

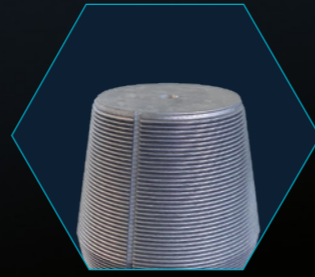
RESONAC



**ULTRA-HIGH-POWER
AND Ω MEGA**

**GRAPHITE
ELECTRODES**

GRAPHITE PINS



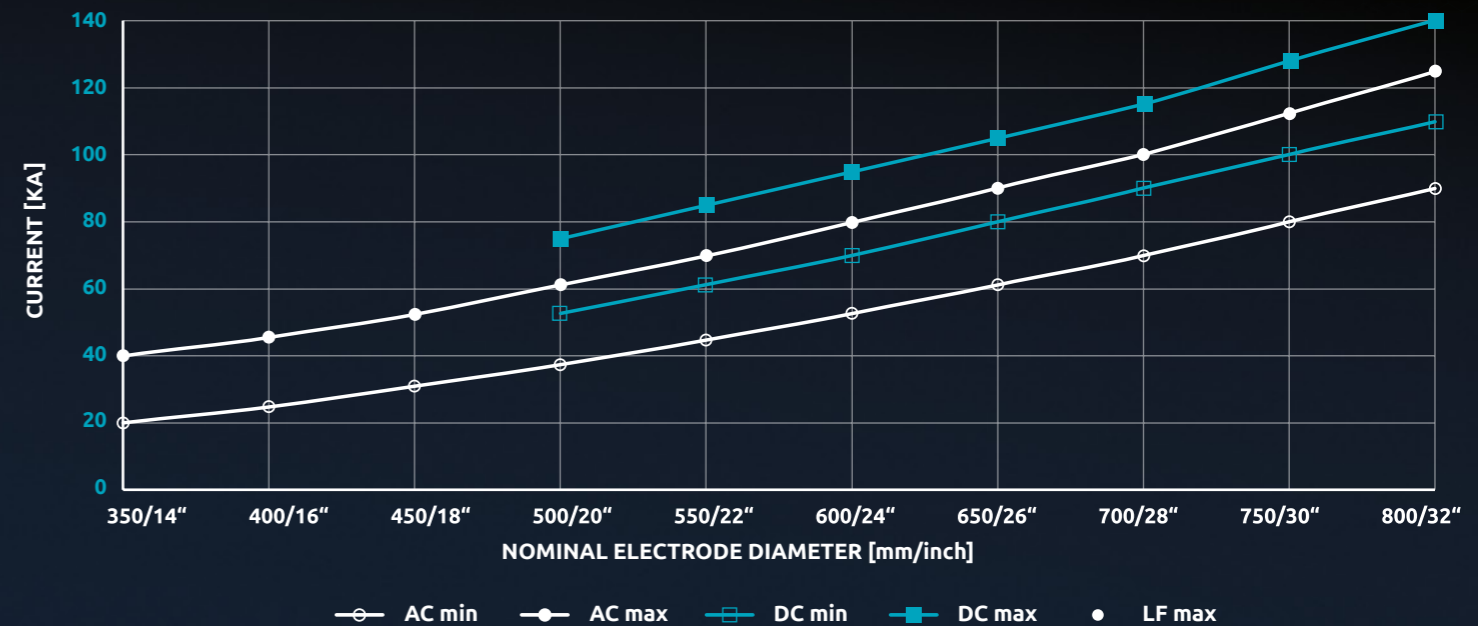
PROPERTY	UNIT	TYPICAL VALUE	
		Diameter (mm/inch) 350 - 450 / 14 - 18	Diameter (mm/inch) 500 - 800 / 20 - 32
Apparent density	g/cm ³	≥ 1.74	≥ 1.77
Specific electrical resistivity	μΩ·m	≤ 4.8	≤ 4.0
Flexural strength	MPa	≥ 18	≥ 20
Coefficient of linear thermal expansion (200 - 400 °C)	μm/(K·m)	≤ 1.3	≤ 1.3
Young's modulus	GPa	≥ 16	≥ 17

GRAPHITE ELECTRODES



PROPERTY	UNIT	TYPICAL VALUE			
		UHP Diameter (mm/inch) 350 - 400 / 14 - 16	UHP Diameter (mm/inch) 450 - 600 / 18 - 24	UHP Diameter (mm/inch) 650 - 800 / 26 - 32	ΩMEGA Diameter (mm/inch) 350 - 450 / 14 - 18
Apparent density	g/cm ³	1.67 - 1.76	1.67 - 1.78	1.67 - 1.78	1.64 - 1.74
Specific electrical resistivity	μΩ·m	4.1 - 6.0	4.1 - 5.8	4.1 - 5.8	4.5 - 6.5
Flexural strength	MPa	8 - 15	8 - 15	8 - 15	8 - 15
Coefficient of linear thermal expansion (200 - 400 °C)	μm/(K·m)	1.0 - 1.8	1.0 - 1.8	1.0 - 1.8	1.9 - 2.7
Young's modulus	GPa	9 - 16	8 - 15	8 - 14	8 - 12

GRAPHITE ELECTRODES CURRENT CARRYING CAPACITY



GRAPHITE ELECTRODES STANDARD SIZES

NOMINAL DIAMETER		TOLERANCE			
		Min	Max	Min	Max
[mm]	[inch]	[mm]	[mm]	[inch]	[inch]
350	14	352	358	13,86	14,09
400	16	403	409	15,87	16,1
450	18	454	460	17,87	18,11
500	20	505	511	19,88	20,12
550	22	556	562	21,89	22,13
600	24	607	613	23,9	24,13
650	26	659	663	25,94	26,1
700	28	710	714	27,95	28,11
750	30	761	765	29,96	30,12
800	32	810	816	31,89	32,13

NOMINAL LENGTH		TOLERANCE			
		Min	Max	Min	Max
[mm]	[inch]	[mm]	[mm]	[inch]	[inch]
1000	40	925	1050	36,42	41,34
1200	48	1100	1250	43,31	49,21
1500	60	1400	1600	55,12	62,99
1800	72	1700	1900	66,93	74,8
2100	84	1975	2225	77,76	87,6
2400	96	2275	2525	89,57	99,41
2700	110	2550	2900	100,39	114,17
3000	118	2850	3150	112,2	124,02
3300	130	3151	3450	124,06	135,83
3600	142	3451	3750	135,87	147,64

Resonac Standard Electrodes Sizes are based on international standard IEC 60239:2005
Nominal diameters smaller than 350 mm (14 inches) can be offered on request

GRAPHITE ELECTRODES TORQUE VALUES



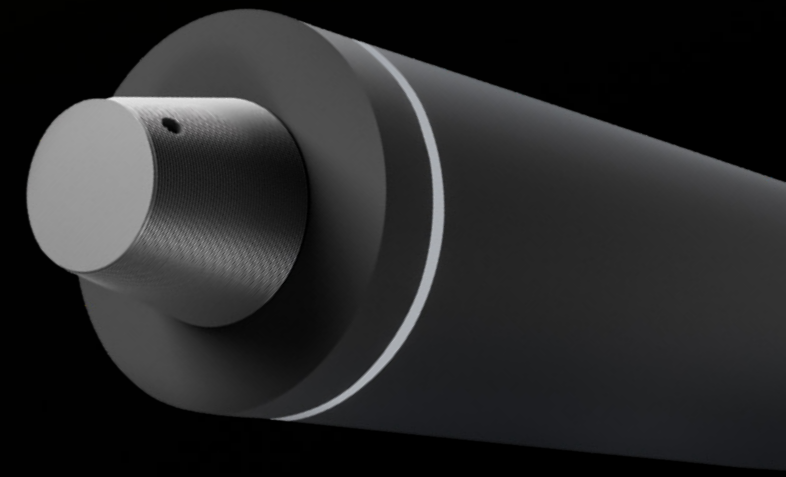
Product type: Graphite Electrodes, Diameter (mm/inch) 350 - 800 / 14 - 32, Tightening Torque
Application: For proper joining of Graphite Electrodes / Electrode Columns, EAF application

Recommendation for Joining Torque Values

GE Diameter [mm]	GE Diameter [inch]	Torque Value [Nm]	Torque Value [ft-lbs]
350	14	1200	885
400	16	1500	1106
450	18	2000	1475
500	20	2500	1844
550	22	3200	2360
600	24	4000	2950
650	26	5000	3688
700	28	6200	4573
750	30	7700	5680
800	32	9400	6933

Manual torquing only recommended to max. 450 mm

GRAPHITE ELECTRODES STANDARD JOINT COMBINATION



ELECTRODE DIAMETER																
Joint Code	Pin Diameter	Pin Length	Pin Diameter	Pin Length	mm inch	350	400	450	500	550	600	650	700	750	800	
	mm		inch			14	16	18	20	22	24	26	28	30	32	
203T4N254	203,20	254,0	8,00	10,00	T4	●										
203T4L305	203,20	304,8	8,00	12,00		●										
222T4N305	222,25	304,8	8,75	12,00			●									
222T4L356	222,25	355,6	8,75	14,00			●									
241T4N305	241,30	304,8	9,50	12,00				●								
241T4L356	241,30	355,6	9,50	14,00				●								
269T4L457	269,88	457,2	10,63	18,00				●	●							
298T4L457	298,45	457,2	11,75	18,00						●						
317T4L457	317,50	457,2	12,50	18,00						●	●					
317T4X559*	317,50	558,8	12,50	22,00							●					
355T4L559	355,60	558,8	14,00	22,00								●				
374T4L559	374,65	558,8	14,75	22,00									●			
406T4L610**	406,40	609,6	16,00	24,00										●		
432T4L635*	431,80	635,0	17,00	25,00											●	

215T3N305	215,90	304,8	8,50	12,00	T3	●	●									
241T3N339	241,30	338,7	9,50	13,33			●	●								
241T3L356	241,30	355,6	9,50	14,00			●	●								
273T3N356	273,05	355,6	10,75	14,00					●							
273T3L457	273,05	457,2	10,75	18,00					●							

* not defined in IEC 60239:2005

** ambiguous definition in IEC 60239:2005



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