

<b>Grey Cloth Standard</b> (Specification for Textile Fabrics)	Oct. 2013  <b>Page 1</b> of 11		<u>FB-7-001</u> Gustav Ernstmeier GmbH & Co. KG Bülowstraße 20 D - 32049 Herford
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## Preface

Gustav Ernstmeier GmbH & Co. KG (ERATEX) processes raw fabric and other textile fabrics for high-performance products that require high demands in terms of performance, quality and reliability. These fabrics are either sourced directly from the manufacturers or are provided by customers for commission finishing.

The objective of this Grey Cloth Standard and this specification respectively is to ensure the permanent supply of company Gustav Ernstmeier GmbH & Co. KG (ERATEX) with perfect quality fabrics.

ERATEX expects its suppliers to ensure compliance with the specifications by a suitable quality management. ERATEX also reserves the right to conduct process and system audits. Compliance with the specified characteristics will be documented by test certificates. This eliminates duplicate measuring of features in incoming inspection.

This specification consists of a general section with attachments which describes the general requirements of textile fabric and the product-specific data sheets.

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### Attachments:

Appendix 1:	Sample Data Sheet ERATEX FB-7-035
Appendix 2:	Inspection Protocol ERATEX FB-8-032
Appendix 3:	Sample Test Certificate

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## 1. Technological Requirements

Product-specific requirements for fabric to be used are defined in individual data sheets, of which the supplier is provided with a current version attached to each ordering.

An example of a relevant data sheet is attached as **Appendix 1**.

In addition to product-specific guidelines in the data sheets general requirements for textile fabrics are defined in the following sections 2 - 7.

ERATEX customers for commission finishing must inform ERATEX if diverging properties have been agreed upon with their cloth suppliers, as ERATEX will have to consider whether subsequently finished cloth specifications need to be adjusted due to diverging grey cloth features.

Exemptions from product-specific requirements in data sheets or general requirements in sections 1-7 require prior approval by ERATEX.

## 2. Restricted Use of Substances

According to German law, textile finishing effluents are restricted and require a careful selection of ingredients for yarn and fabric manufacturing.

Hence the following requirements for all textile fabrics must be observed:

- No use of synthetic warp sizes with DOC elimination degree after 7 days below 80%.
- No use of alkyl phenol ethoxylates (APEO).
- No use of surfactants with DOC elimination degree after 7 days below 80%.  
Surfactants are organic surface-active agents with washing and wetting properties which reduce the surface tension of distilled water at a concentration of 0.5% and a temperature of 20°C to 0.045 N/m or less.
- No use of organic chelating agents with DOC elimination degree after 28 days below 80%.

Also, supplied textile fabrics must not contain:

- Substances that contribute to the AOX content of wastewater
- Biocides: Pesticides, herbicides, and fungicides etc. up to MAX 100 ppm (sum of biocides)
- Substances which lead to entry of heavy metals in waste water
- Substances with significantly increased radioactivity
- Non-ROHS compliant substances
- Substances not registered for this use according to REACH-exposure scenarios
- Substances on the SVHC list applicable at the time of the order was placed

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### 3. Warp Sizes for Raw Cloth

Depending on fibre raw materials different requirements for warp sizes are valid:

Permitted ranges for the size content (3.4.) are specified in the respective grey cloth data sheets.

#### 3.1. Cotton and Staple Fibre blends with cotton contents of at least 33% weight.

Permitted are:

- native starch, starch ethers and starch esters.
- alkali-resistant, biodegradable polyvinyl alcohol
- polyacrylates and galactomannanes up to 33% dry weight of the total warp size.
- Non-alkaline resistant polyvinyl alcohol may be used only with explicit permission.

#### 3.2. Cellulosic Staple Fibre

Permitted are:

- easily soluble starch derivatives (leaching temperature of 60 °C max)
- alkali-resistant, biodegradable polyvinyl alcohol
- galactomannanes
- polyacrylates up to 33% dry weight of the total warp size

#### 3.3. Polyester (PET)-Staple Fibre

Permitted are:

- polyvinyl alcohol
- polyacrylates up to 15% dry weight of the total warp size

#### 3.4. Determination of size content in accordance with ERATEX PA-8-002

Two 100 cm<sup>2</sup> - round samples are dried for 60 min in a recirculating air oven at 105 °C, cooled in a desiccator over dry silica gel and weighed to give the "dry weight".

Subsequently the two samples are immersed for 30 min at 65 °C into a dilute solution of amylase (200 ml BGXC Desamyl HT in 200 ml of water).

After thorough washing under running water the samples are dried for 60 min in a recirculating air oven at 105 °C, cooled in a desiccator over dry silica gel and weighed to give the "desized weight".

The size content [% weight] is calculated as follows:

$$\frac{(\text{dry weight} - \text{desized weight})}{\text{dry weight}} \times 100 = \text{size content [\%]}$$

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#### 4. Requirements for Textile Fabrics (Specifications)

##### 4.1. Widths

The maximum permissible deviation in the width is + 20 mm.  
Deliveries in lower than nominal width are not permitted (tolerance range: -0 mm / +20 mm).  
See the relevant data sheets for details.

##### 4.2. Piece Lengths

A continuous seamless textile fabric without joints is defined as a piece.  
Maximum piece lengths are to be pursued.

##### 4.2.1. Piece Lengths for Abrasive Backing Cloth

Minimum piece length:	1000 m
Short piece:	1000 m - 500 m
Amount of short pieces:	Maximum 1 short piece per delivered 10 000 m is permitted
Not permitted piece lengths:	< 500 m

##### 4.2.2. Piece Lengths for Technical Textiles

The specific requirements for piece lengths for technical textiles are given in the relevant data sheets.

##### 4.3. Dimensional Inspection

The length is controlled on an officially calibrated measuring device.  
A maximum deviation of  $\pm 0.3\%$  compared to the information on individual or overall lengths in the delivery note will be tolerated.

##### 4.4. Selvedge Design

Selvedge design based on representative samples is to be released by ERATEX prior to the first delivery.

Data for the maximum allowable thickness difference between edge and centre, as well as requirements to the selvedge design, are given in the data sheets for textile fabrics.

##### 4.5. Thread Count (Picks and Ends)

Maximum deviations for the specified thread count in warp (picks) and weft (ends) from the specifications of the data sheets:

$\pm 1.0\%$  for filament yarns,  
 $\pm 5.0\%$  for staple fibre yarns



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#### 4.10. Specification for Polyester Staple Fibres (PET)

##### 4.10.1. Heat Shrinkage

Heat shrinkage of staple fibres is specified by heat shrinkage of representative reference fabrics with typical constructions.

Specified are the percentages of unrestricted changes in length of flat raw fabric samples in warp and weft after dry heat treatment (recirculating air oven) at T = 130 °C and 180 °C for t = 10.0 minutes .

##### **Heat shrinkage [%], unrestricted, 10.0 min, dry**

Upper limit (UL), target value (TV), lower limit (LL)

Reference Fabric (S4/1, Warp / Weft)			Heat Shrinkage <b>Warp</b> [%]						Heat Shrinkage <b>Weft</b> [%]					
			T = 130 °C			T = 180 °C			T = 130 °C			T = 180 °C		
No.	1/cm	Nm	LL	TV	UL	LL	TV	UL	LL	TV	UL	LL	TV	UL
1	40/16	20/34	2.0	<b>3.0</b>	4.5	6.0	<b>7.5</b>	9.0	1.5	<b>2.3</b>	3.3	4.3	<b>6.1</b>	7.9
2	40/19	20/20	2.0	<b>3.5</b>	4.5	7.1	<b>8.0</b>	9.7	1.5	<b>2.3</b>	3.3	4.3	<b>6.1</b>	7.9
3	40/16	20/12	2.5	<b>3.5</b>	5.0	6.0	<b>7.0</b>	8.5	1.5	<b>2.0</b>	3.8	4.5	<b>5.5</b>	7.0
4	40/14	20/10	2.5	<b>3.5</b>	5.0	6.0	<b>7.0</b>	8.5	1.5	<b>2.0</b>	3.8	4.5	<b>5.5</b>	7.0
5	33/24	28/12	2.3	<b>3.8</b>	5.3	5.7	<b>7.2</b>	8.7	1.9	<b>3.4</b>	4.9	4.4	<b>5.9</b>	7.4
6	25/21	20/10	2.0	<b>3.5</b>	5.0	5.5	<b>7.0</b>	8.5	0.5	<b>2.0</b>	3.5	4.0	<b>5.5</b>	7.0

##### 4.10.2. Polyester Fibre Yarn Count

Upper limit: 1.7 dtex

**Target value: 1.5 dtex**

Lower limit: 1.3 dtex

## 5. Fabric Inspection

The supplied textile fabric must not exceed the maximum fault points given in the data sheet (based on a length of 100 m).

In case of irregularities (such fabric appearance, surface cleanliness, faults), ERATEX carries out an inspection of at least 100 m according to inspection protocol (**Appendix 2**).

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## 6. Test Certificates

At the latest upon delivery a test certificate must be present at ERATEX.

This test certificate must show compliance of the delivered fabric with the requirements of the data sheet (**Appendix 1**).

A sample test certificate is contained in **Appendix 3** to this Grey Cloth Standard.

Textile fabric without an available and valid test certificate will not be further processed at ERATEX.

- 6.1. To ensure the presence of test certificates already at the incoming goods department these shall be attached in written form to the delivery of textile fabric.
- 6.2. To facilitate electronic storage of test certificates these shall be additionally submitted by e-mail to:

[wpz.textil@ernstmeier.de](mailto:wpz.textil@ernstmeier.de)

## 7. Packaging / Presentation of Deliveries on Pallets and Rolls

### 7.1. Delivery Note

The delivery note shall contain at least the following information:

- Supplier
- Designation (construction, raw material, width).
- Buyer (ERATEX or customer)
- Order or commission number
- Delivery quantity, total
- Pallet / roll numbers of the delivery
- Piece list describing the actual piece order, consisting of piece number and piece length for each pallet or roll upward or outward respectively.

### 7.2. Labelling of Pallets and Rolls

Each pallet shall be labeled on four sides, each roll on both sides, the cores remaining free with the following information:

- Supplier
- Designation (construction, raw material, width).
- Total quantity on pallet or roll
- Pallet / roll number according to delivery note

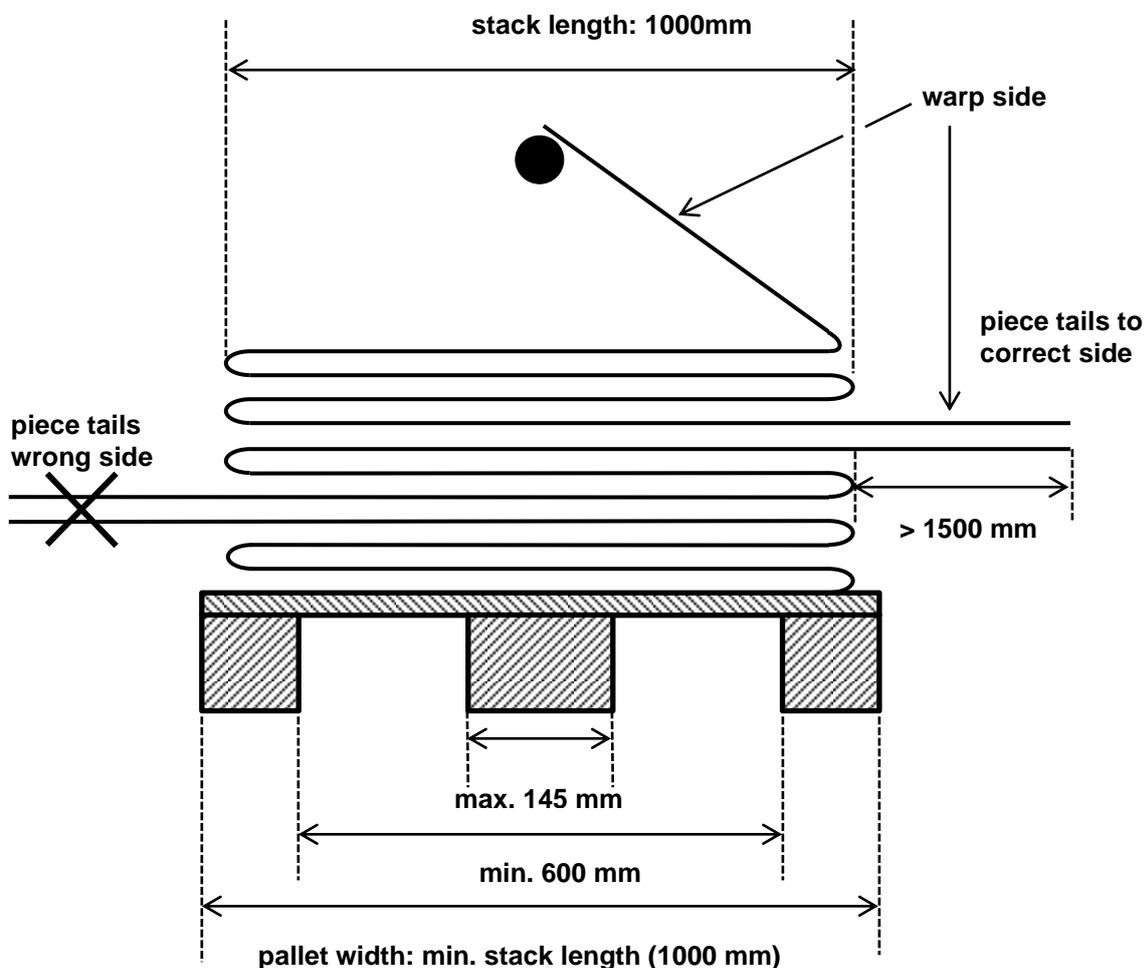
### 7.3. Presentation and Packaging

- Whenever technically possible ERATEX prefers fabrics to be stacked on pallets. Exceptions require approval by ERATEX.
- Each piece shall be labeled with number and piece length according to the piece list in the delivery note.
- Seam construction for connection seams have to be released by ERATEX. Seams must be sewn perpendicular to the web, straight and without offset.

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### 7.3.1. Stacked Fabric on Pallet

- Storage on the pallet with straight edges in layers 1000 mm long.
- Maximum stack height is 1800 mm. Piece tails even if they are sewn on, shall be drawn out for at least 1500 mm. (see sketch below)
- Multiple pieces must be stacked with the same side, warp- or back side respectively facing upwards.
- Reusable or disposable pallets are permitted only with cardboard padding.
- Pallets shall be constructed similar to a euro-pallet. Pallets must be accessible from the side and longer than the width of the textile fabric.
- The dimension limits of pallets according to the sketch below must be observed.



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### 7.3.2. Roll on Pallet

- Rolls shall be wound with straight edges on cardboard cores with an inner diameter of 76 mm or 120 mm and a minimum wall thickness of 10 mm.
- Fabrics exceeding 1910 mm width shall be wound on cores with an inner diameter of 120 mm or 150 mm and a minimum wall thickness of 10 mm.
- Maximum roll diameter:                    1600 mm
- Maximum roll weight:                        1500 kg
- Winding direction:                            Warp side outside
- Seams and joints (i.e. several pieces on a roll) are not permitted.
- Rolls are to be secured on pallets with plastic straps and wedges. To prevent pressure marks chords and wedges shall be bolstered for example with cardboard and must have a sufficient width.
- Construction in minimum and maximum values of pallets for rolls corresponds to the pallet for stacked fabric (section 7.3.1).

### 7.3.3. Packaging / Wrapping

- Pallets shall be secured for transport with plastic chords. To prevent pressure marks these shall be bolstered with cardboard.
- The textile fabric must be protected against moisture during transport. The used packaging must prevent mould stains.
- Preferably transparent wrapping foils shall be used.
- Textile fabric with UV sensitive fibres must be packed with UV opaque film.

All different forms of delivery require the prior authorization by ERATEX.

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## 8. Supplier Declaration for Quality Management

To permanently ensure the requirements to textile fabric described in the present specification including all appendices, we operate a suitable **quality management**.

Compliance with the specified characteristics shall also be documented in **test certificates** and ERATEX is provided with these with the delivered goods.

This declaration releases ERATEX from the need for a comprehensive **incoming inspection** prior to start of production. We hereby waive the objection of late notification of defects.

If **deviations** from these guidelines occur, we will inform ERATEX **before delivery** of the goods.

Supplier / Customer

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Place, Date

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Authorised signature

<b>Rohgewebestandard</b> (Spezifikation für textile Flächengebilde)	Apr. 2013 <u>Anlage 1:</u> <b>Muster Datenblatt</b> <b>Seite 1 von 1</b>		<b>FB-7-001</b> Gustav Ernstmeier GmbH & Co. KG Bülowstraße 20 D - 32049 Herford
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<b>FB-7-035</b>					
<b>Data Sheet</b>			 <b>Gustav Ernstmeier GmbH &amp; Co. KG</b> Bülowstraße 20 D-32049 Herford  qs@ernstmeier.de		
					<b>For Grey Cloth and Other Textile Fabrics</b>
<b>ERATEX-Identification No.</b>		<b>00123 (Example)</b>			
Material (Warp/Weft):	CO mk.com. ring / 35%CO am.card 65%PET OE	Issued:	01 - 2001		
Construction (Thr-Nm):	30/27 - 50/50 L 1/1	Revision:	10 - 2012		
Manufact. designation:		Revision No.	005		
Feature	Specification / Range			Unit	Test Standard
	Min.	Target	Max.		
Width	1500	1500	1520	mm	DIN EN 1773
Material Warp / Weft	CO mk.com. ring / 35%CO am.card 65%PET OE				
Yarn count - warp	30,0			Threads / cm	DIN EN 1049-2
Yarn count - weft	27,0			Threads / cm	DIN EN 1049-2
Yarn number - warp	50			Nm or dtex	DIN EN ISO 2060
Yarn number - weft	50			Nm or dtex	DIN EN ISO 2060
Yarn twist - warp				T / m	DIN EN ISO 2061
Yarn twist - weft				T / m	DIN EN ISO 2061
Construction, pitch	L 1/1				
Selvedge construction	Twisted (Leno), 2 full twists. Panama selvedge. Twist yarns: cotton twine. Brush length: 3 - 5 mm				
Size content*	5,0		10,0	% wt.	ERATEX-method*
Selvedge thickness			0,38	mm	DIN EN ISO 5084
Fabric thickness			0,33	mm	DIN EN ISO 5084
Thickness difference selv. / fabric			0,05	mm	DIN EN ISO 5084
Weight, conditioned 65% r.h.**	120			g / m <sup>2</sup>	DIN EN 12127
Tensile strength - warp**	300			N / 5cm	DIN EN ISO 13934-1
Elongation at break - warp**	9,0			%	DIN EN ISO 13934-1
Elongation at N warp**				%	DIN EN ISO 13934-1
Tensile strength - weft**	280			N / 5cm	DIN EN ISO 13934-1
Elongation at break - weft**	9,0			%	DIN EN ISO 13934-1
Elongation at N weft**				%	DIN EN ISO 13934-1
Max. allowed defects***			20	per 100 lin. m	ERATEX-method***
<p>* Size content according to ERATEX PA-8-005-002 (See also § 3.4 of our Grey Cloth Standard)</p> <p>** Conditioning of test samples according to DIN EN 20139</p> <p>*** Cloth inspection protocol ERATEX FB 8-001-032 (Attachment No. 2 to our Grey Cloth Standard)</p>					
<p><b>Note:</b> - General requirements of our Grey Cloth Standard also apply.</p> <p>- Warp and weft direction are to be understood in the sense of machine or cross direction respectively.</p>					
Revision: 003		Datum: 09/2012		Seite 1 von 1	

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		<b>Inspection Protocol</b> Appendix No. 2 to Specification for Textile Fabrics			<b>FB-8-032</b>	
Protocol No.	Customer	Ident.-No.	Construction / Type / Designation			Points / 100m:
						Permitted Points:
Supplier	Order No.		Pallet No.	Piece No.		Measured length: m
Delivery Date:						Measured width: mm
<b>Defect Rating</b>		up to 2 cm	up to 5 cm	up to 8 cm	above 8 cm	<b>Total</b>
<b>Defect Type</b> ↓		1 Point	2 Points	3 Points	4 Points	per type of defect
<b>Warp / Machine Direction</b>						
damaged end						
knot						
tight / loose end						
thick / thin end						
dark / soiled end						
stripes / reed stripes						
<b>Weft / Cross Direction</b>						
irregular weft density						
damaged pick						
double pick						
kinky weft						
thick / thin weft						
lashed-in / sloughed-off						
<b>Non-directional defects</b>						
thick places / slubs						
oil stains						
creases						
holes						
mends						
fly / foreign fibers						
<b>Other defects</b>						
defective selvage						
temple mark						
drawing-in / weave defect						
change in width						
<b>Remarks :</b>						
<b>Date</b>		<b>Inspector</b>			<b>Release</b>	
					<b>Yes :</b>	<b>No :</b>

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	<b>Muster Prüfzeugnis</b> Seite 1 von 1		Gustav Ernstmeier GmbH & Co. KG Bülowstraße 20 D - 32049 Herford

<b>Test Certificate</b>							<b>Manufacturer</b>		
<b>For Grey Cloth and Other Textile Raw Materials</b>									
<b>Customer</b>						<b>Order No. ERATEX / Cust.</b>			
<b>ERATEX-Identif. No.</b>						<b>Width [mm]</b>			
Manufacturer designation						<b>Total length [m]</b>			
<b>Construction, pitch</b>						<b>Number of pallets</b>			
<b>Material (warp / weft)</b>	/					<b>Delivery note No.</b>			
<b>Construction (Thr - Nm)</b>	/ - /					<b>Test date</b>			
<b>Feature</b>	<b>Specification/Range</b>			<b>Measurement Reading</b>			<b>Unit</b>	<b>Test Standard</b>	
	Min.	Target	Max.	1	2	3			
Width							mm	DIN EN 1773	
Yarn count - warp							Threads / cm	DIN EN 1049-2	
Yarn count - weft							Threads / cm	DIN EN 1049-2	
Yarn number - warp							Nm or dtex	DIN EN ISO 2060	
Yarn number - weft							Nm or dtex	DIN EN ISO 2060	
Yarn twist - warp							T / m	DIN EN ISO 2061	
Yarn twist - weft							T / m	DIN EN ISO 2061	
Size content*							% wt.	ERATEX-method*	
Selvedge thickness							mm	DIN EN ISO 5084	
Fabric thickness							mm	DIN EN ISO 5084	
Thickness difference selv. / fabric							mm	DIN EN ISO 5084	
Weight, conditioned 65% r.h.**							g / m <sup>2</sup>	DIN EN 12127	
Tensile strength - warp**							N / 5cm	DIN EN ISO 13934-1	
Elongation at break - warp**							%	DIN EN ISO 13934-1	
Elongation at N warp**							%	DIN EN ISO 13934-1	
Tensile strength - weft**							N / 5cm	DIN EN ISO 13934-1	
Elongation at break - weft**							%	DIN EN ISO 13934-1	
Elongation at N weft**							%	DIN EN ISO 13934-1	
Max. allowed defects***							per 100 lin. m	ERATEX-method***	
<p>* Size content according to ERATEX PA-8-005-002 (See also § 3.4 of our grey cloth standard)</p> <p>** Conditioning of test samples according to DIN EN 20139</p> <p>*** Cloth inspection protocol ERATEX FB 8-001-032 (Attachment No. 2 to our grey cloth standard)</p>									
<b>Test result:</b>	<b>Meets general requirements of ERATEX-Grey Cloth Standard FB 7-31-001 and specific requirements according to the <u>Data Sheet</u> attached to purchase order.</b>								
	<b>Yes</b>		<b>No</b>		<b>Deviation permit</b>		<b>Inspector:</b>		