

Conformity Report

20-TUV-ATR-COC-0003

TÜV AUSTRIA TURK
BELGELENDİRME EĞİTİM VE GÖZETİM
HİZMETLERİ LTD. ŞTİ.
Barbaros Mah. Susuz Sok.
No:13/1 PK: 34746
Ataşehir / İSTANBUL – TURKEY
www.tuvaustriaturk.com



Manufacturer: Fercam Cam San.ve Tic.Ltd.Şti.
Type: FC-OLGW-AS1 3+3

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American National Standart for Safety Glazing Materials for Glazing Motor Vehicles and
Motor Vehicle Equipment Operating on Land Highways – Safety Standard

ANSI / SAE Z26.1 - 1996

Approval Status	
<input type="checkbox"/>	Granting of a type approval:
<input type="checkbox"/>	Extension to type approval number:
<input type="checkbox"/>	Correction to type approval number:
<input checked="" type="checkbox"/>	Only test report:

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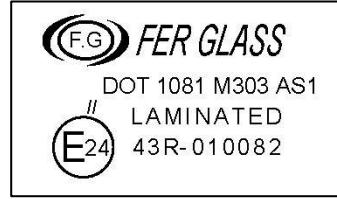
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1. General

1.1 Trade Names or marks / approval marks : Fercam



1.2 Item no / Type of glazing material: 1 / Laminated Safety Glazing / FC-OLGW-AS1 3+3

1.3 Type name / Description of the type of glazing: FC-OLGW-AS1 / Safety glazing material for use anywhere in motor vehicle

1.4 Name and address of the manufacturer: Alaşarköy mahallesi 2.Aral sokak No:6 Osmangazi Bursa Türkiye

1.5 If applicable, name and address of manufacturer's representative: Not applicable

1.6 Date of issue of information folder: 03.02.2020

1.7 Information folder no: FC-OLGW-AS1 3+3

1.8 Parameter of the test area: 18 °C,
%50 Humidity

1.9 Calibration Equipments

Test Instrument	Type	Manufacturer	ID - No.	
Electronic Scales	SF-400C	-	20685	<input checked="" type="checkbox"/>
Thermometer	DİJİTAL	IMPAC	3887090	<input checked="" type="checkbox"/>

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LIST OF ANNEXES		
Annex	No of Pages	Subject
1	1	Information Document of Manufacturer(FC-OLGW-AS1 3+3)
2	68	E24 43R 0104 0082 02 UN ECE R43 type approval

TEST SPECIFICATION AND WORST CASE**Test required (SAE Z26.1 / Table 1 / Grouping of the tests)**

- Test no : 1 Light stability
- Test no : 2 Luminous transmittance
- Test no : 3 Humidity test
- Test no : 4 Boil test
- Test no : 9 Impact, dart 9,14 m
- Test no : 12 Impact, ball 9,14 m
- Test no : 15 Deviation and distortion
- Test no : 18 Abrasion resistance
- Test no : 26 Penetration resistance

MANUFACTURER'S DOCUMENTATION	
Manufacturer's documentation is complete and reflects the agreed specification for the component tested and covers all variants and versions agreed in the worst case rationale	Yes

2. Test Report

Clause	Requirements	Results
5.	Test specifications	
5.1	Light Stability, Test 1	
5.1.1	The purpose of this test is to determine the regular (parallel) luminous transmittance of the safety glazing material or multiple glazed unit before and after irradiation, thereby indicating the suitability of the safety glazing material and whether or not it is adversely affected by exposure to simulated sunlight over an extended period of time	Fulfilled
5.1.2	Three 305 mm x 305 mm (12 in x 12 in) or three 76 mm x 305 mm (3 in x 12 in), substantially flat specimens as submitted shall be tested for regular (parallel) luminous transmittance at normal incidence calculated to International Commission on Illumination .	Fulfilled
5.1.3	The regular (parallel) luminous transmittance of the exposed specimens shall be reduced no more than 5 %. An increase in regular (parallel) luminous transmittance is acceptable. A very slight discoloration, noticeable only when specimens are placed on a white background, may develop, but defects other than this discoloration shall not develop.	Fulfilled

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5.2	Luminous Transmittance, Test 2	
5.2.1	The purpose of this test is to determine the regular (parallel) luminous transmittance of safety glazing material intended for use at levels in motor vehicles requisite for driving vision.	Fulfilled
5.2.2	If safety glass is being tested, the data obtained from Test 1 through 5.1.3 shall be used. If plastic is being tested, the data obtained in Test 16 shall be used. No additional samples other than those tested in Test 1 or 16 are required in this test	Fulfilled
5.2.3	Safety glazing materials or multiple glazed units intended for use at levels requisite for driving visibility in the motor vehicle shall show regular (parallel) luminous transmittance of not less than 70 % of the light, at normal incidence, both before and after irradiation.” For Item 11C - safety glazing material for use in bullet-resistant shields, the combined regular (parallel) luminous transmittance at normal incidence through both the shield and the permanent vehicle glazing must be at least 60 %.	Fulfilled
5.3	Humidity, Test 3	
5.3.1	The purpose of this test is to determine whether the safety glazing material will successfully withstand the effect of moisture in the atmosphere over an extended period of time.	Fulfilled
5.3.2	Three 305 mm x 305 mm (12 in x 12 in), substantially flat specimens, as submitted, shall be kept for 2 weeks in a closed container over water. The temperature of the air in the container shall be maintained within the limits of 49 °C and 54 °C (120 °F and 130 °F). (These conditions give a relative humidity of about 100 %).	Fulfilled
5.3.3	No separation of materials shall develop, except for occasional small spots, no one of which shall extend inward from the adjacent edge of the specimen to a depth of more than 6.35 mm (4 in).	Fulfilled
5.4	Boil, Test 4	
5.4.1	The purpose of this test is to determine whether the safety glazing material will successfully withstand exposure to tropical temperatures over an extended period of time.	Fulfilled
5.4.2	Three 305 mm x 305 mm (12 in x 12 in), substantially flat specimens, as submitted, shall be immersed, vertically on edge, in water at 66 °C (150 °F) for 3 minutes and then quickly transferred to and similarly immersed in boiling water. The specimens shall be kept in the boiling water for 2 hours and then removed. The first immersion is intended to reduce the possibility of thermal shock breakage and is optional.	Fulfilled
5.4.3	The glass itself may crack in this test, but no bubbles or other defects shall develop more than 13 mm (4 in) from the outer edge of the specimen or from any cracks that may develop. Any specimen in which the glass cracks to an extent confusing the result shall be discarded without prejudice, and another specimen shall be tested in its stead.	Fulfilled

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5.9	Impact, Test 9 (Dart Drop, 9.14 m [30 ft])	
5.9.1	The purpose of this test is to determine the behavior of the safety glazing material under impact from a small, hard object.	Fulfilled
5.9.2	Five 305 mm x 305 mm (12 in x 12 in), substantially flat specimens, as submitted, shall be tested. Specimens to be tested shall be separated and kept at a temperature of 1 C to 29 C (70 °F to 85 °F) for at least 4hours immediately preceding the test, thereby ensuring a uniform temperature throughout each specimen whentested. The specimen tested shall be supported in a steel frame made in accordance with Fig. 1. The frame shall be so supported that the plane of the specimen will be substantially horizontal at the time of impact. A 196 g to 201 g (7 oz + 0.1 02) steel dart, made in accordance with Fig. 3, shall be dropped 9.14 m (30 ft), once, freely and from rest, the nose of the dart striking the specimen within 25mm (1 in) of its center on that face of the specimen representing the face mountedto the exterior of the vehicle.	Fulfilled
5.9.3	The dart may crack the safety glazing material and may puncture the specimen. However, the hole so produced in the specimen shall not be sufficiently large to permit passage of the body of the dart completely through the specimen. Small particles may disengage themselves from both sides of the specimen at and immediately around the point of impact, but no loose or detached pieces shall leave any area of the specimen exclusive of the area punctured by the dart. Furthermore, the glass on adjacent sides of each crack extending from the area punctured by the dart shall be held in place by the reinforcing or strengthening material, and no glass shall be freed from reinforcing or strengthening material for a distance greater than 38 mm (1½in) from a crack. Spalling of the outer glass surface opposite the point of impact and adjacent to the area of impact is not to be considered a failure. Not more than one specimen shall break into separate large pieces.	Fulfilled
5.12	Impact, Test 12 (Ball Drop, 9.14 m [30 ft])	
5.12.1	The purpose of this test is to determine whether the safety glazing material has a certain minimum strength and whether it is properly made.	Fulfilled
5.12.2	Twelve 305 mm x 305 mm (12 in x 12 in), substantially flat specimens, as submitted, shall be tested. Specimens to be tested shall be separated and kept at a temperature of 21 °C to 29°C (70 °F to 85 °F) for at least 4 hours immediately preceding the test, thereby ensuring a uniform temperature throughout each specimen when tested. The specimen tested shall be supported in a steel frame made in accordance with Fig. 1. The frame shall be so supported that the plane of the specimen will be substantially horizontal at the time of impact. A 224 g to 230 g (0.5 lb + 0.1 oz) solid, smooth steel sphere shall be dropped 9.14 m (30 ft), once, freely and from rest, striking the specimen within 25 mm (1 in) of its center on the face that would be mounted to the exterior of the vehicle. The ball shall be allowed to make only one impact with the specimen.	Fulfilled

20-TUV-ATR-COC-0003

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5.12.3	The impact may produce a large number of cracks in the glass; not more than two of the specimens shall break into separate large pieces. Furthermore, with no more than two of the remaining specimens shall the ball produce a hole or fracture at any location in the specimen through which the ball will pass. At the point immediately opposite the point of impact, small fragments of glass may leave the specimen, but the small area thus affected shall expose less than 645 mm ² (d in ²) of reinforcing or strengthening material, the surface of which shall always be well covered with tiny particles of tightly adhering glass. Total separation of glass from the reinforcing or strengthening material shall not exceed 1935 mm (3 in) on either side. Spalling of the outer glass surface opposite the point of impact and adjacent to the area of impact is not to be considered a failure.	Fulfilled
5.15	Optical Deviation and Visibility Distortion, Test 15	
5.15.1	The purpose of this test is to measure the optical deviation and visibility distortion effects of flat or curved safety glazing materials or both. To this end, the procedure is divided into two parts: Optical Deviation (5.15.2.1). and Visibility Distortion (5.15.2.2).	Fulfilled
5.15.2	<p>Procedure.</p> <p>Ten 305 mm x 305 mm (12 in x 12 in), substantially flat specimens of the safety glazing material and in the case of curved glazings, three approximately 305 mm x 305 mm (12 in x 12 in) additional curved specimens as described in Section 3, Specimens to Be Tested, curved to the minimum radius, shall be tested for optical deviation (see 5.15.2.1) and visibility distortion (see 5.15.2.2) before being subjected to other tests. That area of each specimen within 25 mm (1 in) of any edge shall be covered with a suitable opaque mask.</p> <p>Optical Deviation.</p> <p>The equipment for this test consists of the illuminated box as shown in Fig. 4. The illuminated box shall be placed in a dark or semidark room so that the secondary image and the white circle shall be distinctly visible. The specimen shall be placed 7.62 m (25 ft) from the face of the box and positioned so that the area of the specimen being examined will be normal to the line of vision between the light source and the examiner's eye (one eye only). The entire unmasked area of the specimen shall be surveyed. In testing of unsymmetrical glazing materials, such as glass-plastic laminates, the exterior surface of the specimen shall face the illuminated box.</p> <p>Visibility Distortion.</p> <p>The equipment for this test consists of:</p> <p>(1) A good quality, 500 W, lantern slide projector or a similar assembly of light source and lenses that is capable of projecting a sharply defined image on a screen at a distance of 7.62 m (25 ft). The objective lens of this system shall have an aperture approximately 51 mm (2 in) in diameter and a focal length of 305 mm (12 in). The light source shall be not less than 500 W rating.</p> <p>(2) A square, clean, matte, white projection screen that lies substantially in one plane, measuring approximately 1.62 m (5 ft) on a side.</p>	Fulfilled

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	(3) A darkroom of sufficient length to accommodate the setup. The projection lantern shall be focused on the screen 7.62 m (25 ft) distant. The specimen shall be placed between the lantern and the screen, close to and as nearly parallel with the screen as may be possible. The specimen shall be positioned so that the exterior surface faces the screen. The specimen shall be moved toward the lantern in steps of 127 mm (5 in), always as nearly parallel to the screen as may be possible, and the shadow on the screen observed. When light and dark patches begin to appear throughout the entire area of the shadow, the distance from the screen to the specimen shall be noted. The entire unmasked area of the specimen shall be surveyed.	
5.15.3	<p>Throughout the area surveyed under 5.15.2.1 there shall be no shift of the secondary image beyond the point of tangency with the inside edge of the circle.</p> <p>NOTE: An image shift to the point of tangency of the inside edge of the 114 mm (4.5 in) circle represents a direct vision deviation of 3.95 minutes of arc or 8.9 mm (0.35 in) at 7.62 m (25 ft). Under 5.15.2.2, no light and dark patches, existent over the entire area, shall appear in the shadow of the unmarked area of the specimen before the specimen shall have been moved a distance of a least 635 mm (25 in) from the screen. Specimens shall comply with both 5.15.2.1 and 5.15.2.2 to meet the requirements of histest.</p> <p>Optical Deviation.</p> <p>The equipment for this test consists of the illuminated box as shown in Fig. 4. The illuminated box shall be placed in a dark or semidark room so that the secondary image and the white circle shall be distinctly visible. The specimen shall be placed 7.62 m (25 ft) from the face of the box and positioned so that the area of the specimen being examined will be normal to the line of vision between the light source and the examiner's eye (one eye only). The entire unmasked area of the specimen shall be surveyed. In testing of unsymmetrical glazing materials, such as glass-plastic laminates, the exterior surface of the specimen shall face the illuminated box.</p>	Fulfilled
5.18	Abrasion Resistance, Test 18 (Safety Glazing Material)	
5.18.1	The purpose of this test is to determine whether safety glazing material, as mounted in the vehicle, has a certain minimum resistance to abrasion.	Fulfilled
5.18.2	The procedure for this test shall be that described in Test 17 except that the specimens of safety glazing material for this test are to be subjected to abrasion for 1000 cycles. Three 102 mm x 102 mm, (4 in x 4 in) flat specimens shall be tested.	Fulfilled
5.18.3	The arithmetic mean of the percentages of light scattered by three specimens as a result of abrasion shall not exceed 2.0 %	Fulfilled
5.26	Penetration Resistance, Test 26	Fulfilled
5.26.1	The purpose of this test is to determine whether the safety glazing material has satisfactory penetration resistance.	Fulfilled
5.26.2	Ten 305 mm x 305 mm (12 in x 12 in), substantially flat specimens, as submitted, shall be tested. Specimens to be tested shall be	Fulfilled

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	<p>separated and kept at a temperature of 21 °C to 29 °C (70 °F to 85 °F) for at least 4hours immediately preceding the test to ensure a uniform temperature throughout each specimen when tested. The specimen to be tested shall be supported in a steel frame made in accordance with Fig. 1. The frame shall be so supported that the plane of the specimen will be substantially horizontal. When necessary to retain the specimen in the frame, the specimen shall be clamped to ensure that the movement of the specimen during the test will not exceed 2 mm (0.079 in) at any point along the inside periphery of the frame. A 2.254 kg to 2.282 kg (5 lb + 0.5 oz) solid, smooth steel sphere shall be dropped from a height of 3.66 m (12 ft), once, freely and from rest, so as to strike the approximate center of the surface that would be mounted to the interior of the vehicle. The ball shall be allowed to make only one impact with each test specimen.</p>	
5.26.3	<p>The impact may produce a large number of cracks in the glass and may cause tears in reinforcing interlayer material. The impact furthermore may produce a substantial permanent deformation in the shape of the originally substantially flat specimen. However, with no more than two of the specimens shall the ball pass completely through the specimen within a 5 second interval after impact, either by what could be described as a puncture of the specimen or by means of the specimen fracturing into relatively large pieces that subsequently fold aside to permit passage of the ball. For glass-plastic glazing material, only the plastic surface specimens, whether coated or uncoated, facing inward is subject to test and evaluation. When the specimen is clamped, the specimens during the test exhibiting more than 2 mm (0.079 in) of movement at any point along the inside periphery of the frame shall be discarded and a new specimen substituted in its place.</p>	Fulfilled

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3. Test Results

As this laminated safety glazing thickness category has a valid UN ECE R43 type approval the requirements for tests related with items 1 , 2 , 3 , 12 , 15 , 18 , 26 are accepted as fulfilling the tests . See type approval E24 43R 0104 0082 02 attached to this document.

SAE Z 26.1 clause 5.4 Boil, Test 4

	The glass itself may crack in this test, but no bubbles or other defects shall develop more than 13 mm (4 in) from the outer edge of the specimen or from any cracks that may develop. Any specimen in which the glass cracks to an extent confusing the result shall be discarded without prejudice, and another specimen shall be tested in its stead.
3 Samples 305 x 305 mm	Some cracks seen , no defects within 13 mm or more Fulfilled
	 
	

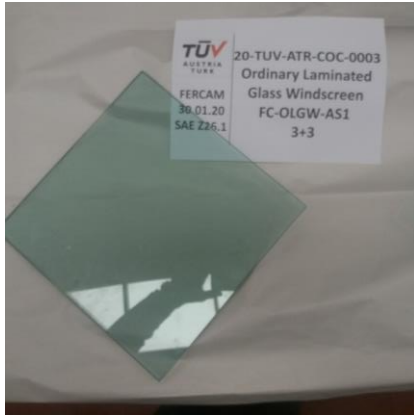
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SAE Z 26.1 clause 5.9 Impact, Test 9 (Dart Drop, 9.14 m [30 ft])

The dart may crack the safety glazing material and may puncture the specimen. However, the hole so produced in the specimen shall not be sufficiently large to permit passage of the body of the dart completely through the specimen. Small particles may disengage themselves from both sides of the specimen at and immediately around the point of impact, but no loose or detached pieces shall leave any area of the specimen exclusive of the area punctured by the dart.

5 Samples
 305 x 305 mm

Fulfilled



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4. Test place and date

TR – Bursa Fercam 30.01.2020

5. Final Confirmation

As the result of inspections of **Fercam Cam San.ve Tic.Ltd.Şti.** company's sample product, it has been confirmed that the sample product as a component fulfilled the requirements related to the SAE Z 26.1 .

This report cannot be multiplied without written approval of TÜV AUSTRIA TURK.
This report is not valid without security hologram in this page.
This technical report consists of 11 pages.

TR-İstanbul 12.02.2020	Özlem OK A Check 	Serap GÜRSESLİ Q Check 		Sinan COŞKUN Recognized Expert/Signature 
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