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SPECIFICATION 160715
FOR MOULDED EVA FOAM PARTS
FOR THE CTS RUCKSACK



1 SCOPE

1.1 Scope – This specification covers the requirements for the Ethylene Vinyl Acetate, and the moulded polymeric foam backpad that will be used in the Rucksack Assembly.

1.2 Classification – The foam stock shall be one of the following types, whichever is specified by the invitation to tender:

1.2.1 Foam Stock Types:

- a. Type I – Single ply foam stock, closed cell polymeric foam, **physically** expanded, PE/EVA 50 kg/m³
- b. Type II – Single ply foam stock, closed cell polymeric foam, **chemically** expanded, PE/EVA 50 kg/m³

1.2.2 Cloth – The cloth used in the lamination process shall be Polyester Warp Knit as specified in the Manufacturing Data for the Rucksack Assembly, CADPAT™, Temperate Woodland.

2 APPLICABLE DOCUMENTS

2.1 Government document – The following document form part of this manufacturing data to the extent specified herein. The effective dates shall be those in effect on the date of the invitation to tender.

a.	Drawing 0375632	Compression mould Backpad, Small
b.	Drawing 0375633	Compression mould Backpad, Medium
c.	Drawing 0375634	Compression mould Backpad, Large
d.	Drawing 0375635	Compression mould Backpad, Extra Large
e.	Drawing 2004-1	Rucksack Hip Belt Insert Extra-Large Left.
f.	Drawing 2004-2	Rucksack Hip Belt Insert Extra-Large Right.
g.	Drawing 2004-3	Rucksack Hip Belt Insert Large Left.
h.	Drawing 2004-4	Rucksack Hip Belt Insert Large Right.
i.	Drawing 2004-5	Rucksack Hip Belt Insert Medium Left.
j.	Drawing 2004-6	Rucksack Hip Belt Insert Medium Right.
k.	Drawing 2004-8	Rucksack Hip Belt Insert Small Left.
l.	Drawing 2004-9	Rucksack Hip Belt Insert Small Right.
m.	Drawing 2004-10	Rucksack Hip Belt Shell Extra-Large Left.
n.	Drawing 2004-11	Rucksack Hip Belt Shell Extra-Large Right.
o.	Drawing 2004-12	Rucksack Hip Belt Shell Large Left.
p.	Drawing 2004-13	Rucksack Hip Belt Shell Large Right.
q.	Drawing 2004-14	Rucksack Hip Belt Shell Medium Left.
r.	Drawing 2004-15	Rucksack Hip Belt Shell Medium Right.
s.	Drawing 2004-16	Rucksack Hip Belt Shell Small Left.
t.	Drawing 2004-7	Rucksack Hip Belt Shell Small Right.
u.	Drawing 2004-18	Rucksack Lumbar Shell.

2.2 Other publications - The following documents form part of this specification to the extent specified herein. Unless otherwise specified, the issue or amendment of the publication in effect on the date of the invitation to tender shall apply. Sources are as shown.



ASTM D412, D413, D471, D624, D1052, D2240, D2632, and D3575

American Society of Testing and Materials
ASTM International
100 Barr Harbor Drive
PO Box C700
West Conshohocken, Pennsylvania, USA
19428-2959

3 REQUIREMENTS

- 3.1 Lamination - The cloth shall be laminated to the foam in order to give full stability and shall conform to the requirements as specified in the Tables below.
- 3.2 Foam Stock Types – There are two types of foam which may be specified in the fabrication of the backpad:
- a. Type I – Closed cell, chemically cross-linked, polyethylene foam. PE/EVA-50kg/m³. **Physically** expanded, single ply. Shall meet all the requirements specified in Table: 1
 - b. Type II – Closed cell, chemically cross-linked, polyethylene foam. PE/EVA-50kg/m³. **Chemically** expanded. This foam is usually available up to a maximum thickness of 12.5mm in rolled stock shall meet all the requirements as specified in Table: 2
- 3.3 Laminated Surface Finish – The laminated finished surface shall be smooth and free of indentations, pitting, bubbling, deformations, and blemishes. The finish shall be as depicted by the applicable sealed pattern. The primary and secondary surfaces shall be even with no tears, bubbling, blistering, nor other surface imperfections.
- 3.4 Inspection – The laminated foam shall be visually inspected for workmanship, material, and compliance with this manufacturing data. The laminated foam shall be examined in detail for the defects as mentioned above in paragraph 4.3.

4 MOULDED FINISHED PRODUCT

- 4.1 Moulding – The laminated polymeric foam shall be shaped to conform to the finished dimensions and performance requirement for each respective backpad, hip belt insert and shell.
- 4.2 Moulding Process – The manufacturing process shall use a thermal compression mould. The fabric shall be aligned in the warp direction.
- 4.3 Mould Pattern – The mould pattern, dimensions, trimming, and tolerances shall produce backpads, hip belts inserts and shells and lumbar pads that will meet the performance requirements.
- 4.4 Venting – The mould shall be properly vented in order to eliminate distortions, voids, sinks, and depressions.
- 4.5 Workmanship – The moulded surfaces covered by this specification shall be smooth and free of indentations, pitting, bubbling, deformations, and blemishes such as may adversely affect its appearance or serviceability. Any cut edges shall be smooth and even in width and must be free of fraying and nick. For inspection purposes, the above-mentioned imperfections shall be considered defects when clearly visible at a normal inspection distance of approximately one metre under good, preferably North Light, lighting conditions.
- 4.6 Dimensions – The backpad, hip belt and lumbar pad dimensions, trimming, and tolerances shall conform to individual drawing requirement.
- 4.7 Inspection – Each Foam Backpad shall be visually inspected for workmanship, material, and compliance with this manufacturing data. Each Foam Backpad shall be examined in detail for the defects as mentioned above in paragraph 5.5 and to ensure the dimensions conform to the drawing as mentioned above in paragraph 5.6.



5 QUALITY CONTROL/INSPECTION

- 5.1 Quality Control - Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspections and tests as specified herein and to demonstrate that the materiel and services conform to the requirements specified in this Manufacturing Data. Contractors must utilise an independent, accredited, third party laboratory/inspection facility acceptable to the Crown or its designated representative.
- 5.2 Inspections - The Crown reserves the right to perform any of the inspections or tests specified herein, where such are deemed necessary to ensure the materiel and/or services submitted to the Crown for acceptance meet all requirements of the contract. This applies equally to materiel contracted for delivery directly to the Department of National Defence or as component parts to a supplier with a contract for products for Defence use.

6 PACKAGING

- 6.1 Packaging and packing - Packaging, packing and marking of shipping containers shall be as specified in the invitation to tender or in the contract or by the pack manufacturer.

7 NOTES

- 7.1 Ordering data - Procurement documents should specify the following:
- a. Title, number and date of this specification.
 - b. Colour requirement (see 3.5).
 - c. Design Authority.
 - d. Quality Assurance Authority.
- 7.2 Design Authority - The Design Authority is the Government agency responsible for technical aspects of design and changes to design. Unless otherwise specified in the contract, the Design Authority is the Directorate of Soldier Systems Program Management (DSSPM).
- 7.3 Quality Assurance Authority - The Quality Assurance Authority is the Government agency responsible for providing assurance that materiel and services supplied by the contractor conform to specified requirements. The Quality Assurance Authority is the Director General Quality Assurance.
- 7.4 Order of precedence - In the event that any inconsistency in contractual documents such as contract, specification, drawings, and sealed sample, the order of precedence shall be contract, specification, drawings, and sealed sample.

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APPENDIX B2

Performance Requirements for Polymeric Foam, Type I

TABLE 1 - Unprocessed Single Ply Foam Stock (for lamination). EVAZOTE™ EV50 by Zotefoams Inc. has been known to meet this requirement.

PROPERTY	METHOD	Units	TYPICAL VALUES REQUIREMENT	MINIMUM	MAXIMUM
FOAM TYPE			Closed Cell	95	100
DENSITY	ASTM D3575	Kg/m ³		40	52
THICKNESS		mm	As required by the solicitation or to meet performance requirements		
TENSILE STRENGTH	ASTM D412 Die A	kPa	700	600	900
ELONGATION	ASTM D3575	%	130	100	
TEAR STRENGTH	ASTM D624 Die "C"	KN/m Lb/in		≥ 2.1 ≥ 15.2Per T7A	
Compression Set 22 Hrs@50% Rh,73 °F, 24 Hr recovery	ASTM D3575	kPa			≤ 10 T7A
COMPRESSIVE STRENGTH @ 25%	ASTM D3575	%		29	63
COMPRESSIVE STRENGTH @ 50%	ASTM D3575	Kpa		72	142
Operation Conditions		°F °C		-95 -70	+150 +65

ASTM American Society for Testing and Materials

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Performance Requirements for Polymeric Foam, Type II

TABLE 2 - Unprocessed Foam Stock (for lamination). Artilon™ by Youngbo America Inc. A-EVA-30, has been known to meet this requirement.

PROPERTY		METHOD	Units	TYPICAL VALUES REQUIREMENT	MINIMUM	MAXIMUM
FOAM TYPE				Closed Cell	95	100
DENSITY		ASTM D3575	pcf		40	52
THICKNESS			mm	As required by the solicitation or to meet performance requirements		
TENSILE STRENGTH	M CM	ASTM D412 Die A		76 55	50 36	104 75
ELONGATION	M CM	ASTM D412	%	154 180	110 125	198 235
TEAR RESISTANCE	M CM	ASTM D624 Die "C"	Lbs/in ² Lbs/in ²	14 16	8 10	20 21
COMPRESSIVE STRENGTH @ 25%		ASTM D3575	psi	6.7	3.9	9.7
COMPRESSIVE STRENGTH @ 50%		ASTM D3575	kPa	15.5	13	17.5
COMPRESSION SET ORITINAL THICKNESS (50%)		ASTM D3575	%	19	15	25
Thermal Stability	M CM		°F °C	< -2 < -1		

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- M** Machine Direction
- CM** Cross Machine Direction
- Indicates shrinkage
- +** Indicates Expansion