# How About a Date? <br> Breakthrough Research Smoothes Rough Road for Gruen Wristwatch Collectors 

By Mike Barnett and Barry Cooper

If you've collected Gruen watches for any length of time, you know how difficult it is determine -- at least with any degree of accuracy -- just when a specific model of Gruen was made.

There is precious little information "out there," unlike many other popular brands such Hamilton, Rolex, Omega, Elgin and others. These and other brands have volumes of material and definitive movement serial number listings that allow for precise dating down to the year, and in some instances even the MONTH, in which a given specimen was manufactured.

Not so for Gruen, being the "orphan child" without a birth certificate because of a rather complicated method of serializing their movements, the records for which have been long lost, and most likely destroyed.

Curiously, the process for dating the earliest Gruen wristwatches -- from about 1915 to 1935 or so -- is probably the easiest because of the limited number of movements that Gruen had available, and the resulting relatively small number of specific models. The wonderful Gruen Guild Book that the company put out between 1929 and about 1931 (and widely available online) is arguably close to a "Masterbook" of Gruen watches, particularly wristwatches made up to that time period.

But from about the mid 1930s to 1958 (when Gruen ceased production of watches at their factory in Cincinnati), the number of movement calibers exploded, and the serializing of those movements took on byzantine characteristics that make Egyptian hieroglyphic look like a Kindergarten reading primer by comparison.

For most collectors, this is frustrating. But, ironically for some, it is a great source of fun and fascination, as the process of dating a given specimen often involves piecing nuggets of information together from far-flung resources. The chance to play the starring role in your own mini version of CSI (a popular crime show on the CBS Television Network in case you've been living in a cave for about the last decade or so) is irresistible to some.

Yes, there are bits of information scattered here and there. Certainly, the movement dating chart developed by Gruen collector Charlie Cleves, of Bellevue, Ky., almost 30 years ago was a good start, and pointed many collectors in the general vicinity as far as dating a given specimen. Beginning in the mid 1990s, with the advent of eBay and other online venues, collectors have been able to piece together additional dating information through the posting of individual vintage advertisements. All of which has resulted in a greater refinement of the original "Cleves Chart." (And that effort continues.)

The past two or three years have yielded more tools for collectors to work with, but the results of all these efforts have proven painstaking and piecemeal at best, as information and clues are scattered among a variety of paper publications and online resources, the latter of which must surely put the number of sources into the dozens if you count discussion websites.

There is still is no single comprehensive source for dating Gruen watches, especially those produced after the mid 1930s.

That is, until now.

By studying literally thousands of Gruen watches, and developing techniques for dating and identifying model names (and recording every detail about each watch) we believe we have reached a significant breakthrough that will help Gruen wristwatch collectors more definitively pinpoint the age of a given specimen.

In ongoing research into Gruen watch dating techniques, Gruen researchers log everything stamped onto the watch, inside of the case, and look for a match in vintage advertising. This is the standard labor involved in collecting the basics. It is from raw data such as this that patterns begun to emerge if you collect enough of it. One of the items to record is the pair of numbers stamped into the back of most Gruen watches, the Caliber and Style Number. While studying this data, a pattern emerged. The Style Numbers consistently increased over time. It's a simple observation, but an important one.

This article, and our identification tables and charts below, are the result of months of research and testing. We used several methods to date and validate the date of Gruen watches - this article will focus on using the Style Number, a term Gruen coined in the 1947 Gruen Crystal Catalog. It must be stressed that the dates we derived using Style Numbers are approximations, providing the earliest date a watch model was made. It is not meant to date the specific year a watch was manufactured.

As most Gruen collectors know, there is typically a pair of three-digit numbers stamped on the inside back of their watch case, usually in the format or CCC-SSS or SSS/CCC. The majority of Gruen wristwatches have the caliber and then the Style Number (CCC-SSS). Figure 1 is from the 1947 Gruen Crystal Catalog and defines Style Numbers.

Some cases do not contain a Caliber \& Style Number pair. Older models and some round-shaped models may have only a single three-digit number. Swiss and solid gold cases sometimes do not have the numerical pair as well. These watches are not valid candidates for using the Style Number dating method detailed here.


Figure 1 - Gruen Style and Caliber Number Definition from the 1947 Crystal Catalog

Looking closer at the numbers, one of these numbers is the caliber of the movement for that specific watch. By matching the caliber number stamped on the movement with that stamped on the case, collectors can verify that the correct movement is in the watch. If you don't feel comfortable removing the back of your watch to read the Style Number, take it to a skilled watchmaker.

The second three-digit number is the Gruen Style Number; in the example in Figure it is " 387 ". Gruen stated in their Crystal Catalog and 1948 Material Catalog that Style Numbers are paired with specific watch crystals. Generally speaking, the Caliber and Style Number pairs are uniquely assigned to one particular Gruen watch model. However, there are some instances, where the Style numbers were used for multiple models. This happened most often during the early Curvex years when many of the Curvexes had a very similar shape. It makes sense two similar watches would use the same crystal and thus have the same Style Number. These differing wristwatches are problematic and create situations where the Style Number's date is earlier than the watch's correct date of availability. How to identify these situations is explained later.

We limited our work to wristwatches created from 1935 to 1956. The result of the research produced the Style Number Dating Table (Figure 2) which was created by identifying as many watches for each year. The data from the Style Date Table is shown graphically in Figure 3. Perhaps not evident in the
table, the graph visually shows which years Gruen made more watch models, or assigned more Style Numbers, than others.

To create the Style Number Dating Table, the goal was to find at least three watches introduced per year. The primary method of identifying a watch's initial date of production or availability was through the use of magazine advertisements. If a watch matched the advertisement illustration, that watch's Style Number was associated with the year of the advertisement. This technique of identifying watch model names and date of initial availability was also utilized to create the "Gruen Watch Model Identification Guide - Volume 1" written by Mike Barnett. (Watch for Volume 2, to be published later this year.)

After several watches were found in a given year, and its surrounding years, a range of Style Numbers could be approximated for that year. These were the data points used to create the table. The Style Number column indicates the lowest Style Number of a watch introduced in the associated year.

| First Style <br> Number of <br> Year | Year of <br> Introduction |
| :---: | :---: |
| 183 | 1935 |
| 220 | 1936 |
| 255 | 1937 |
| 304 | 1938 |
| 372 | 1939 |
| 390 | 1940 |
| 449 | 1941 |
| 495 | 1942 |
| 506 | 1943 |
| 512 | 1944 |
| 541 | 1945 |
| 544 | 1946 |
| 553 | 1947 |
| 583 | 1948 |
| 625 | 1949 |
| 641 | 1950 |
| 742 | 1951 |
| 752 | 1952 |
| 832 | 1953 |
| 863 | 1954 |
| 883 | 1955 |
| 933 | 1956 |
| 1,015 | 1957 |

Figure 2 - The Style Date Table

We cross-checked our dates utilizing all watch dating methods available to us. The cross-checking was limited to a subset of watches for which the additional methods were valid. One such method was provided by Gruen historian Jack Wood, an active Gruen Forum member, contributor, and Gruen researcher. His dating method, currently "in press", is based on the serial numbers of cases manufactured by the Wadsworth Case Company. He found that for wristwatches that used Wadsworth manufactured cases, the date a specific watch was manufactured is tied directly to the serial number of its case. Another verification method utilizes the movement's serial number. This too is a relatively new technique, and is limited to the 405,410 and 420 caliber families. A full description of dating via
movement serial numbers can be found on the website GruenWristwatches.com. Both of these techniques, using Wadsworth case serial numbers and movement serial numbers, pinpoint a watch to its specific date of manufacture, but are also approximations.

For years in which no watches could be identified, we relied on watch crystal catalogs. These catalogs show the highest Style Number in use for the year the catalog was published. Seventeen crystal catalogs were utilized in this project including those from the GS, Rocket, and Perfit companies.


Figure 3- Style Number/Date Chart

There are anomalies to the Style Number dating method! The Gruen Company was not always consistent in its assignment and use of new Style Numbers, particularly in the years around World War
II. We identified several anomalies but undoubtedly there are others that savvy Gruen collectors will find and share with the community.

We found some Style Numbers were paired with different movement calibers, but the watch model remained the same. We called this a model "movement migration". Over time Gruen changed the movements in a watch model. They maintained the correct labeling in the case by changing the caliber number while leaving the Style Number the same. The 1951 "Submarine" model shown in figures 4 and 5 is a good example of this migration from one movement to another. Some Submarine models have the identification 421-725 indicating a caliber 421 movement is utilized while others marked with 426725 indicate a caliber 426 .


Figure 4 - Gruen "Submarine" model


Figure 5 - Submarine watch model "migration" shown in the case back

To help determine when Style Numbers were reused or when a watch model show evidence of "movement migration", we developed a Style Caliber Table shown in Figure 6 by capturing data from many crystal catalog. The first column lists each Style; the numbers to the right are the movement calibers that are used for that Style. Again, looking at the Submarine model we see that it has a Style Number of 725. In the Style Caliber Table, calibers 421 and 426 are shown to the right of Style 725.

The Style Number re-use anomaly can be at least recognized by using the Style Caliber Table. If a watch's Style Number indicate a date that is prior to the date the movement itself was introduced, then clearly that style number has been used previously. Take for example the Style Number 498. Figure 6 shows six different calibers of movements that used that number. One such movement is the caliber 335 that began production in 1948. The Style Number of 498 indicates the year of introduction for the watch was 1942, but this clearly cannot be the case for watches with caliber 335 movements. When in doubt, check the Style Caliber Table to ensure a Style Number re-use hasn't occurred.

In approximately 1956 the Style Numbers broke the 999 barrier. While we show 1,015 as the end Style Number for the year 1956, the Style Numbers stamped in the cases will not be a 4-digit number. Much like a 3 -digit odometer, the number rolls over and started over again as a 3 digit number padded with
zeros on the front end. For example, the Style Number we reference as 1,002 will have a case that is stamped with a Style Number of 002. That particular watch is stamped with 422-002, or 002-422

The Style Caliber Table proved to be a distraction while we were doing our research because there is such a wealth of data that can be mined from it. For example, the lifespan of a movement can be approximated by finding the lowest and highest Style Numbers associated with that movement caliber. To do this the caliber to investigate is chosen, its lowest and highest Style Numbers are found in the Style Caliber table and these Style Numbers are then looked up in the Style Date table to determine the dates of the lowest and highest Styles. You'll find that it is the lady's movements that have the longest lifespan as well as having more Style Numbers than the men's watches.

We hope that our contribution will help Gruen collectors learn more about their watches and perhaps motivate them to help piece together other missing parts in the Gruen puzzle. Our work provides the date of initial production which is the first step in solving the many mysteries that await those that are curious enough to seek more information. Be careful though, that curiosity found in some Gruen collectors turn collectors into obsessed researchers.

Credit should be given to the early Gruen pioneers Roy Ehrhardt, Charles Cleves, and more recently, Bruce Shawkey. Mr. Cleves' work was a springboard from which we could research, providing initial manufacturing dates of Gruen movements. A special thank you is owed to Bruce Shawkey for his riveting introduction outlining the history of Gruen research and encouragement. And to Jack Wood, a hard-working Gruen researcher and historian that has consistently given much to the Gruen community. We were able to use his recent work to help validate our findings. And the ever-growing GruenWristwatches.com Forum members for providing motivation and sharing their passion and watches with the Gruen community.

| Style | Calibers |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 183 | 311 |  |  |  |  |  |  |
| 184 | 685 |  |  |  |  |  |  |
| 185 | 165 |  |  |  |  |  |  |
| 186 | 353 |  |  |  |  |  |  |
| 190 | 325 |  |  |  |  |  |  |
| 191 | 465 |  |  |  |  |  |  |
| 192 | 325 |  |  |  |  |  |  |
| 193 | 465 |  |  |  |  |  |  |
| 194 | 700 |  |  |  |  |  |  |
| 196 | 165 |  |  |  |  |  |  |
| 197 | 355 |  |  |  |  |  |  |
| 199 | 700 |  |  |  |  |  |  |
| 201 | 676 |  |  |  |  |  |  |
| 202 | 311 |  |  |  |  |  |  |
| 205 | 455 |  |  |  |  |  |  |
| 207 | 355 |  |  |  |  |  |  |
| 210 | 907 |  |  |  |  |  |  |
| 213 | 455 |  |  |  |  |  |  |
| 214 | 675 |  |  |  |  |  |  |
| 215 | 455 |  |  |  |  |  |  |
| 216 | 455 |  |  |  |  |  |  |
| 217 | 485 |  |  |  |  |  |  |
| 218 | 467 |  |  |  |  |  |  |
| 220 | 165 | 167 |  |  |  |  |  |
| 221 | 167 |  |  |  |  |  |  |
| 222 | 165 |  |  |  |  |  |  |
| 223 | 165 |  |  |  |  |  |  |
| 224 | 485 |  |  |  |  |  |  |
| 225 | 325 |  |  |  |  |  |  |
| 226 | 325 |  |  |  |  |  |  |
| 227 | 325 | 355 | 500 |  |  |  |  |
| 228 | 311 | 330 |  |  |  |  |  |
| 229 | 915 | 917 |  |  |  |  |  |
| 230 | 915 |  |  |  |  |  |  |
| 231 | 465 |  |  |  |  |  |  |
| 232 | 465 |  |  |  |  |  |  |
| 233 | 465 |  |  |  |  |  |  |
| 234 | 917 |  |  |  |  |  |  |
| 235 | 917 |  |  |  |  |  |  |
| 238 | 300 |  |  |  |  |  |  |
| 239 | 300 |  |  |  |  |  |  |
| 240 | 355 |  |  |  |  |  |  |
| 241 | 355 |  |  |  |  |  |  |
| 242 | 307 |  |  |  |  |  |  |
| 243 | 300 |  |  |  |  |  |  |
| 244 | 485 |  |  |  |  |  |  |
| 246 | 485 | 501 |  |  |  |  |  |
| 247 | 123 | 325 |  |  |  |  |  |
| 248 | 580 |  |  |  |  |  |  |
| 250 | 917 |  |  |  |  |  |  |
| 251 | 531 |  |  |  |  |  |  |
| 252 | 531 |  |  |  |  |  |  |
| 253 | 531 |  |  |  |  |  |  |
| 254 | 501 |  |  |  |  |  |  |
| 255 | 311 |  |  |  |  |  |  |
| 257 | 501 |  |  |  |  |  |  |
| 258 | 501 |  |  |  |  |  |  |
| 259 | 280 |  |  |  |  |  |  |
| 260 | 311 |  |  |  |  |  |  |
| 261 | 280 |  |  |  |  |  |  |
| 262 | 290 |  |  |  |  |  |  |
| 263 | 465 |  |  |  |  |  |  |
| 264 | 465 |  |  |  |  |  |  |
| 265 | 465 |  |  |  |  |  |  |
| 266 | 165 | 501 |  |  |  |  |  |
| 267 | 487 |  |  |  |  |  |  |
| 268 | 697 | 698 |  |  |  |  |  |
| 269 | 280 |  |  |  |  |  |  |
| 270 | 280 |  |  |  |  |  |  |
| 271 | 311 | 330 |  |  |  |  |  |


| 272 | 350 | 520 |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 273 | 311 | 400C |  |  |  |  |  |
| 274 | 270 |  |  |  |  |  |  |
| 275 | 115 | 215 | 216 | 270 | 215SS | 270SS |  |
| 276 | 270 |  |  |  |  |  |  |
| 278 | 206 | 217 | 501 |  |  |  |  |
| 279 | 280 |  |  |  |  |  |  |
| 280 | 330 |  |  |  |  |  |  |
| 281 | 300 |  |  |  |  |  |  |
| 282 | 300 |  |  |  |  |  |  |
| 283 | 581 | 704 | 704SS |  |  |  |  |
| 284 | 270 |  |  |  |  |  |  |
| 285 | 270 |  |  |  |  |  |  |
| 286 | 270 |  |  |  |  |  |  |
| 287 | 330 |  |  |  |  |  |  |
| 288 | 330 |  |  |  |  |  |  |
| 289 | 400 |  |  |  |  |  |  |
| 290 | 500 | 877 | 500DD |  |  |  |  |
| 291 | 520 |  |  |  |  |  |  |
| 292 | 330 |  |  |  |  |  |  |
| 293 | 330 |  |  |  |  |  |  |
| 294 | 300 |  |  |  |  |  |  |
| 295 | 330 |  |  |  |  |  |  |
| 296 | 275 | 500 | 501 | 500C |  |  |  |
| 297 | 300 |  |  |  |  |  |  |
| 298 | 400 |  |  |  |  |  |  |
| 299 | 400 | 542 |  |  |  |  |  |
| 300 | 416 |  |  |  |  |  |  |
| 303 | 271 |  |  |  |  |  |  |
| 304 | 330 |  |  |  |  |  |  |
| 305 | 400 |  |  |  |  |  |  |
| 308 | 330 |  |  |  |  |  |  |
| 309 | 580 | 581 |  |  |  |  |  |
| 310 | 270 |  |  |  |  |  |  |
| 320 | 270 |  |  |  |  |  |  |
| 321 | 270 |  |  |  |  |  |  |
| 322 | 270 |  |  |  |  |  |  |
| 323 | 700 | 704 |  |  |  |  |  |
| 324 | 500 | 501 | 500C |  |  |  |  |
| 326 | 270 |  |  |  |  |  |  |
| 334 | 330 |  |  |  |  |  |  |
| 335 | 280 |  |  |  |  |  |  |
| 336 | 700 |  |  |  |  |  |  |
| 337 | 700 |  |  |  |  |  |  |
| 338 | 270 |  |  |  |  |  |  |
| 339 | 330 |  |  |  |  |  |  |
| 340 | 355 | 500 | 355C |  |  |  |  |
| 350 | 270 |  |  |  |  |  |  |
| 351 | 401 | 501 | 501C |  |  |  |  |
| 352 | 401 |  |  |  |  |  |  |
| 353 | 350 |  |  |  |  |  |  |
| 354 | 520 |  |  |  |  |  |  |
| 355 | 520 |  |  |  |  |  |  |
| 356 | 330 | 355 | 355 C |  |  |  |  |
| 357 | 215 | 270 |  |  |  |  |  |
| 358 | 704 |  |  |  |  |  |  |
| 359 | 168 |  |  |  |  |  |  |
| 360 | 582 |  |  |  |  |  |  |
| 361 | 270 |  |  |  |  |  |  |
| 362 | 300 |  |  |  |  |  |  |
| 363 | 280 |  |  |  |  |  |  |
| 364 | 400 | 400C |  |  |  |  |  |
| 365 | 406 |  |  |  |  |  |  |
| 366 | 406 | 406SS |  |  |  |  |  |
| 367 | 167 |  |  |  |  |  |  |
| 368 | 280 |  |  |  |  |  |  |
| 369 | 355 | 355C |  |  |  |  |  |
| 370 | 355 | 355C | 401C |  |  |  |  |
| 371 | 917 |  |  |  |  |  |  |
| 372 | 401 | 410 | 581 | 582 | 704 |  |  |
| 373 | 406 |  |  |  |  |  |  |


| 374 | 405 |  |  |  |  |  |  | 452 | 350 |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 375 | 300 |  |  |  |  |  |  | 453 | 211 |  |  |  |  |  |  |
| 376 | 355 | $355 C$ |  |  |  |  |  | 454 | 430 |  |  |  |  |  |  |
| 377 | 405 |  |  |  |  |  |  | 455 | 430 |  |  |  |  |  |  |
| 378 | 210 |  |  |  |  |  |  | 456 | 430 |  |  |  |  |  |  |
| 379 | 400 | 400 C |  |  |  |  |  | 457 | 430 |  |  |  |  |  |  |
| 380 | 210 | 211 | 210SS |  |  |  |  | 458 | 405 |  |  |  |  |  |  |
| 381 | 410 | 410C |  |  |  |  |  | 459 | 406 |  |  |  |  |  |  |
| 382 | 210 |  |  |  |  |  |  | 460 | 406 | 406SS |  |  |  |  |  |
| 383 | 410 | 410 C |  |  |  |  |  | 461 | 430 |  |  |  |  |  |  |
| 384 | 210 | 211 | 216 |  |  |  |  | 462 | 210 | 211 |  |  |  |  |  |
| 385 | 211 | 211SS |  |  |  |  |  | 463 | 210 |  |  |  |  |  |  |
| 386 | 210 | 211 | 430 | 210SS |  |  |  | 464 | 405 |  |  |  |  |  |  |
| 387 | 211 | 405 | 406 | 426 |  |  |  | 465 | 230 | 405 | 420 | 425 |  |  |  |
| 388 | 405 |  |  |  |  |  |  | 466 | 210 | 211 | 215 | 216 | 266 | 211SS | 216SS |
| 389 | 411 | 411C |  |  |  |  |  | 467 | 431 |  |  |  |  |  |  |
| 390 | 411 | 411C |  |  |  |  |  | 468 | 431 |  |  |  |  |  |  |
| 391 | 406 |  |  |  |  |  |  | 469 | 435 | 436 |  |  |  |  |  |
| 392 | 405 |  |  |  |  |  |  | 470 | 405 |  |  |  |  |  |  |
| 393 | 330 |  |  |  |  |  |  | 471 | 405 |  |  |  |  |  |  |
| 394 | 406 | 406SS |  |  |  |  |  | 472 | 431 |  |  |  |  |  |  |
| 395 | 405 | 405SS |  |  |  |  |  | 473 | 430 | 435 |  |  |  |  |  |
| 396 | 405 |  |  |  |  |  |  | 474 | 435 |  |  |  |  |  |  |
| 397 | 211 |  |  |  |  |  |  | 475 | 330 |  |  |  |  |  |  |
| 398 | 210 |  |  |  |  |  |  | 476 | 330 |  |  |  |  |  |  |
| 399 | 211 |  |  |  |  |  |  | 477 | 406 |  |  |  |  |  |  |
| 402 | 405 |  |  |  |  |  |  | 478 | 291 |  |  |  |  |  |  |
| 403 | 406 |  |  |  |  |  |  | 479 | 290 | 291 |  |  |  |  |  |
| 404 | 411 | 411C |  |  |  |  |  | 480 | 406 | 425 |  |  |  |  |  |
| 408 | 410 | 410C |  |  |  |  |  | 481 | 411 | 411C |  |  |  |  |  |
| 409 | 168 | 500 | 501 |  |  |  |  | 482 | 410 | 401C |  |  |  |  |  |
| 411 | 211 |  |  |  |  |  |  | 483 | 211 |  |  |  |  |  |  |
| 413 | 405 |  |  |  |  |  |  | 484 | 210 |  |  |  |  |  |  |
| 414 | 406 |  |  |  |  |  |  | 485 | 291 |  |  |  |  |  |  |
| 415 | 300 | 531 |  |  |  |  |  | 486 | 405 |  |  |  |  |  |  |
| 416 | 531 |  |  |  |  |  |  | 487 | 410 |  |  |  |  |  |  |
| 417 | 330 | 430 |  |  |  |  |  | 488 | 411 |  |  |  |  |  |  |
| 418 | 270 |  |  |  |  |  |  | 489 | 430 |  |  |  |  |  |  |
| 419 | 400 | 401 |  |  |  |  |  | 490 | 435 |  |  |  |  |  |  |
| 420 | 401 | 401C |  |  |  |  |  | 491 | 350 |  |  |  |  |  |  |
| 421 | 211 |  |  |  |  |  |  | 492 | 500 | 500C |  |  |  |  |  |
| 422 | 210 | 211 |  |  |  |  |  | 494 | 410 | 410SS |  |  |  |  |  |
| 423 | 210 |  |  |  |  |  |  | 495 | 405 |  |  |  |  |  |  |
| 424 | 300 |  |  |  |  |  |  | 496 | 410 | 410ss |  |  |  |  |  |
| 425 | 210 |  |  |  |  |  |  | 497 | 411 | 411SS |  |  |  |  |  |
| 426 | 210 |  |  |  |  |  |  | 498 | 335 | 422 | 430 | 435 | 440 | 3351 |  |
| 427 | 210 | 211 |  |  |  |  |  | 499 | 440 |  |  |  |  |  |  |
| 428 | 211 |  |  |  |  |  |  | 500 | 501 |  |  |  |  |  |  |
| 429 | 290 |  |  |  |  |  |  | 501 | 290 |  |  |  |  |  |  |
| 430 | 290 |  |  |  |  |  |  | 502 | 290 |  |  |  |  |  |  |
| 431 | 290 |  |  |  |  |  |  | 503 | 290 |  |  |  |  |  |  |
| 432 | 290 |  |  |  |  |  |  | 504 | 290 |  |  |  |  |  |  |
| 433 | 290 | 411 |  |  |  |  |  | 505 | 290 |  |  |  |  |  |  |
| 434 | 290 |  |  |  |  |  |  | 506 | 290 |  |  |  |  |  |  |
| 435 | 290 |  |  |  |  |  |  | 507 | 210 |  |  |  |  |  |  |
| 436 | 290 |  |  |  |  |  |  | 508 | 211 |  |  |  |  |  |  |
| 437 | 290 |  |  |  |  |  |  | 509 | 290 | 291 |  |  |  |  |  |
| 438 | 290 |  |  |  |  |  |  | 510 | 290 |  |  |  |  |  |  |
| 439 | 290 |  |  |  |  |  |  | 511 | 405 |  |  |  |  |  |  |
| 440 | 430 |  |  |  |  |  |  | 512 | 406 |  |  |  |  |  |  |
| 441 | 211 |  |  |  |  |  |  | 513 | 469 |  |  |  |  |  |  |
| 442 | 411 | 411C |  |  |  |  |  | 514 | 290 |  |  |  |  |  |  |
| 443 | 411 | 411C |  |  |  |  |  | 515 | 290 |  |  |  |  |  |  |
| 444 | 212 |  |  |  |  |  |  | 516 | 290 |  |  |  |  |  |  |
| 445 | 211 |  |  |  |  |  |  | 517 | 290 |  |  |  |  |  |  |
| 446 | 405 |  |  |  |  |  |  | 518 | 210 | 211 |  |  |  |  |  |
| 447 | 405 | 406 |  |  |  |  |  | 519 | 210 |  |  |  |  |  |  |
| 448 | 440 |  |  |  |  |  |  | 520 | 290 |  |  |  |  |  |  |
| 449 | 440 |  |  |  |  |  |  | 521 | 290 |  |  |  |  |  |  |
| 450 | 440 |  |  |  |  |  |  | 522 | 210 |  |  |  |  |  |  |
| 451 | 405 | 405SS |  |  |  |  |  | 523 | 405 | 425 |  |  |  |  |  |



| 597 | 370 |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 598 | 420 | 421 | 425 |  |  |  |
| 599 | 335 | 435 |  |  |  |  |
| 600 | 370 |  |  |  |  |  |
| 601 | 370 |  |  |  |  |  |
| 602 | 370 |  |  |  |  |  |
| 603 | 335 |  |  |  |  |  |
| 604 | 275 |  |  |  |  |  |
| 605 | 380 | 385 |  |  |  |  |
| 606 | 335 | 3351 |  |  |  |  |
| 607 | 370 |  |  |  |  |  |
| 608 | 285 |  |  |  |  |  |
| 609 | 285 |  |  |  |  |  |
| 610 | 370 |  |  |  |  |  |
| 611 | 460 | 470 |  |  |  |  |
| 612 | 275 |  |  |  |  |  |
| 613 | 435 |  |  |  |  |  |
| 614 | 425 |  |  |  |  |  |
| 615 | 370 |  |  |  |  |  |
| 616 | 210 | 215 |  |  |  |  |
| 617 | 275 |  |  |  |  |  |
| 619 | 215 | 275 |  |  |  |  |
| 620 | 210 |  |  |  |  |  |
| 621 | 425 |  |  |  |  |  |
| 622 | 210 | 215 | 216 |  |  |  |
| 623 | 430 | 435 |  |  |  |  |
| 624 | 210 | 211 |  |  |  |  |
| 625 | 370 | 435 |  |  |  |  |
| 626 | 430 |  |  |  |  |  |
| 627 | 3351 |  |  |  |  |  |
| 628 | 275 |  |  |  |  |  |
| 629 | 425 |  |  |  |  |  |
| 630 | 420 | 651 | 3351 |  |  |  |
| 631 | 335 |  |  |  |  |  |
| 632 | 420 |  |  |  |  |  |
| 633 | 421 |  |  |  |  |  |
| 634 | 275 | 425 |  |  |  |  |
| 635 | 335 |  |  |  |  |  |
| 636 | 425 | 426 |  |  |  |  |
| 637 | 335 | 3351 | 3551 |  |  |  |
| 638 | 275 |  |  |  |  |  |
| 639 | 420 |  |  |  |  |  |
| 640 | 475 |  |  |  |  |  |
| 641 | 440 |  |  |  |  |  |
| 642 | 370 |  |  |  |  |  |
| 643 | 370 |  |  |  |  |  |
| 644 | 285 |  |  |  |  |  |
| 645 | 210 |  |  |  |  |  |
| 646 | 285 |  |  |  |  |  |
| 647 | 3351 |  |  |  |  |  |
| 648 | 210 |  |  |  |  |  |
| 649 | 430 | 475 | 480 |  |  |  |
| 650 | 370 |  |  |  |  |  |
| 651 | 3351 |  |  |  |  |  |
| 652 | 425 | 435 | 3351 |  |  |  |
| 653 | 421 |  |  |  |  |  |
| 654 | 421 |  |  |  |  |  |
| 655 | 275 |  |  |  |  |  |
| 656 | 210 |  |  |  |  |  |
| 657 | 335 | 3351 |  |  |  |  |
| 658 | 210 | 215 | 216 |  |  |  |
| 659 | 435 | 3351 |  |  |  |  |
| 660 | 415 | 416 |  |  |  |  |
| 661 | 275 |  |  |  |  |  |
| 662 | 370 |  |  |  |  |  |
| 663 | 285 |  |  |  |  |  |
| 664 | 285 | 423 | 432 | 423A |  |  |
| 665 | 275 |  |  |  |  |  |
| 666 | 275 | 430 |  |  |  |  |
| 667 | 275 | 335 |  |  |  |  |
| 668 | 275 |  |  |  |  |  |


| 669 | 290 |  |  |  |  |  |  | 745 | 275 |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 670 | 210 | 215 | 216 |  |  |  |  | 746 | 215 |  |  |  |  |  |  |
| 671 | 275 | 275 |  |  |  |  |  | 747 | 370 | 430 | 435 |  |  |  |  |
| 672 | 435 | 3351 |  |  |  |  |  | 748 | 275 | 2751 |  |  |  |  |  |
| 673 | 210 | 210SS |  |  |  |  |  | 749 | 275 |  |  |  |  |  |  |
| 674 | 430 | 435 | 3351 |  |  |  |  | 750 | 370 |  |  |  |  |  |  |
| 675 | 215 | 216 |  |  |  |  |  | 751 | 480 |  |  |  |  |  |  |
| 676 | 370 | 415 | 460 |  |  |  |  | 752 | 335 | 3351 |  |  |  |  |  |
| 677 | 415 | 430 |  |  |  |  |  | 753 | 370 | 440 |  |  |  |  |  |
| 678 | 275 |  |  |  |  |  |  | 754 | 215 | 216 |  |  |  |  |  |
| 679 | 421 |  |  |  |  |  |  | 755 | 480 |  |  |  |  |  |  |
| 680 | 335 | 3351 | 3551 |  |  |  |  | 756 | 335 | 3351 |  |  |  |  |  |
| 681 | 430 |  |  |  |  |  |  | 757 | 275 |  |  |  |  |  |  |
| 682 | 415 |  |  |  |  |  |  | 759 | 275 |  |  |  |  |  |  |
| 683 | 215 |  |  |  |  |  |  | 760 | 370 |  |  |  |  |  |  |
| 685 | 210 |  |  |  |  |  |  | 761 | 480 |  |  |  |  |  |  |
| 686 | 210 |  |  |  |  |  |  | 762 | 335 | 3351 |  |  |  |  |  |
| 688 | 420 | 422 | 460 | 422SS |  |  |  | 764 | 415 |  |  |  |  |  |  |
| 689 | 335 |  |  |  |  |  |  | 766 | 422 |  |  |  |  |  |  |
| 690 | 335 | 3351 |  |  |  |  |  | 767 | 462 |  |  |  |  |  |  |
| 691 | 415 |  |  |  |  |  |  | 768 | 460 | 462 |  |  |  |  |  |
| 693 | 210 |  |  |  |  |  |  | 769 | 480 |  |  |  |  |  |  |
| 694 | 430 |  |  |  |  |  |  | 770 | 4803 |  |  |  |  |  |  |
| 695 | 285 |  |  |  |  |  |  | 771 | 3351 |  |  |  |  |  |  |
| 696 | 370 |  |  |  |  |  |  | 772 | 416 | 422 |  |  |  |  |  |
| 698 | 215 | 215SS |  |  |  |  |  | 773 | 370 |  |  |  |  |  |  |
| 699 | 475 |  |  |  |  |  |  | 774 | 415 |  |  |  |  |  |  |
| 700 | 335 | 3351 |  |  |  |  |  | 776 | 335 | 3351 |  |  |  |  |  |
| 701 | 215 |  |  |  |  |  |  | 777 | 335 | 3351 |  |  |  |  |  |
| 702 | 215 |  |  |  |  |  |  | 778 | 480 |  |  |  |  |  |  |
| 703 | 335 | 3351 |  |  |  |  |  | 779 | 360 |  |  |  |  |  |  |
| 704 | 3351 |  |  |  |  |  |  | 780 | 480 |  |  |  |  |  |  |
| 705 | 335 | 3351 |  |  |  |  |  | 781 | 480 |  |  |  |  |  |  |
| 706 | 370 |  |  |  |  |  |  | 782 | 275 |  |  |  |  |  |  |
| 707 | 370 | 440 |  |  |  |  |  | 783 | 270 | 275 | 3351 |  |  |  |  |
| 708 | 275 |  |  |  |  |  |  | 784 | 215 |  |  |  |  |  |  |
| 709 | 335 | 3351 |  |  |  |  |  | 785 | 275 | 285 |  |  |  |  |  |
| 710 | 3351 |  |  |  |  |  |  | 786 | 215 |  |  |  |  |  |  |
| 711 | 435 | 3351 |  |  |  |  |  | 788 | 480 |  |  |  |  |  |  |
| 712 | 435 |  |  |  |  |  |  | 789 | 415 |  |  |  |  |  |  |
| 713 | 425 |  |  |  |  |  |  | 790 | 435 |  |  |  |  |  |  |
| 714 | 275 |  |  |  |  |  |  | 791 | 3351 |  |  |  |  |  |  |
| 715 | 335 | 3351 |  |  |  |  |  | 792 | 215 | 415 |  |  |  |  |  |
| 716 | 370 |  |  |  |  |  |  | 793 | 415 |  |  |  |  |  |  |
| 717 | 460 |  |  |  |  |  |  | 794 | 415 |  |  |  |  |  |  |
| 718 | 415 | 470 | 3351 |  |  |  |  | 795 | 416 |  |  |  |  |  |  |
| 719 | 415 | 430 |  |  |  |  |  | 797 | 440 |  |  |  |  |  |  |
| 720 | 415 | 416 |  |  |  |  |  | 798 | 3351 |  |  |  |  |  |  |
| 721 | 216 |  |  |  |  |  |  | 799 | 422 |  |  |  |  |  |  |
| 723 | 335 | 3351 |  |  |  |  |  | 800 | 460 |  |  |  |  |  |  |
| 724 | 275 |  |  |  |  |  |  | 801 | 3351 |  |  |  |  |  |  |
| 725 | 421 | 426 |  |  |  |  |  | 802 | 335 | 3351 |  |  |  |  |  |
| 726 | 475 |  |  |  |  |  |  | 804 | 415 |  |  |  |  |  |  |
| 727 | 215 |  |  |  |  |  |  | 807 | 3351 |  |  |  |  |  |  |
| 728 | 275 |  |  |  |  |  |  | 808 | 422 |  |  |  |  |  |  |
| 729 | 480 |  |  |  |  |  |  | 809 | 335 | 3351 |  |  |  |  |  |
| 730 | 215 | 216 |  |  |  |  |  | 810 | 415 | 416 |  |  |  |  |  |
| 731 | 275 |  |  |  |  |  |  | 811 | 216 |  |  |  |  |  |  |
| 732 | 415 |  |  |  |  |  |  | 812 | 215 | 216 |  |  |  |  |  |
| 733 | 460 |  |  |  |  |  |  | 813 | 430 | 435 | 480 |  |  |  |  |
| 734 | 275 |  |  |  |  |  |  | 814 | 480 |  |  |  |  |  |  |
| 735 | 275 | 2751 |  |  |  |  |  | 815 | 415 |  |  |  |  |  |  |
| 736 | 480 |  |  |  |  |  |  | 816 | 335 | 3351 |  |  |  |  |  |
| 737 | 3351 |  |  |  |  |  |  | 820 | 3351 |  |  |  |  |  |  |
| 738 | 3351 |  |  |  |  |  |  | 821 | 370 |  |  |  |  |  |  |
| 739 | 415 | 480 |  |  |  |  |  | 822 | 415 |  |  |  |  |  |  |
| 740 | 335 | 3351 |  |  |  |  |  | 824 | 415 |  |  |  |  |  |  |
| 741 | 335 | 3351 |  |  |  |  |  | 826 | 480 |  |  |  |  |  |  |
| 742 | 480 |  |  |  |  |  |  | 827 | 415 |  |  |  |  |  |  |
| 743 | 275 | 2751 |  |  |  |  |  | 828 | 285 |  |  |  |  |  |  |
| 744 | 475 | 480 |  |  |  |  |  | 829 | 415 | 416 |  |  |  |  |  |



| 926 | 275 | 2753 |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 930 | 275 |  |  |  |  |  |  |
| 931 | 215 | 462 |  |  |  |  |  |
| 939 | 215 |  |  |  |  |  |  |
| 940 | 215 |  |  |  |  |  |  |
| 941 | 215 |  |  |  |  |  |  |
| 942 | 480 |  |  |  |  |  |  |
| 943 | 275 |  |  |  |  |  |  |
| 944 | 275 |  |  |  |  |  |  |
| 945 | 215 | 275 |  |  |  |  |  |
| 950 | 215 |  |  |  |  |  |  |
| 951 | 285 |  |  |  |  |  |  |
| 952 | 215 |  |  |  |  |  |  |
| 953 | 215 |  |  |  |  |  |  |
| 961 | 275 |  |  |  |  |  |  |
| 970 | 275 | 2751 |  |  |  |  |  |
| 976 | 217 |  |  |  |  |  |  |
| 977 | 215 | 216 |  |  |  |  |  |
| 978 | 215 | 220 |  |  |  |  |  |
| 979 | 215 | 275 |  |  |  |  |  |
| 980 | 275 |  |  |  |  |  |  |
| 981 | 462 |  |  |  |  |  |  |
| 984 | 275 |  |  |  |  |  |  |
| 986 | 275 |  |  |  |  |  |  |
| 988 | 275 |  |  |  |  |  |  |
| 991 | 215 |  |  |  |  |  |  |
| 997 | 275 |  |  |  |  |  |  |
| 998 | 422 |  |  |  |  |  |  |
| 999 | 435 | 439 |  |  |  |  |  |
| 1002 | 422 |  |  |  |  |  |  |
| 1003 | 422 | 423 |  |  |  |  |  |
| 1010 | 275 | 2751 |  |  |  |  |  |
| 1013 | 275 |  |  |  |  |  |  |
| 1015 | 211 | 215 | 415 |  |  |  |  |
| 1017 | 215 |  |  |  |  |  |  |
| 1019 | 275 |  |  |  |  |  |  |
| 1020 | 215 |  |  |  |  |  |  |
| 1025 | 673 |  |  |  |  |  |  |
| 1027 | 787 |  |  |  |  |  |  |
| 1032 | 215 |  |  |  |  |  |  |
| 1035 | 215 |  |  |  |  |  |  |
| 1042 | 215 |  |  |  |  |  |  |
| 1049 | 215 |  |  |  |  |  |  |
| 1050 | 275 | 2753 |  |  |  |  |  |
| 1056 | 215 |  |  |  |  |  |  |
| 1061 | 422 |  |  |  |  |  |  |
| 1062 | 422 |  |  |  |  |  |  |
| 1064 | 2753 |  |  |  |  |  |  |
| 1070 | 275 |  |  |  |  |  |  |
| 1076 | 215 | 3353 |  |  |  |  |  |
| 1079 | 2753 |  |  |  |  |  |  |
| 1085 | 673 |  |  |  |  |  |  |
| 1099 | 215 | 225 |  |  |  |  |  |
| 1116 | 215 |  |  |  |  |  |  |
| 1156 | 215 |  |  |  |  |  |  |
| 1158 | 215 |  |  |  |  |  |  |
| 1176 | 215 |  |  |  |  |  |  |
| 1199 | 278 |  |  |  |  |  |  |
| 1231 | 278 |  |  |  |  |  |  |

Figure 6-Style Caliber Table

