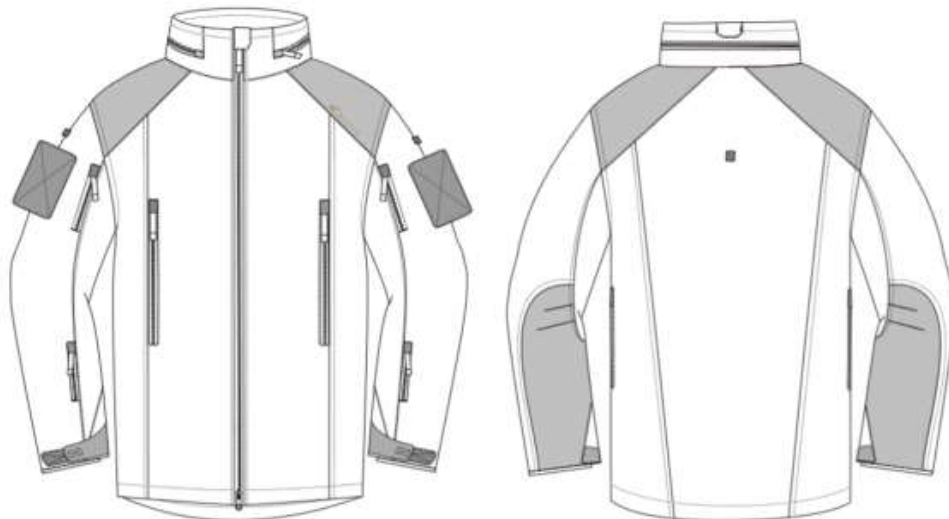


Technical Specification  
**THERMAL CLOTHING**  
**3.1 Jacket**

**HIG 4.0 | HIGH INSULATED GARMENTS**  
**– JACKET**

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## MAIN FEATURES:

- 0 windproof and water-repellent material;  
(2 Layer Laminate ePFTFE membrane)
- 0 reinforcements on shoulders and elbows  
(2 Layer Polyamide)
- 0 covered zipper in closed position, pullable in both directions;  
(2way zipper covered with kissing flaps )
- 0 Hood stowable in the collar
- 0 Ventilation with zippers
- 0 compression bag included;
- 0 use temperature up to -20°C
- 0 Colour olive with IRR

## ADDITIONAL FEATURES:

- 0 G-Loft® High quality Insulation (made in Europe)
- 0 Lined helmet-compatible fixed hood storable in collar with zipper
- 0 Elastic drawstring hood, adjustable in 2 directions
- 0 Width-adjustable collar with neck baffle
- 0 2-way front zipper with wind flap and chin guard
- 0 2 large outer zipp-pockets, lined with thermo fleece
- 0 1 Napoleon inner zipp-pocket
- 0 Zipp-ventilation/access opening on sides
- 0 2 upper arm pockets with Velcro for attaching badges
- 0 1 small pocket on the left forearm
- 0 2 inner pockets
- 0 Pre-shaped sleeves with adjustable cuffs, inner sleeve elastic
- 0 Adjustable, elastic drawcord at hem
- 0 IR / IFF patches




## 1 Technical Requirements – Main Materials

### 1.1 Outer Fabric

Properties	Standard	Requirement
Face fabric properties		
composition		100% Polyamid
construction	ISO 9354	Ripstop
Functional layer	Membrane based on PTFE	
Physical & Mechanical laminate properties		
Weight [g/m²]	ISO 3801, method 5 / EN 12127	≤ 120
Ret [m²Pa/W]	EN ISO 11092	≤ 5
Tensile strength	EN ISO 1421 method 1	Warp ≥ 650 N Weft ≥ 500 N
Tear Strength (Tounge)	EN ISO 4674-1, method A	Warp ≥ 70 N Weft ≥ 70 N
Dimensional stability	EN ISO 5077/EN ISO 3759 EN ISO 6330/6N, dry method F (1 wash cycle)	Warp ≤ 3% Weft ≤ 3%
Abrasion Martindale Face / Backing [Rubs]	EN ISO 12947-2 12kPa/wool SM 25	≥ 100.000
Permeability to air		
Initial		< 5 l/m².s
After 50x/5x wash/dry cycles	EN ISO 6330/6N, dry method F60	< 5 l/m².s
Durability		
Visuell assessment of resistance to delamination after 50x/5x wash/dry cycles	EN ISO 6330/6N, dry method F60	- no delamination (disintegration of composite membrane) - no separation of individual components - no bubbles or crimping (bigger than 3mm) Visuell assessment every 10 wash cycles
Spray rate Initial	EN 24920/ISO 4920	Grade ≥ 5
Oil rate Initial	EN ISO 14419	Grade ≥ 5
Colour fastness properties		
Colour fastness to light	EN ISO 105-B02, method 2	≥ 4-5 Depending on color depth
Colour fastness to washing 60°C	EN ISO 105-C06, C1S Colour change: Staining: (PA) Staining: (CO)	Depending on color depth ≥ 4-5 ≥ 3-4 ≥ 3-4
Colour fastness to water	EN ISO 105-E04 (alkaline/acid) Colour change: Staining: (PA) Staining: (CO)	Depending on color depth ≥ 4-5/4-5 ≥ 3-4 ≥ 3-4
Colour fastness to rubbing	ISO 105-D01 Colour change: Staining: (PA) Staining: (CO)	Depending on color depth ≥ 4-5 ≥ 3-4 ≥ 3-4
Colour Requirements		Note colour fastness and colour requirements meet typical plain colour and



		camouflage requirement for military application
IRR All plain colours	As measured on Perin Elmer Lambda 950 in a range between 800 -1100 nm	Kakhi grey 10-55% Urban grey 10-55% Olive 10-55% Black 10-55% Navy Blue 10-55%
Care Labelling: Related to This Laminate Only		

## 1.2 Inner fabric

Properties	Standard	Requirement
Material		100 % Polyamide 6 or 6.6; 44 dtex; semi dull or dull
Thread count		Warp $\geq$ 650/10cm Weft $\geq$ 440/10cm
Construction		1/1 Ripstop
Weight per m <sup>2</sup> in gram	DIN EN 12127-1	53 g/m <sup>2</sup> $\pm$ 10 g
Breaking load in N/5 cm	DIN EN ISO 13934-1	Warp $\geq$ 500 N Weft $\geq$ 330 N
Tear strength	DIN EN ISO 13937-2	Warp $\geq$ 18 N Weft $\geq$ 18 N
<b>Colorfastness</b>		
To the light	DIN EN ISO 105-B02	min. 5
To rubbing dry and wet	DIN EN ISO 105-X12	min. 4
To washing 40 °C	DIN EN ISO 105-C06	min. 4
*Size changes after 5 washes 40°C	DIN EN 25077*	$\leq$ 3 %
Value of the pH		from 4,8 to 7,5

\* Washing according to DIN EN ISO 6330-4M

Washing machine type A

Drying method F,  $\leq$  50°C

## 1.3 Reinforcement Material (at shoulders, cuffs and elbows)

Properties	Standard	Requirement
Material		100% polyamid 6.6 + ePTFE laminated
Weight	EN 12127 method 5	240 g / m <sup>2</sup> ( $\pm$ 10%)
Weave structure		Plain weave



Tensile strength warp	ISO 13934-1 2013	1600 N
Tensile strength weft	ISO 13934-1 2013	1300 N
Tear strength (3 legs) warp	4674-1A 2003	90 N
Tear strength (3 legs) weft	4674-1A 2003	75 N
Watercolumn	EN 20811 / ISO811	≥ 10.000 MM
<b>Colourfastness</b>		
To washing 60°C	ISO 105C06 2010	Light ≥ 5 Middle ≥ 4 Dark ≥ 3/4
To water	ISO 105E01 2013	Light ≥ 5 Middle ≥ 4 Dark ≥ 3/4
To rubbing dry	ISO 105X12 2001	Light ≥ 5 Middle ≥ 4 Dark ≥ 3/4
To rubbing wet	ISO 105X12 2001	Light ≥ 5 Middle ≥ 3/4 Dark ≥ 3
IRR All plain colours	As measured on Perin Elmer Lambda 950 in a range between 800 - 1100 nm	Kakhi grey 10-55% Urban grey 10-55% Olive 10-55% Black 10-55% Navy Blue 10-55%

#### 1.4 Stretch Material (at cuffs and neck)

Properties	Standard	Requirement
Fiber composition	ISO 1833	Nylon ~80% Elastane ~20%
Weight	EN 12127	170 g / m <sup>2</sup> (± 10%)
Dimensional stability to washing at 40°C C	EN ISO 6330	WIDTH +2% to - 4% LENGTH +2% to -5%

#### 1.5 Thermovelour

Properties	Standard	Requirement
Material		100% PL
Weight	EN 12127	Square 120 g / m <sup>2</sup> (± 10%)
DIMENSIONAL STABILITY TO WASHING AT 40° C	EN ISO 6330	WIDTH -5% / average result LENGTH -5% /average result

#### 1.6 Net (inner pockets)

Properties	Standard	Requirement
Material		100% PES or PA
Weight	EN 12127	190 g / m <sup>2</sup> (± 10%)
Tensile Strength	EN ISO 13934-1:1999 50mm Strip Method	≥ 450N Warp ≥ 600N Weft



Net Colourfastness		
Crocking, Wet and Dry	EN 105 X12:2002	≥ 4 for “pure” finished goods only
Water	EN 105 EO1:1996	≥ 4
Perspiration, Acid & Alkali	EN 105 EO4:1996	≥ 4

### 1.7 Heat reflection insert

Material	100 % polypropylene, white
Fibrous structure	loose filaments, thermobonded, without additives
Breaking load	N/50 mm, DIN EN 29073-3, lengthwise/crosswise 24 N/15 N
Weight	15,0 to 19,0 g/m <sup>2</sup> DIN EN 29073-1
Aluminised	82 mg/m <sup>2</sup> , (+/- 10%), on one side

### 1.8 Quilting insert, pp-spunbond

Material	100 % polypropylene, white
Breaking load	N/50 mm, DIN EN 29073-3, lengthwise/crosswise 24 N/18 N
Fibrous structure	loose filaments, thermobonded, without additives
Weight	15,0 to 17,0 g/m <sup>2</sup>

### 1.9 Polyester Insulating Fleece (145g – Body; 110g – Sleeves)

Fiber quality	100 % original brand polyester fiber (hybrid fiber) with conjugate, helical crimp and silicone-finished fiber surface.
Manufacture	Insulation made of thermobond and spray-bonded random-fiber polyester consisting of 3 different polyester fibers (i.e., Hollow Fiber, Micro Fiber and Thermobond Fiber)

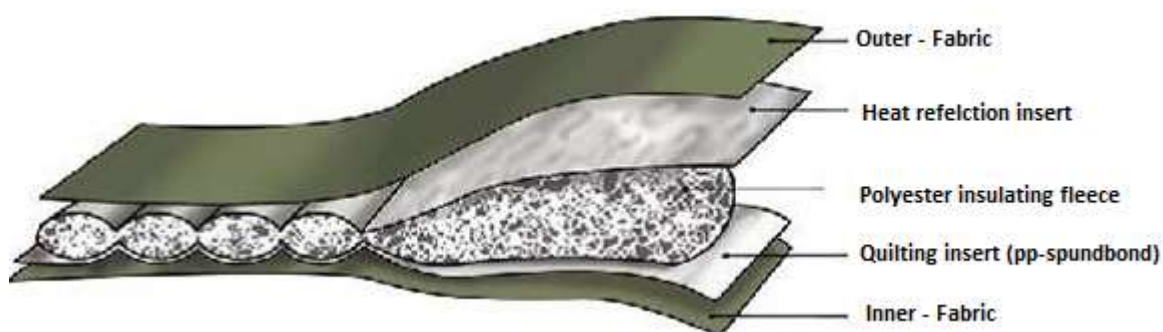


### 1.9.1 Basic Performance Parameters

Parameter	Product Targets 145 g	Product Targets 110 g	Tolerances	Test Methods
Area Weight (g/m <sup>2</sup> )	145	110	± 10 %	DIN EN 29073-1
Thickness (mm)	25	19	min.	DIN EN ISO 9073-2
Thermal Resistance R <sub>ct</sub> (m <sup>2</sup> K/W)*	0,47	0,37	min.	DIN/EN 31092:1994-02A resp. ISO 11092:1993-10A

\*Measured in new and unquilted condition

## 2 Structure



### Physiological Properties

Taken from the finished jacket

R <sub>ct</sub> -Value*		
145 g insulation (body)	DIN EN 31092 ISO 11092	≥ 0,400 m <sup>2</sup> K/W
110 g insulation (sleeves)	DIN EN 31092 ISO 11092	≥ 0,310 m <sup>2</sup> K/W

\*Measured in new and unquilted condition

## 3 Accessories

### 3.1 Zipper (All zippers according to DIN EN 3418)

#### 3.1.1 Front Zipper

Type	two-way zipper-devideable
Modell	Water repellent; 6 to 7 mm spiral
Material	polyester

#### 3.1.2 Zippers on the outside



Type	one-way zipper
Modell	Water repellent; 6 to 7 mm spiral
<b>3.1.3 Zipper (inside mesh pockets)</b>	
Type	one-way zipper
Modell	6 to 7 mm spiral
<b>3.1.4 Zipp Slider</b>	
Material	Zinc die cast, Stainless steel

## 3.2 Hook and Loop Fastener (according to DIN 3415-A, ISO 9001:2015)

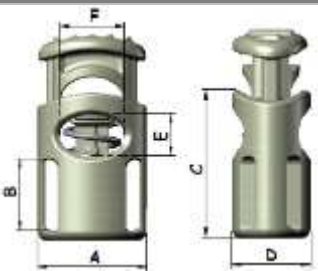
### 3.2.1 Hook and Loop Fastener (according to DIN 3415-A, ISO 9001:2015)

Material	100% Polyamid
Mass per unit area	~ 330g / m <sup>2</sup> hook and ~ 330g / m <sup>2</sup> loop part
after 10.000 openings & closings (EN1414)	
peel strength (EN 12242)	min.0,60N/cm
shear strength (EN 13780)	min.3,0N/cm <sup>2</sup>

### 3.2 Hook and Loop Fastener (upper arm patches)

Material	100% Polyamid – Velour
Mass per unit area	~ 180g / m <sup>2</sup> loop part

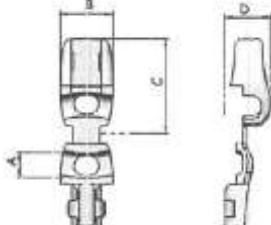
## 3.3 Cord-Stopper


Modell	GTSP or equivalent with hole for self cleaning of snow and dirt	
Material	Polyamide (PA6, Nylon) or POM	
Color	olive	
Measurement	A14,5 B9,5 C 19,5 D10,4 E 5,5 F 8,5mm Tolerance ±0,5mm	

## 3.4 Cord- Clip

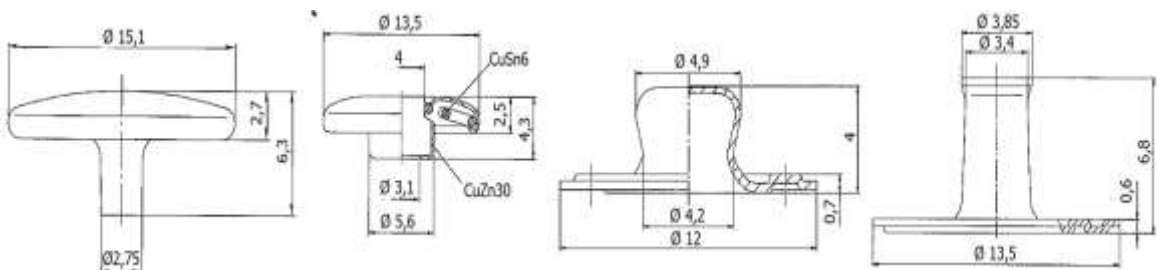
Material	Polyamide (PA6 or 6.6) or POM
Color	Black or olive



Measurement	A3,8 x B7,9 x C14,8 x D6,7 mm Tolerance $\pm 0,5$ mm	
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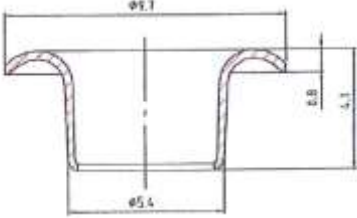
3.5 Cord- End		
Material	Rubber	
Color	Black or olive	
Measurement	A 20 x B 7 x C 8 mm (Tolerance $\pm 5\%$ )	

3.6 Hanging-Loop (inside)	
Material	100% Polyester
Weave structure	rip
Width	8 mm $+0,5$ mm; $-1,0$ mm

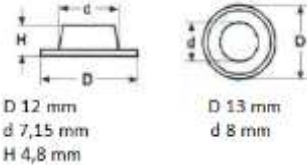
3.7 Press studs	
Material	brass
Color	brass
	
Tolerance $\pm 3\%$	

### 3.8 Eyelet

#### 3.8.1 Eyelet 5

Material	Brass
Colour	Brass
	
Tolerance $\pm 0,5\text{mm}$	

#### 3.8.2 Eyelet 7

Material	Brass
Colour	Brass
	
Tolerance $\pm 0,5\text{mm}$	

### 3.9 Elastic Draw Cord

Material	Latex Nr.30, PES 167x1
Diameter	$3 \pm 0,5 \text{ mm}$
Elasticity/Shrink	$\pm 5\%$

### 3.10 Draw Cord

Material	Polyester or PA
Color	white
Diameter	$3 \pm 0,5 \text{ mm}$

### 3.11 Elastic Rubber Band

Material	Latex Nr.30, PES 167x1
Thickness	$1,5 \pm 0,3 \text{ mm}$
Width	$24,5 \pm 1\text{mm}$
Elasticity/Shrink	$\pm 5\%$

### 3.12 Threads

#### Overlock Thread

Material	Poly/Poly
Construction	Core spun
Linear Density (Nm)	Approx. 60/2 (EN ISO 2060)

#### Sewing / Quilting Thread

Material	Poly/Poly
Construction	Core spun
Linear Density (Nm)	Approx. 50/2 (EN ISO 2060)

## 4 Compression Bag

### 4.1 Main Material Composition (textile)

Parameter	Test method	Value
Material		100% Polyamide + PU
Weight		$\leq 160 \text{ g/m}^2$
Shrinkage wash 40°C warp	ISO 5077 2007	$\pm 3,00 \%$
Shrinkage wash 40°C weft	ISO 5077 2007	$\pm 3,00 \%$
Tensile strength warp	ISO 13934-1 2013	$\geq 700 \text{ N}$
Tensile strength weft	ISO 13934-1 2013	$\geq 450 \text{ N}$
Tear resistance warp	ISO13937-1 2000	$\geq 35 \text{ N}$
Tear resistance weft	ISO13937-1 2000	$\geq 35 \text{ N}$
Watercolumn	ISO811 1981	$\geq 1000\text{mm}$
Colorfastness to washing 40°C	ISO105C06 2010	min. 4
Colorfastness to rubbing dry	ISO105X12 2001	min. 4
Colorfastness to rubbing wet	ISO105X12 2001	min. 3-4

### 4.2 Belt (Compression Bag)

Material	94% PES + 6%PA
Width	20 $\pm$ 1mm
Thickness	1 $\pm$ 0,5mm

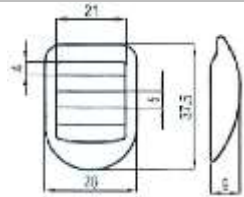
### 4.3 Draw Cord

Material	100% Polyester or PA
Diameter (when used round draw cord)	4 $\pm$ 1mm



Width (when used flat draw cord)	5 ± 1mm
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#### 4.4 Buckle

Material	PA or POM	
Tolerance	±0,25mm	

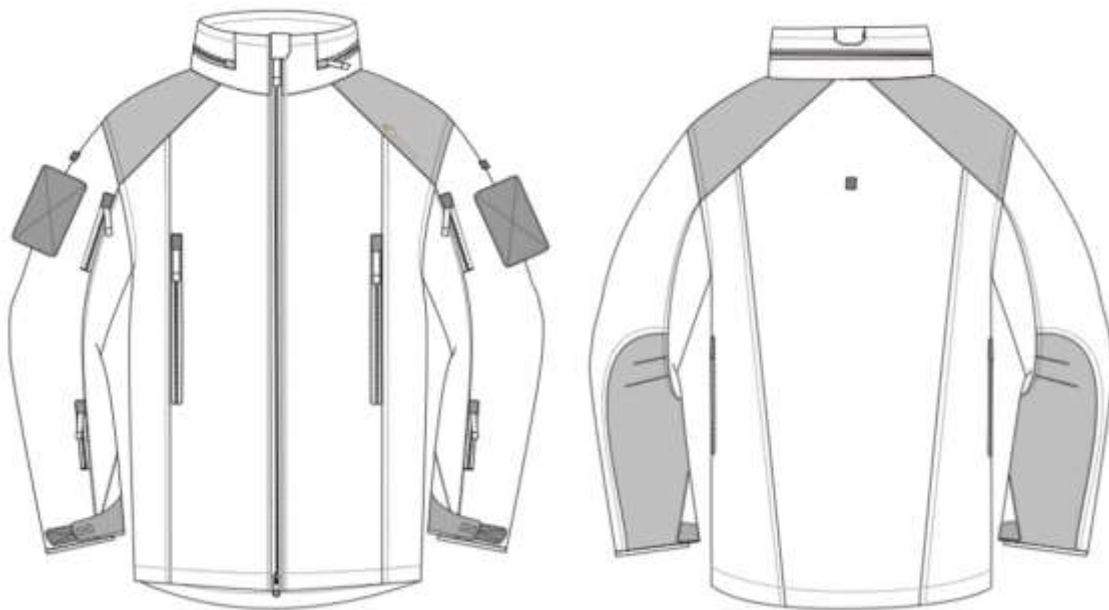
#### 4.5 Cord Stopper

Material	POM or PA
Diameter	Fitting to the drawcord (4.3)

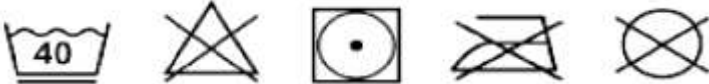
5 Measurements * all measurements are in cm							
Size	S / 44	M / 48	L / 52	XL / 56	XXL / 60	XXXL / 64	
Back panel length	79	82	85	87	88	89	cm
Collar height	10	10	10	10	10	10	cm
Front length (incl. collar)	76	79	82	84	85	86	cm
½ Chest circumference	61	65	69	73	77	81	cm
½ Hem circumference	58	62	66	70	74	78	cm
Shoulder width	15,8	16,4	17	17,6	18,2	18,8	cm
Sleeve length	65,5	67,5	69,5	71,5	73,5	73,5	cm
½ Sleeve cuff	15,5	16	16,5	17	17,5	18	cm
½ Width of the hood	28	29	30	31	32	33	cm
½ Height of the hood	37,5	38	38,5	39	39,5	39,5	cm
Front zipper	75	78	81	83	84	85	cm
side pockets	28	28	28	28	28	28	cm
side seam opening (Ventilation incl. Zipp Garage)	19	19	19	19	19	19	cm
sleeve pockets	16	16	16	16	16	16	cm
left sleeve pocket	14	14	14	14	14	14	cm
inner pocket	18	18	18	18	18	18	cm
collar zipper	45	47	49	51	53	55	cm
compression bag height	35	35	35	35	35	35	cm
compression bottom	19	19	19	19	19	19	cm
weight of finished product	1.080	1.120	1.160	1.200	1.250	1.280	gr.
weight of PS	70	70	70	70	70	70	gr.

Note: A tolerance up to ±3% is applicable for all measurements

A tolerance up to ±10% is applicable for all weights



## 6 CARE INSTRUCTIONS



- Use very little amount of mild detergent only
- Use no softener
- Rinse thoroughly