



# **Cummins ISM Test (PC-10)**



# Why the ISM '02?

- Current engine platform
  - Insure test longevity
  - Representative of today's issues
  - Latest technology
    - Better control of engine
    - Readily available
    - Correlation to the field
- Current thinking will require 2007 engines to be built on the same platform
  - Backwards Compatibility



# What are the ISM goals?

## ■ Primary

- Introduce a new test with familiar operating conditions
  - Ease of set-up at engine labs
  - Use existing control algorithms
- Insure engine oil technology provides adequate engine protection for 2007 and is backwards compatible.

## ■ Secondary

- Become the sole Cummins Heavy Duty testing platform
  - One (1) engine stand
    - One (1) test (ISM)
    - Four (4) Correlations (200-hr/300-hr HST/EGR)



## What is next? (proposed)

- Request formation of a new task force from HDEOCP
  - Scope and Objectives
- Engines are currently available
  - ISM 370 HP, 1450 ft-lbs torque
  - Where should we send them? (support)
    - Test cell installation, instrumentation, break-in
      - Modified calibration, EGR control valve
    - How soon can we have them running?
  - What oils should we use for evaluation testing?
    - TMC 1005 and TMC 830-2



# What is different?

## ■ Hardware

- Electronic control module CM870 instead of ECMb
  - Simplicity and reliability
- New pistons
  - Same design without bushing
  - Phosphorus coating - pistons are black
- Cylinder head improved to resist valve “beat-in”
- Cylinder liners
  - Induction hardened
- Oil ring
  - Nitrided for improved wear



# What is different?

## ■ Hardware

- New rocker levers (ball and socket type)
- Intake system
  - EGR system with EGR valve and venturi
  - Variable Geometry Turbo



# What is the same?

## ■ Hardware

- Crossheads
- Engine block
- Top and second ring
- Remainder of CPD rebuild parts

## ■ Same Celect Fuel System

- Improved fuel injectors

## ■ Performance Design Limits Unchanged



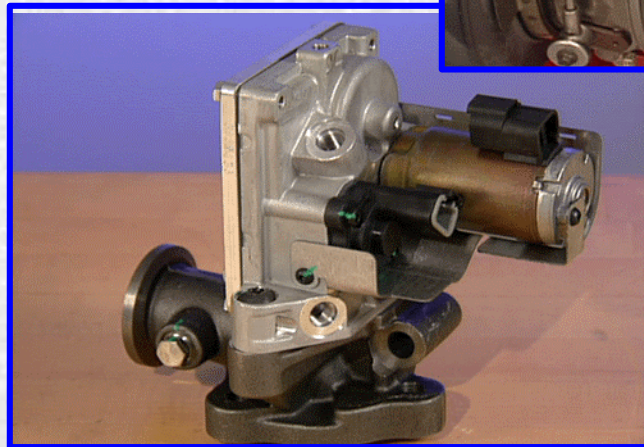
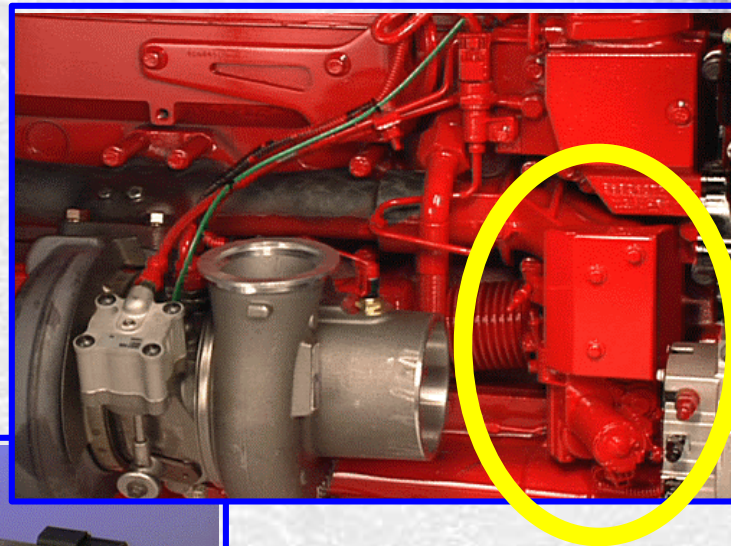
# ISM '02 Hardware





## EGR Hardware - EGR Valve

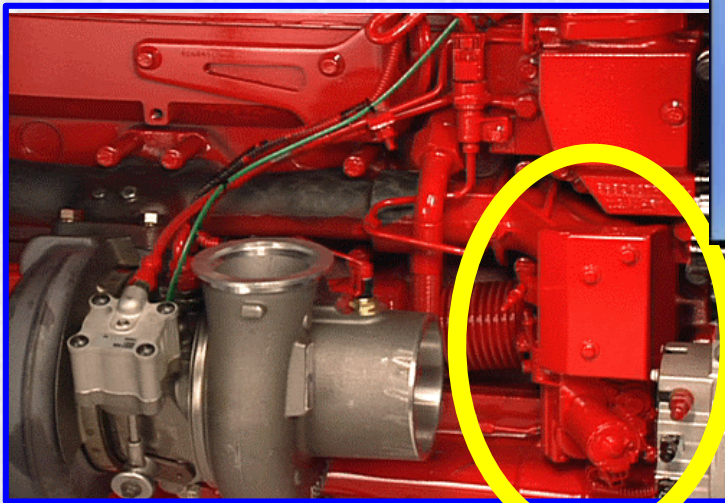
- The EGR valve regulates the amount of exhaust gas that is recirculated into the intake system.





## EGR Hardware - EGR Valve

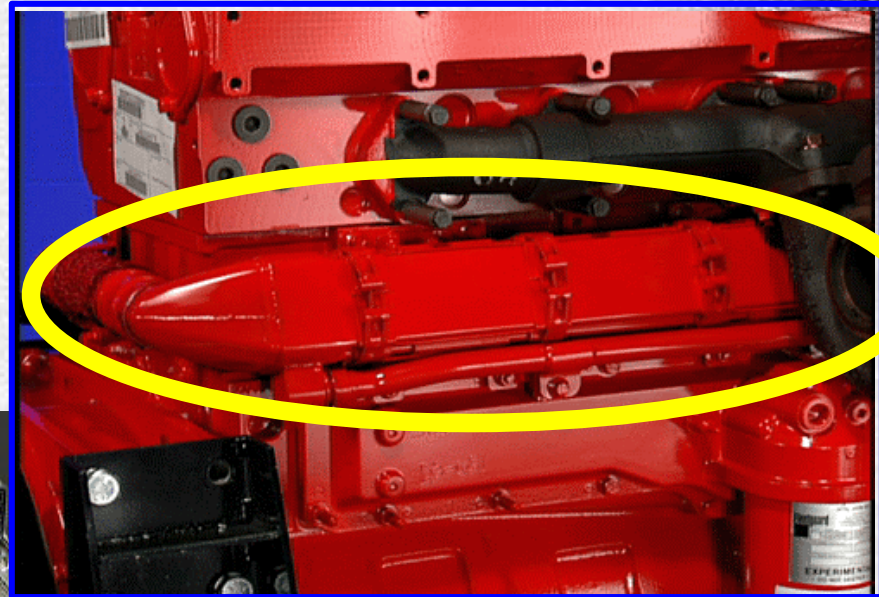
- The EGR valve regulates the amount of exhaust gas that is recirculated into the intake system.





## EGR Cooler

- Tube-and-shell design
- Stainless steel
- Engineered by Behr...a leader in heat exchangers





## EGR Cooler

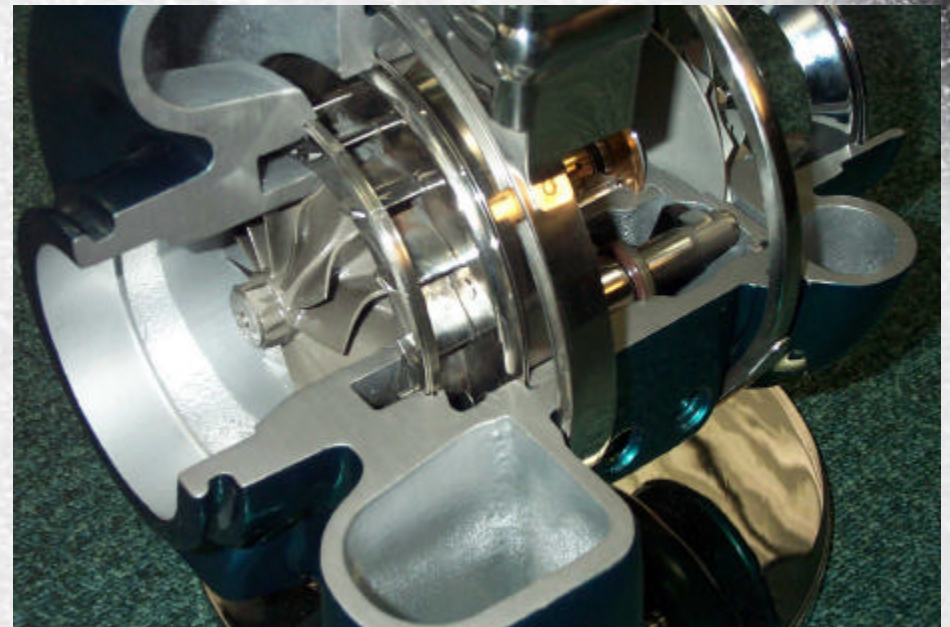
- Tube-and-shell design
- Stainless steel
- Self-cleaning tube design





## Holset Variable Geometry (VG) Turbo

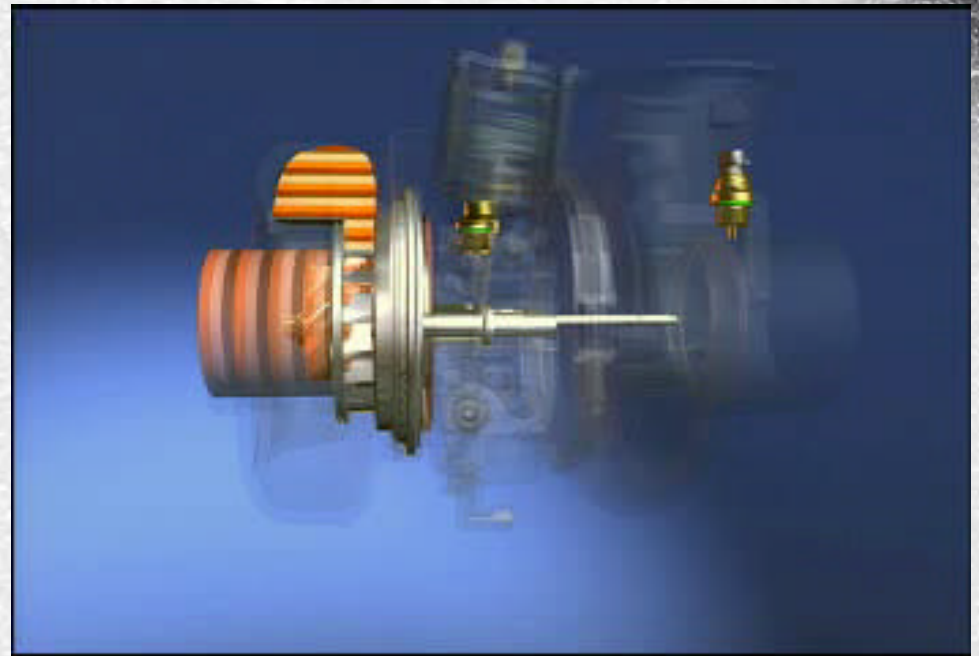
- Patented Design
- Over 55,000 Operating in Europe
- Competitive Advantage





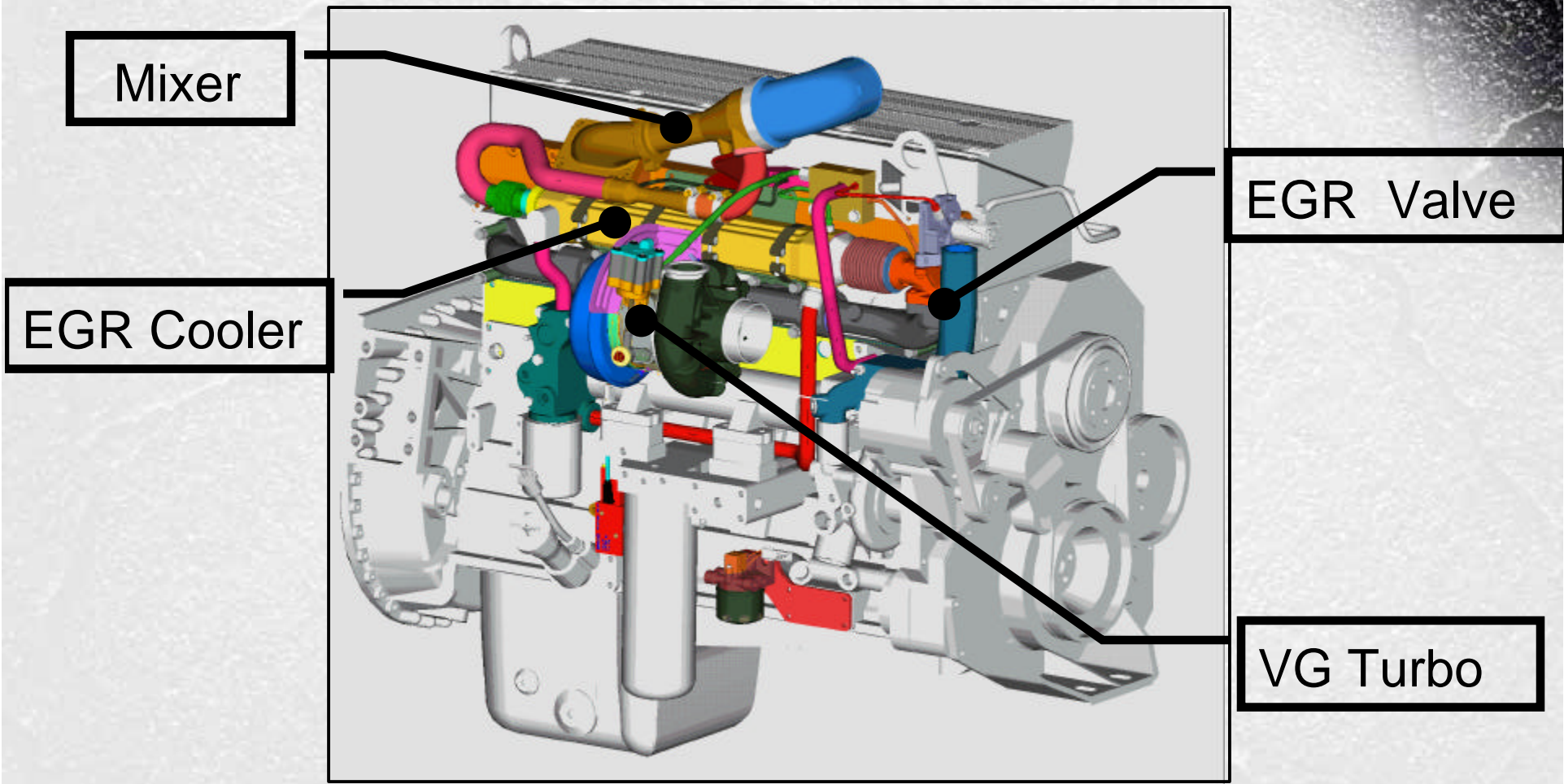
# Holset Variable Geometry (VG) Turbo

- Reliable Design
- One moving part in the exhaust flow
- Infinitely variable for maximum flexibility of boost and pressure control





# ISM Components



Mixer

EGR Cooler

EGR Valve

VG Turbo



# Discussion

- How do we get these engines up and running?
  - Industry support
  - Test lab support
- Focus on PC-10 goals and timelines
- Sub-groups required
  - O&H Panel
  - Instrumentation/Reliability
  - Correlation/Statistics
    - Determination of Repeatability and Differentiation





# Discussion

- Issue and Address Action Items
- Other comments and concerns?

Cummins

