

**Safety Footwear Testing Equipments**

Pos.	Equipment	Our Model
<b>1</b>	<p><b>. "ROSS" flexing machine</b> .....</p> <p><b>Standards:</b> SATRA TM60 ; BS 5131 ; ASTM D-1052 ; ISO 4643 ; ISO 5423.</p> <p><b>Purpose:</b> Determine the resistance of polymeric materials to cut growth during repeated flexing, this test is applicable to all types of flexible sheet material and especially those used in footwear soling.</p> <p style="text-align: center;"><b>Or in option our model:</b></p>	<b>EL-10</b>
	<p><b>. "ROSS" flexing machine with cold chamber</b> .....</p> <p><b>Standards:</b> SATRA TM60 ; BS 5131 ; ASTM D-1052 ; ISO 4643 ; ISO 5423.</p> <p><b>Purpose:</b> Same purpose as the anterior equipment but this one fitted inside a cold chamber, so it is possible to adjust the test temperature since room temperature till -25 °C.</p>	<b>EL-10F</b>
<b>2</b>	<p><b>. Footwear rigidity tester</b> .....</p> <p><b>Standards:</b> EN ISO 20344:8.4 ; EN ISO 17707.</p> <p><b>Purpose:</b> This equipment is intended to measure the rigidity of the complete footwear, to determine if it should be subjected to the "BENNEWART" flexing test.</p>	<b>EL-12</b>
<b>3</b>	<p><b>. "BENNEWART" flexing machine</b> .....</p> <p><b>Standards:</b> SATRA TM161 ; EN ISO 20344:8.4 ; DIN 53 543.</p> <p><b>Purpose:</b> Determine the resistance of whole soles to cut growth during repeated flexing, it is also suitable to assess the effect of surface patterns on crack initiation and growth, this test is applicable to the outsoles of footwear.</p> <p style="text-align: center;"><b>Or in option our model:</b></p>	<b>EL-13</b>
	<p><b>. "BENNEWART" flexing machine with cold chamber</b> .....</p> <p><b>Standards:</b> SATRA TM161 ; EN ISO 20344:8.4 ; DIN 53 543.</p> <p><b>Purpose:</b> Same purpose as the anterior equipment but this one fitted inside a cold chamber, so its possible to adjust the test temperature since room temperature till -25 °C.</p>	<b>EL-13F</b>
<b>4</b>	<p><b>. " VAMP " flexing machine with 12 stations</b> .....</p> <p><b>Standards:</b> SATRA TM25 ; EN ISO 20344:6.5 ; BS 3424 ; ISO 4643 ; ISO 5423 ; EN 13335.</p> <p><b>Purpose:</b> Determine the propensity for materials to crack or otherwise fail at flexing creases and assess whether leathers are likely to produce salt spue, this machine simulates conditions in the Vamp part of footwear during walking. This test is applicable to all flexible materials and in particular those used to manufacture outers and linings of footwear uppers such as leathers and coated fabrics.</p> <p style="text-align: center;"><b>Or in option our model:</b></p>	<b>EL-15</b>
	<p><b>. " VAMP " flexing machine with 12 stations and cold chamber</b> .....</p> <p><b>Standards:</b> SATRA TM25 ; EN ISO 20344:6.5 ; BS 3424 ; ISO 4643 ; ISO 5423.</p> <p><b>Purpose:</b> Same purpose as the anterior equipment but this one fitted inside a cold chamber, so it is possible to adjust the test temperature since room temperature till -25 °C.</p>	<b>EL-15F</b>

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5	. <b>“BALLY” flexing machine with 6 stations</b> ..... <b>Standards:</b> SATRA TM55 ; BS 3144 ; IUP 20 ; SLP 14 ; UNE 59-029 ; EN 13 512 ; ISO 5402. <b>Purpose:</b> Determine the resistance of a material to cracking or other types of failure at flexing creases, this test is applicable to all flexible materials and in particular leathers and coated fabrics used in footwear uppers. <p style="text-align: center;"><u>Or in option our model:</u></p>	<b>EL-18/6</b>
	. <b>“BALLY” flexing machine with 12 stations</b> ..... <b>Standards:</b> SATRA TM55 ; BS 3144 ; IUP 20 ; SLP 14 ; UNE 59-029 ; EN 13 512 ; ISO 5402. <b>Purpose:</b> Same purpose as the last equipment, but this one with 12 stations. <p style="text-align: center;"><u>Or in option our model:</u></p>	<b>EL-18/12</b>
	. <b>“BALLY” flexing machine with 12 stations and cold chamber</b> ..... <b>Standards:</b> SATRA TM55 ; BS 3144 ; IUP 20 ; SLP 14 ; UNE 59-029 ; EN 13 512 ; ISO 5402. <b>Purpose:</b> Same purpose as the last equipment but this one with 12 stations and cold chamber so it is possible to adjust the test temperature since room temperature till -25 °C.	<b>EL-18F/12</b>
6	. <b>Steel midsole flexing machine</b> ..... <b>Standards:</b> EN ISO 20344:5.9 ; EN 12568 ; Z195-02. <b>Purpose:</b> Determine the endurance of steel midsoles to repeated flexing.	<b>EL-24</b>
7	. <b>“BALLY” penetrometer with 4 stations</b> ..... <b>Standards:</b> SATRA TM171 ; BS 3144 ; EN ISO 20344:6.13 ; IUP 10 ; DIN 53 338 ; EN 13518. <b>Purpose:</b> Assess the resistance of a material to water penetration on flexing, this test is mainly applicable to leather but can be used with any flexible sheet material. <p style="text-align: center;"><u>Or in option our model:</u></p>	<b>EL-26/4</b>
	. <b>“BALLY” penetrometer with 6 stations</b> ..... <b>Standards:</b> SATRA TM171 ; BS 3144 ; EN ISO 20344:6.13 ; IUP 10 ; DIN 53 338 ; EN 13518. <b>Purpose:</b> Same purpose as the anterior equipment but this one with 6 stations.	<b>EL-26/6</b>
8	. <b>Stiffness tester for leathers</b> ..... <b>Standards:</b> DIN 53 338 ; EN 13 518. <b>Purpose:</b> Assess the stiffness of leathers.	<b>EL-26/R</b>
9	. <b>Equipment assess water absorption/desorption of insole and insock</b> ..... <b>Standards:</b> EN ISO 20344:7.2 ; IUP 11 ; EN 13072 ; BS 3144:Part22. <b>Purpose:</b> Assess the water absorption and desorption of insoles and insocks.	<b>EL-32</b>
10	. <b>Electrical conductivity tester</b> ..... <b>Standards:</b> EN ISO 20344:5.10. <b>Purpose:</b> Measurement of electrical resistance of conductive footwear.	<b>EL-38</b>
11	. <b>Determination of electrical insulation</b> ..... <b>Standards:</b> EN ISO 20344:5.11 ; EN 50321. <b>Purpose:</b> Measurement of electrical insulation of protective footwear.	<b>EL-39</b>
12	. <b>Whole footwear water resistance tester (brush machine method)</b> ..... <b>Standards:</b> EN ISO 20344:5.15. <b>Purpose:</b> This equipment is intended to assess the resistance of whole footwear to water penetration.	<b>EL-46</b>
13	. <b>Water vapor permeability tester</b> ..... <b>Standards:</b> SATRA TM172 ; EN ISO 20344:6.6 ; IUP 15 ; EN 13 515. <b>Purpose:</b> Assess the "breathability" of leather and non-leather upper materials (outers and linings).	<b>EL-60</b>

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14	. <b>Water vapour absorption tester</b> ..... <b>Standards:</b> SATRA TM172 ; EN ISO 20344:6.7 ; EN 13 515. <b>Purpose:</b> Calculate the coefficient of water vapour on leather and non-leather upper materials (outers and linings).	<b>EL-61</b>
15	. <b>Shaking machine for 8 vacuum flasks</b> ..... <b>Standards:</b> SATRA TM29 ; BS 1309 ; IUC 6 ; ISO 4045. <b>Purpose:</b> Agitates up to eight vacuum flasks.	<b>EL-63</b>
16	. <b>Laboratory mill</b> ..... <b>Standards:</b> BS 1309 ; IUC 3 ; ISO 4044. <b>Purpose:</b> This mill is designed to disintegrate swiftly and efficiently leather and non-leather upper materials, to use afterwards on several chemical tests.	<b>EL-67</b>
17	. <b>Equipment to test resistance to cutting by chainsaw</b> ..... <b>Standards:</b> EN 381-1 ; EN 381-3. <b>Purpose:</b> Assess the resistance to cut by chainsaw of personal protective devices.	<b>EL-68</b>
18	. <b>"MARTINDALE" abrasion machine</b> ..... <b>Standards:</b> SATRA TM31 ; BS 3424 ; EN ISO 20344:6.12 ; EN 13520 ; ISO 12947. <b>Purpose:</b> Determine the resistance of a material to wet and dry abrasion, this test its applicable to coated fabrics, leathers and other flexible sheet materials.	<b>EL-71</b>
19	. <b>Abrasion test machine "DIN" type for sole materials</b> ..... <b>Standards:</b> SATRA TM174 ; ISO 4649 ; DIN 53 516 ; EN 12770. <b>Purpose:</b> Determine the abrasion resistance of a material, this test is mainly applicable to polymeric footwear soling materials or suitable material cut from finished soles, but can be used with any polymer based sheet material.	<b>EL-78</b>
20	. <b>Determination of resistance to cutting</b> ..... <b>Standards:</b> EN ISO 20344:6.14 ; EN 388:6.2. <b>Purpose:</b> Assess the resistance to cut of footwear uppers and protective gloves.	<b>EL-82</b>
21	. <b>"VESLIC" rub fastness tester</b> ..... <b>Standards:</b> SATRA TM173 ; ISO 11640 ; EN 13516 ; EN ISO 20344:7.3 ; IUF 450. <b>Purpose:</b> Determine the behavior of the surface of leather on rubbing with a felt. <u>Or in option our model:</u>	<b>EL-83</b>
	. <b>"VESLIC" rub fastness tester with ironing element</b> ..... <b>Standards:</b> SATRA TM173 ; ISO 11640 ; EN 13516 ; EN ISO 20344:7.3 ; IUF 450 ; IUF 458. <b>Purpose:</b> Determine the behavior of the surface of leather on rubbing with a felt and also on exposure to a hot iron.	<b>EL-83A</b>
22	. <b>Slip resistance tester</b> ..... <b>Standards:</b> EN 13287 ; SATRA TM144. <b>Purpose:</b> Determine the coefficient of friction between footwear outsoles and flooring surfaces.	<b>EL-88</b>
23	. <b>Shock absorption tester for ankle protection materials</b> ..... <b>Standards:</b> EN ISO 20344:5.17. <b>Purpose:</b> Assess the shock absorption properties of ankle protective materials.	<b>EL-91</b>
24	. <b>Heat resistance tester</b> ..... <b>Standards:</b> BS 1006 ; EN ISO 20344:8.7. <b>Purpose:</b> Determine the ability of the finish of shoemaking materials to withstand the heat involved in various shoemaking operations, such as embossing, crimping, hot blasting, flaming and ironing.	<b>EL-92</b>

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25	<p><b>. Leakproofness tester</b> .....</p> <p><b>Standards:</b> EN ISO 20344:5.7.  <b>Purpose:</b> Assess the leakproofness of whole footwear.</p>	<b>EL-94</b>
26	<p><b>. Determination of insulation against heat apparatus</b> .....</p> <p><b>Standards:</b> EN ISO 20344:5.12.  <b>Purpose:</b> Assess the heat insulating properties of the sole complex of protective footwear.</p>	<b>EL-96</b>
27	<p><b>. Determination of insulation against cold apparatus</b> .....</p> <p><b>Standards:</b> EN ISO 20344:5.13.  <b>Purpose:</b> Assess the cold insulating properties of the sole complex of protective footwear.</p>	<b>EL-97</b>
28	<p><b>. Steel toe caps impact tester</b> .....</p> <p><b>Standards:</b> EN ISO 20344:5.4 ; EN 12568 ; ANSI Z41 ; CAN/CSA Z195-M92  <b>Purpose:</b> Measures the impact resistance of the toes of safety footwear and steel toe caps, with additional suitable accessories is also able to carry out the metatarsal impact test.</p> <p><b>Optionals:</b> This test equipment together with the suitable accessories is also able to perform the metatarsal impact test according to "<b>EN ISO 20344:5.16</b>". To carry out this test will be necessary to purchase the additional "<u>Vacuum equipment to prepare the wax test forms</u>" and the "<u>Support to hold specimens to perform metatarsal test</u>", both quoted below.</p> <p style="text-align: center;"><b>Optional accessories for the "<u>Steel toe caps impact tester</u>"</b></p>	<b>EL-99</b>
	<p><b>. Dial gauge for measuring the cylinders of modeling clay</b> .....</p> <p><b>Standards:</b> EN ISO 20344:5.4.1.4</p>	<b>EL-99/1</b>
	<p><b>. Vacuum equipment to prepare the wax test forms for metatarsal test</b> .</p> <p><b>Standards:</b> EN ISO 20344:5.16</p>	<b>EL-99/2</b>
	<p><b>. Support to hold specimens to perform metatarsal test</b> .....</p> <p><b>Standards:</b> EN ISO 20344:5.16</p>	<b>EL-99/3</b>
29	<p><b>. Electronic Dynamometer, <u>capacity till 20 KN</u></b> .....</p> <p><b>Standard configuration:</b>  1 x Load cell 1 KN ;  1 x Pair of screw action grips ;  1 x Computer with TFT display monitor ;  1 x Color Inkjet printer ;  1 x Software package for tension, compression and fatigue tests.  <b>Purpose:</b> Carry out all kinds of tension, compression and fatigue tests till 20 KN.</p> <p style="text-align: center;"><b><u>Accessories recommended for ours Dynamometers</u></b></p>	<b>JUPITER</b>
	<p><b>. Universal pneumatic grips</b> (pneumatic command through footswitch included) ...</p> <p><b>Note:</b> Many other optional tools and accessories are available for ours Dynamometers (Extensometer, additional load cells, several kinds of jaws, additional accessories, ...), please consult.</p>	<b>GPU</b>

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<b><u>Accessories to perform tests on the Dynamometer</u></b>		
<b>Notes:</b> . The prices for the accessories mention below are based on the dimensions of ours Dynamometers, however they may be subject to revision if additional adapters will be necessary to fit other brands of Dynamometers. . To perform test with the accessories below will be necessary one Dynamometer with 20 kN maximum load capacity.		
<b>30</b>	<b>. Device to perform penetration resistance of the sole .....</b> <b>Standards: EN ISO 20344:5.8.2.</b>	<b>DP-25</b>
<b>31</b>	<b>. Device to perform determination of energy absorption of seat region .....</b> <b>Standards: EN ISO 20344:5.14.</b>	<b>DP-30</b>
<b>32</b>	<b>. Device to perform safety toe caps compression resistance test .....</b> <b>Standards: EN ISO 20344:5.5.</b>	<b>DP-35</b>

**S. João da Madeira (Portugal), 26<sup>th</sup> September 2007**

Pedro Miguel