

GG-S-764C  
February 26, 1974

SUPERSEDING

Int. Fed. Spec. GG-S-00764B(GSA-FBS)  
January 31, 1967 and  
Fed Spec. GG-S-764A  
April 22, 1964

**FEDERAL SPECIFICATION**

**STOP WATCH, LABORATORY**

This specification was approved by the Commissioner, Federal Supply Service, General Services Administration, for the use of all Federal agencies.

**1. SCOPE AND CLASSIFICATION**

**1.1 Scope.** This specification covers stop watches having a minimum of seven jewels placed according to good horological practice.

**1.2 Classification.**

**1.2.1 Types.** Stop watches covered by this specification shall be of the following types:

- Type I. Single action timers.
- Type II. Double action timers.

Type I stop watches shall be controlled by successively depressing the crown or a push-piece extending through the crown which will cause the hands to start, stop, or fly back to zero. Type II stop watches shall have two sweep hands mounted one above the other, on concentric shafts. Both sweep hands shall operate simultaneously, and be controlled as in type I stop watches. In addition, one of the sweep hands shall be further controlled by an additional push-piece placed in a convenient location. When this additional push-piece is depressed, it shall stop one of the sweep hands without interfering with the motion or progress of the other. When depressed again, the extra sweep hand shall immediately "catch-up" with the other and advance with it. There shall be no flyback operation from the use of the additional push-piece.

**1.2.2 Classes.** This specification provides for two classes of stop watches for both type I and type II as follows:

- Class 1. Adjusted for one position.
- Class 2. Adjusted for three positions.

Class 1 watches shall be adjusted for operation in the horizontal, dial-up position.  
Class 2 watches shall be adjusted for operation in the following positions:

Vertical, pendant-up; horizontal, dial-up; tilted 45°, pendant-up, dial-up.

**2. APPLICABLE DOCUMENTS**

**2.1** The following specifications and standards, of the issues in effect on date of invitation for bids, or request for proposal, form a part of this specification to the extent specified herein:

Federal Specifications:

- L-P-392 - Plastic Molding Material, Acetal, Injection and Extrusion.
- L-P-403 - Plastic Molding Material, Polytetrafluoroethylene (TFE - Fluorocarbon).
- PPP-B-636 - Boxes, Shipping, Fiberboard.
- PPP-T-360 - Time Measuring Instruments: Packaging of.

(Activities outside the Federal Government may obtain copies of Federal Specifications, Standards, and Handbooks as outlined under General Information in the Index of Federal Specifications and Standards and at the prices indicated in the Index. The Index, which includes cumulative monthly supplements as issued, is for sale on a subscription basis by the Superintendent of Documents, U. S. Government Printing Office, Washington, DC, 20402.

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(Single copies of this specification and other Federal Specifications required by activities outside the Federal Government for bidding purposes are available without charge from Business Service Centers at the General Services Administration Regional Offices in Boston, New York, Washington, DC, Atlanta, Chicago, Kansas City, MO, Fort Worth, Denver, San Francisco, Los Angeles, and Seattle, WA.

(Federal Government activities may obtain copies of Federal Specifications, Standards, and Handbooks and the Index of Federal Specifications and Standards from established distribution points in their agencies.)

#### Military Standards:

MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes.

(Copies of Military Specifications and Standards required by contractors in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

### 3. REQUIREMENTS

#### 3.1 Materials.

3.1.1 Case. The case shall be of inherently corrosion-resistant metal, fiberglass, or polyacetal resin per L-P-392, type I, class 3, (see 4.3.2), covers, bezels, crystals, and all points of separation shall be fashioned such that they can be disassembled and reassembled periodically as required for maintenance.

3.1.2 Crystal. The crystal shall be clear, uncolored, and free of bubbles, scratches, or other imperfections which are visible to an unaided eye with 20/20 vision or its equivalent.

3.1.3 Dial and hands. The dial shall be a clear white enamel on metal with arabic numerals. The value of the smallest readable graduation shall be no greater than 1/5 second. Each graduation representing a full second shall be emphasized and no graduation shall be omitted. Each watch shall be provided with a minute register, the capacity of which shall be at least 30 minutes. A third hand may be used to indicate fractions of a second.

#### 3.2 Movement.

3.2.1 Winding. All watches shall be stem wound.

3.2.2 Size. The size shall be from 18 to 20 lignes (1.599 to 1.776 inches) or approximately size 16, as determined by the diameter of the pillar plate.

3.2.3 Jeweling. All jewels shall be of natural or synthetic sapphire, ruby, or garnet (see 4.3.2).

3.2.4 Mainspring. The mainspring shall be a nickel-iron alloy containing 10 to 40 percent nickel and less than 25 percent iron (see 4.3.2).

3.2.5 Temperature variation. Stop watches shall be compensated for operation over the range of 5° to 35° C.

3.2.6 Assembly. Stop watches shall be designed in a manner to permit assembly and disassembly easily. Screws shall not be required for the positive indexing of bridges or other members.

3.2.7 Operating force. The force required on the operating mechanism to start, stop, or return the hands to zero shall not exceed 4 pounds (see 4.4.2).

3.2.8 Torque. The winding torque shall not exceed 6-inch-ounces to fully wind the mainspring. There shall be no motion or slippage of the crown when a torque of 32-inch-ounces is applied to the crown of a fully wound watch (see 4.4.1).

3.2.9 Beat. For other than five-beat watches, the beat of a watch shall be indicated on the dial or on the cover.

3.2.10 Start-stop flyback mechanism. The flyback mechanism shall be capable of withstanding 7500 crown operations so as to accomplish a complete cycle of start, stop, and flyback 2500 times (see 4.4.3).

3.2.11 Dustproofness. When tested in accordance with 4.4.4, not more than 400 cc of air per minute shall leak through the watch case.

3.2.12 Shockproofness. After testing in accordance with 4.4.7, all functions of the watch, including winding, start, stop, and flyback shall be operated and the watch shall run for a minimum of two hours. In case of any operational failures, the watch shall be considered to have failed the test.

3.2.13 Operation in magnetic fields. After exposure to a magnetic field of 60 gauss for 5 seconds, and when placed in the positions specified for the class purchased, stop watches shall suffer no change in rate in excess of 4 seconds in 6 hours (see 4.4.5).

3.2.14 Time out and resetting features. When specified (see 6.1), a type I single action timer shall be provided with a side push-piece placed in a convenient location. The time out and resetting shall be as follows:

The time out shall be controlled by a crown or push-piece extending through the crown. The resetting feature shall be controlled by a side push-piece. Successively depressing the crown or a push-piece extending through the crown shall cause the hands (sweep second and minute register) to start, stop, and start (from point where stopped, neither hand flies-back to zero). With the hands (sweep second and minute register) running, depressing the side push-piece (only one action) shall cause the hands to instantaneously fly-back to zero and automatically restart to measure the next interval of time. When the sweep second and minute register hands are stopped, depressing the side push-piece shall cause both hands to return to zero.

3.2.15 Timekeeping. When tested in accordance with 4.4.6, all watches in the sample lot shall operate within the specified tolerance.

3.3 Availability of repair parts. Watches furnished under this specification shall be of a brand or manufacture such that necessary repair parts are readily available.

3.4 Marking on Watches. Each watch furnished under this specification shall bear the inscription, "U.S. Government," across the face of the dial or engraved on the back of the case. The brand name or manufacturer's name shall also appear on the dial or be engraved on the back of the case. Any combination of these marking locations shall be acceptable.

#### 4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Unless otherwise specified, the supplier shall without any additional expense, provide his facilities and equipment, or any commercial laboratory acceptable to the Government for inspection. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure that supplies and services conform to prescribed requirements.

4.1.1 Certificate of compliance. Where certificates of compliance are submitted, the Government reserves the right to test such items to determine the validity of the certification. The certificate shall state that the watches being procured are in full compliance with the specified requirements of this specification; and that the workmanship and materials conform with recognized standards of commercial quality. The certificate of compliance shall reference the contract or purchase order and shall be signed by a responsible officer of the contractor. The certificate shall contain, adjacent to the signature, the following statement: "As the authorized representative of the contractor, the undersigned warrants and represents that all the information supplied herewith is true and accurate."

#### 4.2 Sampling.

4.2.1 External visual inspection. Sampling for external visual inspection (see 4.3.1) shall be in accordance with MIL-STD-105, Inspection Level II, Acceptable Quality Level (AQL) 4.0 percent defective.

4.2.2 Internal visual inspection. Sampling for internal visual inspection (see 4.3.2) shall be in accordance with MIL-STD-105, Inspection Level S-4, AQL 2.5 percent defective.

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4.2.3 Tests. Sampling for tests shall be in accordance with MIL-STD-105, Inspection Level S-4, AQL 1.0 percent defective. The AQL shall apply to all the tests combined that are listed in 4.4.

#### 4.3 Inspection.

4.3.1 External Visual inspection. Samples selected in accordance with 4.2.1 shall be visually inspected for, but not limited to the following:

Crystal (see 3.1.2)  
Dial (see 3.1.3)  
Hands (see 3.1.3)  
Minute Register (see 3.1.3)  
Size (see 3.2.2)  
Beat (see 3.2.9)  
Marking (see 3.4)

4.3.2 Internal Visual inspection. Samples selected in accordance with 4.2.2 shall be visually inspected for, but not limited to the design and construction of entire movement for compliance with 3.2.6. A certificate of compliance will be acceptable for the requirements stated in 3.1.1, 3.2.3 and 3.2.4.

4.4 Tests. Samples selected for tests in accordance with 4.2.3 shall be tested for the following in accordance with the stated test paragraphs:

Winding torque (see 4.4.1)  
Force to depress crown (see 4.4.2)  
Start, Stop, Flyback (see 4.4.3)  
Dustproof (see 4.4.4)  
Magnetization Test (see 4.4.5)  
Timing test (see 4.4.6)  
Shock Test (see 4.4.7)  
Accuracy Test (4.4.8)

4.4.1 Winding torque. The winding torque is to be measured by a suitable torque gage. When watch is fully wound, the maximum torque specified in 3.2.8, shall be applied without deleterious effect on the watch.

4.4.2 Force required to depress crown. A force gage may be used to determine compliance with this requirement (3.2.7).

4.4.3 Start, stop, flyback mechanism. This test may be conducted by any manual or mechanical means provided the sweep hand is permitted to advance 20 seconds before each "stop" operation (3.2.10).

4.4.4 Dustproofness. This test may be performed by any apparatus capable of impressing a pressure drop equal to one inch of water between the inside and the outside of the watchcase. Under this condition, the leakage of air through the case shall not exceed that specified. Before beginning this test, watch covers and bezels shall be removed and replaced. The rear cover, when replaced, shall go on with a positive snap (3.2.11).

4.4.5 Magnetization. Each watch in the sample shall be exposed to a magnetic field of 60 gauss for 5 seconds after which any change in rate shall not be greater than that specified (3.2.13).

4.4.6 Timing tests. Each watch in the sample shall be subjected to the following timing tests and shall not exceed the allowed tolerances specified below:

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No.	Criteria	Allowed tolerances (seconds)	
		Class 1	Class 2
1	Correction 3-hour run *	4.5	2
2	Correction for 6-hour run ** *	6	4
3	Maximum difference between the 3-hour correction and 1/2 of the 6-hour correction	1.0	.5

\*In H-DU Position.

\*\*Each watch will be subjected to the following temperature tests:

(a) Operated at 5°C. for 6 hours in the H-DU position after first being allowed to attain the test temperature.

(b) Operated at 35°C. for 6 hours in the H-DU position after first being allowed to attain the test temperature.

(c) Test for accuracy in accordance with 4.4.8 after first being allowed to attain room temperature.

All watches in class 2 shall be operated for 6-hours at room temperature, 2 hours in each of the positions specified in 1.2.2.

No.	Criteria	Tolerances (Seconds)
4	Maximum difference between corrections in the specified positions.	4

Government tests may be performed with a watch rate recorder in lieu of, or in addition to other equipment for timekeeping tests.

4.4.7 Shock. The stop watch shall show no evidence of physical damage after one uncontrolled drop, while running, from a height of 30 inches onto the end grain of a hardwood block of beech, oak or hard maple, a minimum of eight inches square. The block shall be surrounded with a soft, resilient material to protect the watch if it should bounce off the block. Immediately after the drop, the watch shall be checked for compliance with 3.2.12 and 4.4.8, without having had any parts replaced.

4.4.8 Accuracy Test. Each watch in the sample shall be checked on a watch Master Model G57 Recorder and Model 386 Hair Spring Vibrator or equipment of similar characteristics and quality. The watch must be adjustable to pass the test.--The accuracy must be within the tolerances of 4.4.6 No. 1.

4.5 Order of tests. The inspections and tests shall be performed in the sequence indicated in 4.4; however, any test may be repeated, at the option of the purchaser.

## 5. PREPARATION FOR DELIVERY

5.1 Packaging, packing and marking. Packaging, packing and marking shall be as specified for Packaging Group 2 in PPP-T-360, except that for civil agency procurements, 10 unit packages shall be intermediate packaged in a fiberboard box conforming to PPP-B-636, class domestic. Five intermediate packages ( 50 watches) shall be packed in a fiberboard box conforming to PPP-B-636, class domestic and closed in accordance with the appendix to the box specification. In addition to the markings required by the civil agency requirements of the specification each unit package shall be marked with the Federal Stock Number, nomenclature and quantity.

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## 6. NOTES.

6.1 Ordering data. Purchasers should select the preferred options permitted herein and include the following information in procurement documents:

- (a) Title, number, and date of this specification.
- (b) Type and class desired (1.2.1 and 1.2.2).
- (c) If time out and resetting features are required (3.2.14).
- (d) Levels of packaging, packing, and marking required for shipment (see section 5).
- (e) Tests in lieu of certification for (3.1.1, 3.2.3, and 3.2.4) if required.

6.2 Purchasers should note that a class 2 watch will perform to closer tolerances than a class 1 watch. The precision required should be the deciding factor in the selection of the proper class.

6.2.1 Investigation has shown that the greatest number of watch failures is due to the damage caused by shock. It is possible, at only slight additional cost, to provide against considerable shock damage. Watches covered by this specification are intended to meet the shock test as specified herein.

6.2.2 The second largest number of watch failures is found to be due to the need for cleaning. A sufficient degree of dust and dirt resistance can be obtained at slight additional cost. Watches covered by this specification are intended to be so designed that they will pass the test specified herein.

6.2.3 The third largest number of watch failures is found "to be due to the flyback" mechanism. Watches covered by this specification are designed to have a satisfactory life expectancy if, through sampling, they pass the test specified.

6.3 Purchasers are urged, when possible, to procure stop watches in a quantity such that destructive testing may be performed to the degree indicated by the size of the sample. There is no other practical manner in which satisfactory stop watch tests can be made.

6.4 Purchasers should forewarn bidders that watches will be subject to testing. Also, suppliers should be advised that a fee may be charged against the contract or order for each watch tested, if the lot fails to meet any of the requirements of this specification.

6.5 This specification does not include all types, classes, grades, sizes, etc., of stop watches which are available. It is intended to cover types and classes which are satisfactory for the majority of requirements of the Federal Government.

6.6 Jewel bearings (see 3.2.3) shall be procured in accordance with Public Law Title 41 - Public Contracts and Property Management, Chapter 1 - Federal Procurement Regulations, Part 1-1 - General, Subpart 1-1.3 General Policies, "Procurement Of Items Using Jewel Bearings".

MILITARY INTERESTS:Custodians:

Army - MU.  
Airforce - 82

Review activities:

Army - MU  
Airforce - 82

User activities:

Army - ME, WC

CIVIL AGENCY COORDINATING ACTIVITIES:

GSA-FSS  
HEW-NIH  
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