u>	<u> </u>	4.88	19				
Base Plate Thickness (inches)	1.15	0.16	0.57	0.30	0.50	1.09	1.22	1.12	1.19	
Base Plate Thickness (mm)	29.28	4.12	14.37	7.50	12.65	27.65	30.89	28.35	30.12	30.89
Uplift Condition Yield Stress of Plate (F _y)										
√2 bf Guage Distance (Centre to centre) mm										
Guage Distance (Centre to centre) inches										
Condition 1 (√2 bf < d)		A	llowable St	ress Design						
Plate thickness (inches)										
Condition 1 (V2 bf > d)										
Plate thickness (inches)										
Plate Thickness (inches) Plate Thickness (mm)										
Plate Thickness (inches) Plate Thickness (mm)	Dorameter	Hoit			Domonte					
Plate Thickness (inches) Plate Thickness (mm) Description	Parameter	Unit			Remarks					
Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M27 Bolt material	IS 2062 E 250 A				Remarks					
Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M27 Bolt material Minimum Embedment Length Tensile Strength	IS 2062 E 250 A 324 410	mm N/mm²			IS 2062					
Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M27 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts	IS 2062 E 250 A 324 410 230 8	mm N/mm² N/mm²								
Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M27 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch	IS 2062 E 250 A 324 410 230 8 27 3	mm N/mm² N/mm² mm			IS 2062					
Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M27 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch Core Diameter Shank Area of bolt	IS 2062 E 250 A 324 410 230 8 27 3 23.32 572.555	mm N/mm² N/mm² mm mm mm mm			IS 2062					
Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M27 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch Core Diameter	IS 2062 E 250 A 324 410 230 8 27 3 23.32	mm N/mm² N/mm² mm mm			IS 2062					
Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M27 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch Core Diameter Shank Area of bolt Stress Area Root Area Hole diameter	IS 2062 E 250 A 324 410 230 8 27 3 23.32 572.555 459	mm N/mm² N/mm² mm mm mm mm² mm²			IS 2062					
Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M27 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch Core Diameter Shank Area of bolt Stress Area Root Area Hole diameter Edge distance (For Side N)	IS 2062 E 250 A 324 410 230 8 27 3 23.32 572.555 459 419.10 30 60	mm N/mm² N/mm² N/mm² mm mm mm mm² mm² mm² mm²			IS 2062					
Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M27 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch Core Diameter Shank Area of bolt Stress Area Root Area Hole diameter Edge distance (For Side N) Minimum edge distance Edge distance	IS 2062 E 250 A 324 410 230 8 27 3 23.32 572.555 459 419.10	mm N/mm² N/mm² mm mm mm mm² mm² mm² mm²			IS 2062					
Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M27 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch Core Diameter Shank Area of bolt Stress Area Root Area Hole diameter Edge distance (For Side N) Minimum edge distance Edge distance (For Side B) Guage Distance between Holes (For Side "B")	IS 2062 E 250 A 324 410 230 8 27 3 23.32 572.555 459 419.10 30 60 45 60 240	mm N/mm² N/mm² N/mm² N/mm² mm mm mm mm² mm² mm² mm mm mm mm mm			IS 2062					
Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M27 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch Core Diameter Shank Area of bolt Stress Area Root Area Hole diameter Edge distance (For Side N) Minimum edge distance Edge distance (For Side B) Guage Distance between Holes (For Side "B") Guage Distance between Holes (For Side "N")	IS 2062 E 250 A 324 410 230 8 27 3 23.32 572.555 459 419.10 30 60 45 60 240 240 240	mm N/mm² N/mm² N/mm² mm mm mm mm² mm² mm² mm mm mm mm mm			IS 2062					
Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M27 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch Core Diameter Shank Area of bolt Stress Area Root Area Hole diameter Edge distance (For Side N) Minimum edge distance Edge distance (For Side B) Guage Distance between Holes (For Side "B") Guage Distance between Holes (For Side "N")	IS 2062 E 250 A 324 410 230 8 27 3 23.32 572.555 459 419.10 30 60 45 60 240 240 stress in anchor ro	mm N/mm² N/mm² N/mm² N/mm² mm mm mm² mm² mm² mm² mm mm mm d			IS 2062					
Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M27 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch Core Diameter Shank Area of bolt Stress Area Root Area Hole diameter Edge distance (For Side N) Minimum edge distance Edge distance (For Side B) Guage Distance between Holes (For Side "B") Guage Distance between Holes (For Side "N") Tensile	IS 2062 E 250 A 324 410 230 8 27 3 23.32 572.555 459 419.10 30 60 45 60 240 240 240 stress in anchor ro	mm N/mm² N/mm² N/mm² N/mm² mm mm mm² mm² mm² mm mm mm d mm	Acce	epted	IS 2062 Table No 2					
Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M27 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch Core Diameter Shank Area of bolt Stress Area Root Area Hole diameter Edge distance (For Side N) Minimum edge distance Edge distance (For Side B) Guage Distance between Holes (For Side "B") Guage Distance between Holes (For Side "N") Tensile Required tension in bolt Required tension per bolt Actual tensile stress per bolt	IS 2062 E 250 A 324 410 230 8 27 3 23.32 572.555 459 419.10 30 60 45 60 240 240 240 stress in anchor ro 9.98 1.248 2.18	mm N/mm² N/mm² N/mm² N/mm² N/mm² mm mm mm² mm² mm² mm mm mm d Tons Tons kg/mm²	Acce	epted	IS 2062 Table No 2					
Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M27 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch Core Diameter Shank Area of bolt Stress Area Root Area Hole diameter Edge distance (For Side N) Minimum edge distance Edge distance (For Side B) Guage Distance between Holes (For Side "B") Guage Distance between Holes (For Side "N") Tensile	IS 2062 E 250 A 324 410 230 8 27 3 23.32 572.555 459 419.10 30 60 45 60 240 240 240 stress in anchor ro	mm N/mm² N/mm² N/mm² N/mm² mm mm mm² mm² mm² mm mm mm d mm	Acce	epted	IS 2062 Table No 2					
Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M27 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch Core Diameter Shank Area of bolt Stress Area Root Area Hole diameter Edge distance (For Side N) Minimum edge distance Edge distance (For Side B) Guage Distance between Holes (For Side "B") Guage Distance between Holes (For Side "N") Tensile Required tension in bolt Required tension per bolt Actual tensile stress per bolt Nominal Tensile capacity per bolt	IS 2062 E 250 A 324 410 230 8 27 3 23.32 572.555 459 419.10 30 60 45 60 240 240 240 240 240 218 12.78 119716.10	mm N/mm² N/mm² N/mm² N/mm² mm mm mm² mm² mm² mm mm mm d Tons Tons kg/mm² N			IS 2062 Table No 2					
Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M27 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch Core Diameter Shank Area of bolt Stress Area Root Area Hole diameter Edge distance (For Side N) Minimum edge distance Edge distance (For Side B) Guage Distance between Holes (For Side "B") Guage Distance between Holes (For Side "N") Tensile Required tension in bolt Required tension per bolt Actual tensile stress per bolt Nominal Tensile capacity per bolt Design Strength due to yielding Design Strength due to rupture at threaded section	IS 2062 E 250 A 324 410 230 8 27 3 23.32 572.555 459 419.10 30 60 45 60 240 240 240 stress in anchor ro 9.98 1.248 2.18 12.78 119716.10 119716.10	mm N/mm² N/mm² N/mm² N/mm² mm mm mm² mm² mm² mm mm mm mm mm	12.20	Tons	IS 2062 Table No 2					
Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M27 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch Core Diameter Shank Area of bolt Stress Area Root Area Hole diameter Edge distance (For Side N) Minimum edge distance Edge distance (For Side B) Guage Distance between Holes (For Side "B") Guage Distance between Holes (For Side "N") Tensile Required tension in bolt Required tension per bolt Actual tensile stress per bolt Nominal Tensile capacity per bolt Design Strength due to yielding Design Strength due to rupture at threaded section	IS 2062 E 250 A 324 410 230 8 27 3 23.32 572.555 459 419.10 30 60 45 60 240 240 240 stress in anchor ro 9.98 1.248 2.18 12.78 119716.10 119716.10 135496.80	mm N/mm² N/mm² N/mm² N/mm² mm mm mm² mm² mm² mm mm mm mm mm	12.20	Tons	IS 2062 Table No 2					
Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M27 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch Core Diameter Shank Area of bolt Stress Area Root Area Hole diameter Edge distance (For Side N) Minimum edge distance Edge distance (For Side B) Guage Distance between Holes (For Side "B") Guage Distance between Holes (For Side "N") Tensile Required tension in bolt Required tension per bolt Actual tensile stress per bolt Design Strength due to yielding Design Strength due to rupture at threaded section	IS 2062 E 250 A 324 410 230 8 27 3 23.32 572.555 459 419.10 30 60 45 60 240 240 240 stress in anchor ro 9.98 1.248 2.18 12.78 119716.10 119716.10 135496.80 Stress in anchor roe Stress in anchor roe 9.98	mm N/mm² N/mm² N/mm² N/mm² mm mm mm² mm² mm² mm mm mm mm mm	12.20	Tons	IS 2062 Table No 2					
Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M27 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch Core Diameter Shank Area of bolt Stress Area Root Area Hole diameter Edge distance (For Side N) Minimum edge distance Edge distance (For Side B) Guage Distance between Holes (For Side "B") Guage Distance between Holes (For Side "N") Tensile Required tension in bolt Required tension per bolt Actual tensile stress per bolt Nominal Tensile capacity per bolt Design Strength due to rupture at threaded section Shear force in bolt	IS 2062 E 250 A 324 410 230 8 27 3 23.32 572.555 459 419.10 30 60 45 60 240 240 240 240 stress in anchor ro 9.98 1.248 2.18 12.78 119716.10 119716.10 135496.80 Stress in anchor roe 7.8	mm N/mm² N/mm² N/mm² N/mm² mm mm mm² mm² mm² mm mm mm mm mm m	12.20 13.81	Tons	IS 2062 Table No 2					
Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M27 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch Core Diameter Shank Area of bolt Stress Area Root Area Hole diameter Edge distance (For Side N) Minimum edge distance Edge distance (For Side B) Guage Distance between Holes (For Side "B") Guage Distance between Holes (For Side "N") Tensile Required tension per bolt Actual tensile stress per bolt Nominal Tensile capacity per bolt Design Strength due to rupture at threaded section Shear force per bolt Shear force per bolt	IS 2062 E 250 A 324 410 230 8 27 3 23.32 572.555 459 419.10 30 60 45 60 240 240 240 240 stress in anchor ro 9.98 1.248 2.18 12.78 119716.10 135496.80 Stress in anchor ro 7.8 0.975	mm N/mm² N/mm² N/mm² N/mm² mm mm mm² mm² mm² mm mm mm mm mm mm	12.20 13.81	Tons Tons	IS 2062 Table No 2 IS 2062 Table No 2					
Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M27 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch Core Diameter Shank Area of bolt Stress Area Root Area Hole diameter Edge distance (For Side N) Minimum edge distance Edge distance (For Side B) Guage Distance between Holes (For Side "B") Guage Distance between Holes (For Side "N") Tensile Required tension in bolt Required tension per bolt Actual tensile stress per bolt Nominal Tensile capacity per bolt Design Strength due to yielding Design Strength due to rupture at threaded section Shear force in bolt Shear force per bolt Permissible Shear stress in bolt Permissible Shear stress per bolt Nominal shear capacity of bolt	IS 2062 E 250 A 324 410 230 8 27 3 23.32 572.555 459 419.10 30 60 45 60 240 240 240 240 240 31.248 2.18 12.78 119716.10 119716.10 135496.80 Stress in anchor roce 7.8 0.975 1.70 10.59	mm N/mm² N/mm² N/mm² N/mm² mm mm mm² mm² mm² mm² mm mm mm mm mm	12.20 13.81	Tons Tons	IS 2062 Table No 2 IS 2062 Table No 2 IS 2062 IS 206					
Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M27 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch Core Diameter Shank Area of bolt Stress Area Root Area Hole diameter Edge distance (For Side N) Minimum edge distance Edge distance (For Side B) Guage Distance between Holes (For Side "B") Guage Distance between Holes (For Side "B") Tensile Required tension in bolt Required tension per bolt Actual tensile stress per bolt Nominal Tensile capacity per bolt Design Strength due to yielding Design Strength due to rupture at threaded section Shear force in bolt Shear force per bolt Permissible Shear stress per bolt Nominal Shear stress in bolt	IS 2062 E 250 A 324 410 230 8 27 3 23.32 572.555 459 419.10 30 60 45 60 240 240 240 240 stress in anchor ro 9.98 1.248 2.18 119716.10 119716.10 135496.80 Stress in anchor ro 7.8 0.975 1.70 10.59 99205.8	mm N/mm² N/mm² N/mm² N/mm² mm mm mm² mm² mm² mm² mm mm mm mm mm	12.20 13.81	Tons Tons	IS 2062 Table No 2 IS 2062 Table No 2 IS 2062 IS 206					

IS:800 11.6.2.2

IS:800 11.6.2.5

Permissible bearing stress of the bolt

Nominal bearing strength of bolt

Actual Shear stress in bolt

Permissible Shear stress per bolt

Actual tensile stress per bolt

Permissible tensile stress per bolt

Combined Shear and Tension

62.67

996300.0

1.70

10.59

2.18

12.78

0.05

Combined Shear and Tension

kg/mm²

kg/mm²

kg/mm²

kg/mm²

Accepted

N

	Description	Parameter	Unit	Remark]				
	Column D3	D ISMB 350					-	В —	_	
	Yield Stress of Plate (F _y)	36	ksi]		b _f -	T	T
	Base Plate Size Base Plate Thickness	600 x 600 36	mm mm	31	Pass	1	1	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	- m	
	Flange Width	440 17.32	mm inches]	d d		0.95d	N
	Depth	382	mm			1	Ĭ		0.550	
	m	15.04 4.67	inches inches			}	1	(Landan land	, m]
	Base Plate Dimension - N n	23.622 4.88	inches inches	600	mm	-	L → n	-0.80b _f		I
	Base Plate Dimension - B	23.622	inches	600	mm			n management 1		
	Area of base plate - A1 Load Case	558.00 8	inches 9	10	11	12	13	14	15	16
	Load Combination Fx (Ton)	SW +DL +LL 0.74	SW + WX -7.95	SW +W-X 7.42	-0.39	SW+W-Z 0.08	SW+DL+LL+W> -7.06	8.3 SW+DL+LL+W-X	SW+DL+LL+WZ 0.5	SW+DL+I 0.9
	Fy (Ton) Fz (Ton)	153.86 -0.44	2.89 0.1	36.71 -0.16	28.8 7.49	9.49 -7.44	137.25 -0.31	171.07 -0.57	163.16 7.08	143. -7.8
	Resultant shear force	0.8	7.9	7.4	7.49	7.4	7	8.3	7.08	7.9
+			Α	llowable St	ress Design					
					200 200.8.1					
	Case 1 (Area of base plate = Area of concrete) Area of base plate A1					558	.00			
	Area of concrete A2			T	1	558			Τ	
	Axial compressive load - kips (Pa)	339.11	6.37	80.91	63.48	20.92	302.50	377.04	359.60	317.0
	Compressive Strength of concrete- fc (kg/m²) Compressive Strength of concrete (ksi)					2550 3.6				
R	Required Base Plate area (Ω^* Pa / 0.85 *fc) inches ²	274.989	5.165	65.611	51.473	16.961	245.303	305.748	291.611	257.0
_	Delta Base plate Breadth (N) in inches	0.21 17	0.21	0.21 8	0.21 7	0.21	0.21 16	0.21 18	0.21 17	0.23
	N Considered	23.62	23.62	23.62 8	23.62 7	23.62	23.62	23.62 17	23.62 17	23.6 16
	Base Plate length (B) in inches B considered	16 23.62	23.62	23.62	23.62	23.62	15 23.62	23.62	23.62	23.6
+		688.1	688.1	688.1	688.1	688.1	688.1	688.1	688.1	688.
 (Condition (0.85*fc*A1 *VA2/A1)/2.50) > Fy (Kips)	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRL
 	Factor X	0.49	0.01	0.12	0.09	0.03	0.44	0.55	0.52	0.4
	λ	0.82 0.82	0.10 0.10	0.35 0.35	0.31 0.31	0.18 0.18	0.76 0.76	0.88	0.85 0.85	0.78
	λn'	3.30	0.39	1.42	1.25	0.71	3.05	3.56	3.44	3.15
	Í				1	4.88	19			<u> </u>
	Base Plate Thickness (inches)	1.16	0.16	0.57	0.50	0.29	1.09	1.22	1.19	1.13
	Base Plate Thickness (mm)	29.44	4.04	14.38	12.74	7.31	27.81	31.05	30.32	28.4
	Uplift Condition									
	Yield Stress of Plate (F _y) √2 bf									
	Guage Distance (Centre to centre) mm									
	Guage Distance (Centre to centre) inches									
	Condition 1 (v/2 hf c d)		Α	llowable St	ress Design	T				<u> </u>
	Condition 1 (V2 bf < d) Plate thickness (inches)									
ĺ										
	Condition 1 (V2 bf > d)									
	Condition 1 (√2 bf > d) Plate thickness (inches)									
	Condition 1 (V2 bf > d)									
	Condition 1 (V2 bf > d) Plate thickness (inches) Plate Thickness (inches)									
	Condition 1 (V2 bf > d) Plate thickness (inches) Plate Thickness (inches)	Parameter	Unit			Remarks				
	Condition 1 (V2 bf > d) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M27		Unit			Remarks				
	Condition 1 (V2 bf > d) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description	Parameter IS 2062 E 250 A 324	Unit			Remarks				
	Condition 1 (V2 bf > d) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M27 Bolt material Minimum Embedment Length Tensile Strength	IS 2062 E 250 A 324 410	mm N/mm²			IS 2062				
	Condition 1 (V2 bf > d) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M27 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts	IS 2062 E 250 A 324 410 230 8	mm N/mm² N/mm²							
	Condition 1 (V2 bf > d) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M27 Bolt material Minimum Embedment Length Tensile Strength Yield Stress	IS 2062 E 250 A 324 410 230	mm N/mm²			IS 2062				
	Condition 1 (V2 bf > d) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M27 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch Core Diameter	IS 2062 E 250 A 324 410 230 8 27 3 23.32	mm N/mm² N/mm² mm mm			IS 2062				
	Condition 1 (V2 bf > d) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M27 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch Core Diameter Shank Area of bolt Stress Area	IS 2062 E 250 A 324 410 230 8 27 3 23.32 572.555 459	mm N/mm² N/mm² mm mm mm mm mm² mm²			IS 2062				
	Condition 1 (V2 bf > d) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M27 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch Core Diameter Shank Area of bolt	IS 2062 E 250 A 324 410 230 8 27 3 23.32 572.555	mm N/mm² N/mm² mm mm mm mm			IS 2062				
	Condition 1 (V2 bf > d) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M27 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch Core Diameter Shank Area of bolt Stress Area Root Area Hole diameter	IS 2062 E 250 A 324 410 230 8 27 3 23.32 572.555 459	mm N/mm² N/mm² mm mm mm mm mm² mm²			IS 2062				
	Condition 1 (\forall 2 bf > d) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M27 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch Core Diameter Shank Area of bolt Stress Area Root Area Hole diameter Edge distance (For Side N)	IS 2062 E 250 A 324 410 230 8 27 3 23.32 572.555 459 419.10 30 60	mm N/mm² N/mm² N/mm² mm mm mm mm² mm² mm² mm² mm			IS 2062				
	Condition 1 (\forall 2 bf > d) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M27 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch Core Diameter Shank Area of bolt Stress Area Root Area Hole diameter Edge distance	IS 2062 E 250 A 324 410 230 8 27 3 23.32 572.555 459 419.10 30 60 45	mm N/mm² N/mm² N/mm² mm mm mm mm² mm² mm² mm² mm mm			IS 2062				
	Condition 1 (v2 bf > d) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M27 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch Core Diameter Shank Area of bolt Stress Area Root Area Hole diameter Edge distance (For Side N) Minimum edge distance Edge distance (For Side B)	IS 2062 E 250 A 324 410 230 8 27 3 23.32 572.555 459 419.10 30 60 45 60	mm N/mm² N/mm² N/mm² mm mm mm mm² mm² mm² mm mm mm mm			IS 2062				
	Condition 1 (v2 bf > d) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M27 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch Core Diameter Shank Area of bolt Stress Area Root Area Hole diameter Edge distance (For Side N) Minimum edge distance Edge distance Edge distance	IS 2062 E 250 A 324 410 230 8 27 3 23.32 572.555 459 419.10 30 60 45	mm N/mm² N/mm² N/mm² mm mm mm mm² mm² mm² mm² mm mm			IS 2062				
	Condition 1 (V2 bf > d) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M27 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch Core Diameter Shank Area of bolt Stress Area Root Area Hole diameter Edge distance (For Side N) Minimum edge distance Edge distance (For Side B) Guage Distance between Holes (For Side "N")	IS 2062 E 250 A 324 410 230 8 27 3 23.32 572.555 459 419.10 30 60 45 60 240	mm N/mm² N/mm² N/mm² mm mm mm mm² mm² mm² mm mm mm mm mm			IS 2062				
	Condition 1 (V2 bf > d) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M27 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch Core Diameter Shank Area of bolt Stress Area Root Area Hole diameter Edge distance (For Side N) Minimum edge distance Edge distance (For Side B) Guage Distance between Holes (For Side "B") Guage Distance between Holes (For Side "N")	IS 2062 E 250 A 324 410 230 8 27 3 23.32 572.555 459 419.10 30 60 45 60 240 240 stress in anchor ro	mm N/mm² N/mm² N/mm² N/mm² mm mm mm² mm² mm² mm mm mm mm d			IS 2062				
	Condition 1 (V2 bf > d) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M27 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch Core Diameter Shank Area of bolt Stress Area Root Area Hole diameter Edge distance (For Side N) Minimum edge distance Edge distance (For Side B) Guage Distance between Holes (For Side "B") Guage Distance between Holes (For Side "N") Tensile Required tension in bolt Required tension per bolt	IS 2062 E 250 A 324 410 230 8 27 3 23.32 572.555 459 419.10 30 60 45 60 240 240 240 stress in anchor ro 28.8 3.600	mm N/mm² N/mm² N/mm² N/mm² mm mm mm² mm² mm² mm mm mm d mm			IS 2062 Table No 2				
	Condition 1 (V2 bf > d) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M27 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch Core Diameter Shank Area of bolt Stress Area Root Area Hole diameter Edge distance (For Side N) Minimum edge distance Edge distance (For Side B) Guage Distance between Holes (For Side "B") Guage Distance between Holes (For Side "N")	IS 2062 E 250 A 324 410 230 8 27 3 23.32 572.555 459 419.10 30 60 45 60 240 240 240 28.8	mm N/mm² N/mm² N/mm² N/mm² mm mm mm² mm² mm² mm² mm mm mm d mm	Acc	epted	IS 2062				
	Condition 1 (v2 bf > d) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M27 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch Core Diameter Shank Area of bolt Stress Area Root Area Hole diameter Edge distance (For Side N) Minimum edge distance Edge distance (For Side B) Guage Distance between Holes (For Side "B") Guage Distance between Holes (For Side "N") Tensile Required tension per bolt Actual tensile stress per bolt	IS 2062 E 250 A 324 410 230 8 27 3 23.32 572.555 459 419.10 30 60 45 60 240 240 240 stress in anchor ro 28.8 3.600 6.29	mm N/mm² N/mm² N/mm² N/mm² mm mm mm² mm² mm² mm mm mm d Tons Tons kg/mm²		epted	IS 2062 Table No 2				
	Condition 1 (v2 bf > d) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M27 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch Core Diameter Shank Area of bolt Stress Area Root Area Hole diameter Edge distance (For Side N) Minimum edge distance Edge distance (For Side B) Guage Distance between Holes (For Side "B") Guage Distance between Holes (For Side "N") Tensile Required tension per bolt Actual tensile stress per bolt	IS 2062 E 250 A 324 410 230 8 27 3 23.32 572.555 459 419.10 30 60 45 60 240 240 240 stress in anchor ro 28.8 3.600 6.29	mm N/mm² N/mm² N/mm² N/mm² mm mm mm² mm² mm² mm mm mm mm m		apted Tons Tons	IS 2062 Table No 2				

Shear force in bolt

Shear force per bolt

Actual shear stress in bolt

Permissible Shear stress per bolt

Nominal shear capacity of bolt

Actual Stress of bolt in bearing

Nominal bearing area of bolt on plate

Permissible bearing stress of the bolt

Nominal bearing strength of bolt

Actual Shear stress in bolt

Permissible Shear stress per bolt

Actual tensile stress per bolt

Permissible tensile stress per bolt

Combined Shear and Tension

8.3

1.0375

1.81

10.59

Bearing Stress of bolt on plate

1.07

972.0

62.67

996300.0

1.81

10.59

6.29

12.78

0.27

Combined Shear and Tension

99205.8 N

Tons

Tons

kg/mm²

kg/mm²

kg/mm²

kg/mm²

kg/mm²

kg/mm²

IS:800 11.6.2.1

IS:800 11.6.2.1

IS:800 10.3.3

IS:800 11.6.2.2

IS:800 11.6.2.2

IS:800 11.6.2.5

Accepted

Accepted

Accepted

	Description	Parameter	Unit	Remark		-	0.		No.	
	Column B4	D ISMB 400				-	-	B — b _f —		
	Yield Stress of Plate (F _y) Base Plate Size	36 600 x 600	ksi mm						m	1
	Base Plate Thickness	36 440	mm mm	34	Pass]	4	VIXIA	-	
	Flange Width	17.32	inches]	d		0.95d	N
	Depth	420 16.54	mm inches				•	2224		
	m Base Plate Dimension - N	3.96 23.622	inches inches	600	mm					•
	n Base Plate Dimension - B	4.88 23.622	inches inches	600	mm	1	 n-	0.80bf	- n - -	
	Area of base plate - A1 Load Case	558.00 8	inches 9	10	11	12	13	14	15	16
	Load Combination Fx (Ton)	SW +DL +LL 0.5	SW + WX -7.22	SW +W-X 7.5	SW+WZ 0.41	SW+W-Z -0.24	SW+DL+LL+WX -6.8	SW+DL+LL+W-X 7.92	SW+DL+LL+WZ 0.83	SW+DL+LL+W-Z 0.18
	Fy (Ton)	137.55	47.85	13.82	78.94	44.64	168.21	106.54	199.3	75.72
	Fz (Ton) Resultant shear force	3.88 3.9	7.2	0.11 7.5	15.86 15.8	-16.53 16.5	4.02 7.8	3.73 8.7	19.48 19.4	-12.92 12.9
			Α	llowable Sti	ess Design					
	Case 1 (Area of base plate = Area of concrete)									
	Area of base plate A1					558.				
	Area of concrete A2					558.				
	Axial compressive load - kips (Pa) Compressive Strength of concrete- fc (kg/m²)	303.16	105.46	30.46	173.98	98.39 255 0		234.81	439.26	166.89
	Compressive Strength of concrete (ksi) Required Base Plate area (Ω*Pa / 0.85 *fc) inches²	245.839	85.521	24.700	141.087	3.6 79.784	300.637	190.416	356.203	135.332
	Delta Base plate Breadth (N) in inches	0.93 17	0.93 10	0.93 6	0.93 13	0.93 10	0.93 18	0.93 15	0.93 20	0.93 13
	N Considered	23.62	23.62	23.62	23.62	23.62	23.62	23.62	23.62	23.62
	Base Plate length (B) in inches B considered	23.62	23.62	23.62	23.62	23.62	16 23.62	13 23.62	18 23.62	23.62
	Condition (0.85*fc*A1 *VA2/A1)/2.50) > Fy (Kips)	688.1	688.1	688.1	688.1	688.1	688.1	688.1	688.1	688.1
		TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE
	Factor X	0.44 0.76	0.15 0.41	0.04 0.21	0.25 0.54	0.14 0.39	0.54 0.87	0.34 0.64	0.64 1.00	0.24 0.53
	λ λn'	0.76 3.21	0.41	0.21	0.54	0.39 1.66	0.87 3.70	0.64 2.73	1.00	0.53
	All	3.21	1.72	0.90	2.28			2.73	4.22	2.23
	Proceedings Third and Control	1.10	0.65	0.25	0.02	4.88		0.00	4.22	0.04
	Base Plate Thickness (inches) Base Plate Thickness (mm)	1.10 27.84	0.65 16.42	0.35 8.82	0.83 21.09	0.62 15.86	1.21 30.79	0.96 24.50	1.32 33.51	0.81 20.66
	Uplift Condition									
	Yield Stress of Plate (F _y) V2 bf				36 24.50					
	Guage Distance (Centre to centre) mm Guage Distance (Centre to centre) inches				231.00 9.09					
	Guage Distance (centre to centre / menes									
	Condition 1 (√2 bf < d)		A	llowable Str	ess Design					
	Plate thickness (inches)				1.339					
	Condition 1 ($\sqrt{2}$ bf > d)									
	Plate thickness (inches)				1.290					
	Plate Thickness (inches) Plate Thickness (mm)				1.290 32.76					
										•
	Description	Parameter	Unit			Remarks				
	Bolt Considered M33 Bolt material	IS 2062 E 250 A								
	Minimum Embedment Length	396	mm							
	Tensile Strength Yield Stress	410 230	N/mm ²			IS 2062 Table No 2				
	No of Bolts Major/Nominal Diameter	8 33	mm							
	Pitch Core Diameter	3 28.706	mm mm							
	Shank Area of bolt Stress Area	855.299 694	mm ²							
	Root Area	665.08	mm ²							
	Hole diameter	36	mm							
	Edge distance (For Side N)	69	mm							
	Minimum edge distance Edge distance	54 69	mm mm							
	(For Side B) Guage Distance between Holes (For Side "B")	231	mm							
	Guage Distance between Holes (For Side "N")	231	mm							
	Tensile	stress in anchor ro	d							
	Required tension in bolt Required tension per bolt	78.94 9.868	Tons Tons							
	Actual tensile stress per bolt	11.54	kg/mm ²	Acce	epted	IS:800 11.6.2.3				
	Permissible tensile stress per bolt	12.78	kg/mm ²			IS800 11.6.2.3				
	Nominal Tensile capacity per bolt Design Strength due to yielding	178835.16 178835.16	N N	18.22	Tons					
	Design Strength due to rupture at threaded section	204868.80	N	20.88	Tons					
	Shear	 Stress in anchor roc	<u> </u> 	<u> </u>	<u> </u>	1				
	Shear force in bolt	19.4	Tons							
	Shear force per bolt	2.425	Tons							
	Actual shear stress in bolt	2.84	kg/mm ²	Acce	epted	IS:800 11.6.2.1				
	Permissible Shear stress per bolt Nominal shear capacity of bolt	11.25 157434.2	kg/mm ²			IS:800 11.6.2.1 IS:800 10.3.3				
		Stress of bolt on pla				2.200 10.3.3				
					anted	S-200 11 C 2 2				
	Actual Stress of bolt in bearing Nominal bearing area of bolt on plate	2.04 1188.0	kg/mm ²	Acce	epted	IS:800 11.6.2.2				
<u> </u>			<u> </u>							

N

kg/mm²

kg/mm²

kg/mm²

Accepted

62.67

1217700.0

2.84

11.25

11.54

12.78

0.88

Combined Shear and Tension

IS:800 11.6.2.2

IS:800 11.6.2.5

Permissible bearing stress of the bolt

Nominal bearing strength of bolt

Actual Shear stress in bolt

Permissible Shear stress per bolt

Actual tensile stress per bolt

Permissible tensile stress per bolt

Description	Parameter	Unit	Remark						
					1	-	— в —	-	
Column D4 Yield Stress of Plate (F _v)	D ISMB 400 36	ksi			_		- b _f		_
Base Plate Size	600 x 600	mm	24	Davis				m	1
Base Plate Thickness Flange Width	36 440	mm mm	34	Pass		†			
Flatige Width	17.32 420	inches mm			-	d		0.95d	N
Depth	16.54	inches				<u> </u>	222		
m Base Plate Dimension - N	3.96 23.622	inches inches	600	mm	-			m T	•
n	4.88	inches				→ n	0.80b _f	- n -	
Base Plate Dimension - B Area of base plate - A1	23.622 558.00	inches inches	600	mm	-				
Load Case Load Combination	8 SW +DL +LL	9 SW + WX	10 SW +W-X	11 SW+WZ	12 SW+W-Z	13 SW+DL+LL+WX	14 SW+DL+LL+W-X	15 SW+DL+LL+WZ	16 SW+DL+LL
Fx (Ton)	0.44	-6.96	7.17	-0.2	0.3	-6.58	7.56	0.19	0.69
Fy (Ton) Fz (Ton)	136.43 -3.88	48.35 -0.33	14.46 -0.2	45.84 16.29	80.04 -15.63	167.66 -3.94	104.84 -3.82	73.47 12.68	199.3 ⁴ -19.2 ⁴
Resultant shear force	3.9	6.9	7.1	16.2	15.6	7.6	8.4	12.6	19.2
			Allowable Str	ess Design					
Case 1 (Area of base plate = Area of concrete) Area of base plate A1					558	3.00			
Area of concrete A2					558	3.00			
Axial compressive load - kips (Pa) Compressive Strength of concrete- fc (kg/m²)	300.69	106.56	31.87	101.03		369.52 0000	231.07	161.93	439.35
Compressive Strength of concrete (ksi) Required Base Plate area (Ω^* Pa / 0.85 *fc) inches ²	243.837	86.414	25.844	81.928	3. 143.053	299.654	187.377	131.311	356.27
Delta	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Base plate Breadth (N) in inches N Considered	23.62	10 23.62	6 23.62	10 23.62	13 23.62	18 23.62	15 23.62	12 23.62	20 23.62
Base Plate length (B) in inches	15	8	4	8	11	16	13	11	18
B considered	23.62	23.62	23.62	23.62	23.62	23.62	23.62	23.62	23.62
Condition (0.85*fc*A1 *VA2/A1)/2.50) > Fy (Kips)	688.1	688.1	688.1	688.1	688.1	688.1	688.1	688.1	688.1
	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE
Factor X	0.44 0.76	0.15 0.41	0.05 0.22	0.15 0.40	0.26 0.54	0.54 0.87	0.34 0.64	0.24 0.52	0.64 1.00
λ	0.76	0.41	0.22	0.40	0.54	0.87	0.64	0.52	1.00
λn'	3.19	1.73	0.92	1.69	2.30	3.69	2.70	2.19	4.22
I		1	i	'	4.8	819	· · · · · · · · · · · · · · · · · · ·		1
Base Plate Thickness (inches)	1.09	0.65	0.36	0.63	0.84	1.21	0.96	0.80	1.32
Base Plate Thickness (mm)	27.73	16.51	9.03	16.07	21.24	30.74	24.30	20.35	33.51
Uplift Condition Yield Stress of Plate (F _v)				36					
V2 bf				24.50					
Guage Distance (Centre to centre) mm Guage Distance (Centre to centre) inches				231.00 9.09					
Guage Distance (Gentre to centre / menes									
Condition 1 (V2 bf < d)			Allowable Str	ess Design					
Plate thickness (inches)				1.021					
Condition 1 ($\sqrt{2}$ bf > d)									
Plate thickness (inches)				0.983					
Plate Thickness (inches)				0.983					
Plate Thickness (mm)				24.97		1			
Description	Parameter	Unit			Remarks				
Bolt Considered M33 Bolt material	IS 2062 E 250 A					-			
Minimum Embedment Length	396	mm							
Tensile Strength Yield Stress	410 230	N/mm ²			IS 2062 Table No 2				
No of Bolts	8								
Major/Nominal Diameter Pitch	33	mm mm				_			
Core Diameter	28.706	mm 2							
Shank Area of bolt Stress Area	855.299 694	mm ²				_			
Root Area	665.08	mm ²				4			
Hole diameter	36	mm				1			
Edge distance (For Side N)	69	mm							
Minimum edge distance	54	mm				1			
Edge distance (For Side B)	69	mm							
Guage Distance between Holes (For Side "B")	231	mm				1			
Guage Distance between Holes (For Side "N")	231	mm				1			
Tens	le stress in anchor re	σα	<u> </u>	<u> </u>]			
Required tension in bolt	45.84	Tons				-			
Required tension per bolt Actual tensile stress per bolt	5.730 6.70	Tons kg/mm²	Acce	pted	IS:800 11.6.2.3	1			
Permissible tensile stress per bolt	12.78	kg/mm ²			IS800 11.6.2.3	1			
Nominal Tensile capacity per bolt	178835.16	N			15000 11.0.2.3	1			
Design Strength due to yielding	178835.16	N	18.22	Tons					
Design Strength due to rupture at threaded section	204868.80	N	20.88	Tons					

204868.80 N 20.88 Tons

Tons Tons

kg/mm²

kg/mm²

kg/mm²

kg/mm²

N

kg/mm²

kg/mm²

kg/mm²

Accepted

Accepted

Accepted

IS:800 11.6.2.1

IS:800 11.6.2.1

IS:800 10.3.3

IS:800 11.6.2.2

IS:800 11.6.2.2

IS:800 11.6.2.5

Shear Stress in anchor rod

19.2

2.4

2.81

11.25 157434.2

2.02

1188.0

62.67

1217700.0

2.81

11.25

12.78

0.34

6.70

Combined Shear and Tension

Bearing Stress of bolt on plate

Design Strength due to rupture at threaded section

Shear force in bolt

Shear force per bolt

Actual shear stress in bolt

Permissible Shear stress per bolt

Nominal shear capacity of bolt

Actual Stress of bolt in bearing

Nominal bearing area of bolt on plate

Permissible bearing stress of the bolt

Nominal bearing strength of bolt

Actual Shear stress in bolt

Permissible Shear stress per bolt

Actual tensile stress per bolt

Permissible tensile stress per bolt

Description	Parameter	Unit	Remark						
Column B5	UC 305 x 305 x 18					-	В —	-	
Base Plate Size	500 X 500		27	Pass			- b _f	-	T
Base Plate Thickness (mm) Yield Stress of Plate (F _y)	32 36	mm ksi	21	PdSS		1	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	m	
Flange Width	307 12.09	mm inches				d d		0.95d	N
Depth	314 12.36	mm inches]	Ţ			
m	3.97	inches				-		·	ļ
Base Plate Dimension - N n	19.685 5.01	inches inches	500	mm		- n	0.80bf	-n-	<u> </u>
Base Plate Dimension - B Area of base plate - A1	19.685 387.50	inches inches	500	mm					
Load Case Load Combination	8 SW +DL +LL	9 SW + WX	10 SW +W-X	11 SW+WZ	12 SW+W-Z	13 SW+DL+LL+WX	14 SW+DL+LL+W-X	15 SW+DL+LL+WZ	16 SW+DL+LL+W-Z
Fx (Ton)	0.28	-6.88	6.81	0.06	-0.23	-6.52	7.18	0.43	0.13
Fy (Ton) Fz (Ton)	70.49 0.42	18.43 0.2	3.61 0.16	15.96 4.65	1.1 -5.53	81.42 0.44	59.38 0.4	78.95 4.88	61.89 -5.29
Resultant shear force	0.5	6.8	6.8	4.6	5.5	6.5	7.1	4.8	5.2
		Α	llowable Stres	s Design					
Case 1 (Area of base plate = Area of concrete)					207.50	1			
Area of base plate A1 Area of concrete A2		1			387.50 387.50		T		
Axial compressive load - kips (Pa)	155.36	40.62	7.96	35.18	2.42	179.45	130.87	174.01	136.41
Compressive Strength of concrete- fc (kg/m²) Compressive Strength of concrete (ksi)					255000 3.63	00			
Required Base Plate area (Ω^* Pa / 0.85 *fc) inches ²	125.985	32.939	6.452	28.525	1.966	145.519	106.128	141.105	110.614
Delta Base plate Breadth (N) in inches	1.04	1.04 7	1.04 4	1.04 6	1.04 2	1.04	1.04	1.04 13	1.04 12
N Considered Base Plate length (B) in inches	20 10	20 5	20 2	20 4	20	20 11	20 9	20 11	20 10
B considered	20	20	20	20	20	20	20	20	20
Candikian (0.05*fa*A4.*.(A2/A4)/2.50) > 5(//ina)	477.9	477.9	477.9	477.9	477.9	477.9	477.9	477.9	477.9
Condition (0.85*fc*A1 *VA2/A1)/2.50) > Fy (Kips)	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE
Factor X	0.33	0.08	0.02	0.07	0.01	0.38	0.27	0.36	0.29
λ	0.63 0.63	0.30 0.30	0.13 0.13	0.28 0.28	0.07 0.07	0.68 0.68	0.57 0.57	0.67 0.67	0.58 0.58
λn'	1.91	0.91	0.40	0.84	0.22	2.09	1.73	2.05	1.77
I I					5.0079)	1		
Base Plate Thickness (inches)	0.97	0.49	0.22	0.46	0.12	1.04	0.89	1.02	0.91
Base Plate Thickness (mm)	0.97 24.53	0.49 12.54	0.22 5.55	0.46 11.67			0.89 22.52	1.02 25.96	0.91 22.99
Base Plate Thickness (mm) Uplift Condition			5.55		0.12 3.06	1.04			
Base Plate Thickness (mm) Uplift Condition Yield Stress of Plate (F _y) √2 bf			36 17.09		0.12 3.06 36 17.09	1.04			
Uplift Condition Yield Stress of Plate (F _y)			5.55 36		0.12 3.06 36	1.04			
Base Plate Thickness (mm) Uplift Condition Yield Stress of Plate (F _y) √2 bf Guage Distance (Centre to centre) mm		12.54	36 17.09 388 15.28	11.67	0.12 3.06 36 17.09 194	1.04			
Base Plate Thickness (mm) Uplift Condition Yield Stress of Plate (F _y) V2 bf Guage Distance (Centre to centre) mm Guage Distance (Centre to centre) inches Condition 1 (V2 bf < d)		12.54	36 17.09 388 15.28	11.67	0.12 3.06 36 17.09 194 7.64	1.04			
Base Plate Thickness (mm) Uplift Condition Yield Stress of Plate (F _y) V2 bf Guage Distance (Centre to centre) mm Guage Distance (Centre to centre) inches Condition 1 (V2 bf < d) Plate thickness (inches)		12.54	36 17.09 388 15.28	11.67	0.12 3.06 36 17.09 194	1.04			
Base Plate Thickness (mm) Uplift Condition Yield Stress of Plate (F _y) V2 bf Guage Distance (Centre to centre) mm Guage Distance (Centre to centre) inches Condition 1 (V2 bf < d)		12.54	36 17.09 388 15.28	11.67	0.12 3.06 36 17.09 194 7.64	1.04			
Base Plate Thickness (mm) Uplift Condition Yield Stress of Plate (F _y) V2 bf Guage Distance (Centre to centre) mm Guage Distance (Centre to centre) inches Condition 1 (V2 bf < d) Plate thickness (inches) Condition 1 (V2 bf > d) Plate thickness (inches)		12.54	36 17.09 388 15.28 Illowable Stres 0.444	11.67	0.12 3.06 36 17.09 194 7.64 0.173	1.04			
Base Plate Thickness (mm) Uplift Condition Yield Stress of Plate (F _y) V2 bf Guage Distance (Centre to centre) mm Guage Distance (Centre to centre) inches Condition 1 (V2 bf < d) Plate thickness (inches) Condition 1 (V2 bf > d)		12.54	36 17.09 388 15.28 Illowable Stres	11.67	0.12 3.06 36 17.09 194 7.64 0.173	1.04			
Base Plate Thickness (mm) Uplift Condition Yield Stress of Plate (F _y) V2 bf Guage Distance (Centre to centre) mm Guage Distance (Centre to centre) inches Condition 1 (V2 bf < d) Plate thickness (inches) Condition 1 (V2 bf > d) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (inches)	24.53	12.54	36 17.09 388 15.28 Illowable Stres 0.444 0.433	11.67	0.12 3.06 36 17.09 194 7.64 0.173 0.169 4.29	1.04			
Uplift Condition Yield Stress of Plate (F _y) V2 bf Guage Distance (Centre to centre) mm Guage Distance (Centre to centre) inches Condition 1 (V2 bf < d) Plate thickness (inches) Condition 1 (V2 bf > d) Plate thickness (inches)		12.54	36 17.09 388 15.28 Illowable Stres 0.444 0.433	11.67	0.12 3.06 36 17.09 194 7.64 0.173 0.169	1.04			
Base Plate Thickness (mm) Uplift Condition Yield Stress of Plate (F _y) V2 bf Guage Distance (Centre to centre) mm Guage Distance (Centre to centre) inches Condition 1 (V2 bf < d) Plate thickness (inches) Condition 1 (V2 bf > d) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M24	Parameter	12.54	36 17.09 388 15.28 Illowable Stres 0.444 0.433	11.67	0.12 3.06 36 17.09 194 7.64 0.173 0.169 4.29	1.04			
Uplift Condition Yield Stress of Plate (Fy) V2 bf Guage Distance (Centre to centre) mm Guage Distance (Centre to centre) inches Condition 1 (V2 bf < d) Plate thickness (inches) Condition 1 (V2 bf > d) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M24 Bolt material Minimum Embedment Length	Parameter IS 2062 E 250 A 288	12.54 A Unit mm	36 17.09 388 15.28 Illowable Stres 0.444 0.433	11.67	0.12 3.06 36 17.09 194 7.64 0.173 0.169 4.29 Remarks	1.04			
Base Plate Thickness (mm) Uplift Condition Yield Stress of Plate (F _y) V2 bf Guage Distance (Centre to centre) mm Guage Distance (Centre to centre) inches Condition 1 (V2 bf < d) Plate thickness (inches) Condition 1 (V2 bf > d) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M24 Bolt material Minimum Embedment Length Tensile Strength Yield Stress	Parameter IS 2062 E 250 A	12.54 A Unit	36 17.09 388 15.28 Illowable Stres 0.444 0.433	11.67	0.12 3.06 36 17.09 194 7.64 0.173 0.169 4.29	1.04			
Base Plate Thickness (mm) Uplift Condition Yield Stress of Plate (F _y) V2 bf Guage Distance (Centre to centre) mm Guage Distance (Centre to centre) inches Condition 1 (V2 bf < d) Plate thickness (inches) Condition 1 (V2 bf > d) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M24 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts	Parameter IS 2062 E 250 A 288 410 230 6	Lunit mm N/mm² N/mm²	36 17.09 388 15.28 Illowable Stres 0.444 0.433	11.67	0.12 3.06 36 17.09 194 7.64 0.173 0.169 0.169 4.29 Remarks	1.04			
Uplift Condition Yield Stress of Plate (F _y) V2 bf Guage Distance (Centre to centre) mm Guage Distance (Centre to centre) inches Condition 1 (V2 bf < d) Plate thickness (inches) Condition 1 (V2 bf > d) Plate Thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M24 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch	Parameter IS 2062 E 250 A 288 410 230 6 24 3	Lange of the second of the sec	36 17.09 388 15.28 Illowable Stres 0.444 0.433	11.67	0.12 3.06 36 17.09 194 7.64 0.173 0.169 0.169 4.29 Remarks	1.04			
Base Plate Thickness (mm) Uplift Condition Yield Stress of Plate (F _Y) V2 bf Guage Distance (Centre to centre) mm Guage Distance (Centre to centre) inches Condition 1 (V2 bf < d) Plate thickness (inches) Condition 1 (V2 bf > d) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (inches) Description Bolt Considered M24 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter	Parameter IS 2062 E 250 A 288 410 230 6 24	Lange of the second of the sec	36 17.09 388 15.28 Illowable Stres 0.444 0.433	11.67	0.12 3.06 36 17.09 194 7.64 0.173 0.169 0.169 4.29 Remarks	1.04			
Base Plate Thickness (mm) Uplift Condition Yield Stress of Plate (F _V) V2 bf Guage Distance (Centre to centre) mm Guage Distance (Centre to centre) inches Condition 1 (V2 bf < d) Plate thickness (inches) Condition 1 (V2 bf > d) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M24 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch Core Diameter Shank Area of bolt Stress Area	Parameter IS 2062 E 250 A 288 410 230 6 24 3 20.32 452.389 353	I2.54 Unit mm N/mm² N/mm² mm mm mm mm mm mm mm² mm²	36 17.09 388 15.28 Illowable Stres 0.444 0.433	11.67	0.12 3.06 36 17.09 194 7.64 0.173 0.169 0.169 4.29 Remarks	1.04			
Uplift Condition Yield Stress of Plate (F _V) V2 bf Guage Distance (Centre to centre) mm Guage Distance (Centre to centre) inches Condition 1 (V2 bf < d) Plate thickness (inches) Condition 1 (V2 bf > d) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M24 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch Core Diameter Shank Area of bolt Stress Area Root Area	Parameter IS 2062 E 250 A 288 410 230 6 24 3 20.32 452.389 353 317.31	Mm N/mm² N/mm² mm mm mm² mm² mm² mm² mm²	36 17.09 388 15.28 Illowable Stres 0.444 0.433	11.67	0.12 3.06 36 17.09 194 7.64 0.173 0.169 0.169 4.29 Remarks	1.04			
Base Plate Thickness (mm) Uplift Condition Yield Stress of Plate (F _y) V2 bf Guage Distance (Centre to centre) mm Guage Distance (Centre to centre) inches Condition 1 (V2 bf < d) Plate thickness (inches) Condition 1 (V2 bf > d) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M24 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch Core Diameter Shank Area of bolt Stress Area Root Area Hole diameter Edge distance	Parameter IS 2062 E 250 A 288 410 230 6 24 3 20.32 452.389 353 317.31	Mm N/mm² N/mm² mm mm mm² mm² mm² mm² mm² mm² mm²	36 17.09 388 15.28 Illowable Stres 0.444 0.433	11.67	0.12 3.06 36 17.09 194 7.64 0.173 0.169 0.169 4.29 Remarks	1.04			
Base Plate Thickness (mm) Uplift Condition Yield Stress of Plate (F _y) V2 bf Guage Distance (Centre to centre) mm Guage Distance (Centre to centre) inches Condition 1 (V2 bf < d) Plate thickness (inches) Condition 1 (V2 bf > d) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M24 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch Core Diameter Shank Area of bolt Stress Area Root Area Hole diameter Edge distance (For Side N)	Parameter IS 2062 E 250 A 288 410 230 6 24 3 20.32 452.389 353 317.31	Mm N/mm² N/mm² mm mm mm² mm² mm² mm² mm²	36 17.09 388 15.28 Illowable Stres 0.444 0.433	11.67	0.12 3.06 36 17.09 194 7.64 0.173 0.169 0.169 4.29 Remarks	1.04			
Base Plate Thickness (mm) Uplift Condition Yield Stress of Plate (F _V) V2 bf Guage Distance (Centre to centre) mm Guage Distance (Centre to centre) inches Condition 1 (V2 bf < d) Plate thickness (inches) Condition 1 (V2 bf > d) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M24 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch Core Diameter Shank Area of bolt Stress Area Root Area Hole diameter Edge distance (For Side N) Minimum edge distance Edge distance Edge distance	Parameter IS 2062 E 250 A 288 410 230 6 24 3 20.32 452.389 353 317.31	Mm N/mm² N/mm² mm mm mm² mm² mm² mm² mm² mm² mm² m	36 17.09 388 15.28 Illowable Stres 0.444 0.433	11.67	0.12 3.06 36 17.09 194 7.64 0.173 0.169 0.169 4.29 Remarks	1.04			
Base Plate Thickness (mm) Uplift Condition	Parameter IS 2062 E 250 A 288 410 230 6 24 3 20.32 452.389 353 317.31 27 56 40.5 56 194	nmm N/mm² N/mm² N/mm² mm mm mm mm² mm² mm² mm² mm² mm mm m	36 17.09 388 15.28 Illowable Stres 0.444 0.433	11.67	0.12 3.06 36 17.09 194 7.64 0.173 0.169 0.169 4.29 Remarks	1.04			
Base Plate Thickness (mm) Uplift Condition Yield Stress of Plate (F _v) Y2 bf Guage Distance (Centre to centre) mm Guage Distance (Centre to centre) inches Condition 1 (√2 bf < d) Plate thickness (inches) Condition 1 (√2 bf > d) Plate thickness (inches) Plate Thickness (inches) Plate Thickness (inches) Plate Thickness (mm) Description Bolt Considered M24 Bolt material Minimum Embedment Length Tensile Strength Yield Stress No of Bolts Major/Nominal Diameter Pitch Core Diameter Shank Area of bolt Stress Area Root Area Hole diameter Edge distance (For Side N) Minimum edge distance Edge distance Edge distance (For Side B)	Parameter IS 2062 E 250 A 288 410 230 6 24 3 20.32 452.389 353 317.31 27 56 40.5 56	Mm N/mm² N/mm² mm mm² mm² mm² mm² mm² mm² mm mm mm	36 17.09 388 15.28 Illowable Stres 0.444 0.433	11.67	0.12 3.06 36 17.09 194 7.64 0.173 0.169 0.169 4.29 Remarks	1.04			

Tensile stress in anchor rod

3.61 0.602

1.33

12.78

94590.50

94590.50

104205.60

7.1

1.18

2.62

10.15

75111.3

62.67

787200.0

2.62

10.15

1.33

12.78

0.08

Combined Shear and Tension

Bearing Stress of bolt on plate

Shear Stress in anchor rod

Required tension in bolt

Required tension per bolt

Actual tensile stress per bolt

Permissible tensile stress per bolt

Nominal Tensile capacity per bolt

Design Strength due to yielding

Design Strength due to rupture at threaded section

Shear force in bolt

Shear force per bolt

Actual shear stress in bolt

Permissible Shear stress per bolt

Nominal shear capacity of bolt

Actual Stress of bolt in bearing

Nominal bearing area of bolt on plate

Permissible bearing stress of the bolt

Nominal bearing strength of bolt

Actual Shear stress in bolt

Permissible Shear stress per bolt

Actual tensile stress per bolt

Permissible tensile stress per bolt

Combined Shear and Tension

Tons

Tons

kg/mm²

kg/mm²

N N

Tons

Tons

kg/mm²

kg/mm²

kg/mm²

mm²

kg/mm²

kg/mm²

kg/mm²

kg/mm²

N 10.62

Accepted

9.64 Tons

Accepted

Accepted

Accepted

Tons

IS:800 11.6.2.3

IS800 11.6.2.3

IS:800 11.6.2.1

IS:800 11.6.2.1 IS:800 10.3.3

IS:800 11.6.2.2

IS:800 11.6.2.2

IS:800 11.6.2.5

		1	1	T	T				
Description	Parameter	Unit	Remark		<u> </u>		5		
Column D5	UC 305 x 305 x 18				1		— в —	-	
Base Plate Size Base Plate Thickness	500 X 500 32	mm	26.00	Pass	<u> </u>		1	1	1
Yield Stress of Plate (F _v)	36	ksi	20.00	1 433	-		77777	, m	
Flange Width	307	mm				Ţ		0.05 4	
	12.09 314	inches mm			-	a		0.95d	N
Depth	12.36	inches				1	411		
m Base Plate Dimension - N	3.97 19.685	inches inches	500	mm	_				<u> </u>
n December Discoursion D	5.01	inches	500]	⊸n-	0.80b _f	- n -	
Base Plate Dimension - B Area of base plate - A1	19.685 387.50	inches inches	500	mm	-				
Load Case	8	9 SW + WX	10	11	12	13	14	15	16
Load Combination Fx (Ton)	SW +DL +LL 0.37	-6.35	SW +W-X 6.11	SW+WZ -0.17	SW+W-Z 0.06	SW+DL+LL+WX -5.7	SW+DL+LL+W-X 6.53	SW+DL+LL+WZ 0.25	SW+DL+L 0.48
Fy (Ton)	67.9	17.67	3.1	2.42	17.18	78.2	57.43	58.11	77.7
Fz (Ton) Resultant shear force	-0.44 0.5	-0.19 6.3	-0.18 6.1	4.96 4.9	-4.06 4	-0.44 5.7	-0.43 6.5	4.71 4.7	-4.3 4.3
		All	bl- Chi-	Desire					
		All	owable Stre	ess Design					
Case 1 (Area of base plate = Area of concrete)									
Area of base plate A1 Area of concrete A2					387.5007 387.5007				
Area of concrete Az					387.5007	7/5			
Axial compressive load - kips (Pa)	149.65	38.94	6.83	5.33	37.86	172.35	126.58	128.07	171.2
Compressive Strength of concrete- fc (kg/m²) Compressive Strength of concrete (ksi)					255000 3.63	0			
Required Base Plate area (Ω^* Pa / 0.85 *fc) inches ²	121.356	31.581	5.541	4.325	30.705	139.764	102.643	103.858	138.8
Delta Base plate Breadth (N) in inches	1.04	1.04 7	1.04 3	1.04 3	1.04 7	1.04	1.04	1.04 11	1.04
N Considered	19.69	19.69	19.69	19.69	19.69	19.69	19.69	19.69	19.69
Base Plate length (B) in inches B considered	10 19.69	19.69	2 19.69	1 19.69	5 19.69	11 19.69	9 19.69	9 19.69	11 19.69
D considered									
Condition (0.85*fc*A1 *VA2/A1)/2.50) > Fy (Kips)	477.9 TRUE	477.9 TRUE	477.9 TRUE	477.9 TRUE	477.9 TRUE	477.9 TRUE	477.9 TRUE	477.9 TRUE	477.9 TRU
Factor X	0.31 0.61	0.08	0.01 0.12	0.01 0.11	0.08 0.29	0.36 0.67	0.26 0.55	0.27 0.56	0.36 0.66
λ	0.61	0.29	0.12	0.11	0.29	0.67	0.55	0.56	0.66
λn'	1.87	0.89	0.37	0.32	0.88	2.04	1.69	1.71	2.03
I					5.0079				
Base Plate Thickness (inches)	0.95	0.48	0.20	0.18	0.48	1.02	0.87	0.88	1.01
Base Plate Thickness (mm)	24.08	12.28	5.14	4.55	12.11	25.84	22.14	22.27	25.70
Uplift Condition									
Yield Stress of Plate (F _y)			36	36					
ν2 bf Guage Distance (Centre to centre) mm			17.09 388.00	17.09 194.00					-
Guage Distance (Centre to centre) inches			15.28	7.64					
		All	 owable Stre	l ess Design					
Condition 1 (V2 bf < d)		7		2 00.8					
Plate thickness (inches)			0.412	0.257					
Condition 1 ($\sqrt{2}$ bf > d) Plate thickness (inches)			0.401	0.251					-
Plate Thickness (inches) Plate Thickness (mm)			0.401 10.19	0.251 6.37					
, ,						' 1			
Description	Parameter	Unit			Remarks				
Delta Constituted MANA									
Bolt Considered M24 Bolt material	IS 2062 E 250 A								
Minimum Embedment Length	288	mm 2			15.5.]			
Tensile Strength Yield Stress	410 230	N/mm ²			IS 2062 Table No 2				
No of Bolts	6]			
Major/Nominal Diameter Pitch	24 3	mm mm							
Shank Area of bolt	452.389	mm ²							
Stress Area	353	mm ²							
Root Area	317.31	mm ²							
Hole diameter	27								
Edge distance	56	mm							
(For Side N)		<u>l</u>	<u>L</u>		<u> </u>				
(For Side N) Minimum edge distance Edge distance	40.5	mm							

mm

mm

Tons Tons

kg/mm²

kg/mm² N

Tons

Tons

kg/mm²

kg/mm² N

 1.41
 kg/mm²
 Accepted

 768.0
 mm²

kg/mm²

N

kg/mm²

kg/mm²

kg/mm²

kg/mm²

Accepted

Accepted

Accepted

Tons

 N
 9.64
 Tons

 N
 10.62
 Tons

IS:800 11.6.2.3

IS800 11.6.2.3

IS:800 11.6.2.1

IS:800 11.6.2.1

IS:800 10.3.3

IS:800 11.6.2.2

IS:800 11.6.2.2

IS:800 11.6.2.5

194

388

3.1 0.517

1.14

12.78

94590.50

94590.50

104205.60

6.5

1.08

2.39

75111.3

62.67

787200.0

2.39

10.15

1.14

12.78

0.06

Combined Shear and Tension

Bearing Stress of bolt on plate

Shear Stress in anchor rod

Tensile stress in anchor rod

(For Side B) Guage Distance between Holes (For Side "B")

Guage Distance between Holes (For Side "N")

Required tension in bolt

Required tension per bolt

Actual tensile stress per bolt

Permissible tensile stress per bolt

Nominal Tensile capacity per bolt

Design Strength due to yielding of gross section

Design Strength due to rupture at threaded section

Shear force in bolt

Shear force per bolt

Actual shear stress in bolt

Permissible Shear stress per bolt Nominal shear capacity of bolt

Actual Stress of bolt in bearing Nominal bearing area of bolt on plate

Permissible bearing stress of the bolt

Nominal bearing strength of bolt

Actual Shear stress in bolt

Permissible Shear stress per bolt

Actual tensile stress per bolt

Permissible tensile stress per bolt

Description	Parameter	Unit	Remark						
		Unit	Remark		-	-	— в —	-	
Column B6 Base Plate Size	UC 254 x 254 x 107 500 x 500			_	-		b _f	1	T
Base Plate Thickness Yield Stress of Plate (F _y)	32 36	mm ksi	29	Pass		1	 \	m	Ī
Flange Width	259 10.20	mm inches				d		0.95d	N
Depth	267 10.51	mm inches				V			
m Base Plate Dimension - N	4.85 19.685	inches inches	500	mm			1		<u> </u>
n Base Plate Dimension - B	5.76 19.685	inches inches	500	mm]	→ n •	-0.80b _f -	→ n →	
Area of base plate - A1 Load Case	387.50 8	inches	10	11	12	13	14	15	
Load Combination Fx (Ton)	SW +DL +LL 0	SW + WX 0.2	SW +W-X -0.18	SW+WZ -0.01	SW+W-Z 0.01	SW+DL+LL+WX 0.2	SW+DL+LL+W-X -0.18	SW+DL+LL+WZ -0.01	SW+
Fy (Ton) Fz (Ton)	59.4 0.35	7.92 0.18	6.87	22.12 6.11	7.26 -7.15	59.9 0.36	58.85 0.35	74.09 6.28	
Resultant Shear Force (Tons)	0.3	0.2	0.2	6.1	7.1	0.4	0.3	6.2	
		Allo	wable Stres	ss Design					
Case 1 (Area of base plate = Area of concrete)									
Area of base plate A1 Area of concrete A2					387.50 387.50				
Axial compressive load - kips (Pa)	130.92	17.46	15.14	48.75	16.00	132.02	129.71	163.29	
Compressive Strength of concrete- fc (kg/m²) Compressive Strength of concrete (ksi)					2550000 3.63				
Required Base Plate area (Ω^* Pa / 0.85 *fc) inches ²	106.16	14.16	12.28	39.53	12.98	107.06	105.18	132.42	
Delta Base plate Breadth (N) in inches	0.91	0.91	0.91	0.91 7	0.91	0.91	0.91	0.91	
N Considered Base Plate length (B) in inches	19.69 9	19.69 3	19.69 3	19.69 5	19.69 3	19.69 10	19.69 9	19.69 11	
B considered	19.69	19.69	19.69	19.69	19.69	19.69	19.69	19.69	
Condition (0.85*fc*A1 *VA2/A1)/2.50) > Fy (Kips)	477.9 TRUE	477.9 TRUE	477.9 TRUE	477.9 TRUE	477.9 TRUE	477.9 TRUE	477.9 TRUE	477.9 TRUE	2
Factor X	0.27	0.04	0.03	0.10	0.03	0.28	0.27	0.34	
λ Condition check for λ	0.57 0.57	0.19 0.19	0.18 0.18	0.33 0.33	0.18 0.18	0.57 0.57	0.56 0.56	0.65 0.65	
λn'	1.46	0.50	0.46	0.85	0.48	1.47	1.45	1.67	
I					5.7638				
Base Plate Thickness (inches) Base Plate Thickness (mm)	1.02 25.92	0.37 9.46	0.35 8.81	0.62 15.82	0.36 9.06	1.02 26.03	1.02 25.80	1.14 28.95	
Uplift Condition									
Yield Stress of Plate (F _y) √2 bf					36 14.42				
Guage Distance (Centre to centre) mm					194.00				
Guage Distance (Centre to centre) inches					7.64				
Condition 1 (v2 bf < d)		Allo	wable Stres	ss Design					
Plate thickness (inches)					0.485				
Condition 1 (V2 bf > d)									
Plate thickness (inches)					0.473				
Plate Thickness (inches) Plate Thickness (mm)					0.473 12.02				
Description	Parameter	Unit			Remarks				
Bolt Considered M24 Bolt material	IS 2062 E 250 A								
Minimum Embedment Length Tensile Strength	288 410	mm N/mm²			IS 2062				
Yield Stress No of Bolts	230 6	N/mm ²			Table No 2				
Major/Nominal Diameter Pitch	24 3	mm mm							
Core Diameter Shank Area of bolt	20 452.389	mm mm²							
Stress Area Root Area	353 317.31	mm ²							
Hole diameter	27	mm							
Edge distance (For Side N)	56	mm							
Minimum edge distance Edge distance	40.5	mm							
(For Side B)	56 194	mm							
Guage Distance between Holes (For Side "B") Guage Distance between Holes (For Side "N")	388	mm mm							
т	ensile stress in anchor rod								
Required tension in bolt	7.26	Tons							
Required tension per bolt Actual tensile stress per bolt	1.210 2.67	Tons kg/mm ²	A.c.c.	epted	IS:800 11.6.2.3				
			ACCE	picu					
Permissible tensile stress per bolt Nominal Tensile capacity per bolt	12.78 94590.50	kg/mm ²	_	_	IS800 11.6.2.3				
Design Strength due to yielding of gross section	94590.50 104205.60	N N	9.64 10.62	Tons Tons					
Design Strength due to rupture at threaded section	104203.00			I	Ī.				
	Shear Stress in anchor rod	Tons							

kg/mm²

kg/mm²

 mm^2

kg/mm²

N

kg/mm²

kg/mm²

kg/mm²

N

Accepted

Accepted

Accepted

2.62

10.15

75111.3

1.54

768.0

62.67

787200.0

Combined Shear and Tension

2.62

10.15

2.67

12.78

0.11

Bearing Stress of bolt on plate

IS:800 11.6.2.1

IS:800 11.6.2.1

IS:800 10.3.3

IS:800 11.6.2.2

IS:800 11.6.2.2

IS:800 11.6.2.5

Actual shear stress in bolt

Permissible Shear stress per bolt

Nominal shear capacity of bolt

Actual Stress of bolt in bearing

Nominal bearing area of bolt on plate

Permissible bearing stress of the bolt

Nominal bearing strength of bolt

Actual Shear stress in bolt

Permissible Shear stress per bolt

Actual tensile stress per bolt

Permissible tensile stress per bolt

Sr No	Description	Parameter	Unit	Remark						
							.	D		
	Column D6	UC 254 x 254 x 107						B		
	Base Plate Size	500 x 500						→ b _f →		-
	Base Plate Thickness	32	mm	30	Pass			**************************************	m	A
	Yield Stress of Plate (F _y)	36	ksi				1	1 477777	- 	
	Flange Width	259	mm						J	
	rialige Wiutii	10.20	inches				d		0.95d	N
	Depth	267 10.51	mm inches				•	LLEYLA		
	m	4.85	inches						m̄	<u> </u>
	Base Plate Dimension- N	19.685	inches	500	mm		<u> </u>			1
	n	5.76	inches				- n-	— 0.80ь _f —	- n-l	
	Base Plate Dimension - B	19.685	inches	500	mm					
	Area of base plate - A1	387.50	inches				T	T	T	1
	Load Case	8	9	10	11	12	13	14	15	16
	Load Combination	SW +DL +LL	SW + WX	SW +W-X	SW+WZ	SW+W-Z	SW+DL+LL+WX	SW+DL+LL+W-X	SW+DL+LL+WZ	SW+DL+LL+V
	Fx (Ton)	-0.07 60.54	0.19 7.93	-0.17 6.87	0.01 7.29	-0.01 22.12	0.12 61.04	-0.24 59.98	-0.07 45.82	-0.08 75.24
	Fy (Ton) Fz (Ton)	-0.35	-0.18	-0.18	7.29	-6.1	-0.35	-0.35	6.98	-6.28
	Resultant Shear Force (Tons)	0.3	0.2	0.2	7.13	6.1	0.3	0.4	6.9	6.2
-	resultant shear rorce (rons)	0.5	0.2	0.2	7.1	0.1	0.5	0.4	0.5	0.2
			А	llowable Sti	ess Design					
	Case 1 (Area of base plate = Area of concrete)	1								
	Area of base plate – Area of concrete)					387.50				
	Area of concrete A2					387.50				
	Area or concrete Az					367.30	T			
	Axial compressive load - kips (Pa)	133.43	17.48	15.14	16.07	48.75	134.53	132.20	100.99	165.83
	Compressive Strength of concrete- fc (kg/m²)		•			2550000				•
	Compressive Strength of concrete - fc (ksi)					3.63				
	Required Base Plate area (Ω *Pa / 0.85 *fc) inches ²	108.20	14.17	12.28	13.03	39.53	109.09	107.20	81.89	134.47
	Delta	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
	Base plate Breadth (N) in inches	11	5	4	5	7	11	11	10	13
	N Considered	20	20	20	20	20	20	20	20	20
	Base Plate length (B) in inches	10	3	3	3	5	10	10	8	11
	B considered	20	20	20	20	20	20	20	20	20
		477.9	477.9	477.9	477.9	477.9	477.9	477.9	477.9	477.9
	Condition (0.85*fc*A1 *VA2/A1)/2.50) > Fy (Kips)	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE
			11.02	11.02		11102	11102	11.02	11.02	11.02
	Factor X	0.28	0.04	0.03	0.03	0.10	0.28	0.28	0.21	0.35
	λ	0.57	0.19	0.18	0.18	0.33	0.57	0.57	0.49	0.65
		0.57	0.19	0.18	0.18	0.33	0.57	0.57	0.49	0.65
	λn'	1.48	0.50	0.46	0.48	0.85	1.49	1.47	1.26	1.69
						F 7639				
	' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' '		1			5.7638	T		1	
	Base Plate Thickness (inches)	1.03	0.37	0.35	0.36	0.62	1.03	1.03	0.90	1.15
	Base Plate Thickness (mm)	26.17	9.47	8.81	9.08	15.82	26.27	26.05	22.76	29.17
	Uplift Condition									
	Yield Stress of Plate (F _y)				36					
	√2 bf				14.42					
	Guage Distance (Centre to centre) mm				194.50					
	Guage Distance (Centre to centre) inches				7.66					
			A	⊥ Ilowable Stı	ess Design				<u>[</u>	
	Condition 1 (√2 bf < d)									
	Plate thickness (inches)				0.487					
		†			21.0,					
	Condition 1 (V2 bf > d)									
	Plate thickness (inches)				0.475					
	Plate Thickness (inches)				0.475					
	Plate Thickness (mm)				12.07					
							_			
	~						_			
	Description	Parameter	Unit			Remarks	-			
		+	+				1			
	Bolt Considered M24									

Condition 1 (V2 bf > d)					
Plate thickness (inches)				0.475	
Plate Thickness (inches)				0.475	
Plate Thickness (mm)				12.07	
	1				1
Description	Parameter	Unit			Remarks
Bolt Considered M24					
Bolt material	IS 2062 E 250 A				
Minimum Embedment Length	288 410	mm N/mm ²			10.2002
Tensile Strength Yield Stress	230	N/mm N/mm ²			IS 2062 Table No 2
No of Bolts	6	N/mm			Table NO 2
Major/Nominal Diameter	24	mm			
Pitch	3	mm			
Core Diameter	20.32	mm			
Shank Area of bolt	452.389	mm ²			
Stress Area	353.00	mm ²			
Root Area	317.31	mm ²			
Hala diamatan	27				
Hole diameter Edge distance	27	mm			
(For Side N)	56.0	mm			Condition Satisfied
	10.5				As per IS:800
Minimum edge distance	40.5	mm			10.2.4.2
Edge distance	56	mm			Condition Satisfied
(For Side B)					
Guage Distance between Holes (For Side "B")	195	mm			Need To check
Guage Distance between Holes (For Side "N")	388	mm			
	ा Fensile Stress in Anchor Ro	nd		<u> </u>	
	Tensile Stress in Anchor in				
Required tension in bolt	7.29	Tons			
Required tension per bolt	1.215	Tons			
Actual tensile stress per bolt	2.69	kg/mm ²	Acce	epted	IS:800 11.6.2.3
Permissible tensile stress per bolt	12.78	kg/mm ²			IS800 11.6.2.3
Nominal Tensile capacity per bolt	94590.50	N	0.64	T	
Design Strength due to yielding of gross section Design Strength due to rupture at threaded section	94590.50 104205.60	N N	9.64 10.62	Tons Tons	
Design Strength due to rupture at threaded section	104203.00	IN	10.02	10113	
	Shear stress in anchor ro	d		•	•
Shear force in bolt	7.1	Tons			
Shear force per bolt	1.18	Tons			
Actual shear stress in bolt	2.62	1 . 1 2	A 666	epted	IS:800 11.6.2.1
Actual stress in boil	2.02	kg/mm ²	Acce	-pieu	13.800 11.0.2.1
Downissible Cheev stress now helt	10.15	kg/mm ²			IS:800 11.6.2.1
Permissible Shear stress per polit		NS/ !!!!!			IS:800 10.3.3
Permissible Shear stress per bolt Nominal shear capacity of bolt	75111.3	N			
Nominal shear capacity of bolt	75111.3	N			
Nominal shear capacity of bolt	75111.3 earing Stress of bolt on pl				
Nominal shear capacity of bolt B	earing Stress of bolt on pl	ate			
Nominal shear capacity of bolt B Actual Stress of bolt in bearing	earing Stress of bolt on pl	ate kg/mm ²	Acce	epted	IS:800 11.6.2.2
Nominal shear capacity of bolt B	earing Stress of bolt on pl	ate	Ассе	epted	IS:800 11.6.2.2
Nominal shear capacity of bolt B Actual Stress of bolt in bearing Nominal bearing area of bolt on plate	earing Stress of bolt on plane. 1.54 768.0	kg/mm ² mm ²	Acce	epted	
Nominal shear capacity of bolt B Actual Stress of bolt in bearing Nominal bearing area of bolt on plate Permissible bearing stress of the bolt	1.54 768.0	kg/mm ² mm ² kg/mm ²	Acce	epted	IS:800 11.6.2.2 IS:800 11.6.2.2
Nominal shear capacity of bolt B Actual Stress of bolt in bearing Nominal bearing area of bolt on plate	earing Stress of bolt on plane. 1.54 768.0	kg/mm ² mm ²	Acce	epted	
Nominal shear capacity of bolt B Actual Stress of bolt in bearing Nominal bearing area of bolt on plate Permissible bearing stress of the bolt Nominal bearing strength of bolt	1.54 768.0	kg/mm ² mm ² kg/mm ² N	Acce	epted	
Nominal shear capacity of bolt B Actual Stress of bolt in bearing Nominal bearing area of bolt on plate Permissible bearing stress of the bolt Nominal bearing strength of bolt	1.54 768.0 62.67 787200.0	kg/mm ² mm ² kg/mm ² N	Acce	epted	
Nominal shear capacity of bolt B Actual Stress of bolt in bearing Nominal bearing area of bolt on plate Permissible bearing stress of the bolt Nominal bearing strength of bolt	1.54 768.0 62.67 787200.0 Combined Shear and Tensi	kg/mm² mm² kg/mm² N on kg/mm²	Acce	epted	
Nominal shear capacity of bolt B Actual Stress of bolt in bearing Nominal bearing area of bolt on plate Permissible bearing stress of the bolt Nominal bearing strength of bolt Actual Shear stress in bolt	1.54 768.0 62.67 787200.0 Combined Shear and Tensi	kg/mm² mm² kg/mm² N on kg/mm² kg/mm² kg/mm²	Acce	epted	
Actual Stress of bolt in bearing Nominal bearing area of bolt on plate Permissible bearing stress of the bolt Nominal bearing strength of bolt Actual Shear stress in bolt Permissible Shear stress per bolt	1.54 768.0 62.67 787200.0 Combined Shear and Tensi 2.62 10.15	kg/mm² mm² kg/mm² N on kg/mm²	Acce	epted	

Sr No	Description	Paramter	Unit	Remark
1	Hole diamter	27	mm	
2	No of bolts in X Direction	3		
3	No of bolts in Z Direction	3		
4	Edge distance (Along X Direction)	56.0	mm	Condition satisfied
5	Minimum edge distance	40.5	mm	As per IS:800
6	Edge distance (Along Z Direction)	56	mm	
7	Distance between Hole centre & beam (For Z Direction)	65	mm	
8	Distance between Hole centre & top plate (For X Direction)	61	mm	

Recording 1.7 miles 1.7											
Secretary Secr			T		Γ	1	T				
The process of the		Description	Parameter	Unit	Remark			-	R		
Manufaction							-		- b _f -		
Proceedings		Base Plate Thickness	32		27	Pass				m m m	1
Digitary								1			
1975 1975							-	d 		0.95d	N
Part Company			10.51	inches				1	2221	- + ‡	
The second color of the color			19.685	inches	500	mm					<u> </u>
Control Cont				1	500	mm	-	⊢ - n-•	0.80b _f	~ n ~ l	
Beautiful Control of				1	10	11	12	13	14	15	16
Part		Load Combination	SW +DL +LL	SW + WX	SW +W-X	SW+WZ	SW+W-Z	SW+DL+LL+WX	SW+DL+LL+W-X	SW+DL+LL+WZ	SW+DL+LL+W-Z
Proceedings (1) Process Proces		Fy (Ton)	53.64	8.86	5.84	16.11	1.48	55.17	52.15	62.42	44.83
Const Nome Transport N											
Const Nome Transport N					Allowable	Stress Desi	ign				
Control of the property of t					Allowable	- Stress Desi	'b''				
Management Man							387.50				
Company to American Services Control Con					Ι	I		Ι	T		I
Commission (Continues (Continue			118.22	19.53	12.87	35.51		•	114.94	137.57	98.81
Propure place and Coff Page 25 Congress Page Aut		Compressive Strength of concrete - fc (ksi)					3.63				
Bern per Percent (Victor Inches)		Required Base Plate area (Ω^* Pa / 0.85 *fc) inches ²				ł	2.65				+
Control Find Proceedings 1		Base plate Breadth (N) in inches	11	5	4	6	3	11	11	11	10
Condition Cond											
March Colon Colo			19.69	19.69	19.69	19.69	19.69	19.69	19.69	19.69	19.69
100, 150, 150, 150, 150, 150, 150, 150,		Condition (0.85*fc*A1 *VA2/A1)/2.50) > Fy (Kips)		1							
Control Color Co			TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE
A											
Section Sect			0.53	0.20	0.17	0.28	0.08	0.54	0.52	0.58	0.48
Base riske Thistones Inches 0.97 3.80 2.92 2.93 0.91 2.90 0.80 1.80		An	1.38	0.53	0.43	0.72		1.40	1.36	1.51	1.24
Base Plate Technolos (semi) 24.83 30.01 3.15 13.50 4.09 24.39 24.29 25.57 22.53		l l					5.7638				
Uppir Condition											
West Stees of Paper											
SALCO SALC							36				
Condition 1 1/2 tol < d)											
Condition 1 (12 Min 4)											
Condition (2 243 x 4)					Allowable	Stress Desi	ign				
Condition 1 12 et 3 et 4							0.240				
Plate trackness (suches)		Plate thickness (inches)					0.219				
Plate Thickness (mn)											
Description		Plate thickness (inches)					0.214				
Description											
Biolit Condidered M24 STR02 F 250 A Biolit material STR02 F 250 A							I	<u> </u>			
Bit Minimum Embedmen Length 288		Description	Parameter	Unit			Remarks				
Minimum Embedment Length		Bolt Considered M24									
Tensile Strength				mm							
Major/Moninal Diameter											
Pitch 3		No of Bolts	6				Tubic No 2				
Shank Area of bolt											
Stress Area 353.00 mm²											
Hole diameter		Stress Area	353.00	mm ²							
Edge distance (For Side N)				mm							
Minimum edge distance 40.5 mm											
Edge distance (For Side B) 56 mm Condition Satisfied (For Side B) 56 mm Need To check Guage Distance between Holes (For Side "B") 195 mm Need To check Guage Distance between Holes (For Side "N") 388 mm Tensile stress in anchor rod Tensile stress in anchor rod Tension in bolt 1.48 Tons Tension per bolt 0.247 Tons Actual tensile stress per bolt 0.55 kg/mm² Accepted 15.800 11.6.2.3 Permissible tensile stress per bolt 94590.50 N 9.64 Tons Design Strength due to yielding of gross section 94590.50 N 9.64 Tons Design Strength due to rupture at threaded section 104205.60 N 10.62 Tons				mm							
Guage Distance between Holes (For Side "B") Tensile stress in anchor rod Tension in bolt Tension per bolt Actual tensile stress per bolt Permissible tensi			40.5	mm			-				
Guage Distance between Holes (For Side "N") 388 mm Tensile stress in anchor rod Tension in bolt 1.48 Tons Tension per bolt 0.247 Tons Actual tensile stress per bolt 0.55 kg/mm² Accepted IS:800 11.6.2.3 Permissible tensile stress per bolt 94590.50 N Design Strength due to rupture at threaded section 104205.60 N 10.62 Tons Design Strength due to rupture at threaded section 104205.60 N 10.62 Tons		(For Side B)		mm							
Tensile stress in anchor rod							Need To check				
Tension in bolt Tension per bolt O.247 Tons Actual tensile stress per bolt Permissible tensile stress per bolt 12.78 Nominal Tensile capacity per bolt Design Strength due to yielding of gross section Design Strength due to rupture at threaded section Tension in bolt O.247 Tons Accepted IS:800 11.6.2.3 IS800 11.6.2.3 IS800 11.6.2.3 Nominal Tensile capacity per bolt Oesign Strength due to yielding of gross section Oesign Strength due to rupture at threaded section											
Tension per bolt Actual tensile stress per bolt Permissible tensile stress per bolt 12.78 kg/mm² Accepted IS800 11.6.2.3 Nominal Tensile capacity per bolt Design Strength due to yielding of gross section Design Strength due to rupture at threaded section Design Strength due to rupture at threaded section 104205.60 N 10.62 Tons		Ter	nsile stress in ancho	or rod		I	<u>. </u>				
Actual tensile stress per bolt 0.55 kg/mm² Accepted IS:800 11.6.2.3 Permissible tensile stress per bolt 12.78 kg/mm² IS800 11.6.2.3 Nominal Tensile capacity per bolt 94590.50 N Design Strength due to yielding of gross section 94590.50 N 9.64 Tons Design Strength due to rupture at threaded section 104205.60 N 10.62 Tons											
Permissible tensile stress per bolt Nominal Tensile capacity per bolt Design Strength due to yielding of gross section Design Strength due to rupture at threaded section Design Strength due to rupture at threaded section 104205.60 N 104205.60 N 104205.60 N 104205.60 N 104205.60 N 104205.60 N 104205.60					Acce	 epted	IS:800 11.6.2.3				
Nominal Tensile capacity per bolt94590.50NSesign Strength due to yielding of gross section94590.50N9.64TonsDesign Strength due to rupture at threaded section104205.60N10.62Tons											
Design Strength due to rupture at threaded section 104205.60 N 10.62 Tons		Nominal Tensile capacity per bolt	94590.50	N	2.5	_	11.0.2.3				
Shear stress in anchor rod											
Shear stress in anchor rod											
	_ 	Ch	oar stross in ancho	r rod							

Shear force in bolt

Shear force per bolt

Actual shear stress in bolt

Permissible Shear stress per bolt

Nominal shear capacity of bolt

Actual Stress of bolt in bearing

Nominal bearing area of bolt on plate

Permissible bearing stress of the bolt

Nominal bearing strength of bolt

Actual Shear stress in bolt

Permissible Shear stress per bolt

Actual tensile stress per bolt

Permissible tensile stress per bolt

Combined Shear and Tension

4.3

0.717

1.58

75111.3

Bearing Stress of bolt on plate

0.93

768.0

62.67

787200.0

Combined Shear and Tension

1.58

10.15

0.55

12.78

0.03

Tons

Tons

kg/mm²

kg/mm² N

kg/mm²

kg/mm²

N

kg/mm²

kg/mm²

kg/mm²

Accepted

IS:800 11.6.2.1

IS:800 11.6.2.1

IS:800 11.6.2.2

IS:800 11.6.2.2

IS:800 11.6.2.5

IS:800 10.3.3

	Description	Parameter	Unit	Remark						
	Column D7 Base Plate Size	UC 254 x 254 x 107 500 X 500						- b _f -		_
	Base Plate Thickness Yield Stress of Plate (F _y)	32 36	mm ksi	27	Pass		+	¥77,777	m	1
	Flange Width	259 10.20	mm			-	d d		0.95d	N -
	Depth m	267 10.51 4.85	mm inches inches			-	•		- +	
	Base Plate Dimension - N n	19.69 5.76	inches inches	500.00	mm	1	→ n-	0.80b _f	-n-	1
	Base Plate Dimension - B Area of base plate - A1	19.69 387.50	inches	500.00	mm	-				
	Load Cases Load Combination Fx (Ton)	8 SW +DL +LL 0.01	9 SW + WX 0.06	10 SW +W-X 1.27	11 SW+WZ 0	12 SW+W-Z -0.01	13 SW+DL+LL+WX 0.07	14 SW+DL+LL+W-X 1.28	15 SW+DL+LL+WZ 0.01	SW+DL
	Fy (Ton) Fz (Ton)	53.42	8.88 -0.15	5.82	1.46 4.32	16.14 -3.73	54.97 -0.3	51.91 -0.3	44.62 4.16	62 -3
	Resultant Shear Force (Tons)	0.3	0.1	1.2	4.3	3.7	0.3	1.3	4.1	3
	Case 1 (Area of base plate = Area of concrete)		Allowab	ie Stress De	esign Meth	oa				
	Area of base plate A1 Area of concrete A2	387.50 387.50								
(Axial compressive load - kips (Pa) Compressive Strength of concrete- fc (kg/m²) Compressive Strength of concrete (ksi)	117.74	19.57	12.83	3.22	35.57 255000 3.63	121.15	114.41	98.34	137
Red	quired Base Plate area (Ω*Pa / 0.85 *fc) inches² Delta	95.48 0.91	15.87 0.91	10.40 0.91	2.61 0.91	28.85 0.91	98.25 0.91	92.78 0.91	79.75 0.91	111
	Base plate Breadth (N) in inches N Considered Base Plate Length (R) in inches	11 19.69	5 19.69	19.69	3 19.69	19.69	11 19.69	11 19.69	10 19.69	19
	Base Plate length (B) in inches B considered	19.69	3 19.69	3 19.69	1 19.69	5 19.69	9 19.69	9 19.69	19.69	19
Co	andition (0.85*fc*A1*VA2/A1)/2.50) > Fy (Kips)	477.9 TRUE	477.9 TRUE	477.9 TRUE	477.9 TRUE	477.9 TRUE	477.9 TRUE	477.9 TRUE	477.9 TRUE	47 TF
	Factor X	0.25	0.04	0.03	0.01	0.07	0.25	0.24	0.21	0.
	λ λn'	0.53 0.53 1.38	0.20 0.20 0.53	0.16 0.16 0.43	0.08 0.08 0.21	0.28 0.28 0.72	0.54 0.54 1.40	0.52 0.52 1.35	0.48 0.48 1.24	0. 0. 1.
	I I	1.30	v.33	0.43	0.21	5.76	1.40	1.33	1.24	
	Base Plate Thickness (inches) Base Plate Thickness (mm)	0.97 24.58	0.39	0.32 8.11	0.16 4.06	0.53 13.51	0.98 24.93	0.95 24.23	0.88 22.46	1.
	Uplift Condition									
	Yield Stress of Plate (F _y) V2 bf Guage Distance (Centre to centre) mm				36 14.42 194.50					
	Guage Distance (Centre to centre) inches				7.66					
	Condition 1 (V2 bf < d)		Allowab	le Stress De	sign Meth	od				
	Plate thickness (inches)				0.218					
	Condition 1 (V2 bf > d) Plate thickness (inches)				0.213					_
	Plate Thickness (inches) Plate Thickness (mm)				0.213 5.40					
]			
	Description	Parameter	Unit			Remarks				
	Bolt Considered M24 Bolt material	IS 2062 E 250 A								
	Minimum Embedment Length Tensile Strength	288 410.00	mm N/mm²			IS 2062				
	Yield Stress No of Bolts Major/Nominal Diameter	230.00 6.00 24.00	N/mm²			Table No 2				
	Hole Diameter Pitch	27.00 3.00	mm mm mm							
	Core Diameter Shank Area of bolt	20.32 452.389	mm mm²							
	Stress Area Root Area	353.00 317.31	mm² mm²							
	Edge distance	56.0	mm				-			
	(For Side N) Minimum edge distance Edge distance	40.5	mm							
	(For Side B) Guage Distance between Holes (For Side "B")	56 195	mm							
	Guage Distance between Holes (For Side "N")	388 sile stress in anchor rod	mm							
	Required tension in bolt	1.46	Tons							
	Tension per bolt Actual tensile stress per bolt	0.243 0.54	Tons kg/mm²	Acc	epted	IS:800 11.6.2.3				
	Permissible tensile stress per bolt Nominal Tensile capacity per bolt	12.78 94590.50	kg/mm²			IS800 11.6.2.3				
	esign Strength due to yielding of gross section sign Strength due to rupture at threaded section	94590.50 104205.60	N N	9.64 10.62	Tons Tons					
	Sh	ear Stress in anchor rod								
	Shear force in bolt Shear force per bolt	4.3 0.717	Tons Tons							
	Actual shear stress in bolt	1.58	kg/mm ²	Acc	epted	IS:800 11.6.2.1				
			kg/mm ²			IS:800 11.6.2.1				
	Permissible Shear stress per bolt	10.15			 	IS:800 10.3.3				
	Nominal shear capacity of bolt	75111.3 ring Stress of bolt on plate	N							
	Nominal shear capacity of bolt Bear Actual Stress of bolt in bearing	75111.3 ring Stress of bolt on plate 0.93	kg/mm ²	Acc	epted	IS:800 11.6.2.2				
	Nominal shear capacity of bolt Bear Actual Stress of bolt in bearing Nominal bearing area of bolt on plate	75111.3 fing Stress of bolt on plate 0.93 768.0	kg/mm²	Acc	epted					
	Nominal shear capacity of bolt Bear Actual Stress of bolt in bearing Nominal bearing area of bolt on plate Permissible bearing stress of the bolt Nominal bearing strength of bolt	75111.3 ring Stress of bolt on plate 0.93 768.0 62.67 787200.0	kg/mm ²	Acc	epted	IS:800 11.6.2.2 IS:800 11.6.2.2				
	Nominal shear capacity of bolt Bear Actual Stress of bolt in bearing Nominal bearing area of bolt on plate Permissible bearing stress of the bolt Nominal bearing strength of bolt Con Actual Shear stress in bolt	75111.3 10.93 768.0 62.67 787200.0 hbined Shear and Tension 1.58	kg/mm² mm² kg/mm² N	Acc	epted					
	Nominal shear capacity of bolt Bear Actual Stress of bolt in bearing Nominal bearing area of bolt on plate Permissible bearing stress of the bolt Nominal bearing strength of bolt Con	75111.3 ring Stress of bolt on plate 0.93 768.0 62.67 787200.0 nbined Shear and Tension	kg/mm² mm² kg/mm²	Acc	epted					