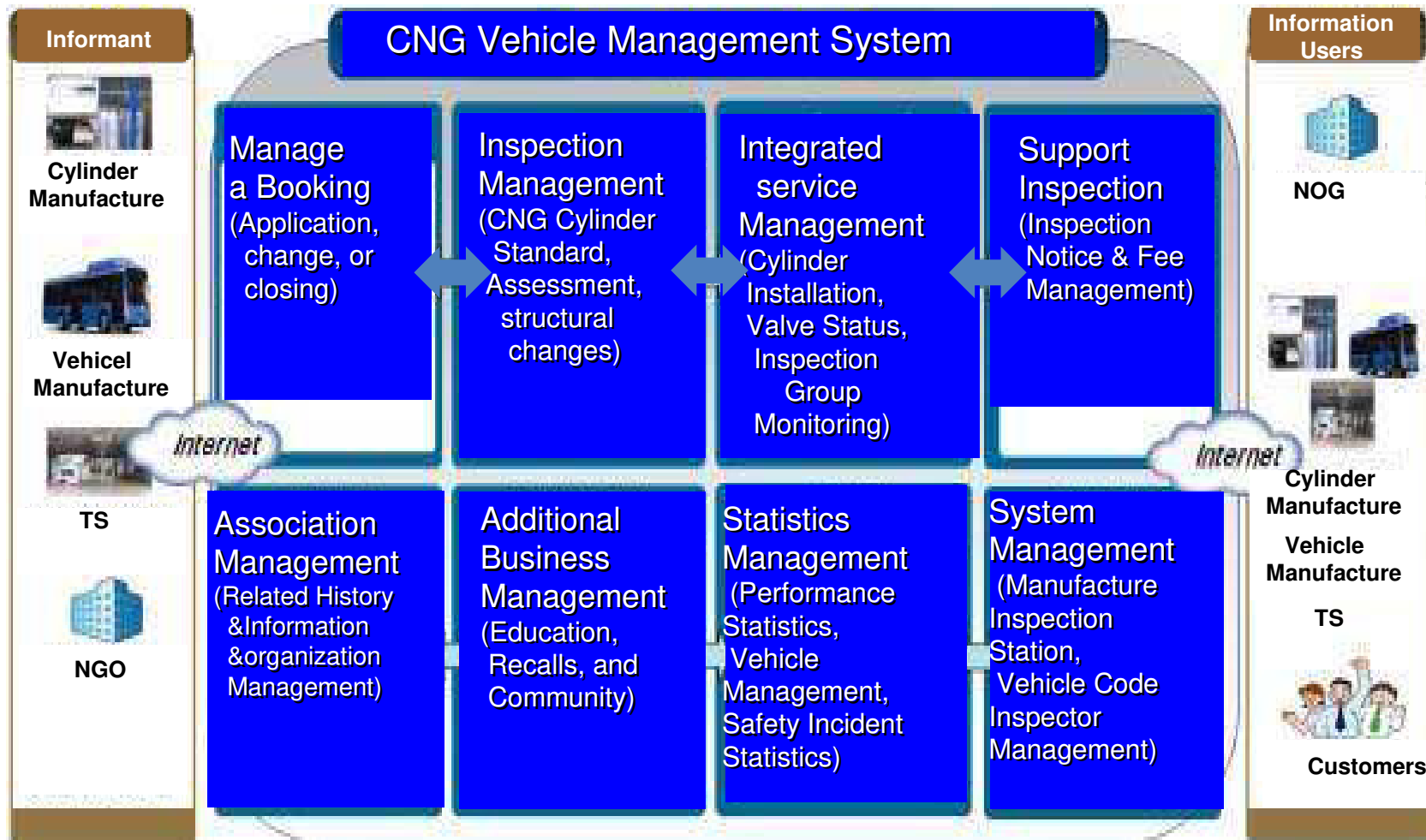


□. Korea Safety Management System

Vehicle Database Management



□. Korea Safety Management System



Vehicle High Pressure Cylinder Safety Management System

Manufacture

Cylinder Manufacture

Cylinder Inspection



Cylinder Manufacturing Company

Korea Gas Safety Corporation

Cylinder Installation

Installation Inspection



Vehicle Manufacturer

Korea Automobile Testing & Research Institute

Cylinder Structure Change

Reconfiguration Inspection



Body Shop

Vehicle Inspection Station

Vehicle



Inspection Station

High Pressure Cylinder Management System



Cylinder Inspection

Cylinder history

Passed reinspection CNG Cylinder



Attach Certificate

Failed reinspection CNG Cylinder



Body Shop

Issue Change Certificate

Inspection Station - Cylinder reinspection

CNG Cylinder



Fule Pipes



Installation System



Deconstruct & Recycle Company
Issue Destruction Certificate

□. Korea Safety Management System

Inspection Facilities



Inspection Station Inside



Inspection Station Outside



Fixed Lift



Ladders for Low-Floor Bus



Movable Lift

□. Korea Safety Management System

1.CNG Cylinder Inspection

- Group : Those Who Cylinder Manufacturing, Repair, Import
- Time : Before Cylinder Selling, Using
- Inspection Agency :KGS
- Inspection Place
 - Cylinder Manufacturing Plant
- Inspection Contents : Design Stage Test, Production Stage Test
- Inspection Result : Pass:Imprinting, Failure:Destruction
- Non-Inspection Penalty : Less than 10 million won ,
Less than three years in prison
- Inspection Time/Method : Witness Test / (3 □ 4day)



□. Korea Safety Management System

1.CNG Cylinder Inspection(2)

● Inspection Content

Type	Inspection Content	
Design Stage Inspection	<ul style="list-style-type: none"> ❖ Dimensions, Flaws, Metal containers and liner Heat Treatment, Hydrostatic Test Markings : Total CNG 1,2,3,4 ❖ Leak Test: Only CNG 4 ❖ Surface Finish, End Closing By Forming: CNG 1,2,3 	
Production Stage Inspection	<ul style="list-style-type: none"> ❖ Original Design ,Liner : Total ❖ Resin : □ □ □, □, □ ❖ Brackets : □, □ ❖ External Coating: □, □, □ ❖ Fiber : □ □ □, □ ❖ Pressure Relief Device: □ ❖ Boss: □, □ 	<ul style="list-style-type: none"> □ Ambient Cycling Test □ Environmental Test □ Extreme Temperature Cycling Test □ Hydrostatic Burst Test □ Composite Flaw Tolerance Test □ Drop Test □ Bonfire Test □ Accelerated Stress Rupture Test □ Shooting Test □ Penetration Test □ Natural Gas Cycling Test □ Leak Before break □ Chlorine Spray Test

□. Korea Safety Management System

2. Installation Inspection_(Manufacture)

- Group : CNG Vehicle Manufacturers
- Time : Installed on Cylinder Vehicle
- Inspection Agency : TS
- Inspection Place : Manufacture Plant
- Inspection Contents : Technical Test, Safety Test
- Non-Inspection Penalty : Less than 10 million won ,
Less than three years in prison
- Inspection fee : 78,100 won, Inspection Time : 1 hour
- Qualified Inspector: Vehicle Inspection / Gas National Certificate holder
- one person
- Result : 1509 Bus inspection (□'12.5.31)



□. Korea Safety Management System

2. Installation Inspection_(Structural Modified)

- Group : CNG Vehicle that Structural Changed Fuel System
- Time : When the Fuel System Structural Modify to CNG
- Inspection Agency : TS
- Inspection Place
 - TS Inspection Station(56)
- Inspection Contents
 - Technical Test, Safety Test
- Inspection fee : 41,800 won, Inspection Time : 30 Minutes
- Qualified Inspector: Vehicle Inspection / Gas National Certificate holder
one person
- Result : 1208 CNG Vehicle inspection (□'12.5.31)



□. Korea Safety Management System

2. Installation Inspection

□ Inspection Standard

Device	Detailed Standard
Storage Facility Standard	<ul style="list-style-type: none">❖ Details of the Cylinder Fail (Note: Re-Inspection Standard)❖ Safety distance— The Rear Surface: More than 300mm The Outer Surface : More than 200mm❖ Install Vents in Preparation for Gas Leaks❖ Safe Distance from Cylinder to the surrounding Facilities: More than 5mm
Gas Facility Standard	<ul style="list-style-type: none">❖ Gas Filling Inlet Safety Distance<ul style="list-style-type: none">-Exhaust Facilities: More than 300mm, Electrical Facilities: More than 200mm❖ Main Valve : Safe Distance from Vehicle the Rear Surface and the Outer Surface❖ Gas Filling Valve : Install Backflow Prevention Valve
Pipe Facility Standard	<ul style="list-style-type: none">❖ Pipe Material, Pipe Fixing Installation: 600mm❖ Safe Distance from Electrical Facilities: 200mm이상
Accident Precaution	<ul style="list-style-type: none">❖ Whether or not Install Over Pressure Safety Device , Backflow Prevention Device Eddy Prevention Valve
Mark ing Standard	<ul style="list-style-type: none">❖ Mark(Type of Gas, The Maximum Charging Pressure)

□. Korea Safety Management System

3. Cylinder Periodic Inspection (1)

- Group : CNG, LNG Vehicle Owner
- Inspection Cycle : Non-Business Car(3 years), Other Car(4years)

Inspection Agency : TS

- Inspection Place :TS Cylinder Inspection Station(22)
- Non-Inspection Penalty :Less than 10 million won ,

Less than three years in prison

- Inspection fee

(Include VAT/Won)

Number	Inspection Fee	Number	Inspection Fee	Number	Inspection Fee
1	87,000	2	188,000	3	274,000
4	360,000	5	449,000	6	539,000
7	628,000	8	717,000	9	806,000

- Inspection Time : 4 hours(8 Cylinders)
- Qualified Inspector: Vehicle Inspection / Gas National Certificate holder
one person

□. Korea Safety Management System

3. Cylinder Periodic Inspection (2)

Extended Period of Inspection

- Extended Period: Up to 30 days in case of unavoidable reasons
 - When maintenance after the accident
 - When accepted case that impossible to operate a car
(Vehicle Parts Delay, Vehicle Theft, Vehicle Seizure)

Cylinder Reuse Condition/Method

- Condition : Within 8 years from the Date of the First Inspection
- Cylinder Terms of Use: 15 years
 - Limitation : The Use of Commercial Taxi Cylinder Exceed 10 years
- Method : Cylinder Manufacturers Admit (Reuse)

□. Korea Safety Management System

3. Cylinder Periodic Inspection (3)

● Inspection Record

Type	2011. 11.25 □ 12.31	2012. 1.2 □ 5.31
Periodic Inspection	70	1509
Frequent Inspection	2	910

● Inspection Result : Enter the information Computerized System

Pass → Cylinder Pass Sticker, Cylinder Imprinting

내압용기재검사 합격표			
자동차등록번호			합격인
재검사 연월일			
유효기간 만료일			
최고충전압력(MPa)	개수		
번호	용기의 번호	부속품의 기호와 번호	
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

← 80 →

↑ 80 ↓

- 1) Cylinder Manufacturer Name
- 2) Lot and Serial Number
- 3) Pass Pressure Test year, month
- 4) Cylinder Volume (V, Unit: L)
- 5) Cylinder Weight(W, Unit : kg)
- 6) The name of Charging Gas
- 7) The Maximum Charging Pressure
(FP, Unit : MPa)
- 8) The Hydrostatic Test Pressure(TP, Unit: MPa)

□. Korea Safety Management System

3. Cylinder Periodic Inspection (4)

● Cylinder Inspection Procedure



① Inspection Accept
(confirm day of Inspection)



⑤ Inspection CNG Cylinder
(corrosion, dent cut, abrasion)



② Check the Status of Inspection Preparation



⑥ Inspection Vehicle Gas System
(gas filter, pressure regulator, shut off ball valve)



③ Check the Status of CNG Vehicle
(registration card , mileage)



⑦ Inspection Gas Leakage
(cylinder, pipe. fuel device)



④ Check the Status of CNG Cylinder
(valve number and working state)



⑧ Inspection (pass or fail in) Decision

□. Korea Detailed inspection method

General Standard

● Inspection Item

- Stay dry, Clean the Cylinders
- Fuel System Standard : 「 Rules on Motor Vehicle Safety Standard」 Attached 3of 5, 5of 5
- The Gas Leak Test: Conducted in the Charged Fuel
Using Gas Leak Detector, Test liquid
- Check equality

● Inspection Contents

- Cylinder(include Valve) : Damage, Deformation, Gas leaks
- Pipe etc. Gas facilities : Installation, Operation status, Gas leaks

□. Detailed inspection method_Equipment

Installation Equipment

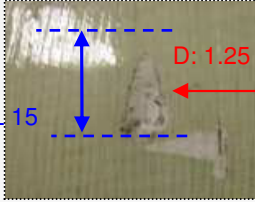



Inspection Installation Equipment(20Kinds/49Set)



Devison	Installation Equipment Name	Devison	Installation Equipment Name
1	Ultrasonic Waves Gas Leak Detector	11	Digital Depth Gauge
2	Ultrasonic Depth Gauge	12	Laptop Computer
3	Electronic Endoscope	13	Laser printer
4	Certificate Printer	14	Digital camera
5	General Tool SET	15	Explosion Proof Light
6	Inspection Board	16	Mobile Light Projector
7	Safety Helmet & Eye Shield	17	Light Scale Lupe(10X)
8	Gas Leak Detector	18	Inspection Mirror
9	Infrared Thermometer	19	Metal Ruler
10	Digital vernier calipers	20	Mobile lift

□. Detailed inspection method_Cylinder

Inspection Standard

Damage	Example	Standard
Cut, Gouges, Scratches		<ul style="list-style-type: none">• depth is less than 0.5mm under metal, depth is Less than 1.25mm Under Composite
Stress Cracking		<ul style="list-style-type: none">• Take the stress of the material liner or composite Cylinder for cracks or no damage
Abrasion		<ul style="list-style-type: none">• depth is Less than 1.25mm Under Composite
General Corrosion		<ul style="list-style-type: none">• Corrosion Depth is less than 15% of wall thickness