ECE TYPE-APPROVAL CERTIFICATE

E24

Communication concerning:[2] Approval granted
~~Approval extended~~
~~Approval refused~~
~~Approval withdrawn~~
~~Production definitively discontinued~~

of a type of safety glazing material pursuant to Regulation No. 43.

Approval No: ***E24*43R01/12*0291*00***

1.	Class of safety glazing material:	***Rigid Plastic Panes (PC-3.3mm）***
2.	Description of the type of glazing:	***Please refer to Appendices ~~1, 2, 3, 4, 5, 6, 7~~, 8,~~ and 9, 10, 11 and 12~~[(2)] and in the case of windscreens, the list conforming to Appendix 13***
3.	Trade names or marks:	
4.	Manufacturer's name and address:	***Jiangsu Sanjo Intelligent Technology Co., Ltd. No.8, Jinguazi Road, Nandu Town, Liyang City, Jiangsu Province, China.***
5.	If applicable, name and address of manufacturer's representative:	***N/A***
6.	Submitted for approval on:	***04.09.2025***
7.	Technical service responsible for conducting approval tests:	***CETOC TECHNICAL SERVICE S.R.L. Via della Bufalotta, 374 00139 - Roma (RM) Italy***
8.	Date of report issued by that service:	***01.08.2025***
9.	Number of report issued by that service:	***CN-118-17-680-COM25-28373-IR***

(1) Distinguishing number of the country which has granted/extended/refused/withdrawn approval (see approval provisions in the regulation).
(2) Strike out what does not apply.

NSAI, 1 Swiftsquare, Northwood, Santry, Dublin 9, Ireland. Telephone: (+353+1) 807 3800, Facsimile: 01-807 3844

Approval No: ***E24*43R01/12*0291*00***

10.	Approval is granted~~/refused/extended/withdrawn~~:	***Granted***
11.	Reason(s) for extension of approval:	***N/A***
12.	Remarks:	***N/A***
13.	Place:	***Dublin***
14.	Date:	***01st October, 2025***
15.	Signature:	

16. The list of documents filed with the Type Approval Authority which has granted approval and available on request is Annexed to this communication.

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Annex 1 - Appendix 8

RIGID PLASTICS PANES

(Principal and secondary characteristics in accordance with Annex 14)

Approval No: ***E24*43R01/12*0291*00***

Principal characteristics:

Chemical designation of the material:	***PC***
The classification of the material by the manufacturer:	***N/A***
Process of manufacture:	***Injection molding***
Shape and dimensions:	***Greatest area: 0.63 m^2***
Nominal Thickness:	***3.3 mm***
Colouring of rigid plastic material:	***Transparent gray***
Nature and type of surface coating:	***N/A.***

Secondary characteristics:

Conductors incorporated (~~yes~~\no):	***No***
Remarks:	***None***

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Approval No: ***E24*43R01/12*0291*00***

Index to the Information Package

Date of issue:	***01st October, 2025***
Date of latest amendment:	***N/A***
Reason for extension/revision:	***N/A***

1. Additional conditions, and advisory notes on legal alternatives.

2. Test report(s)

- numbers(s):	***CN-118-17-680-COM25-28373-IR***
- date of issue:	***01.08.2025***
- date of latest amendment:	***N/A***

3. Information document

- number(s):	***PC-3.3mm-00***
- date of issue:	***02.04.2025***
- date of latest amendment:	***N/A***
Documentation:	***11 pages***

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Approval No: ***E24*43R01/12*0291*00***

Appendix: **Additional conditions, and advisory notes on legal alternatives.**

A: Additional conditions:

1. The attached technical report, with any of its attachments, forms part of this Type Approval certificate.
2. Each type from series production shall be to the measurements specified in the attached drawings, and shall be manufactured only from the materials specified in the Approval documents.
3. Changes in the type are permitted only with the explicit permission of NSAI. Breaches of this requirement will lead to a withdrawal of the Type Approval, and in addition may be subject to criminal prosecution.
4. At regular intervals, any tests or associated checks prescribed by the applicable legislation to verify continued conformity with the approved type shall be carried out. The manufacturer shall demonstrate compliance with this by submitting to NSAI evidence of adequate arrangements and documented control plans for each type approved.
5. Any set of samples or test pieces showing evidence of non-conformity shall give rise to further sampling and testing and all steps shall be taken to restore conformity of production.
6. This Type Approval will expire when it is surrendered by the holder, or withdrawn by NSAI, or when the approved type no longer conforms to legal requirements. The recall of the Type Approval can be issued by NSAI when the conditions required for the issuing or continuation of the Type Approval are no longer current, or when the Approval holder is in breach of the duties attached to the Type Approval, or when it is established that the approved type no longer meets the requirements of traffic safety.
7. Changes in the company name, address or manufacturing site, as well as in any of the sales or other agents specified in the issuing of the approval must immediately be notified to NSAI.
8. The duties imposed by the issuing of this certificate are not transferable. The legal protection of third parties is not affected by this certificate.
9. When the manufacture or sale of the system, component or separate technical unit has not been started within one year of the date of issue of this certificate, then NSAI is to be informed. This requirement also applies when the manufacture or sale has been halted for more than one year, or when it ought to have been halted for more than one year. The initial commencement of manufacture or sale, or the resumption of manufacture or sale, shall then be notified to NSAI within one month of commencement or resumption.

B: Legal Options:

Any objection to the requirements set out in this certificate shall be made within one month of the date of issue. The objection shall be made, in writing, to NSAI in Dublin.

NSAI, 1 Swiftsquare, Northwood, Santry, Dublin 9, Ireland. Telephone: (+353+1) 807 3800, Facsimile: 01-807 3844

CETOC TECHNICAL SERVICE S.R.L.
Via della Bufalotta, 374
00139 - Roma (RM) Italy

Inspection Report Nr.: CN-118-17-680-COM25-28373-IR
Manufacturer: Jiangsu Sanjo Intelligent Technology Co., Ltd.
Type: PC-3.3mm

01480

Safety Glazing
Rigid Plastic Panes

0. Legislation:

0.1.	Requirements according to	:	UNECE Regulation 43.01, Supplement 12

1. General

1.1.	Reason for Inspection Report	:	New approval / ~~Extension of approval / Test report only / COP~~
1.1.1.	Previous Type Approval Number	:	N/A
1.2.	Manufacturer's Representative(s)	:	N/A
1.3.	CETOC TS Representative(s)	:	Ellen Jin
1.4.	Location of test	:	China Testing & Certification International Group Co., Ltd. No.1, Guanzhuang Dongli, Chaoyang District, Beijing, China
1.5.	Date of test	:	18/03/2025-24/06/2025

2. Manufacturer Details

2.1.	Make	:	FREUCAMP, RV innotec
2.2.	Type	:	PC-3.3mm
2.3.	Variant/Version	:	Not applicable.
2.4.	Commercial Name	:	Not applicable.
2.5.	Category	:	Rigid Plastic Panes
2.6.	Name and Address of manufacturer	:	Jiangsu Sanjo Intelligent Technology Co., Ltd. No.8, Jinguazi Road, Nandu Town, Liyang City, Jiangsu Province, China.

3. Conclusion:

3.1.	Final conclusion of the inspection	:	The above mentioned type was tested in accordance with the above mentioned legislation and was found to comply in all respects. This Inspection report relates only to the items tested.

Signature	:	Ellen Jin	Marco Pagliari
Name	:	Ellen Jin	Marco Pagliari
Position	:	Type Approval Engineer	Technical Manager
Place and date	:	Hangzhou China, 01/08/2025	Rome, 01/08/2025

4. List of Appendixes:

Appendix Nr.	Page Nr.		Subject
Appendix 1	2	:	Test report history
Appendix 2	2-3	:	General specification
Appendix 3	4-8	:	Inspection results
Appendix 4	9	:	Testing photos

APPENDIX 1 - TEST REPORT HISTORY

List this report and previous reports, with extension details.

Inspection Report Number	Reason for Extension	Date of Issue
CN-118-17-680-COM25-28373-IR	Not applicable	01/08/2025

APPENDIX 2 – GENERAL SPECIFICATION

1. Worst Case Rationale : Single specification

2. Significant Interpretations, Alternative Test Methods, New Technologies : N/A

3. Summary of test results :

	PASS	FAIL	N/A	COVERED BY PREVIOUS EXTENSON	See approval/Report Nr.
Flexibility test	☒	☐	☐	☐	
Head form test	☐	☐	☒	☐	
227 g Ball test	☒	☐	☐	☐	
Resistance to the environment test	☒	☐	☐	☐	
Optical qualities test	☐	☐	☒	☐	
Fire resistance test	☒	☐	☐	☐	
Resistance of Chemicals test	☒	☐	☐	☐	

4. Vehicle/Component Specification :

PRINCIPAL CHARACTERISTICS	
Chemical designation of the material:	PC
The classification of the material by the manufacturer:	Not applicable
Process of manufacture:	Injection molding
Shape and dimensions:	Greatest area: 0.63m^2
Nominal thickness:	3.3mm
Colouring of the rigid plastic material:	Transparent gray
Nature and type of surface coating:	Not applicable

SECONDARY CHARACTERISTICS	
Conductors incorporated (yes/no):	no

CETOC TECHNICAL SERVICE S.R.L.
Via della Bufalotta, 374
00139 - Roma (RM) Italy

5. Facility and Equipment Checks

5.1.	Calibration certificates checked and valid, recorded in the following table	:	Conform
5.2	All instruments are equipped with identification label	:	Yes
5.3	Calibration certificates are complete of calibration-chain with detailed information regarding primary used.	:	Yes

Equipment	Serial / Certificate No.	Calibration due*
Digimatic micrometer	SN-0-25 mm	09/08/2025
Digital thermometer	SN-Q-20	22/04/2026
Humidity Chamber	SN-GDJW-024	20/03/2027
Transmittance tester	SN-SGT-A	01/08/2025

**Specify calibrated date + (interval) or calibration due date.*

APPENDIX 3 – INSPECTION RESULTS

		PASS	FAIL	N/A
	Flexibility test			
Ann 14, 3.2	One flat test piece measuring 300 mm x 25 mm shall be subjected to testing.	☒	☐	☐
Ann 14, 3.3.1	The method used shall be that described in Annex 3, paragraph 12.	☒	☐	☐
Ann 14, 3.4	Vertical deflection of the test piece shall be less than or equal to 50 mm after 60 seconds.	☒	☐	☐

Sample	Vertical deflection (mm)
300 mm x 25 mm	7

		PASS	FAIL	N/A
	Headform test			
Ann 14, 4.2	Six flat test pieces (1,170 x 570 +0/-2 mm) or six complete parts shall be subjected to testing	☐	☐	☒
Ann 14, 4.3.1	The method used shall be that described in Annex 3, paragraph 3.2.	☐	☐	☒
Ann 14, 4.3.2	For forward facing glazing situated forward of an occupant like partitions and separating windows which have impact probability (classification VIII/A) the drop height shall be 3 m. The HIC value shall also be measured.	☐	☐	☒
Ann 14, 4.3.3.	For glazing like side windows, back windows and sunroofs which have reduced impact possibilities(classification VIII/B) the drop height shall be 1.5 m. The HIC value shall also be measured.	☐	☐	☒
Ann 14, 4.3.4.	For glazing which do not have contact possibilities, as well as for small glazing and for all windows in trailer caravans there will be no headform testing	☐	☐	☒
Ann 14, 4.4.1	The test piece or sample is not penetrated nor shall it break into fully separate large pieces	☐	☐	☒
Ann 14, 4.4.2	**The HIC value is less than 1000.**			

Sample	1	2	3	4	5	6
Test result	--	--	--	--	--	--

Ann 14, 4.4.3	A set of test pieces submitted for approval shall be considered satisfactory from the point of view ofthe headform test if all tests give satisfactory results.	☐	☐	☒
	227 g Ball Test			
Ann 14, 5.2	Ten flat square pieces 300 mm +10/-0 mm or ten substantially flat finished parts shall be subjected to testing	☒	☐	☐
Ann 14, 5.3.1	The method used shall be that prescribed in Annex 3, paragraph 2.1	☒	☐	☐

		PASS	FAIL	N/A
Ann 14, 5.3.2	The height of drop for the various nominal thickness values is given in the table below	☒	☐	☐

Sheet thickness(mm)	Height of drop(m)
~~<3~~	~~2~~
~~4~~	~~3~~
~~5~~	~~4~~
~~>6~~	~~5~~

For intermediate values of test piece nominal thickness in the interval between 3 mm and 6 mm the height of drop must be interpolated.
The test height of drop is 2.3m.

Ann 14, 5.4.1.	The ball test shall be considered to have given a satisfactory result if the following conditions are met: (a) The ball does not penetrate the test piece; (b) The test piece does not break into separate pieces.	☒	☐	☐
Ann 14, 5.4.2	A set of test pieces submitted for approval shall be considered satisfactory from the point of view of the 227g ball test if eight or more separate tests give a satisfactory result at the drop height	☒	☐	☐

Samples (Complies Y/NA)									
1	2	3	4	5	6	7	8	9	10
Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

227 g Ball Test at -18 °C ± 2 °C

Ann 14, 5.5.1.	To minimize the temperature change of the test piece, the test shall be performed within 30 seconds of the removal of the test piece from the conditioning appliance.	☒	☐	☐
Ann 14, 5.5.2.	The test method shall be that described in paragraph 5.3. of this annex, except that the test temperature is -18°C ±2°C	☒	☐	☐
Ann 14, 5.5.3.	Interpretation of results as in paragraph 5.4. of this annex.	☒	☐	☐
Ann 14, 5.4.2.	A set of test pieces submitted for approval shall be considered satisfactory from the point of view of the 227g ball test if eight or more separate tests give a satisfactory result at the drop height			

Samples (Complies Y/NA)									
1	2	3	4	5	6	7	8	9	10
Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

Resistance to abrasion test

Ann 14, 6.1.2	Three flat square test pieces of 100 mm side for each type of surface shall be subjected to testing.	☐	☐	☒
Ann 14, 6.1.1.	The requirements of Annex 3, paragraph 4, shall apply.	☐	☐	☒
Ann 14, 6.1.3.1.	In the case of glazing of class L, the abrasion test shall be considered to have given a satisfactory result if the total light scatter after abrasion does not exceed 2 per cent after 1,000 cycles on the outer surface of the test piece and 4 per cent after 100 cycles on the inner surface of the test piece.	☐	☐	☒

		PASS	FAIL	N/A
Ann 14, 6.1.3.2.	In the case of glazing of class M, the abrasion test shall be considered to have given a satisfactory result if the total light scatter after abrasion does not exceed 10 per cent after 500 cycles on the outer surface of the test piece and 4 per cent after 100 cycles on the inner surface of the test piece.	☐	☐	☒
Ann 14, 6.1.3.3.	In the case of glazing of Class L, for the abrasion on the outer surface of the test sample, either the abrasion test according to Annex 3, paragraph 4. or as an equivalent alternative the package of sand drop test, car-wash test and wiper test shall apply as described in Annex 17, paragraphs 6.1.2.,6.1.3. and 6.1.4.	☐	☐	☒
Ann 14, 6.1.3.4.	For sun roofs, no abrasion test is required.	☒	☐	☐

Samples	outer surface			inner surface		
	1	2	3	4	5	6
Haze	--	--	--	--	--	--

Ann 14, 6.1.4. A set of test pieces for approval shall be considered satisfactory if one of the following conditions is met:

(a)	All test pieces meet the requirements or	☐	☐	☒
(b)	One test piece having failed, a repeat of the tests on a new set of test pieces gives a satisfactory result.	☐	☐	☒

Ann 24, 3. **Exemptions** ☒ ☐ ☐

In the case of plastic safety panes, the provisions related to abrasion resistance as referred to in paragraph 4.2.3.2. of this annex do not apply for the locations of vehicles and panes as listed below:

(a) Motorhomes, ambulances and hearses for panes not requisite for the driver's forward and rearward field of vision;
~~(b) Trailers, including caravans;~~
~~(c) Sunroofs and glazing located in the roof of a vehicle;~~
~~(d) All glazing of the upper deck of a double deck vehicle;~~
~~(e) Partitions and separating windows not requisite for the driver's forward and rearward field of vision.~~

For these cases, no abrasion test and symbol /L or /M is required.

Resistance to simulated weathering test

Ann 14, 6.2.1.	The requirements of Annex 3, paragraph 6.4., shall apply. The total ultraviolet radiant exposure with the long arc xenon lamp shall be 500 MJ/m^2.	☒	☐	☐
Ann 14, 6.2.2.	Three flat test pieces 130 mm x 40 mm cut from a flat sheet sample shall be subjected to testing.	☒	☐	☐
Ann 14, 6.2.3.1.1.	The light transmittance measured in accordance with Annex 3, paragraph 9.1. does not fall below 95 per cent of the pre-weathering value. Additionally, for windows which are required for driver visibility the value shall not fall below 70 per cent.	☒	☐	☐

	Sample 1	Sample 2	Sample 3
T% before	56.2	55.8	56.8
T% after	56.1	55.7	56.4
After/before	99.8%	99.8%	99.3%

		PASS	FAIL	N/A
Ann 14, 6.2.3.1.2	No bubbles or other visible decompositions, discolorations, milkiness or crazing shall occur during weathering.	☒	☐	☐
Ann 14, 6.2.4.1.	A set of test pieces submitted for approval shall be considered satisfactory from the point of view of the resistance to simulated weathering if all test pieces give satisfactory results.	☒	☐	☐

Cross-cut test

Ann 14, 6.3.1.	The requirements of Annex 3, paragraph 13., shall apply only to coated rigid products.	☐	☐	☒
Ann 14, 6.3.2.	The cross-cut test shall be carried out on one of the test pieces from simulated weathering test.	☐	☐	☒
Ann 14, 6.3.3.1.	The cross-cut test shall be considered to have given a satisfactory result if:			

The cross-cut value
--

Ann 14, 6.3.3.1.1	The cross-cut value Gt1 is met.	☐	☐	☒
Ann 14, 6.3.3.2.	The test piece shall be considered satisfactory from the point of view of approval if the test gives satisfactory results.	☐	☐	☒

Resistance-to-humidity test

Ann 14, 6.4.1.	The requirements of Annex 3, paragraph 7, shall apply.	☒	☐	☐
Ann 14, 6.4.2.	Ten flat square test pieces of 300 mm side or ten original parts shall be subjected to testing.	☒	☐	☐
Ann 14, 6.4.3.1.1.	No visible decompositions like bubbles or milkiness occur on any sample.	☒	☐	☐
Ann 14, 6.4.3.1.2.	And if the light transmittance measured according to Annex 3, paragraph 9.1. does not fall to less than 95 per cent of the pre-test value and additionally to no less than 70 per cent for any window required for driver visibility.	☒	☐	☐

Samples	1	2	3	4	5	6	7	8	9	10
T% before	56.2	55.8	56.8	56.8	55.8	55.9	55.6	56.7	56.3	56.8
T% after	56.3	55.8	56.7	56.6	55.9	56.0	55.5	56.8	56.3	56.8
After/before	100 %	100 %	99.8 %	99.6 %	100 %	100 %	99.8 %	100 %	100 %	100 %

Ann 14, 6.4.4.	After testing the test pieces shall be stored for at least 48 hours at a temperature of 23 °C ± 2 °Cand a relative humidity of 50 ± 5 per cent, and then subjected to the 227 g ball drop test described under item 5 of this annex.	☒	☐	☐

		PASS	FAIL	N/A
	Optical Qualities test			
Ann 14, 7	The requirements of Annex 3, paragraph 9.1. shall apply for products which are requisite for driver visibility.	☐	☐	☒
Ann 14, 7.1.	A set of four samples shall be considered as satisfactory if all samples give satisfactory results.	☐	☐	☒
	Fire resistance test			
Ann 14, 8.1.	The requirements of Annex 3, paragraph 10 shall apply.	☒	☐	☐
Ann 14, 8.2	The fire-resistance test shall be considered to have given a satisfactory result if the burning rate is less than 110 mm/min.	☒	☐	☐

Samples	1	2	3
Burning rate (mm/min)	0	0	0

Ann 14, 8.2.1.	For the purpose of approval a set of samples will be considered satisfactory if all samples give satisfactory results.	☒	☐	☐
	Resistance to chemicals			
Ann 14, 9.1.1	Immersion test: The requirements of Annex 3, paragraph 11.2.1, shall apply.	☒	☐	☐
Ann 14, 9.1.2	A set of four samples for each chemical shall be tested; for each chemical, in case of glazing of Class L, one of these samples shall be cross-cut according to paragraph 13. of Annex 3. Three samples out of four, among which the cross-cut sample mentioned above when applicable, shall give satisfactory results for each chemical.	☒	☐	☐
Ann 14, 9.2.1	Test under load: The requirements of Annex 3, paragraph 11.2.4. shall apply.	☒	☐	☐
Ann 14, 9.2.2	A set of four samples, not being the ones mentioned in paragraph 9.1. above, for each chemical shall be tested. Three samples out of four shall give satisfactory results for each chemical.	☒	☐	☐

APPENDIX 4 – TESTING PHOTOS

227 g ball test	After resistance-to-humidity test
	
After test under load	**Fire resistance test**
	

Remarks

None.

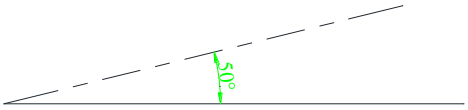
Note: CETOC TS apply measurement uncertainty to calibrated items but not test results.

Principal and secondary characteristics as defined in Annex 14 to Regulation No. 43

TECHNICAL DESCRIPTION		
1. Class of safety-glass pane	:	Rigid Plastic Panes (PC-3.3mm）
2. Description of glass pane	:	Please refer to point 5. Principal characteristics
3. Trade name	:	, FREUCAMP, RV innotec
4.1. Name and address of manufacturer	:	Jiangsu Sanjo Intelligent Technology Co., Ltd. No.8, Jinguazi Road, Nandu Town, Liyang City, Jiangsu Province, China.
4.2. Name and address of assembly plants	:	Jiangsu Sanjo Intelligent Technology Co., Ltd. No.8, Jinguazi Road, Nandu Town, Liyang City, Jiangsu Province, China.
5. Principal characteristics		
Chemical designation of the material	:	PC
The classification of the material by the manufacturer	:	Not applicable
Process of manufacture	:	Injection molding
Shape and dimensions	:	Greatest area: 0.63m^2
Nominal thickness	:	3.3mm
Colouring of the rigid plastic material	:	Transparent gray
Nature and type of surface coating	:	Not applicable
6. Secondary characteristics		
Conductors incorporated(yes/no)	:	No
Remark	:	None

Approval mark:

Greatest area: 0.63m²



Smallest angle:50°

Drawing No.	PC-3.3mm-01

Jiangsu Sanjo Intelligent Technology Co., Ltd.