

NEW GENERATION KEIHIN GAS INJECTOR For *CNG & LPG*

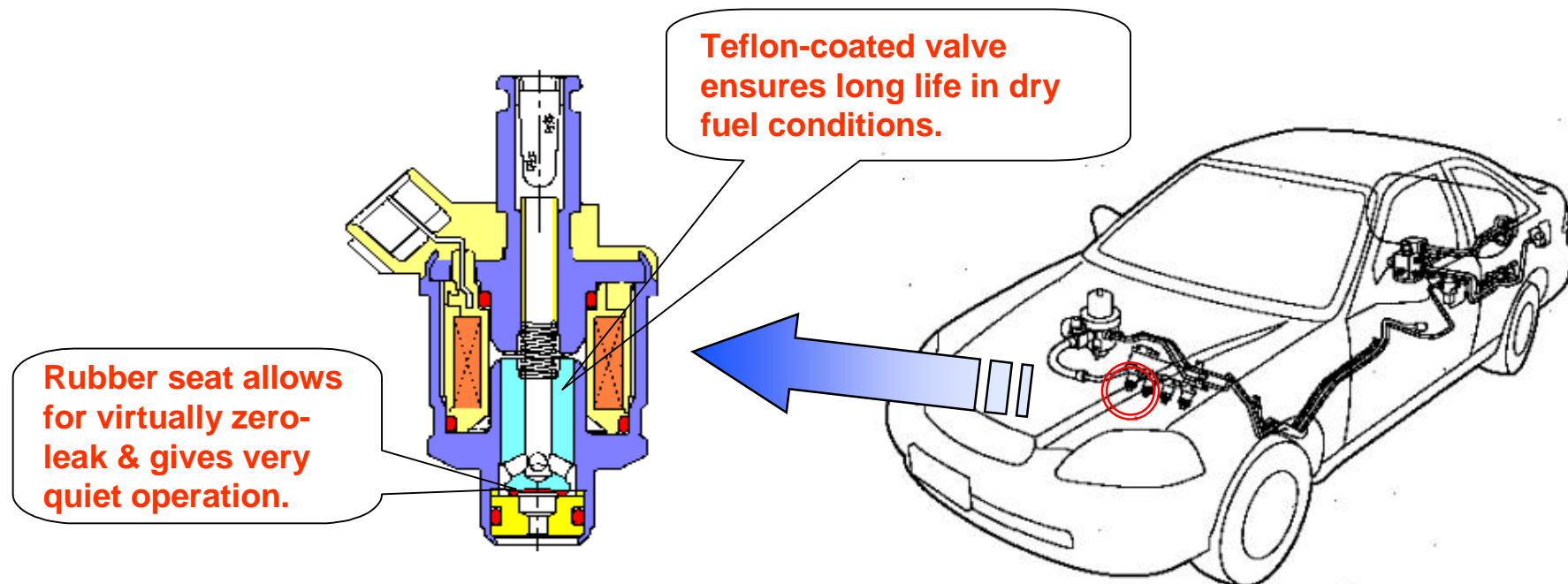


Issued for

Toka-Seiki on May 22nd, 2006

KEIHIN GAS INJECTOR

- Exclusively developed for gaseous fuel; used with LPG, CNG & hydrogen. Production started in 1997 of the first generation as KN3. Production of new generation from August 2005.
- Valve is Teflon-coated for superior dry operation & long life; internal dampening gives quiet operation.
- Consistent fuel injection using unique rubber valve seat improves fuel economy & decreases emissions.
- Advanced design works well with high-speed engines; a range of fuel flows are available to match vehicle needs.







- Basic performance of New Injector - Strictly confidential

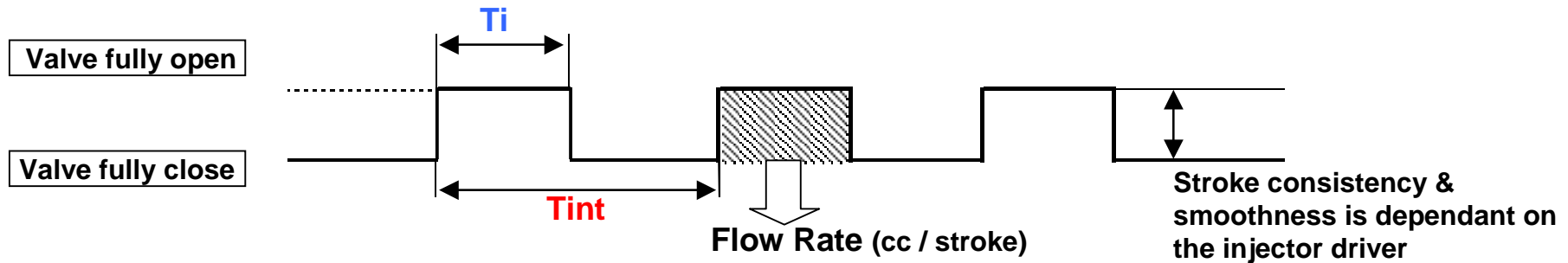
New injector offers improved LFR, reduced size, lower cost and improved contamination tolerance then KN3 Injector.



Performance Characteristic	KN3	DM4 NEW
Type	Peak & Hold	
Rated Voltage (Operating Range)	14V (6.3 ~ 16V)	
Operating Current (peak / hold / max)	4A / 1.5A / 6A	
Special Cold Start Current (one time)	8A	
Fuels	CNG, LPG, Hydrogen	
Seat Material	Rubber type	
Valve leakage	less than 0.5cc/min	
Required Oil Lubricant	None	
Operating Pressure Range	392 kPa Max recommended	
Ambient Temperature Range	-30C ~ +120C	
Flow Range - Dynamic (255kPa)	32.1 ~ 92.4 cc/st , Ti=24ms	
Flow Range - Static (255kPa)	80 ~ 172 L/min	
LFR	10.8	12.8
Body Diameter	27mm	26.3mm
Overall Length	80mm	68mm
Oil Tolerance (perf. change < 5%)	—	-20 C
Durability	290 million cycles (~150,000 miles)	

Name	DM4 OEM	DM4 KIT
Design	 <p style="text-align: center;">Intake Manifold and Fuel Rail (CLIP) Mounting TYPE</p>	 <p style="text-align: center;">Piping Type</p>
O-Rings parts No	O-Ring(Top) D8351-CS6 -0100 O-Ring(Bottom) 3787-DM40-0300	O-Ring(Top) D8351-CS6 -0100 Cushion Ring
Fuel Flow and Mark	Fuel flow Model / Paint Mark on Injector Model 32cc / 32, Model 42cc / 42, Model 52cc / 52, Model 62cc / 62, Model 73cc / 73, Model 100cc/10	
DWG.NO.	30NA-DM40-1000 type32cc (INJECTOR DM4 OEM with FUEL FLOW TYPE 32cc)	30NA-DM40-0000 type32cc (INJECTOR DM4 KIT with FUEL FLOW TYPE 32cc)
	30NA-DM40-1100 type42cc (INJECTOR DM4 OEM with FUEL FLOW TYPE 42cc)	30NA-DM40-0100 type42cc (INJECTOR DM4 KIT with FUEL FLOW TYPE 42cc)
	30NA-DM40-1200 type52cc (INJECTOR DM4 OEM with FUEL FLOW TYPE 52cc)	30NA-DM40-0200 type52cc (INJECTOR DM4 KIT with FUEL FLOW TYPE 52cc)
	30NA-DM40-1300 type62cc (INJECTOR DM4 OEM with FUEL FLOW TYPE 62cc)	30NA-DM40-0300 type62cc (INJECTOR DM4 KIT with FUEL FLOW TYPE 62cc)
	30NA-DM40-1400 type73cc (INJECTOR DM4 OEM with FUEL FLOW TYPE 73cc)	30NA-DM40-0400 type73cc (INJECTOR DM4 KIT with FUEL FLOW TYPE 73cc)
	30NA-EF80-1000 type100cc (INJECTOR EF8 OEM with FUEL FLOW TYPE 100cc)	30NA-EF80-0000 type100cc (INJECTOR EF8 KIT with FUEL FLOW TYPE 100cc)

© Basically New Injector's Flow range is same as KN3 Injector.



KEIHIN Gas Injector Flow characteristics	Ti:msec		3.4	6.0	20	24	ENG Size
	Flow rate cc/st	Model 32cc	4.02	7	27	32.06	<1.1L
	Model 42cc	4.77	9.35	34.37	42.01	1.1~1.6L	
	Model 52cc	5.91	11.58	42.55	52.04	1.6~1.8L	
	Model 62cc	6.78	13.76	50.92	62.81	2.0~2.4L	
	Model 73cc	7.59	15.88	59.99	73.79	>2.4L	

Note 1: Air used to measure flow rate. The most appropriate injector type will depend on the application.

Note 2: All testing was done using Keihin's injector driver

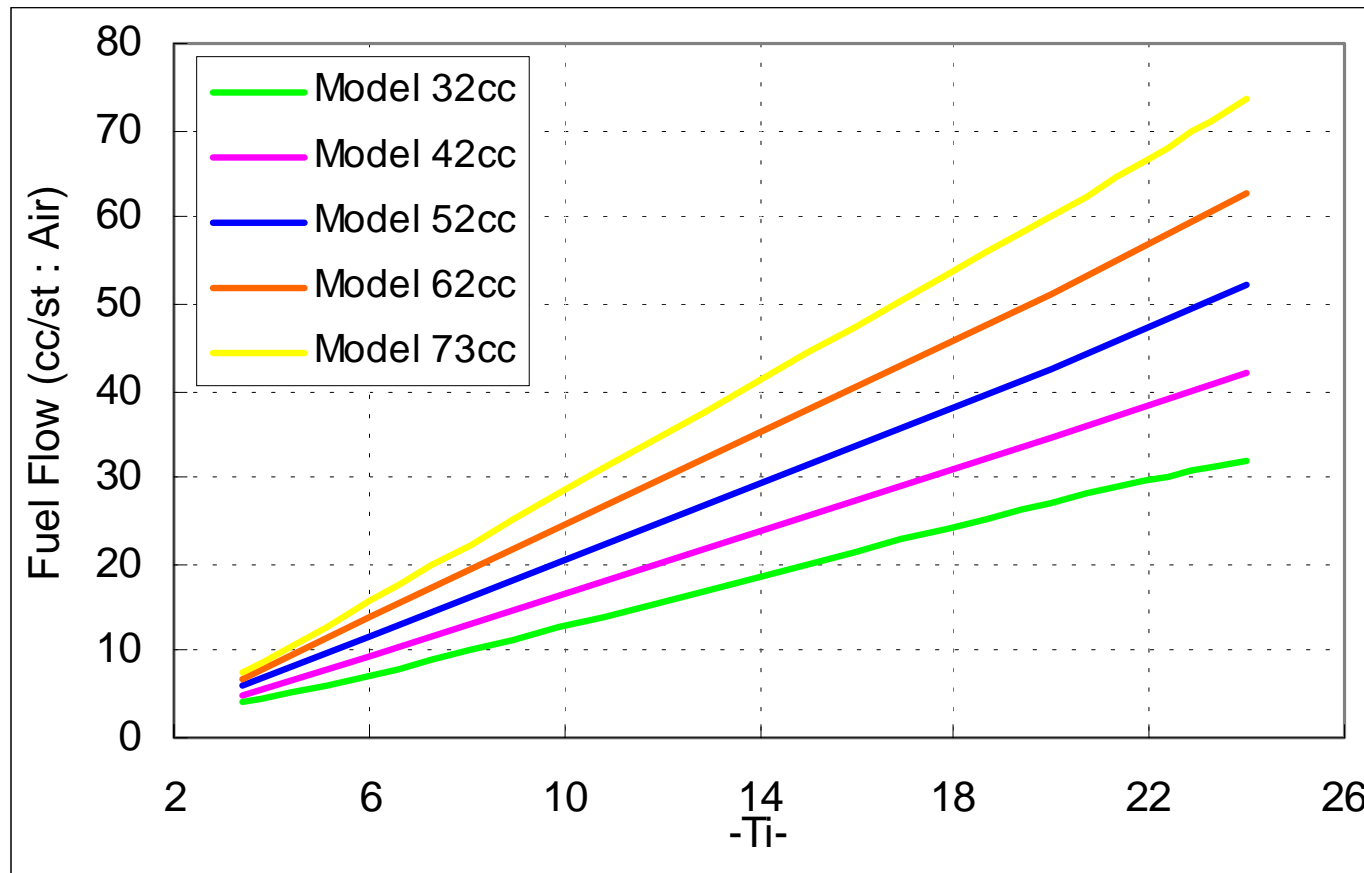
INJECTOR CHARACTERISTICS

Inductance:	3.5 mH (20°C)
Resistance:	1.25 Ω (20 °C)

KEIHIN DRIVER RUNNING CONDITIONS

- PEAK CURRENT 4.0 A
- HOLD CURRENT 1.5 A

- Flow Curve and Linearity performance (1)-

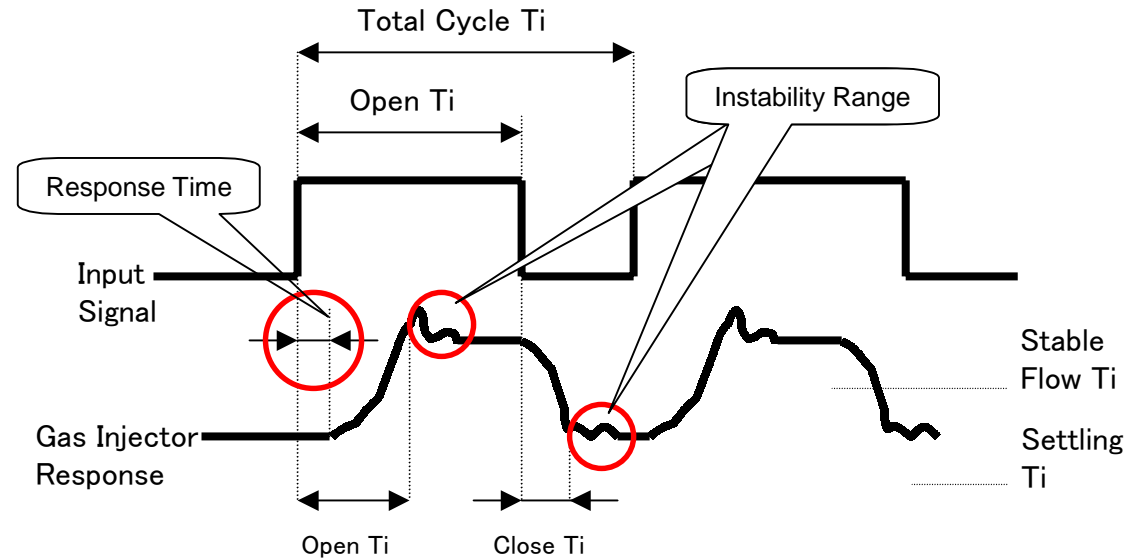
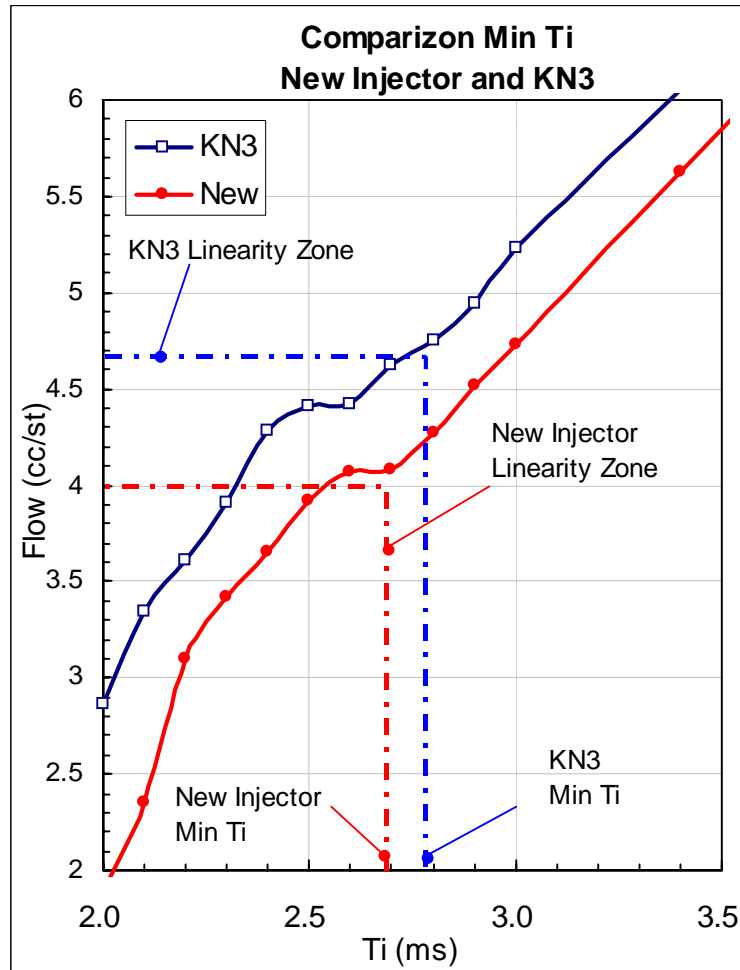


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★ AIR PRESSURE: 255 kPa (37psi)

HIGH LINEARITY PERFORMANCE!!

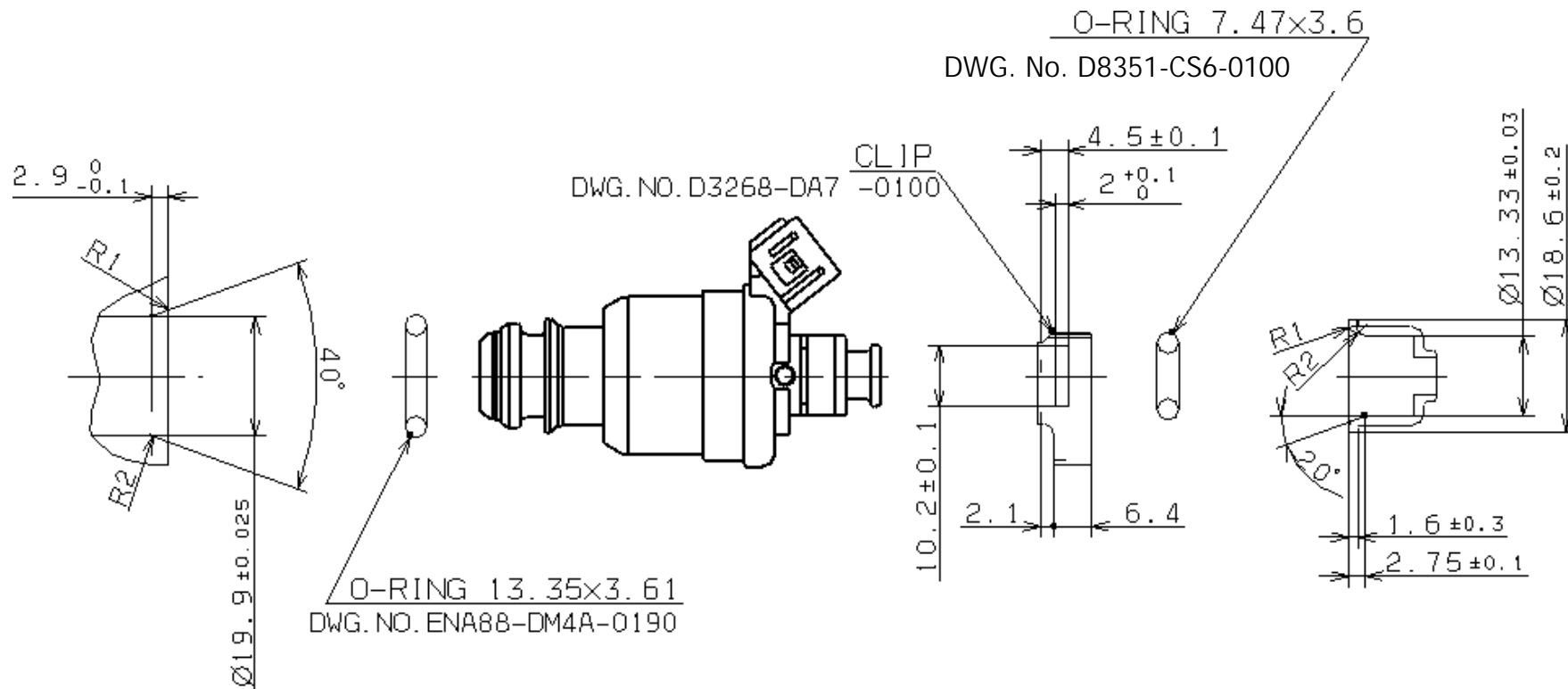
- Flow Curve and Linearity performance (2)-



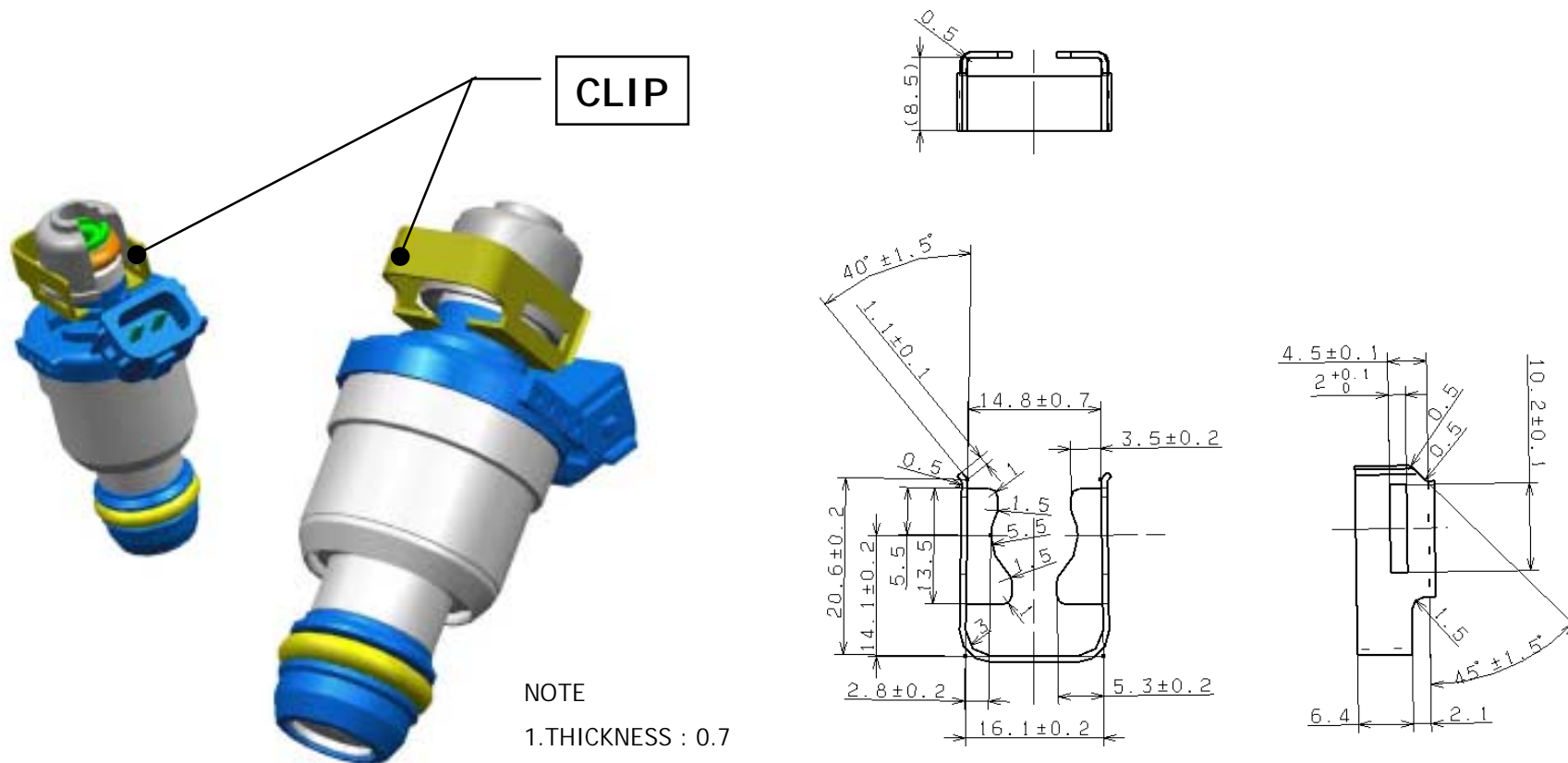
Linear Flow Range(LFR) is a critical performance characteristic for running quality and emissions. New Injector could be improved the LFR than KN3 by faster Response time and reducing instability range.

- Injector installation -

- DM4-1 (Intake manifold direct Mount type).



- DM4-1 INJECTOR CLIP LAY-OUT-

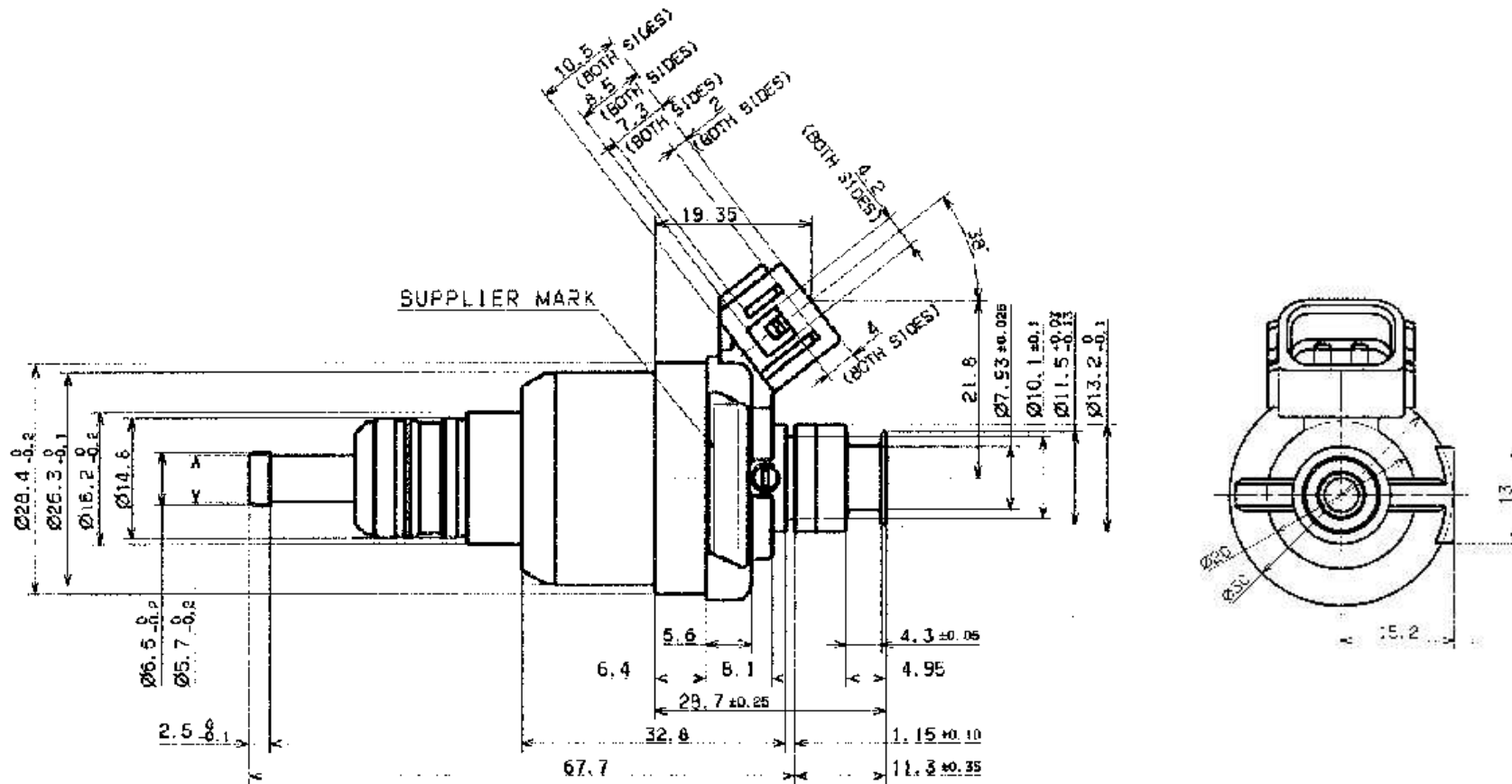


NOTE

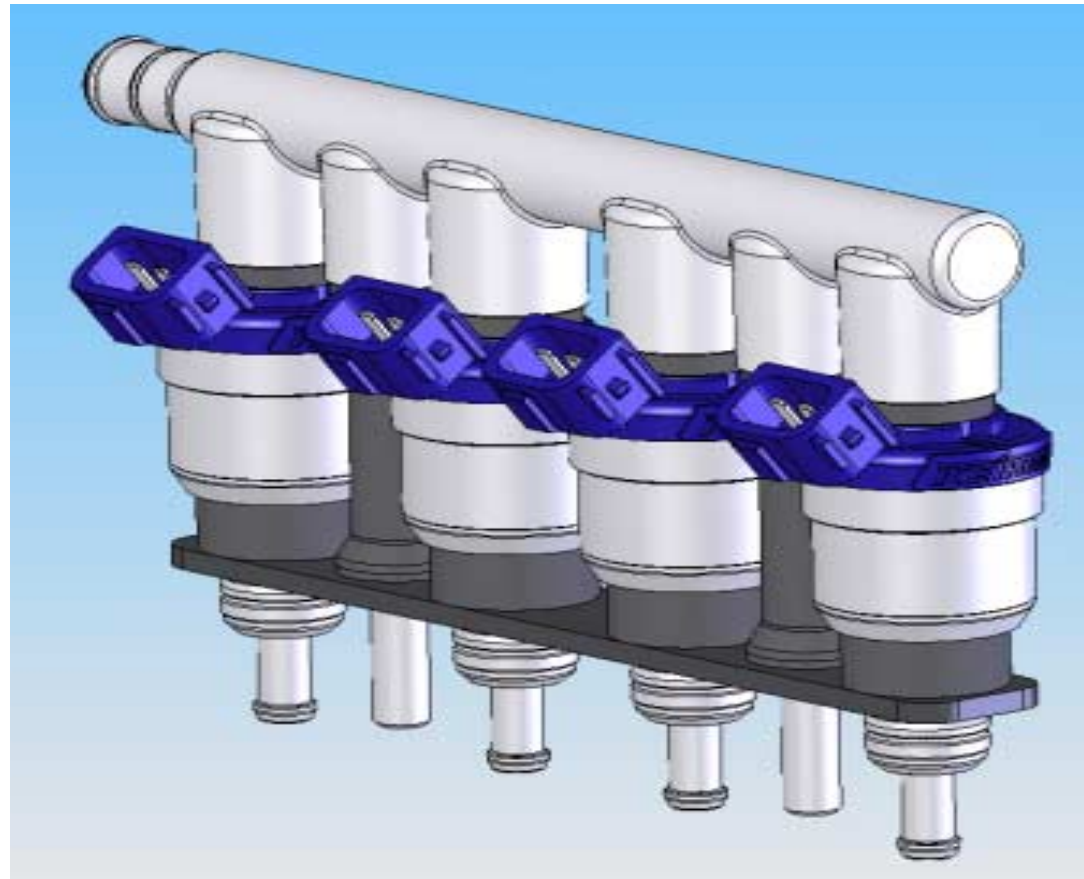
1. THICKNESS : 0.7
2. THIS DWG. IS SYMMETRICAL ABOUT CENTER LINE.
3. HARDNESS : Hv430-470.
4. MATERIAL : SUS301-CSP-H

- Injector Dimension -

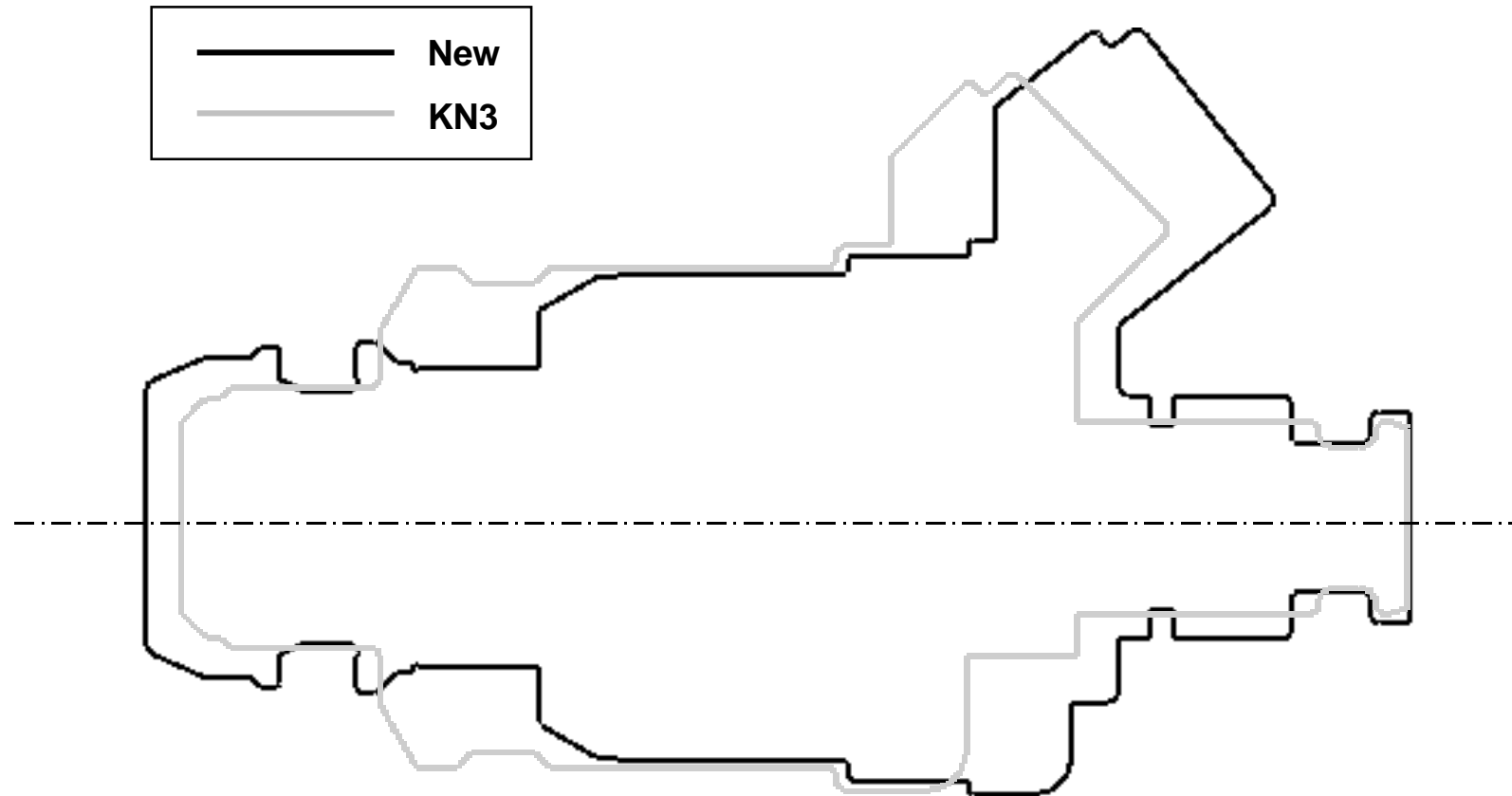
- DM4-2 (Piping connection type).



**Gas Rail Assy DM4-2 (Piping connection type).
for the aftermarket.(Image)**



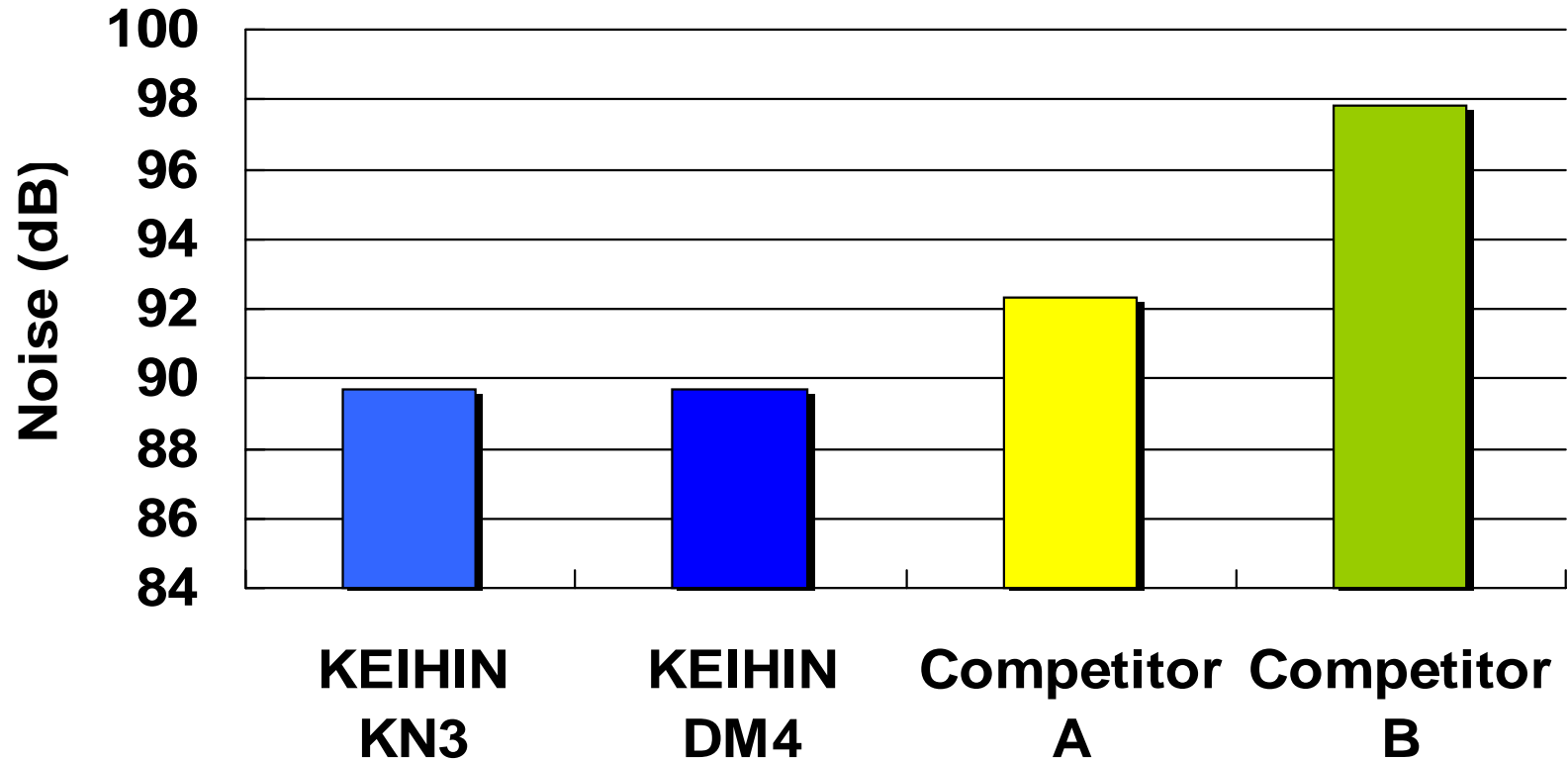
- COMPARISON KN-3 WITH DM4 -



Length: KN3 65.9mm → New 67.7mm

Body width: KN3 29.5mm → New 28.4mm

- QUIET OPERATION -



(Comparison of three different Gas injectors.)

- ENGINEERING SPECIFICATIONS -

ITEM	SPECIFICATIONS
Mounting Position	Installed to fuel pipe & intake manifold; rubber insulation & filter installed onto the top of the injector
Mounting Condition	147 m / S3 {15G} or less; 50 - 400Hz
Operating Temperature	-30°C ~ +120°C
Storage Temperature	-40°C ~ +120°C
Fuel Type	CNG, LPG, Hydrogen
Fuel Pressure	392 kPa (57 psi) or less recommended
Voltage	6.3 ~16 volts
Normal Operating Current	Less than 6.0 A (peak), 1.5 A (hold);
Coil Resistance	1.25 ± 0.06 ohm at 20°C
Coil Inductance	3.5 ± 0.4 mH at 20°C
Weight	118g(Incl O-Rings)

- DURABILITY TESTS -

ITEM	CONDITIONS	
Extreme Temperature & Vibration Long-Life Durability Test	Temperature Vibration Frequency Work Time	-30°C to +120°C 15 G 50 - 400 Hz 290,000,000 cycles*
Thermal Shock Durability	Temperature Work Time Condition	-40°C to +120°C 100 phases Dry, non-operating
High Temperature Durability	Temperature Test Time Condition	120°C 1,000 hours Dry, not operating

*290,000,000 cycles covers 10 years at 240,000 km, or 150,000 miles