



Royal Canadian Mounted Police  
Gendarmerie royale du Canada

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## Purchase Description Boots, Tactical, Safety

This document has 15 pages including the drawings.

This document was created in English.

The document is available in English and French.

English/Anglais

Français/French

## Modifications

| Date       | Para. No. | Description              |
|------------|-----------|--------------------------|
| 2021-10-28 |           | New purchase description |
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## 1 Document Scope

- 1.1 This purchase description governs the manufacture and inspection of the Boots, Tactical, Safety. The specific items covered under this specification with stock numbers are as follows:
- i. 2760 – Boots, Tactical, Safety;
  - ii. 2761-000 – Boots, Tactical, Safety, Non-stock
- 1.2 This Purchase Description, or other information issued in connection therewith, may only be used for specific enquiries, solicitations, or orders placed on behalf of the Royal Canadian Mounted Police.
- 1.3 This Purchase Description supersedes all previous Purchase Descriptions for the RCMP Boots, Tactical, Safety.
- 1.4 This Specification has been translated into French from this original English language document.

## 2 Applicable Documents

- 2.1 The following publications are applicable to this Specification.
- 2.2 **Shoe and Allied Trades Research Association (SATRA)**
- |       |   |
|-------|---|
| TM34  | Resistance to Water Penetration – Maeser Test |
| TM137 | Tensile Properties of Rubber                  |
| TM144 | Friction (Slip Resistance) of Footwear        |
| TM194 | Longitudinal Stiffness of Footwear            |
| TM205 | Hardness of Rubber – Durometer Method         |
| TM223 | Floor marking by soling or top pieces         |
| TM256 | Torsional Stiffness of Footwear               |
- 2.3 **American Society for Testing and Materials (ASTM)**
- |                  |  |
|------------------|--|
| D98-15           | Standard Specification for Calcium Chloride  |
| D412-15A         | Vulcanized Rubber and Thermoplastic Elastomers<br>Tension                                |
| D624-00 (2012)   | Tear Strength of Conventional Vulcanized Rubber  |
| D792-13          | Density and Specific Gravity (Relative Density) of Plastics by<br>Displacement           |
| D1052-09 (2014)  | Measuring Rubber Deterioration—Cut Growth Using Ross<br>Flexing Apparatus                |
| D1813-13 (R2017) | Measuring Thickness of Leather Specimens   |
| D2210-13         | Grain Crack and Extension of Leather by the Mullen Test                                  |
| D2240-15         | Rubber Property—Durometer Hardness   |
| D2099-14         | Dynamic Water Resistance of Shoe Upper Leather by the<br>Maeser Water Penetration Tester |
| D1630-06 (R2012) | Rubber Property – Abrasion Resistance  |
| D3495-10 (2015)  | Hexane Extraction of Leather   |
| D4705-13         | Stitch Tear Strength of Leather, Double Hole   |

- |     |   |  |
|-----|---|--|
|     | D5034-09 (R2013)  | Standard Test Method for Breaking Strength and Elongation of Textile Fabrics   |
| 2.4 | <b>American Association of Textile Chemists and Colorists (AATCC)</b><br>AATCC EP 9-2011                                      | Visual Assessment of Color Difference of Textiles  |
| 2.5 | <b>The Canadian Standards Association (CSA)</b><br>CSA Z195-14  | Protective Footwear  |
| 2.6 | <b>ISO, International Standards Organization (ISO)</b><br>ISO 34-1:2015<br>ISO 868:2003<br>ISO 9407:1991<br>EN ISO 20344:2011 | Rubber, vulcanized or thermoplastic — Determination of tear strength<br>Plastics and ebonite — Determination of indentation hardness by means of a durometer (Shore hardness)<br>Shoe sizes – Mondopoint system of sizing and marking<br>Personal Protective Equipment – Test methods for footwear |
| 2.7 | <b>Group CTT</b><br>Temperature Rating  |  |

### 3 Definitions

- 3.1 In specifying the different requirements, three levels of measurement must be used. They are defined as follows:
- 3.1.1 **Mandatory Requirements** – A criterion that must be met to be in accordance with the technical requirement. The words “must” and “mandatory” indicate a mandatory requirement.
- 3.1.2 **Preferred Criterion** – A criterion with significant operational value. The words “should” or “preferred” indicate a preference. A preferred criterion is not mandatory.
- 3.1.3 **Optional Criterion** – A criterion that is permissive or discretionary. The word “may” indicates an option. An optional criterion is not mandatory.

### 4 Terminology

- 4.1 **Terminology** - For the purposes of this Purchase Description, the following definitions apply:
- 4.1.1 **Bottoming Components** – Component group consisting of the outsole, heel and midsole.
- 4.1.2 **Cleat(s)** – The protruding part(s) of the outer surface of the sole also known as the lugs.
- 4.1.3 **Direct Attached Construction** – Direct attach construction fuses the sole to the fibres of the upper to produce a tough watertight bond.
- 4.1.4 **EVA** – Ethylene-vinyl Acetate: A common shock-absorbing foam.

- 4.1.5 **Full Grain Leather** – Hide or skin tanned to be impudrescible, having conserved the totality of its grain on the surface.
- 4.1.6 **Functionality** – A purpose that something is designed or expected to fulfill.
- 4.1.7 **Insert** – A footbed normally made of a foam product with leather or fabric cover shaped to cover the entire insole, which can be inserted between the foot and the insole board. May also be known as a sockliner.
- 4.1.8 **Lining** – Material covering the inner surface of the upper.
- 4.1.9 **Lug(s)** – The protruding part(s) of the outer surface of the sole also known as the cleats.
- 4.1.10 **Metatarsal Guard** – Safety component that provides protection to the complete dorsum (top side) of the foot.
- 4.1.11 **Midsole** – Material that provides cushioning, support and protection to the foot, cut to the shape of the outsole and used between the insole board and the outsole.
- 4.1.12 **Outsole** – The outsole is the part of the sole in contact with the ground.
- 4.1.13 **PVC** – Polyvinyl chloride: A synthetic thermoplastic material made by polymerizing vinyl chloride.
- 4.1.14 **PU** – Polyurethane: A high density and resilient organic polymer often used in midsoles.
- 4.1.15 **Quarter** – The quarter is the part of the upper that covers the sides and back of the foot behind the vamp.
- 4.1.16 **Serviceability** – The conditions under which the product is still considered useful.
- 4.1.17 **Shank** – The part of the sole of the footwear between the heel and the ball or tread. Also, the material (for example but not limited to, steel, wood, polymer, composite material, etc.) piece inserted in the arch of the boot for reinforcement.
- 4.1.18 **Sole Plate** – Safety component that provides protection to the soles of the feet from puncture hazards.
- 4.1.19 **Toecap** – Safety component that provides protection to the toes from drop and crush hazards.
- 4.1.20 **TPU** – Thermoplastic Polyurethane: A class of polyurethane plastics often used on the bottom of dual-density outsoles.
- 4.1.21 **Upper** – Parts of the boot that are above the bottoming components.
- 4.1.22 **Vamp** - The part of the upper that covers from the front of the foot, back to the quarter.

## 5 Requirements

### 5.1 General

- 5.1.1 The following statements are applicable to all aspects of the Boots, Tactical, Safety.
- 5.1.2 **Intended Use** - The Boots, Tactical, Safety are intended for use by all members of the Royal Canadian Mounted Police (RCMP) to provide enhanced foot protection while performing specialized policing services.
- 5.1.3 **Workmanship** – The article or material covered by this Purchase Description must be free from material and manufacturing defects that may affect its appearance, functionality or serviceability. The integrity and performance of all materials and components must remain for the expected life of the boot.
- 5.1.4 **Durability** – The Boots, Tactical, Safety must be expected to perform with consistent exposure to these environmental conditions without degradation for a 260 field day life expectancy.
- 5.1.5 **Material Features** – The Boots, Tactical, Safety design must incorporate fabrics and materials to ensure the foot and lower leg (to the collar of the boot) remains dry from exterior sources, wicks perspiration, and enables the foot to breathe naturally when worn for twelve (12) hours per day.
- 5.1.6 **Overall Performance** – In order to optimize the overall boot performance for the given environment, not specifically address a single measure or performance (i.e. weight, comfort, water absorption, etc.), materials should be selected with the specific component information provided in paragraphs 5.2 as well as in the whole boot requirements outlined in Table III.
- 5.1.7 **Environmental Requirements** – The Boots, Tactical, Safety must withstand temperatures of -10°C to +30°C and humidity ranges of 45% to 100%. Boots must be expected to perform with consistent exposure to the above conditions without damage.
- 5.1.8 **Design Features** – The Boots, Tactical, Safety must have the following design features.
- a) Uppers - The uppers must be made with black leather. Uppers with textile inserts will not meet the requirements.
  - b) Gusset and Tongue - The gusset and tongue may be made with black leather or black synthetic leather.
  - c) Colour - The colour requirements for the upper material(s), outsole and midsole, removable inserts, and fittings (lacing system, laces, etc.) of the Boots, Tactical, Safety must be a commercial black. All materials and finishes must be in low conspicuity colours. The colour of the boots must be consistent from material lot to material lot as well as finished boot lots.

- d) **Weight** - The overall average weight of a pair of boots must be no more than 1000 grams per boot, including laces and removable inserts. The weighing must be done on a left and a right boot of one pair of size 9.0 Regular and the result averaged. Individually, the right and the left boot must not vary in weight by more than 50 grams.
- e) **Closure system** - The boots must have a lace-up closure lacing system with eyelets as specified in para. 5.2.6.1.
- f) **Protection** - The boots must have features that protect from drop, crush, puncture, and electric-shock hazards. The protective features must meet CSA Z195-14 (R2019), Grade 1 standards.
- g) **Sole Attachment** - The boots must have a PU midsole that directly attaches the outsole to the upper by injection moulding process. The bond strength of the sole to the upper must meet performance requirement 4 outlined in Table III.
- h) **Outsole** - The rubber outsole must be non-conducting and must have excellent slip resistance on frosted ice and wet ice surfaces.
- i) **Height** - The finished height of the boot must be 22 cm  $\pm$  1.5 cm measured from the bottom of the heel (on a level surface) to the highest point of the collar on a pair of US size 9.0 boots. Height must be graded proportionately to the size.
- j) **Break-in wear**- After a break-in period, the boot must produce minimal noise when worn. During the break-in period, discomfort to users must preclude the development of long-lasting injuries that would require the user to seek medical care. The break-in period should be a maximum of eight days (sixty-four hours) of wear.
- k) **Accessories** - Each pair of boots must be supplied with two (2) pairs of the specified laces as specified in para. 5.2.6.4 and two (2) pairs of removable cushion inserts as specified in para. 5.2.2.6. One pair of laces must be laced through the two bottom eyelets of the finished boots and loosely tied. One pair of removable inserts must be inserted into the finished boot. The second pair of laces must be inserted in a plastic bag along with the second pair of removable inserts and care instructions in each assembled box.
- l) **Thermal Protection** - The boot must have a thermal protection rating between 0°C and -10°C. The thermal protection must meet performance requirement '1' outlined in Table III.

## 5.2 Components

5.2.1 **Leather** – The leather used for the Boots, Tactical, Safety must have the following characteristics:

- a) The leather must be full grain only, chrome tanned, fat-liquored cattle hide sides treated to be resistant to both water absorption and water penetration. The temper of the leather must be round to the hand with sufficient stand-up to prevent collapse of the boot upper. The tongue and collar leather must be dry milled to obtain an appropriate softness.

- b) The leather must be free of imperfections such as flesh cuts, heavy vein marks, grub damage or excessive fat wrinkles. Looseness or pipiness is not acceptable. The thickness of leather in the upper must be 1.8 mm to 2.0 mm.
- c) A slight finish or leveling coat may be applied to the grain side to make the surface colour uniform providing that the specified water penetration rate requirements are maintained. The finish must be one that is easily maintained by the user and can be restored by non-emulsifying oils (such as a silicone-based product).
- d) The leather must be treated with an active fungicide.
- e) The leather must meet the chemical and physical properties outlined in Table I.

## 5.2.2 Lining Materials

- 5.2.2.1 **General** – The boot lining must incorporate materials that provide moisture management, breathability, and padding to the foot and ankle. The liner materials must aid in preventing skin maceration, irritation, and blisters on the foot. All joints and seams must be finished using a method that has high seam strength, however does not cause any discomfort to the user. Lining materials must meet the requirement in Table II.
- 5.2.2.2 **Microbial Resistance** – The materials used in the lining as well as the materials used in the inserts must have anti-bacterial and anti-fungal protective properties that last throughout the life span of the components. The anti-microbial product(s) must be acceptable for use on textile substrates. The product(s) or active ingredient(s) used to impart the anti-microbial finish must have a Pest Control Product Registration Number that has been issued by the Pest Management Regulatory Agency of Health Canada or be an Environmental Protection Agency (EPA)-registered antimicrobial.
- 5.2.2.3 **Counters** – The counters must correspond to the shape and design of the heel portion of the last and must be supplied in a sufficient number of sizes to provide a well-fitted counter for the complete boot size range. The user must be protected from abrasion at the heel. The finished counters must be properly moulded to fit the back of the boot to ensure comfort when worn.
- 5.2.2.4 **Ankle Pad** – If an ankle pad is used, it must be treated with an anti-microbial additive applicable for use on the material that prevents and inhibits mould and mildew. Ankle pads must correspond to the shape and design of the heel portion of the last. If used, a left and right ankle pad must be used and must be supplied in a size range appropriate for the available sizes. The ankle pad must be assembled to the counter with adhesives that must not disassemble or delaminate over time.
- 5.2.2.5 **Shank** – The shank must be supplied in a sufficient number of sizes to cover the available boot size range and must be curved to fit the bottom of the last. The materials and stiffness must meet performance requirements '2' and '3' outlined in Table III. Metal shanks will not meet the requirement.
- 5.2.2.6 **Inserts (Sockliner)** – The inserts must be made of low density polyurethane foam with a density range of 0.20 g/cm<sup>3</sup> to 0.30 g/cm<sup>3</sup> when tested to ASTM D792-13. The inserts must



be removable, washable, fast drying, and breathable with a durable anti-bacterial/anti-fungal, anti-odour treatment that is non-hazardous to the user. EVA sockliners will not meet the requirements. Inserts must be permanently formed to cup around the foot at the heel and provide support through the arch area.

5.2.2.7 **Thread** – The thread used in the construction of the boots must be non-wicking and compatible with all components and must not break or wear during the durability period outlined in para. 5.1.4.

### 5.2.3 **Bottoming Components**

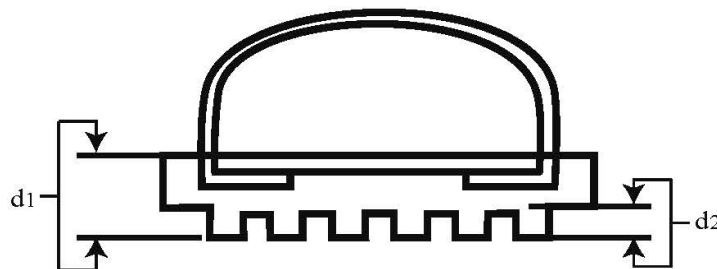
5.2.3.1 **General** – The materials and design of the bottoming construction must provide adequate comfort and structure to minimize fatigue of personnel standing for prolonged periods.

5.2.3.2 **Soles** – The soles must be made using an outsole in a rubber compound, and a midsole in a polyurethane compound. The use of PVC, TPU or EVA compounds is not acceptable.

5.2.3.3 **Outsoles** – The outsoles must be made using rubber with a density and a tread pattern that provides traction and stability to the user on all surfaces under outdoor ambient temperature conditions outlined in para. 5.1.7 including frosted ice surfaces, snow (with soft and hard packed surfaces) and slush. The tread pattern must meet performance requirements '5' and '6' outlined in Table III. When outsole material slabs are tested, they must meet the chemical and physical properties in accordance with Table V.

5.2.3.4 **Midsoles** – When the midsole slab materials are tested they must meet the requirements of Table IV.

5.2.3.5 **Outsole and Lug Depth** – When measured in accordance with Figure 1, the total depth of the outsole including lug depth ( $d_1$ ) at any one point must be no less than 11 mm and no more than 25 mm. The lug depth or cleat height ( $d_2$ ) for any part of the sole must be a minimum of 4.0 mm and maximum of 6.0 mm.



**Figure 1 – Outsole and Lug Depth**

## 5.2.4 Protective Components

5.2.4.1 **Toecaps** – The protective toecaps must be an integrated and permanent part of the boot, constructed of non-conducting material. The toecaps must be CSA Z195-14 (R2019) Grade 1 certified to provide drop and crush protection to the toes. There must be conspicuous marking and labelling on the boot identifying CSA Z195-14 (R2019) protective toecap certification.

5.2.4.2 **Sole Plates** - The protective sole plates must be an integrated and permanent part of the boot, constructed of non-conducting material. The sole plates must be CSA Z195-14 (R2019) Grade 1 certified to provide puncture protection to the complete sole of the foot. There must be conspicuous marking and labelling on the boot identifying CSA Z195-14 (R2019) sole puncture protection certification.

5.2.4.3 **Metatarsal Guards** – The protective metatarsal guards must be an integrated part of the boot, composed of a leather-wrapped hard-shell, shock absorbent, non-conducting material and permanently attached to the outside of the boot. The metatarsal guards must be CSA Z195-14 (R2019) certified to provide drop and crush protection to the complete dorsum (top) of the foot. There must be conspicuous marking and labelling on the boot identifying CSA Z195-14 (R2019) metatarsal protection certification.

5.2.4.4 **Overall**– The boots must meet the requirements for electric-shock-resistant footwear as specified in paragraph 5.4 of CSA Z195-14 (R:2019). There must be conspicuous marking and labelling on the boot identifying CSA Z195-14 (R2019) electric-shock-resistant certification.

## 5.2.5 Mandatory Design Requirements

5.2.5.1 The design of the Boots, Tactical, Safety must allow for adjustment to secure the user's foot in place and provide support to the instep, heel, skin, Achilles tendon and ankle joint while not interfering with the range of motion required to complete policing tasks. The design of the boots must not create any pressure points on the top or side of the foot.

5.2.5.2 **Tongue** – The tongue must be designed to lay flat so that no pressure points result on the top or side of the foot when the boot is in use. The shape of the tongue and the design of the foot entrance/opening must be large enough to avoid tearing of the materials and ensure easy donning and doffing. To help prevent the ingress of any liquids, the tongue must be sewn to the upper between the second-from-top and third-from-top eyelets. The tongue may be constructed of synthetic leather.

5.2.5.3 **Pull tab** – To facilitate donning, each boot must have a looped pull tab at the back of the upper. The pull tab loop must be large enough for a finger to fit through.

## 5.2.6 Closure System

5.2.6.1 The closure system must not have open hooks or protrusions that could snag. The lace-on closure lacing system must have 3 to 4 eyelets in each lower quarter and 3 to 5 eyelets in each upper quarter, graded to increase as the size of the boot increases. The total number

and placement of the components used for the closure system must ensure the stability and functionality of the boot.

5.2.6.2 **Fittings** – The eyelets must have a non-shiny finish and must match the colour of the upper materials. The materials and design of the lacing system is at the manufacturer’s discretion with the stipulation that leather and uncoated metal lacing systems must not be used. The functionality, finish, and colour of the lacing system must last for the life of the boot without corrosion or wear. Physical properties of the materials must remain consistent across a wide range of temperatures, relative humidity, and weather conditions. Fittings must be free from voids, porosity or unformed sections, glossiness, splays or other surface imperfections such as weld lines and flash or burrs.

5.2.6.3 **Laces** – The laces must be black in colour and constructed of fire resistant material. When tested in accordance with ASTM D5034-09 (R2013), the breaking strength of the laces must be a minimum of 220 pounds. The laces must come in 3 lengths as itemized below:

| Size of boots     | Length of Laces |
|-------------------|-----------------|
| US Size 5 to 7    | 174 cm + 2 cm   |
| US Size 7½ to 11  | 189 cm + 2 cm   |
| US Size 11½ to 16 | 215 cm + 2 cm   |

5.2.6.4 **Closure at collar** – The top of the boot must be designed to form a comfortable and snug fit. A padded collar would be an acceptable design solution. All materials used in the closure at the collar must allow a minimal amount of absorption (if any) of liquids and have the ability to dry quickly.

5.3 **Size and Dimensions** – The Boots, Tactical, Safety must be available in the following US sizes; 5, 6 through 12 with half sizes, and sizes 13 through 16, in regular (R) width. All dimensions referred to in this specification are for US size 9.0 R. The US size 9.0 R corresponds to a foot measuring 265 mm in length and 108 mm in width when following ISO 9407 method of defining size. The increment between sizes is 5 mm in length. The increment between widths is 4 mm. The US size 14.0 R must correspond to a foot measuring 300 mm in length. Boots that fit either more than one half size or less than one half size when worn in fit trials will not be accepted. The manufacturer must be able to produce custom sizes.

5.4 **Marking and Labelling** – The right boot upper or tongue must have the appropriate CSA Z195-14 (R:2019) approved marking patch to denote Grade 1 sole and toe protection, metatarsal protection, and electric-shock-resistance. Each boot must have a label affixed by either heat press or sewn to the inside of the tongue. The label information must be as outlined below in a font no less than size 6. The text must be permanent ink in a contrasting colour. The manufacturer’s identification may appear on the outside of the boot and must be discreet in colour and size. The label must be completed in accordance with the following information.

- a) RCMP stock number – reference contract documents (Ex. 2760 000)
- b) Size of the article including width, combining the size designation referenced in the English and French contract documents. (Ex. 9.0 R)
- c) Date of manufacture, in numeric format year/month (Ex. 2018/11)

- d) The manufacturer identification (Company name or number). Optional if already on the exterior of the boot.

**Table I**  
**Performance Requirements of Leather**

| REQUIREMENTS |   |  | TEST METHODS   |
|--------------|---|--|--|
| 1            | Thickness                                     | <ul style="list-style-type: none"> <li>Upper – 1.8 mm to 2.0 mm</li> </ul>   | <ul style="list-style-type: none"> <li>ASTM D 1813-13 (R2017) Woburn Gauge</li> </ul>                  |
| 2            | Fat Content (Hexane extraction)               | <ul style="list-style-type: none"> <li>8-16%</li> </ul>  | <ul style="list-style-type: none"> <li>ASTM D3495-10 (2015)</li> </ul>                                 |
| 3            | Burst Strength (Mullen)                       | <ul style="list-style-type: none"> <li>1.4 mm to 1.6 mm – 250 lb/inch<sup>2</sup> (min.)</li> <li>1.8 mm to 2.0 mm – 350 lb/inch<sup>2</sup> (min.)</li> </ul> | <ul style="list-style-type: none"> <li>ASTM D2210-13</li> </ul>  |
| 4            | Stitch Tearing Strength                       | <ul style="list-style-type: none"> <li>1.4 to 1.6 mm thickness 40 lb (min.)</li> <li>2.0 to 2.2 mm thickness 70 lb (min.)</li> </ul>                           | <ul style="list-style-type: none"> <li>ASTM D4705-13</li> </ul>  |
| 5            | Water Penetration (for entire skin of uppers) | <ul style="list-style-type: none"> <li>&lt; 15% weight gain after 15,000 flexes</li> <li>No penetration after 15,000 flexes minimum</li> </ul>                 | <ul style="list-style-type: none"> <li>SATRA TM34</li> <li><b>OR</b></li> <li>ASTM D2099-14</li> </ul> |

**Table II**  
**Performance Requirements of Lining**

| REQUIREMENTS |                     |  | TEST METHODS  |
|--------------|---------------------|--|---|
| 1            | Abrasion Resistance | Dry: ≥ 51,000 cycles<br>Wet: ≥ 25,000 cycles | <ul style="list-style-type: none"> <li>EN ISO 20344:2011, para. 6.12</li> </ul> |

**Table III**  
**Performance Requirements Whole Boot Testing**

| REQUIREMENTS |   |   | TEST METHODS  |
|--------------|---|---|---|
| 1            | Whole boot thermal protection   | <ul style="list-style-type: none"> <li>Between 0°C and - 10°C</li> </ul>  | <ul style="list-style-type: none"> <li>CTT PTC-1 Thermal rating test</li> </ul> |
| 2            | Longitudinal stiffness of boot  | <ul style="list-style-type: none"> <li>8.0 – 12.0 (average result of right and left foot of same pair)</li> </ul>   | <ul style="list-style-type: none"> <li>SATRA TM 194</li> </ul>                  |
| 3            | Torsional Rigidity  | <ul style="list-style-type: none"> <li>5 degree angle: 1.5 – 2.5</li> <li>10 degree angle: 3 – 4.5 (average result of 4 trials: 2 trials/foot)</li> </ul> | <ul style="list-style-type: none"> <li>SATRA TM 256</li> </ul>                  |
| 4            | Bond Strength of sole to upper  | <ul style="list-style-type: none"> <li>≥ 4 N/mm</li> </ul>  | <ul style="list-style-type: none"> <li>EN ISO 20344:2011, para. 5.2</li> </ul>  |
| 5            | Slip Index on Frosted Ice surface (Sole pre-conditioned at -7°C in water-ethanol bath)<br>Heel, Forward slip at 7° angle -<br>Flat Forward slip - | <ul style="list-style-type: none"> <li>Coefficient of Friction (CoF) =</li> <li>After initial pass</li> <li>0.28 minimum</li> <li>0.28 minimum</li> </ul> | <ul style="list-style-type: none"> <li>SATRA TM 144</li> </ul>                  |
| 6            | Slip Index on Wet Ice surface (Sole pre-conditioned at -7°C in water-ethanol bath)<br>Heel, Forward slip at 7° angle -<br>Flat Forward slip -     | <ul style="list-style-type: none"> <li>Coefficient of Friction (CoF) =</li> <li>After initial pass</li> <li>0.07 minimum</li> <li>0.07 minimum</li> </ul> | <ul style="list-style-type: none"> <li>SATRA TM 144</li> </ul>                  |

**Table IV**  
**Performance Requirements of Midsole (PU Compound)**

| REQUIREMENTS |                          |   | TEST METHODS                                  |
|--------------|--------------------------|---|---|
| 1            | Density                  | • 0.30 – 0.40 g/cm <sup>3</sup>                   | • ASTM D792-13                                |
| 2            | Hardness Shore A         | • 45 - 50   | • SATRA TM205<br><b>OR</b><br>• ASTM D2240-15 |
| 3            | Tear Strength (Die C)    | • >13 N/mm  | • ASTM D624-00 (2012)                         |
| 4            | Tensile Strength (Die A) | • 2.06 N/mm <sup>2</sup> - 2.75 N/mm <sup>2</sup> | • ASTM D412-15A                               |
| 5            | Elongation               | • 300% minimum                                    | • SATRA TM137<br><b>OR</b><br>• ASTM D412-15A |

**Table V**  
**Performance Requirements of Outsole (Rubber Compound)**

| REQUIREMENTS |  |                              | TEST METHODS                      |
|--------------|--|------------------------------|-----------------------------------|
| 1            | NBS Abrasion (%)                         | • 80 minimum                 | • ASTM D1630-06 (2012)            |
| 2            | Hardness (Shore A)<br>Rubber slab > 6 mm | • 55-65                      | • ISO 868:2003                    |
| 3            | Hardness (Shore A)<br>Change at -40°C    | • No hardening after 2 hours | • ISO 868:2003                    |
| 4            | T Tear Resistance                        | • >4 KN/m                    | • ISO 34-1:2015                   |
| 5            | Cold Flex (-23°C)                        | • 500% @ 7,500 flexes        | • ASTM D1052-09 (2014)            |
| 6            | Elongation                               | • 300% minimum               | • SATRA TM137<br>• ASTM D412-15A  |
| 7            | Non-Marking                              | • Pass                       | • SATRA TM 223                    |
| 8            | Oil resistance (Isooctane)               | • < 12%                      | • BS EN ISO 20344-2011, para. 8.6 |