D0 Carriage Roller Bearing Measurements

Engineering Note #3740.520-EN-206

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Originator: Al Jaques
Checked: _____

D0 Carriage Roller Bearing Measurement

Al Jaques

All of the ordered Tychoway rollers, to be used under the cryostat carriages on the center beam, have to be modified to accommodate a keyed way used to guide the cryostat along these same ways. A 0.320 x 0.406 inch notch is machined along one of the longer lower edges in order to create a 0.640 x 0.406 inch keyway when two of these notched rollers are bolted together (side by side) for installation. This keyway will fit over a .635 x .375 inch key, which is inserted into the ways.

Due to the close fit, the rollers were sent to the Fermi Inspection Dept. to double check the machined notch dimensions and tolerances. Included is the drawing sent to the Tychoway manufacturer, who machined the notch, and the results of the measurements taken by the Inspection Dept. The tolerance on the 0.320 inch dimension is ± 0.002 inches.

Only three of the initial ten rollers fall within the tolerance; #3, 9 and 10 (they were numbered by the Inspection Dept.). The other seven, plus one of the "good" rollers, can be matched up to meet the required dimensions of a 0.640 ± 0.004 inch keyway. Since only four rollers will be used on the keyed way per cryostat, the worst matches can be installed on the non-keyed side of the cryostat. Below is a table listing the best possible matches and their subsequent dimensions and tolerances.

#/#	-	dimension $\pm$ tolerance
4/6		0.642 $\pm$ 0.006 in.
2/3		0.642 $\pm$ 0.004 in.
1/7		0.639 $\pm$ 0.004 in.
5/8		0.640 $\pm$ 0.004 in.
9/10		0.640 $\pm$ 0.004 in.

* Bold-faced pairs are to be used on keyed way.

.320 ± .002 (3 measurement
taken)

.406 ± .005

1- .322 to .325

.430 to .436

2- .321 to .324

.435 to .437

3- .317 to .322

.436 to .437

4- .323 to .331

.438 to .441

5- .325 to .329

.429 to .431

6- .312 to .317

.434 to .436

7- .313 to .318

.434 to .436

8- .311 to .316

.433 to .437

9- .317 to .319

.433 to .441

10- .318 to .325

.427 to .432

al-

these are the measurements that were
found to be out of tolerance. Everything
else looked good so measurements were
not recorded.

JK