MILITARY SPECIFICATION

WATCH, POCKET, (60 SECONDS DAILY RATE), GRADE III

1. SCOPE

1.1 This specification covers a durable, rugged, water-resistant military pocket watch with good timekeeping quality, capable of extended service without repair.

1.2 Classification.- Pocket watches shall be of the following types:

Type A - Dial with dull silver luster finish and black markings, off the center second hand (Figure 1).

Type B - Dial with dull silver luster finish and black markings, sweep second hand (Figure 2).

Type C - Dial with black finish and white markings, off the center second hand (Figure 1).

Type D - Dial with black finish and white markings, sweep second hand (Figure 2).

2. APPLICABLE DOCUMENTS

2.1 The following specifications, standards, drawings and publications of the issue in effect on the date of invitation for bids form a part of this specification.

SPECIFICATIONS

Federal

TT-R-58	Radioactive Luminous Compound and Adhesives

Military

MIL-L-3918	Lubricating Oil; Instrument, Jewel Bearing, Nonspreading, Low Temperature

MIL-P-11446	Packaging of Watches, Pocket, Stop and Wrist
MIL-F-13926	Fire Control Materiel: General Specifications Governing the Manufacture and Inspection of

STANDARDS

Military

MIL-STD-105	Sampling Procedures and Tables for Inspection by Attributes
MIL-STD-129	Marking for Shipment and Storage

(Copies of specifications, standards, drawings and publications 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 Qualification.- Watches furnished under this specification shall be a product that has been tested and successfully passed the qualification tests specified herein (see 6.2).

3.2 Material.- All materials shall be of a uniform quality and free of any defects which might impair the functioning of the watch. Where a definite material is not specified it shall be in accordance with the best commercial practice and not affect the ability of the watch to meet the other requirements of this specification.

3.2.1 Luminous material.- The luminous coating applied to the numerals and hands as specified herein shall be in accordance with Specification TT-R-58, Grade 65M, using Type A adhesive.

3.3 Lubricant.- The lubricant used in the watch movement shall be in accordance with Specification MIL-L-3918.

3.4 Physical requirements

3.4.1 Movement.- The movement shall be stem wound and stem set, of a size not less than 16 nor greater than 18-1/2 (Sizes are in accordance with those established by English and American Watchmakers) and shall fit into the case snugly without interference. The winding stem shall be located at a point above the numeral "12" on the dial. Plates, bridges, train wheels, pinions and other moving parts shall be free of burrs, sharp edges, rough surfaces and defects that would be detrimental to the movement. All steel parts and screws not protected by lubricant shall be black oxide finished, blued, or rustproofed in some approved manner except those parts, the proper function of which, would be detrimentally affected.

3.4.2 Mainspring.- The mainspring shall drive the completed movement a minimum of 34 hours without rewinding. Each mainspring shall meet an accelerated life test of 1200 cycles minimum without breakage and obtain a group average of not less than 1800 cycles. Failure to meet this requirement shall be cause for rejection of watches.

3.4.3 Hairspring and balance wheel unit.- The movement shall have a temperature compensating hairspring and a nonmagnetic, solid, monometallic balance wheel. Both shall be made of materials such that the combination will not be permanently affected in the presence of a magnetic field.

3.4.4 Regulation.- A regulator is not required, however, where one is provided, it shall not be utilized to regulate the watches after initiation of qualification or production testing in accordance with this specification.

3.4.5 Setting and winding.- The crown and stem shall be constructed and assembled to provide water resistance, and operation shall be smooth without excessive torque. Continuous winding and setting operations shall not adversely affect the timekeeping and water resistant qualities of the watch.

3.4.6 Case assembly.- The case assembly shall be water resistant and component parts, together with appropriate bow and crown, shall be fabricated in accordance with the best commercial practices. The case shall have a dull gray lustre corrosion resistant finish.

3.4.7 Crystal.- The crystal shall be plastic, unbreakable, permanently clear, nonfading and transparent and shall not be adversely affected as a result of exposure to extreme storage temperatures. Design shall be such that when assembled in the bezel, it shall be water resistant.

3.4.8 Dial

3.4.8.1 The dial shall be constructed from non-ferrous metal in accordance with Figure 1 or 2 as applicable. It shall be free from burrs, rough surfaces, and sharp edges, and shall be finished as required for the type watch specified.

3.4.8.2 All markings shall be legible and shall have a baked, hard enamel paint coating. The hours shall be marked with solid figures and shall be painted with luminous material.

3.4.8.3 The minute tracks on either type dial shall be of the closed type. Each fifth minute graduation shall be heavier to designate the hour. One Type "B" and "D" watches, the closed minute track shall also serve as the second track (figure 2).

3.4.8.4 For the "off the center" second hand type the dial shall have a circular recess, minimum 0.005 inch deep to insure clearance for second hand, and shall be as large in diameter as possible without interfering with the legibility of the "5" or "7" nor blocking out any part of the minute track at the "6" o'clock position. The second hand track shall be a closed design and shall follow recessed portion of the dial shown in figure 1.

3.4.9 Hands

3.4.9.1 The hour and minute hands, shall have skeleton type features and shall be distinctly different in style and length. The hour hand shall be a heavy spade shape; the minute hand baton shape, and shall extend to at least the middle of the closed minute track but not beyond its outer circle. The interior portion of the hands shall be filled with the luminous material. Samples of these hands are shown in figure 3.

3.4.9.2 The "off the center" second hand shall be within the recessed portion. It shall be of any style capable of providing for a dot of luminous material of such a size to be visible at normal reading distances (figure 4). The place for the dot of luminous material shall be skeleton and shall be located at a point as close as possible to the end of the second hand without covering any part of the closed track. A sample of this hand is shown in figure 4.

3.4.9.3 The "sweep second" hand shall be plain tapered counter balanced type and shall have sufficient length to at least cover the closed minute track. The top surface of the sweep end shall be painted with the luminous material for a sufficient length to be visible at normal reading distances. A sample of this hand is shown in figure 4.

3.4.9.4 All hands on type A and B watches shall have a corrosion resistant black or blue finish; all hands for type C and D watches shall be nickel or rhodium plated.

3.4.9.5 The watch shall be so constructed that the hands when in place shall be essentially parallel and there will be sufficient clearance between all hands to prevent rubbing or binding.

3.4.10 Identification.- Unless otherwise specified, the manufacturers name or known trade mark shall be plainly and inconspicuously marked on the dial face in such a manner that it will not interfere with the dial numerals.

3.4.11 Workmanship.- Standards of workmanship shall be such that the watches shall meet all requirements herein and all components and subassemblies shall be in accordance with applicable workmanship requirements specified in MIL-F-13926.

3.5 Operational Requirements

3.5.1 Accuracy.- Only completely assembled watches shall be submitted. Wherein watches are sealed to provide water resistance characteristics, the complete watch less sealing may be submitted for initial accuracy tests and sealing shall be accomplished prior to the water resistance test. Daily rates shall be recorded every 24 hours for a period of 3 days in each position and the mean daily rate shall be determined therefrom. The mean daily rate shall not exceed the accuracy values for the respective temperatures specified below:

Temperature (degrees F)	Accuracy (seconds)	Position
75° ± 3° (Room temperature)	± 60	dial up & Pendant up
40° ± 2°	± 120	Pendant up
125° ± 2°	± 120	Pendant up

3.5.2 Qualification.- Watches submitted as qualified products shall meet all requirements specified herein and shall then be run for a period of nine months in the crown up position. At the conclusion of this period the watch shall meet the room temperature requirements of 3.5.1 except that plus or minus 60 seconds per day shall be changed to 180 seconds per day.

3.5.3 Magnetism.- While running, the watch shall not be adversely affected when subjected to a 10 gauss magnetic field for a period of at least 5 seconds and shall subsequently pass the final accuracy test.

3.5.4 Shock.- The watch shall show no evidence of damage affecting serviceability after a controlled drop from a height of one foot (equivalent to approximately a 4 foot free fall onto a wooden floor) one with the watch in the pendant up position and once with the watch in the dial up position as specified herein.

3.5.5 Vibration.- The watch shall show no evidence of damage affecting serviceability as a result of being vibrated in 3 mutually perpendicular planes for a period of at least 30 minutes each at an amplitude of 0.025 inch (total excursion 0.050 inch) and a frequency increasing from 0 to 30 vibrations per second and reversed in a cycle of approximately 5 minutes.

3.5.6 Storage.- The watch shall show no evidence of damage affecting serviceability when thermally stabilized at an ambient storage temperatures of minus 80°F (plus or minus 2°F) for 24 hours and plus 160°F (plus or minus 2°F) with at least 50 percent relative humidity for 24 hours.

3.5.7 Water resistance.- The watch shall show no evidence of leakage or other damage affecting serviceability when placed in a dial-up position with a soaked cloth covering the watch.

3.5.8 Final accuracy.- Watches which have met the requirements of 3.5.1 to 3.5.7, inclusive, shall again be subjected to the room temperature (75°F) accuracy requirements of 3.5.1 except that plus or minus 60 seconds shall be changed to plus or minus 90 seconds.

4. QUALITY ASSURANCE PROVISIONS

4.1 Pilot lot.- A pilot lot representing initial production, the size of which shall be determined by the contracting officer, shall be submitted to the Government inspector for acceptance inspection. The pilot lot shall be subjected to one hundred percent (100%) inspection, except for qualification (see 3.5.2), by both contractor and Government inspector in accordance with the requirement and procedures outlined herein.

4.1.1 Failure.- Should the pilot lot fail to pass the Government inspection test, all production will cease until the defective characteristics have been corrected in the process used to produce the pilot lot. When corrections have been made, a new pilot lot will be submitted for acceptance inspection. The rejected pilot lot may be corrected by the contractor and be part of the first production lot submitted for inspection after the acceptance of a pilot lot.

4.2 Sampling

4.2.1 Samples for Qualification Tests.- Ten sample watches and ten sample mainsprings (with barrel and arbor) shall be submitted for approval as qualified products in accordance with 3.1.

4.2.2 Sampling for Production Tests.- Sampling, including lot size, shall be in accordance with MIL-STD-105 and the acceptable quality levels specified herein except where special sampling is specified.

4.3 Inspection.- The contractor shall perform all inspection specified herein. The Government inspector shall ascertain prior to, during, or after final assembly, whenever most practicable, that production of components, sub-assemblies and assemblies have been subjected to inspection for conformance with the dimensional and visual requirements as well as the requirements prescribed herein.

4.3.1 Visual and dimensional

4.3.1.1 Material.- A visual inspection of component parts and assemblies shall be made to determine compliance with 3.2. Where defects or inferior quality is evident and the Government inspector deems a material analysis necessary, the contractor will be requested to submit samples or specimens to the contracting officer.

4.3.1.1.1 Luminous material.- Prior to production, the contractor will supply the government inspector with a statement of quality certifying the luminous material is in accordance with paragraph 3.2.1. All markings, numerals and hands shall be inspected for neatness, legibility and adequacy in compliance with 3.4.8 and 3.4.9.

4.3.1.1.2 Lubricants.- Prior to production, the contractor will supply the government inspector with a statement of quality certifying the lubricant is in accordance with that specified in paragraph 3.3.

4.3.2 Movement.- A visual and dimensional inspection shall be made to determine size and quality of workmanship (3.4.1 and 3.4.11). Inspection shall be made on the pilot lot (4.1) and during phases of production as deemed necessary by the Government inspector.

4.3.3 Case Assembly.- Inspection for workmanship shall be made visually for the requirements of 3.4.6.

4.3.3.1 Crystal.- The crystals shall be visually inspected before and after assembly to the bezel and after the storage temperature tests (4.4.2.9) to determine compliance with 3.4.7.

4.3.4 Dial.- The dial shall be inspected for size, markings, legibility, finish and type in accordance with the respective requirements of 3.4.8. Luminous coating shall also be inspected for adequacy of coverage and compliance with 3.2.1.

4.3.5 Hands.- The hour, minute and second hands shall be inspected for style, length, shape and finish in compliance with 3.4.9. Luminous coating shall also be inspected for adequacy of coverage and compliance with 3.2.1.

4.3.6 Identification.- All numbers and names shall be inspected for correctness, legibility and application in accordance with 3.4.10.

4.3.7 Workmanship.- Quality of workmanship in conjunction with standard practices shall be inspected at the discretion of the Government inspector during in-process and on the end item to insure the watches are continually produced in accordance with 3.4.1.1.

4.3.8 Classification of defects.- Inspection for the defects established below shall apply to each item of the applicable samples. Sampling plans shall be in accordance with Table IV-A of MIL-STD-105 and the assigned Acceptable Quality Levels (AQL's).

Major A	AQL 2.5	Req't	Test Procedure	Method of Inspection
1.	Setting	3.4.5	4.4.2.3	Functional
2.	Winding	3.4.5	4.4.2.4	Functional
3.	Dial	3.4.8	4.3.4	Visual
4.	Hands	3.4.9	4.3.5	Visual & Functional
5.	Accuracy (75°F)	3.5.1	4.4.2.5	Functional

Major B	AQL 4.0	Req't	Test Procedure	Method of Inspection
1.	Accuracy (40°F & 125°F)	3.5.1	4.4.2.5	Functional
2.	Shock	3.5.4	4.4.2.7	Functional
3.	Vibration	3.5.5	4.4.2.8	Functional
4.	Storage	3.5.6	4.4.2.9	Visual
5.	Crystal	3.4.7	4.3.3.1	Visual
6.	Water resistance	3.5.7	4.4.2.10	Visual
7.	Final accuracy	3.5.8	4.4.2.11	Functional

Minor	AQL 4.0	Req't	Test Procedure	Method of Inspection
1.	Case assembly	3.4.6	4.3.3	Visual
2.	Identification	3.4.10	4.3.6	Visual
3.	Workmanship	3.4.11	4.3.7	Visual

4.4 Test procedures

4.4.1 Qualification tests

4.4.1.1 Mainspring tests.- Mainsprings with barrels and arbors shall be tested in accordance with 4.2.1 and 4.4.2.1.

4.4.1.2 Completed watches.- Qualification tests on completed watches shall include all tests specified herein and watches shall be tested in compliance with 3.5.2.

4.4.2 Acceptance tests.- The following acceptance tests shall be made by the contractor on individual lots submitted for acceptance in accordance with 4.2.2 and 4.3.8.

4.4.2.1 Mainspring test.- One half of one percent but not less than four mainsprings produced from each run of material from each heat treatment lot used in production watches under procurement shall be subjected to the cyclic tests to determine compliance with 3.4.2. Each spring shall be assembled in barrel with arbor. Half the springs shall be stored under room conditions (75°F plus or minus 5°F) for a

period of 14 days, the other half of the springs shall be stored at 120°F (plus or minus 3°F), 100 percent relative humidity for a period of 14 days. After this storage period, each spring shall be fully wound and then permitted to unwind to simulate a 24 hour wind. The entire wind and unwind cycle shall be accomplished in approximately 60 seconds.

4.4.2.2 Hairspring and balance wheel unit.- The hairspring and balance wheel unit shall be considered acceptable for compliance with 3.4.3 if the watch is capable of meeting the requirements of 3.5.1 and 3.5.3.

4.4.2.3 Setting test.- Six settings shall be made in two hour increments at each testing temperature to insure compliance with 3.4.5 and 3.4.9.5.

4.4.2.4 Winding test.- The accuracy test specified below shall be utilized during each daily winding to determine compliance with 3.4.5 and excessive torque shall be interpreted as any additional torque that is necessary to wind watches as compared to the normal winding practice used in the trade.

4.4.2.5 Accuracy test.- Prior to the accuracy tests, watches shall be conditioned by being fully wound and shall have run a minimum of 34 hours without rewinding to determine compliance with 3.4.2. During the conditioning period the watches shall be subjected to the test temperature for at least four hours prior to the test. The watches shall be wound at the beginning of each test and each 24 hours thereafter for the duration of the tests. The watches shall be recorded every 24 hours and shall be rejected if the mean daily rate exceeds the requirements of 3.5.1.

4.4.2.5.1 Temperature tests at plus 40°F and plus 125°F shall be conducted under controlled ambient conditions and the watches may be gradually exposed to the specified temperatures prior to actual testing and subsequent thereto.

4.4.2.6 Magnetism test.- One percent of the watches under contract but not less than three watches shall be placed in a magnetic field generated by conventional laboratory methods in compliance with 3.5.3.

4.4.2.7 Shock test.- For the pendant up position, the watch shall be positioned and secured to a steel block in such a manner that the area of the rim of the case between "5" and "7" o'clock shall be in full contact with the locating surface of the steel block with pressure applied to a portion of the rim on each side of the pendant to prevent shifting at the moment of impact. For the dial up position, the watch shall be secured in such a manner that the case cover shall rest on the locating surface of the steel block, and a

ring of pressure shall be applied on the bezel to prevent shifting at the moment of impact. When the watch is properly positioned and secured, the steel block shall be dropped onto a horizontal surface of dry true hickory, grain up, which is supported by a two inch steel plate. The weight of the steel mounting block shall be 1.75 pounds plus or minus one ounce and the area of contact at the instant of impact with the hickory shall be 2-1/4 inches in diameter by 3-1/2 inches thick. During the operation of the test care should be exercised to properly guide the block (with watch) to prevent any gyration.

4.4.2.8 Vibration test.- The watch shall be vibrated in the following positions in accordance with 3.5.5 as follows:

With vibration perpendicular to dial
With vibration in plane of dial and in direction from 12 to 6
With vibration in plane of dial and in direction from 9 to 3

4.4.2.9 Storage.- In compliance with 3.5.6 subject the watches to specified temperatures as follows:

Store at minus 80°F for 24 hours
Store at room temperature for 24 hours
Store at plus 160°F for 24 hours
Store at room temperature for 24 hours

NOTE: Watches shall not be run during storage tests. Temperature changes in the watch may be gradual to avoid thermal shock.

4.4.2.10 Water resistance.- The watch shall be mounted on a metal platform between two tanks filled with water. The top of the metal platform shall be level with the water. An absorbent cloth (3.5.7) shall be used to cover the watch. The ends of the cloth shall be submerged in each tank of water so that they will act as a lamp wick to keep the cloth saturated with water for a 24 hour period. Observe the crystal and dial for appearance of water or moisture within the watch. The watches shall be inspected for compliance with 3.4.7 and3.5.7. Detection of water or moisture on dial or inside of crystal shall be cause for rejection.

4.4.2.11 Final accuracy test.- On completion of tests in 4.4.2.5.1 to 4.4.2.10 inclusive, the watches shall meet the room temperature accuracy requirements of 3.5.8.

4.4.2.12 Resubmission after rejection.- Watches rejected for failure during or after testing may after readjustment and correction of defects, be resubmitted for complete test. Watches rejected on a retest shall not be resubmitted without specific approval of the contracting agency.

5. PREPARATION FOR DELIVERY

5.1 Packaging and packing.- Military, limited military and minimum military, preservation, packaging and packing shall be in accordance with the requirements of Specification MIL-P-11446 and applicable protection levels (A, B or C).

5.2 Marking.- Marking shall be in accordance with Standard, MIL-STD-129.

6. NOTES

6.1 Ordering data.- Procurement documents shall specify the following:

a. Title, number and date of this specification.
b. Type required (see 1.2).
c. Packaging level (A, B or C), Packing level (A, B or C).
d. Special identification (3.14).

6.2 Qualification.- With respect to products requiring qualification, awards will be made only for such products as have, prior to the bid opening date, been tested and approved for inclusion in the applicable Qualified Products List whether or not such products have actually been so listed by that date. The attention of suppliers is called to this requirement, and manufacturers are urged to arrange to have the products that they propose to offer to the Federal Government tested for qualification in order that they may be eligible to be awarded contracts or orders for the products covered by this specification. Information pertaining to qualification of products covered by this specification may be obtained from the Commanding General, Frankford Arsenal, Attention of Industrial Division, Fire Control Instrument Group, Philadelphia 37, Pennsylvania.

NOTICE: When Government drawings, specifications or other data are used for any purpose other than in connection with a definitely related Government procurement operation, the United States Government thereby incurs no responsibility nor any obligation whatsoever; and the fact that the Government may have formulated, furnished, or in any way supplied the said drawings, specifications, or other data is not to be regarded by implication or otherwise as in any manner licensing the holder or any other person or corporation, or conveying any rights or permission to manufacture, use or sell any invention that may in any way be related thereto.

Custodian:

Army - Ordnance Corps

Preparing Activity

Ordnance Corps

Other interest:

Army - E

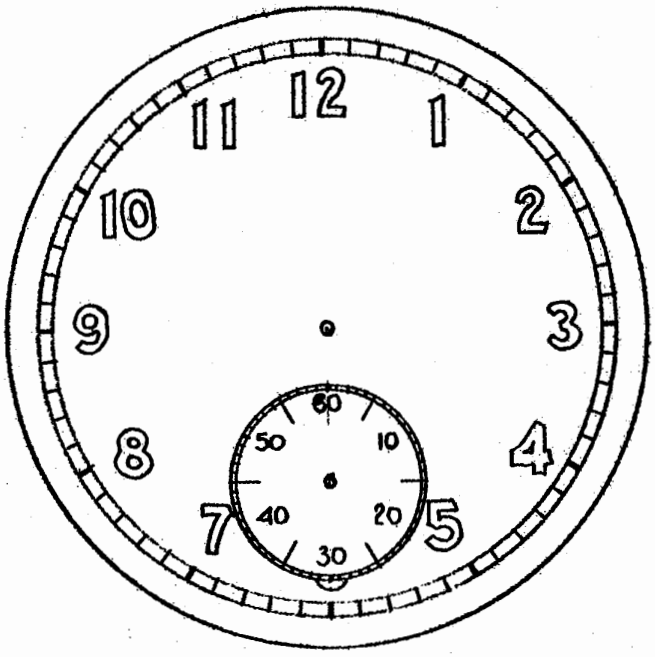

FIGURE 1

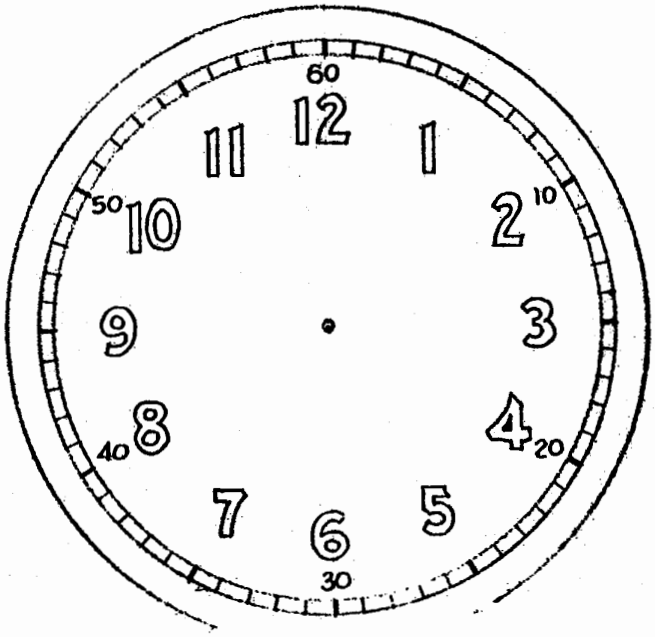

FIGURE 2

BATON SHAPE

HEAVY SPADE SHAPE

FIGURE 3

SWEEP SECOND HAND

OFF THE CENTER
SECOND HAND

FIGURE 4