中国认可
国际互认
检测
TESTING
CNAS L6069

Test Report

Report No. TC.21.06.002477

Date of Issue 07/06/2021

Applicant: **Ningguo Xinmao Glass Fiber Products Co., Ltd**

Applicant address: **Zhenning Road (Desheng Electromechanical) Park, Helik Park, Ningguo City**

Description of the test subject:

Sample	Description	Photo
001	Sample Number: 21-622-30 Sample Description: High temperature and fire resistant fiberglass sleeves Style No.: XM-GT-30 Manufacturer: Ningguo Xinmao Glass Fiber Products Co., Ltd Country of origin: Ningguo City, Xuancheng City, Anhui Province, China	

Receipt Date of Sample: **06/24/2021**

Date of Testing: **From 06/24/2021 to 07/06/2021**

Sample submitted: **The sample(s) was (were) submitted by applicant and identified.**

Conclusion:

Test Items			R22			R23		
No.	Items	Items	HL1	HL2	HL3	HL1	HL2	HL3
1	Oxygen index	EN 45545-2:2013+A1:2015 EN ISO 4589-2:2017	Pass	Pass	Pass	Pass	Pass	Pass
2	Smoke density testing	EN 45545-2:2013+A1:2015 EN ISO 5659-2:2017	Pass	Pass	Pass	*	Pass	Pass
3	Toxicity testing	EN 45545-2:2013+A1:2015 NF X 70-100-1/-2:2006(R2011)	Pass	Pass	Pass	*	Pass	Pass

Remark: *=Standards are not required.

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Test Results

EN 45545-2:2013+A1:2015 Railway applications-Fire protection on railway vehicles Part2: Requirements for fire behaviour of materials and components

1. EN ISO 4589-2:2017 Plastics—determination of burning behavior by oxygen index Part 2: Ambient temperature test

1.1 Sample details:

Specimen size	150mm×10mm
Thickness	About 2.4 mm

Precondition	Temperature	Relative humidity	Duration
	23±2°C	50±5%R.H.	24h

1.2 Test result

Section 1：Determination of oxygen concentration for one pair of "X" and "O" responses at ≤ 1 % (V/V) O_2 concentration interval

Oxygen concentration, % (V/V)	35.0	40.0	45.0						
Length burnt, mm	<50	<50	>50						
Response ("X" or "O")	O	O	X						

Oxygen concentration of the "O" response for the pair = 40.0 % (V/V)
(This is the concentration to be used again for the first measurement in section 2)

Section 2: Determination of oxygen index：Step size to be used for successive changes d in oxygen concentration = 0.2 % (V/V)

	N_T series measurements									
	N_L series measurements									C_i
Oxygen concentration, % (V/V)	40.0	40.2	40.4	40.6	40.8	40.8	40.6	40.8	40.6	40.8
Length burnt, mm	<50	<50	<50	<50	>50	>50	<50	>50	<50	>50
Response ("X" or "O")	O	O	O	O	X	X	O	X	O	X
k value	k=-0.45									

OI= C_i + kd ：
OI= C_i + kd = 40.7 %

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k of oxygen index as following table

1	2	3	4	5	6
Test results of last five times	Previous measurement of K				
	O	O O	O O O	O O O O	
X O O O O	-0.55	-0.55	-0.55	-0.55	O X X X X
X O O O X	-1.25	-1.25	-1.25	-1.25	O X X X O
X O O X O	0.37	0.38	0.38	0.38	O X X O X
X O O X X	-0.17	-0.14	-0.14	-0.14	O X X O O
X O X O O	0.02	0.04	0.04	0.04	O X O X X
X O X O X	-0.50	-0.46	-0.45	-0.45	O X O X O
X O X X O	1.17	1.24	1.25	1.25	O X O O X
X O X X X	0.61	0.73	0.76	0.76	O X O O O
X X O O O	-0.30	-0.27	-0.26	-0.26	O O X X X
X X O O X	-0.83	-0.76	-0.75	-0.75	O O X X O
X X O X O	0.83	0.94	0.95	0.95	O O X O X
X X O X X	0.30	0.46	0.50	0.50	O O X O O
X X X O O	0.50	0.65	0.68	0.68	O O O X X
X X X O X	-0.04	0.19	0.24	0.25	O O O X O
X X X X O	1.60	1.92	2.00	2.01	O O O O X
X X X X X	0.89	1.33	1.47	1.50	O O O O O
	Previous measurement of K				
	X	X X	X X X	X X X X	Test results of last five times
	k of column 6 in above table, the symbol instead, mean OI=ci-kd (see 9.1)				

2. EN ISO 5659-2:2017 Plastics — Smoke generation —Part 2: Determination of optical density by a single-chamber test

2.1 Sample details:

Specimen size	75 mm×75 mm
Thickness	About__2.4__mm

Precondition	Temperature	Humidity	Duration
	23±2°C	50±5%R.H.	24h

2.2 Test results

Test mode	The heat flux was 25 kW/m^2 with pilot flame

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Item	Specimens			Average
	1	2	3	
Ds(1.5)	6.8	6.7	5.0	6.2
Ds(4)	28.7	25.6	23.9	26.1
Ds(10)	44.9	44.2	41.8	43.6
Ds(max)	44.9	44.2	41.8	43.6
VOF4	56.1	47.5	40.7	48.1
T(Ds max), s	600	600	600	600

Note:
Ds(n): Specific optical density of smoke where n is the elapsed time since the start of testing in minutes.
VOF4: VOF4 = $[Ds(1) + Ds(2) + Ds(3) + \frac{Ds(4)}{2}] \times 1min$
Ds(max): For each specimen, produce a graph of light transmission against time and determine the minimum percentage transmission T_{min}. Covert T_{min} to the maximum specific density D_{smax} by calculation to two significant figures using the following equation. $Dsmax = 132\log 10\frac{100}{Tmin}$ Test duration is 10min.
T (Ds max): The time of the start of test at which the Ds(max) was made.

Conclusion:

Ds(max)	43.6

3. NF X 70-100-1:2006 (R2011) / NF X 70-100-2:2006 (R2011) Analysis of gaseous effluents -As modified by EN 45545-2:2013+A1:2015 R22/R23 at a temperature of 600℃.

3.1 Sample details

Weight	S1: 1.0000 g; S2: 0.9997 g; S3: 1.0002 g

Precondition	Temperature	Humidity	Duration
	23±2°C	50±5%R.H.	At least 48h

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3.2 Test results

Gas	MDL	S 1	S 2	S 3	Average
Carbon Dioxide (CO_2)	40	208.7	206.5	207.4	207.5
Carbon Monoxide (CO)	5	20.3	20.6	20.7	20.5
Hydrogen Fluoride (HF)	0.05	0.1	0.1	0.1	0.1
Hydrogen Chloride (HCl)	0.05	0.6	0.2	0.3	0.4
Hydrogen Bromide (HBr)	0.1	ND	ND	ND	ND
Hydrogen Cyanide (HCN)	0.3	0.3	0.3	0.3	0.3
Nitrogen Dioxide (NO_2)	0.5	ND	ND	ND	ND
Sulphur Dioxide (SO_2)	0.1	ND	ND	ND	ND

Note: All values given are in mg/g.
Where ND indicates Non-detected.
Where MDL indicates Method Detection Limit.

Calculate the Index of Toxic Fume CIT $_{NLP}$

The test results obtained for toxicity measurements were used to calculate the Index of Toxic Fume CIT $_{NLP}$, as described in EN 45545-2:2013+A1:2015 Annex C.16.3,

$$CIT_{NLP} = \sum_{i=1}^{i=8} \frac{Y_i}{C_i}$$

Where:
Yi is the yield of the i^{th} gas in mgg^{-1} in the NF X70-100-1 tube furnace;
Ci is the reference concentration of the i^{th} gas in mg/m^3,see table 2

Table 2

Gas	Reference concentration; mg/m^3
Carbon Dioxide (CO_2)	72000
Carbon Monoxide (CO)	1380
Hydrogen Fluoride (HF)	25
Hydrogen Chloride (HCl)	75
Hydrogen Bromide (HBr)	99
Hydrogen Cyanide (HCN)	55
Nitrogen Oxides (NO_2)	38
Sulphur Dioxide (SO_2)	262

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Result:

CIT_{NLP}	0.032

Requirement of EN 45545-2:2013+A1:2015 R22 & R23:

Item	Vehicle category(R22)			Vehicle category(R23)		
	HL1	HL2	HL3	HL1	HL2	HL3
OI%(min)	28	28	32	28	28	32
Ds max(max)	600	300	150	*	600	300
CIT_{NLP}(max)	1.2	0.9	0.75	*	1.8	1.5

Conclusion:

Item	Record	Vehicle category(R22)			Vehicle category(R23)		
		HL1	HL2	HL3	HL1	HL2	HL3
OI%	40.7	Pass	Pass	Pass	Pass	Pass	Pass
Ds(max)	43.6	Pass	Pass	Pass	*	Pass	Pass
CIT_{NLP}	0.032	Pass	Pass	Pass	*	Pass	Pass

Statement：The test results relate to the behaviour of the test specimens of a product under the particular conditions of the test; they are not intended to the sole criterion for assessing the potential smoke and toxicity hazard of the product in use. Test results are just for internal reference.

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-End of Report-

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