SpeedCut™

Hollow Bars from ISMT (Conforming to EN 10294 – 1)

The new benchmark in Quality and Cost

ISO 14001:2004
VEXIL BPS MS
E9100811

OHSAS 18001:1999
VEXIL BPS MS
H9100825

BSI REGISTERED
ISO/TS 16949 : 2002

ISMT LIMITED

Solutions You Can Trust

SpeedCut™

Hollow Bars from ISMT (Conforming to EN 10294 – 1)

If you are a user of Hollow Bar our products are sure to interest you. We are setting new industry benchmarks in the production of Hollow Bars. ISMT produces Hollow Bars to the tightest tolerances and the highest quality standards in the industry. This means, as a customer you get more length (meters) and therefore more finished product per ton of Hollow Bar that you purchase. This alsomeans our Hollow Bars cost less to machine than our competitors.

TOTAL PROCESS CONTROL

At ISMT we believe the only way to guarantee quality is to stand responsible for the entire production process. For that reason we start with producing all our steel in-house. We bring to bear over 20 years of experience in manufacturing high-grade Bearing steel to all our manufacturing processes and to all our steel products (we are among a few select manufacturers globally to be approved by SKF and FAG for the supply of Bearing steels).

We produce our steel through the Electric Arc Furnace route. The raw material mix is chosen and prepared carefully to ensure the highest standards of cleanliness. All heats are ladle refined and vacuum degassed before continuous casting and rolling. Right through the production process we maintain full traceability of the material and a record of the tightly controlled process parameters. This ultra-clean steel forms the starting point for the manufacture of our tubes and hollow bars.

The manufacture of precision seamless tubes is as much a matter of equipment as it is of experience and process technology. At ISMT we believe in investing in the finest equipment. For making seamless tubes, we operate three Assel Mills, one PQF mill, Pilger Mills, and Cold draw benches. Our tube-mills are imported from Shloemann Mannesman in Germany and incorporate the best in technology. As regards experience, we have, perhaps, the most technically qualified team anywhere in the world, and the Hollow Bars that we produce for mechanical applications reflect this experience.

CLEAN TURNED SIZE

ISMT Hollow Bars conform to European EN 10294 -1 standards. The Clean Turned Size refers to the finished machined size that is guaranteed to be produced by chucking the Hollow Bar on the OD. Each Clean Turned Size, defined in steps of 5, 10 or 20 mm corresponds to a delivered hollow bar size. The difference in these two sizes represents the material that needs to be machined off.

TIGHTER TOLERANCES = SAVINGS

ISMT offers the tightest tolerances in the industry. We are able to do so through stringent control of our process parameters and because of proprietary processes that we have developed. With over 25 years of experience in operating Assel Mills we have a complete understanding of the primary parameters that are responsible for variations in product quality and we are able to control these parameters very carefully. Similarly, we have developed special surface treatment and cold sizing processes that allow us to ensure extremely good dimensional control as well as surface cleanliness.

In the case of Hollow Bars, tighter tolerances translate directly into cost savings. In order to guarantee a clean turned size, we are able to provide a finer machining allowance than our competitors. This not only means that you have less material to machine but also you get a greater number of meters of hollow bar per tonne and therefore more finished components per tonne of hollow bars that you purchase.

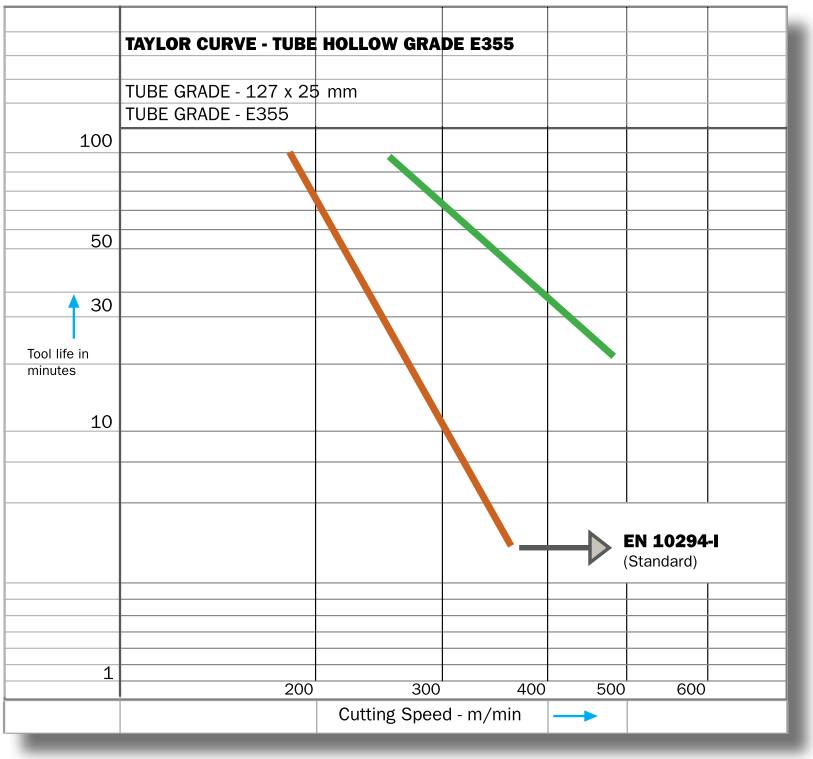
HIGHLY MACHINABLE STEEL

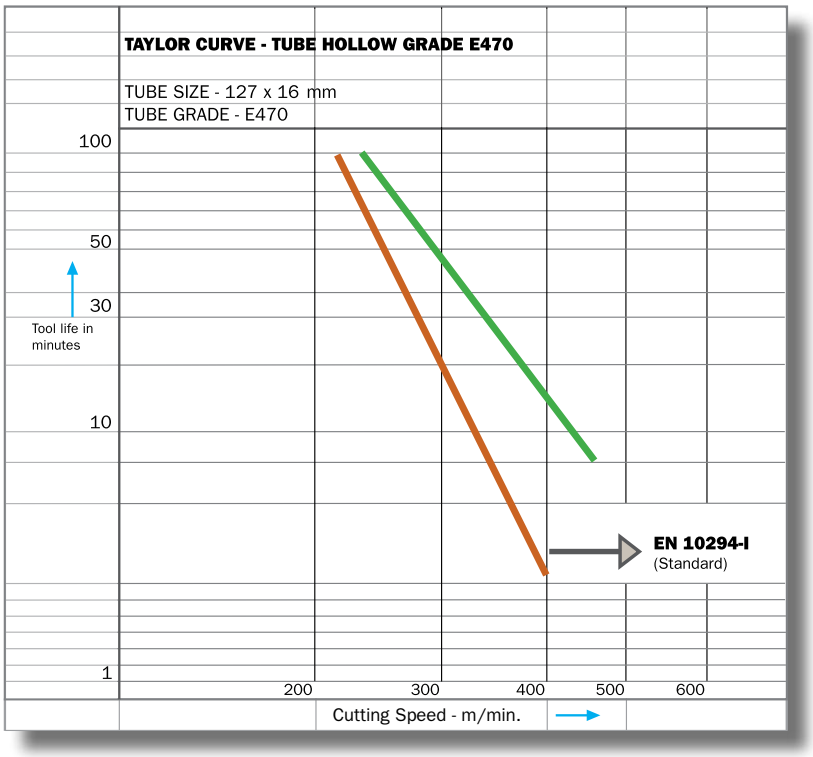
With over 25 years of experience in the Mechanical Tubes business, we fully understand that machinability and weldability of our tubes is of the essence to our customers. Therefore we have invested vast efforts in developing and perfecting the SPEEDCUT grades of steel.

TAYLOR CURVES

Our Hollow Bars are regularly put through testing procedures to benchmark machinability of the steel. The standard procedure used is to generate Taylor Curves for the steel (as per ISO 3685 – 1993) which provide a proxy measure of tool life as a function of the cutting speeds employed while machining the steel.

The graph below demonstrates the standard Taylor curve for the SPEEDCUT grade as compared to the requirements as per EN 10294 -1 standard.





GRADES

ISMT produces four standard grades of SPEEDCUT Hollow Bar: three micro-alloyed grades (470, 420, 590) and one regular grade (355). Although, the three micro-alloyed grades share the same chemistry they differ in their heat treatments.

CHEMICAL ANALYSIS

SpeedCut Grade	C	Mn	Si	P	S	Al	V
470, 420, 590	< 0.22	< 1.70	< 0.5	< 0.025	0.020 – 0.035	0.020 – 0.035	0.08 – 0.15
355	< 0.22	< 1.60	< 0.55	< 0.030	0.015 – 0.050		

MECHANICAL PROPERTIES

The Mechanical properties of EN-10294-1:2005 (E)

Steel grade		Upper yield strength ReH min Mpa For T_N in mm				Tensile strength Rm min Mpa For T_N in mm				Elongation in the longitudinal direction A min % *	Minimum average absorbed energy KV, in, J at a test temperature of - 20°C
Name	Number	T_N<= 16	16<T_N<=25	25<T_N<=40	40<T_N<=50	T_N<= 16	16<T_N<=25	25<T_N<=40	40<T_N<=50		
355	1.0580	355	345	335	335	490	490	470	470	18	-
355 J2	1.0592	355	345	335	335	490	490	470	470	20	27
420 J2	1.0599	420	400	380	380	600	560	530	530	19	27
470	1.0536	470	460	430	430	650	620	600	550	17	-
E590K2	1.0644	590	540	480	480	700	650	570	570	16	40

* At the discretion of the manufacturer the elongation may also be determined in the transverse direction.
In this case the minimum values to be achieved shall be those for the longitudinal direction minus 2 points

WELDABILITY

We assure a Ceq of less than 0.57. and thereby guarantee weld ability. Nevertheless, as a practice we recommend the following:

For tubes of thicknesses > 16 mm : Pre-heating between 200° and 250° C
For tubes of thicknesses < 16 mm : Pre-heating between 100° and 120° C

Stress Relieving at 600° C

HEAT TREATMENTS

Approximate transformation temperatures are as follows:

Transformation Temp	SPEEDCUT 420, 470, 590	SPEEDCUT 355, 355J2
Acl	720° C	715° C
Ac3	815° C	810° C
Austenitisation	880° C	880° C

We also deliver Hollow Bars in quench & tempered conditions, customised to specific needs.

SIZES AS PER EN 10294 – 1

The following tables show the finished machined sizes (guaranteed clean turned size with OD chucking), the delivered sizes (OD,Wall Thickness), weight per meter, and the guaranteed clean turned size if chucked on the ID.

Sr No.	Hollow Bar Size Code	Supply condition	Turn OD for OD Chucking	Turn ID for OD Chucking	Dimensions for OD chucking				
					Max OD	Min OD	Max WT	Min WT	KG/MTR
1	3015	CDS	30	15	31.150	30.150	9.394	7.306	4.594
2	3020	CDS	30	20	31.150	30.150	6.581	5.119	3.579
3	3520	CDS	35	20	36.150	35.150	9.394	7.306	5.624
4	3525	CDS	35	25	36.150	35.150	6.581	5.119	4.301
5	4020	CDS	40	20	41.150	40.150	12.206	9.494	7.977
6	4025	CDS	40	25	41.150	40.150	9.394	7.306	6.654
7	4030	CDS	40	30	41.150	40.150	6.581	5.119	5.022
8	4530	CDS	45	30	46.150	45.150	9.394	7.306	7.684
9	4535	CDS	45	35	46.150	45.150	6.581	5.119	5.744
10	5030	CDS	50	30	51.200	50.200	12.263	9.538	10.702
11	5035	CDS	50	35	51.200	50.200	9.450	7.350	8.766
12	5040	CDS	50	40	51.200	50.200	6.638	5.163	6.521
13	5530	CDS	55	30	56.200	55.200	15.075	11.725	13.983
14	5535	CDS	55	35	56.200	55.200	12.263	9.538	12.047
15	5540	HFS	55	40	56.650	55.650	10.322	8.028	10.633
16	5545	HFS	55	45	56.650	55.650	7.791	6.059	8.410
17	6035	CDS	60	35	61.200	60.200	15.075	11.725	15.636
18	6040	HFS	60	40	61.650	60.650	13.134	10.216	14.250
19	6045	HFS	60	45	61.650	60.650	10.322	8.028	11.764
20	6050	HFS	60	50	61.650	60.650	7.509	5.841	8.971
21	6535	CDS	65	35	66.200	65.200	17.490	14.310	19.534
22	6540	HFS	65	40	66.650	65.650	15.947	12.403	18.176
23	6545	HFS	65	45	66.650	65.650	13.134	10.216	15.690
24	6550	HFS	65	50	66.650	65.650	10.322	8.028	12.896
25	6555	HFS	65	55	66.650	65.650	7.791	6.059	10.118
26	7040	HFS	70	40	71.650	70.650	18.618	15.233	22.641
27	7045	HFS	70	45	71.650	70.650	15.947	12.403	19.924
28	7050	HFS	70	50	71.650	70.650	13.134	10.216	17.130
29	7055	HFS	70	55	71.650	70.650	10.322	8.028	14.028
30	7060	HFS	70	60	71.650	70.650	7.791	6.059	10.972
31	7545	HFS	75	45	76.721	75.579	18.343	15.008	24.466
32	7550	HFS	75	50	76.721	75.579	15.947	12.403	21.672
33	7555	HFS	75	55	76.721	75.579	13.134	10.216	18.570
34	7560	HFS	75	60	76.721	75.579	10.322	8.028	15.160
35	8040	HFS	80	40	81.910	80.690	24.200	19.800	32.184
36	8045	HFS	80	45	81.910	80.690	21.450	17.550	29.730
37	8050	HFS	80	50	81.910	80.690	18.425	15.075	26.674
38	8055	HFS	80	55	81.910	80.690	16.031	12.469	23.571
39	8060	HFS	80	60	81.910	80.690	13.219	10.281	20.161
40	8545	HFS	85	45	86.947	85.653	24.200	19.800	34.898
41	8550	HFS	85	50	86.947	85.653	21.450	17.550	32.135
42	8555	HFS	85	55	86.947	85.653	18.425	15.075	28.740
43	8560	HFS	85	60	86.947	85.653	16.031	12.469	25.329
44	8565	HFS	85	65	86.947	85.653	13.219	10.281	21.610
45	8570	HFS	85	70	86.947	85.653	10.406	8.094	17.583
46	9045	HFS	90	45	91.985	90.615	26.950	22.050	40.375
47	9050	HFS	90	50	91.985	90.615	24.200	19.800	37.612
48	9055	HFS	90	55	91.985	90.615	21.175	17.325	34.216
49	9060	HFS	90	60	91.985	90.615	18.425	15.075	30.806
50	9065	HFS	90	65	91.985	90.615	16.031	12.469	27.087

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					Max OD	Min OD	Max WT	Min WT	KG/MTR
51	9070	HFS	90	70	91.985	90.615	13.219	10.281	23.059
52	9075	HFS	90	75	91.985	90.615	10.688	8.313	19.171
53	9545	HFS	95	45	97.022	95.578	29.700	24.300	46.160
54	9550	HFS	95	50	97.022	95.578	26.950	22.050	43.397
55	9555	HFS	95	55	97.022	95.578	24.200	19.800	40.326
56	9560	HFS	95	60	97.022	95.578	21.175	17.325	36.591
57	9565	HFS	95	65	97.022	95.578	18.425	15.075	32.872
58	9570	HFS	95	70	97.022	95.578	16.031	12.469	28.844
59	9575	HFS	95	75	97.022	95.578	13.219	10.281	24.509
60	9580	HFS	95	80	97.022	95.578	10.688	8.313	20.343
61	10050	HFS	100	50	102.513	100.987	30.278	24.773	50.402
62	10055	HFS	100	55	102.513	100.987	27.528	22.523	47.367
63	10060	HFS	100	60	102.513	100.987	24.503	20.048	43.673
64	10065	HFS	100	65	102.513	100.987	21.753	17.798	39.991
65	10070	HFS	100	70	102.513	100.987	19.003	15.548	36.001
66	10075	HFS	100	75	102.513	100.987	16.622	12.928	31.702
67	10080	HFS	100	80	102.513	100.987	13.809	10.741	27.095
68	10085	HFS	100	85	102.513	100.987	11.278	8.772	22.685
69	10550	HFS	105	50	107.551	105.949	33.028	27.023	56.831
70	10555	HFS	105	55	107.551	105.949	30.278	24.773	53.797
71	10560	HFS	105	60	107.551	105.949	27.528	22.523	50.454
72	10565	HFS	105	65	107.551	105.949	24.503	20.048	46.421
73	10570	HFS	105	70	107.551	105.949	21.753	17.798	42.431
74	10575	HFS	105	75	107.551	105.949	19.003	15.548	38.132
75	10580	HFS	105	80	107.551	105.949	16.622	12.928	33.525
76	10585	HFS	105	85	107.551	105.949	13.809	10.741	28.609
77	10590	HFS	105	90	107.551	105.949	11.278	8.772	23.922
78	11060	HFS	110	60	112.588	110.912	30.278	24.773	57.192
79	11065	HFS	110	65	112.588	110.912	27.253	22.298	53.159
80	11070	HFS	110	70	112.588	110.912	24.503	20.048	49.169
81	11075	HFS	110	75	112.588	110.912	21.753	17.798	44.870
82	11080	HFS	110	80	112.588	110.912	19.003	15.548	40.263
83	11085	HFS	110	85	112.588	110.912	16.622	12.928	35.347
84	11090	HFS	110	90	112.588	110.912	13.809	10.741	30.123
85	11095	HFS	110	95	112.588	110.912	11.278	8.772	25.158
86	11565	HFS	115	65	117.626	115.874	30.278	24.773	60.588
87	11570	HFS	115	70	117.626	115.874	27.253	22.298	56.215
88	11575	HFS	115	75	117.626	115.874	24.503	20.048	51.916
89	11580	HFS	115	80	117.626	115.874	21.753	17.798	47.309
90	11585	HFS	115	85	117.626	115.874	19.003	15.548	42.394
91	11590	HFS	115	90	117.626	115.874	16.622	12.928	37.170
92	11595	HFS	115	95	117.626	115.874	13.809	10.741	31.638
93	12070	HFS	120	70	122.865	121.035	30.388	24.863	64.283
94	12075	HFS	120	75	122.865	121.035	27.363	22.388	59.572
95	12080	HFS	120	80	122.865	121.035	24.613	20.138	54.965
96	12085	HFS	120	85	122.865	121.035	21.863	17.888	50.049
97	12090	HFS	120	90	122.865	121.035	19.113	15.638	44.825
98	12095	HFS	120	95	122.865	121.035	16.734	13.016	39.293
99	120100	HFS	120	100	122.865	121.035	14.203	11.047	34.050
100	12570	HFS	125	70	127.902	125.998	33.138	27.113	71.959

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101	12575	HFS	125	75	127.902	125.998	30.113	24.638	67.247
102	12580	HFS	125	80	127.902	125.998	27.363	22.388	62.640
103	12585	HFS	125	85	127.902	125.998	24.613	20.138	57.724
104	12590	HFS	125	90	127.902	125.998	21.863	17.888	52.501
105	12595	HFS	125	95	127.902	125.998	19.113	15.638	46.968
106	125100	HFS	125	100	127.902	125.998	16.734	13.016	41.128
107	125105	HFS	125	105	127.902	125.998	14.203	11.047	35.608
108	13075	HFS	130	75	133.595	131.606	33.825	27.675	77.264
109	13080	HFS	130	80	133.595	131.606	30.800	25.200	72.253
110	13085	HFS	130	85	133.595	131.606	28.050	22.950	67.375
111	13090	HFS	130	90	133.595	131.606	25.300	20.700	62.188
112	13095	HFS	130	95	133.595	131.606	22.550	18.450	56.693
113	130100	HFS	130	100	133.595	131.606	19.800	16.200	50.889
114	130105	HFS	130	105	133.595	131.606	17.050	13.950	44.777
115	130110	HFS	130	110	133.595	131.606	14.906	11.594	39.013
116	14075	HFS	140	75	143.670	141.531	39.325	32.175	94.237
117	14080	HFS	140	80	143.670	141.531	36.575	29.925	89.697
118	14085	HFS	140	85	143.670	141.531	33.550	27.450	84.348
119	14090	HFS	140	90	143.670	141.531	30.800	25.200	79.161
120	14095	HFS	140	95	143.670	141.531	28.050	22.950	73.666
121	140100	HFS	140	100	143.670	141.531	25.300	20.700	67.862
122	140105	HFS	140	105	143.670	141.531	22.550	18.450	61.750
123	140110	HFS	140	110	143.670	141.531	19.800	16.200	55.330
124	140115	HFS	140	115	143.670	141.531	17.050	13.950	48.601
125	140120	HFS	140	120	143.670	141.531	14.906	11.594	42.282
126	15085	HFS	150	85	154.551	152.250	40.095	32.805	105.164
127	15090	HFS	150	90	154.551	152.250	37.070	30.330	99.516
128	15095	HFS	150	95	154.551	152.250	34.320	28.080	94.058
129	150100	HFS	150	100	154.551	152.250	31.570	25.830	88.291
130	150105	HFS	150	105	154.551	152.250	28.820	23.580	82.216
131	150110	HFS	150	110	154.551	152.250	26.070	21.330	75.833
132	150115	HFS	150	115	154.551	152.250	23.320	19.080	69.141
133	150120	HFS	150	120	154.551	152.250	20.570	16.830	62.141
134	150125	HFS	150	125	154.551	152.250	17.820	14.580	54.833
135	16085	HFS	160	85	164.854	162.399	45.722	37.409	125.164
136	16090	HFS	160	90	164.854	162.399	42.972	35.159	120.045
137	16095	HFS	160	95	164.854	162.399	40.222	32.909	114.618
138	160100	HFS	160	100	164.854	162.399	37.472	30.659	108.882
139	160105	HFS	160	105	164.841	162.387	34.713	28.401	102.808
140	160110	HFS	160	110	164.841	162.387	31.963	26.151	96.456
141	160115	HFS	160	115	164.841	162.387	29.213	23.901	89.795
142	160120	HFS	160	120	164.841	162.387	26.463	21.651	82.826
143	160125	HFS	160	125	164.841	162.387	23.713	19.401	75.548
144	160130	HFS	160	130	164.841	162.387	20.963	17.151	67.962
145	160135	HFS	160	135	164.841	162.387	18.213	14.901	60.068
146	17080	HFS	170	80	175.004	172.399	54.015	44.194	150.938
147	17085	HFS	170	85	175.004	172.399	51.265	41.944	146.128
148	17090	HFS	170	90	175.004	172.399	48.515	39.694	141.010
149	17095	HFS	170	95	175.004	172.399	45.765	37.444	135.583
150	170100	HFS	170	100	175.004	172.399	43.015	35.194	129.848

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151	170105	HFS	170	105	175.004	172.399	40.265	32.944	123.804
152	170110	HFS	170	110	174.992	172.387	37.504	30.685	117.415
153	170115	HFS	170	115	174.992	172.387	34.754	28.435	110.754
154	170120	HFS	170	120	174.992	172.387	32.004	26.185	103.785
155	170125	HFS	170	125	174.992	172.387	29.254	23.935	96.507
156	170130	HFS	170	130	174.992	172.387	26.504	21.685	88.921
157	170135	HFS	170	135	174.992	172.387	23.754	19.435	81.027
158	170140	HFS	170	140	174.992	172.387	21.004	17.185	72.824
159	170145	HFS	170	145	174.992	172.387	18.254	14.935	64.313
160	18085	HFS	180	85	185.614	181.939	56.809	46.480	168.345
161	18090	HFS	180	90	185.614	181.939	54.059	44.230	163.227
162	18095	HFS	180	95	185.614	181.939	51.309	41.980	157.800
163	180100	HFS	180	100	185.614	181.939	48.559	39.730	152.065
164	180105	HFS	180	105	185.614	181.939	45.809	37.480	146.021
165	180110	HFS	180	110	185.614	181.939	43.059	35.230	139.670
166	180115	HFS	180	115	185.602	181.927	40.295	32.969	132.965
167	180120	HFS	180	120	185.602	181.927	37.545	30.719	125.996
168	180125	HFS	180	125	185.602	181.927	34.795	28.469	118.719
169	180130	HFS	180	130	185.602	181.927	32.774	25.491	111.132
170	180135	HFS	180	135	185.602	181.927	29.961	23.303	103.238
171	180140	HFS	180	140	185.602	181.927	27.149	21.116	95.035
172	180145	HFS	180	145	185.602	181.927	24.336	18.928	86.524
173	180150	HFS	180	150	185.602	181.927	21.524	16.741	77.705
174	180155	HFS	180	155	185.602	181.927	18.711	14.553	68.577
175	190100	HFS	190	100	195.790	191.913	54.102	44.265	175.534
176	190105	HFS	190	105	195.790	191.913	51.352	42.015	169.491
177	190110	HFS	190	110	195.790	191.913	48.602	39.765	163.139
178	190115	HFS	190	115	195.790	191.913	45.852	37.515	156.480
179	190120	HFS	190	120	195.790	191.913	43.102	35.265	149.511
180	190125	HFS	190	125	195.781	191.905	40.339	33.004	142.191
181	190130	HFS	190	130	195.781	191.905	37.589	30.754	134.605
182	190135	HFS	190	135	195.781	191.905	34.839	28.504	126.710
183	190140	HFS	190	140	195.781	191.905	32.818	25.525	118.508
184	190145	HFS	190	145	195.781	191.905	30.005	23.338	109.996
185	190150	HFS	190	150	195.781	191.905	27.193	21.150	101.177
186	190155	HFS	190	155	195.781	191.905	24.380	18.963	92.049
187	190160	HFS	190	160	195.781	191.905	21.568	16.775	82.613
188	190165	HFS	190	165	195.781	191.905	18.755	14.588	72.868
189	200100	HFS	200	100	206.576	202.486	60.528	49.523	202.950
190	200105	HFS	200	105	206.576	202.486	57.778	47.273	196.969
191	200110	HFS	200	110	206.576	202.486	55.028	45.023	190.679
192	200115	HFS	200	115	206.576	202.486	52.278	42.773	184.081
193	200120	HFS	200	120	206.576	202.486	49.528	40.523	177.175
194	200125	HFS	200	125	206.564	202.474	46.760	38.258	169.900
195	200130	HFS	200	130	206.564	202.474	44.010	36.008	162.376
196	200135	HFS	200	135	206.564	202.474	41.260	33.758	154.543
197	200140	HFS	200	140	206.564	202.474	38.510	31.508	146.402
198	200145	HFS	200	145	206.564	202.474	35.760	29.258	137.953
199	200150	HFS	200	150	206.564	202.474	33.010	27.008	129.195
200	200155	HFS	200	155	206.564	202.474	30.948	24.071	120.129

Sr No.	Hollow Bar Size Code	Supply condition	Turn OD for OD Chucking	Turn ID for OD Chucking	Dimensions for OD chucking				
					Max OD	Min OD	Max WT	Min WT	KG/MTR
201	200160	HFS	200	160	206.564	202.474	28.136	21.883	110.754
202	200165	HFS	200	165	206.564	202.474	25.323	19.696	101.071
203	200170	HFS	200	170	206.564	202.474	22.511	17.508	91.080
204	200175	HFS	200	175	206.564	202.474	19.698	15.321	80.780
205	210125	HFS	210	125	216.752	212.460	52.321	42.808	196.010
206	210130	HFS	210	130	216.752	212.460	49.571	40.558	188.487
207	210135	HFS	210	135	216.752	212.460	46.821	38.308	180.656
208	210140	HFS	210	140	216.752	212.460	44.071	36.058	172.516
209	210145	HFS	210	145	216.752	212.460	41.308	33.798	164.027
210	210150	HFS	210	150	216.752	212.460	38.558	31.548	155.269
211	210155	HFS	210	155	216.752	212.460	35.808	29.298	146.203
212	210160	HFS	210	160	216.752	212.460	33.058	27.048	136.828
213	210165	HFS	210	165	216.752	212.460	30.997	24.109	127.145
214	210170	HFS	210	170	216.752	212.460	28.184	21.921	117.154
215	210175	HFS	210	175	216.752	212.460	25.372	19.734	106.854
216	210180	HFS	210	180	216.752	212.460	22.559	17.546	96.246
217	210185	HFS	210	185	216.752	212.460	19.747	15.359	85.330
218	220140	HFS	220	140	226.928	222.434	49.614	40.594	199.818
219	220145	HFS	220	145	226.928	222.434	46.864	38.344	191.371
220	220150	HFS	220	150	226.917	222.424	44.094	36.077	182.536
221	220155	HFS	220	155	226.917	222.424	41.344	33.827	173.470
222	220160	HFS	220	160	226.917	222.424	38.594	31.577	164.095
223	220170	HFS	220	170	226.917	222.424	33.094	27.077	144.421
224	220180	HFS	220	180	226.917	222.424	28.221	21.949	123.513
225	230125	HFS	230	125	237.104	232.408	63.408	51.879	251.865
226	230155	HFS	230	155	237.104	232.408	46.908	38.379	202.105
227	230160	HFS	230	160	237.104	232.408	44.158	36.129	192.732
228	230170	HFS	230	170	237.109	232.414	38.644	31.618	173.016
229	230180	HFS	230	180	237.109	232.414	33.144	27.118	152.108
230	230190	HFS	230	190	237.109	232.414	28.272	21.990	129.967
231	250180	HFS	250	180	257.455	252.357	44.244	36.200	213.027
232	250190	HFS	250	190	257.446	252.348	38.718	31.679	190.774
233	250200	HFS	250	200	257.446	252.348	33.218	27.179	167.399

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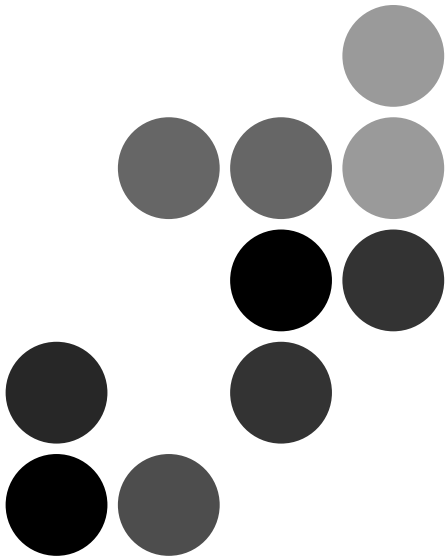

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