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Product Service

## C E R T I F I C A T E

No. B 046481 0017 Rev. 00

**Holder of Certificate:** ZINGERLE AG  
Förche 7  
39040 Natz-Schabs (BZ)  
ITALY

**Certification Mark:**



**Product:** Pavilion  
Foldable pavillion

The product was tested on a voluntary basis and complies with the essential requirements. The certification mark shown above can be affixed on the product. It is not permitted to alter the certification mark in any way. In addition, the certification holder must not transfer the certificate to third parties. This certificate is valid until the listed date, unless it is cancelled earlier. All applicable requirements of the testing and certification regulations of TÜV SÜD Group have to be complied. For details see: [www.tuv-sud.com/ps-cert](http://www.tuv-sud.com/ps-cert)

**Test report no.:** 028-713182235-002

**Valid until:** 2025-06-08

**Date:** 2020-06-30

( Gerhard Hintereder )

# Fabric Polyester Oxford 500



P.O. Box 554 - 2665 ZN Bleiswijk  
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The Netherlands  
+31 88 3473 723  
nederland@efectis.com

## CLASSIFICATION

### CLASSIFICATION OF REACTION TO FIRE PERFORMANCE IN ACCORDANCE WITH EN 13501-1:2007+A1:2009

Classification no.	2013-Efectis-R0497f
Sponsor	Zingerle Metal GmbH Industriezone 103 39040 Natz/Schabs Italy
Product name	<b>Fabric</b> <b>LKR056400 - Polyester Oxford 500x500D</b>
Prepared by	Efectis Nederland BV
Notified body no.	1234
Author(s)	C.C.M. Steinhage B.Sc. A.J. Lock
Project number	2013497
Date of issue	November 2013
Number of pages	5

### 1. INTRODUCTION

This classification report defines the classification assigned to **fabric, type LKR056400 - Polyester Oxford 500x500D** in accordance with the procedures given in EN 13501-1:2007+A1:2009.

### 2. DETAILS OF CLASSIFIED PRODUCT

#### 2.1. GENERAL

The product, **fabric, type LKR056400 - Polyester Oxford 500x500D**, will be used as fabric for tents.

#### 2.2. PRODUCT DESCRIPTION

The product is composed of:  
Polyester fabric, FR grade, designated *LKR056400 - Polyester Oxford 500x500D*  
Surface density approx. 0.225 kg/m<sup>2</sup>.

#### 2.3. MANUFACTURER/IMPORTER

Zingerle Metal GmbH  
Industriezone 103  
39040 Natz/Schabs  
Italy

### 3. STANDARDS, REPORTS, RESULTS AND CRITERIA IN SUPPORT OF THIS CLASSIFICATION

#### 3.1. REPORTS

Name of Laboratories	Name of sponsor	Report ref. no.	Test method
Efectis Nederland BV The Netherlands	Zingerle Metal GmbH Italy	2013-Efectis-R0497d 2013-Efectis-R0497e	EN ISO 11925-2:2010 EN 13823:2010

## 3.2. TEST RESULTS

Test method and test number	Parameter	No. tests	Results	
			Continuous parameter - mean (m)	Compliance with parameters
<b>EN-ISO 11925-2</b>				
surface flame impingement	$F_s \leq 150 \text{ mm}$	6	25	-
	Ignition of filter paper		-	Compliant
Edge flame impingement	$F_s \leq 150 \text{ mm}$	6	25	-
	Ignition of filter paper		-	Compliant
<b>EN 13823</b>				
	FIGRA0.2MJ [W/s]	3	0.0	-
	FIGRA0.4MJ [W/s]		0.0	-
	THR600s [MJ]		0.6	-
	LFS < edge		-	Compliant
	SMOGRA [m <sup>2</sup> /s <sup>2</sup> ]		7	-
	TSP600s [m <sup>2</sup> ]		83	-
	Flaming debris - flaming ≤ 10 s		-	Compliant
	- flaming > 10 s		-	Compliant

## 3.3. CLASSIFICATION CRITERIA

Fire classification of construction products and building elements Excluding floorings and linear pipe thermal insulation products				
Classification criteria				
Class Test method(s)	B	C	D	
EN 13823	$FIGRA \leq 120 \text{ W/s}$ $LFS < \text{edge of specimen}$ $THR_{600s} \leq 7,5 \text{ MJ}$	$FIGRA \leq 250 \text{ W/s}$ $LFS < \text{edge of specimen}$ $THR_{600s} \leq 15 \text{ MJ}$	$FIGRA \leq 750 \text{ W/s}$	
EN ISO 11925-2 Exposure = 30 s	$F_s \leq 150 \text{ mm}$ within 60 s Ignition of the paper in EN ISO 11925-2 results in a d2 classification.			
Additional classification				
Smoke production	$s1 = SMOGRA \leq 30 \text{ m}^2/\text{s}^2$ and $TSP_{600s} \leq 50 \text{ m}^2$ ; $s2 = SMOGRA \leq 180 \text{ m}^2/\text{s}^2$ and $TSP_{600s} \leq 200 \text{ m}^2$ ; $s3 = \text{not } s1 \text{ or } s2$			
Flaming Droplets/particles	$d0 = \text{no flaming droplets/particles in EN 13823 within 600 s};$ $d1 = \text{no flaming droplets/particles persisting longer than 10 s in EN 13823 within 600 s};$ $d2 = \text{not } d0 \text{ or } d1$			

#### 4. CLASSIFICATION AND FIELD OF APPLICATION

##### 4.1. REFERENCE OF CLASSIFICATION

This classification has been carried out in accordance with clause 11 of EN 13501-1:2007+A1:2009.

##### 4.2. CLASSIFICATION

The product, **fabric, type LKR056400 - Polyester Oxford 500x500D**, in relation to its reaction to fire behaviour is classified:

**B**

The additional classification in relation to smoke production is:

**s2**

The additional classification in relation to flaming droplets / particles is:

**d0**

**Reaction to fire classification: B - s2, d0**

##### 4.3. FIELD OF APPLICATION

This classification is valid for the following product parameters:

Surface density **0.225 kg/m<sup>2</sup>**

Other properties **FR grade**

This classification is valid for the following end use applications:

Substrate **Not applicable**

Air gap **Free standing**

Methods and means of fixing **Not applicable**

Joints **No joints**

Other aspects of end use conditions **Used for tents**

##### 4.4. DURATION OF THE VALIDITY OF THIS CLASSIFICATION REPORT

There are no limitations in time on the validity of this report.



Efectis Nederland Report  
2013-Efectis-R0497f  
November 2013  
Zingerle Metal GmbH

## CLASSIFICATION

### 5. LIMITATIONS

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This classification document does not represent type approval or certification of the product.

A handwritten signature in blue ink, appearing to read "Steinhage".

C.C.M. Steinhage B.Sc.  
Project leader reaction to fire

A handwritten signature in blue ink, appearing to read "Lock".

A.J. Lock  
Project leader reaction to fire

# Fabric Polyester Oxford 250



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## CLASSIFICATION

### CLASSIFICATION OF REACTION TO FIRE PERFORMANCE IN ACCORDANCE WITH EN 13501-1:2007+A1:2009

Classification of reaction to fire performance

Classification no.	2013-Efectis-R0497c
Sponsor	Zingerle Metal GmbH Industriezone 103 39040 Natz/Schabs Italy
Product name	<b>Fabric</b> <b>LKR056300 - Polyester Oxford 250x250D</b>
Prepared by	Efectis Nederland BV
Notified body no.	1234
Author(s)	C.C.M. Steinhage B.Sc. A.J. Lock
Project number	2013497
Date of issue	November 2013
Number of pages	5



### 1. INTRODUCTION

This classification report defines the classification assigned to fabric, type LKR056300 - Polyester Oxford 250x250D in accordance with the procedures given in EN 13501-1:2007+A1:2009.

### 2. DETAILS OF CLASSIFIED PRODUCT

#### 2.1. GENERAL

The product, fabric, type LKR056300 - Polyester Oxford 250x250D, will be used as fabric for tents.

#### 2.2. PRODUCT DESCRIPTION

The product is composed of:

Polyester fabric, FR grade, designated *LKR056300 - Polyester Oxford 250x250D*  
Surface density approx. 0.15 kg/m<sup>2</sup>.

#### 2.3. MANUFACTURER/IMPORTER

Zingerle Metal GmbH  
Industriezone 103  
39040 Natz/Schabs  
Italy

### 3. STANDARDS, REPORTS, RESULTS AND CRITERIA IN SUPPORT OF THIS CLASSIFICATION

#### 3.1. REPORTS

Name of Laboratories	Name of sponsor	Report ref. no.	Test method
Efectis Nederland BV The Netherlands	Zingerle Metal GmbH Italy	2013-Efectis-R0497a 2013-Efectis-R0497b	EN ISO 11925-2:2010 EN 13823:2010

## 3.2. TEST RESULTS

Test method and test number	Parameter	No. tests	Results	
			Continuous parameter - mean (m)	Compliance with parameters
<b>EN-ISO 11925-2</b>				
surface flame impingement	$F_s \leq 150 \text{ mm}$	6	25	-
	Ignition of filter paper		-	Compliant
Edge flame impingement	$F_s \leq 150 \text{ mm}$	6	25	-
	Ignition of filter paper		-	Compliant
<b>EN 13823</b>				
	FIGRA0.2MJ [W/s]	3	0.0	-
	FIGRA0.4MJ [W/s]		0.0	-
	THR <sub>600s</sub> [MJ]		0.3	-
	LFS < edge		-	Compliant
	SMOGRA [m <sup>2</sup> /s <sup>2</sup> ]		4	-
	TSP <sub>600s</sub> [m <sup>2</sup> ]		60	-
	Flaming debris - flaming $\leq 10 \text{ s}$ - flaming $> 10 \text{ s}$		-	Compliant Compliant

## 3.3. CLASSIFICATION CRITERIA

Fire classification of construction products and building elements Excluding floorings and linear pipe thermal insulation products				
Classification criteria				
Class Test method(s)	B	C	D	
EN 13823	$FIGRA \leq 120 \text{ W/s}$ $LFS < \text{edge of specimen}$ $THR_{600s} \leq 7,5 \text{ MJ}$	$FIGRA \leq 250 \text{ W/s}$ $LFS < \text{edge of specimen}$ $THR_{600s} \leq 15 \text{ MJ}$	$FIGRA \leq 750 \text{ W/s}$	
EN ISO 11925-2 Exposure = 30 s	$F_s \leq 150 \text{ mm}$ within 60 s Ignition of the paper in EN ISO 11925-2 results in a d2 classification.			
Additional classification				
Smoke production	$s1 = SMOGRA \leq 30 \text{ m}^2/\text{s}^2$ and $TSP_{600s} \leq 50 \text{ m}^2$ ; $s2 = SMOGRA \leq 180 \text{ m}^2/\text{s}^2$ and $TSP_{600s} \leq 200 \text{ m}^2$ ; $s3 = \text{not } s1 \text{ or } s2$			
Flaming Droplets/particles	$d0 = \text{no flaming droplets/particles in EN 13823 within 600 s};$ $d1 = \text{no flaming droplets/particles persisting longer than 10 s in EN 13823 within 600 s};$ $d2 = \text{not } d0 \text{ or } d1.$			

#### 4. CLASSIFICATION AND FIELD OF APPLICATION

---

##### 4.1. REFERENCE OF CLASSIFICATION

This classification has been carried out in accordance with clause 11 of EN 13501-1:2007+A1:2009.

##### 4.2. CLASSIFICATION

The product, **fabric, type LKR056300 - Polyester Oxford 250x250D**, in relation to its reaction to fire behaviour is classified:

**B**

The additional classification in relation to smoke production is:

**s2**

The additional classification in relation to flaming droplets / particles is:

**d0**

**Reaction to fire classification: B - s2, d0**

##### 4.3. FIELD OF APPLICATION

This classification is valid for the following product parameters:

Surface density **0.15 kg/m<sup>2</sup>**

Other properties **FR grade**

This classification is valid for the following end use applications:

Substrate **Not applicable**

Air gap **Free standing**

Methods and means of fixing **Not applicable**

Joints **No joints**

Other aspects of end use conditions **Used for tents**

##### 4.4. DURATION OF THE VALIDITY OF THIS CLASSIFICATION REPORT

There are no limitations in time on the validity of this report.

### 5. LIMITATIONS

---

This classification document does not represent type approval or certification of the product.

A handwritten signature in blue ink.

C.C.M. Steinhage B.Sc.  
Project leader reaction to fire

A handwritten signature in blue ink.

A.J. Lock  
Project leader reaction to fire

# Fabric CRISTAL PLUS FR



## Test Report

No.: SDHGR123444kjjòà

Date: Sep.12, 2017

Page 1 of 5

The following sample(s) was / were submitted and identified on behalf of the client as:

Sample Description : SUPER CLEAR PVC FILMS  
 Country of Destination : EUROPE  
 Test Requested : NF P 92-507:2004 Fire safety-building-interior fitting materials-Classification  
                           according to their reaction to fire  
 Sample Receiving Date : Sep.12, 2017  
 Test Performing Date : Sep.12, 2017 to Sep.16, 2017  
 Test Result(s) : For further details, please refer to the following page(s)  
 Conclusion : Classification  
                           Super clear PVC film:                   M2

Note: The classes with their corresponding fire performance are given in Annex I.

Signed for and on behalf of  
SGS-CSTC Co., Ltd.

Jack Yao  
Approved signatory

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Attention: To confirm the authenticity of testing / inspection report & certificate, please contact us at telephone: (86-757)63071443, or email: [CN.Doscheck@sgs.com](mailto:CN.Doscheck@sgs.com)

  
 SGS-CSTC (Guangdong) Technical Service Co., Ltd. 15/F, Building B, Shunde Industrial Park, 1 Shunde South Avenue, Shunde, Foshan, Guangdong, China 528333 | (86-757)22805888 | (86-757)22805888 | [www.cn.sgs.com](http://www.cn.sgs.com)  
 中国·广东·佛山市顺德区大良街道办事处王沙路和南路1号盈科工业城1号厂房五层 邮编: 528333 | (86-757)22805888 | (86-757)22805888 | [sgs.china@sgs.com](mailto:sgs.china@sgs.com)

## CLASSIFICATION OF REACTION TO FIRE PERFORMANCE IN ACCORDANCE WITH EN 13501-1:2007+A1:2009

<b>Sponsor</b>	Zingerlemetal AG Fürche 7 I-39040 Natz / Schabs (BZ) Italy
<b>Prepared by</b>	Efectis Nederland BV Lange Kleiweg 5 P.O. Box 1090 NL-2280 CB RIJSWIJK The Netherlands
<b>Notified Body no.</b>	1234
<b>Product name</b>	<b>PVC fabric</b>
<b>Classification report no</b>	2012-Efectis-R9353c
<b>Issue number</b>	1
<b>Date of issue</b>	August 2012
<b>Project number</b>	2012353

This classification report consists of four pages and may only be used in its entirety.

## 1. Introduction

This classification report defines the classification assigned to **PVC fabric** in accordance with the procedures given in EN 13501-1:2007+A1:2009.

## 2. Details of classified product

### 2.1 General

The product, **PVC fabric**, will be used for tents.

### 2.2 Product description

The product is composed of:

Material: PVC fabric, laminated 400 gr/m<sup>2</sup>  
Specifications: PES 250x250D, 22x23 / sq.inch  
Treatment: UV + F/R  
Width: 190cm  
Colour: white

The product has a total thickness of 0.3 mm and a mass per unit area of approx. 400 kg/m<sup>2</sup>.

### 2.3 Manufacturer/Importer

Wonpoong  
South Korea

## 3. Standards, reports, results and criteria in support of this classification

### 3.1 Reports

Name of Laboratories	Name of sponsor	Report ref. no.	Test method
Efector Nederland BV The Netherlands	Zingerlemetal AG Italy	2012-Efector-R9353a 2012-Efector-R9353b	EN ISO 11925-2:2010 EN 13823:2010

### 3.2 Test results

Test method and test number	Parameter	No. tests	Results	
			Continuous parameter – mean (m)	Compliance with parameters
EN-ISO 11925-2				
surface flame impingement	Fs ≤ 150 mm [mm]	6	95	-
	Ignition of filter paper		-	Compliant
edge flame impingement	Fs ≤ 150 mm [mm]	6	86	-
	Ignition of filter paper		-	Compliant
EN 13823				
PVC fabric	FIGRA <sub>0,2MJ</sub> [W/s]	3	14	-
	FIGRA <sub>0,4MJ</sub> [W/s]		0	-
	THR <sub>600s</sub> [MJ]		0,5	-
	LFS < edge		-	Compliant
	SMOGRA [m <sup>2</sup> /s <sup>2</sup> ]		123	-
	TSP <sub>600s</sub> [m <sup>2</sup> ]		142	-
	Flaming debris		-	Compliant
	- flaming ≤ 10 s		-	Compliant

### 3.3 Classification criteria

Classification criteria of the Single Burning Item (SBI) test			
Class	Fire	Class	Smoke
A2	FIGRA <sub>0,2 MJ</sub> ≤ 120 W/s LFS < edge of the long wing specimen THR <sub>600s</sub> ≤ 7,5 MJ	s1	SMOGRA ≤ 30 m <sup>2</sup> /s <sup>2</sup> TSP <sub>600s</sub> ≤ 50 m <sup>2</sup>
B	FIGRA <sub>0,2 MJ</sub> ≤ 120 W/s LFS < edge of the long wing specimen THR <sub>600s</sub> ≤ 7,5 MJ	s2	SMOGRA ≤ 180 m <sup>2</sup> /s <sup>2</sup> TSP <sub>600s</sub> ≤ 200 m <sup>2</sup>
C	FIGRA <sub>0,4 MJ</sub> ≤ 250 W/s LFS < edge of the long wing specimen THR <sub>600s</sub> ≤ 15 MJ	Class	Droplets
		d0	No flaming droplets/particles
		d1	Flaming droplets/particles < 10 s
D	FIGRA ≤ 750 W/s	d2	Not d0 or d1

## 4. Classification and field of application

### 4.1 Reference of classification

This classification has been carried out in accordance with clause 11 of EN 13501-1:2007+A1:2009.

#### 4.2 Classification

The product, **PVC fabric**, in relation to its reaction to fire behaviour is classified:

**B**

The additional classification in relation to smoke production is:

**s2**

The additional classification in relation to flaming droplets / particles is:

**d0**

#### Reaction to fire classification: B - s2, d0

#### 4.3 Field of application

This classification is valid for the following product parameters:

- Thickness	0.3 mm
- Surface density	400 g/m <sup>2</sup>
- Other properties	laminated

This classification is valid for the following end use applications:

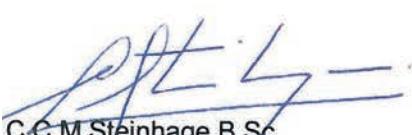
- Substrate	not applicable
- Air gap	free standing
- Methods and means of fixing	not applicable
- Joints	no joints
- Other aspects of end use conditions	used for tents

#### 4.4 Duration of the validity of this classification report

There are no limitations in time on the validity of this report.

### 5. Limitations

This classification document does not represent type approval or certification of the product.

  
C.C.M. Steinhage B.Sc.  
Project leader reaction to fire

  
A.J. Lock  
Project leader reaction to fire

# Fabric for flag and banner

Georg+Otto Friedrich

**Georg+Otto Friedrich**  
EUROPAS GROSSE WIRKWARENPRODUZENTEN

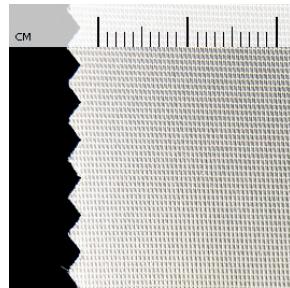


## Product 8029FLBF

Taft aus Wirkware

### Technical data

Indication:	PES-KNITTED-TAFFETA
Field of application:	decoration, pennants, fan merchandise
Material:	100 % Polyester
Weight:	70 g/m <sup>2</sup> (± 5 %)
Stock widths:	310 cm
Remarks:	with flame retardant finishing, with INKTeX+BF® finishing for inkjet-direct printing



### Product Features



### Information and Downloads

- Certificate for the quality management system according DIN EN ISO 9001:2015.
- General considerations regarding further processing of fabrics for digital printing.
- DIN 4102 B1-certification for PES-Fahnenstoff with INKTeX+FL treatment.
- DIN EN 13501 certificate for PES-Fahnenstoff with INKTEX+FL

For possible errors no liability will be assumed. Misprint, mistakes and modifications are subject to change without prior notice.  
Zuletzt aktualisiert am 30.07.2019

## Declaration regarding the REACH Regulation

Dear Sir or Madam,

The European Chemicals Agency ECHA has published a Candidate List of substances of very high concern for Authorisation that met the criteria of Article 57 of the REACH regulation, in accordance with Article 59(10) of the REACH Regulation ([http://echa.europa.eu/chem\\_data/candidate\\_list\\_table\\_en.asp](http://echa.europa.eu/chem_data/candidate_list_table_en.asp)).

By the present letter we confirm that none of the substances contained in the "candidate list" are used for our products.

Our company also does not import any of the mentioned substances in a ratio of more than 1t/year. As a trading company, it is our duty to ensure that our suppliers also comply with the REACH regulation. We have obtained and received information on this from all suppliers.

As stated in the safety data sheets, we rely on the information provided by our suppliers regarding information and risk control. We commit ourselves to inform our customers about changes at any time in order to guarantee the safety of the products distributed by us.

Best regards

Georg Zingerle

-Sole Administrator Zingerle AG-

# Inks for fabric

CENTRO TESSILE COTONIERO E ABBIGLIAMENTO S.p.A.  
Piazza Sant' Anna 2  
21052 Busto Arsizio VA, Italy



## CERTIFICATE

### The Company

**JK Group Spa**  
SP 32 Novedratese 33  
22060 Novedrate CO, ITALY

is granted authorisation according to ECO PASSPORT by OEKO-TEX® to use the OEKO-TEX® mark



### for the following chemical products

**Product(s):** See attached enclosure

**Category:** Pigments and inks

### Supporting documents

- Declaration of conformity in accordance with EN ISO 17050-1 included in ECO PASSPORT by OEKO-TEX® Terms of Use.
- Analytical test report number: 19RA09920
- RSL Screening Report
- Detailed information about the components and safety data sheets of the chemical products mentioned above.

The above captioned product(s) can be used for the production of human-ecological optimized textiles & leathers. The combined results of the reports mentioned above reveal that there is no harmful effect on the human and environmental health of the textiles & leathers treated/finished with the above mentioned products. This evaluation used the test methods and requirements of the ECO PASSPORT by OEKO-TEX® that were in force at the time of the evaluation date. ZDHC MRSI Conformance Level 1 is achieved for certified product(s) without restriction(s).

Busto Arsizio, 19.07.2019

Chiara Salmoiraghi

OEKO-TEX® Certification Scheme Manager  
CENTROCOT

# Test wind tunnel



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[www.maffei.it](http://www.maffei.it)

## ANALYSIS OF GAZEBOS ACCORDING TO EN1990 + EN1991-1-4

ZNG-107-DC105\_REV2\_ENG

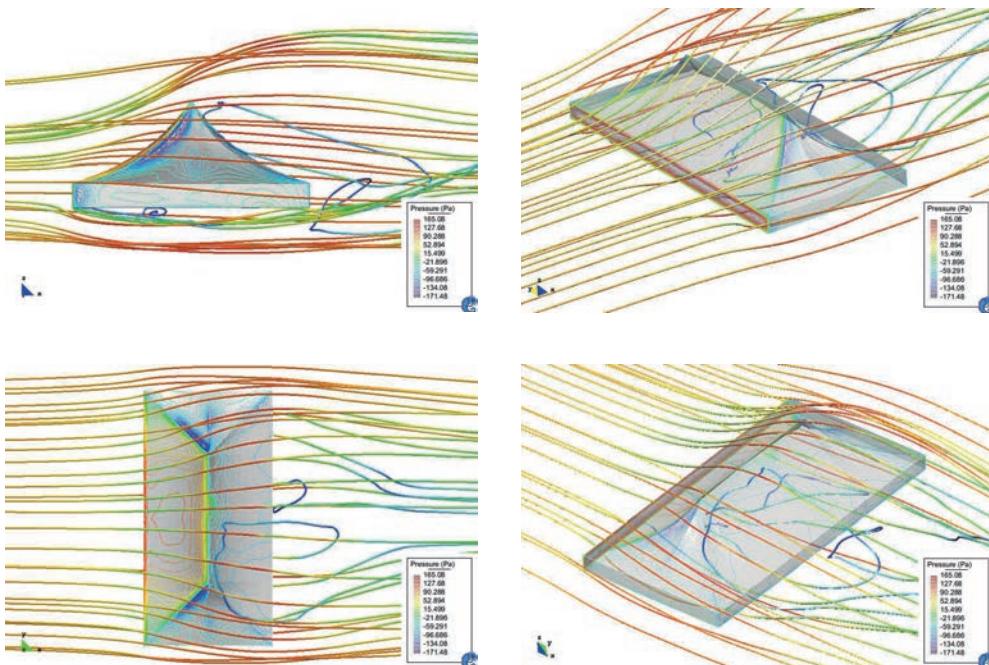
### 1 INTRODUCTION

The following document aims to study Mastertent S.p.A gazebos to define limit velocities for various counterweight configurations.

The limit velocities are to be considered as "3-sec gust" peak velocity measured at 2m height close to the gazebo.

The sliding stability of the gazebo is guaranteed below the limit velocity according to EN 1990 and EN 1991-1-4.

The main step of the analysis are shown in the following.



Note that the document does not cover the structural capacity check of the gazebos.



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Tel: +39 0424 556174 - Fax +39 0424 1745104  
[www.maffei.it](http://www.maffei.it)

## 2 SAFETY ASSESSMENT

The hypotheses of the analytical model are modified slightly to be in accordance with EN 1990 and EN 1991-1-4 and cover a wider range of usage.

The basic hypotheses are:

1. De-stabilizing loads (wind) are multiplied by  $\gamma_Q = 1.5$  whereas stabilizing loads (self-weight + counterweight) are multiplied by  $\gamma_G = 0.9$ , in accordance to EN 1990
2. Wind exposition:
  - Obstructed wind flow ( $\phi = 1$ ), as shown in Figure 2, in accordance with EN 1991-1-4
  - Suction wind load as shown in Figure 3, in accordance to EN 1991-1-4
  - Force coefficients coherent with the above-mentioned hypotheses, as shown in Figure 4, in accordance to EN 1991-1-4
  - Two possible wind load angles:  $\theta=0^\circ$  and  $\theta=45^\circ$
3. In accordance with literature values, Static friction coefficient between steel and concrete = 0.3

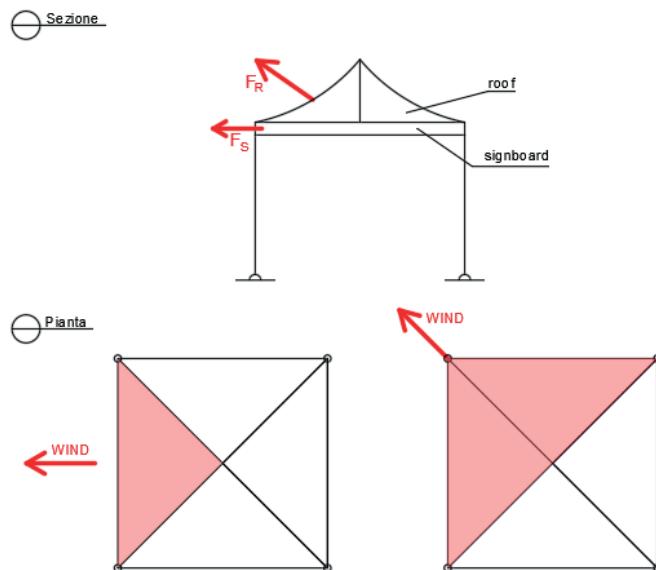


Figure 1 Force application



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To define wind force coefficient, the gazebo roof is treated like a "duopitch roof", whereas the signboard is treated like a "signboard".

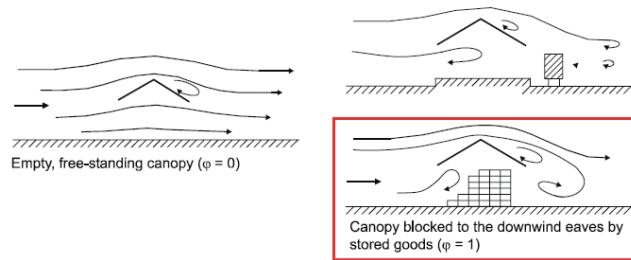


Figure 2 Wind flow (extracted by EN 1991-1-4)

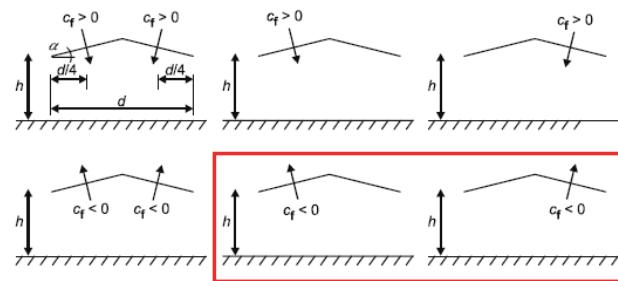


Figure 3 Wind load on duopitch roof (extracted by EN 1991-1-4)

			Net pressure coefficients $c_{p,\text{net}}$ Key plan			
Roof angle $\alpha$ [°]	Blockage $\varphi$	Overall Force Coefficient $c_f$	Zone A	Zone B	Zone C	Zone D
+ 25	Maximum all $\varphi$	+ 0,7	+ 1,2	+ 1,9	+ 1,6	+ 0,5
	Minimum $\varphi = 0$	- 1,0	- 1,4	- 1,9	- 1,4	- 2,0
	Minimum $\varphi = 1$	- 1,3	- 1,4	- 2,0	- 1,5	- 2,0
+ 30	Maximum all $\varphi$	+ 0,9	+ 1,3	+ 1,9	+ 1,6	+ 0,7
	Minimum $\varphi = 0$	- 1,0	- 1,4	- 1,9	- 1,4	- 2,0
	Minimum $\varphi = 1$	- 1,3	- 1,4	- 1,8	- 1,4	- 2,0

NOTE + values indicate a net downward acting wind action  
- values represent a net upward acting wind action

(1) For signboards separated from the ground by a height  $z_g$  greater than  $h/4$  (see Figure 7.21), the force coefficients are given by Expression (7.7):

$$c_f = 180 \quad (7.7)$$

Expression (7.7) is also applicable where  $z_g$  is less than  $h/4$  and  $b/h \leq 1$ .

Figure 4 Table of  $c_f$  (extracted by EN 1991-1-4)



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### 3 FINAL RESULTS

The final results are reported in the following. They are in accordance with EN 1990 and EN 1991-4 and with the hypotheses of § 2.

The values of the velocities are “3-sec gust” peak velocities measured at 2m height close to the gazebo.

Moreover, for some models of gazebo are reported the value of tension in the tensioning straps for wind velocity of 60 – 100 km/h. These values are needed to design the tensioning straps and the anchors. Note that it is assumed that the tensioning straps are installed with an angle of 45° in both the horizontal and vertical plane and in correspondence of each of the legs of the gazebo.

S1	MODEL	VELOCITY			COUNTERWEIGHT	TENSION
		km/h	m/s	knots		
3x3	3x3	13.0	3.6	7.0	0	-
		28.8	8.0	15.5	28	-
		38.5	10.7	20.8	56	-
		46.2	12.8	24.9	84	-
		75.0	20.8	40.5	84	200
		100.0*	27.8	53.9	84	360
4x4	4x4	11.9	3.3	6.4	0	-
		22.8	6.3	12.3	28	-
		30.1	8.4	16.2	56	-
		35.9	10.0	19.4	84	-
		75.0	20.8	40.5	84	400
		100.0*	27.8	53.9	84	600
4,5x3	4,5x3	13.0	3.6	7.0	0	-
		25.1	7.0	13.5	28	-
		33.0	9.2	17.8	56	-
		39.4	11.0	21.2	84	-
		75.0	20.8	40.5	84	350
		100.0*	27.8	53.9	84	490
5x5	5x5	11.0	3.1	5.9	0	-
		18.2	5.1	9.8	28	-
		23.3	6.5	12.6	56	-
		27.5	7.6	14.8	84	-
		31.1	8.6	16.8	112	-
		60.0*	16.7	32.3	112	360
6x3	6x3	13.3	3.7	7.2	0	-
		26.6	7.4	14.4	28	-
		30.0	8.3	16.2	56	-
		42.2	11.7	22.8	84	-
		60.0*	16.7	32.3	84	110
6x4	6x4	11.2	3.1	6.0	0	-
		20.0	5.5	10.8	28	-
		25.9	7.2	13.9	56	-
		30.7	8.5	16.5	84	-
		60.0*	16.7	32.3	84	290
8x4	8x4	11.5	3.2	6.2	0	-
		20.8	5.8	11.2	28	-
		23.4	6.5	12.6	56	-
		32.3	9.0	17.4	84	-
		60.0*	16.7	32.3	84	350



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S2

MODEL	VELOCITY			COUNTERWEIGHT	TENSION
	km/h	m/s	knots		
3x3	13.0	3.6	7.0	0	-
	28.8	8.0	15.5	28	-
	38.5	10.7	20.8	56	-
	46.2*	12.8	24.9	84	-
4,5x3	13.0	3.6	7.0	0	-
	25.1	7.0	13.5	28	-
	33.0	9.2	17.8	56	-
	39.4*	11.0	21.2	84	-
6x3	13.3	3.7	7.2	0	-
	26.6	7.4	14.4	28	-
	30.0	8.3	16.2	56	-
	42.2*	11.7	22.8	84	-

\* do not use for higher velocities

The reported values guarantee the sliding capacity of the gazebo, i.e. the value of the counterweight / strength of the anchors needed to satisfy the sliding check.

The structural check of the gazebo for the velocities of 60 – 100 km/h is out of the scope of this report and has not been tested during experimental test of 18/01/2019.

## 4 CONCLUSIONS

The results shown in §3 are in accordance with the European structural codes EN 1990 and EN 1991-4.

The reported velocities are "3-sec gust" peak velocities measured at 2m height close to the gazebo.

In the analysis are considered:

- Safety factors according to the above-mentioned codes
- Variability of the wind direction
- Variability of the wind flow close to the gazebo
- Surface of ground made of dry concrete or dry asphalt

Owing to this, the results are valid for a wide range of utilization situations.

Using appropriate tensioning straps anchored to the ground it is possible, for some of the models, to resist to the sliding up to a wind velocity of 100 km/h.

It is underlined that **the anchors capacity has to be evaluated case by case** as a function of the type of anchors, deep of anchorage, material strength and type of anchoring ground.

The results are valid for gazebo without lateral cover.

The structural checks of the gazebo are out of the scope of this report.

# Aluminium for frame

## Alluminio lega 6060 UNI 9006 P Al Mg 0.5 Si 0.4 Fe

COMPOSIZIONE CHIMICA PERCENTUALE									
Mg 0.35-0.60	Si 0.30-0.60	Fe 0.10-0.30	Ti 0.10	Cu 0.10	Cr 0.05	Mn 0.10	Zn 0.15	Altri elementi Max 0.05-0.15	Al Resto

### Caratteristiche principali

Estrudibilità eccellente.  
Lega di media durezza adatta per estrusi difficili.  
Alta resistenza alla corrosione.  
Buona Formabilità allo stato TaN.  
Buona finitura di superfici.

### Usi tipici

Applicazioni architettoniche e decorative  
Profili per serramenti  
Industria chimica

### Caratteristiche fisiche generali

Peso specifico	2.7 kg/dm <sup>3</sup>
Modulo di elasticità	66000 N/mm <sup>2</sup>
Modulo di rigidità	26500 N/mm <sup>2</sup>
Punto di fusione	605°C
Calore specifico 0-100°C	~ 0.92 J (g.k)
Coeff. Di dilatazione	
Teorico lineare 20-100°C	23 x 10° x k1
Conduttività termica 20°C	~ 1.75 W (cm x k)
Resistività a 20°C (T6)	- 3.25 µ Ω x cm

### Altre caratteristiche

Resistenza alla corrosione	molto buona
Anodizzazione	molto buona
Saldabilità	buona
Lavorazione plastica a freddo	buona (Stato TaN)

LEGA IN ALLUMINIO PER ESTRUSIONE					
STATO FISICO	O	F	T1	T5	T6
CARATTERISTICHE MECCANICHE. CARICO DI ROTTURA A TRAZIONE R N/mm <sup>2</sup>	90-140	120-180	140-180	190-260	210-270
CARICO AL LIMITE DI SNERVAMENTO N/mm <sup>2</sup>	50-80	70-120	80-140	150-210	170-230
ALLUNGAMENTO A%	20-30	16-25	16-20	11-18	12-18
CARATTERISTICHE FISICHE COEFF.DI DILATAZ.TERMICA LINEARE 20-100°C	23 x 10 x K1				
RESISTIVITA' ELETTRICA A 20°C	3.14				3.25
CONDUTTIVITA' TERMICA A 20°C cal/sec cm°C	0.50				0.42
PESO SPECIFICO kg/dm <sup>2</sup>	2.70				
DUREZZA BRINNELL HB kg/mm <sup>2</sup>	Max 40	Max 40	35	55	60

# Fabric for roof

## **“OXFORD 500”**

### **POLYESTER FABRIC / GEWEBE 500 x 500 D**

Producer/Hersteller	Cetate Production
Finishing/Beschichtung:	PD, WR, PU colour 3x, F/R, ANTI-UV
Coating side/beschichtete Seite:	
- Main material/Hauptmaterial:	<i>Aromatic urethane Polymer: 60%</i>
- Fire retardant material/feuerfestes Material:	<i>FR-8010 (DBDPE) CAS No. 84852-53-9: 20%</i> <i>Antimony Trioxide: 20%</i>
Front site/Frontseite:	
- Water repellency/wasserabweisend:	<i>Perfluoro Alkyl Coplymer: 10%</i>
Yarn/Garn:	100% Polyester 500x500D
Density/Webdichte:	46 (Warp) x 36 (Weft) per inch <sup>2</sup>
Weight/Gewicht:	220 gr/m <sup>2</sup>
Width/Breite:	155 cm
Colorant/Farbstoff:	Bagacrone – India
Highest traction and extension/Höchstzugkraft und –dehnung:	ISO 13934-1:1999 – Mittelwert aus je 5 Streifen
	Highest traction – warp
	Höchstzugkraft – Kette : 2.030 N
	Highest traciton - shot
	Höchstzugkraft – Schuß : 1.577 N
	Highest extension - warp
	Höchstzugkraftdehnung – Kette : 26,6 %
	Highest extension - shot
	Höchstzugkraftdehnung – Schuß : 27,1 %
Water purity/Wasserechtheit	ISO 105 E01:1994
	colour change/Änderung der Farbe : 5
	Anbluten der Begleitgewebe-Polyester : 5
	Anbluten der Begleitgewebe – Baumwolle: 5
Spot acid purity/Echtheit gegen Fleckensäure	ISO 105 E05:1997
	Water/Wasser : 5
	Acetic acid/Essigsäure : 5
	Sulfuric acid/Schwefelsäure : 4
Light-fasteness/Lichtechtheit	ISO 105 B02: 1999
Water-proofing/Wasserdichtheit	Light-fasteness/Lichtechtheitsnote : ≥ 6 (Mittelwerte)
	ISO 811: 1981 – Water-column-test/Wassersäuletetest
	Average/Mittelwert : > 161 cm
	Highest value/Höchster Wert : > 200 cm
	Lowest value/Niedrigster Wert : 161 cm

# Fabric for sidewalls

## **“OXFORD 250”**

### **POLYESTER FABRIC / GEWEBE 250 x 250 D**

Producer/Hersteller	Cetate Production
Finishing/Beschichtung:	PD, WR, PU colour 3x, F/R, ANTI-UV
Coating side/beschichtete Seite:	
- Main material/Hauptmaterial:	Aromatic urethane Polymer: 60%
- Fire retardant material/feuerfestes Material:	FR-8010 (DBDPE) CAS No. 84852-53-9: 20%
Antimony Trioxide: 20%	
Front site/Frontseite:	
- Water repellency/wasserabweisend:	Perfluoro Alkyl Copolymer: 10%
Yarn/Garn:	100% Polyester 250x250D
Density/Webdichte:	54 (Warp) x 45 (Weft) per inch <sup>2</sup>
Weight/Gewicht:	160 gr/m <sup>2</sup>
Width/Breite:	155 cm
Colorant/Farbstoff:	Bagacrone – India
Highest traction and extension/Höchstzugkraft und –dehnung:	ISO 13934-1:1999 – Mittelwert aus je 5 Streifen
	Highest traction – warp
	Höchstzugkraft – Kette : 1.198 N
	Highest traciton - shot
	Höchstzugkraft – Schuß : 815 N
	Highest extension - warp
	Höchstzugkraftdehnung – Kette : 19,9 %
	Highest extension - shot
	Höchstzugkraftdehnung – Schuß : 23,0 %
	ISO 105 E01:1994
Water purity/Wasserechtheit	colour change/Änderung der Farbe : 5
	Anbluten der Begleitgewebe-Polyester : 5
	Anbluten der Begleitgewebe – Baumwolle: 5
	ISO 105 E05:1997
Spot acid purity/Echtheit gegen Fleckensäure	Water/Wasser : 5
	Acetic acid/Essigsäure : 5
	Sulfuric acid/Schwefelsäure : 4
	ISO 105 B02: 1999
Light-fasteness/Lichtechtheit	Light-fasteness/Lichtechtheitsnote : ≥ 6 (Mittel)
Water-proofing/Wasserdichtheit	ISO 811: 1981 – Water-column-test/Wassersäuletest
	Average/Mittelwert : > 200 cm
	Highest value/Höchster Wert : > 200 cm
	Lowest value/Niedrigster Wert : > 200 cm

