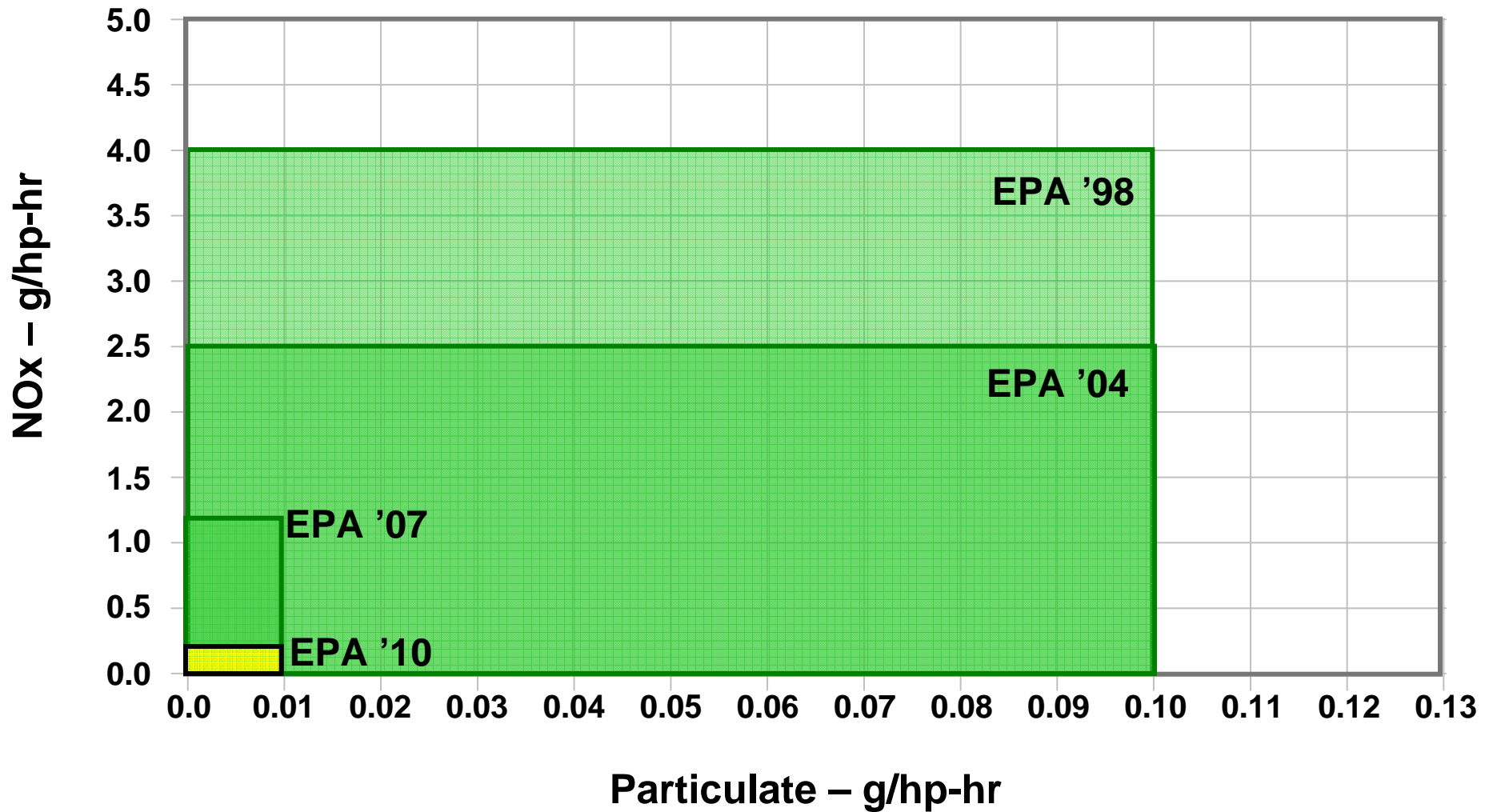




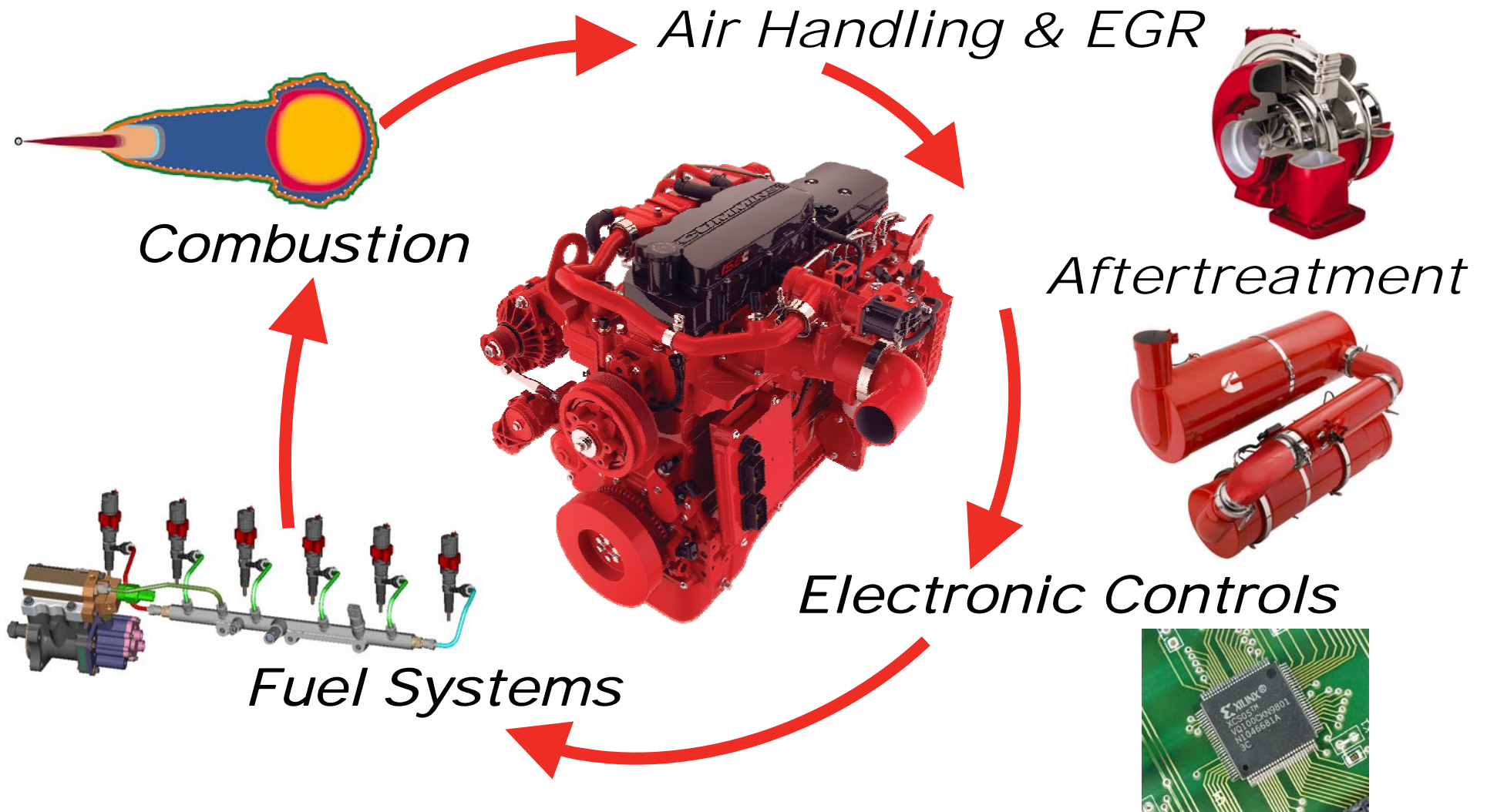
EVERY[™] SYSTEM.
INTEGRATED.



North America On-Highway Standards



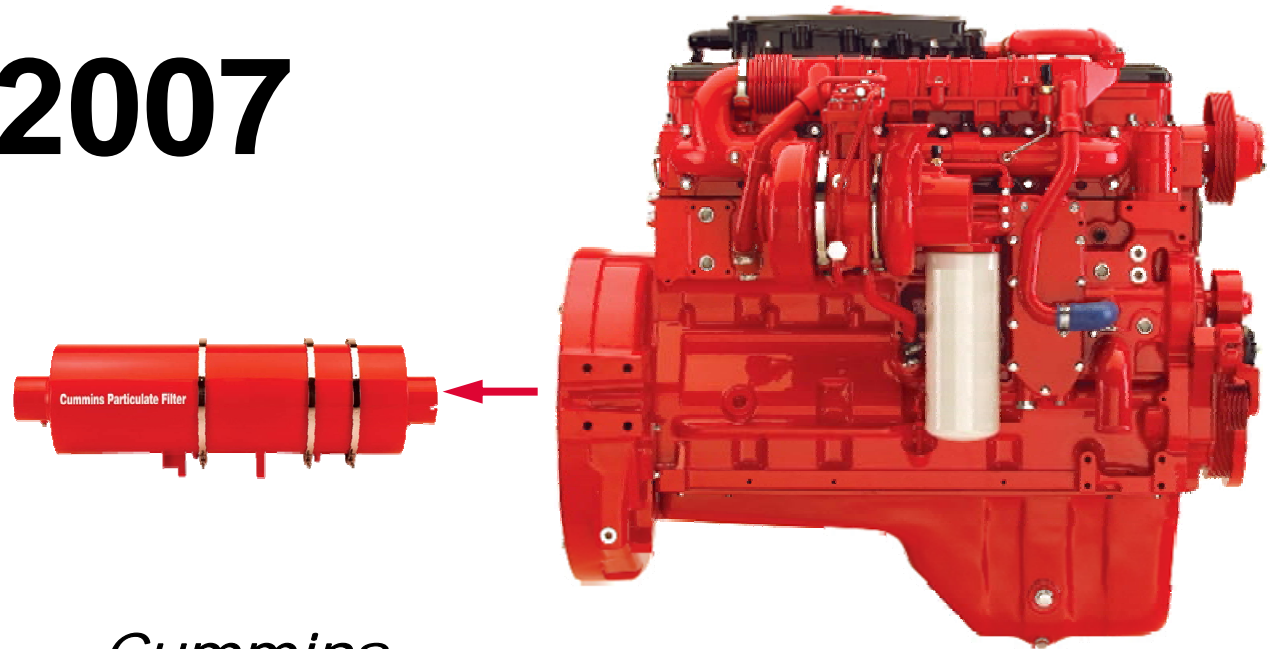
Integrating Critical Subsystems





MidRange Solution

2007



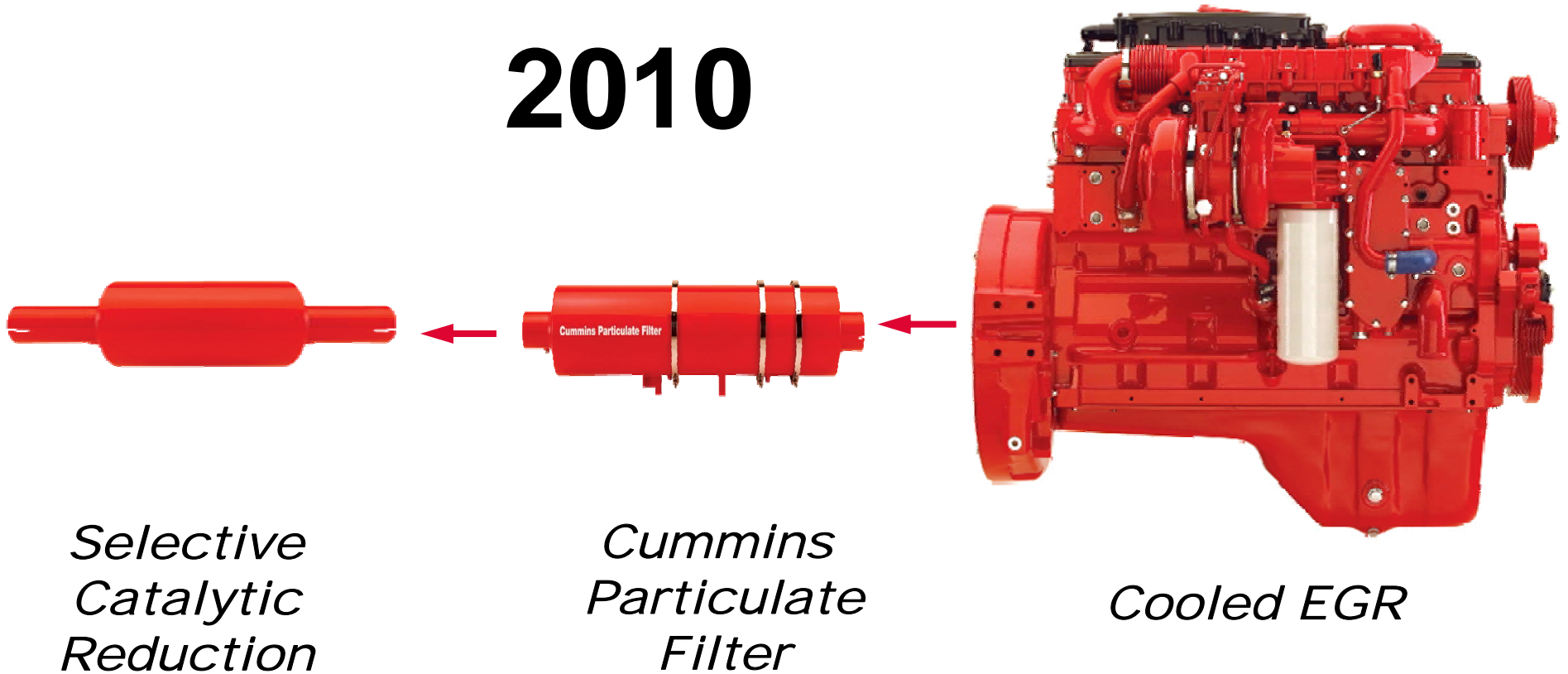
*Cummins
Particulate
Filter*

Cooled EGR



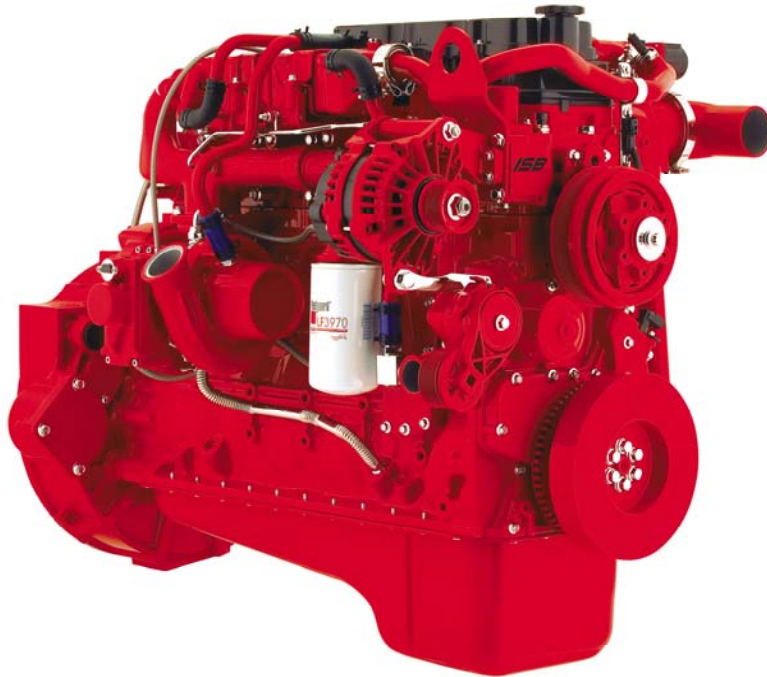
MidRange Solution

2010

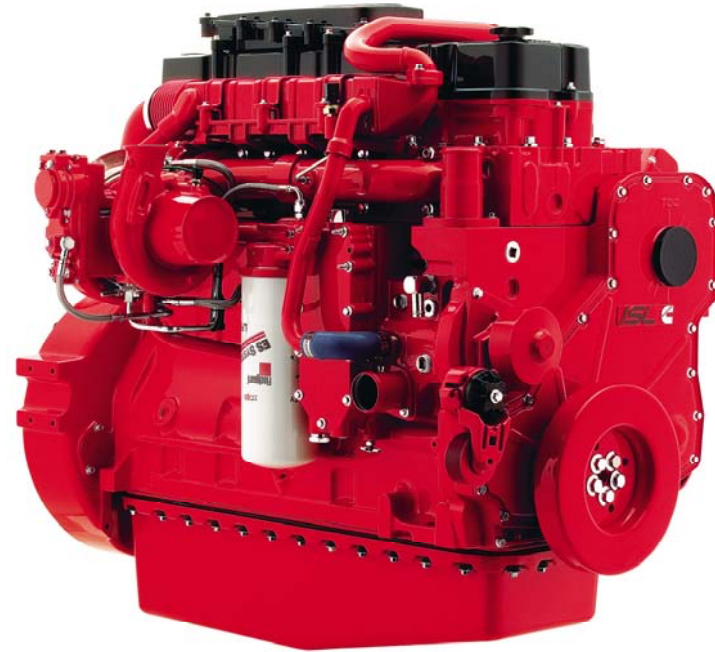




Innovation You Can Depend On



ISB EPA '10



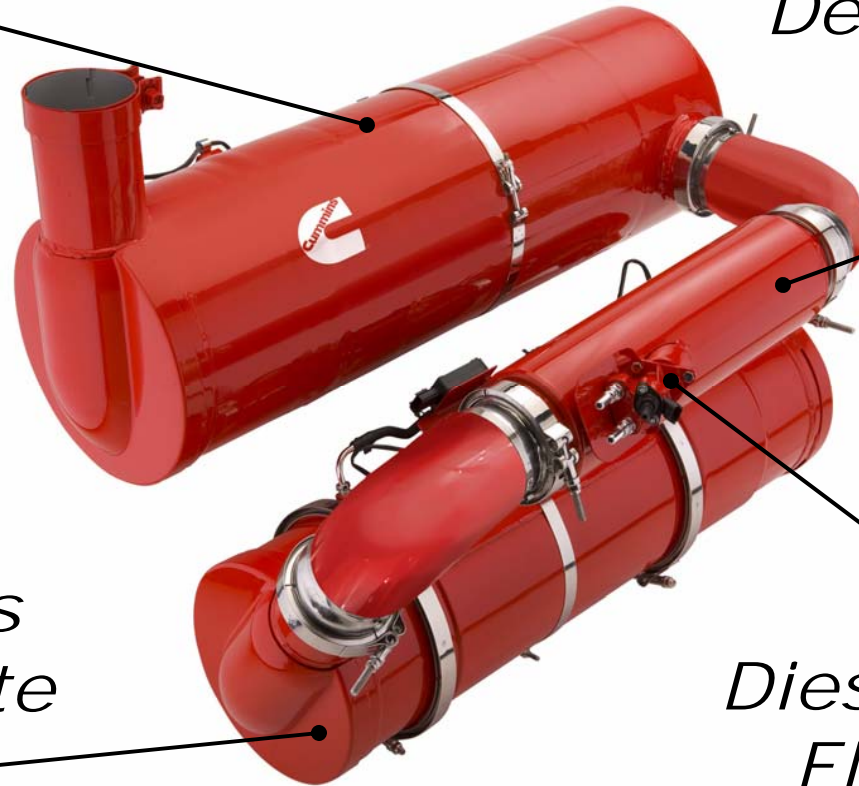
ISL EPA '10



Cummins Aftertreatment System

*Selective
Catalytic
Reduction
(SCR)
Catalyst*

*Decomposition
Reactor*



*Cummins
Particulate
Filter*

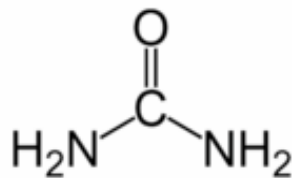
*Diesel Exhaust
Fluid (DEF)
Dosing Valve*

Selective Catalytic Reduction Fundamentals

1

DEF Injection

- Small quantity of DEF injected
- Proportional to NOx rate
- 32.5% solution in water, freezing point = -11°C
- Stored in heated tanks
- (NH₂)₂CO



2

Hydrolysis

- DEF breaks down by hydrolysis to form ammonia
- NH₃

3

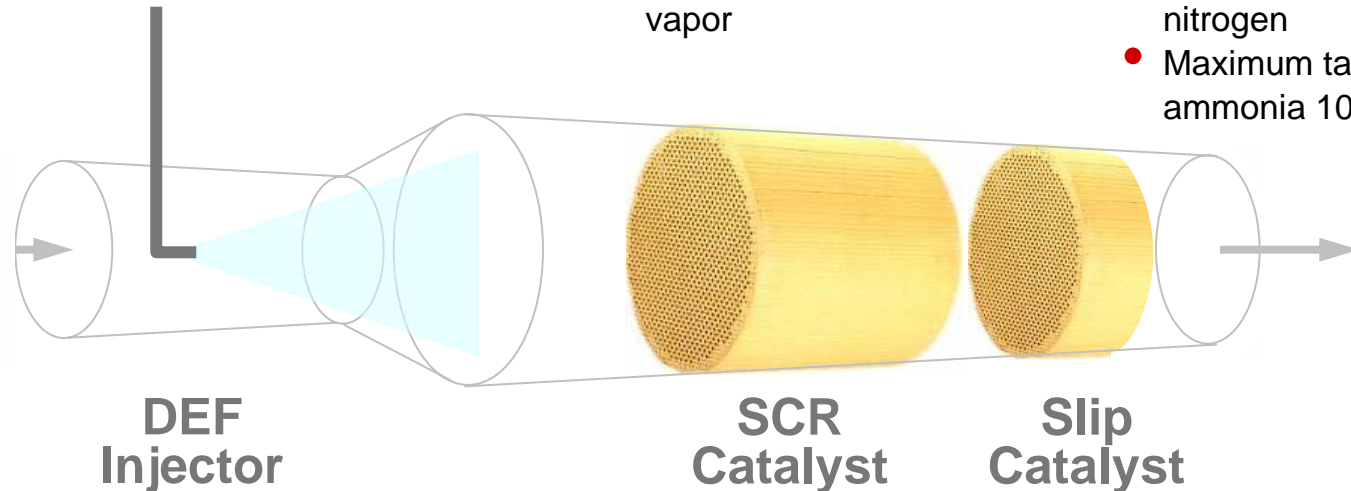
NOx Catalysis

- NO and NO₂ react with ammonia over a catalyst to form nitrogen and water vapor

4

Ammonia Slip

- Any trace amounts of ammonia remaining after reaction with NOx are broken down to nitrogen
- Maximum tailpipe ammonia 10 ppm





Cummins SCR System

- Not a new technology for Cummins
- Achieving near-zero emissions levels
- No compromise on reliability, fuel economy, performance or durability
- Working closely with OEM partners to integrate system



*Diesel Exhaust Fluid (DEF)
How Much Will I Use?*

- Approximately 2% DEF consumption
- Every 50 gallons of fuel = 1 gallon of DEF



Diesel Exhaust Fluid (DEF) Where Can I Get It?

- Will be available for customers to purchase
- Cummins is working with industry partners to ensure DEF is readily available
- Cummins is working to ensure availability of DEF through our distributor and dealer network



Diesel Exhaust Fluid (DEF) Does It Exist Today?



- Cummins Filtration
- StableGuard™ product
- StableGuard products are blended with high-purity synthetic urea dissolved in deionized water
- The finished formulation is further filtered to protect internal SCR system components and enhance catalyst life



EVERY[™] SYSTEM.
INTEGRATED.