WP-12: Warm Magnets
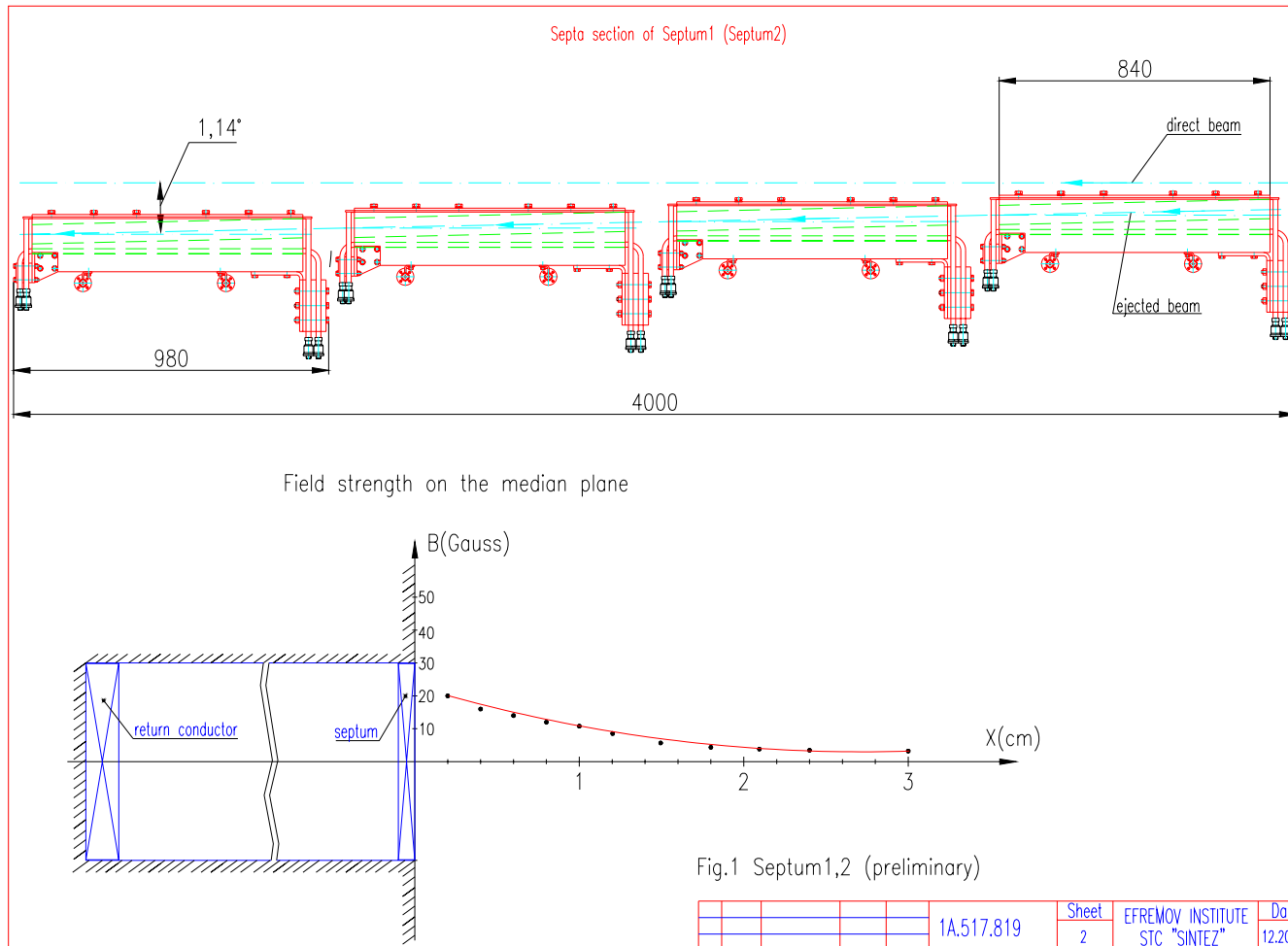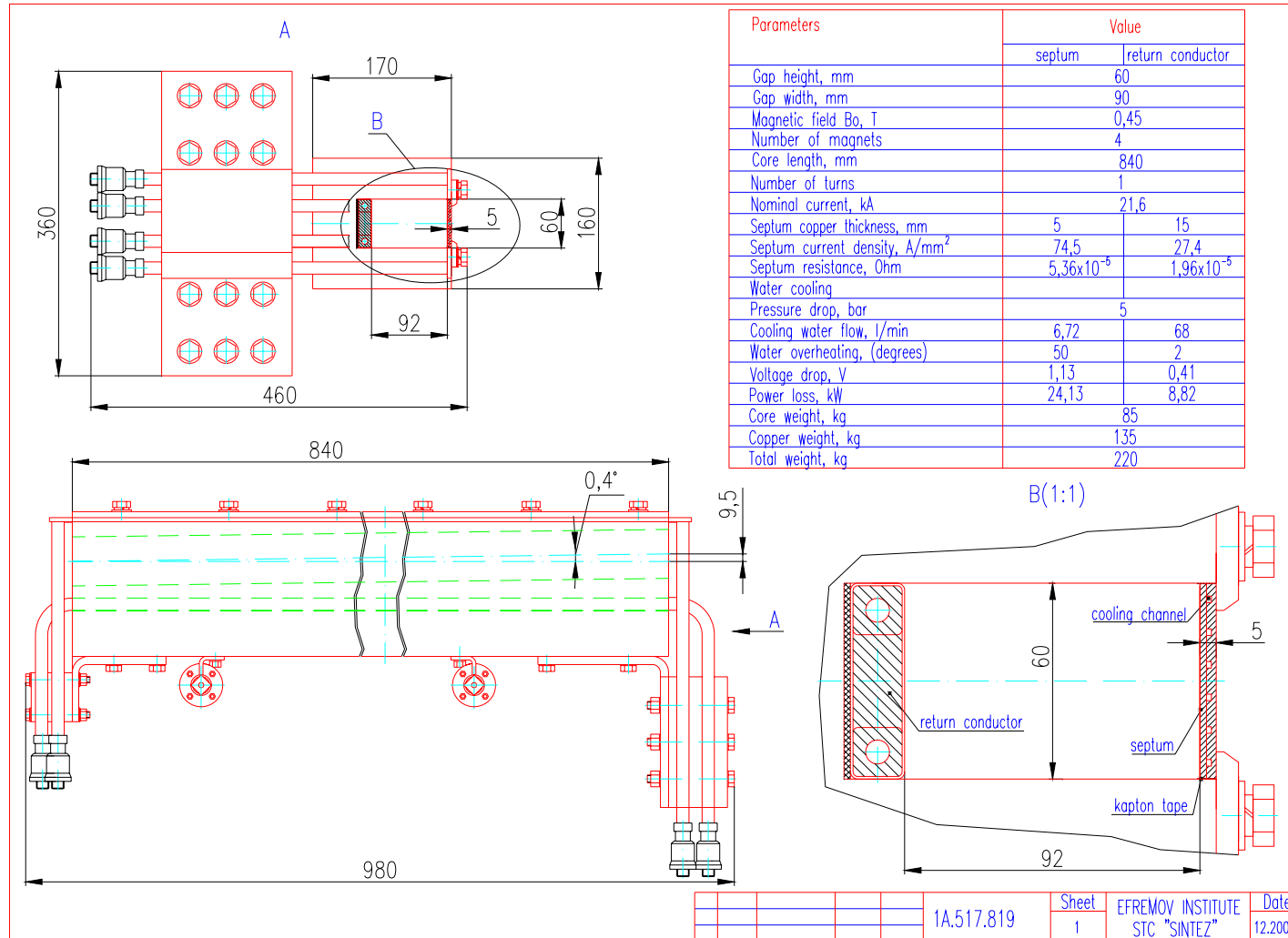# WPL: B. Krause

Septa

DC septa

- Septum 1 deflects the beam into the tunnel XTD1 (deflection of 1.14 degree over 4 m length).

- ~~Septum 2 deflects the beam into XFEL extension (tunnel XTD20)~~

  ~~(deflection of 1.10 degree over 4 m length).~~

- Lambertson septum for dump XS1

DC septum 1 and 2

Fig.1 Septum1,2 (preliminary)

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DC septum 1 and 2

Parameters	Value	
	septum	return conductor
Gap height, mm	60	
Gap width, mm	90	
Magnetic field Bo, T	0,45	
Number of magnets	4	
Core length, mm	840	
Number of turns	1	
Nominal current, kA	21,6	
Septum copper thickness, mm	5	15
Septum current density, A/mm^2	74,5	27,4
Septum resistance, Ohm	$5,36 \times 10^{-5}$	$1,96 \times 10^{-5}$
Water cooling		
Pressure drop, bar	5	
Cooling water flow, l/min	6,72	68
Water overheating, (degrees)	50	2
Voltage drop, V	1,13	0,41
Power loss, kW	24,13	8,82
Core weight, kg	85	
Copper weight, kg	135	
Total weight, kg	220	

A

170

B

360

5

60

160

92

460

840

0,4°

9,5

A

980

B(1:1)

cooling channel

5

60

return conductor

septum

kapton tape

92

1A.517.819

Sheet 1

EFREMOV INSTITUTE STC "SINTEZ"

Date 12.2005

Electrical parameters for septum 1 & 2

Parameters	Value	
	septum	return conductor
Gap heigth, mm	60	
Gap width, mm	90	
Magnetic field Bo, T	0,45	
Number of magnets	4	
Core length, mm	840	
Number of winding turns	1	
Nominal current, kA	21,6	
Septum copper thickness, mm	5	15
Septum current density, A/mm^2	74,5	27,4
Septum resistance, Ohm	$5,36 \times 10^{-5}$	$1,96 \times 10^{-5}$
Water cooling		
Pressure drop, Atm	5	
Cooling water flow, l/min	6,72	68
Water overheating, (degrees)	50	2
Voltage drop, V	1,13	0,41
Power loss, kW	24,13	8,82
Core weight, kg	85	
Copper weight, kg	135	
Total weight, kg	220	

25 GeV/c

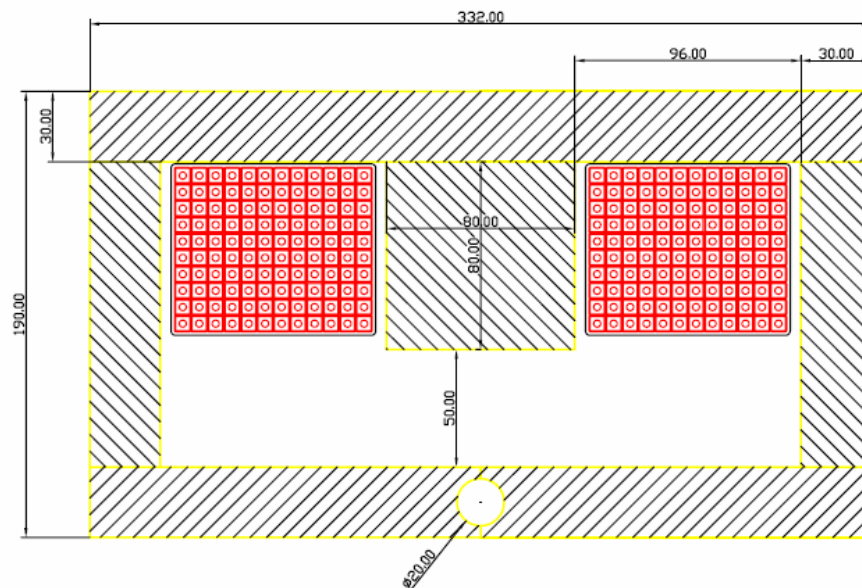03.12.2007   Bernward Krause MEA

DC septum 1 and 2

- Possible solution for septum to reduce current
  - Increase length

  - …

- Missing information:
  - Good field region area

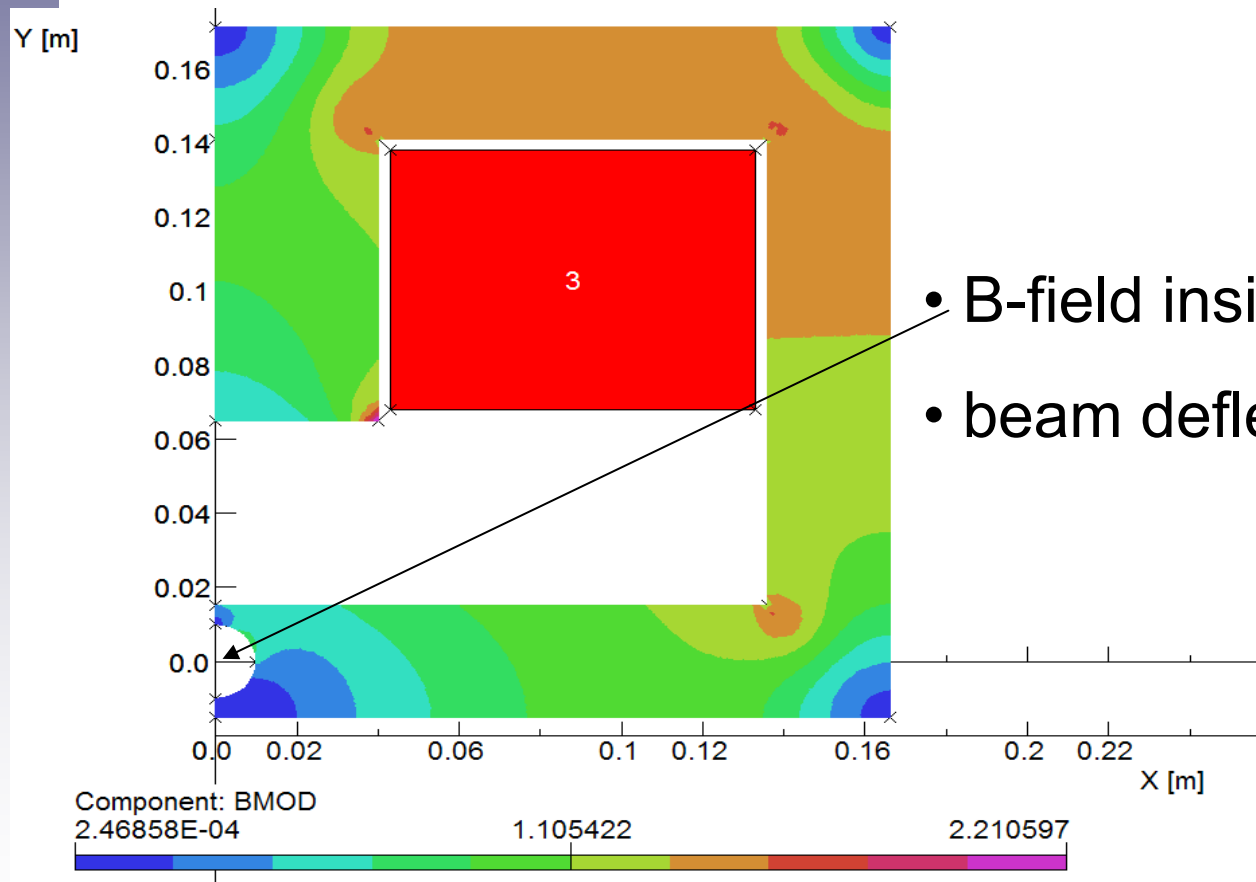 - Magnetic field quality dB/B
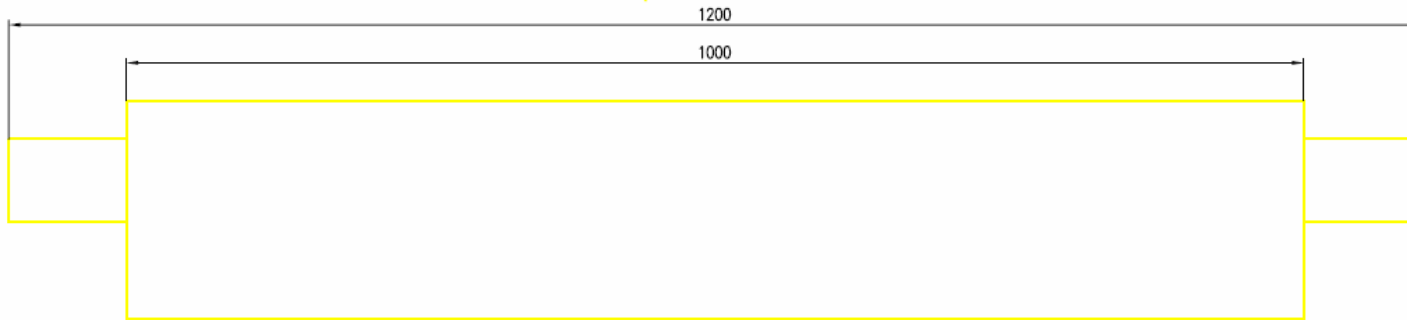
Lambertson septum for dump XS1

Parameters	Value
Air gap, mm	50
Magnetic field Bo, T	0.42
Core length, mm	1000
ΔB/Bo at R=40mm	0.15
Number of magnets	4
Number of winding turns	120
Nominal current, A	155
Conductor with dimensions, mm	6x6−∅3
Current density, A/mm²	5.4
Resistance, Ohm	0.183
Voltage drop, V	32
Power loss, kW	5
Core weight, kg	480
Copper weight, kg	77
Total weight, kg	560
Water pressure drop, МПа	0.5
Water circuit	5
Water flow , l/min	2.3
Temperature overheating, °C	30

Lambertson−septum

Lambertson septum

- B-field inside hole ~2.5 Gauss
- beam deflection horizontally

Component: BMOD

2.46858E-04   1.105422   2.210597

Lambertson septum

- Missing information:
  - Good field region area
  - Magnetic field quality dB/B