High Temperature Exhaust Gas Simulator and Soot/SOF Generator (Multi – purpose Hot Gas Test Rig)

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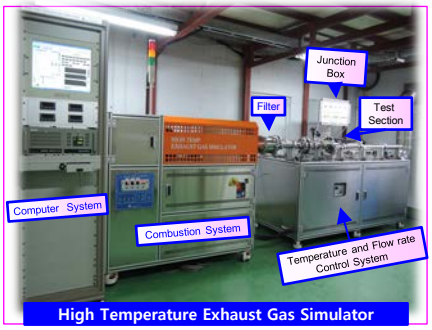
To satisfy the enforced exhaust gas regulation : Cooled EGR, DPF, SCR, LNT, DOC, TWC, Sensors and OBD
☞Increase of cost & development period & reliability & durability problem

To develop and verify the performance of aftertreatment parts
☞using real engine & engine dynamometer: requires a lot of time and cost

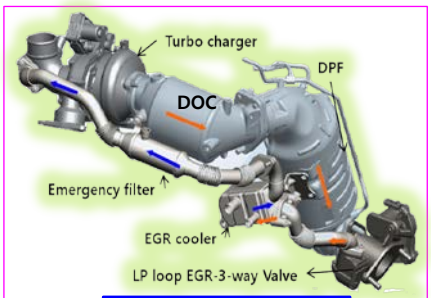
This multi-purpose hot gas test rig and soot/SOF generator can make up for the shortcoming of the engine dynamometer test
※ characteristic test , fast aging test and reliability test and the simulation test of steady state engine test, GUI S/W(parts dedicated expert S/W)

This multi-purpose hot gas test rig and soot/SOF generator ~~~
☞capability of characteristic test according to the variables such as precisely and independently controlled exhaust gas temperature and mass flow rate and O_2 concentration and soot/SOF deposition
☞capability of fast aging test and reliability test and the simulation test of steady state engine test to verify the requirements of OEM
☞appraised as an instrument reducing the R&D period and cost from many Korean parts companies and Hyundai Motor
☞having a parts dedicated expert S/W(GUI base Computer control)



High Temperature Exhaust Gas Simulator


Soot Generator



Serviceable parts list

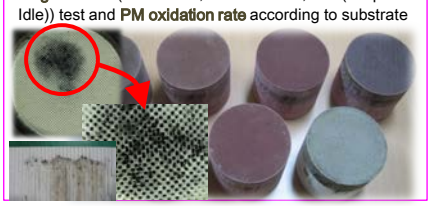
Performance and Advantages
- Alternative Tool for Engine Dynamometer Test
- GUI and Expert S/W base Computer control Test Rig
- Independent Control of Temperature, Flow Rate, Soot/SOF, O_2 and Regulated Gas Composition
- Verification Test Tool for Fast aging, Weak Point Detection and Failure scenario check

Operating Range
- **Temperature :** 100℃~ 1,100℃
- **Mass Flow Rate** : 150~1,000kg/h
- **O2 Concentration :** 0.5~18%(Gasoline/Diesel engine)
- **Toxic gas control :** NO/NO_2/CO/HC with MFC
- **PM control by** Diesel Soot /SOF generator
- **Aging Effects** of Rub. Oil or High Sulfur Fuel

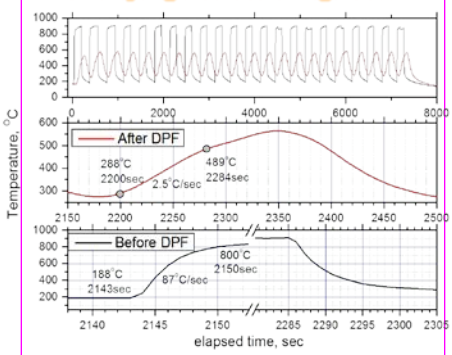
Application example and it's Test items
- **EGR Cooler and Valve :** Pressure drop, effectiveness, thermal shock, reliability, fouling effects of soot/SOF, weak point detection and failure scenario check
- **Catalyst(TWC, DOC, SCR, LNT) :** Conversion efficiency, thermal shock, durability, aging effects
- **Particulate Filter(DPF, GPF, pDPF) :** Pressure drop, oxidation rate of PM, regeneration, thermal shock, Durability
- **High Temperature sensor(O_2, NOx , T, ΔP) :** Response time, interference, stability, resolution, thermal shock, durability, weak point detection and failure scenario check

Soot generator+PM feeder: Soot Particle size Control, SOF control, Aging test with Sulfur/Lub.Oil
-Generate soot particles from **diesel fuel pyrolysis** for simulating real soot particle
-**Soot particle size** and **number** Distribution Control and **SOF(Soluble Organic Fraction)** composition
➔ Evaluation of the Fouling Effects and Particulate Deposit Characteristics on the Cooler surface
➔ Evaluation of the Sulfur and Ash aging effects
➔ Evaluation of the Catalyst performance due to the Soot and SOF or VOF

T&E of Particulate Filter (DPF, GPF, pDPF)
-**Regeneration**(conditional, unconditional, DTI (Drop To Idle)) test and **PM oxidation rate** according to substrate

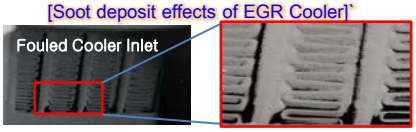


Thermal cycling & Conditional Regeneration

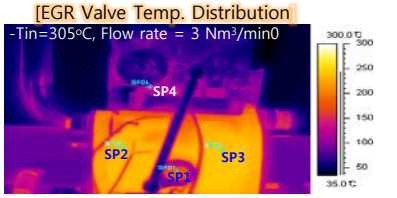


T&E of EGR V/V and EGR Cooler
-Pressure drop, effectiveness, thermal shock, reliability, fouling effects of soot/SOF, weak point detection and failure scenario check

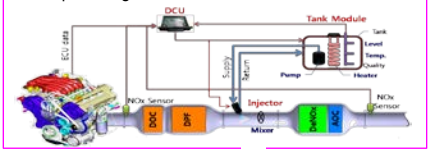
[Soot deposit effects of EGR Cooler]`

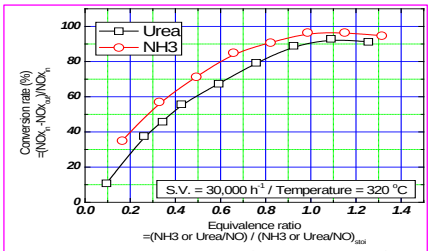


[EGR Valve Temp. Distribution



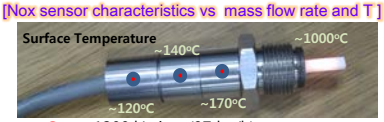
Catalyst(TWC, DOC, SCR, LNT)
- Conversion efficiency, thermal shock, durability, aging and poisoning effects of sulfur or lub. oil

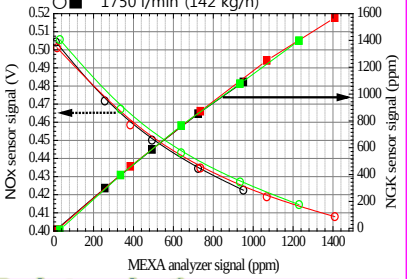




Sensor @exhaust system(O_2, NOx , T, ΔP)
-Response time, interference, stability, resolution, thermal shock, Poisoning and aging factor, durability, weak point detection

[Nox sensor characteristics vs mass flow rate and T]





Products and options
-for DPF : Hot Gas Test Rig + PM feeder ++
-for SCR : Hot Gas Test Rig + Dozing unit
-for Cooler : Hot Gas Test Rig + Cooling water ++ controller + PM feeder ++
-for sensors : Hot Gas Test Rig + Interference Gas++
- **SG(Soot generator) :** Testing of the fouling effects of EGR Cooler, sensor and catalytic effects of soot and SOF for DPF/SCR/DOC/TWC/LNT
- **GUI S/W** : dedicated S/W for the testing parts
- **EGS(Exhaust Gas Cooler):** Temp. Control without changing any other gas composition
- **N_2 generator:** Air Fuel Ratio control, Oxygen/NOx Concentration Control

This system is a multi-purpose high temperature exhaust gas test rig dedicated to the various aftertreatment parts having **a long life, and having a high accuracy control of exhaust gas temperature and mass flow rate, GUI base computer control that gives a diverse and convenient test procedure.**
- High accuracy multi-purpose hot gas test rig for ; **Catalyst(TWC, DOC, SCR, LNT) , EGR Cooler and EGR Valve, Particulate Filter(DPF, GPF, pDPF), High Temperature sensor(O_2, NOx , T, △P)**
- GUI base Computer controlled test facilities **giving a serviceability such as high accuracy performance test of parts and simulation of the ESC/WHSC engine test mode.**
- **As a result, this system and technique is appraised as an instrument saving the R&D duration and cost from many parts companies and OEM.**

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