

# Magnet “20to2T5m100cm”: Power, Bore-Tube I.R. & Field Profiles

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Figure 1 shows how the power consumed by a 5-T insert for Target Magnet “20to2T5m120cm” depends on the number of passages hydraulically in parallel in each double-layer coil. Four, six and eight hydraulic paths per double player are equivalent, respectively, to two, three and four hydraulic paths per layer, with layers connected hydraulically in parallel rather than in series. Such magnets require a manifold at the downstream as well as the upstream end, with water withdrawn either downstream of the magnet or returned to the upstream end via a path radially outward or inward of the magnet windings.

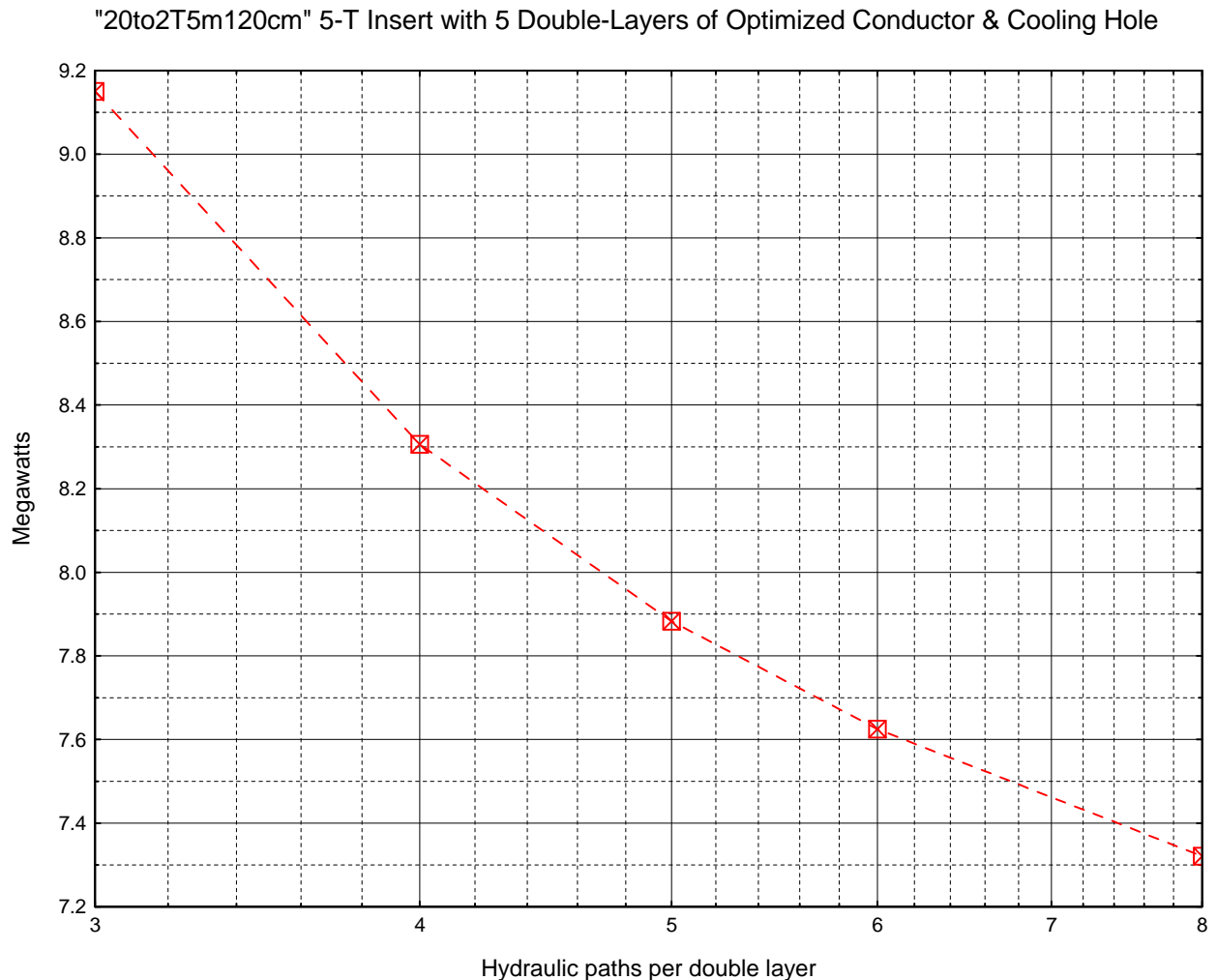


Fig. 1. Power consumption of 5-T insert for Target Magnet “20to2T5m120cm”: dependence on number of passages hydraulically in parallel in each double-layer coil. The current is 25.6 kA when  $n=3$ , and 24 kA when  $n=8$ . In each coil the aspect ratio (axial width  $\div$  radial depth) of the rectangular conductor and rectangular cooling hole is  $2.1 \pm 5\%$ .

Figure 2 plots the bore-tube inner radius & on-axis field profiles of component coils or magnets for the magnet with four paths hydraulically in parallel in each double-layer coil (8.3 MW). Table I lists the magnet dimensions and also the turns per layer.

## Target Magnet "20to2T5m120cm": Bore-Tube Radius and On-Axis Field Profiles

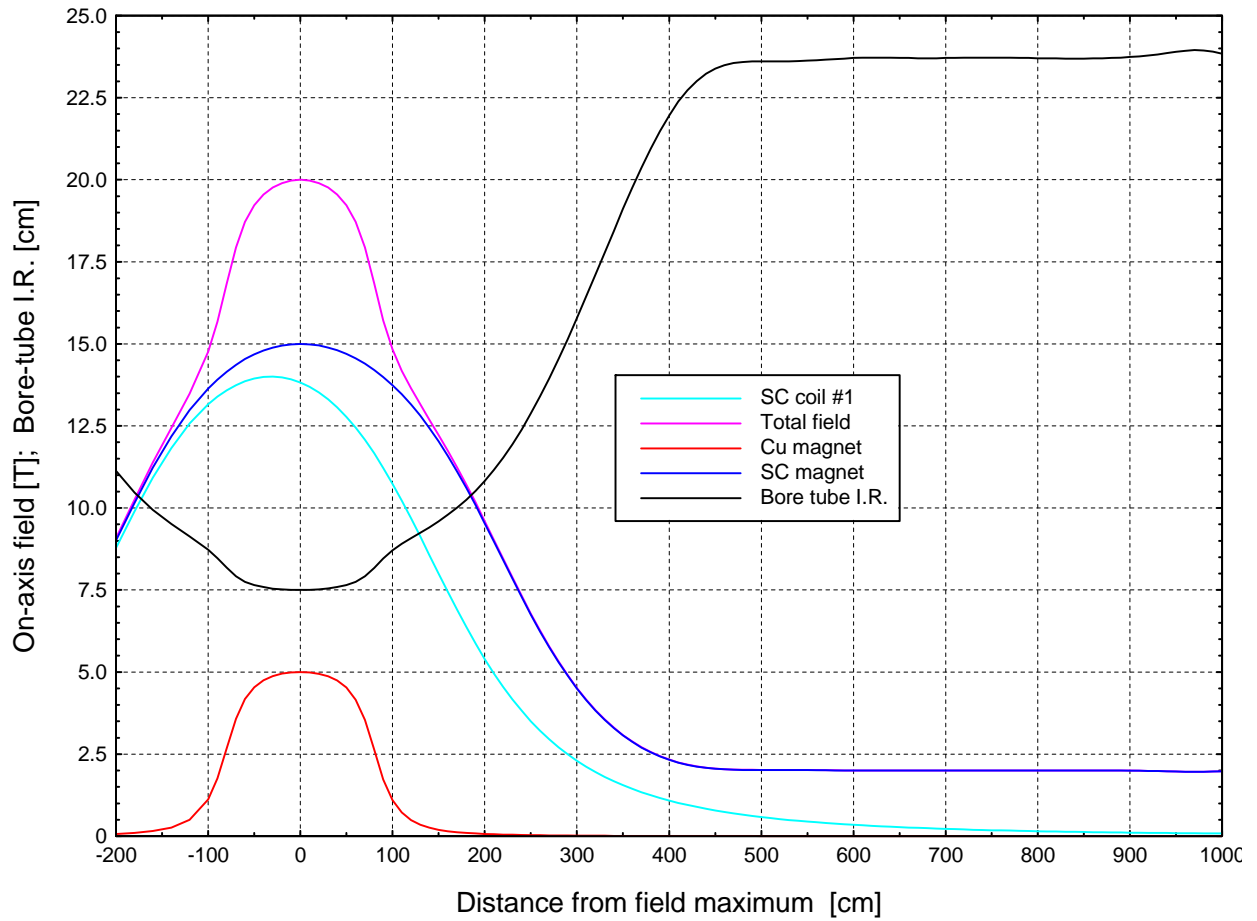


Fig. 2. Target Magnet “20to2T5m120cm”: Bore-tube I.R. & on-axis field profiles of component coils or magnets.

Table I: Selected parameters of Target Magnet “20to2T5m120cm”

SS shell thickness	cm	0.316	0.401	0.419	0.452	0.476							
Upstream end	cm	-80.54	-80.54	-80.54	-80.54	-80.54	-202.0	138.2	457.9	636.4	663.5	724.7	952.0
Length of solenoid	cm	160.6	160.6	160.6	160.6	160.6	340.1	81.37	165.7	21.98	53.30	215.4	15.00
Downstream end	cm	80.10	80.10	80.10	80.10	80.10	138.2	219.5	623.6	658.3	716.8	940.1	967.0
Gap between coils	cm							0	238.4	12.76	5.14	7.92	11.86
Turns/layer	cm	35.74	33.89	31.52	29.99	28.75							
Inner radius	cm	16.00	21.46	27.17	33.19	39.46	120.0	120.0	120.0	120.0	120.0	120.0	120.0
Layers of hollow cond.		2.00	2.00	2.00	2.00	2.00							
Radial depth of coil	cm	5.143	5.314	5.596	5.819	6.062	79.94	59.32	3.002	5.272	3.762	3.496	15.98
O. R. without SS shell	cm	21.14	26.77	32.77	39.01	45.52	199.9	179.3	123.0	125.3	123.8	123.5	136.0
O. R. with SS shell	cm	21.46	27.17	33.19	39.46	46.00							