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REACTIVITY IN THE CENTI-MILLI-K UNIT

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REACTIVITY IN THE CENTI-MILLI-K UNIT

I. Excess Reactivity vs. Pile Rising Periods

Tables 1 through 5 show reactivity values in c-mk vs. pile rising periods (in seconds), for respective ratios of thermal fissions in Pu-239 to thermal fissions in U-235 (the ratio is defined here as F). Data in the tables were calculated on the IBM-650 computer using the reactivity equation in Reference 1.

Figure 1, from Reference 2, is a plot of "F" vs. $\bar{E}$ for the pile. To use the tables, first find the value of F from Figure 1 for the $\bar{E}$ of the pile. Then use the table for which the value of F at the top of the table is nearest to the value of F found in Figure 1.

For example, suppose that the pile $\bar{E}$ is 45 for a pile with a normal 32-piece loading. In Figure 1 we find that the corresponding value of F is approximately .076. F = .07 in Table 3 which is the value nearest to .076 found in Figure 1, so we would use Table 3 to find the reactivity of the rising periods for this sample.

II. Excess Reactivity vs. Pile Falling Periods

Table 6 includes data calculated from the following reactivity equation:

$$R = \frac{54}{T} + \frac{20}{T+62} + \frac{202}{T+2.19} + \frac{529}{T+6.51} + \frac{2016}{T+31.7} + \frac{779}{T+80.2}$$

where R = reactivity in inhours and T = the pile period in seconds. Inhours were converted to c-mk using the conversion of one inhour = 2.5 c-mk.

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III. Mint - Nominal Reactivity vs. Charge Length

Tables 7 through 9 include data which were calculated on the IBM-650 computer using the following equation:

$$Rn_{\text{column}} = \frac{Rn_{\text{SA}} \int_{\theta_1}^{\theta_2} \sin^2 \theta d\theta + Rn_{\text{mint}} \int_{\theta_2}^{\theta_3} \sin^2 \theta d\theta + Rn_{\text{water}} \int_{\theta_3}^{\theta_4} \sin^2 \theta d\theta}{\int_{\theta_1}^{\theta_4} \sin^2 \theta d\theta}$$

where Rn_{SA} = nominal reactivity of a full column of solid aluminum as DSD; Rn_{mint} = nominal reactivity of a full column of mint; and Rn_{water} = nominal reactivity of a full column of water.

NOTE: Tables 7 through 9 include data for mint which is only 72 per cent black.

The drawing below illustrates the assumed distribution of material along a process tube from downstream to upstream.

From 0 to θ_1 is the downstream augmentation distance, which was assumed to be two natural uranium pieces. θ_2 is the junction between the SA dummies and downstream end of the mint charge. θ_3 is the upstream end of the mint charge. From θ_3 to θ_4 is water, and from θ_4 to 1.0 is the upstream augmentation distance, also assumed to be two natural uranium pieces.

IV. Pb-Cd Nominal Reactivity vs. Charge Length

Tables 10 through 12 include data which were calculated on the IBM-650 computer in the same manner as the data for mint in Section III. The only difference is in substituting the nominal reactivity value of a full column of Pb-Cd for the nominal reactivity for a full column of mint.

V. Poison Splines

Table 13 contains data for the nominal reactivity of poison splines vs. the length of the spline covering a natural uranium charge. The length of the spline is measured from the upstream end of the natural uranium charge. The data were calculated on the basis of the following assumptions: (1) the nominal reactivity of a spline covering a full column of an 8-3/8 inch L.U. pile normally loaded with 34 pieces of natural uranium = 37.5 c-mk; (2) the

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V. Poison Splines (Continued)

nominal reactivity of a spline covering a full column of a 7-1/2 inch L.U. pile normally loaded with 38 pieces of natural uranium = 20.5 c-mk; and (3) the plotted neutron flux distribution, front-to-rear, would be a normal "chopped" cosine curve.

Dr. Clark

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Research and Engineering Section
IRRADIATION PROCESSING DEPARTMENT

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REFERENCES

- (1) HW-58148, "Use of Delayed Neutron Data in Reactivity Measurements," D. E. Simpson, 11-7-58.
- (2) HW-55358-RD, "Macroscopic Fission Cross Section Ratio of Pu-239 to U-235 as a Function of Exposure for Two Lattices and Two Slug Types," L. K. Stanton, 3-17-58.

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Figure 1

$\bar{E}$ vs F

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TABLE I
EXCESS REACTIVITY VS PILE PERIOD

<u>F = 0</u>										
Sec →	<u>0</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>
↓										
0						385.2	357.2	334.4	315.2	298.7
10	284.3	271.6	260.3	250.1	240.9	232.5	224.8	217.6	211.0	204.9
20	199.2	193.8	188.8	184.0	179.5	175.3	171.3	167.5	163.9	160.4
30	157.1	154.0	151.0	148.1	145.4	142.7	140.2	137.8	135.4	133.1
40	131.0	128.8	126.8	124.8	122.9	121.1	119.3	117.6	115.9	114.3 40
50	112.7	111.2	109.7	108.3	106.9	105.5	104.2	102.9	101.6	100.4
60	99.2	98.0	96.9	95.8	94.7	93.6	92.6	91.6	90.6	89.6 60
70	88.7	87.7	86.8	85.9	85.1	84.2	83.4	82.6	81.8	81.0
80	80.2	79.5	78.7	78.0	77.3	76.6	75.9	75.3	74.6	73.9 80
90	73.3	72.7	72.1	71.5	70.9	70.3	69.7	69.2	68.6	68.1
100	67.5	67.0	66.5	66.0	65.5	65.0	64.5	64.0	63.5	63.1
110	62.6	62.1	61.7	61.3	60.8	60.4	60.0	59.6	59.2	58.7
120	58.4	58.0	57.6	57.2	56.8	56.4	56.1	55.7	55.4	55.0
130	54.7	54.3	54.0	53.6	53.3	53.0	52.7	52.3	52.0	51.7
140	51.4	51.1	50.8	50.5	50.2	49.9	49.6	49.4	49.1	48.8
150	48.5	48.3	48.0	47.7	47.5	47.2	47.0	46.7	46.4	46.2
160	46.0	45.7	45.5	45.2	45.0	44.8	44.6	44.3	44.1	43.9
170	43.7	43.4	43.2	43.0	42.8	42.6	42.4	42.2	42.0	41.8
180	41.6	41.4	41.2	41.0	40.8	40.6	40.4	40.2	40.0	39.9
190	39.7	39.5	39.3	39.1	39.0	38.8	38.6	38.5	38.3	38.1
200	38.0									

Sec →	<u>0</u>	<u>10</u>	<u>20</u>	<u>30</u>	<u>40</u>	<u>50</u>	<u>60</u>	<u>70</u>	<u>80</u>	<u>90</u>
↓										
200	38.0	36.4	34.9	33.6	32.3	31.2	30.1	29.1	28.2	27.3
300	26.5	25.7	25.0	24.3	23.6	23.0	22.4	21.9	21.3	20.8
400	20.3									

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TABLE 2

EXCESS REACTIVITY VS PILE PERIOD

F = .04

Sec →	<u>0</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>
↓										
0						375.7	348.3	326.0	307.3	291.2
10	277.2	264.8	253.8	243.8	234.8	226.6	219.1	212.2	205.7	199.7
20	194.1	188.9	184.0	179.4	175.0	170.9	167.0	163.3	159.7	156.4
30	153.2	150.1	147.2	144.4	141.7	139.1	136.7	134.3	132.0	129.8
40	127.6	125.6	123.6	121.7	119.8	118.0	116.3	114.6	113.0	111.4
50	109.9	108.4	106.9	105.5	104.2	102.8	101.5	100.3	99.0	97.8
60	96.7	95.5	94.4	93.3	92.3	91.2	90.2	89.2	88.3	87.3
70	86.4	85.5	84.6	83.8	82.9	82.1	81.3	80.5	79.7	78.9
80	78.2	77.5	76.7	76.0	75.3	74.7	74.0	73.3	72.7	72.1
90	71.5	70.8	70.2	69.7	69.1	68.5	68.0	67.4	66.9	66.3
100	65.8	65.3	64.8	64.3	63.8	63.3	62.8	62.4	61.9	61.5
110	61.0	60.6	60.1	59.7	59.3	58.9	58.5	58.1	57.7	57.3
120	56.9	56.5	56.1	55.7	55.4	55.0	54.7	54.3	54.0	53.6
130	53.3	52.9	52.6	52.3	52.0	51.6	51.3	51.0	50.7	50.4
140	50.1	49.8	49.5	49.2	48.9	48.7	48.4	48.1	47.8	47.6
150	47.3	47.0	46.8	46.5	46.3	46.0	45.8	45.5	45.3	45.0
160	44.8	44.6	44.3	44.1	43.9	43.6	43.4	43.2	43.0	42.8
170	42.6	42.3	42.1	41.9	41.7	41.5	41.3	41.1	40.9	40.7
180	40.5	40.3	40.1	39.9	39.8	39.6	39.4	39.2	39.0	38.9
190	38.7	38.5	38.3	38.2	38.0	37.8	37.6	37.5	37.3	37.2
200	37.0									

Sec →	<u>0</u>	<u>10</u>	<u>20</u>	<u>30</u>	<u>40</u>	<u>50</u>	<u>60</u>	<u>70</u>	<u>80</u>	<u>90</u>
↓										
200	37.0	35.5	34.0	32.7	31.5	30.4	29.4	28.4	27.5	26.6
300	25.8	25.0	24.3	23.7	23.0	22.4	21.9	21.3	20.8	20.3
400	19.8									

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TABLE 3

EXCESS REACTIVITY VS PILE PERIOD

F = .07

Sec →	<u>0</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>
↓										
0						369.1	342.3	320.3	301.9	286.1
10	272.3	260.1	249.3	239.5	230.7	222.6	215.2	208.4	202.1	196.2
20	190.7	185.6	180.7	176.2	171.9	167.9	164.0	160.4	156.9	153.6
30	150.5	147.5	144.6	141.8	139.2	136.7	134.2	131.9	129.7	127.5
40	125.4	123.4	121.4	119.5	117.7	116.0	114.3	112.6	111.0	109.4
50	107.9	106.5	105.0	103.7	102.3	101.0	99.7	98.5	97.3	96.1
60	95.0	93.8	92.8	91.7	90.7	89.6	88.6	87.7	86.7	85.8
70	84.9	84.0	83.1	82.3	81.5	80.7	79.9	79.1	78.3	77.6
80	76.8	76.1	75.4	74.7	74.0	73.4	72.7	72.1	71.4	70.8
90	70.2	69.6	69.0	68.4	67.9	67.3	66.8	66.2	65.7	65.2
100	64.7	64.1	63.6	63.2	62.7	62.2	61.7	61.3	60.8	60.4
110	59.9	59.5	59.1	58.7	58.2	57.8	57.4	57.0	56.6	56.3
120	55.9	55.5	55.1	54.8	54.4	54.0	53.7	53.3	53.0	52.7
130	52.3	52.0	51.7	51.4	51.0	50.7	50.4	50.1	49.8	49.5
140	49.2	48.9	48.7	48.4	48.1	47.8	47.5	47.3	47.0	46.7
150	46.5	46.2	46.0	45.7	45.5	45.2	45.0	44.7	44.5	44.2
160	44.0	43.8	43.6	43.3	43.1	42.9	42.7	42.4	42.2	42.0
170	41.8	41.6	41.4	41.2	41.0	40.8	40.6	40.4	40.2	40.0
180	39.8	39.6	39.4	39.2	39.1	38.9	38.7	38.5	38.3	38.2
190	38.0	37.8	37.7	37.5	37.3	37.2	37.0	36.8	36.7	36.5
200	36.3									

Sec →	<u>0</u>	<u>10</u>	<u>20</u>	<u>30</u>	<u>40</u>	<u>50</u>	<u>60</u>	<u>70</u>	<u>80</u>	<u>90</u>
↓										
200	36.3	34.8	33.4	32.2	31.0	29.9	28.8	27.9	27.0	26.1
300	25.4	24.6	23.9	23.2	22.6	22.0	21.5	20.9	20.4	19.9
400	19.5									

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TABLE 4
EXCESS REACTIVITY VS PILE PERIOD

F = .10

Sec →	<u>0</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>
↓										
0						362.9	336.5	314.9	296.7	281.2
10	267.6	255.7	245.0	235.4	226.7	218.8	211.5	204.8	198.6	192.8
20	187.4	182.4	177.6	173.2	169.0	165.0	161.2	157.6	154.2	151.0
30	147.9	144.9	142.1	139.4	136.8	134.3	131.9	129.6	127.4	125.3
40	123.2	121.3	119.3	117.5	115.7	114.0	112.3	110.7	109.1	107.6
50	106.1	104.6	103.3	101.9	100.6	99.3	98.0	96.8	95.6	94.5
60	93.3	92.2	91.2	90.1	89.1	88.1	87.1	86.2	85.2	84.3
70	83.4	82.6	81.7	80.9	80.1	79.3	78.5	77.7	77.0	76.2
80	75.5	74.8	74.1	73.4	72.8	72.1	71.5	70.8	70.2	69.6
90	69.0	68.4	67.8	67.3	66.7	66.2	65.6	65.1	64.6	64.0
100	63.5	63.0	62.6	62.1	61.6	61.1	60.7	60.2	59.8	59.3
110	58.9	58.5	58.1	57.6	57.2	56.8	56.4	56.1	55.7	55.3
120	54.9	54.5	54.2	53.8	53.5	53.1	52.8	52.4	52.1	51.8
130	51.4	51.1	50.8	50.5	50.2	49.9	49.6	49.3	49.0	48.7
140	48.4	48.1	47.8	47.5	47.3	47.0	46.7	46.5	46.2	45.9
150	45.7	45.4	45.2	44.9	44.7	44.4	44.2	44.0	43.7	43.5
160	43.3	43.0	42.8	42.6	42.4	42.1	41.9	41.7	41.5	41.3
170	41.1	40.9	40.7	40.5	40.3	40.1	39.9	39.7	39.5	39.3
180	39.1	38.9	38.8	38.6	38.4	38.2	38.0	37.9	37.7	37.5
190	37.3	37.2	37.0	36.8	36.7	36.5	36.4	36.2	36.0	35.9
200	35.7									
Sec →	<u>0</u>	<u>10</u>	<u>20</u>	<u>30</u>	<u>40</u>	<u>50</u>	<u>60</u>	<u>70</u>	<u>80</u>	<u>90</u>
↓										
200	35.7	34.2	32.9	31.6	30.4	29.3	28.3	27.4	26.5	25.7
300	24.9	24.2	23.5	22.8	22.2	21.7	21.1	20.6	20.1	19.6
400	19.1									

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TABLE 5

EXCESS REACTIVITY VS PILE PERIOD

F = .13

Sec →	<u>0</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>
↓										
0						357.2	331.2	309.9	292.0	276.7
10	263.4	251.6	241.1	231.7	223.1	215.3	208.1	201.5	195.4	189.7
20	184.4	179.5	174.8	170.4	166.3	162.3	158.6	155.1	151.8	148.6
30	145.5	142.6	139.8	137.2	134.6	132.2	129.8	127.6	125.4	123.3
40	121.3	119.3	117.4	115.6	113.8	112.1	110.5	108.9	107.4	105.8
50	104.4	103.0	101.6	100.3	99.0	97.7	96.5	95.3	94.1	92.9
60	91.8	90.8	89.7	88.7	87.7	86.7	85.7	84.8	83.9	83.0
70	82.1	81.2	80.4	79.6	78.8	78.0	77.2	76.5	75.7	75.0
80	74.3	73.6	72.9	72.2	71.6	70.9	70.3	69.7	69.1	68.5
90	67.9	67.3	66.7	66.2	65.6	65.1	64.6	64.0	63.5	63.0
100	62.5	62.0	61.5	61.1	60.6	60.2	59.7	59.3	58.8	58.4
110	58.0	57.5	57.1	56.7	56.3	55.9	55.5	55.2	54.8	54.4
120	54.0	53.7	53.3	53.0	52.6	52.3	51.9	51.6	51.3	50.9
130	50.6	50.3	50.0	49.7	49.4	49.1	48.8	48.5	48.2	47.9
140	47.6	47.3	47.0	46.8	46.5	46.2	46.0	45.7	45.4	45.2
150	44.9	44.7	44.4	44.2	44.0	43.7	43.5	43.2	43.0	42.8
160	42.6	42.3	42.1	41.9	41.7	41.5	41.3	41.0	40.8	40.6
170	40.4	40.2	40.0	39.8	39.6	39.4	39.2	39.1	38.9	38.7
180	38.5	38.3	38.1	37.9	37.8	37.6	37.4	37.2	37.1	36.9
190	36.7	36.6	36.4	36.2	36.1	35.9	35.8	35.6	35.5	35.3
200	35.1									

Sec →	<u>0</u>	<u>10</u>	<u>20</u>	<u>30</u>	<u>40</u>	<u>50</u>	<u>60</u>	<u>70</u>	<u>80</u>	<u>90</u>
↓										
200	35.1	33.7	32.3	31.1	29.9	28.9	27.9	27.0	26.1	25.3
300	24.5	23.8	23.1	22.5	21.9	21.3	20.8	20.2	19.7	19.3
400	18.8									

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TABLE 6
REACTIVITY VS PILE FALLING PERIOD

Sec → ↓	<u>0</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>
90	308.8	288.7	271.7	257.2	244.6	233.5	223.7	215.0	207.0	199.9
100	193.3	187.3	181.8	176.6	171.8	167.4	163.2	159.3	155.6	152.2
110	148.9	145.8	142.8	140.0	137.3	134.7	132.3	130.0	127.7	125.6
120	123.5	121.5	119.6	117.7	116.0	114.2	112.6	111.0	109.4	107.9
130	106.5	105.0	103.7	102.3	101.0	99.8	98.6	97.4	96.2	95.1
140	94.0	92.9	91.9	90.9	89.9	88.9	88.0	87.0	86.1	85.2
150	84.4	83.5	82.7	81.9	81.1	80.3	79.6	78.8	78.1	77.4
160	76.7	76.0	75.3	74.6	74.0	73.3	72.7	72.1	71.5	70.9
170	70.3	69.7	69.2	68.6	68.1	67.5	67.0	66.5	66.0	65.5
180	65.0	64.5	64.0	63.6	63.1	62.6	62.2	61.7	61.3	60.9
190	60.4	60.0	59.6	59.2	58.8	58.4	58.0	57.6	57.3	56.9
200	56.5									

Sec → ↓	<u>0</u>	<u>10</u>	<u>20</u>	<u>30</u>	<u>40</u>	<u>50</u>	<u>60</u>	<u>70</u>	<u>80</u>	<u>90</u>
200	56.5	53.1	50.0	47.4	44.9	42.8	40.8	39.0	37.4	35.8
300	34.5	33.2	32.0	30.9	29.8	28.9	28.0	27.1	26.3	25.6
400	24.9	24.2	23.6	23.0	22.4	21.8	21.3	20.8	20.3	19.9
500	19.5									

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TABLE 7. NOMINAL REACTIVITY OF MINT IN 8-3/8 INCH L.U. PILE WITH NORMAL LOADING OF 32 I&E NU PIECES

No. DSD (SA)	5 MINT PIECES		10 MINT PIECES		15 MINT PIECES		20 MINT PIECES		25 MINT PIECES	
	Displ. (In.)	Rn (cmk)	Displ. (In.)	Rn (cmk)	Displ. (In.)	Rn (cmk)	Displ. (In.)	Rn (cmk)	Displ. (In.)	Rn (cmk)
0	-131	45.9	-121	48.4	-111	52.9	-100	59.8	- 90	68.8
1	-123	46.4	-113	49.6	-103	55.1	- 92	62.8	- 82	72.5
2	-115	47.0	-105	51.0	- 95	57.4	- 84	65.9	- 74	76.2
3	-107	47.6	- 97	52.5	- 87	59.8	- 76	69.1	- 66	79.8
4	- 99	48.3	- 89	54.1	- 79	62.2	- 68	72.1	- 58	83.2
5	- 91	49.0	- 81	55.7	- 71	64.5	- 60	75.0	- 50	86.3
6	- 83	49.6	- 73	57.2	- 63	66.8	- 52	77.7	- 42	89.0
7	- 75	50.3	- 65	58.7	- 55	68.8	- 44	80.0	- 34	91.3
8	- 67	50.9	- 57	60.0	- 47	70.7	- 36	82.0	- 26	93.1
9	- 59	51.4	- 49	61.2	- 39	72.3	- 28	83.6	- 18	94.3
10	- 51	51.8	- 41	62.1	- 31	73.4	- 20	84.6	- 10	94.9
11	- 43	52.0	- 33	62.8	- 23	74.2	- 12	85.2	- 2	94.9
12	- 35	52.2	- 25	63.3	- 15	74.6	- 4	85.2	6	94.3
13	- 27	52.1	- 17	63.5	- 7	74.6	4	84.7	14	93.0
14	- 19	52.0	- 9	63.4	1	74.2	12	83.7	22	91.1
15	- 11	51.7	- 1	62.9	9	73.3	20	82.1	30	88.7
16	- 3	51.2	7	62.2	17	72.1	28	80.0	38	85.8
17	5	50.5	15	61.2	25	70.4	36	77.5	46	82.4
18	13	49.8	23	60.0	33	68.4	44	74.7	54	78.6
19	21	48.9	31	58.4	41	66.1	52	71.4	62	74.6
20	29	47.8	39	56.7	49	63.5	60	68.0	70	70.3
21	37	46.7	47	54.8	57	60.7	68	64.3	78	66.0
22	45	45.5	55	52.8	65	57.8	76	60.6	86	61.7
23	53	44.2	63	50.6	73	54.7	84	56.8		
24	61	42.9	71	48.4	81	51.7	92	53.2		
25	69	41.6	79	46.2	89	48.7	100	49.6		
26	77	40.3	87	44.1	97	45.9				
27	85	39.0	95	42.0	105	43.2				
28	93	37.8	103	40.0						
29	101	36.7	111	38.3						
30	109	35.7	119	36.7						
31	117	34.8								
32	125	34.0								

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TABLE 7. (Cont'd.)

No. DSD (SA)	30 MINT PIECES		35 MINT PIECES		40 MINT PIECES		45 MINT PIECES		50 MINT PIECES	
	Displ. (In.)	Rn (cmk)	Displ. (In.)	Rn (cmk)	Displ. (In.)	Rn (cmk)	Displ. (In.)	Rn (cmk)	Displ. (In.)	Rn (cmk)
0	- 80	79.3	- 69	90.7	- 59	101.8	- 48	111.9	- 38	120.3
1	- 72	83.4	- 61	94.8	- 51	105.7	- 40	115.2	- 30	122.7
2	- 64	87.4	- 53	98.7	- 43	109.1	- 32	117.9	- 22	124.5
3	- 56	91.1	- 45	102.2	- 35	112.1	- 24	120.0	- 14	125.8
4	- 48	94.5	- 37	105.2	- 27	114.4	- 16	121.6	- 6	126.4
5	- 40	97.5	- 29	107.7	- 19	116.2	- 8	122.4	- 2	126.4
6	- 32	100.0	- 21	109.6	- 11	117.2	0	122.6	10	125.8
7	- 24	101.8	- 13	110.8	- 3	117.6	8	122.1	18	124.5
8	- 16	103.1	- 5	111.2	5	117.1	16	120.8	26	122.5
9	- 8	103.7	3	111.0	13	116.0	24	118.8	34	120.0
10	0	103.5	11	110.0	21	114.1	32	116.3		
11	8	102.7	19	108.3	29	111.6	40	113.1		
12	16	101.2	27	105.9	37	108.4	48	109.4		
13	24	99.1	35	102.9	45	104.7				
14	32	96.3	43	99.3	53	100.6				
15	40	93.0	51	95.3						
16	48	89.2	59	90.8						
17	56	85.1	67	86.1						
18	64	80.6								
19	72	75.9								

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TABLE 8. NOMINAL REACTIVITY OF MINT IN 8-3/8 INCH L.U.
PILE WITH NORMAL LOADING OF 34 I&E NU PIECES

No. DSD (SA)	5 MINT PIECES		10 MINT PIECES		15 MINT PIECES		20 MINT PIECES		25 MINT PIECES	
	Displ. (In.)	Rn (cmk)	Displ. (In.)	Rn (cmk)	Displ. (In.)	Rn (cmk)	Displ. (In.)	Rn (cmk)	Displ. (In.)	Rn (cmk)
0	-140	45.8	-130	47.9	-119	51.8	-109	57.9	- 99	65.8
1	-132	46.2	-122	49.0	-111	53.7	-101	60.5	- 91	69.2
2	-124	46.7	-114	50.2	-103	55.7	- 93	63.3	- 83	72.6
3	-116	47.2	-106	51.5	- 95	57.9	- 85	66.1	- 75	75.9
4	-108	47.8	- 98	52.9	- 87	60.0	- 77	68.9	- 67	79.1
5	-100	48.4	- 90	54.3	- 79	62.2	- 69	71.6	- 59	82.1
6	- 92	49.0	- 82	55.7	- 71	64.2	- 61	74.2	- 51	84.9
7	- 84	49.6	- 74	57.0	- 63	66.2	- 53	76.5	- 43	87.3
8	- 76	50.2	- 66	58.3	- 55	68.0	- 45	78.6	- 35	89.3
9	- 68	50.6	- 58	59.4	- 47	69.5	- 37	80.3	- 27	90.9
10	- 60	51.0	- 50	60.4	- 39	70.9	- 29	81.6	- 19	91.9
11	- 52	51.3	- 42	61.2	- 31	71.9	- 21	82.5	- 11	92.5
12	- 44	51.5	- 34	61.8	- 23	72.6	- 13	83.0	- 3	92.5
13	- 36	51.6	- 26	62.1	- 15	72.9	- 5	83.0	5	91.9
14	- 28	51.5	- 18	62.3	- 7	72.9	3	82.6	13	90.8
15	- 20	51.4	- 10	62.1	1	72.5	11	81.7	21	89.2
16	- 12	51.0	- 2	61.7	9	71.7	19	80.3	29	87.1
17	- 4	50.6	6	61.1	17	70.6	27	78.6	37	84.5
18	4	50.0	14	60.2	25	69.2	35	76.4	45	81.5
19	12	49.3	22	59.1	33	67.4	43	73.9	53	78.2
20	20	48.5	30	57.8	41	65.4	51	71.0	61	74.6
21	28	47.5	38	56.3	49	63.1	59	68.0	69	70.8
22	36	46.5	46	54.6	57	60.7	67	64.7	77	66.9
23	44	45.4	54	52.8	65	58.0	75	61.3	85	62.9
24	52	44.3	62	50.8	73	55.3	83	57.9	93	59.0
25	60	43.1	70	48.9	81	52.6	91	54.5		
26	68	41.9	78	46.9	89	49.8	99	51.2		
27	76	40.7	86	44.9	97	47.2	107	48.0		
28	84	39.5	94	42.9	105	44.6				
29	92	38.4	102	41.1	113	42.2				
30	100	37.3	110	39.3						
31	108	36.3	118	37.8						
32	116	35.4	126	36.4						
33	124	34.6								
34	132	33.9								
35	140	33.4								

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TABLE 8. (Cont'd.)

No. DSD (SA)	30 MINT PIECES		35 MINT PIECES		40 MINT PIECES		45 MINT PIECES		50 MINT PIECES	
	Displ. (In.)	Rn (cmk)	Displ. (In.)	Rn (cmk)	Displ. (In.)	Rn (cmk)	Displ. (In.)	Rn (cmk)	Displ. (In.)	Rn (cmk)
0	- 88	75.4	- 78	86.0	- 68	96.7	- 57	106.9	- 47	115.7
1	- 80	79.2	- 70	89.9	- 60	100.5	- 49	110.3	- 39	118.5
2	- 72	82.9	- 62	93.7	- 52	104.1	- 41	113.3	- 31	120.8
3	- 64	86.5	- 54	97.2	- 44	107.2	- 33	115.9	- 23	122.6
4	- 56	89.9	- 46	100.4	- 36	109.9	- 25	117.9	- 15	123.9
5	- 48	92.9	- 38	103.1	- 28	112.1	- 17	119.3	- 7	124.5
6	- 40	95.5	- 30	105.4	- 20	113.7	- 9	120.2	1	124.5
7	- 32	97.7	- 22	107.0	- 12	114.7	- 1	120.3	9	123.9
8	- 24	99.4	- 14	108.1	- 4	115.0	7	119.9	17	122.7
9	- 16	100.5	- 6	108.6	4	114.7	15	118.7	25	120.9
10	- 8	101.0	2	108.4	12	113.7	23	117.0	33	118.6
11	0	100.9	10	107.5	20	112.0	31	114.6	41	115.7
12	8	100.2	18	106.0	28	109.8	39	111.7		
13	16	98.9	26	103.9	36	106.9	47	108.3		
14	24	97.1	34	101.3	44	103.6	55	104.5		
15	32	94.7	42	98.1	52	99.8				
16	40	91.7	50	94.5	60	95.6				
17	48	88.4	58	90.4						
18	56	84.7	66	86.1						
19	64	80.6	74	81.6						
20	72	76.4								
21	80	72.1								
22	88	67.7								

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TABLE 9. NOMINAL REACTIVITY OF MINT IN 7-1/2 INCH L.U.
PILE WITH NORMAL LOADING OF 38 I&E NU PIECES

No. DSD (SA)	5 MINT PIECES		10 MINT PIECES		15 MINT PIECES		20 MINT PIECES		25 MINT PIECES	
	Displ. (In.)	Rn (cmk)	Displ. (In.)	Rn (cmk)	Displ. (In.)	Rn (cmk)	Displ. (In.)	Rn (cmk)	Displ. (In.)	Rn (cmk)
0	-158	27.0	-148	27.8	-137	29.3	-127	31.6	-116	34.7
1	-150	27.2	-140	28.2	-129	30.0	-119	32.6	-108	36.1
2	-142	27.4	-132	28.7	-121	30.8	-111	33.7	-100	37.5
3	-134	27.6	-124	29.2	-113	31.6	-103	34.9	- 92	38.8
4	-126	27.8	-116	29.7	-105	32.4	- 95	36.0	- 84	40.2
5	-118	28.0	-108	30.2	- 97	33.3	- 87	37.1	- 76	41.5
6	-110	28.2	-100	30.7	- 89	34.1	- 79	38.2	- 68	42.8
7	-102	28.4	- 92	31.3	- 81	34.9	- 71	39.2	- 60	43.9
8	- 94	28.5	- 84	31.8	- 73	35.7	- 63	40.2	- 52	44.9
9	- 86	28.7	- 76	32.2	- 65	36.4	- 55	41.0	- 44	45.8
10	- 78	28.8	- 68	32.6	- 57	37.0	- 47	41.7	- 36	46.5
11	- 70	28.9	- 60	32.9	- 49	37.5	- 39	42.3	- 28	47.0
12	- 62	28.9	- 52	33.2	- 41	37.9	- 31	42.7	- 20	47.4
13	- 54	28.9	- 44	33.4	- 33	38.1	- 23	42.9	- 12	47.5
14	- 46	28.9	- 36	33.5	- 25	38.3	- 15	43.0	- 4	47.4
15	- 38	28.7	- 28	33.5	- 17	38.3	- 7	42.9	4	47.0
16	- 30	28.6	- 20	33.4	- 9	38.1	1	42.6	12	46.5
17	- 22	28.4	- 12	33.2	- 1	37.9	9	42.1	20	45.8
18	- 14	28.1	- 4	32.9	7	37.4	17	41.5	28	44.9
19	- 6	27.7	4	32.5	15	36.9	25	40.7	36	43.7
20	2	27.4	12	32.0	23	36.2	33	39.7	44	42.5
21	10	26.9	20	31.4	31	35.4	41	38.6	52	41.0
22	18	26.4	28	30.8	39	34.5	49	37.4	60	39.5
23	26	25.9	36	30.0	47	33.5	57	36.1	68	37.8
24	34	25.4	44	29.3	55	32.4	65	34.7	76	36.1
25	42	24.8	52	28.4	63	31.2	73	33.2	84	34.4
26	50	24.2	60	27.5	71	30.0	81	31.7	92	32.6
27	58	23.6	68	26.6	79	28.8	89	30.1	100	30.8
28	66	23.0	76	25.7	87	27.5	97	28.6	108	29.1
29	74	22.4	84	24.8	95	26.3	105	27.1	116	27.4
30	82	21.8	92	23.8	103	25.1	113	25.7		
31	90	21.2	100	22.9	111	23.9	121	24.3		
32	98	20.7	108	22.1	119	22.8				
33	106	20.2	116	21.3	127	21.8				
34	114	19.7	124	20.5	135	20.9				
35	122	19.2	132	19.8						
36	130	18.8	140	19.3						
37	138	18.5								
38	146	18.2								
39	154	17.9								

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TABLE 9. (Cont'd)

NO. DSD (SA)	30 MINT PIECES		35 MINT PIECES		40 MINT PIECES		45 MINT PIECES		50 MINT PIECES	
	Displ. (In.)	Rn (cmk)	Displ. (In.)	Rn (cmk)	Displ. (In.)	Rn (cmk)	Displ. (In.)	Rn (cmk)	Displ. (In.)	Rn (cmk)
0	-106	38.6	-96	43.1	-85	47.8	-75	52.6	-65	57.2
1	-98	40.2	-88	44.8	-77	49.6	-67	54.3	-57	58.7
2	-90	41.8	-80	46.5	-69	51.3	-59	55.9	-49	60.1
3	-82	43.4	-72	48.1	-61	52.9	-51	57.4	-41	61.3
4	-74	44.9	-64	49.7	-53	54.4	-43	58.7	-33	62.3
5	-66	46.3	-56	51.1	-45	55.7	-35	59.7	-25	63.1
6	-58	47.6	-48	52.3	-37	56.7	-27	60.6	-17	63.6
7	-50	48.7	-40	53.4	-29	57.6	-19	61.1	-9	63.9
8	-42	49.7	-32	54.2	-21	58.2	-11	61.5	-1	63.9
9	-34	50.5	-24	54.8	-13	58.6	-3	61.5	7	63.6
10	-26	51.1	-16	55.2	-5	58.6	5	61.3	15	63.0
11	-18	51.5	-8	55.3	3	58.5	13	60.8	23	62.2
12	-10	51.6	0	55.2	11	58.0	21	60.0	31	61.2
13	-2	51.5	8	54.8	19	57.3	29	58.9	39	59.8
14	6	51.1	16	54.1	27	56.3	37	57.6	47	58.3
15	14	50.5	24	53.2	35	55.1	45	56.1	55	56.6
16	22	49.7	32	52.1	43	53.6	53	54.4	63	54.7
17	30	48.7	40	50.7	51	51.9	61	52.5		
18	38	47.4	48	49.1	59	50.1	69	50.5		
19	46	46.0	56	47.4	67	48.1				
20	54	44.4	64	45.5	75	46.0				
21	62	42.6	72	43.5	83	43.8				
22	70	40.8	80	41.4						
23	78	38.9	88	39.3						
24	86	36.9								
25	94	34.9								
26	102	32.9								

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TABLE 9. (Cont'd.)

No. DSD (SA)	55 MINT PIECES		60 MINT PIECES	
	<u>Disp1.</u> (In.)	<u>Rn</u> (cmk)	<u>Disp1.</u> (In.)	<u>Rn</u> (cmk)
0	- 54	61.2	- 44	64.5
1	- 46	62.5	- 36	65.5
2	- 38	63.6	- 28	66.3
3	- 30	64.5	- 20	66.9
4	- 22	65.2	- 12	67.2
5	- 14	65.7	- 4	67.4
6	- 6	65.9	4	67.3
7	2	65.8	12	66.9
8	10	65.5	20	66.4
9	18	64.9	28	65.5
10	26	64.1	36	64.5
11	34	63.0		
12	42	61.7		
13	50	60.2		

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TABLE 10. NOMINAL REACTIVITY OF PB-CD IN 8-3/8 INCH L. U.
PILE WITH NORMAL LOADING OF 32 I&E NU PIECES.

NO. DSD (SA)	3 PB-CD PIECES		5 PB-CD PIECES		7 PB-CD PIECES		9 PB-CD PIECES		11 PB-CD PIECES	
	Displ. (In.)	Rn (cmk)	Displ. (In.)	Rn (cmk)	Displ. (In.)	Rn (cmk)	Displ. (In.)	Rn (cmk)	Displ. (In.)	Rn (cmk)
0	-132	46.6	-125	48.3	-119	51.1	-112	55.1	-106	60.4
1	-124	47.2	-117	49.6	-111	53.1	-104	57.9	-98	63.9
2	-116	48.0	-109	51.0	-103	55.3	-96	60.8	-90	67.6
3	-108	48.8	-101	52.6	-95	57.7	-88	63.9	-82	71.4
4	-100	49.7	-93	54.3	-87	60.1	-80	67.1	-74	75.2
5	-92	50.7	-85	56.0	-79	62.5	-72	70.2	-66	78.8
6	-84	51.6	-77	57.7	-71	64.9	-64	73.2	-58	82.3
7	-76	52.5	-69	59.3	-63	67.2	-56	76.0	-50	85.4
8	-68	53.3	-61	60.8	-55	69.3	-48	78.5	-42	88.1

NO. DSD (SA)	13 PB-CD PIECES		15 PB-CD PIECES		17 PB-CD PIECES		19 PB-CD PIECES		21 PB-CD PIECES	
	Displ. (In.)	Rn (cmk)	Displ. (In.)	Rn (cmk)	Displ. (In.)	Rn (cmk)	Displ. (In.)	Rn (cmk)	Displ. (In.)	Rn (cmk)
0	-99	66.9	-93	74.5	-86	83.1	-79	92.4	-73	102.1
1	-91	71.1	-85	79.3	-78	88.4	-71	97.9	-65	107.7
2	-83	75.4	-77	84.2	-70	93.6	-63	103.4	-57	113.1
3	-75	79.8	-69	89.0	-62	98.6	-55	108.4	-49	118.1
4	-67	84.1	-61	93.6	-54	103.4	-47	113.1	-41	122.5
5	-59	88.1	-53	97.8	-46	107.6	-39	117.2	-33	126.2
6	-51	91.9	-45	101.7	-38	111.3	-31	120.6	-25	129.1
7	-43	95.2	-37	104.9	-30	114.4	-23	123.2	-17	131.2
8	-35	97.9	-29	107.6	-22	116.7	-15	125.0	-9	132.4

NO. DSD (SA)	23 PB-CD PIECES		25 PB-CD PIECES		27 PB-CD PIECES		29 PB-CD PIECES		31 PB-CD PIECES	
	Displ. (In.)	Rn (cmk)	Displ. (In.)	Rn (cmk)	Displ. (In.)	Rn (cmk)	Displ. (In.)	Rn (cmk)	Displ. (In.)	Rn (cmk)
0	-66	111.9	-60	121.4	-53	130.5	-47	138.7	40	145.9
1	-58	117.4	-52	126.7	-45	135.3	-39	142.9	32	149.4
2	-50	122.6	-44	131.5	-37	139.5	-31	146.5	24	152.2
3	-42	127.2	-36	135.6	-29	143.0	-23	149.2	16	154.2
4	-34	131.2	-28	139.0	-21	145.7	-15	151.2	8	155.4
5	-26	134.4	-20	141.5	-13	147.5	-7	152.2	0	155.6
6	-18	136.7	-12	143.1	-5	148.3	1	152.3	8	155.0
7	-10	138.1	-4	143.8	3	148.2	9	151.4	16	153.5
8	-2	138.5	4	143.4	11	147.1	17	149.6	24	151.1

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TABLE 10. (Cont'd)

NO. DSD (SA)	33 PB-CD PIECES		35 PB-CD PIECES		37 PB-CD PIECES		39 PB-CD PIECES		41 PB-CD PIECES	
	Displ. (In.)	Rn (cmk)	Displ. (In.)	Rn (cmk)	Displ. (In.)	Rn (cmk)	Displ. (In.)	Rn (cmk)	Displ. (In.)	Rn (cmk)
0	-34	151.9	-27	156.7	-20	160.2	-14	162.6	-7	163.9
1	-26	154.7	-19	158.7	-12	161.5	-6	163.2	1	164.1
2	-18	156.7	-11	159.9	-4	162.1	2	163.3		
3	-10	157.9	-3	160.5	4	162.0	10	162.8		
4	-2	158.4	5	160.3	12	161.3				
5	6	158.0	13	159.3	20	159.9				
6	14	156.7	21	157.6						
7	22	154.6								
8	30	151.8								

FOR 43 PB-CD PIECES Rn = 164.6 cmk.

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TABLE 11. NOMINAL REACTIVITY OF PB-CD IN 8-3/8 INCH L. U.
PILE WITH NORMAL LOADING OF 34 I&E NU PIECES

NO. DSD (SA)	3 PB-CD PIECES		5 PB-CD PIECES		7 PB-CD PIECES		9 PB-CD PIECES		11 PB-CD PIECES	
	Displ. (In.)	Rn (cmk)	Displ. (In.)	Rn (cmk)	Displ. (In.)	Rn (cmk)	Displ. (In.)	Rn (cmk)	Displ. (In.)	Rn (cmk)
0	-141	46.4	-134	47.9	-128	50.3	-121	53.8	-115	58.4
1	-133	47.0	-126	49.0	-120	52.0	-113	56.2	-107	61.4
2	-125	47.6	-118	50.3	-112	54.0	-105	58.8	-99	64.7
3	-117	48.4	-110	51.6	-104	56.0	-97	61.5	-91	68.1
4	-109	49.1	-102	53.1	-96	58.2	-89	64.3	-83	71.5
5	-101	50.0	-94	54.6	-88	60.3	-81	67.2	-75	74.9
6	-93	50.8	-86	56.1	-80	62.5	-73	69.9	-67	78.1
7	-85	51.6	-78	57.6	-72	64.6	-65	72.5	-59	81.2
8	-77	52.3	-70	59.0	-64	66.6	-57	75.0	-51	83.9

NO. DSD (SA)	13 PB-CD PIECES		15 PB-CD PIECES		17 PB-CD PIECES		19 PB-CD PIECES		21 PB-CD PIECES	
	Displ. (In.)	Rn (cmk)	Displ. (In.)	Rn (cmk)	Displ. (In.)	Rn (cmk)	Displ. (In.)	Rn (cmk)	Displ. (In.)	Rn (cmk)
0	-108	64.1	-101	70.8	-95	78.5	-88	87.0	-82	96.0
1	-100	67.8	-93	75.2	-87	83.4	-80	92.2	-74	101.3
2	-92	71.7	-85	79.6	-79	88.2	-72	97.3	-66	106.5
3	-84	75.7	-77	84.0	-71	92.9	-64	102.2	-58	111.4
4	-76	79.6	-69	88.3	-63	97.5	-56	106.8	-50	115.9
5	-68	83.4	-61	92.4	-55	101.7	-48	110.9	-42	119.9
6	-60	87.0	-53	96.2	-47	105.4	-40	114.6	-34	123.2
7	-52	90.2	-45	99.5	-39	108.7	-32	117.6	-26	125.8
8	-44	93.1	-37	102.4	-31	111.4	-24	119.9	-18	127.7

NO. DSD (SA)	23 PB-CD PIECES		25 PB-CD PIECES		27 PB-CD PIECES		29 PB-CD PIECES		31 PB-CD PIECES	
	Displ. (In.)	Rn (cmk)	Displ. (In.)	Rn (cmk)	Displ. (In.)	Rn (cmk)	Displ. (In.)	Rn (cmk)	Displ. (In.)	Rn (cmk)
0	-75	105.2	-69	114.5	-62	123.5	-56	131.9	-49	139.6
1	-67	110.6	-61	119.7	-54	128.4	-48	136.4	-41	143.5
2	-59	115.8	-53	124.6	-46	132.9	-40	140.4	-33	146.9
3	-51	120.5	-45	129.0	-38	136.8	-32	143.7	-25	149.6
4	-43	124.7	-37	132.8	-30	140.1	-24	146.3	-17	151.5
5	-35	128.3	-29	135.9	-22	142.6	-16	148.2	-9	152.6
6	-27	131.2	-21	138.2	-14	144.3	-8	149.2	-1	153.0
7	-19	133.3	-13	139.7	-6	145.1	0	149.3	7	152.1
8	-7	134.6	-5	140.4	2	145.0	8	148.6	15	151.0

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TABLE 11. (Cont'd)

NO. DSD (SA)	33 PB-CD PIECES		35 PB-CD PIECES		37 PB-CD PIECES		39 PB-CD PIECES		41 PB-CD PIECES	
	Displ. (In.)	Rn (cmk)	Displ. (In.)	Rn (cmk)	Displ. (In.)	Rn (cmk)	Displ. (In.)	Rn (cmk)	Displ. (In.)	Rn (cmk)
0	-42	146.3	-36	151.9	-29	156.5	-23	159.9	-16	162.2
1	-34	149.6	-28	154.6	-21	158.4	-15	161.2	-8	163.0
2	-26	152.3	-20	156.6	-13	159.8	-7	161.9	0	163.2
3	-18	154.3	-12	157.9	-5	160.4	1	162.0	8	162.9
4	-10	155.5	-4	158.5	3	160.4	9	161.5	16	162.0
5	-2	156.0	4	158.3	11	159.7	17	160.4		
6	6	155.7	12	157.4	19	158.4				
7	14	154.5	20	155.8	27	156.3				
8	22	152.6	28	153.4						

NO. DSD (SA)	43 PB-CD PIECES		45 PB-CD PIECES	
	Displ. (In.)	Rn (cmk)	Displ. (In.)	Rn (cmk)
0	-10	163.7	0	164.4
1	-2	164.0		
2	6	163.8		

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TABLE 12. NOMINAL REACTIVITY OF PB-CD IN 7-1/2 INCH L.U.
PILE WITH NORMAL LOADING OF 38 I&E NU PIECES

No. DSD (SA)	3 PB-CD PIECES		5 PB-CD PIECES		7 PB-CD PIECES		9 PB-CD PIECES		11 PB-CD PIECES	
	Displ. (In.)	Rn (cmk)	Displ. (In.)	Rn (cmk)	Displ. (In.)	Rn (cmk)	Displ. (In.)	Rn (cmk)	Displ. (In.)	Rn (cmk)
0	-159	27.6	-152	28.1	-145	29.0	-139	30.4	-132	32.2
1	-151	27.8	-144	28.5	-137	29.7	-131	31.3	-124	33.4
2	-143	28.0	-136	29.0	-129	30.5	-123	32.4	-116	34.7
3	-135	28.3	-128	29.5	-121	31.3	-115	33.4	-108	36.1
4	-127	28.6	-120	30.1	-113	32.1	-107	34.6	-100	37.5
5	-119	28.9	-112	30.7	-105	33.0	-99	35.7	-92	38.9
6	-111	29.2	-104	31.3	-97	33.9	-91	36.9	-84	40.3
7	-103	29.5	-96	31.9	-89	34.7	-83	38.0	-76	41.7
8	-95	29.8	-88	32.4	-81	35.6	-75	39.1	-68	42.9

No.. DSD (SA)	13 PB-CD PIECES		15 PB-CD PIECES		17 PB-CD PIECES		19 PB-CD PIECES		21 PB-CD PIECES	
	Displ. (In.)	Rn (cmk)	Displ. (In.)	Rn (cmk)	Displ. (In.)	Rn (cmk)	Displ. (In.)	Rn (cmk)	Displ. (In.)	Rn (cmk)
0	-126	34.5	-119	37.2	-113	40.4	-106	43.9	-99	47.8
1	-118	36.0	-111	39.0	-105	42.4	-98	46.2	-91	50.2
2	-110	37.6	-103	40.8	-97	44.5	-90	48.4	-83	52.6
3	-102	39.2	-95	42.7	-89	46.5	-82	50.6	-75	54.9
4	-94	40.9	-87	44.6	-81	48.6	-74	52.8	-67	57.0
5	-86	42.5	-79	46.4	-73	50.5	-66	54.8	-59	59.1
6	-78	44.1	-71	48.2	-65	52.4	-58	56.7	-51	60.9
7	-70	45.6	-63	49.8	-57	54.1	-50	58.3	-43	62.5
8	-62	47.0	-55	51.3	-49	55.5	-42	59.8	-35	63.9

No. DSD (SA)	23 PB-CD PIECES		25 PB-CD PIECES		27 PB-CD PIECES		29 PB-CD PIECES		31 PB-CD PIECES	
	Displ. (In.)	Rn (cmk)	Displ. (In.)	Rn (cmk)	Displ. (In.)	Rn (cmk)	Displ. (In.)	Rn (cmk)	Displ. (In.)	Rn (cmk)
0	-93	51.9	-86	56.2	-80	60.5	-73	64.7	-67	68.7
1	-85	54.4	-78	58.7	-72	63.0	-65	67.1	-59	71.0
2	-77	56.8	-70	61.1	-64	65.3	-57	69.3	-51	73.0
3	-69	59.2	-62	63.4	-56	67.5	-49	71.3	-43	74.8
4	-61	61.3	-54	65.5	-48	69.4	-41	73.1	-35	76.3
5	-53	63.3	-46	67.3	-40	71.1	-33	74.5	-27	77.5
6	-45	65.0	-38	68.9	-32	72.5	-25	75.7	-19	78.4
7	-37	66.5	-30	70.2	-24	73.5	-17	76.4	-11	78.9
8	-29	67.7	-22	71.2	-16	74.2	-9	76.9	-3	79.0

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TABLE 12. (Cont'd.)

No. DSD (SA)	33 PB-CD PIECES		35 PB-CD PIECES		37 PB-CD PIECES		39 PB-CD PIECES		41 PB-CD PIECES	
	Displ. (In.)	Rn (cmk)	Displ. (In.)	Rn (cmk)	Displ. (In.)	Rn (cmk)	Displ. (In.)	Rn (cmk)	Displ. (In.)	Rn (cmk)
0	- 60	72.5	- 54	76.0	- 47	79.0	- 40	81.6	- 34	83.7
1	- 52	74.6	- 46	77.8	- 39	80.5	- 32	82.8	- 26	84.6
2	- 44	76.4	- 38	79.3	- 31	81.8	- 24	83.8	- 18	85.3
3	- 36	77.9	- 30	80.6	- 23	82.8	- 16	84.5	- 10	85.7
4	- 28	79.2	- 22	81.5	- 15	83.4	- 8	84.9	- 2	85.9
5	- 20	80.1	- 14	82.2	- 7	83.8	0	85.0	6	85.7
6	- 12	80.7	- 6	82.5	1	83.8	8	84.7	14	85.3
7	- 4	80.9	2	82.4	9	83.5	16	84.2	22	84.6
8	4	80.7	10	82.0	17	82.8	24	83.3	30	83.6
No. DSD (SA)	43 PB-CD PIECES		45 PB-CD PIECES		47 PB-CD PIECES		49 PB-CD PIECES			
	Displ. (In.)	Rn (cmk)	Displ. (In.)	Rn (cmk)	Displ. (In.)	Rn (cmk)	Displ. (In.)	Rn (cmk)		
0	- 27	85.3	- 21	86.5	- 14	87.3	- 8	87.8		
1	- 19	86.0	- 13	86.9	- 6	87.5	0	87.8		
2	- 11	86.4	- 5	87.1	2	87.5				
3	- 3	86.6	3	87.1	10	87.4				
4	5	86.5	11	86.9						
5	13	86.2	19	86.4						
6	21	85.6								

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TABLE 13. SPLINE NOMINAL REACTIVITY vs LENGTH.

<u>SPLINE LENGTH (Ft.)</u>	<u>Rn</u>	<u>Rn</u>
	<u>8-3/8 L. U. PILES (cmk)</u>	<u>7-1/2 L. U. PILES (cmk)</u>
1	0.1	0
2	0.4	0.2
3	0.9	0.4
4	1.7	0.7
5	2.7	1.1
6	4.1	1.7
7	5.6	2.4
8	7.6	3.1
9	9.8	4.1
10	12.2	5.2
11	14.8	6.3
12	17.5	7.5
13	20.0	8.8
14	22.8	10.2
15	25.4	11.6
16	27.8	12.9
17	29.9	14.1
18	31.8	15.3
19	33.4	16.3
20	34.8	17.3
21	35.8	18.1
22	36.6	18.8
23	37.1	19.4
24	37.4	19.8
25	37.5	20.1
26		20.3
27		20.5
28		20.5

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NOMINAL c-mk VALUES⁽¹⁾

<u>Material</u>	<u>Full Column Nominal c-mk Values</u>	
	<u>8-3/8 LU. Piles</u>	<u>7-1/2 LU. Piles</u>
Air	- 17.5	- 3.25
B-Metal	- 17.5	- 3.25
Graphite Stringer	- 17.5	- 6.0*
J-Metal	-141.0*	-70.3.
Lead Cadmium	-164.6	-88.0
Mint	-136.7	-67.0
Q-Metal	-111.6	-62.0
Perfs	- 40.0*	-22.25
Solid Aluminum	- 32.4	-17.9
Splines		
B ₄ C (Hollow Al)	- 37.5	-20.0
B ₄ C (Sintered Al - 12% B)	- 33.0	-17.5
Cadmium	- 45.0	-24.0
Stainless Steel (1.5% B)	- 22.5	-12.0

* Estimated values.

(1) Data taken from:

- (a) HW-46100 Vol. 2, "Pile Physics Manual of Standard Practices".
- (b) HW-58149, "Reanalysis of Lattice Parameter and Danger Coefficient Measurements From Startup Data C and K Piles," November 7, 1958, D. E. Simpson and W. H. Wolf.

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