QUALITATIVE REQUIREMENTS (QRS)/ SPECIFICATION OF MAHILA POLYCARBONATE SHIELD

SL No	Name	QR specifications		Trial Directives
1.	Nomenclature	**Mahila Polycarbonate Shield**		
2.	Uses	(i) Mahila polycarbonate shield shall be used by Mahila troops during their deployment in riot or riot like situations. It is important protective equipment for Mahila troops when deployed for handling riotous situation. (ii) Polycarbonate shield for Mahila troops has to be light weight with shock absorption capabilities, good quality material and fire resistant for handing crowd with varying degree of hostility. Besides that it must be able to protect the whole body of Mahila from injuries due to impact, blow from blunt objects, brick batting, Lathi blow, stone pelting, projectile/missile, acid bulbs Molotov's cocktails and industrial chemical thrown at her. A standard protective shield is therefore required for Mahila troops.		
3.	Colour	Colourless		To be checked by BOO/Line committee
4.	Transparency	1. Not less than 83% 2. Vision area should be plain for clear vision		
5.	Weight	2.9 kg to 3.0 kg		
6.	Shape	Rectangular curved shape, corrugated vertically for structural strength and stiffness.		
7.	Dimensions	**Length**	**920 mm (±20 mm)**	
		Breadth (flat)	**560mm (±10 mm)**	
		Breadth (curve)	**590mm (±10 mm)**	
		Thickness	**3mm (Minimum)**	
		Arm Strap width	**40mm**	

Mahender Singh, DC, BSF

Raj Ranjan, DC, SSB

Kapil Kumar, AC, RAF

Prasath M, AC, NSG

Kamlesh Kumar Sharma, AC ITBP

D.K.Sharma, AC, CISF

Nb/Sub Balwan Singh, AR

Dr. L. Robart Varte,
Scientist"E" , DRDO

Sanjeev Kumar, 2-I/C
CRPF

D.N.Lal
DIG (Prov), CRPF

Ajay Kumar Yadav, IPS
IG (Prov)

Rashmi Shukla, IPS
ADG (HQR), CRPF
Chairman

<table>
<tr>
<td>8.</td>
<td>Material</td>
<td>i) The polycarbonate sheet shall be made of high impact resistant/ natural polycarbonate material it may contain additives, processing aids and stabilizers (e.g. UV absorber)
ii) The entire fitment should be riveted on reinforced polycarbonate shield.
iii) The material used for manufacture of Polycarbonate sheet shall comply with the requirements as per column-3 when tested as per the prescribed IS of column- 4 in the table below :
<table>
<tr><th>Sl. No.</th><th>Characteristics</th><th>Requirement</th><th>Method of test, Ref to IS/Annx</th></tr>
<tr><td>(a)</td><td>Melt Flow Index, gram/10 min. (at 300° C under 1.2 Kg load when measured after pre-drying of the material at 120 ± 5°C upto 4 hrs.)</td><td>i)1.5 to 8 (for extrusion/ Thermoforming)

ii)8 to 15 (for injection moulding)</td><td>IS 13360 (Part 4 / Sec 1)</td></tr>
<tr><td>(b)</td><td>Specific Gravity</td><td>1.19 to 1.22</td><td>IS 13360 (Part 3 Section 1)</td></tr>
<tr><td>(c)</td><td>Flexural Modulus, Min, Mpa (With crosshead speed of 1.2 mm/min and a span to depth ratio of 16 to 1 (test specimen size, 04 mm x 10 mm)</td><td>2200</td><td>IS 13360 (Part 5 Section 7)</td></tr>
<tr><td>(d)</td><td>Izod Impact Strength , notched , min, kJ/m^2 (test specimen thickness of 03 mm and notch radius of 0.25 mm)</td><td>60</td><td>IS 13360 (Part 5 Section 4)</td></tr>
<tr><td>(e)</td><td>Deflection Temperature under load at 1.82 MPa, Min, °C</td><td>120</td><td>IS 13360 (Part 6 Section 17)</td></tr>
</table>
</td>
<td>Certification from any NABL accredited Lab for the test conducted as per IS specified at column-4 with results as per values shown in column-3 (a),(b) , (c), (d) & (e) of the table at Sl no 8.</td>
</tr>
</table>

Mahender Singh, DC, BSF

Raj Ranjan, DC, SSB

Kapil Kumar, AC, RAF

Prasath M, AC, NSG

Kamlesh Kumar Sharma, AC ITBP

D.K.Sharma, AC, CISF

Nb/Sub Balwan Singh, AR

Dr. L. Robart Varte,
Scientist"E" , DRDO

Sanjeev Kumar, 2-I/C
CRPF

D.N.Lal
DIG (Prov), CRPF

Ajay Kumar Yadav, IPS
IG (Prov)

Rashmi Shukla, IPS
ADG (HQR), CRPF
Chairman

<table>
<tr>
<td>9.</td>
<td>Polycarbonate sheet characteristics</td>
<td>(i) Poly carbonate sheet formed from the above specified material shall comply with the requirements as per column-3 when tested as per the prescribed IS of Column- 4 in the table below:-
<table>
<tr><th>Sl. No.</th><th>Characteristics</th><th>Requirement</th><th>Method of test, Ref to IS/Annx</th></tr>
<tr><td>(1)</td><td>(2)</td><td>(3)</td><td>(4)</td></tr>
<tr><td>(a)</td><td>Dart drop Impact, Minimum J (at 27degree C)</td><td>150</td><td>Annx B of IS 14443</td></tr>
<tr><td>(b)</td><td>Light Transmission, percent, Minimum</td><td>83</td><td>IS 13360 (Part -9 Section - 5)</td></tr>
<tr><td>(c)</td><td>Flammability Test (test specimen thickness 3.18 mm +- 0.13 mm)</td><td>94 HB class</td><td>IS 13360 (Part – 6 Section – 5)</td></tr>
</table>
(iii) The Poly carbonate body of the Shield shall have abrasion resistance surface coating on both surfaces.
(iv) Sheet shall be corrugated (for strength enhancement) except for area defined for higher visibility as per the design specified, with one third of total shield length, in upper extremity.(Refer to figure)
(v) At bottom side of the shield there should be tapering of 5cm from both edges with a height of 27cm. (Refer to figure)</td>
<td>Certification from any NABL accredited Lab for the test conducted as per IS specified at column -4 with results as per values shown in column – 3 (a), (b), (c), (d) & (e) of the table at the Sl no. 9</td>
</tr>
</table>

Mahender Singh, DC, BSF

Raj Ranjan, DC, SSB

Kapil Kumar, AC, RAF

Prasath M, AC, NSG

Kamlesh Kumar Sharma, AC ITBP

D.K.Sharma, AC, CISF

Nb/Sub Balwan Singh, AR

Dr. L. Robart Varte,
Scientist"E" , DRDO

Sanjeev Kumar, 2-I/C
CRPF

D.N.Lal
DIG (Prov), CRPF

Ajay Kumar Yadav, IPS
IG (Prov)

Rashmi Shukla, IPS
ADG (HQR), CRPF
Chairman

<table>
<tr><td>10.</td><td>Handle/Arm Rest Characteristics</td><td>i) Cushioned armed rest shall be provided for comfort during long time use. Same should be covered by the cotton cloth.
ii) Grips and supports must allow the user to comfortably hold and position the polycarbonate protective shield.
iii) The rectangular cushioned arm rest has following dimension:
<table><tr><td>Length</td><td>18 inches</td></tr><tr><td>Width</td><td>6 inches</td></tr><tr><td>Thickness</td><td>20 mm</td></tr></table>iv) General requirement of handle:-
(a) Manufacturing process for handle should be =Gas-Assisted Injection Moulding (GAIM).
(b) Material for handle should be polymeric, preferably poly carbonate
(c) Elastomeric bushed and washer system to be used for nut and bolt system.</td><td>To be checked by BOO/Line committee.</td></tr>
<tr><td rowspan="4">11.</td><td rowspan="4">Performance requirements of PC shield</td><td>(a) <u>Resistance to vandalism</u>:-
(i) Pc shield is to provide complete protection against brick batting, stone pelting, iron rod and cane attack.
(ii) The polycarbonate body of shield shall have impact resistance of level"A3" when tested for vandal resistance as per the method prescribed in Annex of IS14443.</td><td>Certification from any NABL accredited LAB for the test prescribed in Annex C of IS 14443</td></tr>
<tr><td>(b) <u>Resistance to surface penetration:</u> The polycarbonate body of the shield shall have resistance of level'B3' against penetration when tested for resistance to forced entry as per the test method prescribed in Annex of IS1443</td><td>Certification from any NABL accredited LAB for the test prescribed in Annex D of IS 14443</td></tr>
<tr><td>(c) <u>Resistance to surface Abrasion:</u> The resistance of polycarbonate shield to surface abrasion shall be tested in accordance with ASTM D 1044 for 100 cycles under 500g load. Haze of test specimen shall not be more than 20percent</td><td>Certification from any NABL accredited LAB for the test prescribed in ASTM D1044</td></tr>
<tr><td>(d) <u>Resistance to Environmental Stress Cracking:</u> Environment Stress cracking Resistance(ESCR) Test shall be performed on polycarbonate body of the shield (with protective coating)by constant strain method as per IS 13360(Part8/Sec9)</td><td>Certification from any NABL accredited LAB</td></tr>
</table>

Mahender Singh, DC, BSF

Raj Ranjan, DC, SSB

Kapil Kumar, AC, RAF

Prasath M, AC, NSG

Kamlesh Kumar Sharma, AC ITBP

D.K.Sharma, AC, CISF

Nb/Sub Balwan Singh, AR

Dr. L. Robart Varte,
Scientist"E" , DRDO

Sanjeev Kumar, 2-I/C
CRPF

D.N.Lal
DIG (Prov), CRPF

Ajay Kumar Yadav, IPS
IG (Prov)

Rashmi Shukla, IPS
ADG (HQR), CRPF
Chairman

12	**Shelf life**	Six (6) years (minimum)	
13	**Miscellaneous**	(i) Two clutches on each side (both left and right) to be placed on inside surface of shield for holding lathi. (ii) A strap should be given for hanging shield from backside. (iii) The shield should be amphidextrous (as per the design specified) such that it is user friendly for the left handed as well as the right handed individuals. (iv) Female insignia nearby handle shall be provided as marking for being identified as Mahila PC shield.	To be checked by BOO/Line committee

Mahender Singh, DC, BSF

Raj Ranjan, DC, SSB

Kapil Kumar, AC, RAF

Prasath M, AC, NSG

Kamlesh Kumar Sharma, AC ITBP

D.K.Sharma, AC, CISF

Nb/Sub Balwan Singh, AR

Dr. L. Robart Varte,
Scientist"E" , DRDO

Sanjeev Kumar, 2-I/C
CRPF

D.N.Lal
DIG (Prov), CRPF

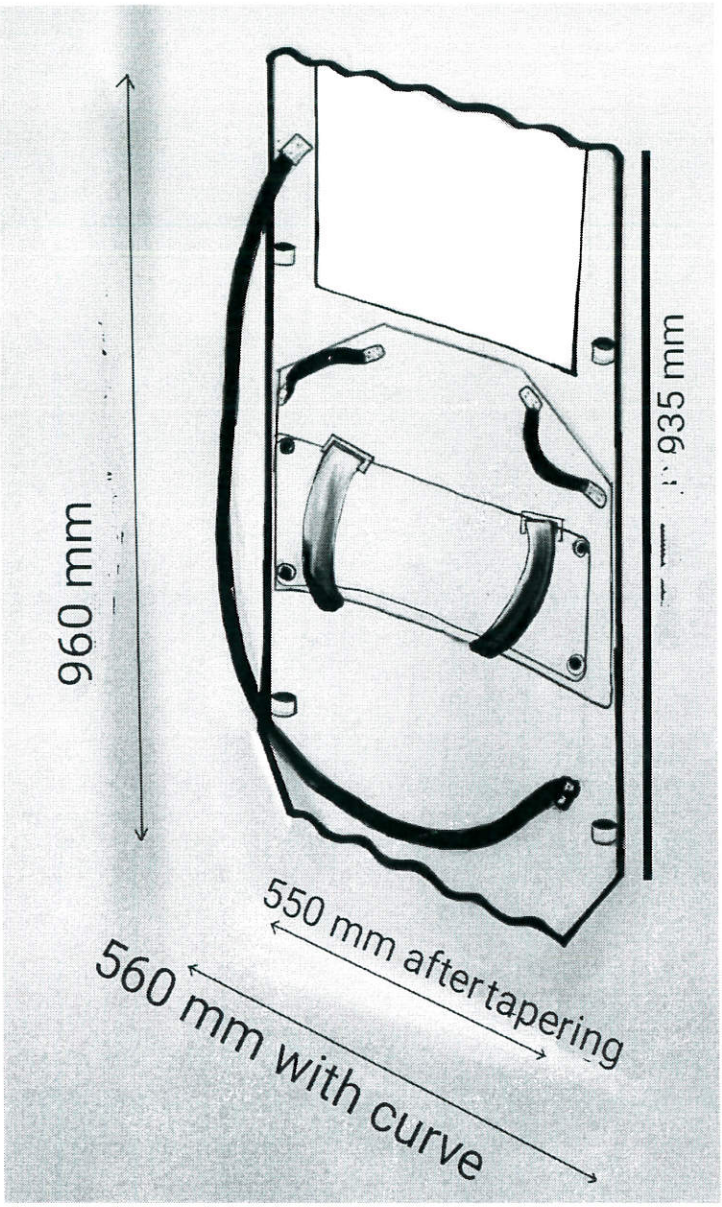
Ajay Kumar Yadav, IPS
IG (Prov)

Rashmi Shukla, IPS
ADG (HQR), CRPF
Chairman

~~Approved/Not Approved~~

(Dr.Sujoy Lal Thaosen) IPS
DG, CRPF

MAHILA POLYCARBONATE SHIELD



Mahender Singh, DC, BSF

Raj Ranjan, DC, SSB

Kapil Kumar, AC, RAF

Prasath M, AC, NSG

Kamlesh Kumar Sharma, AC ITBP

D.K.Sharma, AC, CISF

Nb/Sub Balwan Singh, AR

Dr. L. Robart Varte,
Scientist"E" , DRDO

Sanjeev Kumar, 2-I/C
CRPF

D.N.Lal
DIG (Prov), CRPF

Ajay Kumar Yadav, IPS
IG (Prov)

Rashmi Shukla, IPS
ADG (HQR), CRPF
Chairman