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## Recent Work

### Title

1978 MEASUREMENTS OF PEP DIPOLE MAGNETS (STEERING) 34B500 AND 58B500

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**ENGINEERING NOTE**MME BOOK  
NO. 591

FILE NO.

MT 310

PAGE

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SUBJECT

1978 Measurements of PEP Dipole Magnets (Steering)  
34B500 and 58B500

NAME

D.H. Nelson

DATE

February 10, 1982

INTRODUCTION

The purpose of this report is to document measurements made of 18 PEP injection line steering magnets in October, 1978.

TEST PLAN

According to Magnetic Measurements Engineering (MME) Job Sheet 7809, MME agreed to make the following measurements:

Measure  $\int B dl$  vs  $I$  one of each type, i.e., 34B500 and 58B500.

Measure  $\int B dl$  @  $I(15 \text{ GeV})$  each magnet.

Accuracy required:  $\pm 0.5\%$  (15 GeV quantities)

TEST EQUIPMENT

Table I lists the equipment used for these tests.

<u>Device</u>	<u>Identification</u>	<u>Notes</u>
Coil	L-36	$nw = 7.69$ (turn cm)
Flux Standard	SLFS 41	$\emptyset = 0.02149$ (Wb)
Integrator	Mod '71 S/N 3	$R = 42.2 \text{ k}\Omega$ , $C = 0.1 \text{ }\mu\text{F}$
Voltmeter	Keithley Model 177	S/N 10444
Power Supply	Harrison	AEC No. 127629
Shunt	L & N	S/N 792989
Voltmeter	Keithley Model 177	S/N 10450

TABLE I Test Equipment

**ENGINEERING NOTE**

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PROCEDURE

According to sketchy notes in the data book (MME Data Book No. 591), Ed Cyr and Don Nelson did the following:

1. established magnet history by cycling magnet current: 0A, 26A, 0A.
2. set magnet current and recorded shunt potential
3. flipped integral coil on magnet center line and recorded changes in integrator output potential
4. measured and recorded changes in integrator output potential due to pulsing the flux standard
5. computed integral of magnetic induction ( $\int B dx$ ), magnetic current (I) and normalized induction integral ( $\int B dx / I$ ) for each set of measurements
6. plotted results

RESULTS

Figures 1 and 2 summarize the test results. Both figures show  $\int B dx$  and  $\int B dx / I$  for selected values of magnet current up to  $I = 26$  Amperes. Measurements were made after establishing history. The solid curves correspond to data recorded when the magnet current is increased from 0A. The dashed curves correspond to data recorded when magnet current was decreased from 26 A.

Figure 1 represents the twelve magnets with 34 mm gaps, i.e., 34B500 - BV2, BV3, BV6, BV7, BH1 and BH2.

Figure 2 represents the six magnets with 58 mm gaps, i.e., 58B500 - BV1, BV4 and BV5.

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# PEP INJECTION-LINE STEERING MAGNETS, 58 B-500

## INTEGRAL MAGNETIZATION ON APERTURE C

DATA: '78 OCT. 10-12 DHN, EAC

DRAWN: '78 OCT. 13 DHN

ASSY. DRWG.: SA-209-232-06

0.08

MAGNETIC  
INDUCTION  
INTEGRAL,

$$\int B_z dl$$

(Tesla-meters)

### FIGURE 2

0.05

0.04

0.02

NORMALIZED  
INTEGRAL,

$$\int B_z dl / I$$

( $10^{-3}$  Tesla-meter)  
Ampere)

### LEGEND

CURRENT SET FROM	MAGNET S/N 14	MAGNET S/N 18	AVERAGE S/N 13-18
26A	○	□	△
0A	x	+	▽

MAGNET CURRENT, I (Amperes)

0 0.00

10

20

26

3.40

3.20

3.00

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