Physical Requirements for Military Textiles

<table>
<thead>
<tr>
<th>Property</th>
<th>Comments</th>
</tr>
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<tbody>
<tr>
<td>Light Weight, Low Bulk</td>
<td>Military items have to be carried by individuals or vehicles with minimal weight and space possible</td>
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<tr>
<td>High Durability and Dimensional Stability</td>
<td>Must operate reliably in adverse conditions for long periods of time without maintenance</td>
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<tr>
<td>Cleanbale</td>
<td>Must be easy to clean</td>
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<tr>
<td>Good Handle and Drape</td>
<td>Comfortable</td>
</tr>
<tr>
<td>Low Noise Emission</td>
<td>Tactically quite: no rustle, no swish</td>
</tr>
<tr>
<td>Antistatic</td>
<td>To avoid incendive or explosive sparks</td>
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Signature Management

... is defined as the knowledge and capability to adopt electromagnetic waves and particle streams to support a specific capability or objective.

MULTISPECTRAL CAMOUFLAGE

SIGNATURE MANAGEMENT INCORPORATES THE POTENTIAL TO CHANGE ABSORBED ENERGY AND PASSIVELY REDUCE INTERNAL HEAT, TO SAVE OPERATIONAL ENERGY AND MAKE LOGISTICS MORE COST-EFFECTIVE.
Tepar specializes in Multispectral Camouflage Products. Its products are specially developed to help prevent target detection by state-of-the-art sensors in all relevant spectral ranges. The products are tailored to the requirements of the customer and adaptable to local conditions.

Our expertise and activities cover the following broad tasks:

- **MMCC** mobile camouflage cover
- **MSCN** static 2 and 3-dimensional camouflage net
- **MCS** camouflage net combined with inflatable membrane
Mobile Camouflage

**MMCC Mobile Camouflage Cover**

Application of a thermal camouflage cover reduces the required power of air conditioning under different speed conditions by a factor 4 to 10 for desert environment (NATO classification A1). At the same time using RADAR absorbing material as insulating material, the tank can be effectively protected against intelligent ammunition with mmW-seeker head. Furthermore special attention is paid to usage and durability. The camouflage does not hinder the maneuverability, use of the weapons and access to the accessories, handles etc.

The covers are specifically tailored to any vehicles and therefore grant access to accessories and handles on the surface of the vehicle. The cover is made of multiple elements each of them is designed to a specific part of the vehicle. Therefore the covers can be easily removed for servicing the vehicles. Typical mounting time for a crew of 3 soldiers is about 20 minutes.
Multispectral Camouflage

MSCN Static 2-dimensional Camouflage Net (patented)

The multispectral camouflage nets are based on a multilayer coated polymer fabric. The patented coating of the fabric effects the reduction of signature in the multispectral range (radar and thermal infrared). The manufactured material can be printed in accordance with specific customer and application requirements so as to achieve an optimal camouflage effect in the visual range.

The textile characteristics of the coated fabric such as temperature stability, adhesion of the coating, fire resistance and water repellence are of absolute state-of-the art technology. The chemicals used to achieve flame retardancy comply with recommendations made by the WHO.

The net has a weight of approx. 140 g/m², making it one of the lightest and most advanced camouflage textiles on the market. This new camouflage net is optimally designed for the camouflage of objects at short notice, but also for use in the personal protection of soldiers.
Multispectral Camouflage

MSCN Static 3-dimensional Camouflage Net

The multispectral camouflage nets are based on a multilayer coated textile fabric whereby each coating layer is dedicated to counter the reconnaissance sensors in a specific wavelength range. This fabric is incised with a customer specific pattern and clipped onto a carrier net. The carrier net only has structural but no camouflaging function. Camouflage effectiveness is based on the combined characteristics of the fabric and the incision geometry only.

The textile characteristics of the coated fabric like temperature stability, adhesion of the coating, water repellence and water uptake can be rated as very good. Flame retardant and biocide agents are implement in the coating as well. The flame retardants used are in accordance with the recommendations by the WHO.

The total weight of approx. 270 g/m² corresponds well with usual requirements. Also at lower temperatures the fabric shows no tendency to get stiffer. Different kinds of base nets can be offered, including fine meshes which make the camouflage net non-snagging.
Rapid Deployment Camouflage

MCS Camouflage Net combined with Inflatable Membrane

An inflatable membrane construction is designed to provide rapid deployment camouflage covers for large vehicles, helicopters and combat vehicles by 2 or maximum 4 soldiers within minutes.

The membrane and the camouflage net are firmly fixed to each other and combined in a single package. Only this package must be unloaded from the vehicle and the blower which is included in the package connected to the battery of the vehicle. Within 10 minutes the construction will be erected by inflating. Help is needed only by 2 - 3 soldiers put it in position. Once erected, the construction will be in position without re-inflating for min, 12 hours. The camouflage net which is attached to the membrane is such construed, that the vehicle may drive in or leave the ‘hangar’ any time.
POSSIBILITIES & ADDED VALUE

Tepar Vehicle Uniforms for mission execution, threat response and theatre adaption give the user a host of interlocking capabilities to solve problems in a unique and balanced way.
Threats in the Multispectral

**Threat**: VIS

**Answer:**

To use of camouflage to disrupt an outline by merging it with its surround.
Multispectral Camouflage Products

**SIGNATURE RANGE**

<table>
<thead>
<tr>
<th>Gamma</th>
<th>X-ray</th>
<th>UV</th>
<th>VIS</th>
<th>IR</th>
<th>Microwave</th>
<th>Radio</th>
</tr>
</thead>
</table>

- **Device**
  - **visual**
  - **near IR**
  - **mid IR**
  - **long IR**

  - **right vision goggles**
  - **thermal cameras of today’s standard**
THREATS IN THE MULTISPECTRAL BATTLEFIELD

*Threat:* NIR

*Answer:* Use of camouflage and the management of the spectral reflectivity

*NIR:* Near infrared image intensifiers are sensitive to this area of the spectrum.
THREATS IN THE MULTISPECTRAL BATTLEFIELD

Threat: MIR

Answer:
Heat signature management in order to reduce thermal radiation

MIR: Thermal Infrared - This is the “thermal imaging” region, in which sensors and “homing heads” can obtain a completely passive picture based on thermal emissions only
THREATS IN THE MULTISPECTRAL BATTLEFIELD

*Threat:* RADAR

*Answer:* Management of clutter and absorption of radar signals

*RADAR:* Radar is an object-detection system which uses radio waves to determine the range, altitude, direction, or speed of objects.
OUR ANSWERS TO THE TODAY'S THREATS

**IRBD** - Thermal Infrared Battledress Uniform

**MSCN** - Multispectral Camouflage Net

**MMCC** - Multispectral Mobile Camouflage Cover
MSCN 3D
MULTISPECTRAL CAMOUFLAGE NET 3D

MSCN 3D in brief:

- Multilayer coated textile fabric
- Shielding efficiency up to 87%
- Temperature increase <2°C relative to ambient temperature (low solar loading)
- Detection range is reduced to half distance
- No distinctive signature characteristics is perceivable through the camouflage net
- Identification of the camouflaged equipment is almost impossible
RELIABLE CAMOUFLAGE FOR ALL CLIMATE ZONES

- multilayer coated textile fabric
- shielding efficiency up to 87%
- temperature increase <2°C relative to ambient temperature (low solar loading)
- detection range is reduced to half distance
- no distinctive signature characteristics is perceivable through the camouflage net
MSCN 3D
MULTISPECTRAL CAMOUFLAGE NET 3D
MSCN 3D
MULTISPECTRAL CAMOUFLAGE NET 3D
PERFECT CAMOUFLAGE WITH MINIMAL WEIGHT

- new technology of a multilayer coated polymer fabric
- patented coating effects the reduction of signature in the multispectral range
- extremely lightweight, very low packing volume
- reversible for use in two different geographical areas
- shielding efficiency at least 75%
- temperature increase <2°C relative to ambient temperature (low solar loading)
- no distinctive signature characteristics is perceivable through the camouflage net
MSCN 2D
MULTISPECTRAL CAMOUFLAGE NET 2D

MSCN 2D in brief:
- New technology of multilayer coated polymer fabric
- Patented coating effects the reduction of signature in the multispectral range
- Shielding efficiency >75%
- Temperature increase < 2°C relative to ambient temperature (low solar loading)
- Extremely lightweight, very low packing volume
- Reversible for use in different areas
- No distinctive signature characteristics is perceivable through the camouflage net
MSCN 2D
MULTISPECTRAL CAMOUFLAGE NET 2D
MMCC
MULTISPECTRAL MOBILE CAMOUFLAGE COVER

MMCC in brief:
- Reliable mobile camouflage solution for high value targets
- Reduction of radar waves 10 – 20 dB
- Reduction of thermal signature by heat convection
- Flexible and environmental resistant
- Specifically tailored to any vehicles
MMCC
MULTISPECTRAL MOBILE CAMOUFLAGE COVER

Performance
Applications
Applications
Arctic environment

High altitude environment
WE WILL KEEP THEM MOVING

- reliable mobile camouflage solutions for high value targets
- reduction of radar waves 10–20 dB
- reduction of thermal signature by heat convection
- flexible and environmental resistant
- specifically tailored to any vehicles
Modern reconnaissance and target seeking systems use sensor for the detection of electromagnetic radiation.

Nowadays, any spectral range for which the earth’s atmosphere is in any way transparent is used. These transparent ranges or “atmospheric windows” include visual (VIS) and near infrared (NIR) ranges, thermal infrared ranges from 3–5 μm and 8–14 μm wavelength (MIR) and microwaves and radar (RADAR) ranges.

Electromagnetic radiation that does not fit any of these ranges is absorbed by air molecules, i.e. in those intermediate ranges the atmosphere is opaque.
Thank you / Teşekkür ederiz