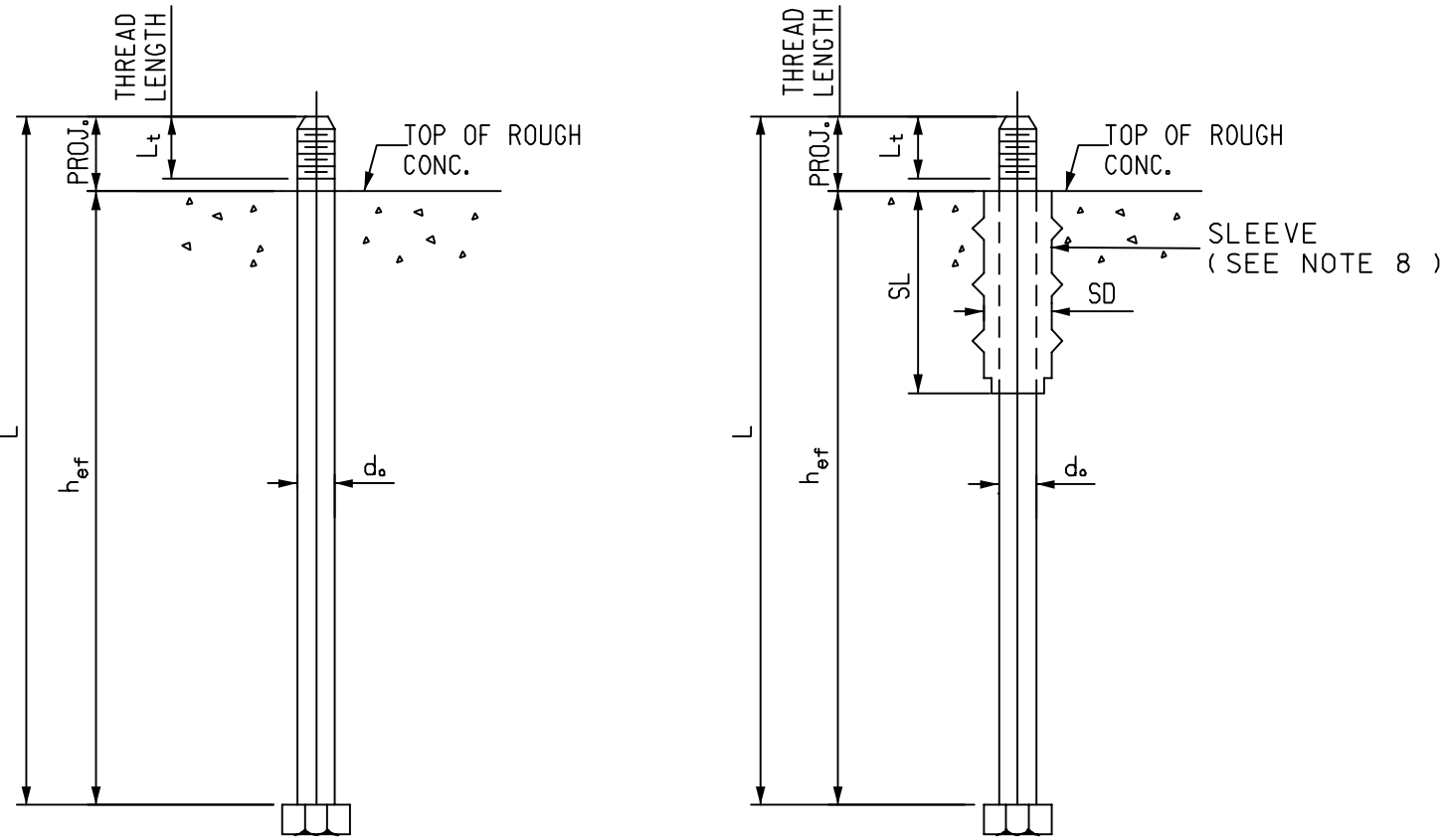
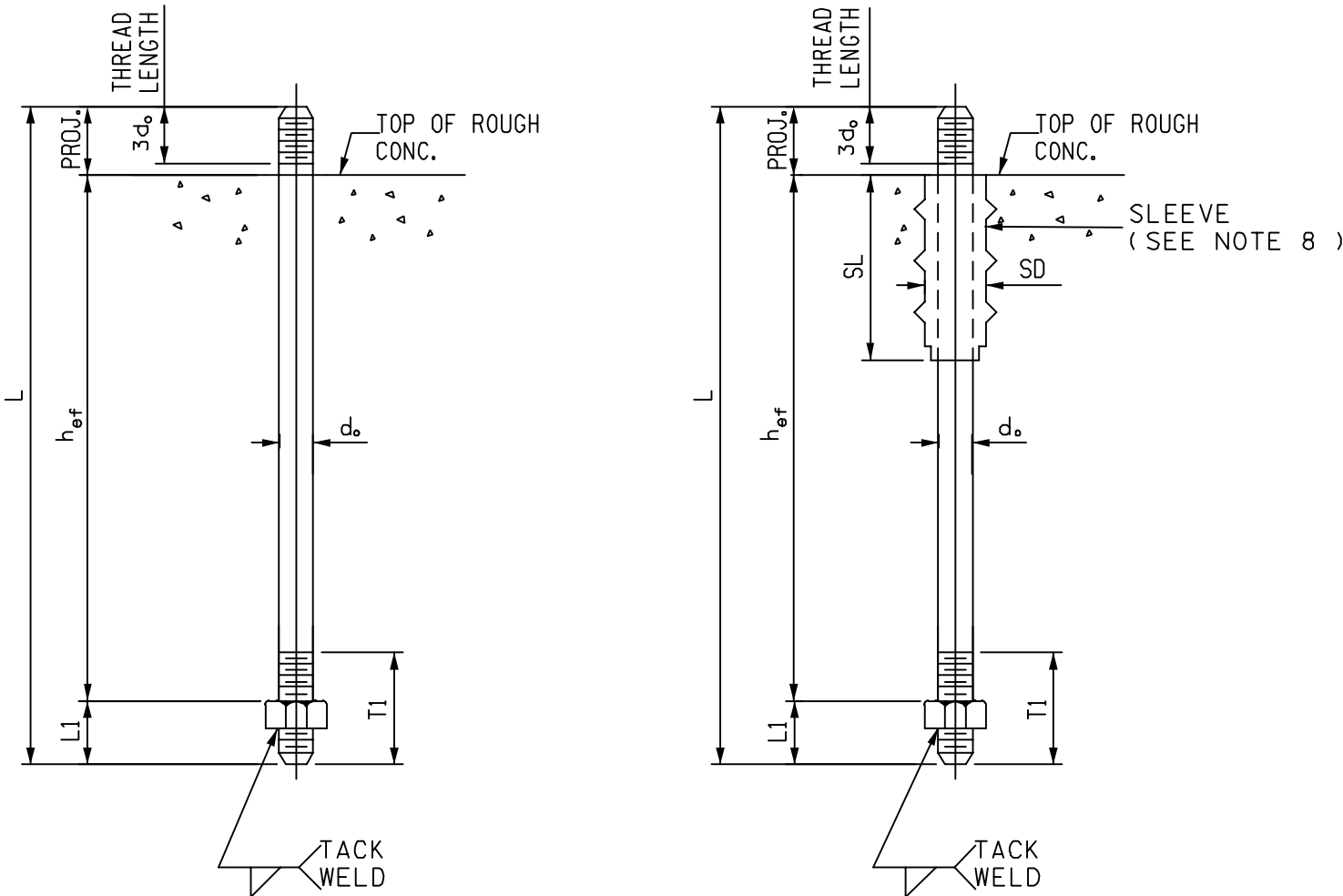


07	001	AA-036322	0	069
PLANT NO.		SHIT. NO.	DRAWING NUMBER	INDEX



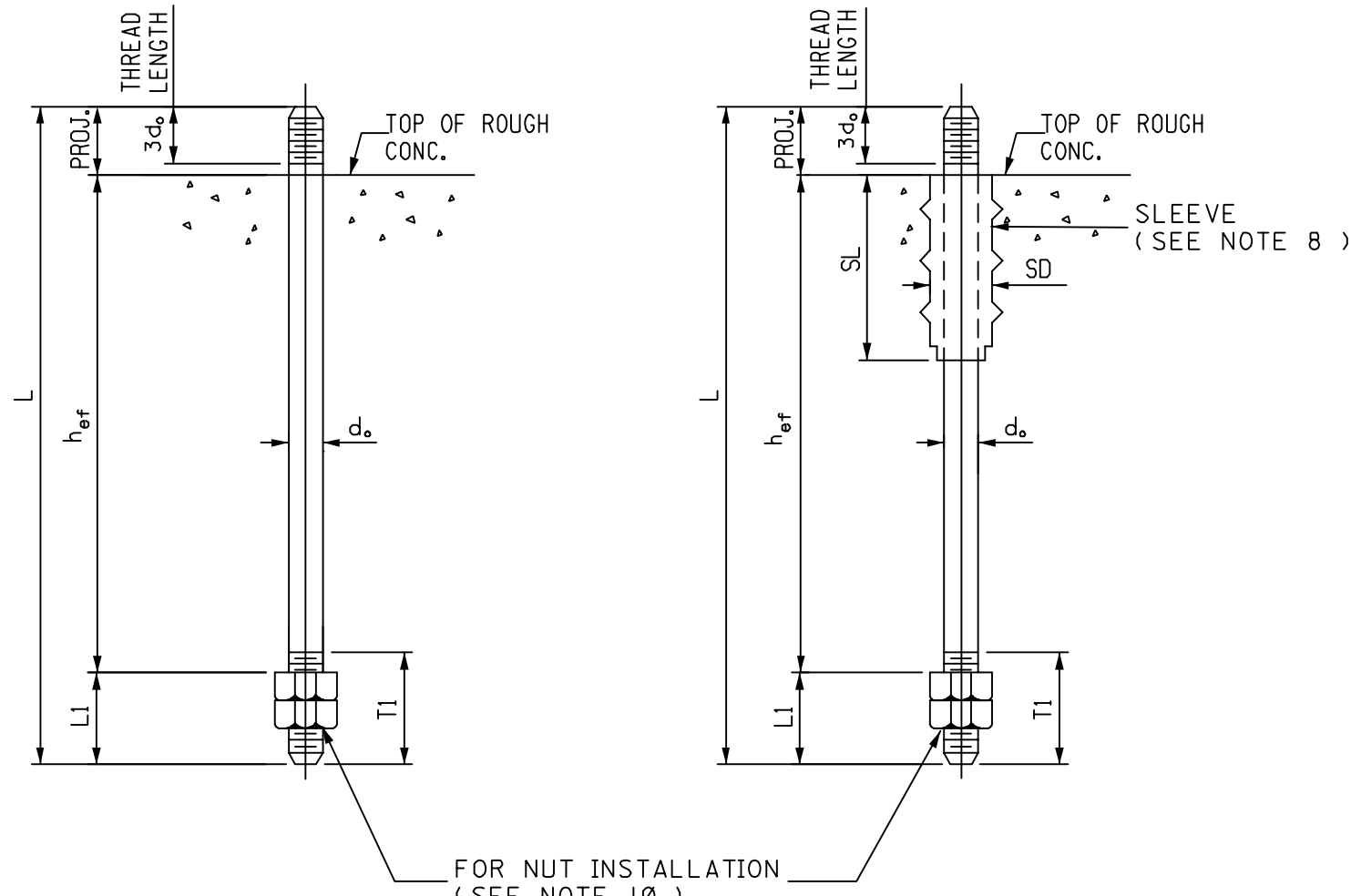
TYPE 1
ASTM A307

TYPE 1S
ASTM A307



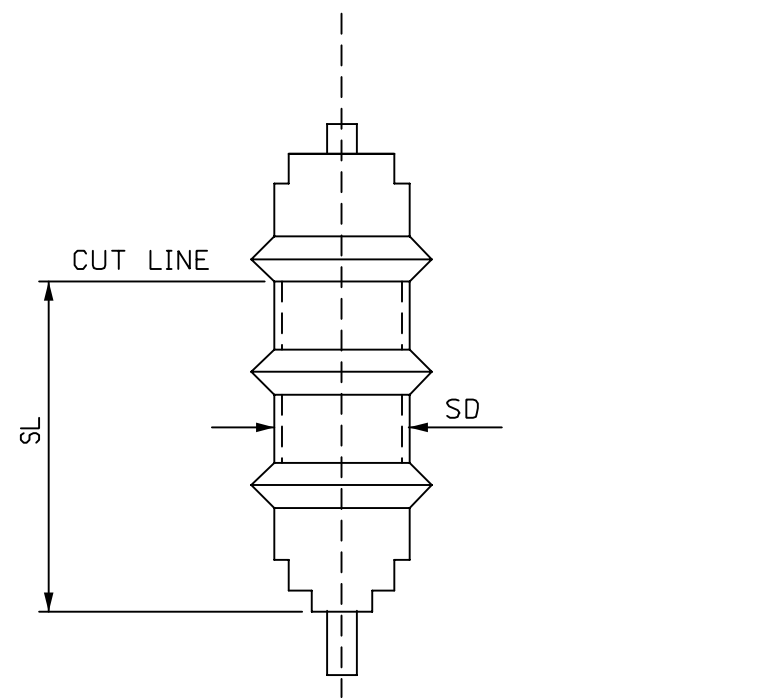
TYPE 2
ASTM A36/A36M or
ASTM F1554, Gr. 36
(SEE NOTE 4)

TYPE 2S
ASTM A36/A36M or
ASTM F1554, Gr. 36
(SEE NOTE 4)



TYPE 3
ASTM A193/A193M or
ASTM F1554, Gr. 105
(SEE NOTE 5)

TYPE 3S
ASTM A193/A193M or
ASTM F1554, Gr. 105
(SEE NOTE 5)



DETAIL OF SLEEVE

PLASTIC ANCHOR BOLT SLEEVES SHALL BE USED WHERE REQUIRED BY DESIGN. TOP OF SLEEVE SHALL BE CUT OFF TO MAINTAIN EMBEDMENT LENGTH.

Table 1- ASTM A307, Grade A Bolt Sizes-Inch Series

Bolt Properties					Type I					Type 1S					Sleeve	
Size d _b	Type	L _t	TPI	Stress Area (in ²)	Max. Proj. (note c) (mm)	h _{ef} min. 12d _b (in)	Length (L) Proj.+h _{ef} (in)	Edge Dist. (4d _b ±100+d _b /2) (mm)	Spacing 6d _b (mm)	h _{ef} min. SL+150 (mm)	Length (L) Proj.+h _{ef} (in)	Edge Dist. (note d) (mm)	Spacing (note e) (mm)	SD (mm)	SL (mm)	
1/2	Hex	1.50	13	0.142	107	152	10	108	76	275	15	127	114	50	125	
3/4	Hex	1.75	11	0.226	115	191	12	110	95	325	17 1/2	127	129	50	175	
1	Hex	2.00	10	0.334	123	229	14	111	114	325	17 1/2	127	145	50	175	
1 1/8	Hex	2.25	9	0.462	131	267	15 1/2	113	133	325	18	127	161	50	175	
1 1/4	Hex	2.50	8	0.606	139	305	17 1/2	114	152	400	21	139	202	75	250	
1 1/2	Hex	2.75	7	0.763	146	343	19 1/2	116	171	421	22 1/2	139	218	75	250	
1 3/4	Hex	3.00	7	0.969	154	381	21	127	191	441	23 1/2	149	234	75	250	
2	Hex	3.25	6	1.155	162	419	23	140	210	460	24 1/2	160	250	75	250	
2 1/4	Hex	3.50	6	1.405	170	457	24 1/2	152	229	604	30 1/2	183	291	100	375	
2 3/4	Heavy Hex	4.00	5	1.899	186	533	28 1/2	178	267	642	32 1/2	206	322	100	375	
3	Heavy Hex	4.50	4	2.498	202	610	32	203	305	755	37 1/2	228	354	100	450	
3 1/4	Heavy Hex	5.00	4	3.248	218	686	35 1/2	229	343	793	40	250	386	100	450	
3 1/2	Heavy Hex	5.50	4	3.999	234	762	39	254	381	981	48	297	468	150	600	
4	Heavy Hex	6.00	4	4.934	250	838	43	279	419	1019	50	319	499	150	600	
5	Heavy Hex	6.50	4	5.967	266	914	46 1/2	305	457	1057	52	342	531	150	600	

- NOTES:
- MINIMUM EDGE DISTANCE IS MEASURED FROM THE CENTERLINE OF THE ANCHOR BOLT TO THE EDGE OF THE CONCRETE.
 - ASTM A307 BOLT LENGTHS MAY NOT BE AVAILABLE FOR THE LARGER DIAMETER TYPE 1S BOLTS.
 - IF THE REQUIRED PROJECTION EXCEED THE MAXIMUM PROJECTION IN THE TABLE ABOVE, USE A TYPE 2 ANCHOR BOLT.
 - EDGE DISTANCE FOR BOLTS WITH SLEEVES MUST BE INCREASED BY (SD-d_b)/2
 - SPACING OF BOLTS WITH SLEEVES MUST BE INCREASED BY (SD- d_b)
 - TPI= THREADS PER INCH.

Table 2 - ASTM A36,ASTM F1554 Grade 36 Anchor Rods-Inch Series

Bolt Properties					Type 2				Type 2S				Sleeve	
Size d _b (in)	TPI	Stress Area (in ²)	L _t d _b +13 (mm)	T _I 2d _b (mm)	h _{ef} min. (2d _b) (mm)	Edge Dist. (4d _b ±100+d _b /2) (mm)	Spacing 6d _b (mm)	h _{ef} min. (2d _b) (mm)	Edge Dist. (note b) (mm)	Spacing (note c) (mm)	SD (mm)	SL (mm)		
1/2	13	0.142	26	25	152	108	76	275	127	114	50	125		
3/4	11	0.226	29	32	191	110	95	325	127	129	50	175		
1	10	0.334	32	38	229	111	114	325	127	145	50	175		
1 1/8	9	0.462	35	44	267	113	133	325	127	161	50	175		
1 1/4	8	0.606	38	51	305	114	152	400	139	202	75	250		
1 1/2	7	0.763	42	57	343	116	171	421	139	218	75	250		
1 3/4	7	0.969	45	64	381	127	191	441	149	234	75	250		
2	6	1.155	48	70	419	140	210	460	160	250	75	250		
2 1/4	6	1.405	51	76	457	152	229	604	183	291	100	375		
2 3/4	5	1.899	57	89	533	178	267	642	206	322	100	375		
3	4	2.498	64	102	610	203	305	755	228	354	100	450		
3 1/4	4	3.248	70	114	686	229	343	793	250	386	100	450		
3 1/2	4	3.999	77	127	762	254	381	981	297	468	150	600		
4	4	4.934	83	140	838	279	419	1019	319	499	150	600		
5	4	5.967	89	152	914	305	457	1057	342	531	150	600		

- NOTES:
- MINIMUM EDGE DISTANCE IS MEASURED FROM THE CENTERLINE OF THE ANCHOR BOLT TO THE EDGE OF THE CONCRETE.
 - EDGE DISTANCE FOR BOLTS WITH SLEEVES MUST BE INCREASED BY (SD-d_b)/2
 - SPACING OF BOLTS WITH SLEEVES MUST BE INCREASED BY (SD-d_b)
 - TPI= THREADS PER INCH.

Table 3 - ASTM A193,ASTM F1554 Grade 105 Anchor Rods-Inch Series

Bolt Properties					Type 3				Type 3S					
Size d _b	TPI	Stress Area (in ²)	L _t 2d _b +13 (mm)	T _I 3d _b (mm)	h _{ef} min. (2d _b) (mm)	Edge Dist. (4d _b ±100+d _b /2) (mm)	Spacing 6d _b SL+150 (mm)	h _{ef} min. (2d _b) (mm)	Edge Dist. (note b) (mm)	Spacing (note c) (mm)	SD (mm)	SL (mm)		
3/4	10	0.334	51	57	229	114	114	325	130	145	50	175		
1	9	0.462	57	67	267	133	133	325	147	161	50	175		
1 1/8	8	0.606	64	76	305	152	152	400	177	202	75	250		
1 1/4	8	0.798	70	86	343	171	171	421	195	218	75	250		
1 1/2	8	1.000	77	95	381	191	191	441	212	234	75	250		
1 3/8	8	1.234	83	105	419	210	210	460	230	250	75	250		
1 1/2	8	1.492	89	114	457	229	229	604	260	291	100	375		
1 3/4	8	2.082	102	133	533	267	267	642	294	322	100	375		
2 1/4	8	3.557	127	171	686	343	343	793	364	386	100	450		
2 1/2	8	4.442	140	191	762	381	381	981	424	468	150	600		
2 3/4	8	5.425	153	210	838	419	419	1019	459	499	150	600		
3	8	6.506	165	229	914	457	457	1057	494	531	150	600		

- NOTES:
- MINIMUM EDGE DISTANCE IS MEASURED FROM THE CENTERLINE OF THE ANCHOR BOLT TO THE EDGE OF THE CONCRETE.
 - EDGE DISTANCE FOR BOLTS WITH SLEEVES MUST BE INCREASED BY (SD-d_b)/2
 - SPACING OF BOLTS WITH SLEEVES MUST BE INCREASED BY (SD-d_b)
 - TPI= THREADS PER INCH.

Anchor Material Specification	Sizes	Profile	Thread Profile	Nut Material Specification	Coating Type
ASTM A307, Grade A	1/2" thru 1-1/2" over 1-1/2"	Hex Bolt Heavy Hex Bolt	ASME B1.8.2.1, UNC	ASTM A563, Gr. A Heavy Hex	Galvanized to ASTM A153, Class C or ASTM B695, Class 50
ASTM A36/A36M	1/2" thru 3" M12 thru M22	Rod	ASME B1.1, UNC, Class 2 ASME B1.13M	ASTM A563, Gr. A Heavy Hex	Galvanized to ASTM A153, Class C or ASTM B695, Class 50
ASTM F1554, Gr.36	1/2" thru 3"	Rod	ASME B1.1, UNC, Class 2	ASTM A563, Gr. A Heavy Hex	Galvanized to ASTM A153, Class C or ASTM B695, Class 50
ASTM A193/A193M, Gr. B7	3/4" thru 3" M20 thru M22	Bolts/Rods	ASME B1.1, 8 UN, Class 2 ASME B1.13M	ASTM A563, DH Heavy Hex or ASTM A194/A 194M	Painted per APC5-IC or APC5-IF per SAES-H-001
ASTM F1554 Gr. 105	3/4" thru 3" M20 thru M22	Rod	ASME B1.1, 8 UN, Class 2	ASTM A563, DH Heavy Hex or ASTM A194/A 194M	Galvanized to ASTM A153, Class C or ASTM B695, Class 50

Table 2M - ASTM A36 Anchor Rods - Metric

Bolt Properties				Type 2				Type 2S					
Nominal Dia. (d _b) & thread pitch	Stress Area	L _t	T _I	h _{ef} min.	Edge Dist.	Spacing	h _{ef} min.	Edge Dist.	Spacing	Sleeve			
(mm)	(mm ²)	d _b +13	2d _b	12d _b	4d _b ±100d _b /2	6d _b	SL+150	(note b)	(note c)	SD	SL		
(mm)		(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)		
M12x1.75	84.3	25	24	144	106	72	275	125	110	50	125		
M16x2	157	29	32	192	108	96	275	125	130	50	125		
M20x2.5	245	33	40	240	110	120	325	125	150	50	175		
M24x3	353	37	48	288	112	144	400	138	195	75	250		
M27x3	459	40	54	324	114	162	400	138	210	75	250		
M30x3.5	561	43	60	360	120	180	400	143	225	75	250		
M36x4	817	49	72	432	144	216	525	176	280	100	375		
M42x4.5	1120	55	84	504	168	252	525	197	310	100	375		
M48x5	1470	61	96	576	192	288	600	218	340	100	450		
M56x5.5	2030	69	112	672	224	336	672	246	380	100	450		
M64x6	2680	77	128	768	256	384	768	299	470	150	600		
M72x6	3460	85	144	864	288	432	864	327	510	150	600		

- NOTES:
- MINIMUM EDGE DISTANCE IS MEASURED FROM THE CENTERLINE OF THE ANCHOR BOLT TO THE EDGE OF THE CONCRETE.
 - EDGE DISTANCE FOR BOLTS WITH SLEEVES MUST BE INCREASED BY (SD-d_b)/2
 - SPACING OF BOLTS WITH SLEEVES MUST BE INCREASED BY (SD-d_b)

Table 3M - ASTM A193M Anchor Rods - Metric

Bolt Properties						Type 3		Type 3S			
Nominal Dia. (d _b) & thread pitch	Stress Area	L _t 2d _b +13	T _I 3d _b	h _{ef} min. 12d _b	Edge Dist. 6d _b ±200d _b /4	Spacing 6d _b	h _{ef} min. S _L +150	Edge Dist. (note b)	Spacing (note c)	SD	SL
(mm)	(mm ²)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)
M12x1.75	84.3	37	36	144	106	72	275	125	110	50	125
M16x2	157	45	48	192	108	96	275	125	130	50	125
M20x2.5	245	53	60	240	120	120	325	135	150	50	175
M24x3	353	61	72	288	144	144	400	170	195	75	250
M27x3	459	67	81	324	162	162	400	186	210	75	250
M30x3.5	561	73	90	360	180	180	400	203	225	75	250
M36x4	817	85	108	432	216	216	525	248	280	100	375
M42x4.5	1120	97	126	504	252	252	525	281	310	100	375
M48x5	1470	109	144	576	288	288	600	314	340	100	450
M56x5.5	2030	125	168	672	336	336	672	358	380	100	450
M64x6	2680	141	192	768	384	384	768	427	470	150	600
M72x6	3460	157	216	864	432	432	864	471	510	150	600