UDC 672.6:629.123

Ref. No.: ISO/R 170 - 1960 (E)

Provisoire

# ISO

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION

# ISO RECOMMENDATION
# R 170



## SHIPBUILDING DETAILS

## ANCHOR CHAINS, STUD LINKS

## (COMMON LINKS, ENLARGED LINKS, END LINKS AND JOINING SHACKLES)



1st EDITION

December 1960



For each individual country the only valid standard is the national standard of that country.

Printed in Switzerland

Also issued in French and Russian. Copies to be obtained through the national standards organizations.

# BRIEF HISTORY

The ISO Recommendation R 170, *Anchor Chains, Stud Links (Common Links, Enlarged Links, End Links and Joining Shackles)*, was drawn up by Technical Committee ISO/TC 8, *Shipbuilding Details*, the Secretariat of which is held by the Stitchting Nederlands Normalisatie-instituut (NNI).

A draft proposal was drawn up for the standardization of details of anchor chains, stud links, based on studies of former International Federation of the National Standardizing Associations (ISA).

At its third meeting, held in Genoa, in 1956, the Technical Committee decided to accept this proposal, subject only to one modification concerning the dimension *C* of the end link. The draft so revised was submitted by correspondence to the members of the Technical Committee. As no objections were received within the given time limit, the draft proposal was adopted as a draft ISO Recommendation.



On 22 May 1959, the Draft ISO Recommendation (No. 285) was distributed to all the ISO Member Bodies and was approved by the following Member Bodies:



| | | |
|---|---|---|
| Belgium | Israel | Romania |
| Burma | Italy | Spain |
| Chile | Japan | Sweden |
| Finland | Netherlands | Switzerland |
| Germany | Poland | Turkey |
| Greece | Portugal | United Kingdom |

One Member Body opposed the approval of the Draft: U.S.S.R.

The Draft ISO Recommendation was then submitted by correspondence to the ISO Council, which decided, in December 1960, to accept it as an ISO RECOMMENDATION.

ISO Recommendation R 170 December 1960

SHIPBUILDING DETAILS

# ANCHOR CHAINS, STUD LINKS

## (COMMON LINKS, ENLARGED LINKS, END LINKS AND JOINING SHACKLES)

### 1. GENERAL REMARKS

#### 1.1 Shape and dimensions

The recommended shape and dimensions for anchor chains, stud links, are specified in the following sections:



1.1.1 All links and shackles should be of uniform shape and the inside radii of common and enlarged links should be sufficient to allow each link to bed properly and work freely. The inside radius of end links should be equal to half the inside width and their sides should be parallel.



1.1.2 All dimensions specified in this ISO Recommendation are *after* the cables and shackles have been subjected to the statutory proof loads.



#### 1.2 Tolerance

The allowable manufacturing tolerance for the dimensions $B$, $B_1$ and $C$ is $\pm$ 2 per cent.

#### 1.3 Material

The quality of the material used for the manufacture of the links and the joining shackle should not be inferior in any respect to that of the material used for the manufacture of the other assembling parts forming the anchor cable.

The design, material and tests of the complete anchor cables are subject to the legal requirements of the countries concerned and of the recognized approving authorities.

#### 1.4 References

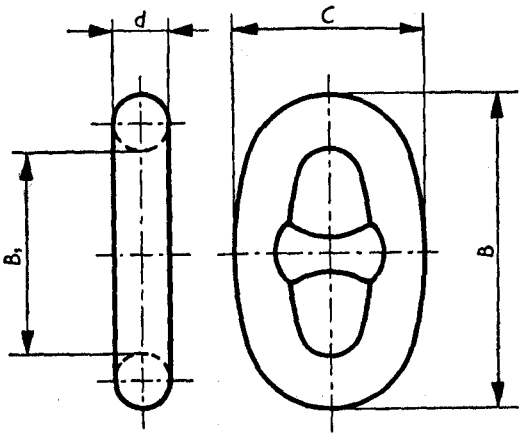
For links of other types, see

ISO Recommendation R 39, *Anchor Chains - Lugless Joining Shackles, Kenter Type*, and

ISO Recommendation R 40, *Anchor Chains - Studless Links*.

## 2. COMMON LINK

### 2.1 Dimensions




$A$ = nominal dimension of common link = $d$

$d$ = diameter of material of common link
2 values: $d'$ = millimetre value of $d$
$d''$ = inch value of $d$, transposed into rounded off millimetre value

$$B = 6\,\frac{d' + d''}{2}$$

$$B_1 = B - 2\,d$$

$$C = 3.6\,\frac{d' + d''}{2}$$

Example for $A$ = 20.5 mm or $^{13}/_{16}$ in:

$$B = 6\,\frac{20.5 + 20.6}{2} = 123 \text{ mm (rounded off)}$$

$$B_1 = 123 - 2 \times 20.5 = 82 \text{ mm}$$

$$C = 3.6\,\frac{20.5 + 20.6}{2} = 74 \text{ mm (rounded off)}$$

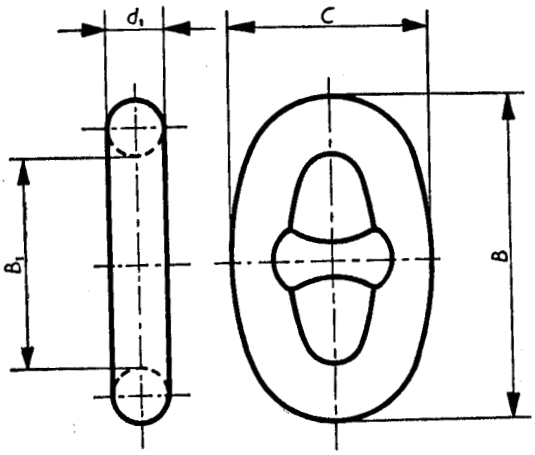
| A | | d | | B | $B_1$ | C |
|---|---|---|---|---|---|---|
| | | $d'$ | $d''$ | | | |
| mm | in | mm | mm | mm | mm | mm |
| 11 | $^{7}/_{16}$ | 11 | 11.1 | 66 | 44 | 40 |
| 12.5 | $^{1}/_{2}$ | 12.5 | 12.7 | 76 | 51 | 45 |
| 14.5 | $^{9}/_{16}$ | 14.5 | 14.3 | 86 | 57 | 52 |
| 16 | $^{5}/_{8}$ | 16 | 15.9 | 96 | 64 | 57 |
| 17.5 | $^{11}/_{16}$ | 17.5 | 17.5 | 105 | 70 | 63 |
| 19 | $^{3}/_{4}$ | 19 | 19.1 | 114 | 76 | 69 |
| 20.5 | $^{13}/_{16}$ | 20.5 | 20.6 | 123 | 82 | 74 |
| 22 | $^{7}/_{8}$ | 22 | 22.2 | 133 | 89 | 80 |
| 24 | $^{15}/_{16}$ | 24 | 23.8 | 143 | 95 | 86 |
| 25.5 | 1 | 25.5 | 25.4 | 153 | 102 | 92 |
| 27 | $1\,^{1}/_{16}$ | 27 | 27.0 | 162 | 108 | 97 |
| 28.5 | $1\,^{1}/_{8}$ | 28.5 | 28.6 | 171 | 114 | 103 |
| 30 | $1\,^{3}/_{16}$ | 30 | 30.2 | 181 | 121 | 108 |
| 32 | $1\,^{1}/_{4}$ | 32 | 31.8 | 191 | 127 | 115 |
| 33 | $1\,^{5}/_{16}$ | 33 | 33.3 | 199 | 133 | 119 |
| 35 | $1\,^{3}/_{8}$ | 35 | 34.9 | 210 | 140 | 126 |
| 37 | $1\,^{7}/_{16}$ | 37 | 36.5 | 220 | 146 | 132 |
| 38 | $1\,^{1}/_{2}$ | 38 | 38.1 | 228 | 152 | 137 |
| 40 | $1\,^{9}/_{16}$ | 40 | 39.7 | 239 | 159 | 143 |
| 41 | $1\,^{5}/_{8}$ | 41 | 41.3 | 247 | 165 | 148 |

## 2.1 Dimensions *(continued)*

| A | | d | | B | $B_1$ | C |
|---|---|---|---|---|---|---|
| | | d′ | d″ | | | |
| mm | in | mm | mm | mm | mm | mm |
| 43 | 1 11/16 | 43 | 42.9 | 258 | 172 | 155 |
| 44 | 1 3/4 | 44 | 44.5 | 266 | 178 | 159 |
| 46 | 1 13/16 | 46 | 46.0 | 276 | 184 | 166 |
| 48 | 1 7/8 | 48 | 47.6 | 287 | 191 | 172 |
| 49 | 1 15/16 | 49 | 49.2 | 295 | 197 | 177 |
| 51 | 2 | 51 | 50.8 | 305 | 203 | 183 |
| 52 | 2 1/16 | 52 | 52.4 | 313 | 209 | 188 |
| 54 | 2 1/8 | 54 | 54.0 | 324 | 216 | 194 |
| 56 | 2 3/16 | 56 | 55.6 | 335 | 223 | 201 |
| 57 | 2 1/4 | 57 | 57.2 | 343 | 229 | 206 |
| 59 | 2 5/16 | 59 | 58.7 | 353 | 235 | 212 |
| 60 | 2 3/8 | 60 | 60.3 | 361 | 241 | 217 |
| 62 | 2 7/16 | 62 | 61.9 | 372 | 248 | 223 |
| 64 | 2 1/2 | 64 | 63.5 | 382 | 254 | 230 |
| 65 | 2 9/16 | 65 | 65.1 | 390 | 260 | 234 |
| 67 | 2 5/8 | 67 | 66.7 | 401 | 267 | 241 |
| 68 | 2 11/16 | 68 | 68.3 | 409 | 273 | 245 |
| 70 | 2 3/4 | 70 | 69.9 | 420 | 280 | 252 |
| 71 | 2 13/16 | 71 | 71.4 | 427 | 285 | 256 |
| 73 | 2 7/8 | 73 | 73.0 | 438 | 292 | 263 |
| 75 | 2 15/16 | 75 | 74.6 | 449 | 299 | 269 |
| 76 | 3 | 76 | 76.2 | 457 | 305 | 274 |
| 78 | 3 1/16 | 78 | 77.8 | 467 | 311 | 280 |
| 80 | 3 1/8 | 80 | 79.4 | 478 | 318 | 287 |
| 82 | 3 1/4 | 82 | 82.6 | 494 | 330 | 296 |
| 85 | 3 3/8 | 85 | 85.7 | 512 | 342 | 307 |
| 88 | 3 7/16 | 88 | 87.3 | 526 | 350 | 316 |
| 90 | 3 9/16 | 90 | 90.5 | 542 | 362 | 325 |
| 92 | 3 5/8 | 92 | 92.1 | 552 | 368 | 331 |
| 95 | 3 3/4 | 95 | 95.3 | 571 | 381 | 343 |
| 98 | 3 7/8 | 98 | 98.4 | 589 | 393 | 354 |
| 100 | 3 15/16 | 100 | 100.0 | 600 | 400 | 360 |

## 3. ENLARGED LINK

### 3.1 Dimensions




$A$ = nominal dimension of enlarged link = $d$

$d$ = diameter of material of common link
2 values: $d'$ = millimetre value of $d$
$d''$ = inch value of $d$, transposed into rounded off millimetre value

$d_1$ = diameter of material of enlarged link

$$= 1.1\ \frac{d' + d''}{2}$$

$$B = 6.5\ \frac{d' + d''}{2}$$

$$B_1 = B - 2\,d_1$$

$$C = 4\ \frac{d' + d''}{2}$$

Example for $A$ = 20.5 mm or $^{13}/_{16}$ in:

$$d_1 = 1.1\ \frac{20.5 + 20.6}{2} = 22.5 \text{ mm (rounded off)}$$

$$B = 6.5\ \frac{20.5 + 20.6}{2} = 134 \text{ mm (rounded off)}$$

$$B_1 = 134 - 2 \times 22.5 = 89 \text{ mm}$$

$$C = 4\ \frac{20.5 + 20.6}{2} = 82 \text{ mm (rounded off)}$$



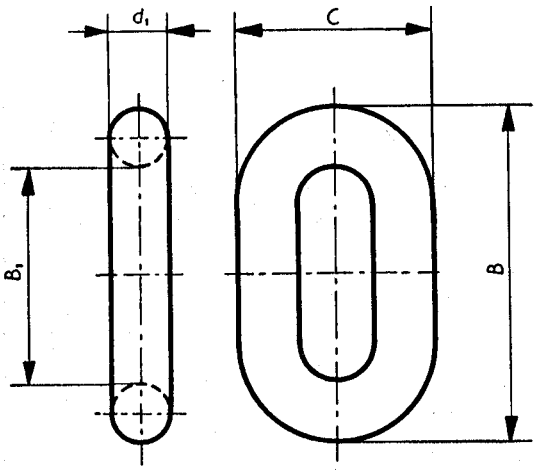
| A | | d (common link) | | $d_1$ | B | $B_1$ | C |
|---|---|---|---|---|---|---|---|
| | | $d'$ | $d''$ | | | | |
| mm | in | mm | mm | mm | mm | mm | mm |
| 11 | $^{7}/_{16}$ | 11 | 11.1 | 12 | 72 | 48 | 44 |
| 12.5 | $^{1}/_{2}$ | 12.5 | 12.7 | 14 | 82 | 54 | 50 |
| 14.5 | $^{9}/_{16}$ | 14.5 | 14.3 | 16 | 94 | 62 | 58 |
| 16 | $^{5}/_{8}$ | 16 | 15.9 | 17.5 | 104 | 69 | 64 |
| 17.5 | $^{11}/_{16}$ | 17.5 | 17.5 | 19 | 114 | 76 | 70 |
| 19 | $^{3}/_{4}$ | 19 | 19.1 | 21 | 124 | 82 | 76 |
| 20.5 | $^{13}/_{16}$ | 20.5 | 20.6 | 22.5 | 134 | 89 | 82 |
| 22 | $^{7}/_{8}$ | 22 | 22.2 | 24.5 | 144 | 95 | 88 |
| 24 | $^{15}/_{16}$ | 24 | 23.8 | 26.5 | 155 | 102 | 96 |
| 25.5 | 1 | 25.5 | 25.4 | 28 | 165 | 109 | 102 |
| 27 | $1\ ^{1}/_{16}$ | 27 | 27.0 | 29.5 | 176 | 117 | 108 |
| 28.5 | $1\ ^{1}/_{8}$ | 28.5 | 28.6 | 31 | 186 | 124 | 114 |
| 30 | $1\ ^{3}/_{16}$ | 30 | 30.2 | 33 | 196 | 130 | 120 |
| 32 | $1\ ^{1}/_{4}$ | 32 | 31.8 | 35 | 207 | 137 | 128 |
| 33 | $1\ ^{5}/_{16}$ | 33 | 33.3 | 36 | 215 | 143 | 133 |

### 3.1 Dimensions *(continued)*

| A | | d (common link) | | $d_1$ | B | $B_1$ | C |
|---|---|---|---|---|---|---|---|
| | | d′ | d″ | | | | |
| mm | in | mm | mm | mm | mm | mm | mm |
| 35 | 1 3/8 | 35 | 34.9 | 38 | 227 | 151 | 140 |
| 37 | 1 7/16 | 37 | 36.5 | 40 | 239 | 159 | 147 |
| 38 | 1 1/2 | 38 | 38.1 | 42 | 247 | 163 | 152 |
| 40 | 1 9/16 | 40 | 39.7 | 44 | 259 | 171 | 159 |
| 41 | 1 5/8 | 41 | 41.3 | 45 | 267 | 177 | 165 |
| 43 | 1 11/16 | 43 | 42.9 | 47 | 279 | 185 | 172 |
| 44 | 1 3/4 | 44 | 44.5 | 49 | 288 | 190 | 177 |
| 46 | 1 13/16 | 46 | 46.0 | 51 | 299 | 197 | 184 |
| 48 | 1 7/8 | 48 | 47.6 | 53 | 311 | 205 | 191 |
| 49 | 1 15/16 | 49 | 49.2 | 54 | 319 | 211 | 196 |
| 51 | 2 | 51 | 50.8 | 56 | 331 | 219 | 204 |
| 52 | 2 1/16 | 52 | 52.4 | 57 | 339 | 225 | 209 |
| 54 | 2 1/8 | 54 | 54.0 | 59 | 351 | 233 | 216 |
| 56 | 2 3/16 | 56 | 55.6 | 61 | 363 | 241 | 223 |
| 57 | 2 1/4 | 57 | 57.2 | 63 | 371 | 245 | 228 |
| 59 | 2 5/16 | 59 | 58.7 | 65 | 383 | 253 | 235 |
| 60 | 2 3/8 | 60 | 60.3 | 66 | 391 | 259 | 241 |
| 62 | 2 7/16 | 62 | 61.9 | 68 | 403 | 267 | 248 |
| 64 | 2 1/2 | 64 | 63.5 | 70 | 414 | 274 | 255 |
| 65 | 2 9/16 | 65 | 65.1 | 72 | 423 | 279 | 260 |
| 67 | 2 5/8 | 67 | 66.7 | 74 | 435 | 287 | 267 |
| 68 | 2 11/16 | 68 | 68.3 | 75 | 443 | 293 | 273 |
| 70 | 2 3/4 | 70 | 69.9 | 77 | 455 | 301 | 280 |
| 71 | 2 13/16 | 71 | 71.4 | 78 | 463 | 307 | 285 |
| 73 | 2 7/8 | 73 | 73.0 | 80 | 474 | 314 | 292 |
| 75 | 2 15/16 | 75 | 74.6 | 82 | 486 | 322 | 299 |
| 76 | 3 | 76 | 76.2 | 84 | 495 | 327 | 304 |
| 78 | 3 1/16 | 78 | 77.8 | 86 | 506 | 334 | 312 |
| 80 | 3 1/8 | 80 | 79.4 | 88 | 518 | 342 | 319 |
| 82 | 3 1/4 | 82 | 82.6 | 91 | 535 | 353 | 329 |
| 85 | 3 3/8 | 85 | 85.7 | 94 | 555 | 367 | 341 |
| 88 | 3 7/16 | 88 | 87.3 | 96 | 570 | 378 | 351 |
| 90 | 3 9/16 | 90 | 90.5 | 99 | 587 | 389 | 361 |
| 92 | 3 5/8 | 92 | 92.1 | 101 | 598 | 396 | 368 |
| 95 | 3 3/4 | 95 | 95.3 | 105 | 618 | 408 | 381 |
| 98 | 3 7/8 | 98 | 98.4 | 108 | 638 | 422 | 393 |
| 100 | 3 15/16 | 100 | 100.0 | 110 | 650 | 430 | 400 |

## 4. END LINK

### 4.1 Dimensions




$A$ = nominal dimension of end link = $d$

$d$ = diameter of material of common link
2 values: $d'$ = millimetre value of $d$
$d''$ = inch value of $d$, transposed into rounded off millimetre value

$d_1$ = diameter of material of end link

$$= 1.2\ \frac{d' + d''}{2}$$

$$B = 6.75\ \frac{d' + d''}{2}$$

$$B_1 = B - 2\,d_1$$

$$C = 4\ \frac{d' + d''}{2}$$

Example for $A$ = 20.5 mm or $^{13}/_{16}$ in:

$$d_1 = 1.2\ \frac{20.5 + 20.6}{2} = 24.5 \text{ mm (rounded off)}$$

$$B = 6.75\ \frac{20.5 + 20.6}{2} = 139 \text{ mm (rounded off)}$$

$$B_1 = 139 - 2 \times 24.5 = 90 \text{ mm}$$

$$C = 4\ \frac{20.5 + 20.6}{2} = 82 \text{ mm (rounded off)}$$



| A | | d (common link) | | $d_1$ | B | $B_1$ | C |
|---|---|---|---|---|---|---|---|
| | | $d'$ | $d''$ | | | | |
| mm | in | mm | mm | mm | mm | mm | mm |
| 11 | $^{7}/_{16}$ | 11 | 11.1 | 13.5 | 75 | 48 | 44 |
| 12.5 | $^{1}/_{2}$ | 12.5 | 12.7 | 15 | 85 | 55 | 50 |
| 14.5 | $^{9}/_{16}$ | 14.5 | 14.3 | 17.5 | 97 | 62 | 58 |
| 16 | $^{5}/_{8}$ | 16 | 15.9 | 19 | 108 | 70 | 64 |
| 17.5 | $^{11}/_{16}$ | 17.5 | 17.5 | 21 | 118 | 76 | 70 |
| 19 | $^{3}/_{4}$ | 19 | 19.1 | 23 | 129 | 83 | 76 |
| 20.5 | $^{13}/_{16}$ | 20.5 | 20.6 | 24.5 | 139 | 90 | 82 |
| 22 | $^{7}/_{8}$ | 22 | 22.2 | 26.5 | 149 | 96 | 88 |
| 24 | $^{15}/_{16}$ | 24 | 23.8 | 28.5 | 161 | 104 | 96 |
| 25.5 | 1 | 25.5 | 25.4 | 31 | 172 | 110 | 102 |
| 27 | $1\ ^{1}/_{16}$ | 27 | 27.0 | 32 | 182 | 118 | 108 |
| 28.5 | $1\ ^{1}/_{8}$ | 28.5 | 28.6 | 34 | 193 | 125 | 114 |
| 30 | $1\ ^{3}/_{16}$ | 30 | 30.2 | 36 | 203 | 131 | 120 |
| 32 | $1\ ^{1}/_{4}$ | 32 | 31.8 | 38 | 215 | 139 | 128 |
| 33 | $1\ ^{5}/_{16}$ | 33 | 33.3 | 40 | 224 | 144 | 133 |

## 4.1 Dimensions *(continued)*

| A | | d (common link) | | $d_1$ | B | $B_1$ | C |
|---|---|---|---|---|---|---|---|
| | | d′ | d″ | | | | |
| mm | in | mm | in | mm | mm | mm | mm |
| 35 | 1 3/8 | 35 | 34.9 | 42 | 236 | 152 | 140 |
| 37 | 1 7/16 | 37 | 36.5 | 44 | 248 | 160 | 147 |
| 38 | 1 1/2 | 38 | 38.1 | 46 | 257 | 165 | 152 |
| 40 | 1 9/16 | 40 | 39.7 | 48 | 269 | 173 | 159 |
| 41 | 1 5/8 | 41 | 41.3 | 49 | 278 | 180 | 165 |
| 43 | 1 11/16 | 43 | 42.9 | 52 | 290 | 186 | 172 |
| 44 | 1 3/4 | 44 | 44.5 | 53 | 299 | 193 | 177 |
| 46 | 1 13/16 | 46 | 46.0 | 55 | 310 | 200 | 184 |
| 48 | 1 7/8 | 48 | 47.6 | 57 | 323 | 209 | 191 |
| 49 | 1 15/16 | 49 | 49.2 | 59 | 331 | 213 | 196 |
| 51 | 2 | 51 | 50.8 | 61 | 344 | 222 | 204 |
| 52 | 2 1/16 | 52 | 52.4 | 63 | 352 | 226 | 209 |
| 54 | 2 1/8 | 54 | 54.0 | 65 | 364 | 234 | 216 |
| 56 | 2 3/16 | 56 | 55.6 | 67 | 377 | 243 | 223 |
| 57 | 2 1/4 | 57 | 57.2 | 69 | 385 | 247 | 228 |
| 59 | 2 5/16 | 59 | 58.7 | 71 | 397 | 255 | 235 |
| 60 | 2 3/8 | 60 | 60.3 | 72 | 406 | 262 | 241 |
| 62 | 2 7/16 | 62 | 61.9 | 74 | 418 | 270 | 248 |
| 64 | 2 1/2 | 64 | 63.5 | 76 | 430 | 278 | 255 |
| 65 | 2 9/16 | 65 | 65.1 | 78 | 439 | 283 | 260 |
| 67 | 2 5/8 | 67 | 66.7 | 80 | 451 | 291 | 267 |
| 68 | 2 11/16 | 68 | 68.3 | 82 | 460 | 296 | 273 |
| 70 | 2 3/4 | 70 | 69.9 | 84 | 472 | 304 | 280 |
| 71 | 2 13/16 | 71 | 71.4 | 85 | 481 | 311 | 285 |
| 73 | 2 7/8 | 73 | 73.0 | 88 | 493 | 317 | 292 |
| 75 | 2 15/16 | 75 | 74.6 | 90 | 505 | 325 | 299 |
| 76 | 3 | 76 | 76.2 | 91 | 514 | 332 | 304 |
| 78 | 3 1/16 | 78 | 77.8 | 93 | 526 | 340 | 312 |
| 80 | 3 1/8 | 80 | 79.4 | 96 | 538 | 346 | 319 |
| 82 | 3 1/4 | 82 | 82.6 | 99 | 556 | 358 | 329 |
| 85 | 3 3/8 | 85 | 85.7 | 102 | 576 | 372 | 341 |
| 88 | 3 7/16 | 88 | 87.3 | 105 | 592 | 382 | 351 |
| 90 | 3 9/16 | 90 | 90.5 | 108 | 609 | 393 | 361 |
| 92 | 3 5/8 | 92 | 92.1 | 110 | 621 | 401 | 368 |
| 95 | 3 3/4 | 95 | 95.3 | 114 | 642 | 414 | 381 |
| 98 | 3 7/8 | 98 | 98.4 | 118 | 663 | 427 | 393 |
| 100 | 3 15/16 | 100 | 100.0 | 120 | 675 | 435 | 400 |