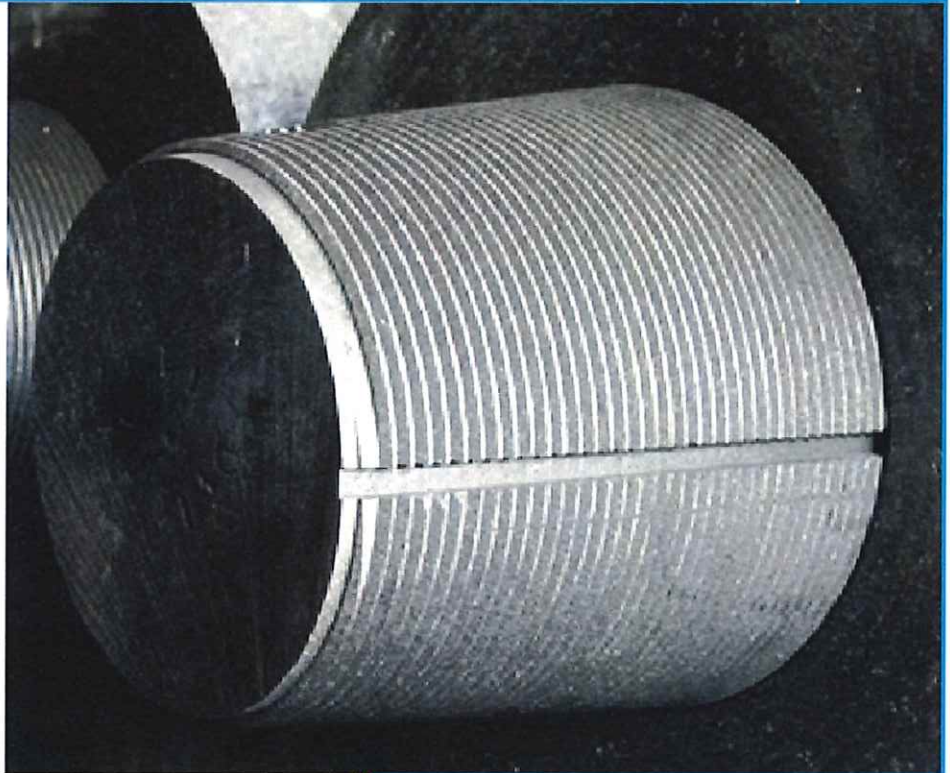




# Graphite Electrodes Brochure



Graphite India Limited



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## Specification Sheet for Physical Properties

UHP FOR AC FURNACE						UHP FOR DC FURNACE
Parameter	Unit	φ 200 - 300 mm	φ 350 - 500 mm	φ 550 & 600 mm	φ 650 - 750 mm	φ 600 - 750 mm
		φ 8" - 12"	φ 14" - 20"	φ 22" & 24"	φ 26" - 30"	φ 24" - 30"
Bulk Density	gm/cm <sup>3</sup>	1.66 - 1.76	1.65 - 1.75	1.65-1.73	1.66-1.74	1.68-1.76
Specific Resistance	m W-m	4.7 - 6.2	4.5 - 6.0	4.5-5.7	4.5-5.3	4.2-5.2
Flexural Strength	N/mm <sup>2</sup>	12-17	9 - 14	9 - 14	9 - 14	10-15
Young's Modulus	N/mm <sup>2</sup>	10-16	9-15	9-15	9-13	9-13
Ash Contents (Max)	%	0.2	0.2	0.2	0.2	0.2
C.T.E. (Longitudinal)	CTE ( x10 <sup>-7</sup> /°C) @ 0-50 °C	2.5-8.0	2.5-8.0	2.5-8.0	2.0 -5.0	2.0 -5.0

UHP-LF		
Parameter	Unit	φ 300 - 500 mm
		φ 12" - 20"
Bulk Density	gm/cm <sup>3</sup>	1.65 - 1.75
Specific Resistance	μ Ω-m	5.0 - 6.2
Flexural Strength	N/mm <sup>2</sup>	9 - 14
Young's Modulus	N/mm <sup>2</sup>	8.5 - 14.5
Ash Contents (Max)	%	0.2
C.T.E. (Longitudinal)	CTE ( x10 <sup>-7</sup> /°C) @ 0-50 °C	3.0 - 8.5

HP			
Parameter	Unit	φ 150 - 300 mm	φ 350 - 500 mm
		φ 6" - 12"	φ 14" - 20"
Bulk Density	gm/cm <sup>3</sup>	1.66 - 1.75	1.65 - 1.75
Specific Resistance	μ Ω-m	5.5 - 7.5	5.5 - 7.5
Flexural Strength	N/mm <sup>2</sup>	12-17	9 - 15
Young's Modulus	N/mm <sup>2</sup>	8 - 14	7 - 13
Ash Contents (Max)	%	0.5	0.5
C.T.E. (Longitudinal)	CTE ( x10 <sup>-7</sup> /°C) @ 0-50 °C	5.0 - 12	5.0 - 12

RP			
Parameter	Unit	φ 150 - 300 mm	φ 350 - 500 mm
		φ 6" - 12"	φ 14" - 20"
Bulk Density	gm/cm <sup>3</sup>	1.56 - 1.65	1.56 - 1.65
Specific Resistance	μ Ω-m	6.0 - 8.0	6.5 - 8.5
Flexural Strength	N/mm <sup>2</sup>	9 - 12	7 - 11
Young's Modulus	N/mm <sup>2</sup>	8 - 10	6 - 10
Ash Contents (Max)	%	0.5	0.5
C.T.E. (Longitudinal)	CTE ( x10 <sup>-7</sup> /°C) @ 0-50 °C	0.5 - 1.2	0.5 - 1.2

**Note:** These are Typical Values & are subjected to change without notice



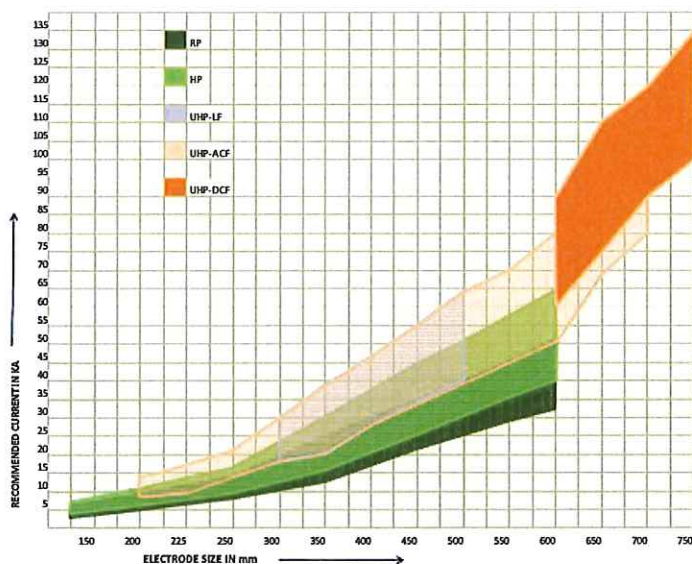


## Specification Sheet for Current Carrying Capacities (Amps)

Dia. (mm)	RP		HP		UHP-LF		UHP-ACF		UHP-DCF	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
75	N.A.	N.A.	1200	2500	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
100	N.A.	N.A.	1600	3500	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
130	N.A.	N.A.	2500	4800	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
150	3800	5700	4200	6500	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
175	4300	7400	5000	9000	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
200	5200	9100	6400	11200	N.A.	N.A.	8000	14000	N.A.	N.A.
225	6500	11700	8000	14400	N.A.	N.A.	10000	18000	N.A.	N.A.
250	8450	14300	10400	17600	N.A.	N.A.	13000	22000	N.A.	N.A.
300	11700	19500	14400	24000	18000	30000	18000	30000	N.A.	N.A.
350	13000	24700	16000	30400	20000	38000	20000	38000	N.A.	N.A.
400	18200	30550	22400	37600	28000	47000	28000	47000	N.A.	N.A.
450	22100	35750	27200	44000	34000	55000	34000	55000	N.A.	N.A.
500	26000	41600	32000	51200	40000	64000	40000	64000	N.A.	N.A.
550	29250	45500	36000	56000	N.A.	N.A.	45000	70000	N.A.	N.A.
600	32500	52000	40000	64000	N.A.	N.A.	50000	80000	60000	90000
650	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	68000	90000	75000	105000
700	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	80000	1E+05	90000	120000
750	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	NA	NA	100000	135000

**Note:**

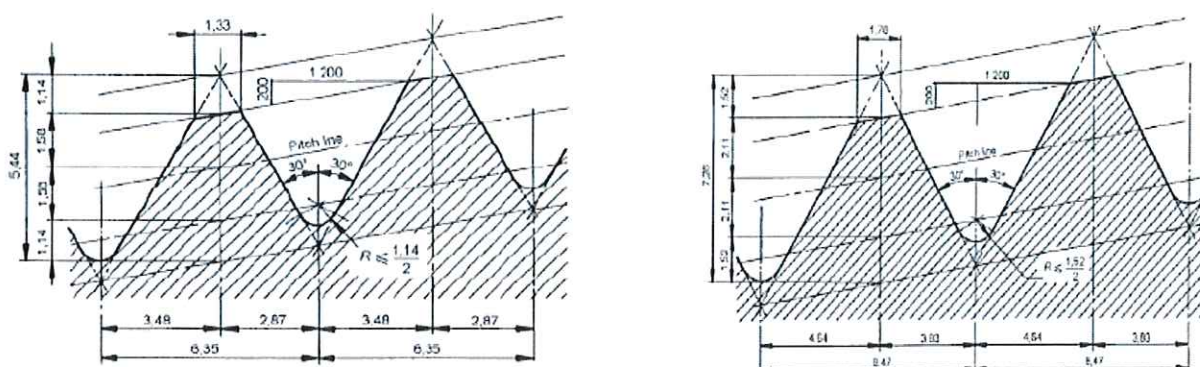
- 1) For 550 & 600 mm sizes, RP & HP grades are manufactured for special applications.
- 2) UHP-LF is designed for Ladle Furnace applications.



**Note:** These are Typical Values & are subjected to change without notice



## Dimensional Details of Electrodes and Nipples



### Specification Sheet for Local Shipments:

#### 1. Diameter Tolerance & Standard Nipple

DIAMETER (mm)	STANDARD NIPPLE SIZE				DIAMETER TOLERANCE			NOMINAL LENGTH SUPPLIED (mm)
	4 T.P.I. NIPPLE		3 T.P.I. NIPPLE		Maximum (mm)	Minimum (mm)	Low Spot (mm)	
	Dia (mm)	Length (mm)	Dia (mm)	Length (mm)				
75	46.04	76.2	-	-	78	73	72	1000, 1200
100	69.85	101.6	-	-	103	98	97	1000, 1200, 1500
130	79.38	127	-	-	132	127	126	1000, 1200, 1500
150	92.08	139.7	-	-	154	149	146	1200, 1500, 1800
175	107.95	165.1	-	-	179	174	171	1200, 1500, 1800
200	122.24	177.8	-	-	205	200	197	1200, 1500, 1800
225	139.7	177.8	-	-	230	225	222	1500, 1800
250	152.4	190.5	155.58	220.1	256	251	248	1500, 1800
300	177.8	215.9	177.17	270.9	307	302	299	1500, 1800, 2100
350	203.2	254	215.9	304.8	357	352	349	1500, 1800, 2100
400	222.25	304.8	215.9	304.8	409	403	400	1500, 1800, 2100, 2400
450	241.3	304.8	241.3	304.8	460	454	451	1500, 1800, 2100, 2400
500	269.88	457.2	273.05	355.6	511	505	502	1800, 2100, 2400, 2700
550	298.45	457.2	298.45	372.5	562	556	553	2100, 2400, 2700
600	317.5	457.2	-	-	613	607	604	2100, 2400, 2700
650	374.65	558.8	-	-	663	657	654	2100, 2400, 2700
700	374.65	558.8	-	-	714	708	705	2100, 2400, 2700
750	406.4	609.6	-	-	765	759	756	2400, 2700





## 2. Length Tolerance

NOMINAL LENGTH ( mm )	FULL LENGTH ( mm )		SHORT LENGTH ( mm )	
	Maximum	Minimum	Maximum	Minimum
1000	1050	925	924	800
1200	1350	1100	1099	975
1500	1650	1400	1399	1225
1800	1975	1700	1699	1525
2100	2275	1975	1974	1825
2400	2575	2275	2274	2125
2700	2895	2540	2539	2400



**EACH SHIPMENT MAY CONTAIN % SHORT LENGTH ELECTRODES AS PER IS STANDARD.**

### Notes:

1. Commonly used nominal lengths & Nipple Sizes are mentioned here. Specific sizes can be supplied on request.
2. Electrodes of dia 350 mm & above are pre fitted with nipple prior to dispatch unless specified otherwise.
3. All nipples are supplied with Dust Slots unless specified otherwise.

## Specification Sheet for Export Shipments:

### Dimensional Details of Electrodes & Nipples

#### 1. Diameter Tolerance & Standard Nipple

DIAMETER ( mm )	STANDARD NIPPLE SIZE				DIAMETER TOLERANCE			NOMINAL LENGTH SUPPLIED ( mm )
	4 T.P.I. NIPPLE		3 T.P.I. NIPPLE		Maximum ( mm )	Minimum ( mm )	Low Spot ( mm )	
	Dia ( mm )	Length ( mm )	Dia ( mm )	Length ( mm )				
75	46.04	76.2	-	-	78	73	72	1000, 1200
100	69.85	101.6	-	-	103	98	97	1000, 1200, 1500
130	79.38	127	-	-	132	127	126	1000, 1200, 1500
150	92.08	139.7	-	-	154	149	146	1200, 1500, 1800
175	107.95	165.1	-	-	179	174	171	1200, 1500, 1800
200	122.24	177.8	-	-	205	200	197	1200, 1500, 1800
225	139.7	177.8	-	-	230	225	222	1500, 1800
250	152.4	190.5	155.58	220.1	256	251	248	1500, 1800
300	177.8	215.9	177.17	270.9	307	302	299	1500, 1800, 2100



350	203.2	254	215.9	304.8	357	352	349	1500, 1800, 2100
400	222.25	304.8	215.9	304.8	409	403	400	1500, 1800, 2100, 2400
450	241.3	304.8	241.3	304.8	460	454	451	1500, 1800, 2100, 2400
500	269.88	457.2	273.05	355.6	511	505	502	1800, 2100, 2400, 2700
550	298.45	457.2	298.45	372.5	562	556	553	2100, 2400, 2700
600	317.5	457.2	-	-	613	607	604	2100, 2400, 2700
650	374.65	558.8	-	-	663	657	654	2100, 2400, 2700
700	374.65	558.8	-	-	714	708	705	2100, 2400, 2700
750	406.4	609.6	-	-	765	759	756	2400, 2700

## 2. Length Tolerance

NOMINAL LENGTH ( mm )	FULL LENGTH ( mm )		SHORT LENGTH ( mm )	
	Maximum	Minimum	Maximum	Minimum
1000	1050	925	924	800
1200	1250	1100	1099	975
1500	1600	1400	1399	1225
1800	1905	1700	1699	1525
2100	2210	1975	1974	1825
2400	2515	2275	2274	2125
2700	2895	2540	2539	2400

**EACH SHIPMENT MAY CONTAIN UPTO 8 % SHORT LENGTH ELECTRODES.**

### Notes:

1. Commonly used nominal lengths & Nipple Sizes are mentioned here. Specific sizes can be supplied on request
2. Nipples for electrode of dia 250 mm & above are supplied with pitch plug unless specified otherwise
3. Electrodes of dia 350 mm & above are pre fitted with nipple prior to dispatch unless specified otherwise
4. All nipples are supplied with Dust Slots unless specified otherwise

*Note: These are Typical Values & are subjected to change without notice*





## Specification Sheet for Recommended Tightening Torque

Mentioned below are the recommended Tightening torques to be applied while using GIL electrodes.

Electrode Size		Typical Tightening Torque		
Mm	Inch	Nm	Kg-m	Ft-Lbs
12	300	600	60	450
350	14	825	84	608
400	16	1075	110	792
450	18	1475	150	1087
500	20	2450	250	1806
550	22	3450	352	2543
600	24	3950	403	2911
650	26	4875	497	3593
700	28	6000	612	4422
750	30	7400	754	5458



*Note: These are Typical Values & are subjected to change without notice*



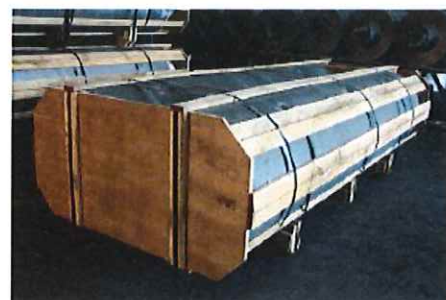


## Product Stuffing Information

Size Dia x Length (mm)	Electrodes Per Pallet (Nos.)	Pallet Net Weight (Approx) (Kgs.)	Pallet Gross Weight (Approx) (Kgs.)	Pallet Dimensions mm x mm x mm			No. of Electrodes per Container	Type of Container
				Length	Breadth	Height		
150 X 1800	21	1218	1265	1985	1140	635		Normal 20' Container
150 X 1500	21	945	900	1660	1140	635		
200 X 1800	15	1409	1459	1985	1070	765		
200 X 1500	15	1164	1214	1660	1070	765		
225 X 1800	8	920	960	1985	970	580		
225 X 1500	8	760	790	1600	970	580		
250 X 1800	10	1452	1502	1985	1325	635		
250 X 1500	10	1210	1250	1660	1325	635		
300 X 1800	6	1255	1303	1985	965	735	90	
350 X 1800	4	1123	1163	1985	1470	465	66	
400 X 1800	2/3	1004 / 1506	1146	1985	868 / 1270	510	50	
400 X 2100	2/3	1154 / 1730		2445	868 / 1270	510	40	
400 X 2400	2	1320	1365	2700	868	510	40	
450 X 1800	2	1409	1450	1985	1450	560	40	
450 X 2100	2	1409	1450	2285	1450	560	32	
450 X 2400	2	1610	1650	2760	1450	560	30	
500 X 1800	2	1238	1293	2160	1070	610	30	
500 X 2100	2	1445	1490	2460	1070	610	24	
500 X 2400	2	1642	1690	2760	1070	610	22	
550 X 2100	2	1745	1791	1480	1170	660	22	
550 X 2400	2	1983	2032	2780	1170	660	20	
550 X 2700	2	2215	2265	3050	1170	660	12	
600 X 2100	2	2130	2180	2460	1280	720	16	
600 X 2400	2	2286	2344	2760	2180	720	16	
600 X 2700	2	2703	2765	3050	1280	720	18	
700 X 2400	2	3786	3856	3150	1480	840	14	
700 X 2700	2	4417	4487	3150	1480	840	12	
750 X 2700	2	4530	4600	3200	1580	890	10	

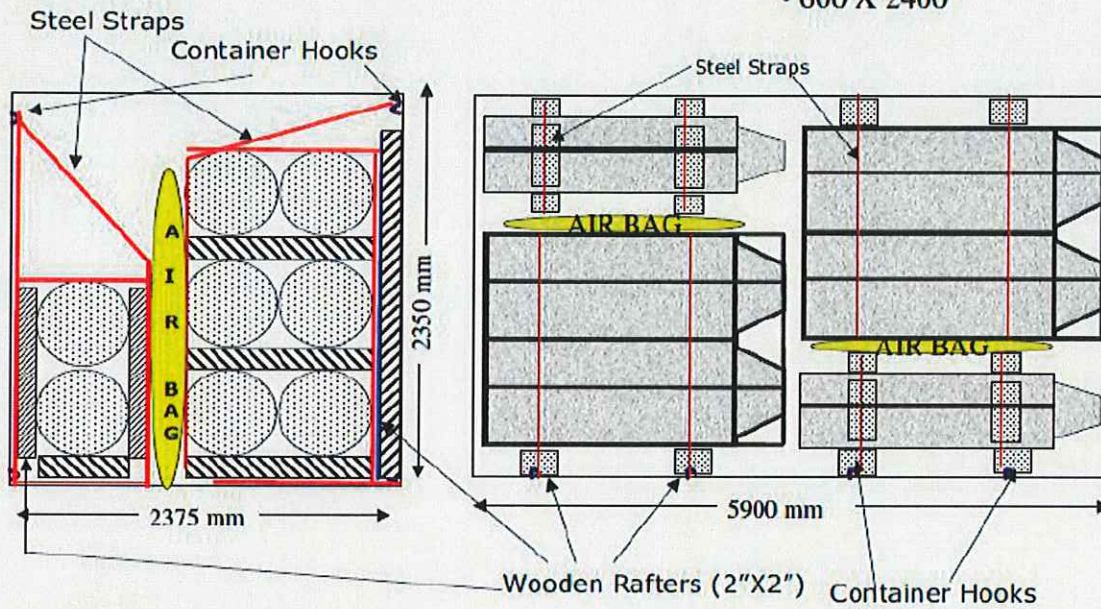
*Note: These are Typical Values & are subjected to change without notice*

Better Stability of Pallets inside the containers are achieved by concept of Vertical Pallet which can be made Horizontal while/after unloading.



## 20' Open Top Container with Vertical Pallet

Size  
• 600 X 2400



Normal Air Bags will be needed here.

Note: Remove the Vertical Pallet only after Unloading all the Horizontal Pallets