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38 Special + P Police Ammunition

By: PROMAXIS Systems and
the Royal Canadian Mounted Police

TECHNICAL MEMORANDUM

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SUMMARY

This standard establishes the performance criteria and defines the sampling plan and procedures for inspection by attributes for 38 Special Calibre +P police ammunition. Nine types of 38 Special Calibre +P ammunition are covered by this standard and include jacketed hollow point(JHP), jacketed soft point(JSP), semi jacketed hollow point(SJHP), semi wadcutter(SWC), semi wadcutter hollow point(SWCHP) and round nose lead(RNL).

This document was drafted by Mr. David Patrick of PROMAXIS systems inc. and Mr. Denis Renaud, Civilian Member of the R.C.M. Police Ordnance Quality Assurance Section.

Much time and effort were spent in compiling this document. The Canadian Police Research Centre sincerely appreciates the dedication of both individuals, and the support provided by both organizations.

SOMMAIRE

La présente norme contient les critères de performance et définit les modalités et le plan d'échantillonnage relatifs à l'inspection qualitative des cartouches de calibre .38 spécial +P. Elle porte sur neuf types de cartouches .38 spécial +P dont celles à balle blindée à pointe creuse, à balle blindée à pointe douce, à balle semi-blindée à pointe creuse, à balle tronconique, à balle tronconique à pointe creuse et à balle ogivale en plomb.

Le présent document a été rédigé par M. David Patrick de PROMAXIS systems inc. et M. Denis Renaud, membre civil de la Section du contrôle de la qualité de l'armement de la GRC.

Il a fallu beaucoup de temps et de travail pour réaliser ce document. Le Centre canadien de recherches policières apprécie sincèrement le dévouement des deux personnes mentionnées ci-dessus de même que la contribution apportée par les deux organismes.

38 SPECIAL CALIBRE + P POLICE AMMUNITION

1. SCOPE

- 1.1 This standard establishes the performance criteria and defines the sampling plan and procedures for inspection by attributes for 38 Special Calibre + P police ammunition.
- 1.2 Extent of Coverage -- Nine types of 38 Special Calibre + P ammunition are covered by this standard and include jacketed hollow point (JHP), jacketed soft point (JSP), semi jacketed hollow point (SJHP), semi wadcutter (SWC), semi wadcutter hollow point (SWCHP) and round nose lead (RNL).
- 1.3 The testing and evaluation of a product against this standard may require the use of materials and/or equipment that could be hazardous. This document does not purport to address all the safety aspects associated with its use. Anyone using this standard has the responsibility to consult the appropriate authorities and to establish appropriate health and safety practices in conjunction with any existing applicable regulatory requirements prior to its use.

2. APPLICABLE PUBLICATIONS

The following publications are applicable to this standard.

- 2.1.1 U.S. Department of Defense
MIL-STD-105E Sampling Procedures and Tables for Inspection By Attributes.
- 2.1.2 American National Standards Institute (ANSI)
ANSI/SAAMI Z299.3 -- Voluntary Industry Performance Standards for Pressure and Velocity of Centerfire Pistol and Revolver Ammunition for the Use of Commercial Manufacturers.
Sporting Arms and Ammunition Manufacturers Institute (SAAMI).
- 2.2 Reference to the above publications is to the latest issue unless otherwise specified by the authority applying this standard. The sources for these publications are shown in the NOTES section.

3. TERMINOLOGY

- 3.1 **Acceptable Quality Level (AQL)** -- Maximum percent defective (or the maximum number of defects per hundred units) that, for purpose of sampling investigation, is considered satisfactory as a process average.
- 3.2 **Critical Defect** -- In accordance with (iaw) MIL-STD-105E or any functional defect of a cartridge which is likely to result in damage to a firearm. Any loading or propellant powder defect which may result in a bullet lodging in the bore of a firearm.
- 3.3 **Critical Defective** -- IAW MIL-STD-105E or one, or more critical defects and may also include major and or minor defects.
- 3.4 **Defect** -- Any non-conformance of the unit of product with specified requirements.
- 3.5 **Defective** -- A unit of product that contains one or more defects.
- 3.6 **Extreme Variation** -- Extreme spread between the highest and lowest measured value.
- 3.7 **Inspection** -- The process of measuring, examining, testing or otherwise comparing the unit of product with the requirements.
- 3.8 **Inspection by Attributes** -- Inspection whereby either the unit of product is classified simply as defective or non-defective, or the number of defects in the unit of product is counted, with respect to a given requirement or set of requirements.
- 3.9 **Inspection Level** -- Determines the relationship between the lot size and sample size.
- 3.10 **Instrumental Velocity** -- The velocity of a projectile, or a shot charge, that is recorded by suitable instrumentation located a predetermined distance from the muzzle of a test barrel. This distance is normally 4.57 metres (15 ft) for metallic cartridges.
- 3.11 **Lot** -- Means "inspection lot" i.e. the collection of units of product from which a sample is to be drawn and inspected to determine conformance with the acceptability criteria, and may differ from a collection of units designated as a lot for other purposes (eg. production etc.).
- 3.12 **Lot Size** -- The number of units of product in an inspection lot.

- 3.13 **Major Defect** -- IAW MIL-STD-105E or a functional, visual or dimensional defect other than critical that is likely to result in failure, or to reduce the usability of the unit of product for its intended purpose, such as misfires, hard extraction.
- 3.14 **Major Defective** -- IAW MIL-STD-105E or one or more major defects and may also include minor defects but not critical defect.
- 3.15 **Maximum Average** -- Maximum limiting value for the average calculated.
- 3.16 **Maximum Standard Deviation** -- Maximum limiting value of the standard deviation.
- 3.17 **Minimum Average** -- Minimum value of the average.
- 3.18 **Minor Defect** -- IAW MIL-STD-105E or a defect that is not likely to reduce materially the usability of the unit or product for its intended purpose, or is a departure from established standards having little bearing on the effective use or operation of the unit.
- 3.19 **Minor Defective** -- IAW MIL-STD-105E or, one or more minor defects but no critical nor major defect.
- 3.20 **Precision** -- A measure of the ability of bullets to group upon firing in the same location.
- 3.21 **Process Average** -- The average percent defective or average number of defects per hundred units (whichever is applicable) of product submitted by the supplier for original inspection. Original inspection is the first inspection of a particular quantity of product as distinguished from the inspection of product that has been resubmitted after prior rejection.
- 3.22 **Sample** -- One or more units of product drawn from a lot, the units of sample being selected at random without regard to their quality.
- 3.23 **Sampling Plan** -- Indicates the number of units of product from each lot that are to be inspected (sample size) and the criteria for determining the acceptability of the lot (acceptance and rejection numbers).
- 3.24 **Sample Size** -- The number of units of product in the sample.
- 3.25 **Unit of Product** -- The thing inspected in order to determine its classification as defective or non-defective, or to count the number of defects. It may be a single article, a pair, a set, a length, an area, an operation, a volume, a compound of attend product, or the end product itself.

4. CLASSIFICATION

4.1 Ammunition shall be classified according to bullet weight and description.

<u>Description</u>	<u>Bullet Weight(grs)</u>	<u>gms</u>
Jacketed Hollow Point (JHP)	110	7.128
Jacketed Soft Point (JSP)	125	8.100
Jacketed Hollow Point (JHP)	125	8.100
Semi Jacketed Hollow Point (SJHP)	125	8.100
Jacketed Hollow Point (JHP)	158	10.238
Semi Wadcutter (SWC)	158	10.238
Semi Wadcutter Hollow Point (SWCHP)	158	10.238
Lead Round Nose (RNL)	158	10.238
Jacketed Soft Point (JSP)	158	10.238

5. GENERAL REQUIREMENTS

- 5.1 Submission of Product** -- The lot size shall consist of the ammunition produced on one machine's continuous run which is not to exceed five consecutive production days and/or 250,000 rounds.
- 5.2 Lot Formation** -- the product shall be assembled into identifiable lots for inspection and identification. The formation of the lot(s) and the manner in which each lot is to be presented and identified by the supplier shall be designated or approved by the responsible authority.
- 5.3 Acceptable Quality Level (AQL)** -- The AQL for a critical defect shall be 0.00, for a major defect 0.040 and 1.00 for a minor defect for all types of ammunition, unless otherwise specified.

NOTE:

(1) The designation of an AQL shall not imply that the supplier has the right to supply knowingly any defective unit of product.

- 5.4 Acceptance** -- The acceptability of a lot for visual, gauging and firing defects shall be based on the use of a double sampling plan.
- 5.5 Sampling Plan** -- The U.S. MIL-STD-105E shall be used to establish the double sampling plan and procedures for inspection by attributes.
 - 5.5.1 MIL-STD 105E, Table 1** -- Shall be used to find the applicable code letter (sample sizes are designated by code letters) for the particular lot and the prescribed inspection level, Level III.
 - 5.5.2** The AQL and the sample size code letter shall be used to obtain the sampling plan from Table III-A Double Sampling Plans for Normal Inspection in MIL-STD-105E. When no sampling plan is available for a given combination of AQL and code letter, the table directs the user to a different letter. The sample size to be used is given by the new code letter, not by the original letter.
- 5.6 Classification of Defects** -- Any non-conformance of the unit of product units specified requirements shall be classified according to seriousness into one or more of the following defect classes: critical defect, major defect, or minor defects as defined in MIL-STD-105E.

6. DETAILED REQUIREMENTS

6.1 Instrumental Velocity

6.1.1 When tested iaw ANSI/SAAMI-Z299.3, Section II and Para 8.1, the ammunition shall meet requirements for the instrumental velocity contained therein.

6.2 Chamber Pressure

6.2.1 When tested iaw ANSI/SAAMI-Z299.3 Section II and Para 8.2, the ammunition shall meet the requirements for chamber pressure contained therein

6.3 Precision of Ammunition

6.3.1 When tested iaw the purchasing agency's Purchase Description and/or par. 8.3 the ammunition shall not exceed the maximum average group size listed in Table 2.

7. PREPARATION FOR DELIVERY

- 7.1 Packaging, Packing, Labelling and Marking -- Unless otherwise specified (par. 9.1), packaging, packing, labelling and marking shall be iaw Transport Canada Transport of Dangerous Goods Regulations. In addition, each packing box of ammunition and each shipping case containing the packing boxes shall be marked/labelled by the manufacturer in such a manner which will permit the purchaser or their agent to determine/identify the lot number.

8. TESTING

- 8.1 The complete sample shall be visually inspected for defects such as cracked cases, inverted primers or any other defect visible to the unaided eye.
- 8.2 Instrumental Velocity and Chamber Pressure shall be tested in a SAAMI standard solid test barrel iaw ANSI/SAAMI Z299.3 Section II. For the test, select at random ten (10) rounds from each sample.
- 8.2.1 Record instrumental velocity and calculate the average velocity, extreme variation, and the standard deviation. If the results do not meet the requirements of Table 1, re-test in accordance with Para 8.2.3.
- 8.2.2 Record Chamber Pressures and calculate the average pressure, extreme variation and standard deviation. If the results do not meet the requirements of Table 2, re-test in accordance with Para 8.2.3.
- 8.2.3 Retest -- Re-test by selecting at random from the sample, twenty (20) rounds and test iaw Para 8.1. The test results of the first and second tests shall **NOT** be accumulated. If the results do not meet the velocity requirements of Table 1 or the chamber pressure requirements of Table 2, the lot shall be rejected.

NOTE:

There is no recognized relationship between the copper crusher and piezo transducer methods for the measurement of chamber pressure. In Canada, the RCMP at present, use the copper crusher method.

- 8.3 Precision of Ammunition -- Test using a clean, dry standard accuracy test barrel. Conduct the test by firing five, five-shot targets at 25 Yards (22.86 M). Measure the extreme spread for each group. Calculate the average group size. If the results do not meet the requirements of Table 2, re-test iaw Para. 8.3.2.
- 8.3.1 If a re-test is required, thoroughly clean the weapon.
- 8.3.2 Repeat the original test by firing five, five shot targets at 25 yds. The results of the two tests shall be accumulated. If the results of the two tests do not meet the requirements of Table 2, the lot shall be rejected.

8.4 Optional Test.

8.4.1 Using a Service Firearm as specified by the purchasing agency mounted in a Ransom Rest or equivalent, test as specified in Para 8.2 and sub-paras above.

NOTE:

Due to the wide variety of firearms available for police use. it is recommended that the precision tests be carried out in a weapon with a barrel of no less than four (4) inches in length.

8.5 Function and Casualty

8.5.1 After all of the above tests have been completed, the cartridges remaining in the sample shall be fired for Function and Casualty.

8.5.2 All firing defects shall be classified iaw the AQL listed below and reported.

a.	Critical	0.00
b.	Major	0.040
c.	Minor	1.00

8.6 Reporting - Report the type of defect(s) and defective product where applicable and as specified. Calculate and report the percent defect and percent defective as follows.

8.6.1 Percent Defect = $\frac{\text{number of defects}}{\text{number of units inspected}} \times 100$

where one or more defects is possible in any unit of product.

8.6.2 Percent defective = $\frac{\text{number of defective units}}{\text{number of units inspected}} \times 100$

9. NOTES

9.1 Options - The following options must be specified by the user in the application of this standard:

- a. Classification of ammunition as listed in Para. 4.1; and,
- b. Service firearm for precision.

9.2 Sources of Applicable Publications

9.2.1 The publications referred to in Paras 2.1.1 and 2.1.2 may be obtained in Canada from the Standards Council of Canada, 1200-45 O'Connor Street, Ottawa, Ontario, K1P 6N7: or,

9.2.2 The publication referred to in par. 2.1.1 may be obtained from the U.S. Department of Naval Publications and Forms Centre, 5801 Talbot Avenue, Philadelphia, PA 19120, U.S.A.

9.2.3 The publication referred to in par. 2.1.2 may be obtained from the American National Standards Institute, (ANSI), 1430 Broadway, New York, N.Y., 10018, U.S.A.

TABLE 1

INSTRUMENTAL VELOCITY

<u>Ammunition Type</u>	<u>Bullet Minimum Weight</u>	<u>Average Maximum Velocity</u>	<u>Extreme Variation</u>	<u>Standard Deviation</u>
JHP (110 gr)	7.128 gm (1180 f/s)	359.664 m/s (90 f/s)	27.43 m/s (15 f/s)	4.57 m/s
JSP JHP SJHP JHP	8.100 gm (125 gr)	333.756 m/s (1095 f/s)	27.43 m/s (90 f/s)	4.57 m/s (15 f/s)
SWC SWCHP RNL JSP	10.238 gm (158 gr)	312.42 m/s (1025 f/s)	27.43 m/s (90 f/s)	4.57 m/s (15 f/s)

Testing to be conducted iaw ANSI/SAAMI Z299.3.

TABLE 2

CHAMBER PRESSURE AND PRECISION REQUIREMENTS

<u>Ammunition Type</u>	<u>Bullet Weight</u>	<u>CHAMBER PRESSURES</u>			<u>PRECISION</u>	
		<u>Maximum Product Average</u>	<u>Maximum Permissible Individual</u>	<u>Maximum Extreme Variation</u>	<u>Cumulative Average Maximum Group Size</u>	
JHP SJHP	7.128 gm (110 gr)	21,900 CUP 22,500 PSI	25,300 CUP 26,000 PSI	6,200 CUP 7,000 PSI	5.1 cm (2.0 in.)	
JSP JHP SJHP	8.100 gm (125 gr)	21,900 CUP 22,500 PSI	25,300 CUP 26,000 PSI	6,200 CUP 7,000 PSI	5.1 cm (2.0 in.)	
JHP SWC SWCHP RNL JSP	10.238 gm (158 gr)	21,900 CUP 22,500 PSI	25,300 CUP 26,000 PSI	6,200 CUP 7,000 PSI	5.1 cm (2.0 in.)	

Testing to be conducted using ANSI/SAAMI Z299.3.