

Technical Data

Hamilton Watch Company

LANCASTER, PENNSYLVANIA

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SUBJECT: REGULATION

Watch regulation comprises three subjects — Timing, Rating and Regulation. Timing is the bringing to time of a watch after it has been repaired. Rating is the observation and comparison of the variation of the daily rate of a watch after adjusting it or while it is on the watch rack. Regulation for the most part refers to adjustment of a watch to fit a watch owner's routine habits.

TIMING

After cleaning, repairing and general order work is completed, a watch may show a gain or loss in timing because of one or more of the following conditions:

(a) Varying balance vibrations caused in truing the balance rims. Hamilton balances are solid monometallic parts which once trued remain true unless mishandled during the process of repairing a watch. This is made possible through the use of Elinvar hairsprings.

(b) Varying balance vibrations resulting because the balance wheel was made heavier or lighter during poising. The solid Hamilton monometallic balances, used with Elinvar hairsprings, seldom need repositing. This allows easier timing after repairs.

(c) The effective length of the hairspring may have been altered by opening or closing the regulator pins.

(d) The balance motion may have been increased or decreased through fitting a new balance staff or mainspring.

(e) Loss or gain may be shown as a result of fitting a new hairspring.

Such errors can usually be corrected by inserting Hamilton timing washers, or by moving the meantime screws in the balances equipped with them.

Hamilton watches, equipped with Elinvar hairsprings and monometallic balances, usually require nothing beyond routine regulation to bring them to time after repairing.

RATING

The rate of a watch is determined by the amount of time it gains or loses in a day. A perfect rate is one in which the gain or loss is exactly the same each day. A good rate is one in which the gain or loss is nearly the

same each day. A poor rate is one in which the gain or loss varies from day to day; such as, gaining one day and losing the next.

The definition of good rate, however, varies with the size and quality of a watch. Chronometers, the standard navigation timepieces, are considered as nearly perfect in rate as it is possible to obtain in a portable timepiece. They are kept in one position always, with gimbal mountings. Even so, some of the best are allowed a variation of $\frac{3}{5}$ of a second per day. The smaller a watch, the greater are the limits within which daily variation is considered a good rate. The variation allowed for a small lady's watch would be greater than that allowed for a man's wrist watch. In the same way, the variation allowed for a man's wrist watch would be greater than that allowed for a pocket watch.

Railroad watches are expected to keep time within 30 seconds per week. These, of course, are large high-grade position adjusted timepieces and as the size of the watch decreases, greater and greater limits must be allowed.

PERSONAL REGULATION

Various factors affect the performance of any watch. For this reason, regulation of a watch to its owner's routine is very necessary. As an instance, a man occupied at a desk has a routine and habits differing from those of a mechanic; or, a typist and her routine cannot be compared to a housewife. Individually, watches worn by these persons would be subjected to widely different conditions during a day's time. And a difference in watch performance would result. Some persons do not wear their watches regularly every day, and they allow them to lie in a flat position while not being worn. Others wind their watches at irregular intervals. Even changing a pocket watch from a trouser's pocket to a vest pocket may result in a variation of several seconds in its daily rate. In addition, small watches are greatly affected by changes in climatic or temperature conditions. Accurate timekeeping is considerably influenced by these things.

Thus, varying conditions under which a watch is required to perform, and over which there is no control,

explains why a new watch, or even a repaired watch may need more regulation than sometimes seems reasonable.

Most important to you, therefore, it is always advisable to explain to watch purchasers or repair clients, with utmost diplomacy, that a watch may gain or lose



time during the first few weeks they carry it. This will prepare and encourage customers to return their watches once a week for comparison and regulation, when necessary. Too, it will open an opportunity to make people "watch conscious"; making them realize that accurate

performance in a watch is almost wholly dependent on the care it receives from them.

HAMILTON HAIRSPRINGS

All Hamilton watches are now made with Elinvar hairsprings. The complete line of men's and women's wrist, strap and pocket watches carry this exclusive Hamilton feature which protects them against many of the inaccuracies caused by moisture, magnetism, and extreme temperature changes.

When ordering hairsprings for Elinvar equipped watches, order by grade number. Weak, medium or strong springs are available for each grade. For closer timing, send the balance-wheel to the Hamilton Material Sales Dept. to have the hairspring vibrated. Following is a list of Hamilton models equipped with Elinvar hairsprings.

Size	Grade	Size	Grade
16	992E	14/0	980A
16	950E	14/0	980B
10	923	14/0	982
10	921	18/0	989E
10	917	20/0	997
6/0	987E	21/0	995
6/0	987A	21/0	995A
14/0	980	22/0	911

For old style bi-metallic balance watches, equipped with steel hairsprings, refer to the following chart when ordering new hairsprings:

HAMILTON HAIRSPRING CHART

When Ordering New Hairsprings for Hamilton Watches With Bi-Metallic Balances — Examine the Balance Screws — The Kind and Number of Screws Determine the Hairspring Number.

Size	Bi-Metallic Balance with Gold Screws				Bi-Metallic Balance with Brass Screws			
	12-Screws	14-Screws	16-Screws	18-Screws	12-Screws	14-Screws	16-Screws	18-Screws
18-16	3	4	5	6	0	1	2	3
12	5	6	7	8	1	2	3	4
6/0	Not Indicated by Strength Numbers							
18/0	Send Balance Wheel to Hamilton Material Sales Department to Have Hairspring Vibrated							

Use of Hamilton Hairspring Chart

For example, a hairspring is required for a 16 size 992 — 21 jewel Bi-Metallic Hamilton balance. Examination of the balance shows that it contains 14 regular gold screws and four gold meantime screws, a total of 18 screws. Observation of the chart indicates that hairspring No. 6 is the required strength for this balance. The order should read 16 size 992 hairspring No. 6.

REGULATION CHARTS

(1)

Effect of One Full Turn of Regulator Screw	
Size or Grade	Seconds per day
18 and 16	18 to 22
12	12 to 14
10 Grade—921 and 923	12 to 14

(2)

Effect of One Full Graduation of Index	
Size or Grade	Seconds per day
10 Grade—917	30 to 40
6/0 Old—fine Index	10 to 12
6/0 New—coarse index	35 to 45
14/0—Grades 980, 982, 980A, 980B	35 to 45
18/0—Grades 989 and 989E	40 to 50
20/0—Grade 997	50 to 60
21/0—Grades 995 and 995A	50 to 60
22/0—Grade 911	50 to 60

(3)

Effect of Meantime Screws		
Size	No. of Turns of Meantime Screws	Seconds per Hour
18-16	1 Full Turn on 4 Screws	6
18-16	½ Turn on 4 Screws	3
18-16	¼ Turn on 4 Screws	1.5
18-16	¼ Turn on 2 Screws	.75
12	1 Full Turn on 4 Screws	4
12	½ Turn on 4 Screws	2
12	¼ Turn on 4 Screws	1
12	¼ Turn on 2 Screws	.5
6/0	1 Full Turn on 4 Screws	10
6/0	½ Turn on 4 Screws	5
6/0	¼ Turn on 4 Screws	2.5
6/0	¼ Turn on 2 Screws	1.25
18/0	1 Full Turn on 4 Screws	10
18/0	½ Turn on 4 Screws	5
18/0	¼ Turn on 4 Screws	2.5
18/0	¼ Turn on 2 Screws	1.25

For watches which are not equipped with meantime screws, timing washers for Hamilton watches are available through the Hamilton Material Sales Department, or your watch material supply house.