MOLIT Ministry of Land, Infrastructure and Transport
KATRI Korea Automobile testing & research Institute

Proposal for Vehicle Indoor Air Quality (VIAQ)

5-6 June 2014

KATRI, The Republic of KOREA
(Korea Automobile testing & research Institute)

Contents

Background

- Increasing concerns about **Vehicle Indoor Air Quality(VIAQ)**
  - ➢ Various chemical substances to harmful to human body are emitted from vehicle interior materials
- Many countries research & manage vehicle indoor air quality
  - ➢ Netherlands, France, Sweden, Germany, Japan, USA, China, Korea
  - ➢ ISO Standard(12219-1:2012), China(GB/T 27630-2011), Korea(Notification No. 2013-889)

Need to unified regulation on vehicle indoor air quality(VAIQ)
to protect driver's health and safe driving

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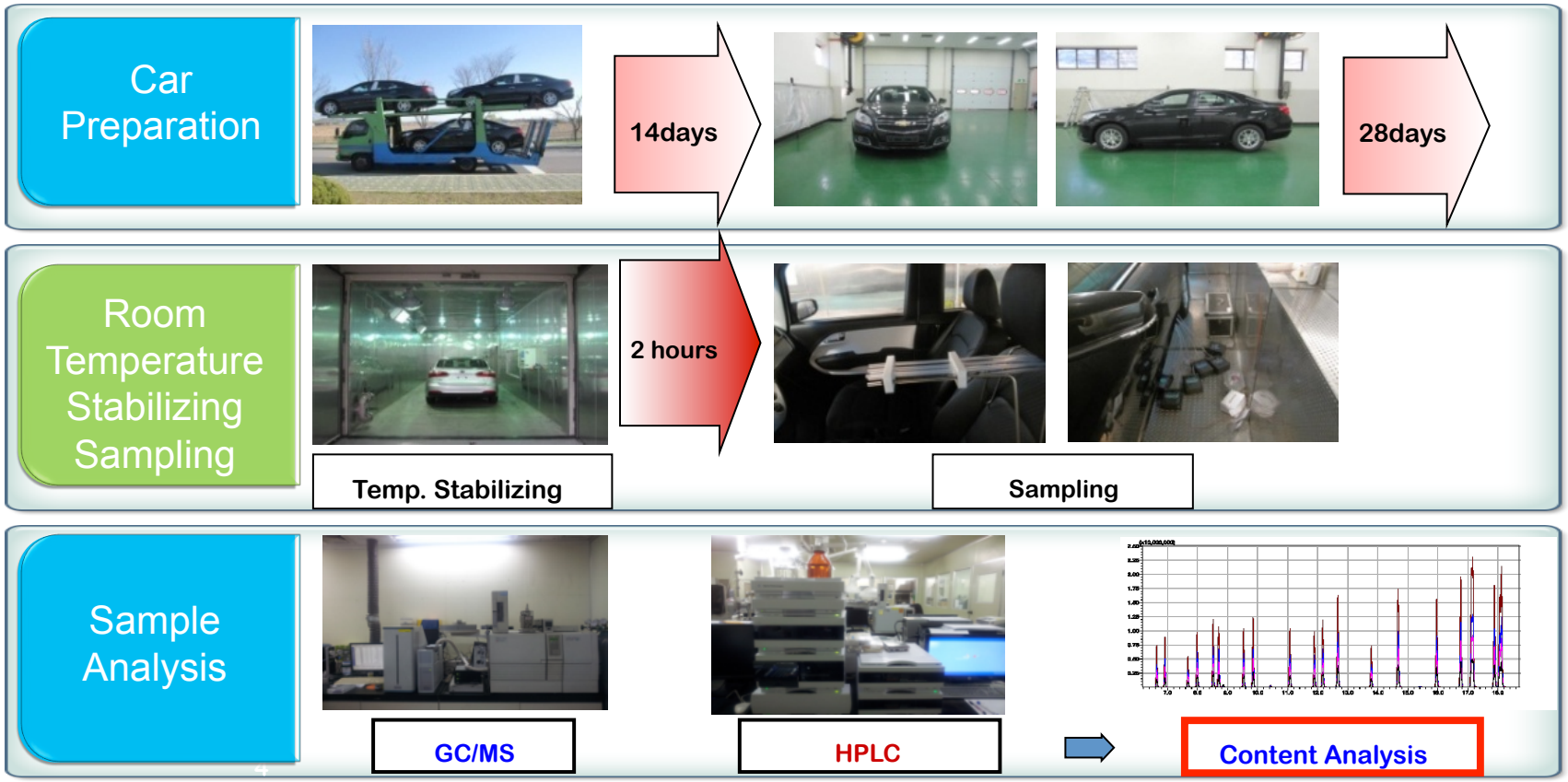
- Korea government established VIAQ guideline in 2007
- Verification test : 2011~ , No penalty but notification to consumer

❖ Verification test whether automobile manufactures comply with VIAQ guideline



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- Verification test results of VIAQ year by year

YEAR	Item	Formaldehyde	Toluene	Ethylbenzene	Styrene	benzene	Xylene
Limit(μg/m^3)		250	1,000	1,600	300	30	870
2006 (36 new model) Before VIAQ guide line	Averg.	**98**	**518**	**222**	**64**	**111**	**828**
	Min	22	51	49	12	7	112
	Max	955	2384	632	185	385	2164
2011 (9 new model) After VIAQ guide line	Averg.	**35**	**1046**	**102**	**14**	**-**	**-**
	Min	8	108	20	7	-	-
	Max	56	2846	470	25	-	-
2012 (8 new model) After VIAQ guide line	Averg.	**20**	**328**	**66**	**33**	**7**	**199**
	Min	4	85	18	4	5	45
	Max	49	753	131	136	13	379
2013 (4 new model) After VIAQ guide line	Averg.	**24**	**206**	**28**	**5**	**1**	**80**
	Min	5	65	8	3	1	21
	Max	38	430	51	7	3	140

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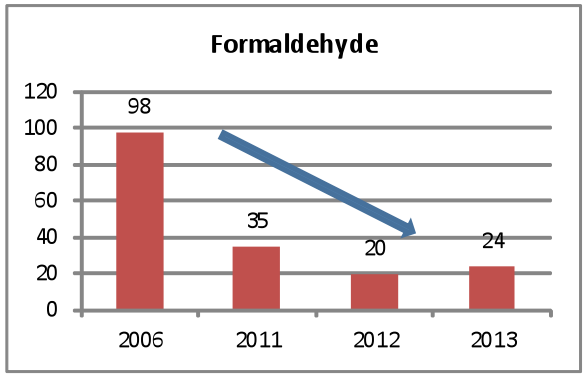
- Comparison of 2006 (Not Apply) and 2011~2013 (VIAQ) test results
  - ✓ After the VIAQ regulation, vehicle indoor air quality levels drastically improved
  - ✓ VIAQ management regulation is proven to be effective to reduce VOCs inside new vehicle

(* VOC : Volatile organic compound)



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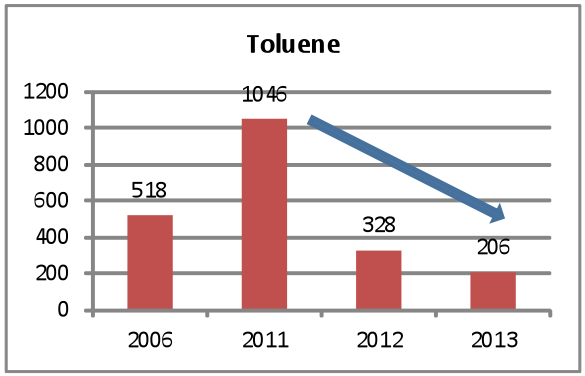

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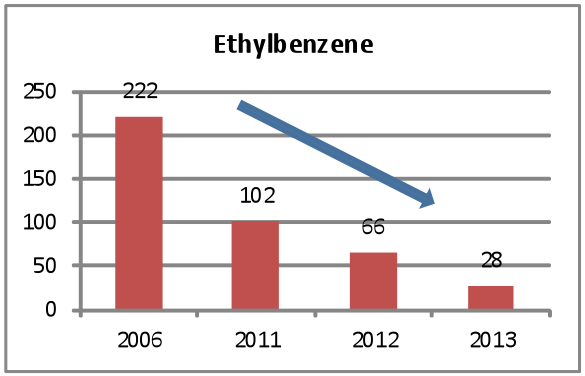

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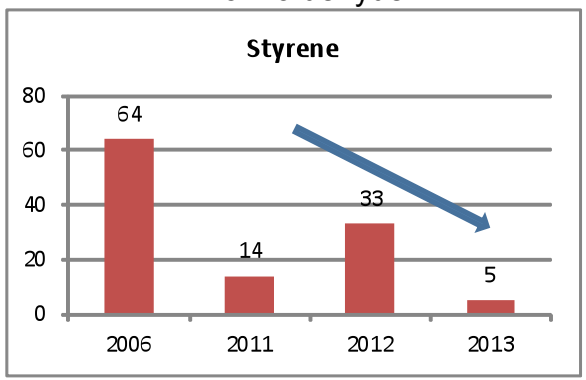

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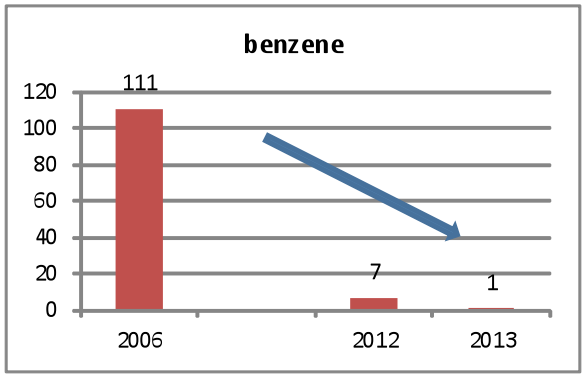

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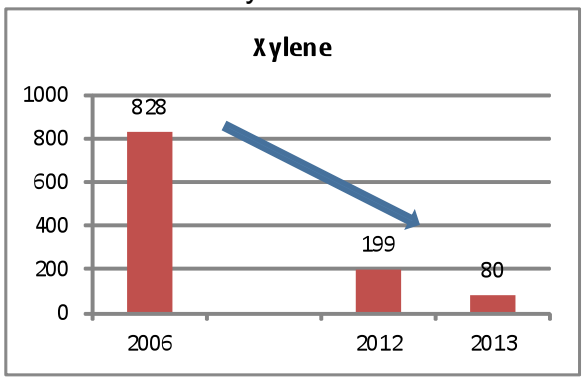

< Xylene>

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Improvement case of VIAQ

- ✓ Hazardous substances are reduced by using environmentally material, BTX free adhesive…
- ✓ There are assessment test each step for managing VIAQ to reduce VOCs inside new vehicle

Tier 1

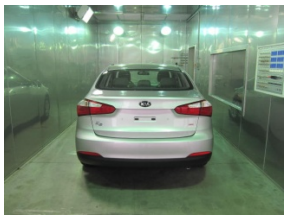
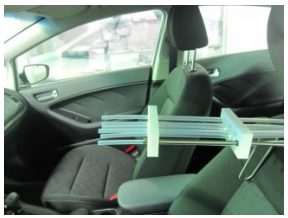
- Completion of Assembly
- VIAQ Assessment test

Tier 2

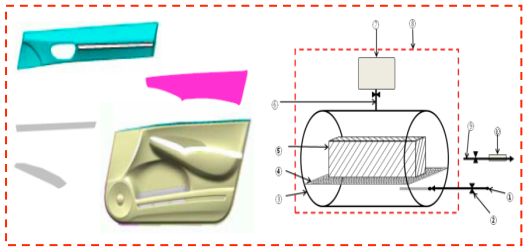
- Assembly VOC test
- Unit components

Tier 3

- Environmentally material
- BTX Free adhesive
- Vacuum and thermal process
-- hot dry process(infra-red heat)
-- water soluble solvent





● VIAQ Standards Worldwide – Test conditions

KOREA	CHINA	JAPAN	VDA	ISO-12219
Mistry of Land Infrastructure and Transport	Ministry of Environmental Protection and State Administration of Quality Supervision, Inspection and Quarantine	JAMA 'Self-Commitment' & Ministry of Health, Labor and Welfare	'Self-Commitment' of the German Association of the automotive Industry	International Organization for Standardization Technical Committee ISO/TC 146, Air quality, Subcommittee SC 6, Indoo air
Control Standard for in-car air quality for new motor vehicles MOLIT Notification NO. 2013-546(2013.09.24)	Voluntary Standard GB/T 27630-2011 Implementation date : 1 March 2012 National Standard of the People's Republic of China	Voluntary Standard since 2005	Voluntary Guideline since 1993	ISO 12219-1 International Standard
Temperature Stabilization 25±2℃ For 20h Ventilation for 30 min seal for 2h sampling after 15 min	Temperature 25±1℃ Relative air humidity 50% Vehicle standstill, all vehicle doors, windows and passenger compartment vents closed, the engine and air- conditioner deactivated	Temperature 40℃ for 4,5h Sampling after 15/30 min AC setting : AC on, circulation	Temperature 65℃ Air exchange rate 0.6 Nm³/h	Temperature 23±2℃ Constant Heating with 400W/㎡ ac on Fresh air circulation Vetilation on

* ACEA Presentation in Beijing 2013

Comparison of vehicle indoor air quality limit

- Vehicle Indoor Air Quality limit values differ between countries due to test conditions
- There are no VIAQ limit value in ISO-12219

(Unit : $\mu g/m^3$)

Harmful Substances	Korea	China	JAPAN (JAMA)	ISO-12219
Formaldehyde	210	100	100	-
Benzene	30	110	-	-
Toluene	1,000	1,100	260	-
Ethyl Benzene	1,000	1,500	3,800	-
Xylene	870	1,500	870	-
Styrene	220	260	220	-
Acetaldehyde	-	50	48	-
Acrolein	50	50	-	-
Total	7 types	8 types	-	-

- Management status of manufacturers

Manufacturers	Management Status
GM	VOC management based on GM standard
FORD	VOC management based on FORD standard
VOLVO	Management based on Chinese regulations
Nissan, Honda, Toyota	Management based on Japanese Automobile Manufacturers Association (JAMA) guideline
Porsche	Management based on German Automobile Industrial Association VDA 270 (smell test) , VDA 275 (measurement of formaldehyde emission), VDA 278 (volatile organic compound) regulations
Jaguar Land-rover	Applies Japanese and Chinese regulations
Hyundai, Kia	Management based on Korean and Chinese regulations

The Progress of VIAQ

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- 2007 Standard for vehicle indoor air quality for new motor vehicles KOREA
- 2013.06 GRPE-66-03 “Proposal for a new UN Global Technical Regulation on Vehicles Indoor Air Quality”
- 2013.06 WP29-160-38 “Proposal for a new UN GTR on Vehicle Indoor Air Quality (VIAQ)”
- 2013.11 WP.29-161-12 “Proposal for development of a new UN Global Technical Regulation on Vehicle Indoor Air Quality”
- 2014.03 WP.29-162-16 “Implementation of Vehicle Indoor Air Quality”

The Comment of VIAQ

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- Canada : Continue to follow the VIAQ issue
- Russian Federation : an active participation in this work
- European Commission : Concern to involve the proper experts for chemical legislation
- OICA : based on an international standard and be addressed in the Consolidated Resolution for the Construction of Vehicles (R.E.3) and the special resolution S.R.1.
- Additional comments are needed from other CPs and stakeholders

Conclusion

- VIAQ could be considered not only as a chemical issue but as a safe driving environment issue for vehicles
- There are several different standards on VIAQ

  - Korea, China, Japan(JAMA), ISO-12219 …
- After Korea's applying the VIAQ regulation, VIAQ have been improved rapidly. It has been proved that VIAQ regulation is effective
- For further review of CPs and stakeholders on VIAQ, it is needed additional period of time
- With these reviews and comments from CPs and Stakeholders, Korea will propose, as a first step, the development of guideline VIAQ at the next GRPE meeting
- It is necessary to active cooperation of CPs and Stakeholders

Thank you very much ! !