20th Asia Experts Meeting on Safety Glass (ECE R43)

Date: 29th September, 2009

Venue: VR Head Office

18 Pham Hung, My Dinh, Ha Noi, Viet Nam

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Time	Agenda
08:00 - 08:30	Registration of Participants
08:30 - 08:45	Opening Speech
08:45 - 08:55	Speech
08:55 – 09:40	**R43: General information** Mr. Masaru Morikawa, General Safety Subcommittee, JASIC
09:40 - 09:55	Coffee Break
09:55 - 10:25	**R43: Safety Glazing** Mr. Masaru Morikawa, General Safety Subcommittee, JASIC
10:25 - 11:25	**R43: Technical requirement and Testing Method for Glass** Mr. Masaru Morikawa, General Safety Subcommittee, JASIC
11:25 - 11:45	**Safety Glass Testing according to ECE R43** Mr. Pham Minh Thanh, Vietnam Motor Vehicle Testing Center, VR
11:45 - 12:15	Q & A
12:15 - 12:30	**Closing remark**
	Lunch

General information
R43

Asia Expert Meeting

Masaru Morikawa
JASIC

What is R43

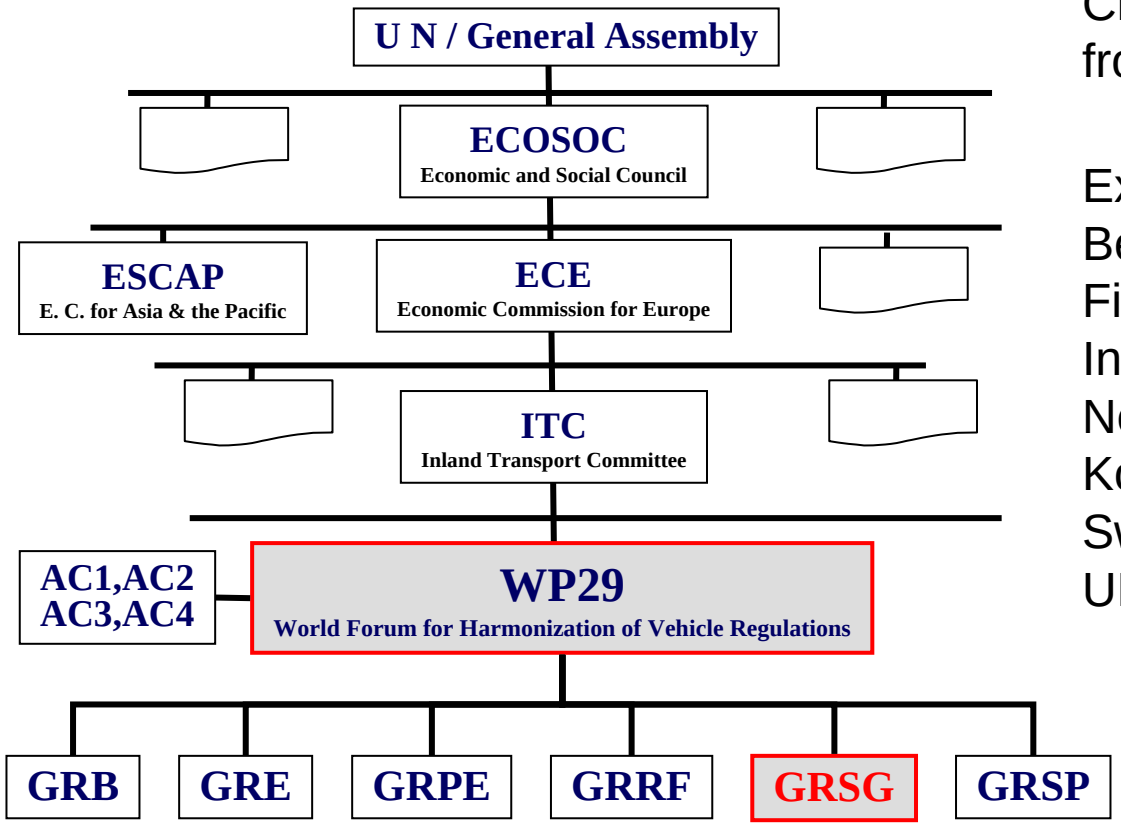
- R43 is a

  “UNIFORM PROVISIONS CONCERNING THE APPROVAL OF SAFETY GLAZING MATERIALS AND THEIR INSTALLATION ON VEHICLES”

  Original version was adopted in 1981.

UN organization

- R43 is discussed by UN/ECE/WP29/GRSG



Chaired by Mr.Antonio Erario
from Italy

Experts from;
Belgium; Canada; Czech Republic;
Finland; France; Germany; Hungary;
India; Italy; Japan; Luxembourg;
Netherlands; Norway; China; Poland;
Korea; Russia; South Africa; Spain;
Sweden; Switzerland; Thailand;
UK; USA; EU

Participation from NGO
OICA; IMMA; IRU, CLCCR and
VERONICA project

Adoption of R43

- R43 has been adopted by 41 contracting party.
- There are 34 administrative department and 53 technical services.

(ECE/TRANS/WP.29/343/Rev.16)

ECE symbol	Contracting Parties	Date of application	Designated Administrative Department(s)	Designated Technical Service(s)
E 1	GERMANY	15.02.81	1/A	1/E; 1/G; 1/H
E 2	FRANCE	15.02.81	2/A	2/E
E 3	ITALY	13.11.81	3/A	3/B (a) to (m)
E 4	NETHERLANDS	21.06.85	4/A	4/A; 4/C; 4/I; 4/N; 4/Q; 4/U
E 5	SWEDEN	18.08.81	5/A	5/B
E 6	BELGIUM	08.03.81	6/A	6/F
E 7	HUNGARY	26.03.84	7/A	7/C; 7/J
E 8	CZECH REPUBLIC	12.09.81	8/A	8/C
E 9	SPAIN	01.11.83	9/A	9/B
E 10	SERBIA	27.04.92	10/A	10/A
E 11	UNITED KINGDOM	15.02.81	11/A	11/A;11/B;11/C;11/E;11/F;11/H;11/L;11/M;11/N
E 12	AUSTRIA	27.05.84	12/A	12/B
E 13	LUXEMBOURG	01.05.83	13/A	13/B (a), (b), (c)
E 14	SWITZERLAND			
E 16	NORWAY	24.05.93	16/A	...
E 17	FINLAND	25.09.81	17/A	17/B (c)
E 18	DENMARK 1/	24.03.98	18/A	...
E 19	ROMANIA	03.02.84	19/A	19/B; 19/E; 19/K
E 20	POLAND	13.11.92	20/A	20/F
E 21	PORTUGAL	20.08.90	21/A	21/B
E 22	RUSSIAN FEDERATION	30.06.98	22/A	22/H; 22/I; 22/J; 22/L
E 23	GREECE	03.12.95	23/A	23/A
E 24	IRELAND 1/	24.03.98	24/A	24/B; 24/C; 24/D; 24/E; 24/F; 24/G
E 25	CROATIA	08.10.91	25/A	...
E 26	SLOVENIA	22.12.85	26/A	26/A
E 27	SLOVAKIA	12.09.81	27/A	...
E 28	BELARUS	02.07.95	28/A	28/H; 28/K; 28/N
E 29	ESTONIA	28.12.98	....	...
E 31	BOSNIA AND HERZEGOVINA	06.03.92	...	...
E 32	LATVIA	18.01.99	32/A	...
E 34	BULGARIA	21.01.00	34/A	34/C
E 36	LITHUANIA	29.03.02	36/A	36/A
E 37	TURKEY	07.07.00	37/A	37/B
E 39	AZERBAIJAN			
E 40	THE FORMER YUGOSLAV REPUBLIC OF MACEDONIA	17.09.91	40/A	...
E 42	EUROPEAN COMMUNITY 2/	24.03.98		
E 43	JAPAN			
E 45	AUSTRALIA			
E 46	UKRAINE	08.10.02	46/A (a), (b)	46/B
E 47	SOUTH AFRICA	17.06.01	47/A	...
E 48	NEW ZEALAND	19.03.02	...	...
E 49	CYPRUS 3/	01.05.04	...	...
E 50	MALTA 3/	01.05.04	...	...
E 51	REPUBLIC OF KOREA			
E 52	MALAYSIA	04.04.06	...	...
E 53	THAILAND			
E 56	MONTENEGRO	03.06.06	...	...
E 58	TUNISIA			

Contents of R43

1. SCOPE
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3. APPLICATION FOR APPROVAL
4. MARKINGS
5. APPROVAL
6. ENERAL REQUIREMENTS
7. PARTICULAR REQUIREMENTS
8. TESTS
9. MODIFICATION OR EXTENSION OF APPROVAL OF A TYPE OF SAFETY GLAZING MATERIAL 10.CONFORMITY OF PRODUCTION
11. PENALTIES FOR NON-CONFORMITY OF PRODUCTION
12. TRANSITIONAL PROVISIONS
13. PRODUCTION DEFINITELY DISCONTINUED
14. NAMES AND ADDRESSES OF TECHNICAL SERVICES RESPONSIBLE FOR CONDUCTING APPROVAL TESTS, AND OF ADMINISTRATIVE DEPARTMENTS

Contents of R43

Annex 1 - Communication concerning approval (or extension or refusal or withdrawal of approval or production definitely discontinued) of a type of safety glazing material pursuant to Regulation No. 43

Annex 1A - Communication concerning approval (or extension or refusal or withdrawal of approval or production definitely discontinued) of a vehicle type with regard to its safety glazing

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Annex 3 - General test conditions

Annex 4 - Toughened-glass windscreens

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Annex 6 - Ordinary laminated-glass windscreens

Annex 7 - Laminated-glass panes other than windscreens

Annex 8 - Treated laminated-glass windscreens

Annex 9 - Safety-glass panes faced with plastics material (on the inside)

Annex 10 - Glass-plastics windscreens

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Annex 12 - Double-glazed units

Annex 13 - Grouping of windscreens for approval testing

Annex 14 - Rigid plastic glazings other than windscreens

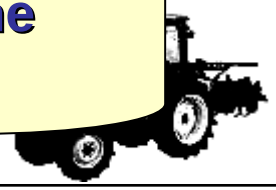
Scope

This Regulation applies to:

(a) safety glazing materials intended for installation as windscreens or other panes, or as partitioning, on vehicles of category L, M, N, O, and T

(b) vehicles of category M, N and O with regard to the installation of these materials;

Category

Cate-gory	Description	Example
L	MOTOR VEHICLES WITH LESS THAN FOUR WHEELS	
M	POWER-DRIVEN VEHICLES HAVING AT LEAST FOUR WHEELS AND USED FOR THE CARRIAGE OF PASSENGERS	
N	POWER-DRIVEN VEHICLES HAVING AT LEAST FOUR WHEELS AND USED FOR THE CARRIAGE OF GOODS	
O	TRAILERS (INCLUDING S ERS)	
T	AG TRACTORS	

Today's discussion focused on the category M and N.

Type of the glazing

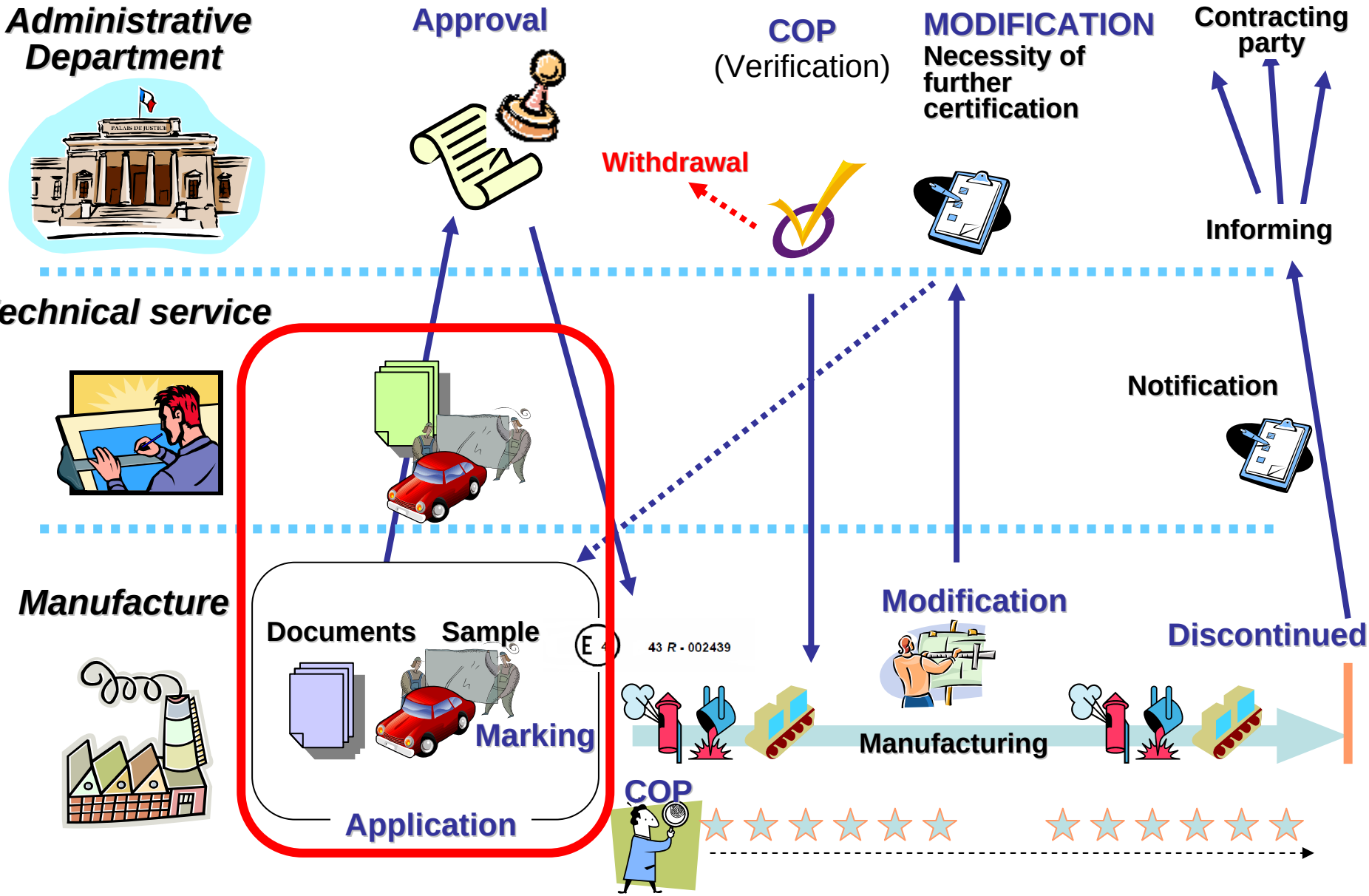
Definitions of type of the each glazing specification are defined in following annexes of this regulation,

Annex 4	TOUGHENED-GLASS WINDSCREENS
Annex 5	UNIFORMLY-TOUGHENED GLASS PANES
Annex 6	ORDINARY LAMINATED-GLASS WINDSCREENS
Annex 7	LAMINATED-GLASS PANES OTHER THAN WINDSCREENS
Annex 8	TREATED LAMINATED-GLASS WINDSCREENS
Annex 9	SAFETY ASS PANES FACED WITH PLASTICS MATERIAL
Annex 10	GL STICS WINDSCREENS
Anne	DSCREENS
Anne	
Anne	SCREENS
Annex 15	FLEXIBLE PLASTIC GLAZINGS OTHER THAN WINDSCREENS
Annex 16	RIGID PLASTIC DOUBLE GLAZED UNITS

Today's discussion focused on these glazing.

These shall be considered to belong to different types if they differ in at least one of the principal or secondary characteristics

Overview of the certification procedure



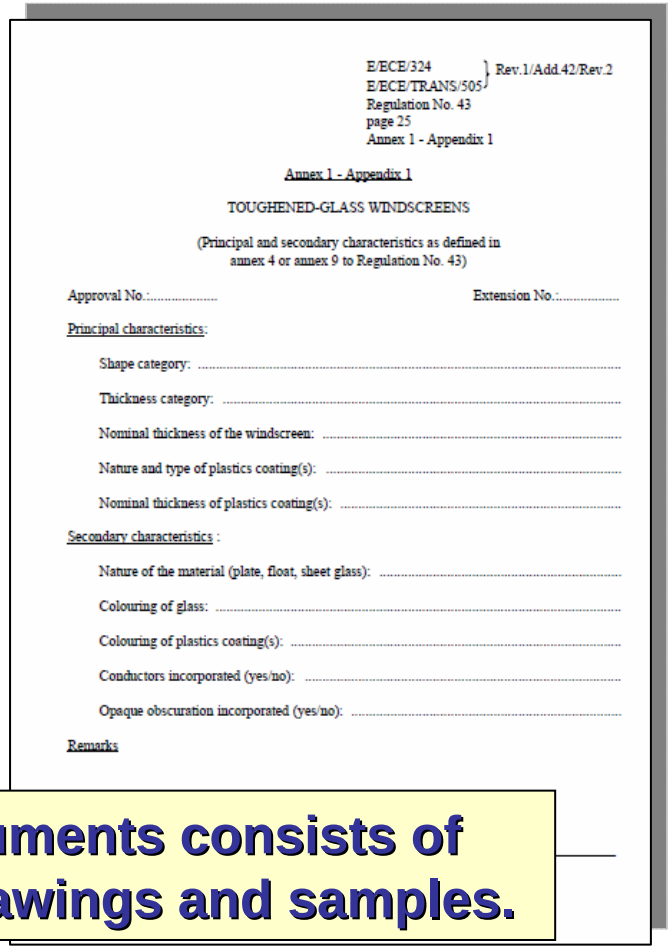
Application for a glazing

The application for approval of a type of glazing shall be submitted by the manufacturer or by his duly accredited representative in the country where the application is made.

Application documents

- A technical description comprising all principal and secondary characteristics (Refer to Annex1 and its Appendix 1 to 9)
- Technical specifications and drawings required each type of glazing. (Para.3.2.1.1 to 3.2.1.3)

The applicant shall submit a sufficient number of test pieces and samples of the finished pieces of the models considered.



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Annex 1 - Appendix 1

Annex 1 - Appendix 1

TOUGHENED-GLASS WINDSCREENS

(Principal and secondary characteristics as defined in annex 4 or annex 9 to Regulation No. 43)

Approval No.: ..... Extension No.: .....

Principal characteristics:

Shape category: .....

Thickness category: .....

Nominal thickness of the windscreen: .....

Nature and type of plastics coating(s): .....

Nominal thickness of plastics coating(s): .....

Secondary characteristics :

Nature of the material (plate, float, sheet glass): .....

Colouring of glass: .....

Colouring of plastics coating(s): .....

Conductors incorporated (yes/no): .....

Opaque obscuration incorporated (yes/no): .....

Remarks

Applicants shall submit application documents consists of technical description, specification and drawings and samples.

Application for a vehicle

The application for approval of a vehicle type with regard to the installation of its safety glazing shall be submitted by the vehicle manufacturer or by his duly accredited representative.

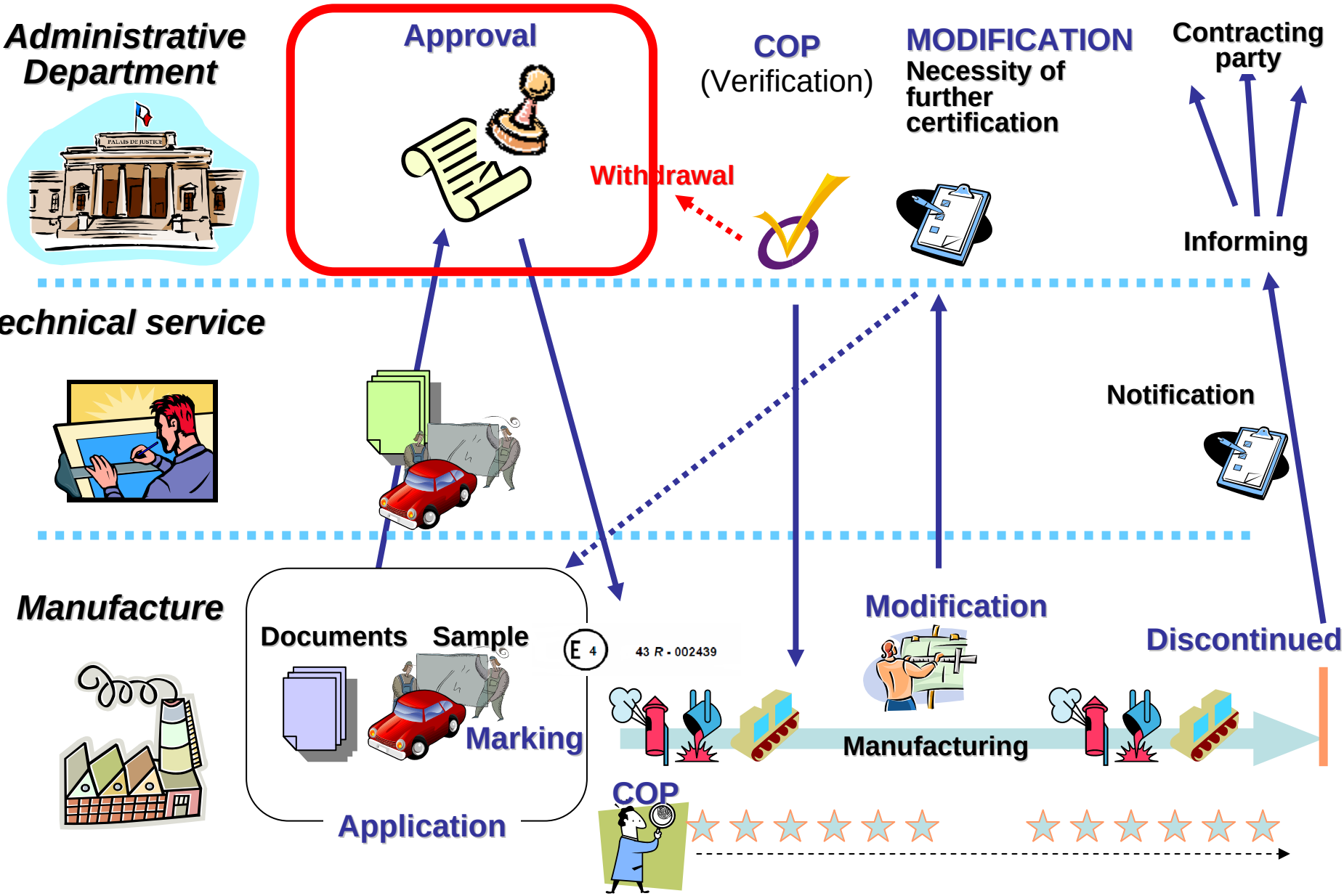
Application documents

- Drawings of the vehicle
  - The position of the windscreen relative to the R point
  - The inclination angle of the windscreen,
  - The inclination angle of the seat back;
- Technical details concerning the windscreen and all other glazings
  - The materials used,
  - Approval numbers,
  - Any additional markings

A vehicle representative of the vehicle type to be approved shall be submitted to the technical service responsible for conducting the approval tests.

Applicants shall submit application documents consists of drawings of the vehicles and technical details and a vehicle.

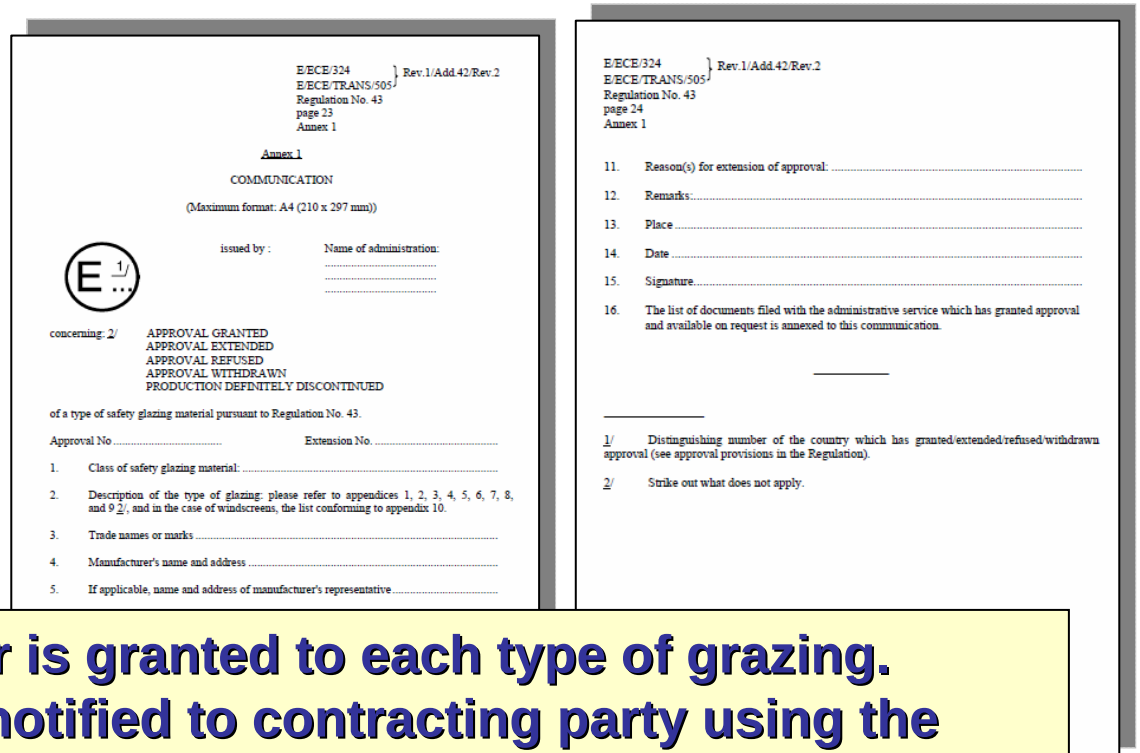
Overview of the certification procedure



Approval

If the samples submitted for approval meet the requirements of paragraphs 6. to 8. of this Regulation, approval of the pertinent type of safety glazing material shall be granted. An approval number shall be assigned to each type as defined in annexes 5, 7, 11, 12, 14, 15 and 16 or, in the case of windscreens, to each group approved.

Notice of approval or extension of approval or refusal of approval of a type of safety glazing material pursuant to this Regulation shall be communicated to the Parties to the Agreement applying this Regulation



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Annex 1

Annex 1

COMMUNICATION

(Maximum format: A4 (210 x 297 mm))

issued by : Name of administration:
.....
.....
.....

E 1/ ...

concerning: 2/ APPROVAL GRANTED
APPROVAL EXTENDED
APPROVAL REFUSED
APPROVAL WITHDRAWN
PRODUCTION DEFINITELY DISCONTINUED

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

Approval No ..... Extension No. .....

1. Class of safety glazing material: .....
2. Description of the type of glazing: please refer to appendices 1, 2, 3, 4, 5, 6, 7, 8, and 9 2/, and in the case of windscreens, the list conforming to appendix 10.
3. Trade names or marks .....
4. Manufacturer's name and address .....
5. If applicable, name and address of manufacturer's representative .....

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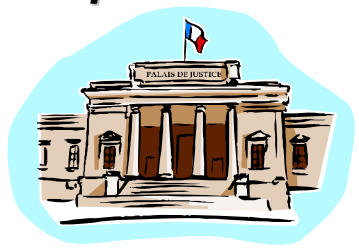
11. Reason(s) for extension of approval: .....
12. Remarks: .....
13. Place .....
14. Date .....
15. Signature .....
16. The list of documents filed with the administrative service which has granted approval and available on request is annexed to this communication.

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.

Approval number is granted to each type of grazing.
Approval shall be notified to contracting party using the communication.

Overview of the certification procedure



Administrative Department

Approval

COP
(Verification)

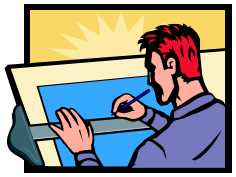
MODIFICATION
Necessity of further certification

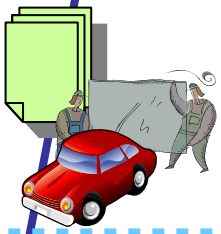
Contracting party

Withdrawal

Informing

Technical service

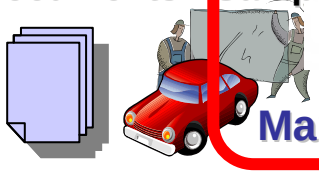




Notification

Manufacture

Documents **Sample**



E 4

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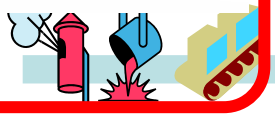
Marking



Application

Modification

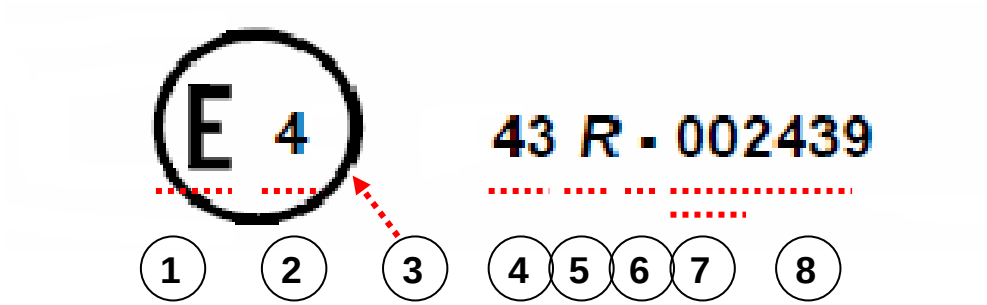
Discontinued

Manufacturing

COP

Markings on glazing

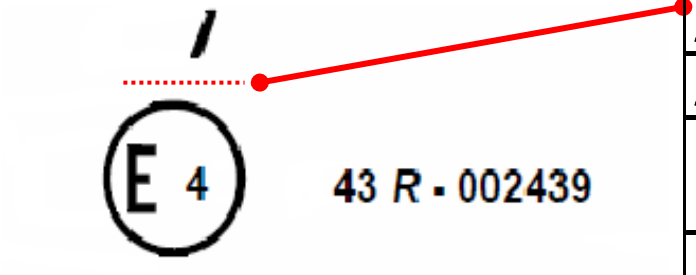
There shall be affixed conspicuously to every piece of glazing and double-glazed unit conforming to a type approved under this Regulation, in addition to the marking prescribed in paragraph 4.1., an international approval mark. Any specific approval mark assigned to each pane forming a double-glazed unit may also be affixed.



1. "E"
2. Country Code Number
3. Circle surrounding "E"
4. Regulation number
5. "R"
6. "-"
7. Series of the regulation "00"
8. Approval number

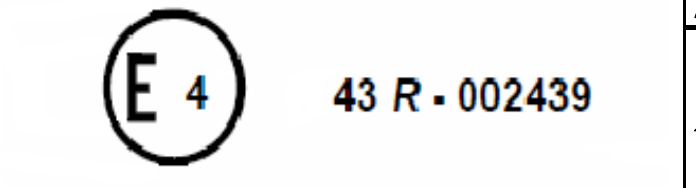
Markings on glazing

For the wind screen, the additional symbols shall be affixed near the above approval mark



The additional symbols can be combined.

VIII /A/L

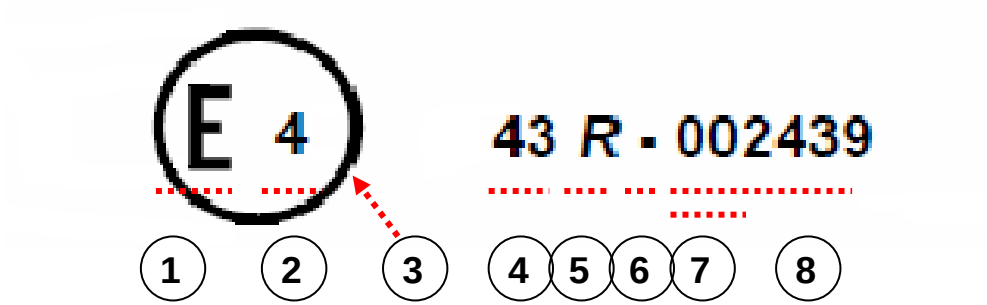


I	Toughened glass windscreens
I/P	Toughened glass faced with plastic material
II	Ordinary laminated glass windscreen
II/P	Ordinary laminated glass faced with plastic material
III	Treated laminated glass windscreen
IV	Glass-plastics windscreen
V	Glass panes other than windscreens having a regular ight transmittance < 70 per cent
VI	Double-glazed units
VII	Uniformly-toughened glass panes which can be used as windscreens for slow-moving vehicles
VIII	Rigid plastic glazing other than windscreens Symbol /A to /M depend on purpose of use and light scatter characteristics
IX	Flexible-plastic glazing other than windscreens
X	Rigid plastic double-glazed units Symbol /A to /M depend on purpose of use and light scatter characteristics
XI	Laminated glass pane other than windscreen

Markings on vehicles

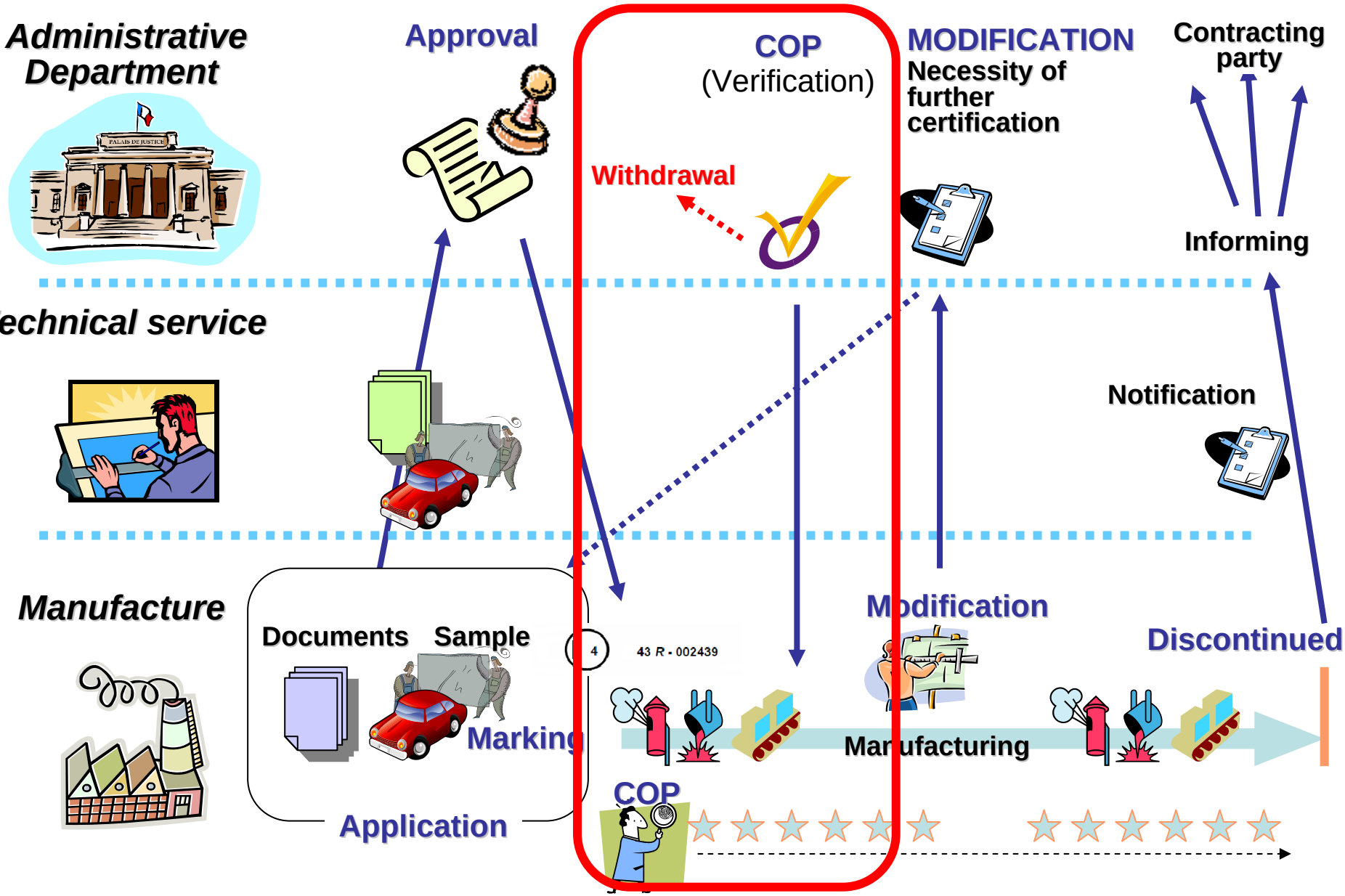
For the approved glazing ; There shall be affixed conspicuously to every piece of glazing.

For the approved vehicle ; The approval mark shall be clearly legible, be indelible, be placed close to or on the vehicle data plate affixed by the manufacturer.



1	"E"	5	"R"
2	Country Code Number	6	"-"
3	Circle surrounding "E"	7	Series of the regulation "00"
4	Regulation number	8	Approval number

Overview of the certification procedure



Conformity of production

The conformity of production procedures shall comply with those set out in the Agreement, appendix 2 (E/ECE/324-E/ECE/TRANS/505/Rev.2), with the following requirements:

The checks shall include compliance with the requirements of annex 20 to this Regulation.

COP procedures for the administrative authority and the manufacture (the approval holders) are provided in Appendix 2 of the 1958 agreement in general
and
Details for COP sampling test done by manufacture are provided in annex 20 of R43 in particular.

The normal frequency of inspection as referred to in paragraph 2.4. of appendix 2 of the Agreement shall be one per year.

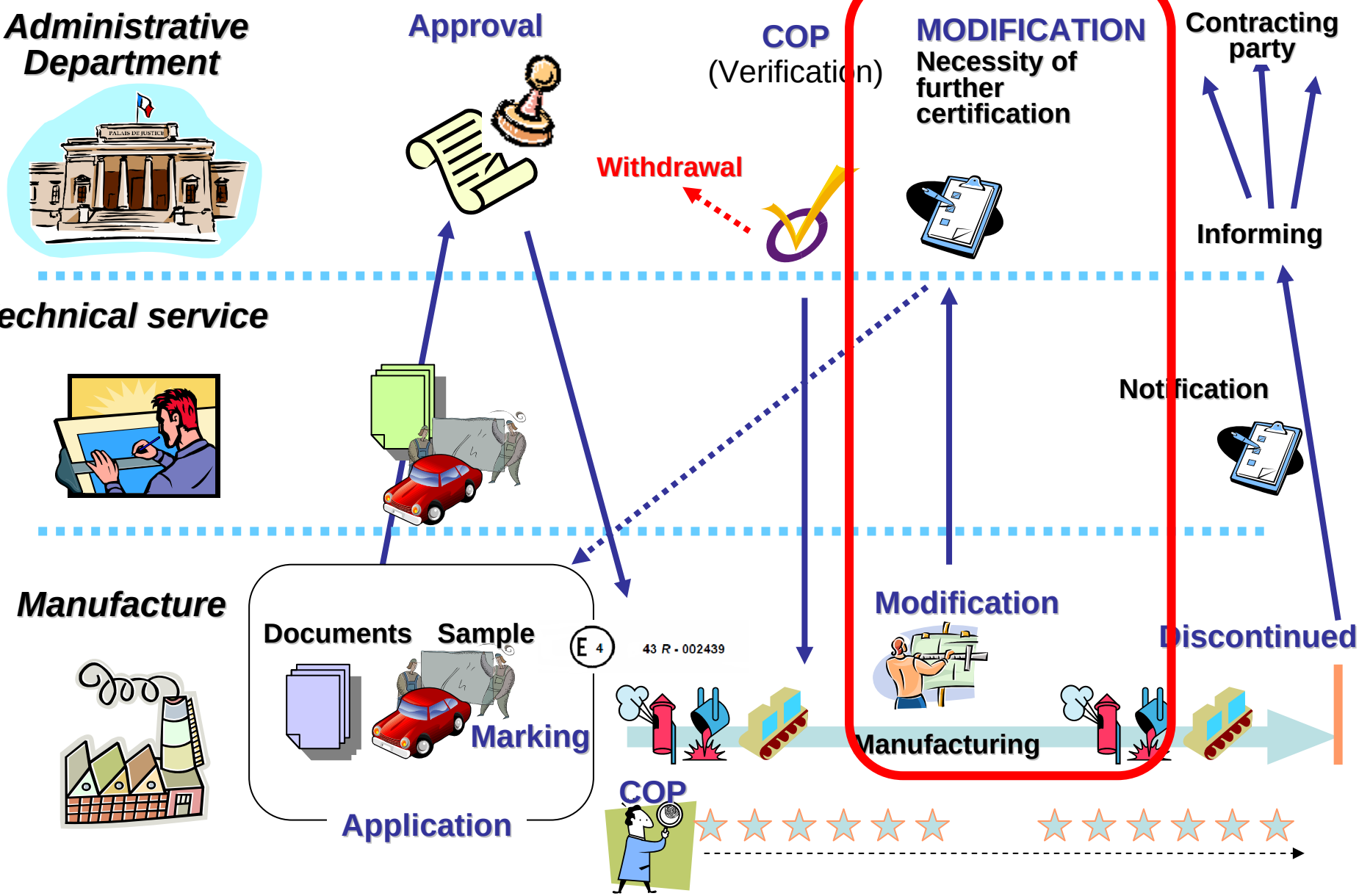
PENALTIES FOR NON-CONFORMITY OF PRODUCTION

The approval granted in respect of a type of safety glazing material may be withdrawn if the requirement is not complied with.

If a Party to the Agreement which applies this Regulation withdraws an approval it had previously granted, it shall forthwith so notify the other Contracting Parties applying this Regulation thereof by means of a copy of a communication form conforming to the model in annex 1 to this Regulation.

Approval may be withdrawn if product does not comply with requirements.

Overview of the certification procedure



MODIFICATION OR EXTENSION OF APPROVAL

Every modification of a type shall be notified to the administrative department which approved the type of safety glazing material.

Definition of Type is mentioned in annexes of R43 for each specification of glazing.

The department may then either consider that

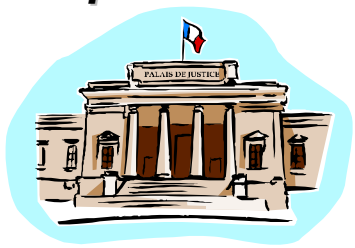
- the modifications made are unlikely to have an appreciable adverse effect and, in the case of windscreens, that the **new** type comes within the approved group of windscreens, and that in any case the safety glazing material still complies with the requirements

Approval may cover modification without additional certification.

- require a further test report from the technical service responsible for conducting the tests.

Certification tests are require for extension of approvals.

Overview of the certification procedure



Administrative Department

Approval

COP
(Verification)

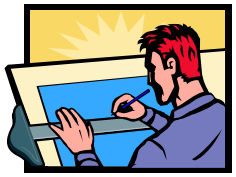
MODIFICATION
Necessity of further certification

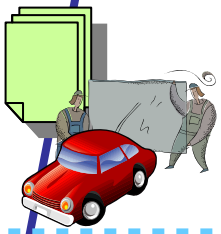
Withdrawal

Contracting party

Informing

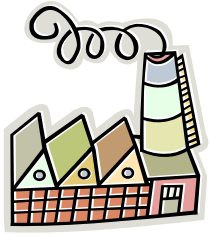
Technical service



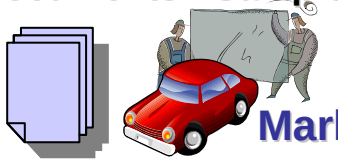


Notification

Manufacture



Documents **Sample**



Marking

Application

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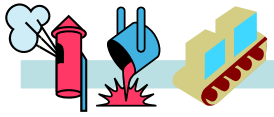
Modification

Discontinued



Manufacturing

COP

PRODUCTION DEFINITELY DISCONTINUED

If the holder of the approval completely ceases to manufacture a type of safety glazing material approved in accordance with this Regulation, he shall so inform the authority which granted the approval.

Upon receiving the relevant communication, that authority shall inform thereof the other Parties to the Agreement which apply this Regulation by means of a copy of a communication form conforming to the model in annex 1 to this Regulation.

It shall be notified to the administrative authority granted approval if manufacture completely ceases manufacturing approved glazing.

The administrative authority shall inform other contracting party using the communication.

TRANSITIONAL PROVISIONS

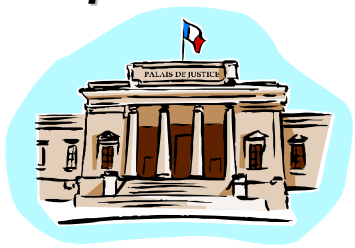
- As from the date of entry into force of Supplement 8 to this Regulation in its original form, no Contracting Party applying this Regulation shall refuse an application for approval under this Regulation as amended by Supplement 8 to the Regulation in its original form.

- As from 24 months after the official date of the entry into force of Supplement 8, the Contracting Parties applying this Regulation may refuse to recognize the approval of safety glazing not bearing the symbols prescribed in paragraph 5.5. of this Regulation

Additional symbols above “E”

Thank you for your attention.

Overview of the certification procedure



Administrative Department

Approval

COP
(Verification)

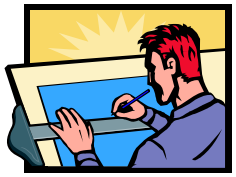
MODIFICATION
Necessity of further certification

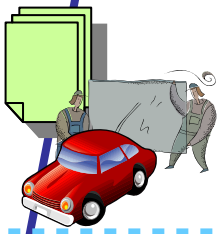
Contracting party

Withdrawal

Informing

Technical service

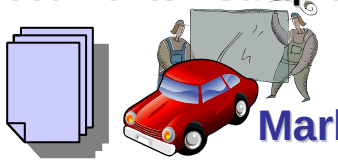




Notification

Manufacture

Documents **Sample**



Marking

E 4 43 R - 002439

Application

Modification

Discontinued

Manufacturing

COP

ECE R43
Safety Glazing

Asia Expert Meeting

Masaru Morikawa
JASIC

R43

PURPOSE

The glazing should have a safe performance during the vehicle in use

R43

SCOPE

Safety glazing materials:

Category L, M, N, O, T

Installation:

Category M, N, O

Exclusion of ;

- Glazing for lighting
- Instrument panels
- Bullet-proof glazing
- Light-signalling devices
- Double windows

R43

Applied category

M：Motor vehicles with at least four wheels designed and constructed for the carriage of passengers

R43

Applied category

N：Motor vehicles with at least four wheels designed and constructed for the carriage of goods

R43

Applied category

L：Motor vehicles with less than four wheels

O:Trailers

T:Agricultural and forestry tractors

R43

REQUIREMENTS

1. General requirements
2. Installation on vehicles
3. Safety glazing performance

R43

1. GENERAL REQUIREMENTS

1. Reduce the danger of body injury in the event of shuttering
2. Sufficiently resistant in normal traffic, temperature,chemical, abrasion
3. Sufficiently transparent

R43

3. INSTALLATION ON VEHICLES

Purpose

Ensure the driver with a high degree of visibility in all traffic conditions

R43

3. INSTALLATION ON VEHICLES

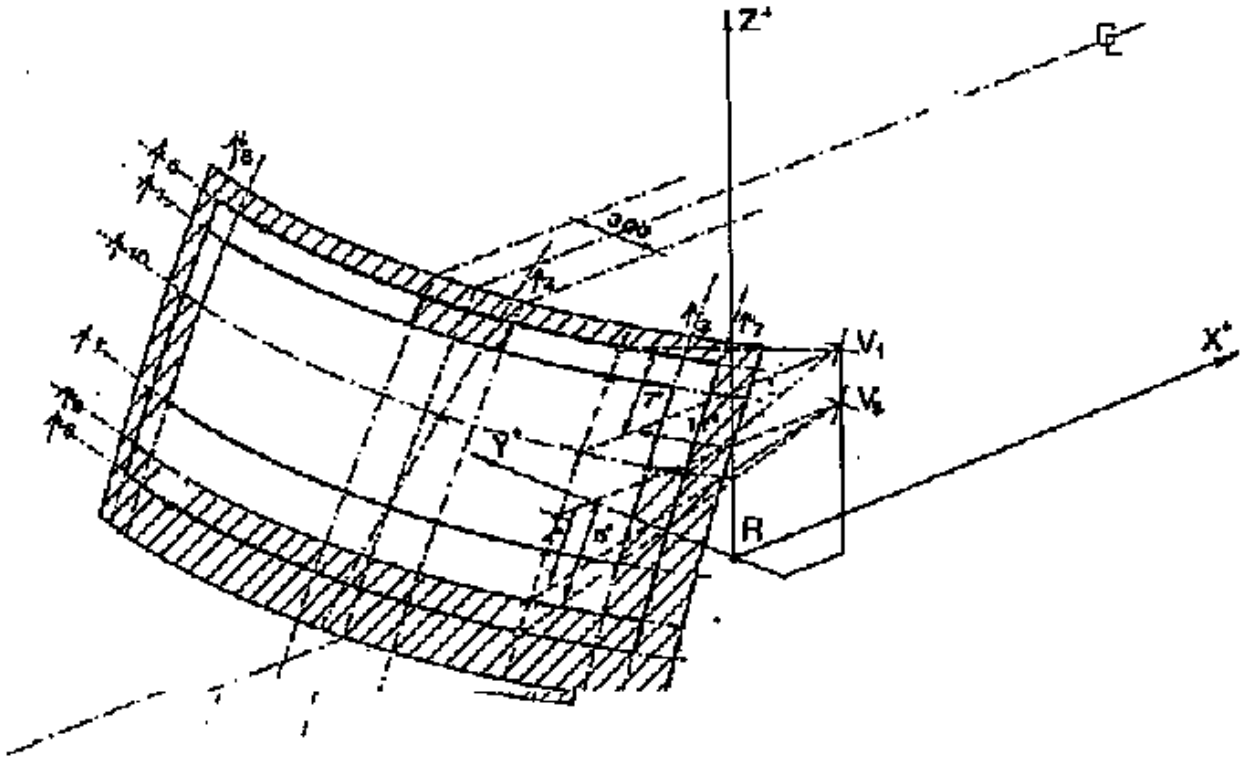
WINDSCREENS

The light transmittance :
not less than 70%

※Amendments (75%→70%)has been approved by WP29 (2008.Nov.)

Reduced test area B for windscreen (1)

R43

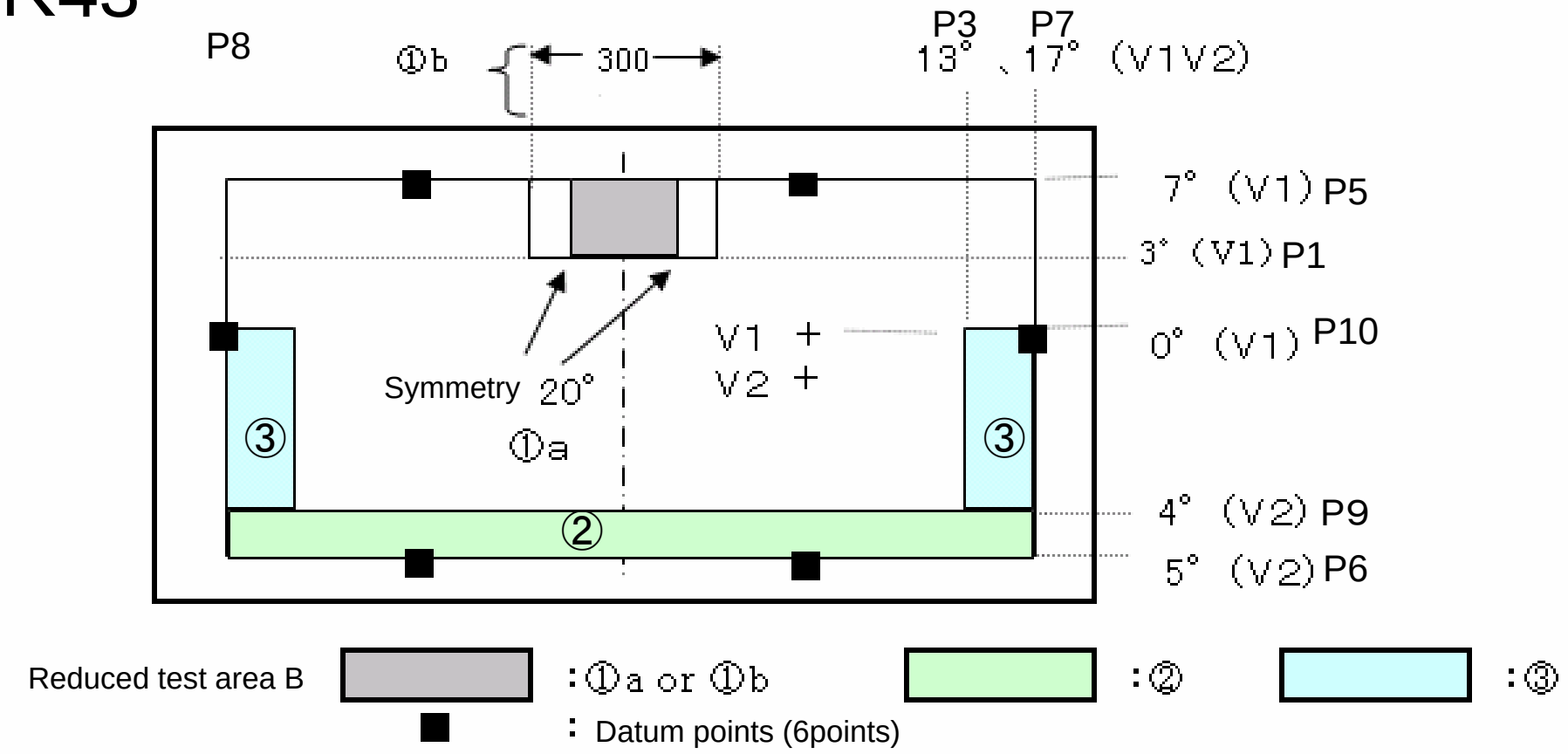


C_L:	trace of the longitudinal median plane of the vehicle
P_i :	trace of the relevant plane (see text)

Figure 2: Reduced test area "B" (example of a left-hand steering control vehicle) - upper obscuration area as defined in paragraph 2.4.2.2.

Reduced test area B for windscreen (2)

R43



R43

R43

R43

3. INSTALLATION ON VEHICLES

Safety glazing other than windscreen

1.Driver’s forwards field of vision

－At least 70%

2.Requisite for the driver’s rearward vision

－At least 70%, but where two exterior rear view mirrors are fitted, allowed below 70%

ECE R43

Technical Requirement and Testing Method for Glass

Asia Expert Meeting

Masaru Morikawa

JASIC

Type of glass for Automotive (Laminated Glass and Toughened Glass)

（M、N category）

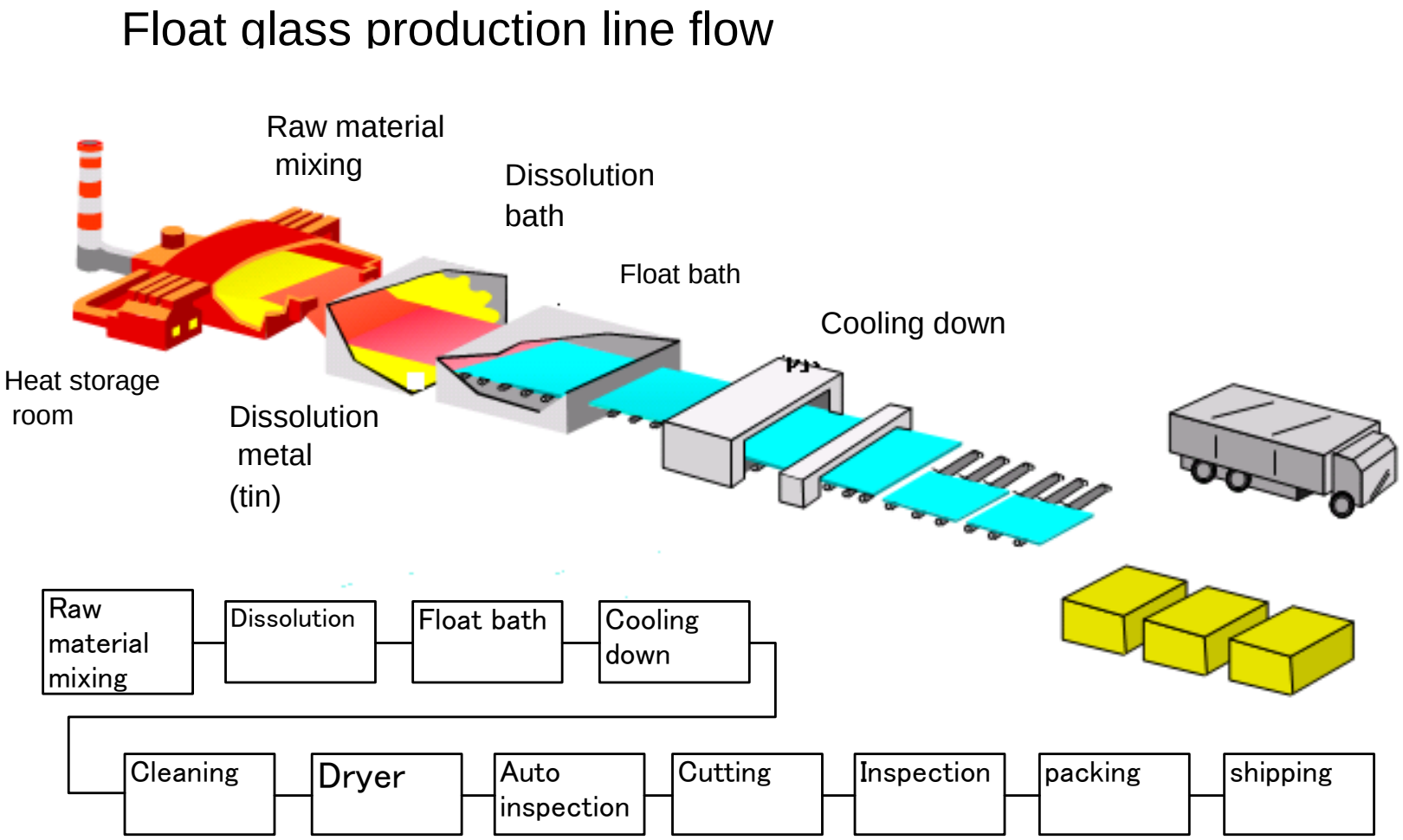
Laminated glass is used for **Windscreen**

Laminated glass or **Toughened glass** are used for **Glass panes other than windscreens**

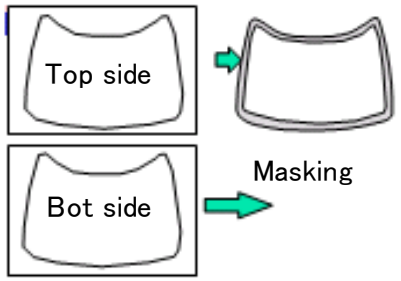
Type of glass in R-43

Windscreen	Glass panes other than windscreens
:Laminated glass : Toughened glass :Treated laminated glass :Glass plastics	:Toughened glass : Laminated glass :Glass plastics

Float glass production line flow



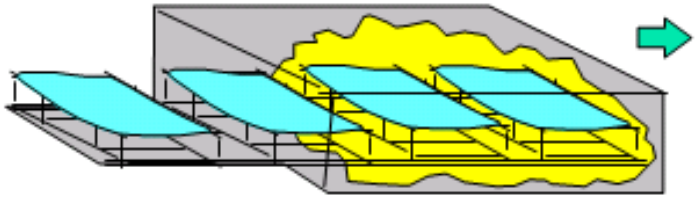
Laminated Glass process



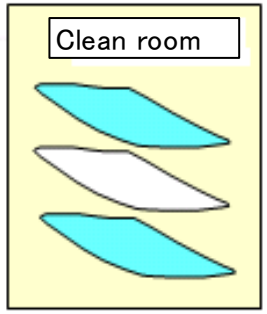
Masking

Cutting
Marking
Grinding
Cleaning

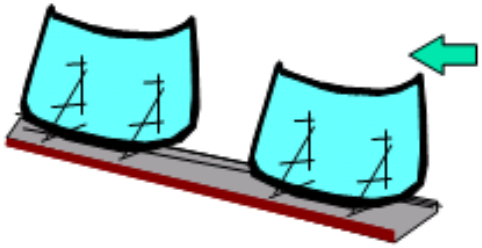
Printing



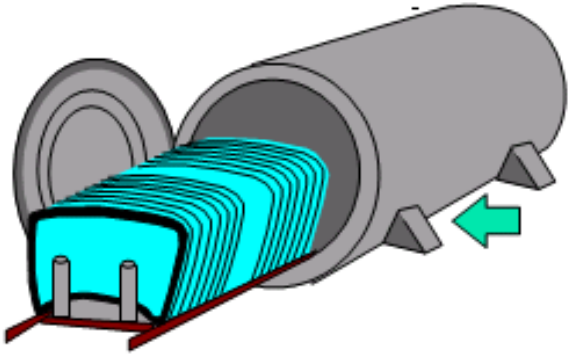
Bending



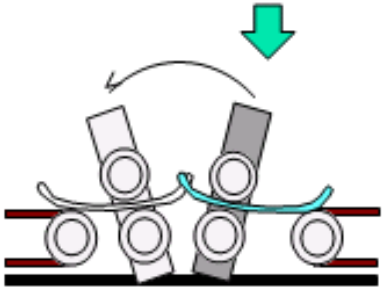
Matching
with interlayer
(PVB)



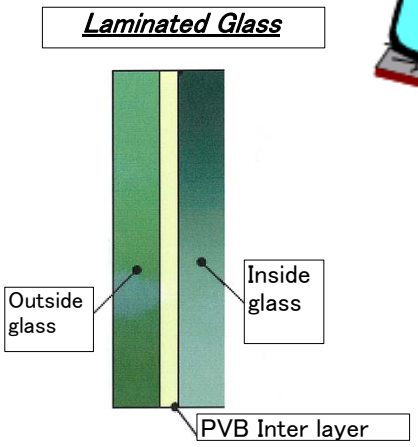
Inspection



Permanent
bonding in the
autoclave

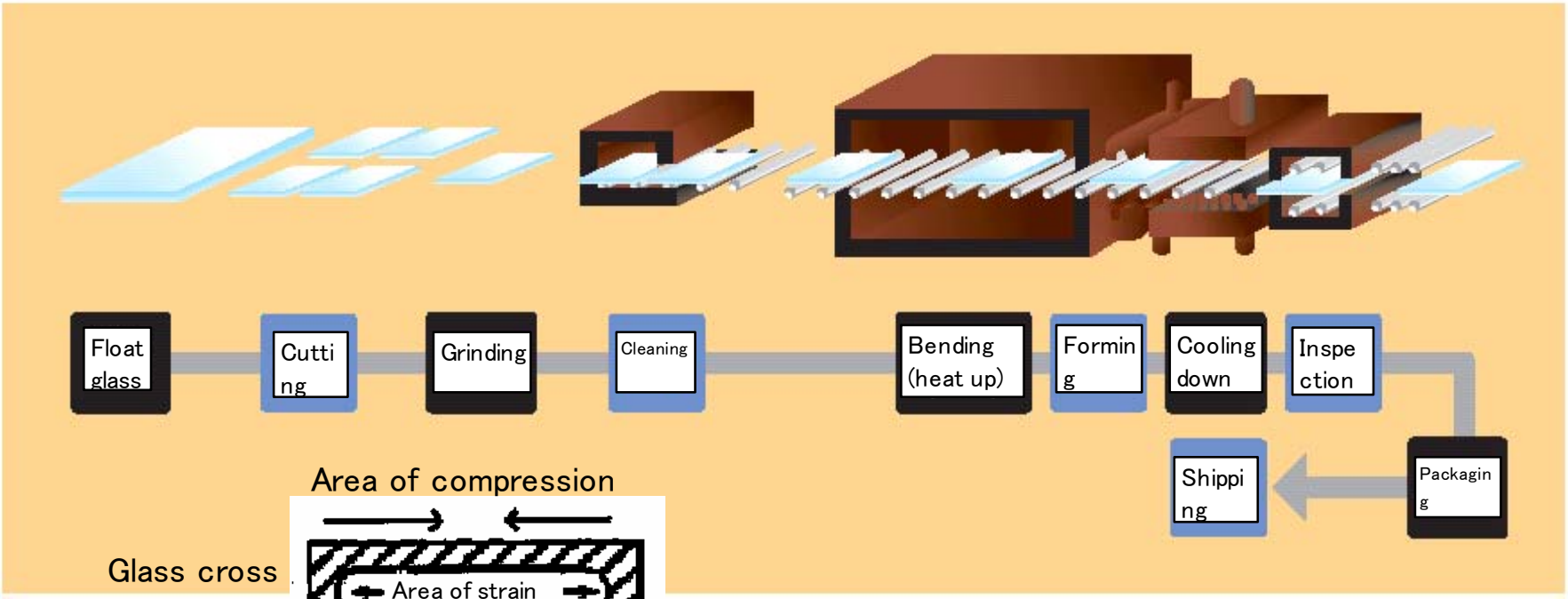


temporary
Bonding



Toughened glass process

In order to realize safety life, Toughened glass is made. The glass manufacturing process are cutting, grinding, cleaning, and furnace. The toughened glass furnace is include bending (heat up), forming, and cooling down process. After heat up the glass, it will be rapid cooling down. The glass surface is harden at first, and glass inside will be cooling down gradually. So we can make the compression strength on glass surface.
Its hardness is 3-5 times.



List of Test requirements in ECE R43

Test items		Windscreen	Glass panes other than windscreens	
		Laminated glass	Toughened glass	Laminated glass
(A) Mechanical strength test	(1) Fragmentation test	-	Yes	-
	(2) 227 g ball impact	Yes	Yes	Yes
	(3) 2,260 g ball impact	Yes	-	-
	(4) Head form	Yes	-	Yes
(B) Resistance to the environment	(5) Abrasion	Yes	-	Yes
	(6) High temperature	Yes	-	Yes
	(7) Radiation	Yes	-	Yes
	(8) Humidity	Yes	-	Yes
(C) Optical test	(9) Light transmission	Yes	Yes	Yes
	(10) Optical distortion	Yes	-	-
	(11) Secondary image	Yes	-	-
	(12) Identification of colors	Yes	-	-

(A) Mechanical strength Test

(1)Fragmentation Test

(2) 227g ball impact Test

(3) 2260g ball impact Test

(4) Head Form Test

(1) Fragmentation

Test purpose

Toughened glass is using a heat tempering that increases the mechanical strength, so it resists breakage.

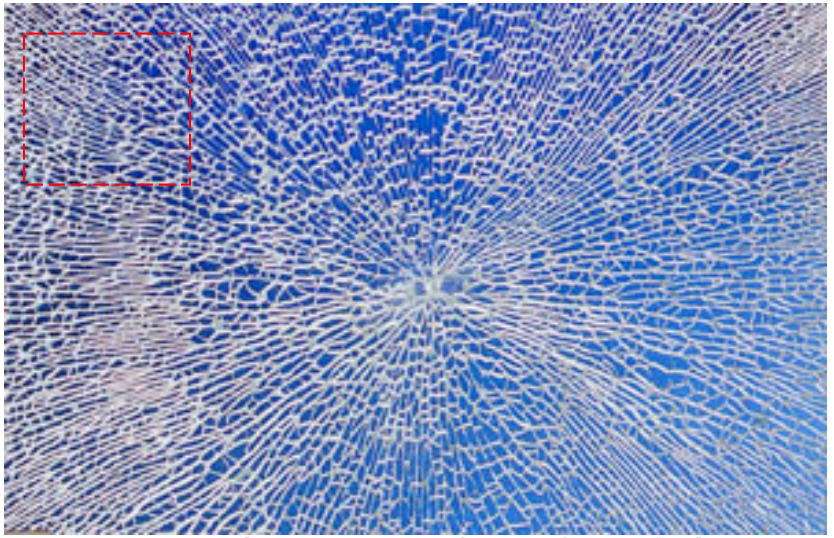
To determine whether the glazing is less likely to cause injury if it does fracture. In the case of breakage, it is desired that the glazing will shatter into very small, blunt pieces rather than large, sharp fragments, thereby significantly reducing the risk of serious injuries.

Assessment criteria

A, Number of fragments in 50x50mm□
40 ≦ Nf ≦ 400
40 ≦ Nf ≦ 450 (below 3.5t)
B, Largest fragment ≦ 3 cm2
C, Longest fragment ≦75mm
D, Fragment ends are not knife-edged
E, if fragment extend to the edge of the glass pane, Fragment do not form an angle of more than 45°

Raw glass (not toughened)

Toughened glass fragment



Fragmentation pattern of Toughened glass

(2)-A. Mechanical strength; Ball-impact (227g) for Toughened glass

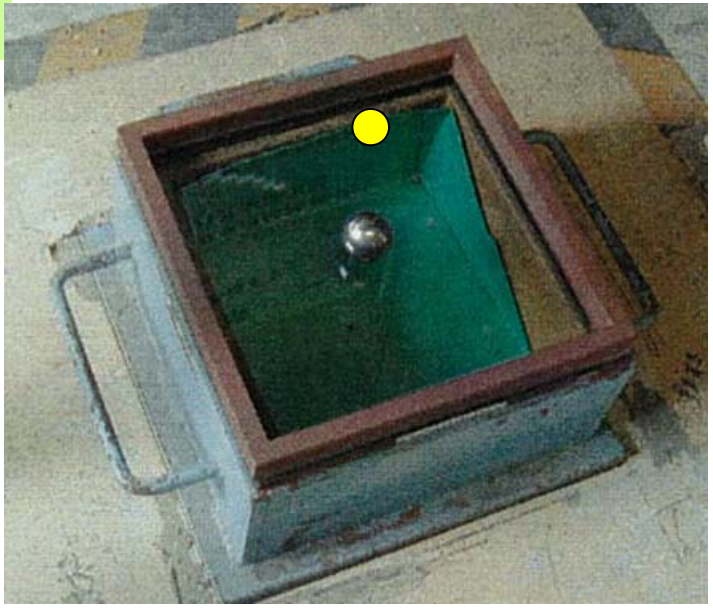
Test purpose

To assess the resistance of the glazing to impact from stones or other flying objects that might be encountered in everyday use.

Assessment criteria

A, Toughened glass

- -Test piece at 20 +/-5 degree C.
- -Test piece dose not break (N=6)
- - ＞3.5mm thickness; 2.5m ball height
- - ≦3.5mm thickness; 2.0m ball height



Test equipment

(2)-B. Mechanical strength; Ball-impact (227g) for Laminated glass

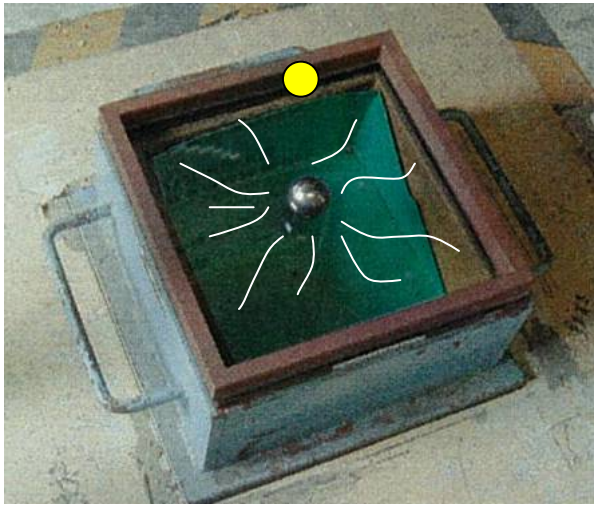
Test purpose

To assess the resistance of the glazing to impact from stones or other flying objects that might be encountered in everyday use.

Assessment criteria

B, Laminated glass

- Test piece at +40 degree C and -20 degree C (N=10 each)
- Test piece dose not penetrate or break into several piece
- Detached fragment shall not exceed the appropriate values.
- Ball height 8.5 ～ 12 m depend on thickness



Test equipment

(3) Mechanical strength; Ball-impact (2260g)

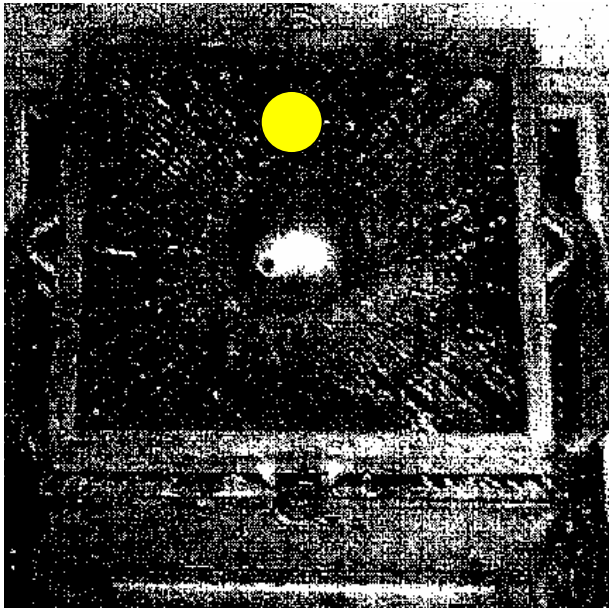
Test purpose

To assess the penetration resistance of laminated glazing materials for windscreens to impact from a heavy object.

Assessment criteria

Laminated glass only

- Test piece at at 20 +/-5 degree C (N=6)
- Test piece dose not penetrate in 5 seconds
- Ball height 4.0 m



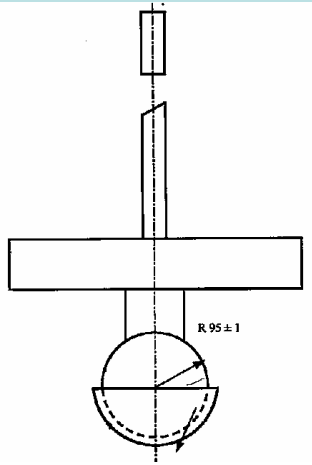
(4) Head-form test

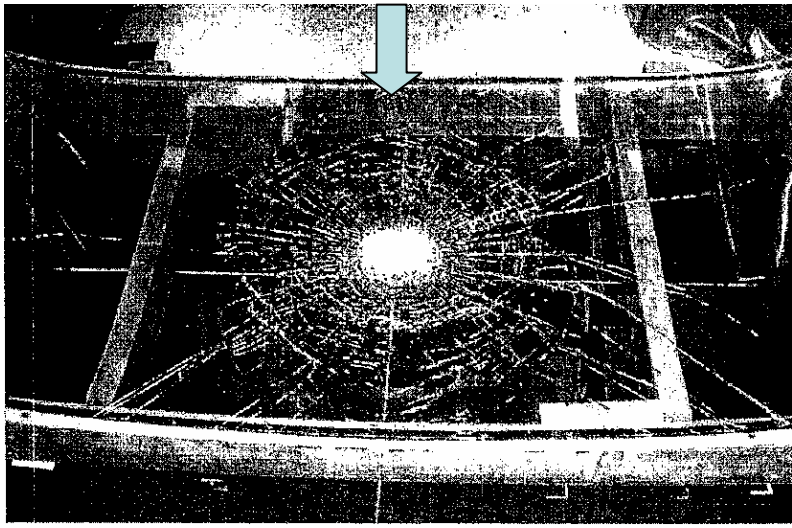
Test purpose

To verify the compliance of glazing with the requirements relating to the limitation of injury in the event of impact of the head against the windscreen.

Assessment criteria

- Laminated glass only
- Test piece at at 20 +/-5 degree C (N=4)
- Laminated windscreen must be broken but not penetrated and must exhibit numerous circumferential and radial cracks.
- Head-form height 1.5 m for windscreen and 4.0 m for flat sample





(B) Resistance to the environment Test

(5) Abrasion Test

(6) High temperature Test

(7) Radiation Test

(8) Humidity Test

(5) Resistance to abrasion

Test purpose

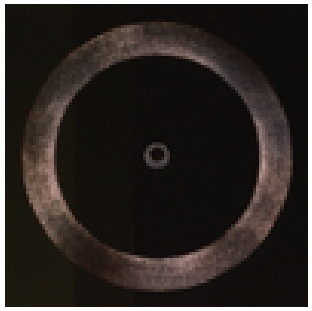
To determine whether the safety glazing material will withstand exposure to the environmental conditions normally experienced, without deterioration in appearance and performance.

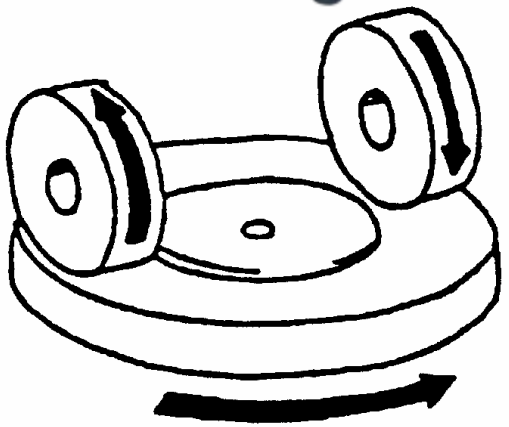
This test is to determine whether the resistance of a safety glazing to abrasion exceeds a specified value.

Assessment criteria

(N=3) 1000rotations

- Abrasive wheel rotate at 65 to 75 rpm with 500g pressure.
- Abrasive wheel shall have a hardness of 72 +/- 5 IRHD.
- Light transmission change shall be less than 2 %.





(6) Resistance to high temperature

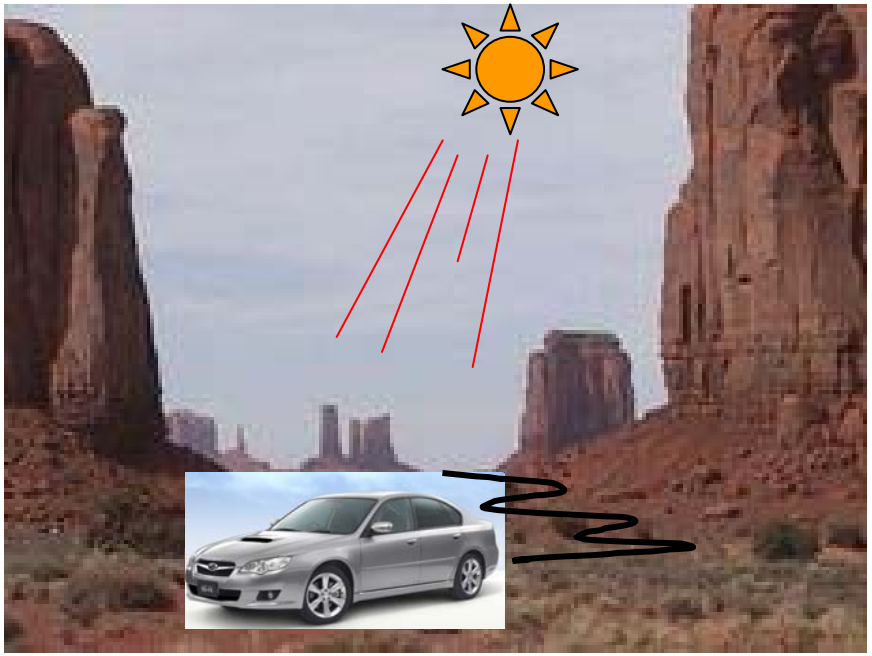
Test purpose

The purpose of these tests is to determine whether the safety glazing material will withstand exposure to the environmental conditions normally experienced, without deterioration in appearance and performance.

This test is to verify that no bubbles, discoloration or other defects occur in the interlayer in laminated glass when exposed to high temperatures.

Assessment criteria (N=3)

- Heat 100 degree C for a period of 2 hours.
- Glass dose not have bubbles or other defects.



(7) Resistance-to-radiation

Test purpose

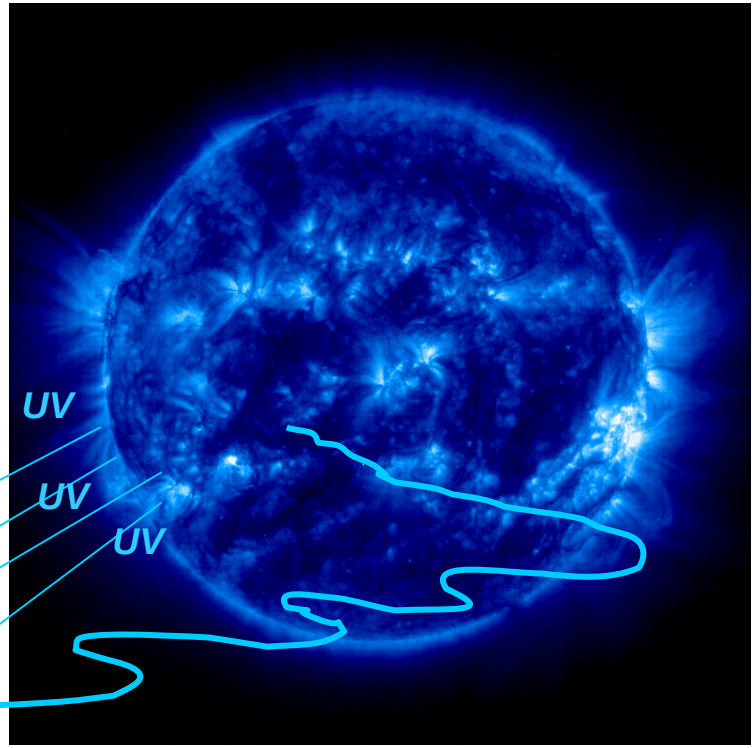
The purpose of these tests is to determine whether the safety glazing material will withstand exposure to the environmental conditions normally experienced, without deterioration in appearance and performance.

This test is an accelerated life test using UV light sources.

After exposure to radiation, the test pieces are examined for visual degradation and changes in light transmittance.

Assessment criteria

- UV lamp; 750W (N=3)
- Temperature keep at 45 degree C
- The exposure time shall be 100 hours.
- After exposure to radiation,
  the test pieces are examined for visual degradation and changes in light transmittance.
  Light transmittance should be above 95% compare with before, and WS should be above 75%, Other than WS should be above 70% after exposure.



(8) Resistance-to-humidity

Test purpose

The purpose of these tests is to determine whether the safety glazing material will withstand exposure to the environmental conditions normally experienced, without deterioration in appearance and performance.

This test is to verify that no bubbles, discoloration or other defects occur in the interlayer in laminated glass when exposed to high humidity.

Assessment criteria (N=3)

- 50 degree C and 95 %RH, for 2 weeks.
- Glass dose not have significant change , such as bubbles ,discoloration or other defects.

(C) Optical Test

(9) Light transmission Test

(10) Optical distortion Test

(11) Secondary image Test

(12) Identification of colours Test

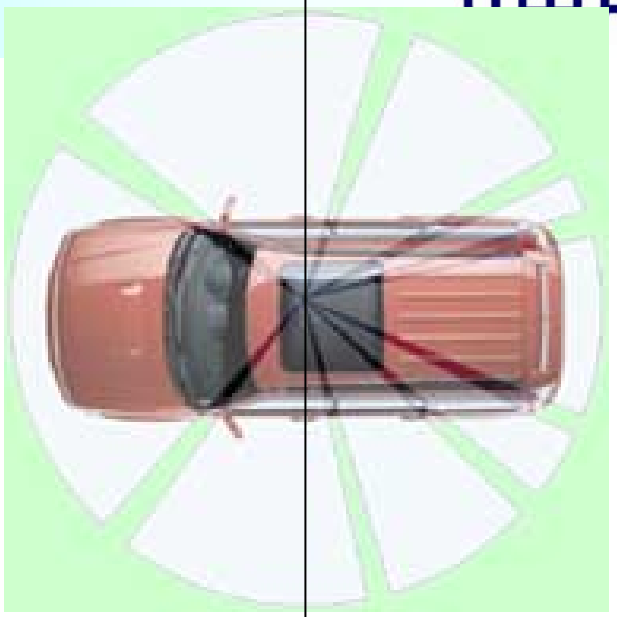
(9) Light-transmission

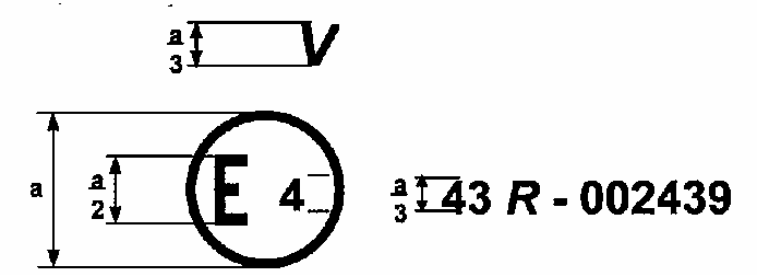
Test purpose

This test is to determine whether the regular light transmittance of the safety glazing exceeds a specified value in order to ensure that sufficient visual information is available for safe operation of the vehicle.

Assessment criteria (N=1)

- In the case of windscreen, it shall not be less than 75 %.
- In the case of side window for using forward field of driver's vision, such as Front door window,
  It shall not be less than 70 %.
- In the case of glazing defined as Safety glazing material requisite for the driver's rearward vision
  must have a light transmittance of at least 70 %, but where two exterior rear view mirrors are fitted,
  the glazing is allowed to have a light transmittance below 70 %, provided that it shall bear the symbol V.





(10) Optical-distortion
(11) Secondary-image-separation

Test purpose

To verify that the distortion of objects as seen through the windscreen is not of such extent as to be likely to confuse the driver.

Limits are specified for distortion and double image.

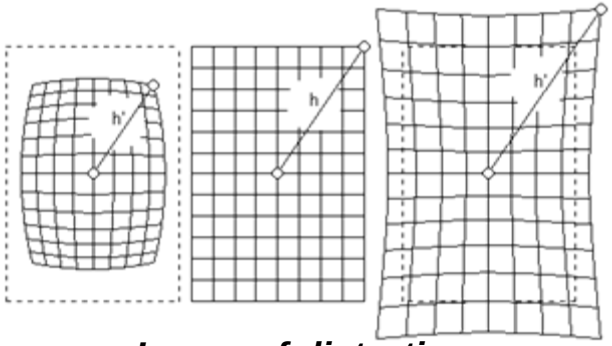


Image of distortion

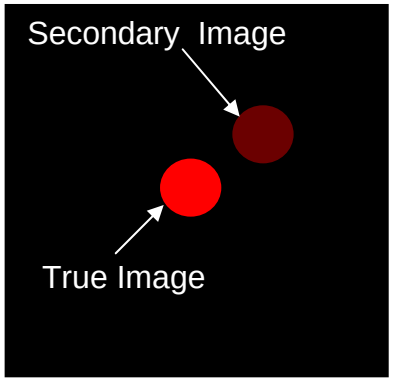
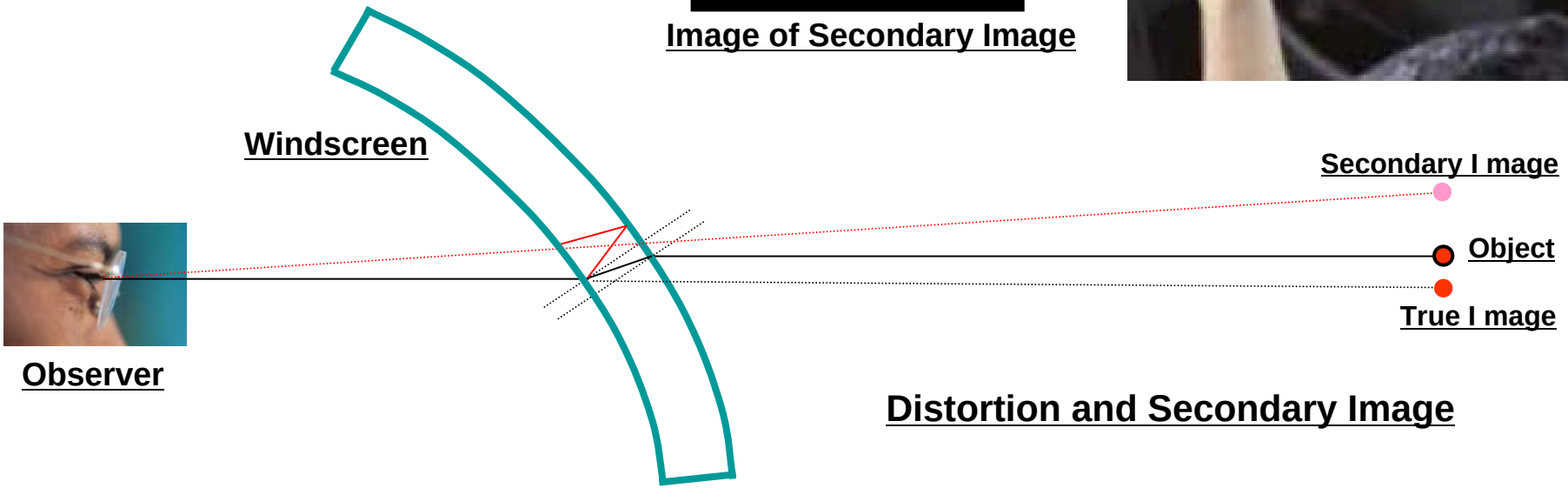


Image of Secondary Image

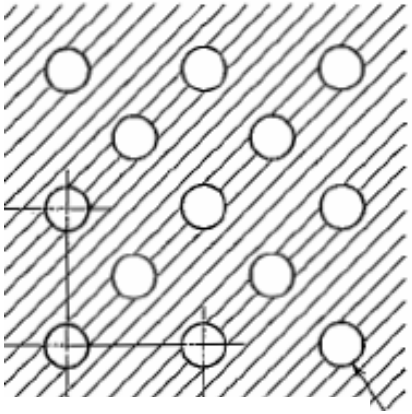


Distortion and Secondary Image

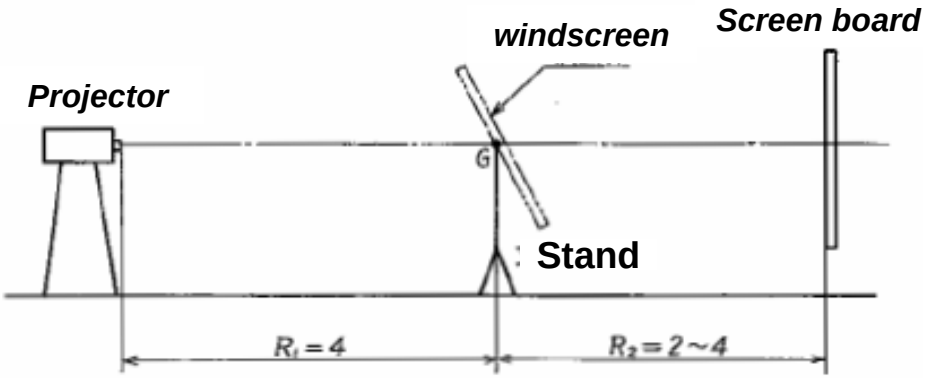
* Optical-distortion measuring system

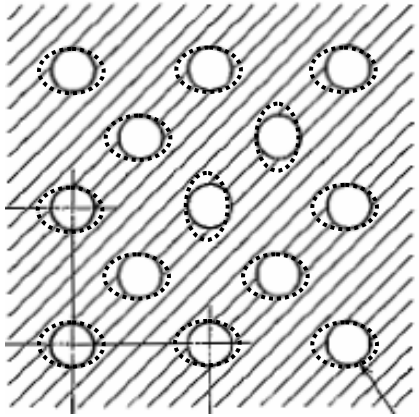
Assessment criteria (N=4)

- Optical Zone A and I ; below 2’ of arc
- Optical Zone B ; below 6’ of arc



Detail of screen board



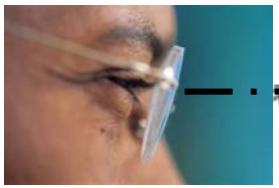


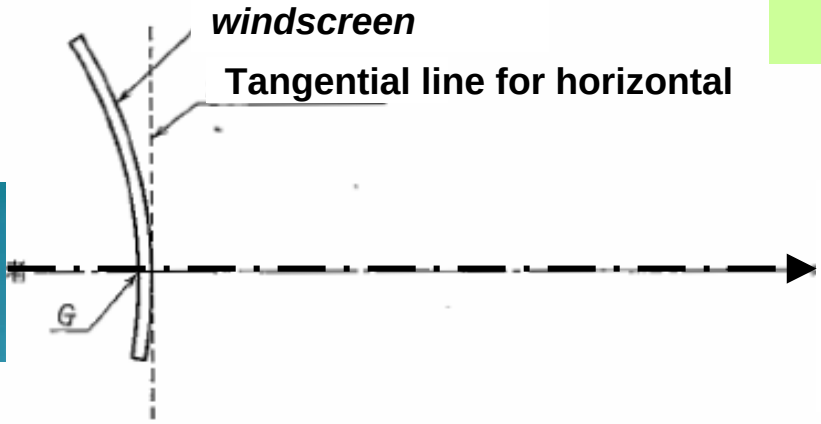
Detail of screen board After through the windscreen

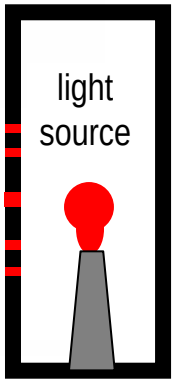
*Secondary-image-separation measuring system

Assessment criteria (N=4)

- Optical Zone A and I ; below 15’ of arc
- Optical Zone B ; below 25’ of arc







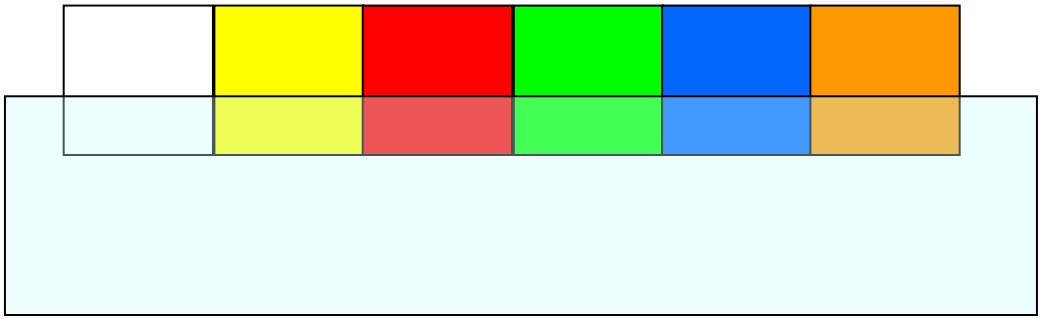
(12) Identification-of-colours

Test purpose

To verify that there is no risk of confusion of colours as seen through a windscreen.

Assessment criteria (N=4)

- Windscreens shall be tested for identification of the following colors: white, selective yellow, red, green, blue, amber..



Thank you for your attention

Japan Automobile Standards
Internationalization Center

Contact address :
jasic@jasic.org

Ordinary laminated Glass windscreens

4.Mecanical strength test

4.3.3.2. The height of drop for the various thickness categories and the mass of the detached fragments are given in the table below:

Thickness of test pieces mm	+40 degrees C		-20 degrees C	
	Height of fall m */	Maximum permitted mass of the fragments g	Height of fall m */	Maximum permitted mass of the fragments g
$e \leq 4.5$	9	12	8.5	12
$4.5 < e \leq 5.5$	10	15	9	15
$5.5 < e \leq 6.5$	11	20	9.5	20
$e > 6.5$	12	25	10	25

*/ A tolerance of +25/-0 mm is allowed in height of fall.

Test conditions

Temperature: 20+/-5 degrees C

Pressure: 860 to 1060 mbar

Relative humidity: 60+/-20 percent

SAFETY GLASS TESTING ACCORDING TO ECE R43

PHẠM MINH THANH
VIETNAM MOTOR VEHICLE TESTING CENTER

CONTENT

1. SAFETY GLASS TESTING EQUIPMENTS ACCORDING TO ECE R43 (EQUIVALENCE TO VIETNAM STANDARD TCVN 6758:2000)
2. ECE R43 IN COMPARISON WITH OTHER STANDARD
3. ROAD MAP OF STANDARD ENTERED INTO FORCE

AUTOMOBILE SAFETY GLASSES

Fig. 1: Kinds of safety glasses used on an automobile

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AUTOMOBILE SAFETY GLASS TESTING ITEMS

No.	Testing Items	Windscreen							Glass panes other than windscreens		
		Toughened glass		Ordinary laminated glass		Treated laminated glass		Glass-plastics	Toughened glass	Laminated glass	Glass-plastics
		I	I-P	II	II-P	III	III-P	IV			
1	Fragmentation:	✓	✓			✓	✓		✓		
2	Mechanical strength 227 g ball			✓	✓	✓	✓	✓	✓	✓	✓
	Mechanical strength 2260 g ball			✓	✓	✓	✓	✓			
3	Head form test	✓	✓	✓	✓	✓	✓	✓		✓	✓
4	Abrasion Outer face			✓	✓	✓	✓	✓		✓	✓
	Abrasion Inner face		✓		✓		✓	✓	✓	✓	✓
5	Light transmission	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
6	Optional distortion	✓	✓	✓	✓	✓	✓	✓	✓		
7	Secondary image	✓	✓	✓	✓	✓	✓	✓	✓		

SAFETY GLASS FRAGMENTATION TESTER

PURPOSE

to verify that the fragments and splinters produced by fracture of the glass pane are such as to minimize the risk of injury, and in the case of windscreens, to check residual visibility after shattering.

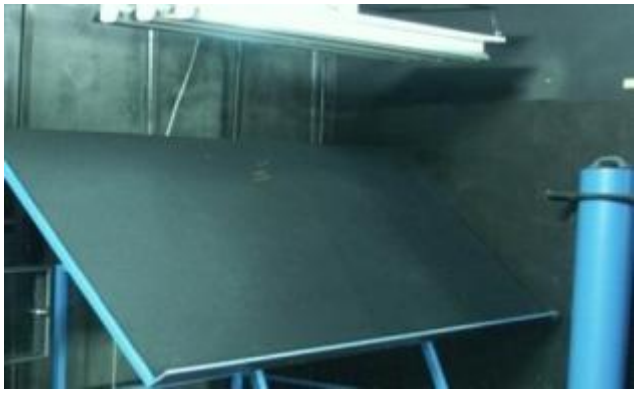


Fig. 2: Testing equipment

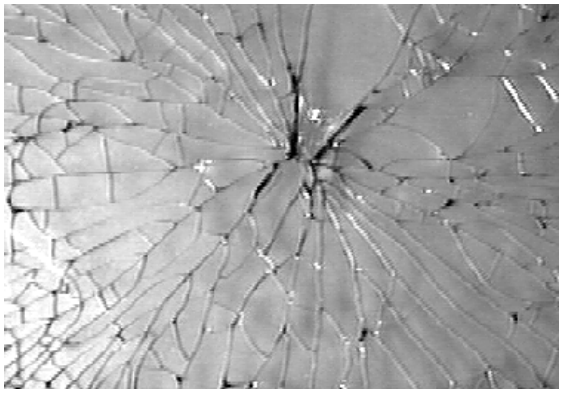


Fig. 3: Safety glass after broken

MECHANICAL STRENGTH TESTING EQUIPMENT WITH BALL-IMPACT

PURPOSE

There are two forms of tests, one using a 227 g ball and one using a 2,260 g ball.
227 g ball test: The purpose of this test is to assess the adhesion of the interlayer of laminated glass and the mechanical strength of uniformly-toughened glass and plastic glazing. 2,260 g ball test: The purpose of this test is to assess ball-penetration resistance of laminated glass.

Fig.4: Simulation of ball-impact (Pre-clash)

Fig.5: Simulation of ball-impact (Pre-clash)

MECHANICAL STRENGTH TESTING EQUIPMENT WITH BALL-IMPACT

Fig.6: Before ball - impact

Fig.7: After ball - impact

Fig.8: Testing equipment

MECHANICAL STRENGTH TESTING EQUIPMENT WITH HEADFORM

PURPOSE

to verify the compliance of glazing with the requirements relating to the limitation of injury in the event of impact of the head against the windscreen, laminated glass

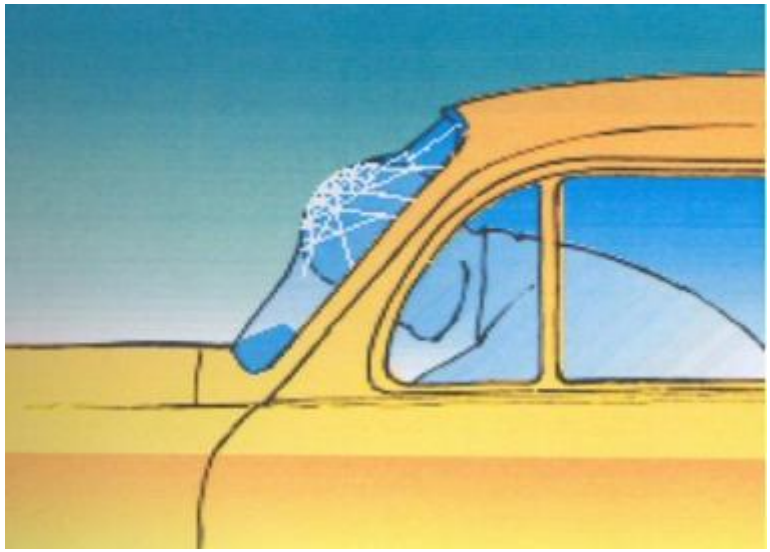


Fig.9 : Simulation of head' impact to windscreen

MECHANICAL STRENGTH TESTING EQUIPMENT WITH HEADFORM

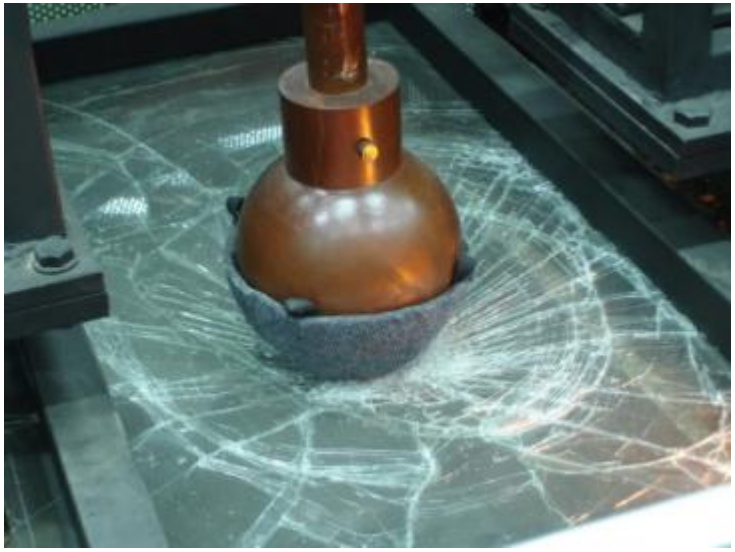


Fig.10: Simulation of head' impact to windscreen

Fig. 11: Testing equipment

OPTICAL-DISTORTION TESTING EQUIPMENT

PURPOSE

to verify that the distortion of objects as seen through the windscreen is not of such extent as to be likely to confuse the driver.

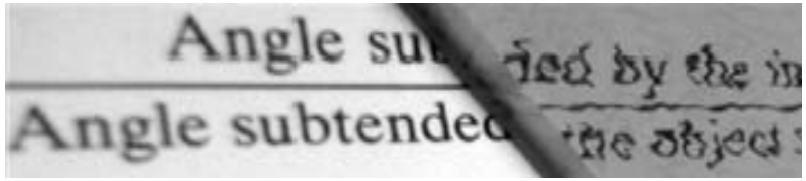


Fig. 12: The image seen through glass

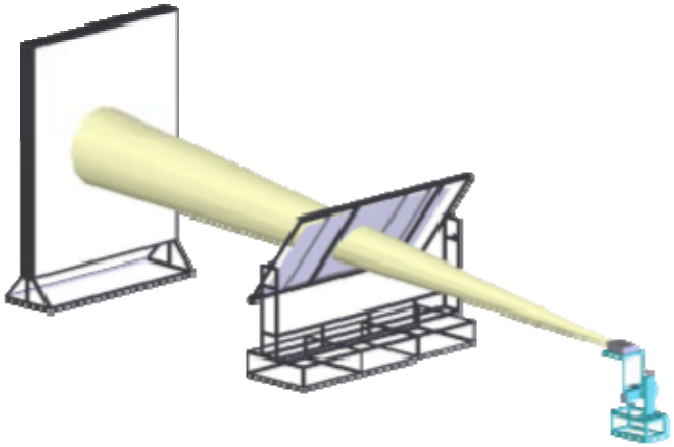


Fig. 14: Testing model

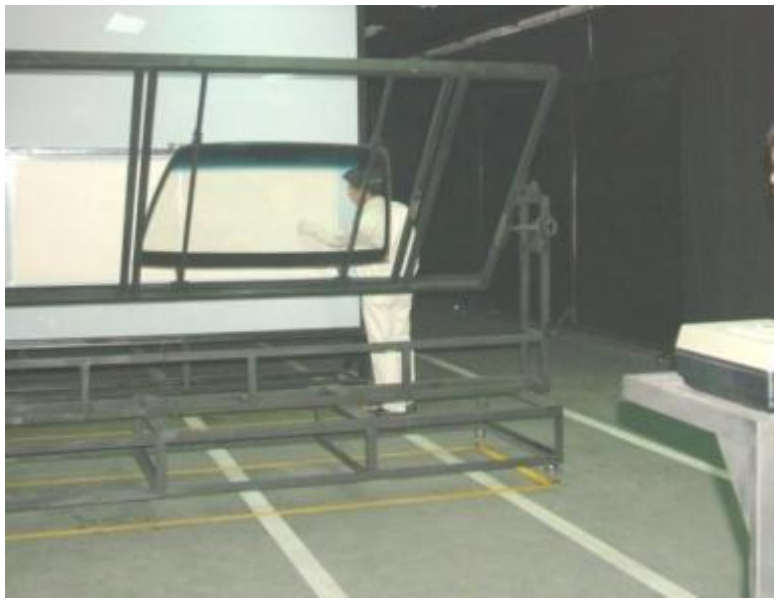
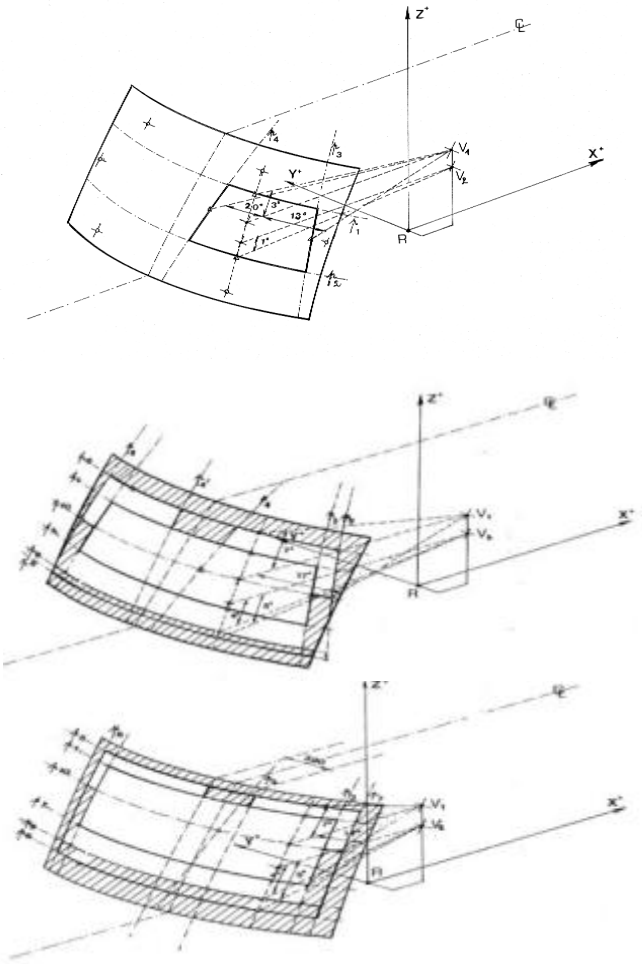


Fig.13 : Testing equipment

TESTING AREAS ON THE GLASS



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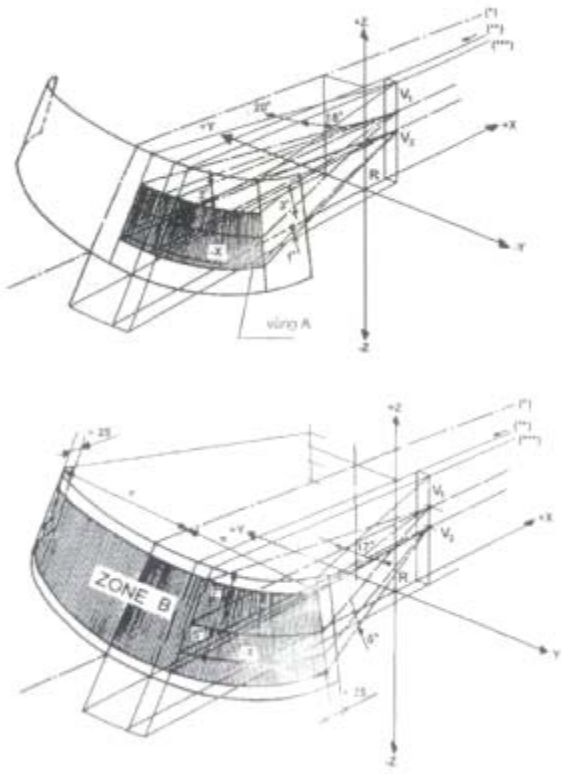

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SECONDARY-IMAGE-SEPARATION TESTING EQUIPMENT

PURPOSE

to verify that the angular separation of the secondary image from the primary image does not exceed a specified value.

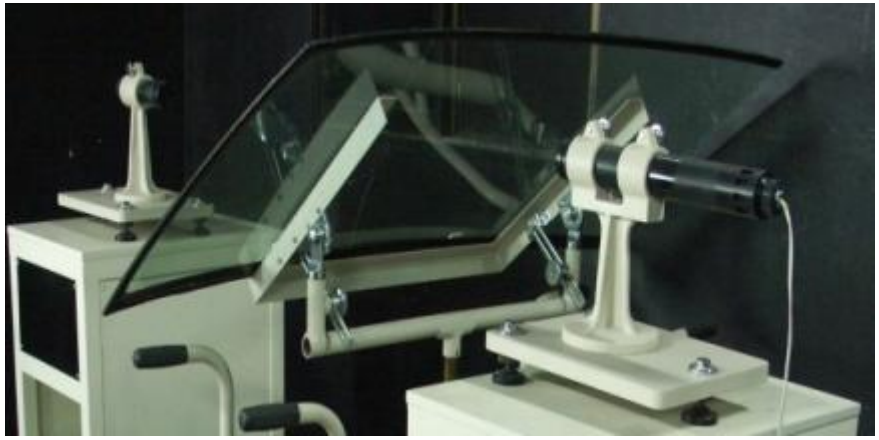

Fig. 15: Testing equipments

Fig. 16: Image seen through safety glass

LIGHT-TRANSMISSION TESTER

PURPOSE

to determine whether the regular transmittance of safety glazing exceeds a specified value.

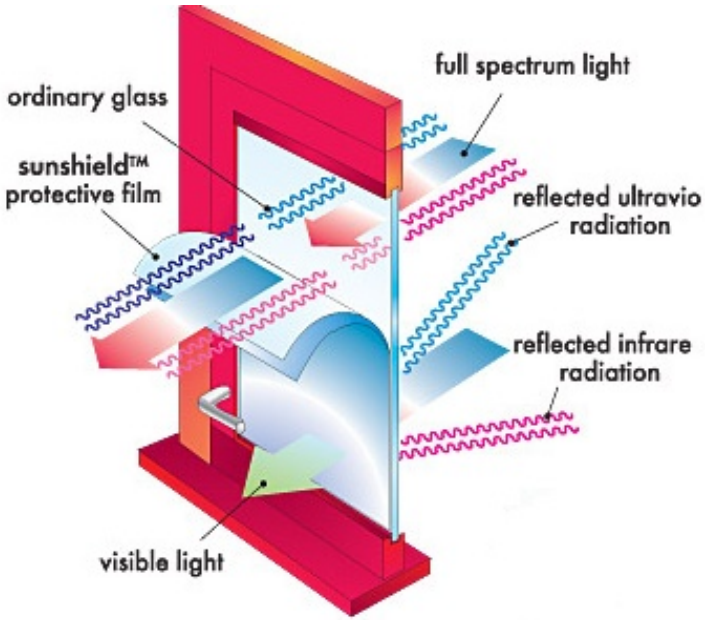

Fig.17 : Light through glass

Fig.18: Testing equipments

TEST OF RESISTANCE TO ABRASION

PURPOSE

to determine whether the resistance of a safety glazing to abrasion exceeds a specified value.

Fig. : Abrasion testing

Fig.19 : Haze tester

Fig.20: Testing equipment

PART 2:
ECE R43 IN COMPARISON WITH OTHER STANDARD

FOR LAMINATED GLASS

No.	TEST	UNECE No.43	JAPAN Safety Regulations for Road Vehicles, Article 29	USA FMVSS 205
1.	Windscreen optics	Tests on windscreens · using defined vision areas · at the installation angle · Test method ISO 3538	Tests on windscreens · using defined vision areas · at the installation angle · Test method ISO 3538	Test of 12" squares which may be cut from the most curved part of the windscreen · no defined vision area · not tested at the installation angle · not as ISO 3538
2.	Light transmission	TL ≥ 75% Test method: ISO 3538	TL ≥ 70 % Test method: ISO 3538	TL ≥ 70% Test method ISO 3538
3.	Impact 227g Ball	Test method ISO 3537 Tests at + 40oC and - 20oC Varying drop heights according to thickness	Test method ISO 3537 Test at + 40oC and - 20oC Varying drop heights according to thickness	Test method ISO 3537 Test at 25oC Standard drop height
4.	Penetration Resistance 2260 g ball	Test method: ISO 3537 Drop height 4.0 m	Test method: ISO 3537 Drop height 4.0 m	Test method: ISO 3537 Drop height 3.66 m
5.	Abrasion Resistance	Test method: ISO 3537	UNECE Regulation No. 43	UNECE Regulation No. 43
6.	Headform Impact Test	Test method: ISO 3537 Evaluation of penetration resistance and breaking pattern 4 m drop test on flat test pieces. 1.5 m drop test on windscreens	Test method: ISO 3537 Evaluation as UNECE Regulation No. 43 Testing as UNECE Regulation No. 43	No test

FOR TOUGHED GLASS

No.	Test	UNECE No. 43	JAPAN	USA FMVSS 205
1.	Impact test 227 g Ball	· Test method: ISO 3537 · Drop heights: thickness ≤ 3.5 mm – 2.0 m thickness > 3.5 mm - 2.5 m · Flat 300 x 300 mm test pieces or finished products	· ISO 3537 · Drop heights as ECE R43 · Flat 300 x 300 mm test pieces	· Test method: ISO 3537 · Drop height: 3.05m · Flat 305 x 305 mm test pieces
2.	Abrasion test	No test for the glass surface If plastic coated, then: test method: ISO 3537	As ECE R43	Test method: ISO 3537, Carried out on body glass requisite for driving visibility (thử trên vùng kính quan sát thường xuyên)
3.	Light transmission	· Test method: ISO 3538 · In areas requisite for driving visibility: · TL ≥ 70 % In areas not requisite for driving visibility: TL no lower limit	As UNECE Regulation No. 43	Test method: ISO 3538 For passenger cars the TL limit is ≥ 70 per cent , except for roof lights For other vehicles the limits are as UNECE No. 43 and Japan.

FOR TOUGHED GLASS

No.	Test	UNECE No. 43	JAPAN	USA FMVSS 205
4.	Fragmentation	Test procedure ISO 3537 · Production parts are broken using a spring loaded centre punch or pointed hammer from 4 defined breaking points · The minimum particle count allowed is 40 (in any 5x5 cm sided square) with an upper limit of 450 for a thickness < 3.50 mm. 400 for thickness >3.5 mm · No elongated particles (splines) in excess of 7.5 cm are permitted · The maximum particle size allowed is 3 cm2 NB: Some deviations on the above are permitted. Example: splines up to 10 cm	ISO 3537 Requirements are similar to those specified in UNECE Regulation No. 43 Some small differences in the allowed deviations Deviation examples: · splines up to 15 cm · in case particle count < 40, then: particle count >= 160 in any 10 x 10 cm square is acceptable	Fragmentation test as ISO 3537, with only one defined break position (25 mm inboard of the mid-point of the longest edge) The interpretation of results is based on the weight of the largest fragment, which shall not exceed 4.25 g. This equates to the following maximum particle sizes: 3 mm thickness: 5.6 cm^2 4 mm thickness: 4.2 cm^2 5 mm thickness: 3.4 cm^2 No evaluation of the length of fragments.

PART 3:
ROAD MAP OF STANDARD ENTERED INTO FORCE

1. SAFETY GLASS REGULATION WILL BE INTO FORCE IN 2009
2. ROAD MAP FOR APPLICATION:
    1. TWO YEAR AFTER THE REGULATION BE INTO FORCE FOR NEW TYPE OF MOTOR VEHICLE
    2. FOUR YEAR AFTER THE REGULATION BE INTO FORCE FOR CERTIFICATED MOTOR VEHICLE

ANY COMMENTS PLEASE CONTACT

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VIETNAM REGISTER
NO.18, PHAM HUNG STR, TU LIEM DIST, HA NOI
EMAIL: VMTC@VNN.VN; THANHMP@VR.ORG.VN
TEL: 043.768.4715/892

THANK YOU FOR YOUR KIND ATTENTION

Summary Report on the 20th Asia Expert Meeting

Expert Meeting on Safety Glazing (ECE R43)

1. Date: 29 September 2009
   Venue: VR's Conference Room
   Organizer: VR
2. Attendees
   Vietnam: About 60 people from VR, industry organizations, etc.
   Japan: Mr. Morikawa (General Safety Subcommittee, JASIC) and Mr. Fukuda (JASIC)
3. Summary of the Meeting

The expert from JASIC (Mr. Morikawa) gave presentations firstly on an overview of procedures for obtaining approvals under UN/ECE R43 (Safety Glazing) (including application for an approval, granting of the approval, application for modification of the approval, and COP), secondly on the applicable categories of safety glass and their installation on vehicles, and finally on the test requirements and procedures, etc. in detail (including manufacturing methods for various types of safety glass). JASIC received questions from attendees regarding the glazing type, test items for each type of glass, application of the transmission of glass, etc. as well as the background to the formulation of the test procedures. In addition, Mr. Pham Minh Thanh from VR gave a presentation titled "Safety Glass Testing according to ECE R43". Through this Meeting, the attendees deepened their understanding of the ECE R43 (Safety Glazing) standards.

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