Quantitative Analysis of Station Hydrogen

- **Role of ENAA**
  (Engineering Advancement Association of Japan)
  - **To manage the construction and operation of hydrogen stations in national project, JHFC Project**
  - **To act as secretariat of ISO/TC197 (Hydrogen technologies) committee of Japan**

Kazuo Koseki
Chief Secretary of ISO/TC197 of Japan
ENAA

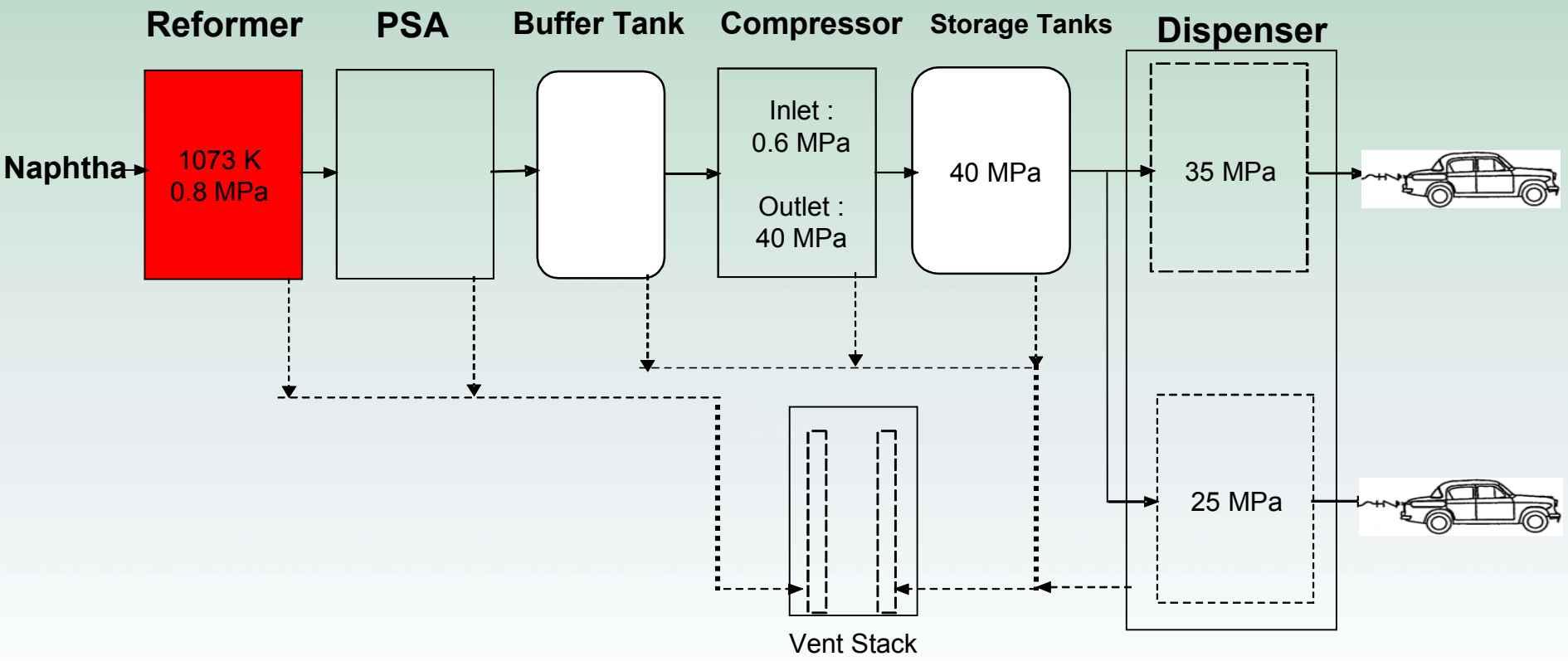
Yokohama Daikoku Station
(Desulfurized Gasoline)

Yokohama Asahi Station
(Naphtha)

Senju Station **(LPG)**

Kawasaki Station **(Methanol)**

Yokohama Asahi Station



Result of Quantitative Analysis

Impurity	Concentration. vol.ppm				Min.Detect Conc.	Analysis Method
	Gasoline	Naphtha	LPG	Methanol		
CO	0.05	0.06	0.02	0.06	0.01	GC-FID
CO2	0.03	0.03	< 0.01	0.97	0.01	GC-MS
Hydrocarbon[1)] : Methane	< 0.05	< 0.05	< 0.05	< 0.05	0.05	GC-FID
: Others	< 0.05	0.11	< 0.05	< 0.05	0.05	GC-FID
Benzene	< 0.005	< 0.005	< 0.005	< 0.005	0.005	GC-FID
Sulfide[2)]	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.0001	IC
Methanol	< 0.01	< 0.01	< 0.01	< 0.01	0.01	GC-MS
Formaldehyde (HCHO)	< 0.01	< 0.01	< 0.01	< 0.01	0.01	DNPH/HPLC
Acetoaldehyde	< 0.01	< 0.01	< 0.01	< 0.01	0.01	DNPH/HPLC
Formic acid (HCOOH)	< 0.01	< 0.01	< 0.01	< 0.01	0.01	IC
Acetone	< 0.01	< 0.01	< 0.01	< 0.01	0.01	GC-MS
Ammonia	< 0.001	< 0.001	< 0.001	< 0.001	0.001	IC
Water	3.5	< 0.5	24	< 0.5	0.5	Dew point meter
Oxygen	< 0.01	< 0.01	< 0.01	< 0.01	0.01	Trace oxygen met
Argon	0.27	0.09	4.95	< 0.03	0.03	GC-MS
Nitrogen	10.7	22.1	3.03	8.01	0.03	GC-MS
Helium	< 3	< 3	< 3	< 3	3	GC-TCD

1) All hydrocarbon concentrations are reduced to methane conc..

2) All sulfide concentrations are reduced to SO_4^{2-} conc..

Comparison

	ISO/TC197 FCV Spec.	JHFC Project H2 Station Spec.	Analysis Results
H2 purity	>99.99%	>99.99%	>99.996－>99.998%
CO	<0.2 ppm	<1ppm	0.02－0.06ppm
CO2	—	<1ppm	<0.01－0.97ppm
N2	—	<50ppm	3.03－22.1ppm
O2	—	<2ppm	<0.01 ppm
Hydrocarbon	—	<1ppm	<0.1－0.11ppm
Sulfur	ND (Provisional<0.02 ppm) (Recommended<0.0002ppm)	—	<0.0001 ppm
HCHO	ND (Provisional<0.05 ppm) (Recommended<0.01ppm)	—	<0.01 ppm
HCOOH	ND (Provisional<0.5ppm) (Recommended<0.04ppm)	—	<0.01 ppm

Conclusion

Hydrogen produced in conventional fossil fuel reforming hydrogen stations satisfies the specification required by ISO and JHFC Project

Issue

Analysis cost