Report 52000
Type Examination

Applicant

Rosenbauer International
Aktiengesellschaft
Paschinger Str. 90
Postfach 176
4060 Leonding
ÖSTERREICH

Reference

Mr. Mag. Wieser

Application

Type examination according EN 469.

Test Material

"Fire-fighter trousers FIRE MAX II"

Issuing and Signatures

Number of pages contained: 16+ 12 marked pages of annex.

The trousers were marked with type examination no. 52000 sealed by the Testing Institute. The sample remains in the laboratory.

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Notified Body 0534,
Ing. Peter Trappl

Director,
Dipl.-Ing. Dr. Erich Zippel

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1 Order

1.1 Chronology

Date	*Received*	*Order*
2006-09-05	2006-09-08	Type examination according EN 469.

1.2 Sample Material

No.	*Received*	*Quantity*	*Description*
1	2006-10-31 (1)	"Fire-fighter trousers FIRE MAX II"	F-F- trousers, 1 pair, Size M

(1) Samples provided by the customer. (2) Sample drawn by ÖTI.

1.3 Submitted documents

- Technical file
- Label design
- User information

• Report 27986	Österr. Textil- Forschungsinstitut
• Report 32984	Österr. Textil- Forschungsinstitut
• Report 33189	Österr. Textil- Forschungsinstitut
• Report 37894	Österr. Textil- Forschungsinstitut
• Report 38920	Österr. Textil- Forschungsinstitut
• Report 42743	Österr. Textil- Forschungsinstitut
• Report 44201	Österr. Textil- Forschungsinstitut
• Report 45284	Österr. Textil- Forschungsinstitut
• Report 45410	Österr. Textil- Forschungsinstitut
• Report 45812	Österr. Textil- Forschungsinstitut
• Report 51998	Österr. Textil- Forschungsinstitut
• Report 53182	Österr. Textil- Forschungsinstitut
• Report 53884	Österr. Textil- Forschungsinstitut
• Report 54239	Österr. Textil- Forschungsinstitut
• Report 54487	Österr. Textil- Forschungsinstitut
• Öko-Tex-Zertifikat 53730	Österr. Textil- Forschungsinstitut
• Untersuchungsbericht Nr.1045-7/97	Sächsisches Textil-Forschungsinstitut
• Untersuchungsbericht Nr. 796-1/96	Sächsisches Textil-Forschungsinstitut
• Prüfbericht Z1.0.8197/1	Forschungsinstitut Hohenstein
• Prüfbericht 04.0.9700	Forschungsinstitut Hohenstein
• Test report 2103/05303	Merchandise Testing Laboratories
• Test report 2103/05306	Merchandise Testing Laboratories
• Test report 2103/05307	Merchandise Testing Laboratories
• Test report 30/02958	Fire Technology Services
• Test report 307/36287	Merchandise Testing Laboratories
• Test report 6406/7/STC004	Fire Technology Services

2 Verification of the documents and materials submitted

2.1 Basic safety requirements

Pursuant to: PPE safety regulation Federal Law Gazette no. 596/1994 and PPE safety directive 89/686/EEC in the currently valid version.

The personal protective equipment submitted

Fire-fighter-trousers FIRE MAX II

is part of the protective clothing which - combined with the corresponding jacket – fulfil the requirements of EN 469:2005.

To meet the standards of EN 469 this clothing may only be worn in the mentioned combination (see user information)

Present fire-fighter-trousers have been made waterproof, water vapour permeably and with fixed thermo lining.

Retroreflective stripes on the trousers and on the jacket to be combined are able to increase the visibility, if the sum of the reflective area fulfil the requirements according to EN 469, item 6.14, annex B.1 and B.3. This is to define in the user information of the jacket.

The fire-fighter-trousers are produced in 25° sizes.

Ergonomics of the combined clothing is secured.

2.2 Technical file

The producer description for protective clothing defines the materials used and the clothing industry. A size scheme with body sizes and ready-made sizes is included. 25° sizes are provided.

Optional design is declared.

The following standards and guidelines were considered for the development of the PPE and the technical description:

- PPE Directive 89/686/EEC
- EN 340:2003 Protective clothing, General requirements
- EN 469:2005 Protective clothing for fire-fighters

as well as the respective standards used for this purpose.

2.3 User information

The customer information for this protective jacket includes the indication to wear the articles of clothing only in combination to meet the requirements of EN 469.

The fire fighting protection aspired, the performance level according to EN 469:2005 and the limits of operation have been described.

Use of additional clothing parts against other risks, particularly fire entry (EN 1486) has been described.

Caring and Cleaning as well as the related limits of operation have been specified.

2.4 Description of the final test

Final testing which is performed as reception control into the finished goods inventory is cited in QS-HB.

In addition and pursuant to § 14 PSASV (article 11.A of the PPE directive) a monitoring agreement is also signed.

3 Performance requirements

Compliance of the manufacturing description with the test samples submitted:

Ready made: The compliance with the manufacturer's description and the requirements pursuant to EN 469:2005 was tested by the test report 51 998.

Record regarding innocuousness of PPE materials:

The compliance with the requirements pursuant to EN 340 Pkt. 4.2 was studied as part of the type examination and confirmed through submitted Öko-Tex Standard 100 certificates and documentation by the applicant's suppliers.

Properties of the materials according EN 469:2005

Test	unit	requirements	results
Mass per square metre			
Outer material, dark blue	g/m²	-	193
Outer material, red	g/m²	-	220
Membrane	g/m²	-	142
Thermo liner	g/m²	-	266
Limited flame spread EN ISO 15025 - A			
Flame application on the outside of the assembly with dark blue outer material			
Flame spread to any edge		no	no
Hole formation		no	no
Molten or burning debris		no	no
Afterflame time	s	≤ 2	0
Afterglow spreading	s	no	no
Flame application on the outside of the assembly with red outer material			
Flame spread to any edge		no	no
Hole formation		no	no
Molten or burning debris		no	no
Afterflame time	s	≤ 2	0
Afterglow spreading	s	no	no
Flame application on the innermost layer			
Flame spread to any edge		no	no
Hole formation		no	no
Molten or burning debris		no	no
Afterflame time	s	≤ 2	0
Afterglow spreading	s	no	no
Flame application on the seam			
Flame spread to any edge		no	no
Hole formation		no	no
Molten or burning debris		no	no
Afterflame time	s	≤ 2	0
Afterglow spreading	s	no	no

Test	unit	requirements	results
Thermal protective index (flame) EN 367		Level 2	
assembly with dark blue outer material			
HTI_{24}	s	≥ 13	16,5
HTI_{24} - HTI_{12}	s	≥ 4	4,7
assembly with red outer material			
HTI_{24}	s	≥ 13	17,0
HTI_{24} - HTI_{12}	s	≥ 4	4,0
Radiant heat flux EN ISO 6942-B-40 kW/m²		Level 2	
assembly with dark blue outer material			
$RHTI_{24}$	s	≥ 18,0	18,5
$RHTI_{24}$ - $RHTI_{12}$	s	≥ 4,0	4,7
assembly with red outer material			
$RHTI_{24}$	s	≥ 18,0	26,7
$RHTI_{24}$ - $RHTI_{12}$	s	≥ 4,0	4,0
Residual tensile strength when exposed to radiant heat EN ISO 6942-A-10kW/m²			
outer material dark blue			
Length direction	N	≥ 450	1180
Width direction	N	≥ 450	1005
outer material red			
Length direction	N	≥ 450	1249
Width direction	N	≥ 450	869
Heat resistance ISO 17493			
outer material dark blue			
melting, dripping or, ignite		no	no
Shrinking length direction	%	≤ 5	<0,5
Shrinking width direction	%	≤ 5	<0,5
outer material red			
melting, dripping or, ignite		no	no
Shrinking length direction	%	≤ 5	<1,0
Shrinking width direction	%	≤ 5	<1,0
Membrane			
melting, dripping or, ignite		no	no
Shrinking length direction	%	≤ 5	-2,3
Shrinking width direction	%	≤ 5	-4,7
Thermo liner			
melting, dripping or, ignite		no	no
Shrinking length direction	%	≤ 5	-0,7
Shrinking width direction	%	≤ 5	-0,7
Tensile strength EN ISO 13934-1			
outer material dark blue			
Length direction	N	≥ 450	1168
Width direction	N	≥ 450	1012
outer material red			
Length direction	N	≥ 450	1250
Width direction	N	≥ 450	845

Test		unit	requirements	results
Tear strength EN ISO 13937-2				
outer material dark blue				
Length direction		N	≥ 25	50
Width direction		N	≥ 25	52
outer material red				
Length direction		N	≥ 25	43
Width direction		N	≥ 25	50
Seam breaking strength EN ISO 13935-2				
outer material dark blue				
Length direction		N	≥ 225	370
Width direction		N	≥ 225	296
Surface wetting EN 24920				
after washing 5 cycles 60°C				
outer material dark blue		Note	≥ 4	4
outer material red		Note	≥ 4	4
Dimensional change (EN 25 077 - 60°C)				
outer material dark blue				
Length direction		%	≤ 3	-2,3
Width direction		%	≤ 3	-0,7
outer material red				
Length direction		%	≤ 3	-1,7
Width direction		%	≤ 3	-0,7
Membrane				
Length direction		%	≤ 3	+0,2
Width direction		%	≤ 3	+0,4
Thermo liner				
Length direction		%	≤ 3	+0,5
Width direction		%	≤ 3	-0,5
Penetration by liquid chemicals EN ISO 6530				
after washing 5 cycles 60°C				
outer material dark blue with membrane				
40% NaOH	repellency rate /penetration	%/%	≥ 80 / 0	98,7/0
36% HCl	repellency rate /penetration	%/%	≥ 80 / 0	96,0/0
30% H2SO4	repellency rate /penetration	%/%	≥ 80 / 0	98,1/0
o-Xylen	repellency rate /penetration	%/%	≥ 80 / 0	89,9/0
outer material red with Membrane				
40% NaOH	repellency rate/penetration	%/%	≥ 80 / 0	99,2/0
36% HCl	repellency rate /penetration	%/%	≥ 80 / 0	97,1/0
30% H2SO4	repellency rate /penetration	%/%	≥ 80 / 0	98,2/0
o-Xylen	repellency rate /penetration	%/%	≥ 80 / 0	88,0/0
Water penetration EN 20811 after washing 5 cycles 60°C			Level 2	passed
Membrane		kPa	≥ 20	> 20
Membrane – Seam		kPa	≥ 20	> 20
Water vapour resistance EN 31092			Level 2	passed
material combination				
R_{et}		m^2Pa/W	≤ 30	24,5

Properties of zip fastener according EN 469:2005

Test	unit	requirements	results
Limited flame spread EN ISO 15025 - A			
Flame spread to any edge		no	no
Hole formation		no	no
Molten or burning debris		no	no
Afterflame time	s	≤ 2	0
Afterglow spreading	s	no	no
Able to function after test		yes	yes
Heat resistance ISO 17493 at 180 ± 5 °C			
melting, dripping or, ignite		no	no
Shrinking length direction	%	≤ 5	-3,4
Shrinking width direction	%	≤ 5	-1,6
Able to function after test		yes	yes

Properties of anti-wicking barrier according EN 469:2005

Test	unit	requirements	results
Limited flame spread EN ISO 15025 - A			
Flame spread to any edge		no	no
Hole formation		no	no
Molten or burning debris		no	no
Afterflame time	s	≤ 2	1
Afterglow spreading	s	no	no
Heat resistance ISO 17493 at 180 ± 5 °C			
melting, dripping or, ignite		no	no
Shrinking length direction	%	≤ 5	-0,5
Shrinking width direction	%	≤ 5	-0,1
Dimensional change ISO 5077 - 5x60°C			
Length direction	%	≤ 3	-2,0
Width direction	%	≤ 3	-0,3

Properties of strengthening according EN 469:2005

Test	unit	requirements	results
Limited flame spread EN ISO 15025 - A			
Flame spread to any edge		no	no
Hole formation		no	no
Molten or burning debris		no	no
Afterflame time	s	≤ 2	2,0
Afterglow spreading	s	no	no
Heat resistance ISO 17493 at 180 ± 5 °C			
melting, dripping or, ignite		no	no
Shrinking length direction	%	≤ 5	0,0
Shrinking width direction	%	≤ 5	0,0
Penetration by liquid chemicals EN ISO 6530 after washing 5 cycles 60°C			
40% NaOH repellency rate /penetration	%/%	≥ 80 / 0	98,5 / 0
36% HCl repellency rate /penetration	%/%	≥ 80 / 0	92,5 / 0
30% H2SO4 repellency rate /penetration	%/%	≥ 80 / 0	97,3 / 0
o-Xylen repellency rate /penetration	%/%	≥ 80 / 0	82,7 / 0
Dimensional change (EN 25 077 - 60°C)			
Length direction	%	≤ 3	-2,5
Width direction	%	≤ 3	-1,0

Properties of knee-pads according EN 469:2005

Test	unit	requirements	results
Limited flame spread EN ISO 15025 - A			
Nonwoven			
Flame spread to any edge		no	no
Hole formation		no	no
Molten or burning debris		no	no
Afterflame time	s	≤ 2	2,0
Afterglow spreading	s	no	no
cover fabric			
Flame spread to any edge		no	no
Hole formation		no	no
Molten or burning debris		no	no
Afterflame time	s	≤ 2	0
Afterglow spreading	s	no	no

Properties of hook and loop fastener according EN 469:2005

Test	unit	requirements	results
Limited flame spread EN ISO 15025 - A			
Hook tape			
Flame spread to any edge		no	no
Hole formation		no	no
Molten or burning debris		no	no
Afterflame time	s	≤ 2	2,0
Afterglow spreading	s	no	no
Limited flame spread EN ISO 15025 - A			
Loop tape			
Flame spread to any edge		no	no
Hole formation		no	no
Molten or burning debris		no	no
Afterflame time	s	≤ 2	1,7
Afterglow spreading	s	no	no
Heat resistance ISO 17493 at 180 ± 5 °C			
Hook and loop tape			
melting, dripping or, ignite		no	no
Shrinking length direction	%	≤ 5	-4,5
Shrinking width direction	%	≤ 5	-4,1

Properties of the silver retroreflective strips 3M 8935

Test	unit	requirements	results
Retroreflection			
New material	class	2	2
After abrasion	cd/lx*m²	≥ 100	40
After flexing	cd/lx*m²	≥ 100	539
After folding at cold temperature	cd/lx*m²	≥ 100	584
After temperature variation	cd/lx*m²	≥ 100	549
after washing 50 cycles 60°C	cd/lx*m²	≥ 100	449
After dry cleaning 30 cycles	cd/lx*m²	≥ 100	511
Influence of rainfall	cd/lx*m²	≥ 100	431
After heat exposure ISO 17493 at 180°C	cd/lx*m²	≥ 100	544
Limited flame spread EN ISO 15025 - A			
Flame spread to any edge		no	no
Hole formation		no	no
Molten or burning debris		no	no
Afterflame time	s	≤ 2	1
Afterglow spreading	s	no	no
Heat resistance ISO 17493 at 180 ± 5 °C			
melting, dripping or, ignite		no	no
Shrinking length direction	%	≤ 5	passed
Shrinking width direction	%	≤ 5	passed

Properties of the yellow strips with combined performance 3M 8987

Test	unit	requirements	results
Colour, new material		fluorescent	
Co-ordinate	x/y	yellow	passed
Luminance factor	β	≥ 0,70	0,85
Colour after Xenon		fluorescent	
Co-ordinate	x/y	yellow	passed
Luminance factor	β	≥ 0,70	0,78
Retroreflection			
New material	class	combined	passed
After abrasion	cd/lx*m²	≥ 30	72
After flexing	cd/lx*m²	≥ 30	170
After folding at cold temperature	cd/lx*m²	≥ 30	181
After temperature variation	cd/lx*m²	≥ 30	178
after washing 20 cycles 60°C	cd/lx*m²	≥ 30	78
After dry cleaning 25 cycles	cd/lx*m²	≥ 30	169
Influence of rainfall	cd/lx*m²	≥ 15	42
After heat exposure ISO 17493 at 180°C	cd/lx*m²	≥ 100	153
Limited flame spread EN ISO 15025 - A			
Flame spread to any edge		no	no
Hole formation		no	no
Molten or burning debris		no	no
Afterflame time	s	≤ 2	0
Afterglow spreading	s	no	no
Heat resistance ISO 17493 at 180 ± 5 °C			
melting, dripping or, ignite		no	no
Shrinking length direction	%	≤ 5	passed
Shrinking width direction	%	≤ 5	passed

Properties of the yellow-silver- yellow retroreflective strip 3M 9587

Test	unit	requirements	results
Yellow strips			
Colour, new material		fluorescent	
Co-ordinate	x/y	yellow	passed
Luminance factor	β	≥ 0,70	1,15
Colour after Xenon		fluorescent	
Co-ordinate	x/y	yellow	passed
Luminance factor	β	≥ 0,70	1,00
Silver strip			
Retroreflection			
New material	class	2	2
After abrasion	cd/lx*m²	≥ 100	364
After flexing	cd/lx*m²	≥ 100	525
After folding at cold temperature	cd/lx*m²	≥ 100	542
After temperature variation	cd/lx*m²	≥ 100	529
after washing 50 cycles 60°C	cd/lx*m²	≥ 100	436
After dry cleaning 30 cycles	cd/lx*m²	≥ 100	507
Influence of rainfall	cd/lx*m²	≥ 100	350
After heat exposure ISO 17493 at 180°C	cd/lx*m²	≥ 100	348

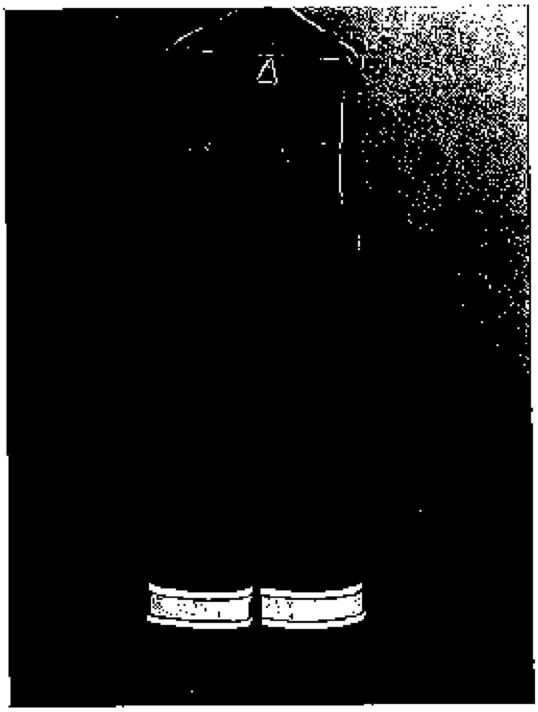
Test	unit	requirements	results
Limited flame spread EN ISO 15025 - A			
Flame spread to any edge		no	no
Hole formation		no	no
Molten or burning debris		no	no
Afterflame time	s	≤ 2	0
Afterglow spreading	s	no	no
Heat resistance ISO 17493 at 180 ± 5 °C			
melting, dripping or, ignite		no	no
Shrinking length direction	%	≤ 5	passed
Shrinking width direction	%	≤ 5	passed

Properties of the yellow-silver- yellow retroreflective strip 3M 9687

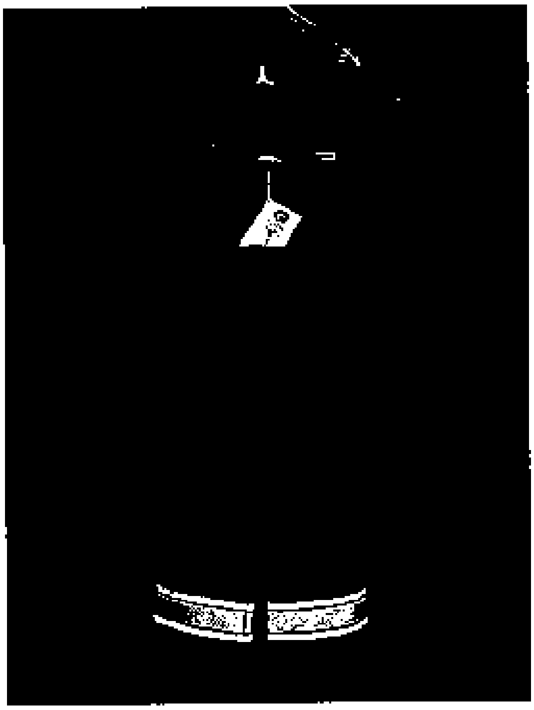
Test	unit	requirements	results
Yellow strips			
Colour, new material		fluorescent	
Co-ordinate	x/y	yellow	passed
Luminance factor	β	≥ 0,70	1,16
Colour after Xenon		fluorescent	
Co-ordinate	x/y	yellow	passed
Luminance factor	β	≥ 0,70	0,95
Silver strip			
Retroreflection			
New material	class	2	2
After abrasion	cd/lx*m²	≥ 100	420
After flexing	cd/lx*m²	≥ 100	576
After folding at cold temperature	cd/lx*m²	≥ 1000	566
After temperature variation	cd/lx*m²	≥ 100	526
after washing 50 cycles 60°C	cd/lx*m²	≥ 100	455
After dry cleaning 30 cycles	cd/lx*m²	≥ 100	485
Influence of rainfall	cd/lx*m²	≥ 100	411
After heat exposure ISO 17493 at 180°C	cd/lx*m²	≥ 100	514
Limited flame spread EN ISO 15025 - A			
Flame spread to any edge		no	no
Hole formation		no	no
Molten or burning debris		no	no
Afterflame time	s	≤ 2	0
Afterglow spreading	s	no	no
Heat resistance ISO 17493 at 180 ± 5 °C			
melting, dripping or, ignite		no	no
Shrinking length direction	%	≤ 5	passed
Shrinking width direction	%	≤ 5	passed

4 Photo - documentation

Front



Back



5 Type examination - assessment

On the basis of documents submitted and the type examination carried out this is to certify:

The new PPE

Fire-fighter- trousers FIRE-MAX II

manufacturer by

Rosenbauer International AG
A-4060 Leonding, Pachingerstraße 90

corresponds to the requirements of the directive 89/686/EEC as currently in force. The PPE fulfils in combination with an equivalent protective jacket the requirements of

Protective clothing for fire-fighter

according to EN 469:2005 level Xf2, Xr2, Y2, Z2.

The new PPE will be assigned to Category III.

6 Remarks

Sample Material

The Type examination report is valid for the provided type sample in conjunction with the provided technical documentation and the test reports. The validity and appropriateness of the test reports for the used materials is the sole responsibility of the applicant.

Without explicit written other agreement testing is destructive and the sample material is transferred to the property of ÖTI, which is entitled to freely decide on storage and disposal.

Quality management and accreditations

All tests and services are performed under a quality management system according to EN ISO 17025.

ÖTI is accredited by several organisations for various tests offered. It also is a Notified Body with the registration number 0534. The accreditation by the Federal Ministry as testing laboratory was repeated under reference 92.714/0211-I/12/2007 (individual accredited test procedures are marked with the federal laboratory logo), the accreditation for testing and surveillance of building products was given by the OIB (Österreichisches Institut für Bautechnik). Details and other accreditations are given on request and can be found on www.oeti.at.

Issuance

The valid first issue is done in paper and has single-handed signatures. For reference purposes and filing an unsigned electronic duplicate can be delivered in pdf format. Duplicates and translations will be marked accordingly on the cover sheet.

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