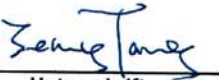



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<i>Test Report No.:</i>		<i>Page 1 of 10</i>	
Auftraggeber: <i>Client:</i>			
Gegenstand der Prüfung: High visibility clothing – warning vest <i>Test item:</i>			
Bezeichnung: <i>Identification:</i>	Art. No. 101	Serien-Nr.: <i>Serial No.:</i>	-
Wareneingangs-Nr.: <i>Receipt No.:</i>	-	Eingangsdatum: <i>Date of receipt:</i>	05 Sep., 2008
Prüfört: <i>Testing location:</i>			
Prüfgrundlage: EN 471:2003+A1:2007, EN 340: 2003 <i>Test specification:</i>			
Prüfergebnis: Der Prüfgegenstand entspricht oben genannter Prüfgrundlage(n). <i>Test Result:</i> The test item passed the test specification(s).			
Prüflaboratorium: TRPS / TÜV Rheinland (Shanghai) Co. Ltd. <i>Testing Laboratory:</i>			
geprüft/ tested by:		kontrolliert/ reviewed by:	
Nov. 14, 08 Jenny Tang/ PE 		Nov 25, 08 Cornelia Albrecht / Reviewer 	
Datum <i>Date</i>	Name/Stellung <i>Name/Position</i>	Unterschrift <i>Signature</i>	Datum <i>Date</i>
			Name/Stellung <i>Name/Position</i>
			Unterschrift <i>Signature</i>
Sonstiges/ Other Aspects:			
Class 2 Level 2			
Abkürzungen: P(ass) = entspricht Prüfgrundlage F(ail) = entspricht nicht Prüfgrundlage N/A = nicht anwendbar N/T = nicht getestet		Abbreviations: P(ass) = passed F(ail) = failed N/A = not applicable N/T = not tested	
Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. <i>This test report relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any safety mark on this or similar products.</i>			

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Used measuring instruments

Measuring	Device-Number Inventory-Number Serial-Number	next Calibration
Types and classes	TX042	07/2009
Specific design	TX042	07/2009
Colour	0003648	07/2011
Xenon	0003661	04/2009
Azo Dye stuff	0003228	08/2009
	0003685	01/2009
pH-Value	0003442	10/2009

Test results of accredited laboratories of competent subcontractor are marked with /*.

- /*1 15028371 001 dated 5.08.08
 /*2 21132594 002 dated 19.11.07
 /*3 21138979 001 dated 13.11.08

Material description/ Picture
Warning vest
Article No.: 101

Materials:

 Fluorescent material:
 CY-01 fluorescent yellow
 Knitted, 100% Polyester

 Retroreflective material:
 A001-102 coated with glass beads
 silver grey 230g/m²


 Geeshan/Rev
 Shant
 TÜV Product Safety GmbH 20.11.08

Test results

Design according to EN 471:2003+A1:2007

Parameter	according to EN 471	Requirement	Test result	Remark												
				P	F	N/A	N/T									
Types and classes	clause 4.1	minimum areas of materials: (smallest available size and smallest possible configuration)	background material: 0.679 m ² retro reflective material: 0.130 m ²	P	F	N/A	N/T									
		<table border="1"> <thead> <tr> <th>material/ class</th> <th>3</th> <th>2</th> <th>1</th> </tr> </thead> <tbody> <tr> <td>- background</td> <td>0,8</td> <td>0,5</td> <td>0,14</td> </tr> <tr> <td>- retro reflective</td> <td>0,2</td> <td>0,13</td> <td>0,10</td> </tr> <tr> <td>- combined performance</td> <td>-</td> <td>-</td> <td>0,20</td> </tr> </tbody> </table>						material/ class	3	2	1	- background	0,8	0,5	0,14	- retro reflective
material/ class	3	2	1													
- background	0,8	0,5	0,14													
- retro reflective	0,2	0,13	0,10													
- combined performance	-	-	0,20													
Specific design requirements	clause 4.2	background material shall encircle the torso and sleeves and trouser legs horizontally	Background material encircle the torso	P	F	N/A	N/T									
	clause 4.2.1															
	clause 4.2.2							bands of retro reflective material: ≥ 50 mm (for harness ≥ 30 mm)	Width of the retro reflective band: 50mm	P						
	boilersuit clause 4.2.3 a							two horizontal retro reflective bands not less than 50 mm apart with a slope of not more than ± 20°	-	N/A						
	jackets, waistcoats, shirts, coats, tabards clause 4.2.3 b							two horizontal retro reflective bands not less than 50 mm apart with a slope of not more than ± 20° bands of retro reflective material joining the uppermost torso band from the front to the back over each shoulder bottom of the bottom torso band shall be not less than 50 mm above the bottom edge of clothing	-	N/A						
or clause 4.2.3 c	one horizontal retro reflective band with a slope of not more than ± 20° bands of retro reflective material joining the band from the front to the back over each shoulder bottom of the bottom torso band shall be not less than 50 mm above the bottom edge of clothing	-	N/A													
or clause 4.2.3 d	two horizontal retro reflective bands not less than 50 mm apart with a slope of not more than ± 20° bottom of the bottom torso band shall be not less than 50 mm above the bottom edge of clothing	- two horizontal retro reflective bands 75 mm apart - with a slope ± 0° - bottom of the bottom torso band 100mm above the bottom edge of clothing	P													
boilersuit, coats, jackets clause. 4.2.4	length sleeves shall be encircled by two bands of retro reflective material not less than 50 mm apart bottom of the lower band not less than 50 mm from the bottom of the sleeve	-	N/A													
boilersuit, bib and brace trousers, waistband trousers clause. 4.2.5	two bands of retro reflective material not less than 50 mm apart with a slope of not more than ± 20° bottom of the lower band not less than 50 mm above the bottom of the trouser leg	-	N/A													

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Design according to EN 471:2003+A1:2007

Parameter	according to EN 471	Requirement	Test result	Remark											
				P	F	N/A	N/T								
bib and brace trousers	clause 4.2.6	of class 2 and 3 band of retro reflective material around the waist	-			N/A									
tabards	clause 4.2.7	with a slope of not more than $\pm 20^\circ$ any gaps at the sides shall be not greater than 50 mm horizontally	-			N/A									
gaps (to enable fastening or fixation or seams) in lengthways direction of retro reflective bands or combined performance materials	clause 4.2.8	no more than 50 mm horizontally complete gaps body not be greater than 100 mm complete gaps arms/legs not be greater than 50 mm	no gap more than 50 mm horizontally complete gaps body not be greater than 100 mm			P									
harnesses	clause 4.2.9	a retro reflective horizontal band (separate or combined performance materials) other retro reflective bands joining the waistband from the back to the front over the both shoulders width not less than 30 mm	-			N/A									
Sizes	clause 4.3 EN 340	pictogram with least detail: <table border="1" style="display: inline-table; vertical-align: top;"> <thead> <tr> <th>clothing</th> <th>measurement</th> </tr> </thead> <tbody> <tr> <td>Jacket, Coat, waistcoat</td> <td>breast and height</td> </tr> <tr> <td>Trousers</td> <td>waistline and height</td> </tr> <tr> <td>Coverall</td> <td>breast and height</td> </tr> </tbody> </table>	clothing	measurement	Jacket, Coat, waistcoat	breast and height	Trousers	waistline and height	Coverall	breast and height	Size: XL Brest: 106 – 118 cm Height: 170 – 182 cm			P	
clothing	measurement														
Jacket, Coat, waistcoat	breast and height														
Trousers	waistline and height														
Coverall	breast and height														

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Requirements for background material, non fluorescent and combined performance materials

Parameter	according to EN 471	Requirement	Test result			Remark				
			x	y	β	P	F	N/A	N/T	
Colour new background material	clause 5.1 clause 5.1.1	The chromaticity shall be within one of the defined areas (classified as follows) and shall exceed the corresponding minimum	<i>colour: fluorescent yellow</i>			0°	0.383	0.542	0.84	P
			Colour	x	y					
		fluoresc. Yellow	0,387 0,356	0,610 0,494						
					0,70					
		fluoresc. Orange-red	0,610 0,535	0,390 0,375						
			0,570 0,655	0,340 0,345	0,40					
		fluoresc. Red	0,655 0,570	0,345 0,340						
			0,595 0,690	0,315 0,310	0,25					
material with combined performance	clause 5.1.2	chromaticity within one of the defined areas luminance factor > β_{min} orientation sensitive: mean value of luminance factor and chromaticity have to agree with the defined requirements	-	-	-	-	-	-	N/A	
Colour after xenon test	clause 5.2	within the areas defined by the coordinates in table 2 for background material and for combined performance material and the luminance factor shall be not less than the corresponding minimum values in this table	<i>colour: fluorescent yellow</i>			0°	0.385	0.531	0.76	P
			x	y	β					

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Requirements for background material, combined performance materials and non-fluorescent material after test exposure

Parameter	according to EN 471	Requirement	Test result	Remark																											
				P	F	N/A	N/T																								
Colour fastness of background material	clause 5.3		/ [*] 1				P																								
colour fastness to rubbing	clause 5.3.1	dry ≥ 4	Colour: fluorescent yellow dry 4-5 wet 4-5																												
colour fastness to perspiration	clause 5.3.2	staining ≥ 3 colour change ≥ 4	/ [*] 1 Colour: fluorescent yellow				P																								
			<table border="1"> <thead> <tr> <th>staining</th> <th>alc</th> <th>acid</th> </tr> </thead> <tbody> <tr> <td>CA</td> <td>4-5</td> <td>4-5</td> </tr> <tr> <td>CO</td> <td>5</td> <td>5</td> </tr> <tr> <td>PA</td> <td>4</td> <td>4</td> </tr> <tr> <td>PES</td> <td>4-5</td> <td>4-5</td> </tr> <tr> <td>PAN</td> <td>5</td> <td>5</td> </tr> <tr> <td>WO</td> <td>5</td> <td>5</td> </tr> <tr> <td>colour change</td> <td>5</td> <td>5</td> </tr> </tbody> </table>	staining	alc	acid	CA	4-5	4-5	CO	5	5	PA	4	4	PES	4-5	4-5	PAN	5	5	WO	5	5	colour change	5	5				
staining	alc	acid																													
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PES	4-5	4-5																													
PAN	5	5																													
WO	5	5																													
colour change	5	5																													
colour fastness when laundered	clause 5.3.3	washing temperature of non industrial cleaning: $\geq 60^{\circ}\text{C}$	/ [*] 1				P																								
		background- material	non fluorescent mat./ mat. with comb. perf.	Colour: fluorescent yellow domestic laundry C06 A2S staining 40°C																											
		staining: 4 colour change 4-5	staining: 4-5	<table border="1"> <tbody> <tr> <td>CA</td> <td>4-5</td> </tr> <tr> <td>CO</td> <td>5</td> </tr> <tr> <td>PA</td> <td>4</td> </tr> <tr> <td>PES</td> <td>5</td> </tr> <tr> <td>PAN</td> <td>5</td> </tr> <tr> <td>WO</td> <td>5</td> </tr> <tr> <td>colour change</td> <td>5</td> </tr> </tbody> </table>	CA	4-5	CO	5	PA	4	PES	5	PAN	5	WO	5	colour change	5													
CA	4-5																														
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PA	4																														
PES	5																														
PAN	5																														
WO	5																														
colour change	5																														
dry cleaning		staining: 4 colour change: 4	staining: 4-5	-			N/A																								
hypochlorite bleached		colour change: 4		-			N/A																								
hot pressed		staining: 4 colour change: 4-5	staining: 4	-			N/A																								

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Requirements for background material, combined performance materials and non-fluorescent material after test exposure

Parameter	according to EN 471	Requirement	Test result	Remark									
				P	F	N/A	N/T						
Dimensional change of background material and non fluorescent material	clause 5.4	length and width: $\pm 3\%$ knitted material: length and width: $\pm 5\%$	/*1 Colour: <i>fluorescent yellow</i> Knitted material Length: -2.9 % Width: -2.0 %				P						
Mechanical properties of the background material	clause 5.5		-										
tensile strength of woven materials	clause 5.5.1	max. force = ≥ 400 N and max. force [N] / mass [g/m ²] = ≥ 2											
bursting strength of knitted materials	clause 5.5.2	≥ 800 kN/m ²	/*1 Colour: <i>fluorescent yellow</i> 1040 kN/m ²				P						
tensile strength and tear resistance of coated fabrics and laminates	clause 5.5.3	tensile strength: (for materials with a elongation of < 50%) max. force = ≥ 400 N and max. force [N] / mass [g/m ²] = ≥ 2 tear resistance: ≥ 25 N	-				N/A						
Water vapour resistance and water vapour permeability index	clause 5.6, 5.6.1	background materials (exception of tabards, waistcoats and harnesses)											
coated fabrics or laminates	clause 5.6.2	classified as follows: class <table style="display: inline-table; border-collapse: collapse;"><tr><td style="border: none; padding: 0 5px;">1</td><td style="border: none; padding: 0 5px;">2</td><td style="border: none; padding: 0 5px;">3</td></tr><tr><td style="border: none; padding: 0 5px;">$R_{et} > 40$</td><td style="border: none; padding: 0 5px;">$20 < R_{et} \leq 40$</td><td style="border: none; padding: 0 5px;">≤ 20</td></tr></table> [m ² Pa/W]	1	2	3	$R_{et} > 40$	$20 < R_{et} \leq 40$	≤ 20	-				N/A
1	2	3											
$R_{et} > 40$	$20 < R_{et} \leq 40$	≤ 20											
woven or knitted fabrics		$R_{et} \leq 5$ m ² Pa/W											
Ergonomics	Clause 5.7	The ergonomic requirements are defined in EN340	Given				P						

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Photometric and physical performance requirements for the retro reflective material and combined performance material

Parameter	according to EN 471	Requirement	Test result	Remark																																																																																																																																
				P	F	N/A	N/T																																																																																																																													
Retro reflective performance of new material	clause 6.1	<p>according to tables 5, 6 or 7 When measured at the rotation angles $\epsilon_1 = 0^\circ$ and $\epsilon_2 = 90^\circ$ materials having coefficients of retro reflection that differ by more than 15% are defined as orientation sensitive.</p> <p>Tab. 4 min. coefficient of retro reflection in $\text{cd}/(\text{lx m}^2)$ for separate performance material, <i>level 2</i> Observation-angle Entrance angle $\beta_1(\beta_2=0)$</p> <table border="1"> <thead> <tr> <th>angle</th> <th>5°</th> <th>20°</th> <th>30°</th> <th>40°</th> </tr> </thead> <tbody> <tr> <td>12°</td> <td>330</td> <td>290</td> <td>180</td> <td>65</td> </tr> <tr> <td>20°</td> <td>250</td> <td>200</td> <td>170</td> <td>60</td> </tr> <tr> <td>1°</td> <td>25</td> <td>15</td> <td>12</td> <td>10</td> </tr> <tr> <td>1°30'</td> <td>10</td> <td>7</td> <td>5</td> <td>4</td> </tr> </tbody> </table> <p>Tab. 5 min. coefficient of retro reflection in $\text{cd}/(\text{lx m}^2)$ for separate performance material, <i>level 1</i> observation-angle Entrance angle $\beta_1(\beta_2=0)$</p> <table border="1"> <thead> <tr> <th>angle</th> <th>5°</th> <th>20°</th> <th>30°</th> <th>40°</th> </tr> </thead> <tbody> <tr> <td>12°</td> <td>250</td> <td>220</td> <td>135</td> <td>50</td> </tr> <tr> <td>20°</td> <td>120</td> <td>100</td> <td>75</td> <td>30</td> </tr> <tr> <td>1°</td> <td>25</td> <td>15</td> <td>12</td> <td>10</td> </tr> <tr> <td>1°30'</td> <td>10</td> <td>7</td> <td>5</td> <td>4</td> </tr> </tbody> </table> <p>Tab. 6: min. coefficient of retro reflection in $\text{cd}/(\text{lx m}^2)$ for combined performance material</p> <p>observation-/ entrance angle $\beta_1(\beta_2=0)$</p> <table border="1"> <thead> <tr> <th>angle</th> <th>5°</th> <th>20°</th> <th>30°</th> <th>40°</th> </tr> </thead> <tbody> <tr> <td>12°</td> <td>65</td> <td>50</td> <td>20</td> <td>5</td> </tr> <tr> <td>20°</td> <td>25</td> <td>20</td> <td>5</td> <td>1,75</td> </tr> <tr> <td>1°</td> <td>5</td> <td>4</td> <td>3</td> <td>1</td> </tr> <tr> <td>1°30'</td> <td>1,5</td> <td>1</td> <td>1</td> <td>0,5</td> </tr> </tbody> </table>	angle	5°	20°	30°	40°	12°	330	290	180	65	20°	250	200	170	60	1°	25	15	12	10	1°30'	10	7	5	4	angle	5°	20°	30°	40°	12°	250	220	135	50	20°	120	100	75	30	1°	25	15	12	10	1°30'	10	7	5	4	angle	5°	20°	30°	40°	12°	65	50	20	5	20°	25	20	5	1,75	1°	5	4	3	1	1°30'	1,5	1	1	0,5	<p>/*3 (21138979 001)</p> <p>$\epsilon_1 = 0^\circ$ (lengthwise) Observation-angle Entrance angle</p> <table border="1"> <thead> <tr> <th>angle</th> <th>5°</th> <th>20°</th> <th>30°</th> <th>40°</th> </tr> </thead> <tbody> <tr> <td>12°</td> <td>473</td> <td>481</td> <td>480</td> <td>448</td> </tr> <tr> <td>20°</td> <td>341</td> <td>345</td> <td>343</td> <td>325</td> </tr> <tr> <td>1°</td> <td>25.3</td> <td>25.7</td> <td>27.1</td> <td>26.2</td> </tr> <tr> <td>1°30'</td> <td>21.4</td> <td>20.6</td> <td>21.3</td> <td>19.0</td> </tr> </tbody> </table> <p>$\epsilon_1 = 90^\circ$ (crosswise) Observation-angle Entrance angle</p> <table border="1"> <thead> <tr> <th>angle</th> <th>5°</th> <th>20°</th> <th>30°</th> <th>40°</th> </tr> </thead> <tbody> <tr> <td>12°</td> <td>474</td> <td>483</td> <td>480</td> <td>447</td> </tr> <tr> <td>20°</td> <td>343</td> <td>346</td> <td>343</td> <td>325</td> </tr> <tr> <td>1°</td> <td>25.4</td> <td>25.5</td> <td>27.0</td> <td>25.5</td> </tr> <tr> <td>1°30'</td> <td>21.4</td> <td>20.2</td> <td>21.2</td> <td>18.9</td> </tr> </tbody> </table> <p>level 2</p>	angle	5°	20°	30°	40°	12°	473	481	480	448	20°	341	345	343	325	1°	25.3	25.7	27.1	26.2	1°30'	21.4	20.6	21.3	19.0	angle	5°	20°	30°	40°	12°	474	483	480	447	20°	343	346	343	325	1°	25.4	25.5	27.0	25.5	1°30'	21.4	20.2	21.2	18.9	P			
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Photometric and physical performance requirements for the retro reflective material and combined performance material

Parameter	according to EN 471	Requirement	Test result	Remark			
				P	F	N/A	N/T
Retroreflective performance requirements after test exposure - abrasion - flexing - folding at cold temperatures - temperature variation - washing - dry cleaning - influence of rainfall material with separate performance	clause 6.2.	coefficient of retro reflection R shall exceed 100 cd/(lx m ²) measured at observation angle 12° and entrance angle 5°	/*2 R [cd/(lx m ²)] 0° 90° - abrasion 457 453 - flexing 486 485 - folding at cold Temperatures 463 463 - temp. variation 457 458 - washing (25cycles) 314 313 - dry cleaning 414 412 - influence of rainfall 355 349				
	clause 6.2.1						
	clause 6.2.2						
combined performance material	clause 6.2.3	the coefficient of retro reflection R shall exceed 30 cd/(lx m ²) measured at observation angle 12° and entrance angle 5° when determined the influence of rainfall the coefficient shall exceed 15 cd/(lx m ²)					N/A
orientation sensitive material	clause 6.2.4	the coefficient of retro reflection R after exposure shall comply with the same requirements of EN 471 clause 6.2.2 or 6.2.3, as appropriate, at one of the two orientations described in clause 7.3 and shall be not less than 75% of those required values at the other orientation					N/A



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General requirements according to EN 340: 2003

Parameter	according to EN 340	Requirement	Test result	Remark			
				P	F	N/A	N/T
General Harmlessness	clause 4.2 b	solution of nickel < 0,5 µg/cm ² a week	-			N/A	
	clause 4.2 c	pH value between 3,5 and 9,5	pH value of Fluorescent yellow material: 4.4 Retroreflective tape: 4.8			P	
	clause 4.2 e	Azo- dye stuff not detectable	Azo- dye stuff of Fluorescent yellow material: not detected Retroreflective tape: not detected			P	
Design	clause 4.3	correct put on and fit	given			P	
		all body parts also protect at moving	given			P	
		complete protection with boots and gloves possible	given			P	
Wear comfort	clause 4.4		given			P	
Aging	clause 5	Colour fastness	Passed the requirement of color after xenon and retroreflective performance after 25cycles washing			P	
Marking General	clause 7	<ul style="list-style-type: none"> - official language of country - fixed at model or label - good visible and readable - resistant to care cycles - name or other identification of manufacturer - model-no. or code - size - number of standard - pictogram and performance levels 	<ul style="list-style-type: none"> - given - at the label - visible and readable - given - Ningbo Chunlong - Article No. 101 - XL - EN471:2003/A1:2007 - given 			P	
Details							<ul style="list-style-type: none"> - care label 
Instruction for use	clause 8	<ul style="list-style-type: none"> - name or other identification of manufacturer with completely address - model-no. or code - size - number of standard : year - performance levels with description - used materials - care label - instruction for use - testing institute with completely address and identification number - suitable packaging - disposal 	<ul style="list-style-type: none"> - Name of the manufacturer with complete address is given - Article No.101 - size: XL - EN471:2003/A1:2007 - given - 100% polyester - given - given - given - given - given 			P	