

GRPE VIAQ IWG - Draft Document Pictures, Tables and Reports

ISO TC146/SC 6 Resolutions

October 2016

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Method Review

- ISO Resolutions and Updates
- Methods Under Review for Best Practices
 - ISO 12219-1
 - HJ/T 400· 2007
 - Korean Method
 - JASO Z 125 : 2009
 - Jama_Report_No_98
- Review of current methods for Best Practices
 - Outlines
 - Figures
 - Pictures
 - Test schemes
 - Test reports
- Reviewed and compiled like parts of each method in a Word Document then compared like parts of each method in this presentation

ISO TC 146/SC 6 Resolutions

■ ISO TC22/TC146 SC6 JWG13

ISO 12219-1 was published in 2012

“ Part 1 - Whole vehicle test chamber - Specification and method for the determination of volatile organic compounds in cabin interiors

The last ISO TC 145/SC6 meeting was held September 26 to 30 2016 in Burlington, Vermont (United States).

Meeting Resolutions

“ Resolution 111 (Burlington 6)

- . Joint ISO/TC 22-ISO/TC 146/SC 6/WG 13 considers the following new work items:
 - » passive sampling method on evaluation on air quality in cars,
 - » cabin VOC method of busses and trucks,
 - » **revision of ISO 12219-1.**

“ Resolution 112 (Burlington 7)

- . Joint ISO/TC 22-ISO/TC 146/SC 6/WG 13 decides to ask SC 6 for starting a new work item on revision of ISO 12219-1.

“ Resolution 113 (Burlington 8)

- . Joint ISO/TC 22-ISO/TC 146/SC 6/WG 13 considers the opportunity to meet again in conjunction with the meeting of ISO/TC 146/SC 6 from 25 to 29 September 2017. The location has still to be found.

The next ISO JWG13 meeting coincides with the formal document+ timing of the GRPE VIAQ IWG.

ISO TC22/TC146 SC6 WG3 (ISO 16000-6)

- ISO plans to update ISO 16000-6.
- After ISO TC 145/SC6 meetings in Burlington, ISO TC 146/SC 6/WG 3, Determination of volatile organic compounds (VOCs) in indoor air, reconvened in order to update ISO 16000-6.
- Mark Polster has been appointed convenor of ISO/TC 146/SC 6/WG 3 and will help lead the updating of ISO 16000-6. Dr. Derrick Crump is appointed secretary.
- ISO is preparing to propose a new work item to ISO. A draft of 16000-6 for a new work item should come by the end of October.
- Then the WG will have a ballot of about three month to find **at least 5 countries** which will contribute to the project.
- The longest period for preparing or revising a new standard is 48 months. A shorter time is possible.
- A key are a focus will be the determination of TVOC.

OUTLINES

ISO 12219-1

- Scope
- Normative references
- Terms and definitions
- Apparatus and materials
- Principle
- Requirements of the whole vehicle test chamber, test vehicle and measurement procedures
- Standard test procedure
- Calculation, presentation of results and precision and uncertainty
- Performance characteristics
- Quality assurance/quality control (QA/QC)
- Safety measures
- Annex A (informative) Whole vehicle test chamber
- Annex B (informative) Temperature measuring points for the parking mode
- Annex C (informative) Test report
- Annex D (informative) Very volatile organic compounds, volatile organic compounds, and semivolatile organic compounds
- Annex E (normative) Overview about the number of samples to be taken
- Bibliography

HJ/T 400—2007

- Foreword
- 1 Scope of application
- 2 Normative reference documents
- 3 Terms and definitions
- 4 Sampling
- 5 Analysis
- 6 Quality assurance and control
- Annex A (Normative) Sampling Environment Chamber
 - A1 Technical requirements
 - A2 Composition
- Annex B (Normative) Measurement Method of Volatile Organic Constituents
 - B1 Scope of application
 - B2 Terms and definitions
 - B3 Principles of method
 - B4 Reagents and materials
 - B5 Instrument and equipment
 - B6 Pre-conditioning of samples
 - B7 Analysis
 - B8 Calculation of results
 - B9 Characteristics of method
 - B10 Quality assurance and control
 - B11 Report of results
 - B12 Bibliography
- Annex C (Normative) Measurement Method for aldehyde-ketone constituents
 - C1 Scope of application
 - C2 Terms and definitions
 - C3 Principles of method
 - C4 Reagents and materials
 - C5 Instrument and equipment
 - C6 Preconditioning of sample
 - C7 Analysis
 - C8 Calculation of results
 - C9 Features of method
 - C10 Quality assurance and control
 - C11 Report of results
 - C12 Bibliography

Korean Method

- Annex 2 Method for Measuring the Interior Air Quality of Newly Manufactured Vehicles
- 1 Purpose
- 2 General Matters
- 3 Scope of Application
- 4 Substances To Be Measured
- 5 Measuring Instruments
- 6 Measurement
- 7 Processing of Measurement Results

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- 1. Scope of Application
- 2. Quoted Standards
- 3. Terms and Definition
- 4. Measurement Methods Outline
- 5. Devices and Tools
- 6. Test Conditions
- 7. Standard Test Methods
- 8. Analysis Methods
- 9. Treatment of Results
- 10. Report
- Commentary

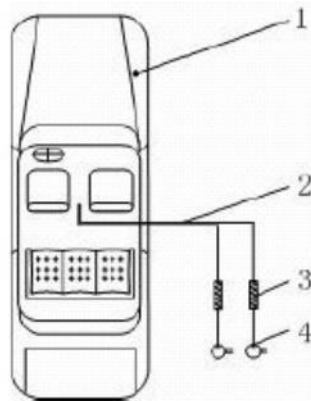
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- 1. Preconditioning
- 2. Close and left-as-is mode
- 3. Driving mode
- 4. Analysis of each chemical compound
- 5. Treatment of results

TEST VEHICLE SCHEMATICS

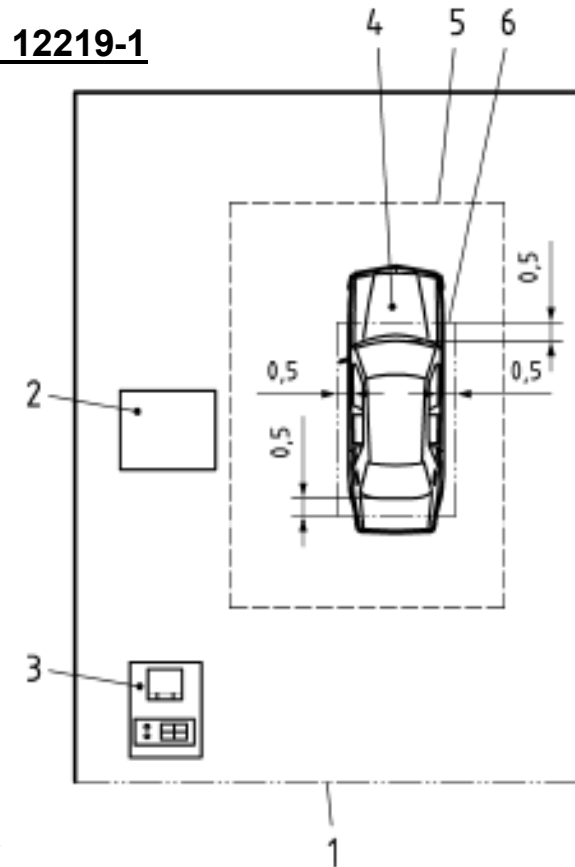
Various Methods

HJ/T 400—2007



- 1 - tested vehicle; 2 - sampling duct;
3 - packed-column sampling tube;
4 - constant-flow gas sampler
Figure 1 Sampling Illustration

ISO 12219-1



Key

- 1 door test chamber
2 sampling device
3 controlling and data logging device
4 test vehicle
5 test area
6 radiator area

Figure 1 — Schematic arrangement of whole vehicle test chamber components and the test vehicle

Various Methods

ISO 12219-1

Annex A
(informative)

Whole vehicle test chamber

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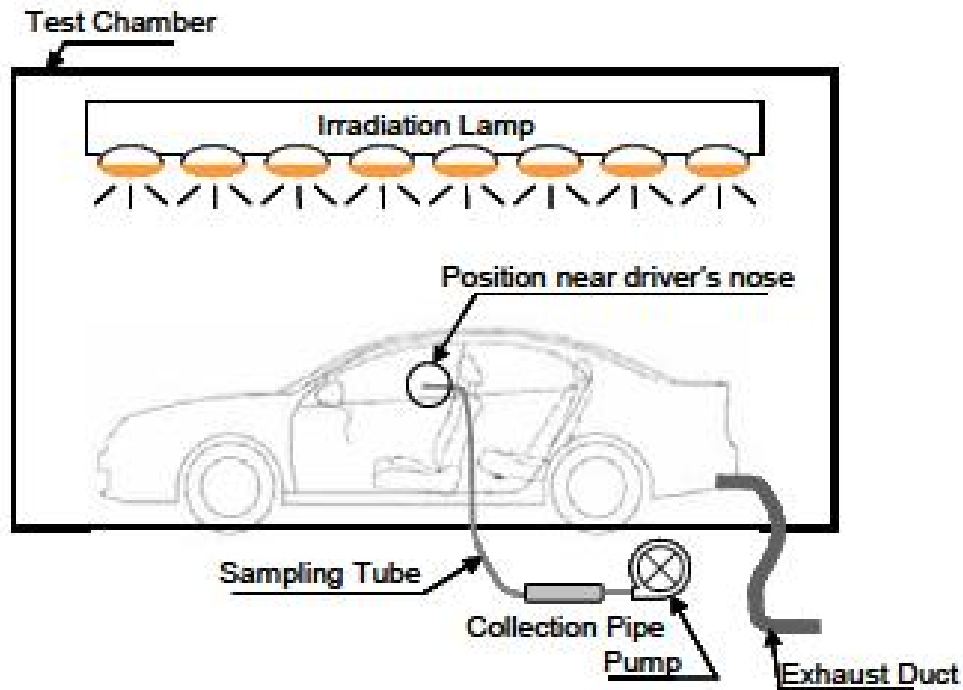


Diagram 1: General Description of Test Chamber



Figure A.1 — Example of the illustration of a whole vehicle test chamber²¹

Temperature Points - ISO 12219-1

Annex B (informative)

Temperature measuring points for the parking mode

The temperature can be measured at the sampling point (inside of the test vehicle).

Other temperature measurements at other points may be of possible interest, depending on the particular problem e. g. instrument panel, top of the test vehicle, rear parcel shelf (see Figure B.1) (measured with e. g. standard PT 100 air thermometers).

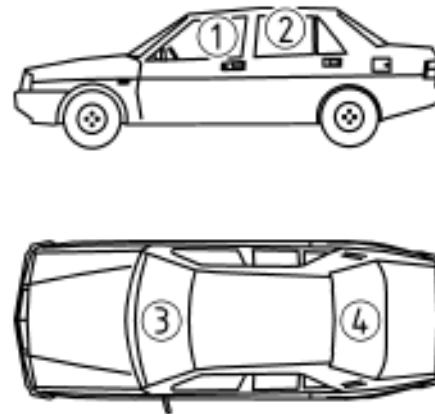


Figure B.1 — Example for temperature measurement points

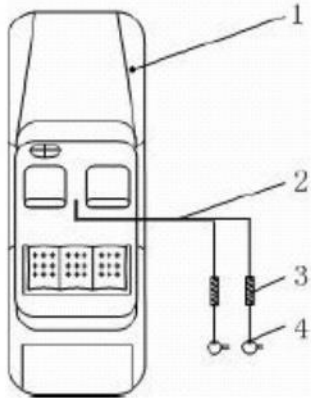
Key

- 1 temperature of the test vehicle cabin air (near sampling probe)
- 2 surface temperature, top of the test vehicle (inside)
- 3 surface temperature, instrument panel
- 4 surface temperature, rear shelf (alternative if there is no rear shelf: rear luggage cover)

SEAT SCHEMATICS

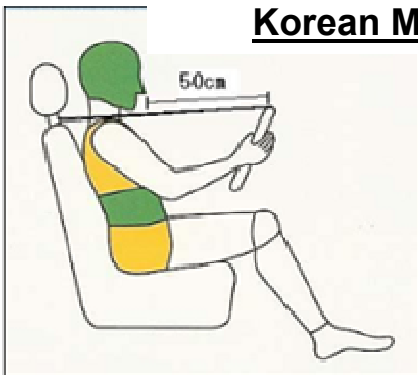
Various Methods

HJ/T 400—2007



1 - tested vehicle; 2 - sampling duct;
3 - packed-column sampling tube;
4 - constant-flow gas sampler
Figure 1 Sampling Illustration

Korean Method



ISO 12219-1

Key
1 sampling point
2 steering wheel
3 seat with head rest

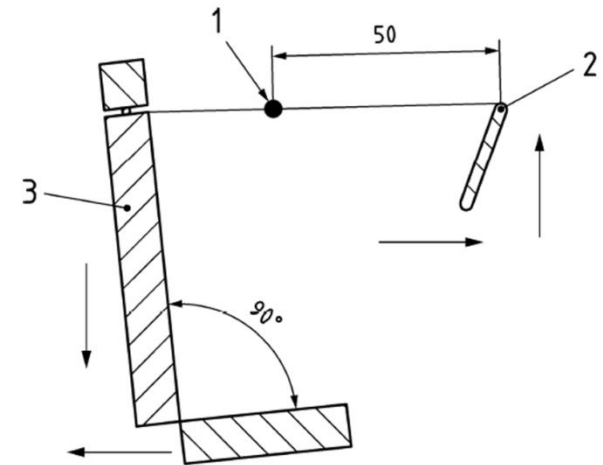


Figure 2 — Schematic arrangement of the sampling position in the test vehicle

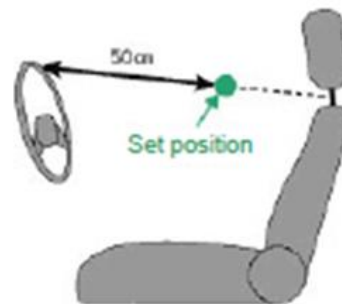


Diagram 2: Vehicle Interior Air Collection Position and Temperature Measurement Point (Passenger Car)

JASO Z 125 : 2009 both

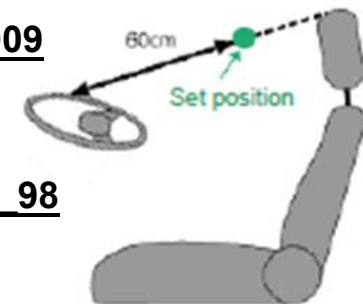


Diagram 3: Vehicle Interior Air Collection Position and Temperature Measurement Point (Truck/Bus)

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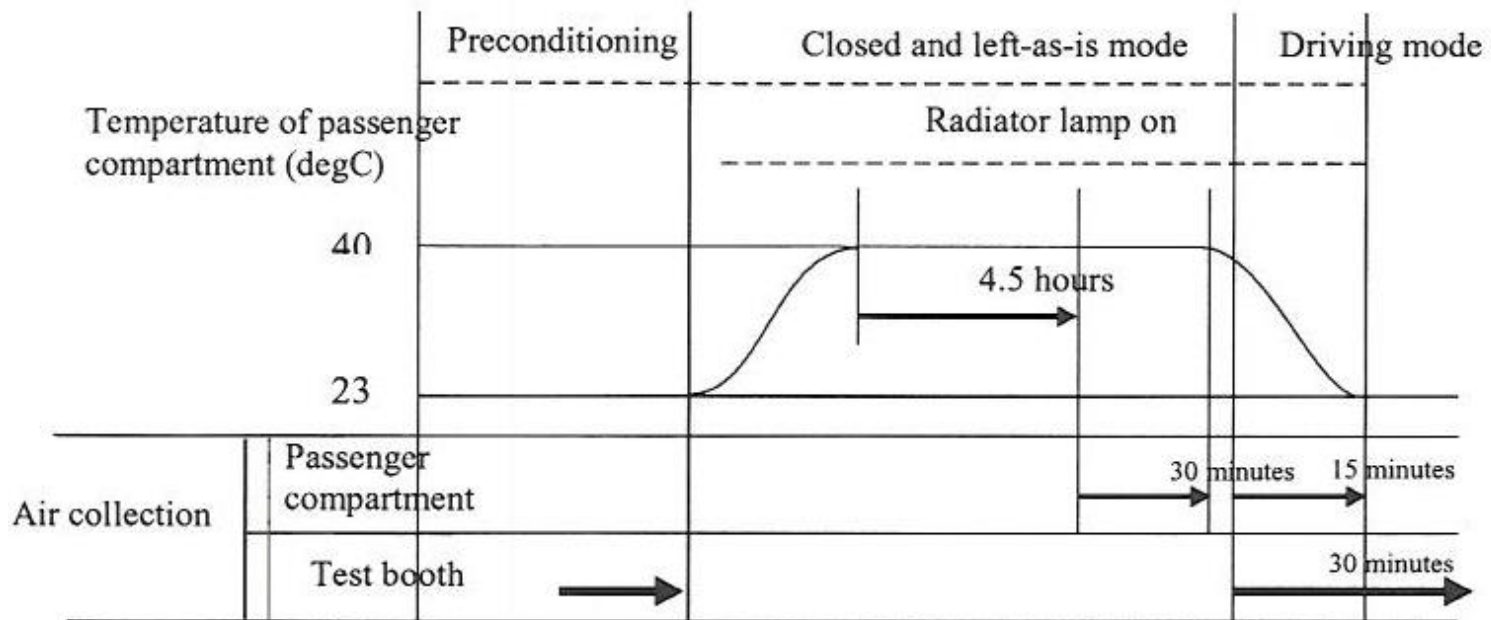
***MODE SCHEMATICS
COLLECTION TIMES***

Korean Method

Time	Temp Stabilization Min. 12hr	Ventilation 30 min	Doors Closed 2 hr	Sampling 15 min
Cabin Temp			25 °C ± 2 °C	Day 1 : Sample 1,2,3 Day 2 : Sample 4,5,6

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Fig. (1) Test schedule



ISO 12219-1

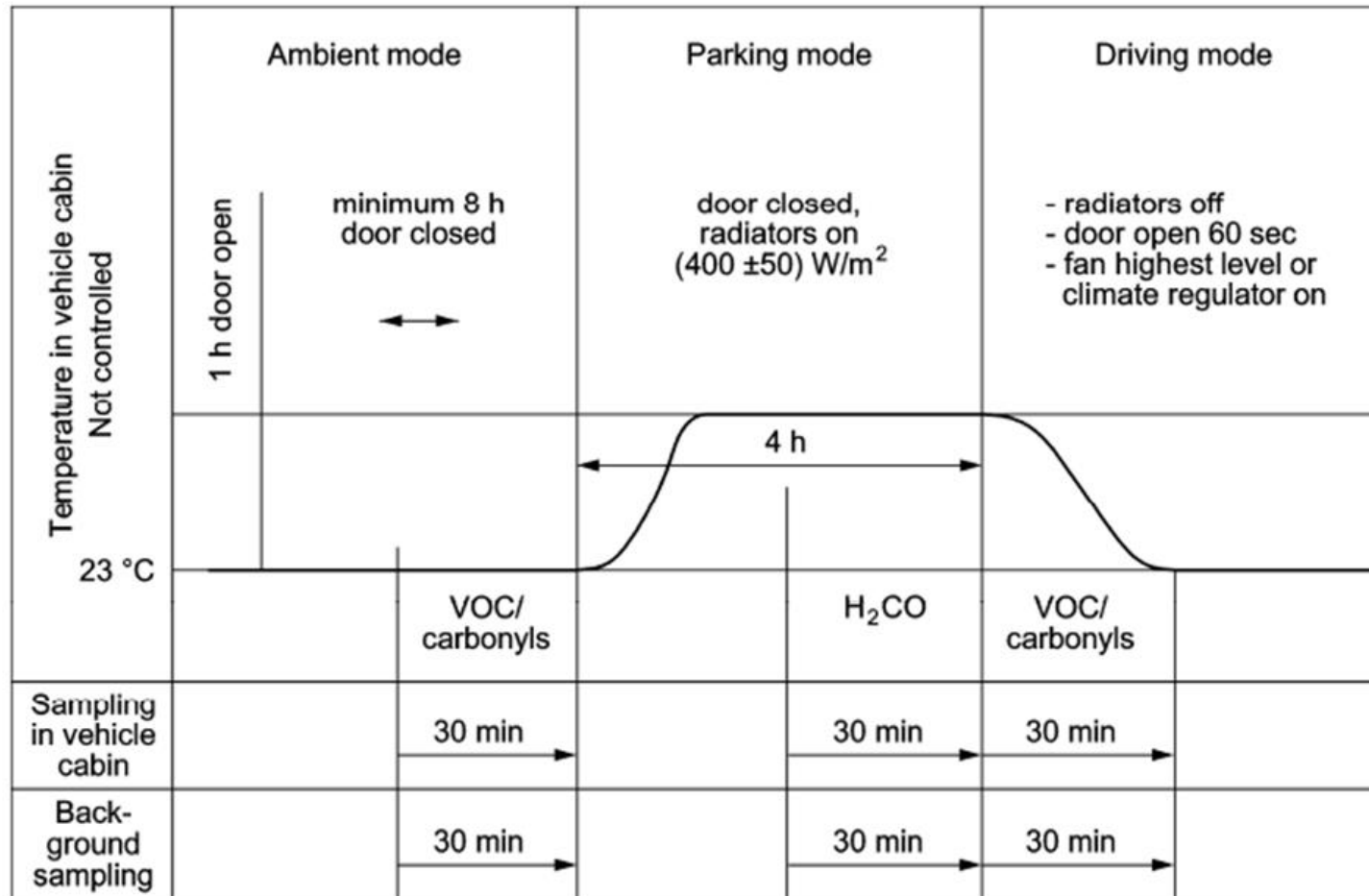
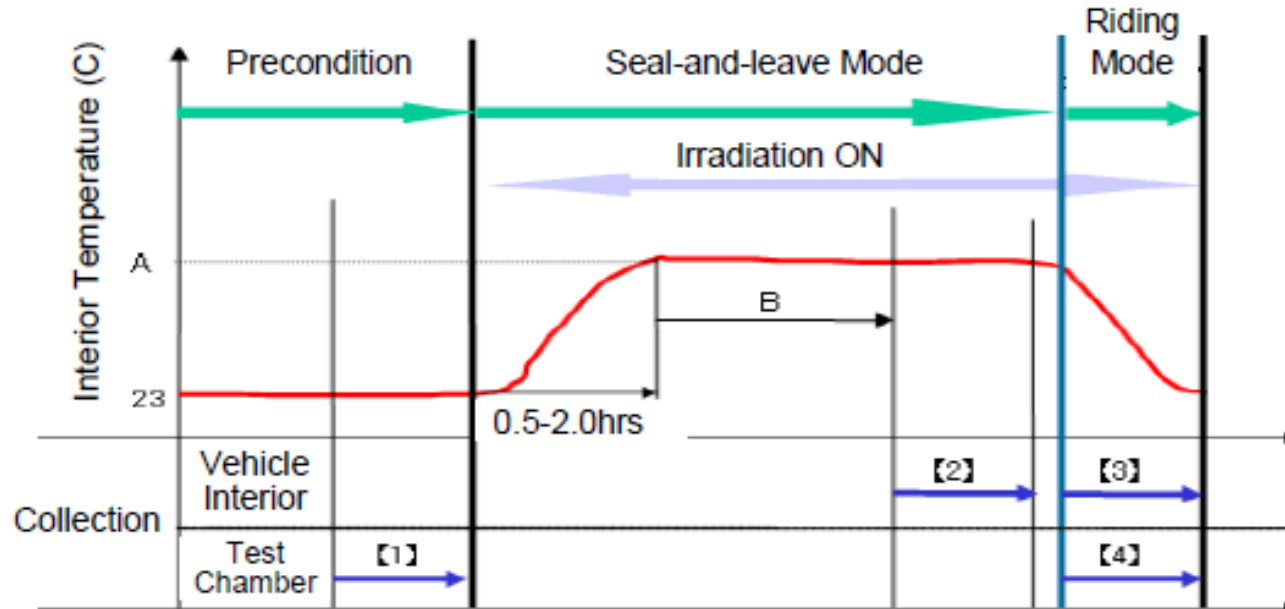


Figure 3 — Schematic temperatures and test schedule

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Test Condition		Car	Truck	Bus
Seal/Leave Condition	A: Temperature	40±2 degrees C	40±2 degrees C	35±2 degrees C
	B: Time	4.5hrs		
Collection Time	[1] Precondition Test chamber	30min		
	[2] Seal/Leave Mode Vehicle interior	30min		
	[3] Riding Mode Vehicle interior	15min	30min	120min
	[4] Riding Mode Test chamber	15min	30min	120min

Diagram 4: Test Schedule

A/C SETUP

Various

Jama Report No 98

Table 1: Air-conditioner Setup

	Auto Air-conditioner	Manual Air-conditioner
Air-conditioner: ON/OFF	ON	
Air Inlet	Recirculation (no air inlet)	
Air Volume	Auto	In the middle between minimum and maximum
Air Direction	Auto or Face Mode All registers entirely open, vertical direction	
Temperature	23 degrees C	Minimum temperature

Table 1 — Setting of air conditioner

	Automatic air conditioner	Semi-automatic or manual air conditioner	No air conditioner
Air-conditioning ON/OFF	ON	ON	—
Indoor/outdoor air change-over	Automatic	Fresh air circulation	—
Air flow selector	— Automatic — All registers to be upright and fully open	face mode ventilation in highest position, with fresh air ventilation All registers to be upright and fully open	ventilation in highest position, with fresh air ventilation All registers to be upright and fully open
Temperature	23 °C	Lowest (or medium to avoid an automatic air recirculation mode)	Lowest

ISO 12219-1

COLLECTION CONDITIONS

ISO 12219-1

Sampling mode per ISO 12219-1	Ambient mode	Ambient mode	Parking mode	Driving mode	Driving mode
Sample media	Tenax TA®	DNPH	DNPH	Tenax TA®	DNPH
Measured compounds	VOCs	Carbonyls	Carbonyls	VOCs	Carbonyls
Sampling location:					
• Whole vehicle test chamber and vehicle for field blank	2 ^a	2 ^a			
• Whole vehicle test chamber for background	2	2	2	2	2
• Vehicle	2	2	2	2	2
Totals	6	6	4	4	4
^a A field blank procedure shall be performed at least before each measurement series (series of consecutive measurements of several vehicles).					

Korean

Table 1 Time and Quantity of Sampling

Substances to be measured	Conditions of Sampling	Amount
Formaldehyde (HCHO) Acrolein (CH ₂ CHCHO)	Sampling time	15 min
	Flow rate	04~1 ℓ/min
	Quantity of sampling	12 ℓ or above
Volatile Organic Compounds (VOCs)	Sampling time	10 min
	Flow rate	100~200 ml/min
	Quantity of sampling	1 ℓ or above

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Table (1) Conditions of air collection¹

Measuring mode		Closed and left as is	Driving mode
Aldehydes	Collection time	30 minutes	15 minutes
	Collection speed	Amount of collected air 0.4-1 litter/min. (Require collection speed of 0.8 litter/min. or faster to collect 12 litters in 15 minutes.)	
	Collection volume	12 litters or more	
Other VOCs	Collection time	30 minutes	15 minutes
	Collection speed	Amount of collected air 0.1-0.2 litter/min. (Require collection speed of 0.2 litter/min. or faster to collect 3 litters in 15 minutes.)	
	Collection volume	3 litters or more	

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Table 2: Collection Conditions

Collection Pipe		Precondition and Seal-and-leave Mode	Riding Mode		
			Passenger Car	Truck	Bus
		(Collect 30min)	(Collect 15min)	(Collect 30min)	(Collect 120min)
DNPH	Amount	12L or more			
	Speed	0.3L/min-1L/min	0.3L/min-1L/min	0.4L/min-1L/min	0.1L/min-1L/min
TENAX (TA or GR)	Amount	3L or more			
	Speed	0.1L/min-0.2L/min	0.1L/min-0.2L/min	0.1L/min-0.2L/min	0.025L/min-0.2L/min

TEST REPORTS

Table C.1 — Test vehicle data

ISO 12219-1 - Vehicle Data

Annex C (informative) Test report

NOTE ISO grants the user of this part of ISO 12219 the right to reproduce or otherwise use the sampling protocol on this page solely for the purpose of implementing this part of ISO 16000.

C.1 General

Client:

Experts:

Telephone:

Fax:

E-Mail:

Date of report:

Pages:

Order number:

Name of Laboratory

Address

Sample cover sheet number:

Vehicle type:	
VIN:	
Number of km/miles upon delivery:	
Vehicle colour	
Interior specification :	
Glazing:	
Shade and type of the window glass:	
Tank capacity:	
Sliding sun-roof/glass roof:	
Airbag in the steering wheel on the left and on the right:	
Central locking system:	
ABS und ASC:	
Fire extinguisher:	
Volume of interior:	
Passenger compartment: in m ³	
Trunk: in m ³	
Total volume: in m ³	
Method of determination:	
The adjustment of the control elements for the ventilation system is done:	
History	
Preservation of outer skin:	
De-preservation:	
Conditioning phase	
Location outdoors:	
Location under sales room conditions:	
Have doors and windows been closed tight all the time?	
Test vehicle delivered on (date):	
Test vehicle pushed or driven into test garage by:	

ISO 12219-1 - Test Results

Sampling condition	1. Sample	2. Sample	3. Sample	4. Sample	5. Sample	6. Sample
	Test vehicle: ambient mode	Whole vehicle test chamber: ambient mode	Test vehicle: parking mode	Whole vehicle test chamber: parking mode	Test vehicle: driving mode	Whole vehicle test chamber: driving mode
	23 °C	23 °C	sampling point X °C (optional)	sampling point Y °C (optional)	sampling point X °C (optional)	sampling point Y °C (optional)
	Concentration µg/m ³					
Sample	xxx	xxx	xxx	xxx		
Compound 1						
Compound 2						
TVOC value						

Table C.3 — Results of TVOC value and selected compounds in the different modes

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Report of results

To the minimum the following information shall be comprised:

- a) Analysis conditions;
- b) Calculation results, including: concentration values of 25 top air pollutants in cabins of vehicles, measured values of volatile organic constituents, background values of ambient pollutants, and blank values;
- c) Analysis spectral charts.

Jama_Report_No_98

5. Treatment of results

- 1) An average of analyzed concentration values for each chemical collected under the same conditions is deemed a measured value.
- 2) For formaldehyde, the concentration level during the closed and left-as-is mode is adopted, while for other chemical substances, the concentration during the driving mode is adopted.⁴

However, should values gained from the test tank after preconditioning and those from the driving mode greatly deviate, some flaw such as exhaust gas leakage may have distorted the test results and the measurement may need to be retried.

Korean Method

Table 2 Report on the Test of the Interior Air Quality of Newly Manufactured Vehicles

Vehicle Model		Manufacturer						
Date of Manufacture		Vehicle Dimension No						
Vehicle Type		Vehicle Identification Number						
Date of Measurement		Date of Analysis						
Test Room Temperature (°C)		Vehicle Interior Temperature (°C)						
Test Room Humidity (%)		Vehicle Interior Humidity (%)						
Measurement Result ($\mu\text{g}/\text{m}^3$)								
Substance		Formaldehyde	Acrolein	Benzene	Toluene	Xylene	Ethylbenzene	Styrene
First	Background Concentration							
	No 1							
	No 2							
	No 3							
Second	Background Concentration							
	No 1							
	No 2							
	No 3							
Mean Value (n=4) (with the highest and lowest values discarded)								

JASO Z 125 : 2009

10. Report

Following descriptions shall be provided normally for test reports.

a) Testing Institute

Testing Institute	Company xxx
Address	Prefecture, City, Street
Responsible Inspector	Name

Test Chamber Facility

Test Chamber	Name, Make
--------------	------------

b) Test Vehicle

Vehicle Name/Grade	Trade Name (XXX car), High-grade XX
Vehicle Type	Type of the vehicle
Place of Manufacture	Factory name
Date of Manufacture	MM DD, 2009

c) Test Date

Test Date	MM DD, 2009
# of Days Passed from Date of Manufacture	xx days

d) Test Result

Test Item	Test Chamber Background	Seal-and-leave Mode	($\mu\text{g}/\text{m}^3$)
			Riding Mode
Toluene	10	-	20
Xylene	10	-	30
Ethylbenzene	10	-	10
Styrene	10	-	50
Tetradecane	10	-	20
Di-n-butyl phthalate,	10	-	20
Di-2-ethylhexyl phthalate	10	-	ND
Formaldehyde	10	10	-
Acetaldehyde	10	-	20
TVOC (Reference value)	200	-	300

Recommendations and Next Steps

- Difficult to create some schematic and diagrams suggest waiting until all parameters are complete, e.g. soak temperature.
- After this meeting will create draft version of the figures, tables and schematics.
 - Vehicle schematic
 - “ Locations for sample inlet, interior and cell
 - “ Locations for temperatures (RDE or TC?)
 - “ Add dimensions were required
 - Seat location will be separate schematic
 - Test Cell could be separate schematic
 - “ Solar load and coverage
- Test Report
 - See Excel File with data fields, data type, etc.
 - Discuss the level of detailed and fields required