

# **INTERTEK TRANSPORTATION TECHNOLOGIES**

**Fuels and Lubricants Testing**

For J. Vega



# INTERTEK OVERVIEW

01





# INTERTEK IS UNIQUELY POSITIONED TO DELIVER ATIC SOLUTIONS



**46,000+** EMPLOYEES

GLOBAL MARKET  
LEADER IN ASSURANCE

**3,000** AUDITORS

**90,000+** AUDITS

**100+** COUNTRIES

GLOBAL MARKET  
LEADER IN TIC

**1,000+** LABS & OFFICES

**80+** LANGUAGES

Systemic approach to Quality and Safety



Products



Trade



Resources

Our Sectors

# INTERTEK TRANSPORTATION TECHNOLOGIES

## A GLOBAL FOOTPRINT



### North America:

Detroit, MI  
Grand Rapids, MI  
San Antonio, TX  
Pittsfield, MA  
Phoenix, AZ  
Irvine, CA

### South America:

Valparaiso, Chile



American Center  
for Mobility

POWERED BY  
intertek

Ypsilanti, MI

### EMEA:

Milton Keynes, UK  
Kaufbeuren, Germ.  
Kista, Sweden  
Geleen, Netherlands  
Johannesburg, S.A.

### APAC:

Shanghai, China  
Guangzhou, China  
Chongqing, China  
Wuhan, China  
Bangkok, Thailand  
Taipei, Taiwan  
Seoul, South Korea  
Matsuda, Japan

### kjtech

Griesheim, Germany  
Lulea, Sweden  
St. Petersburg, Rus.  
Dubai, UAE  
Temporary Test  
Centers

# TRANSPORTATION TECHNOLOGY LABS IN EUROPE





# ASSURANCE, TESTING, INSPECTION, AND CERTIFICATION

## Global Automotive Services

- Engines, Transmissions & Powertrains
- Electric Vehicles / Charging / Battery / eMachines
- Full Vehicle / Fleet Testing
- Electrical Safety / EMC
- Durability / Environmental Testing
- Materials Qualifications / VOC
- Fuel Additives
- Lubricant & Fuel Analysis
- Vehicle Lighting
- Accelerated Stress Testing
- Failure Analysis
- Functional Safety





# TRANSPORTATION TECHNOLOGIES UK

02



# TT – PROPULSION SERVICES



## Core Competencies

- Combustion Engine
  - Performance & Durability testing
- Transmission
- E-Machine
  - Performance & Durability testing
- EDU (e-Axle)
  - Range and efficiency studies
- 4WD Powertrain or Full Vehicle
  - Systems Integration Development



## U.S.P.s

- Highest speed capability in UK
- Highest power, high speed dynos in UK
- Largest independent test house in UK
- In-house rig design capability
- Fast test set-up and swap-over
- 24/7 facility operation
- Dedicated secure customer offices & workshops



## Value Propositions

- Part of TT European lab network covering all aspects of EV propulsion, energy storage and charging system validation and certification
- Best possible productivity based on 24/7 operation and extensive in-house support
- Rare 4WD full BEV climatic test chamber with 1.2MW capacity



# GENERAL TESTING OVERVIEW

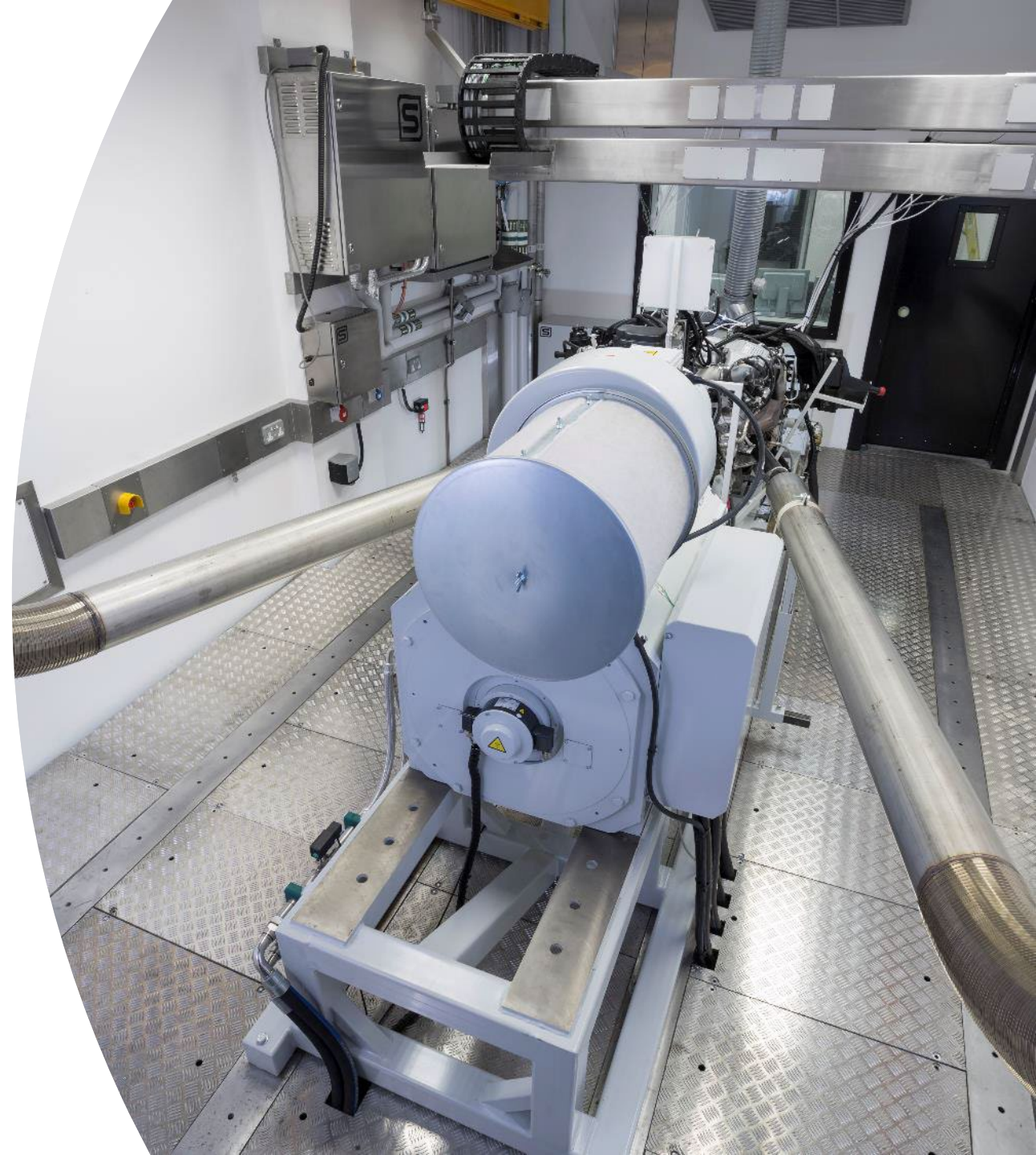
03





# PERFORMANCE AND EMISSIONS CELLS

- Highest capacity commercially available test cells in the UK - infrastructure specified to support 900 kW engines
- 8 engine P&E / Mapping cells
  - Transient dynos up to 800kW
  - AVL CAMEO automated mapping software
  - AVL Indimodul combustion analysis
  - CAHU charge air conditioning systems
    - Precision temp & humidity control on all cells
    - Simulated altitude on cell 27
  - Gas emissions analysers (AVL & Horiba)
  - AVL MSS 483 particle mass
  - AVL 489 CPC+ particle number counter
  - Combustion DMS500 fast particle counters
  - Gasmeter FTIR – NO<sub>x</sub> speciation, ammonia etc.
- 6 high speed A/C transient dynos up to 570kW
- 4 low speed / 4000Nm A/C dynos to 550kW



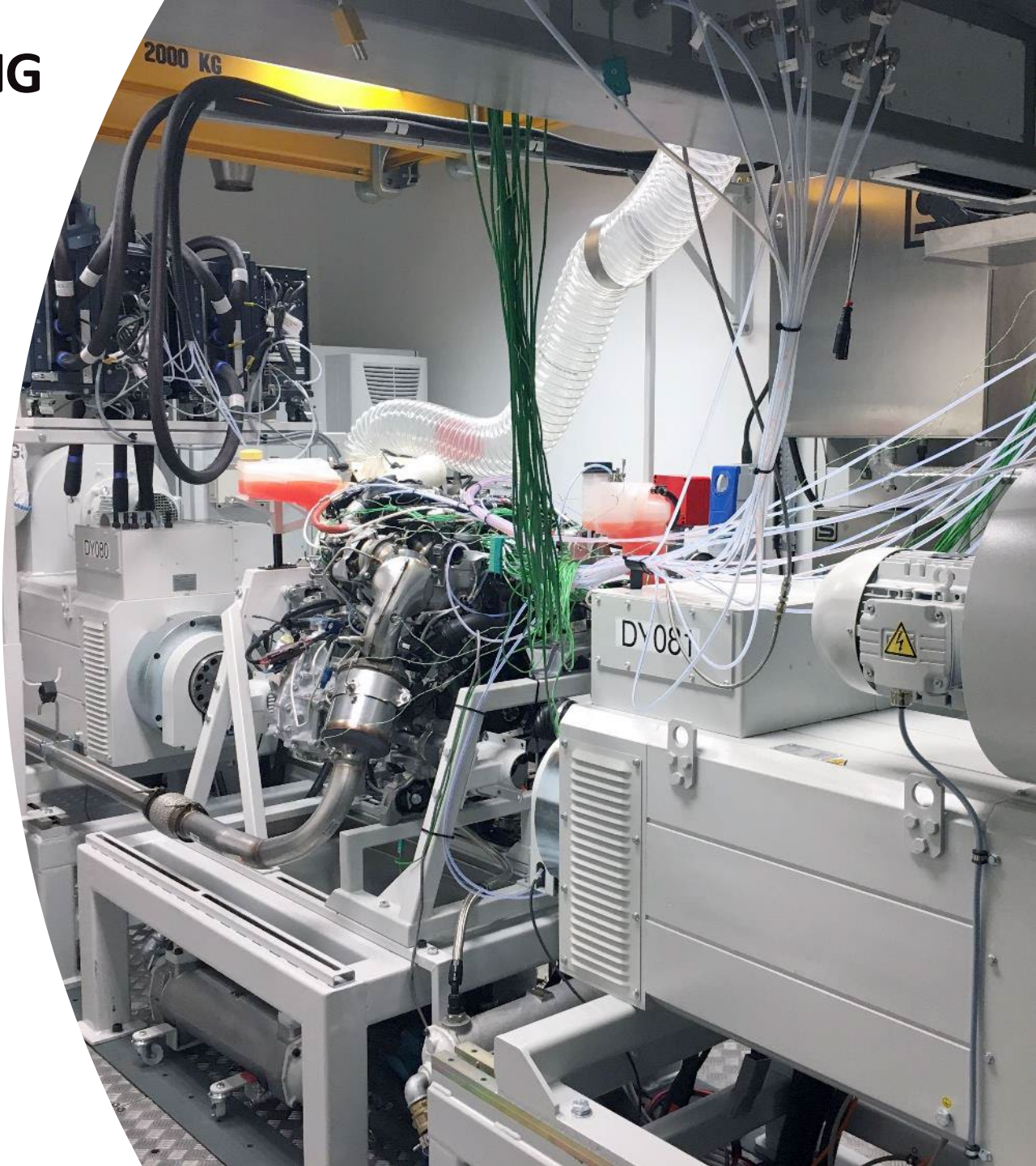


# HYBRID POWERTRAIN EMISSIONS TESTING

- Performing drive-cycle emissions development and durability testing since 2011
- 1-E and 2-E rigs available up to 1000kW
- 3x 2-E (2WD) emissions cells (as shown)
- 6x 1-E emissions cells
- 3x Kratzer 1000V / 250kW Batt Sims
- 2x D&V 1000V / 150kW Batt Sims
- 6x Regatron 500V / 32kW Batt Sims

## Potential Testing

- Engine emissions drive-cycle simulation
  - Up to 8 drive cycles per 16 hour day
- Hybrid powertrain controls development
- Transmission controls development
- Durability







# TRANSMISSION TESTING



3 Rigs currently available

- Transient Rig
  - Range of input motors from 10k to 25krpm up to 570kW
  - 2 x 500kW, 6,000Nm load motors
  - Vibration measurement
  - -30°C to +130°C fluid capability (15lpm)
- Steady State Rig
  - 9,000rpm 500kW input motor
  - 2 x 6000Nm e/c dynos
- Spin Rig
  - 8,500rpm 110kW input motor
  - Precision torque measurement
  - High frequency DAQ system to capture very fast event's such as actuating valves
  - Cold chamber (-25°C)





# EV PROPULSION SERVICES



## Five e-Motor Dyno Rigs:

- e-Motor performance & EU Reg.85 power certification up to 27,000rpm / 500kW
- e-Motor thermal surveys and de-rating software development
- e-Motor efficiency mapping
- Inverter software development

## Five e-Axle 2WD Rigs:

- 2WD eAxle rigs up to 800kW, 1100V
- System integration development
- System level thermal analysis, endurance / durability
- Range and efficiency studies

## BEV Vehicle Test Chamber:

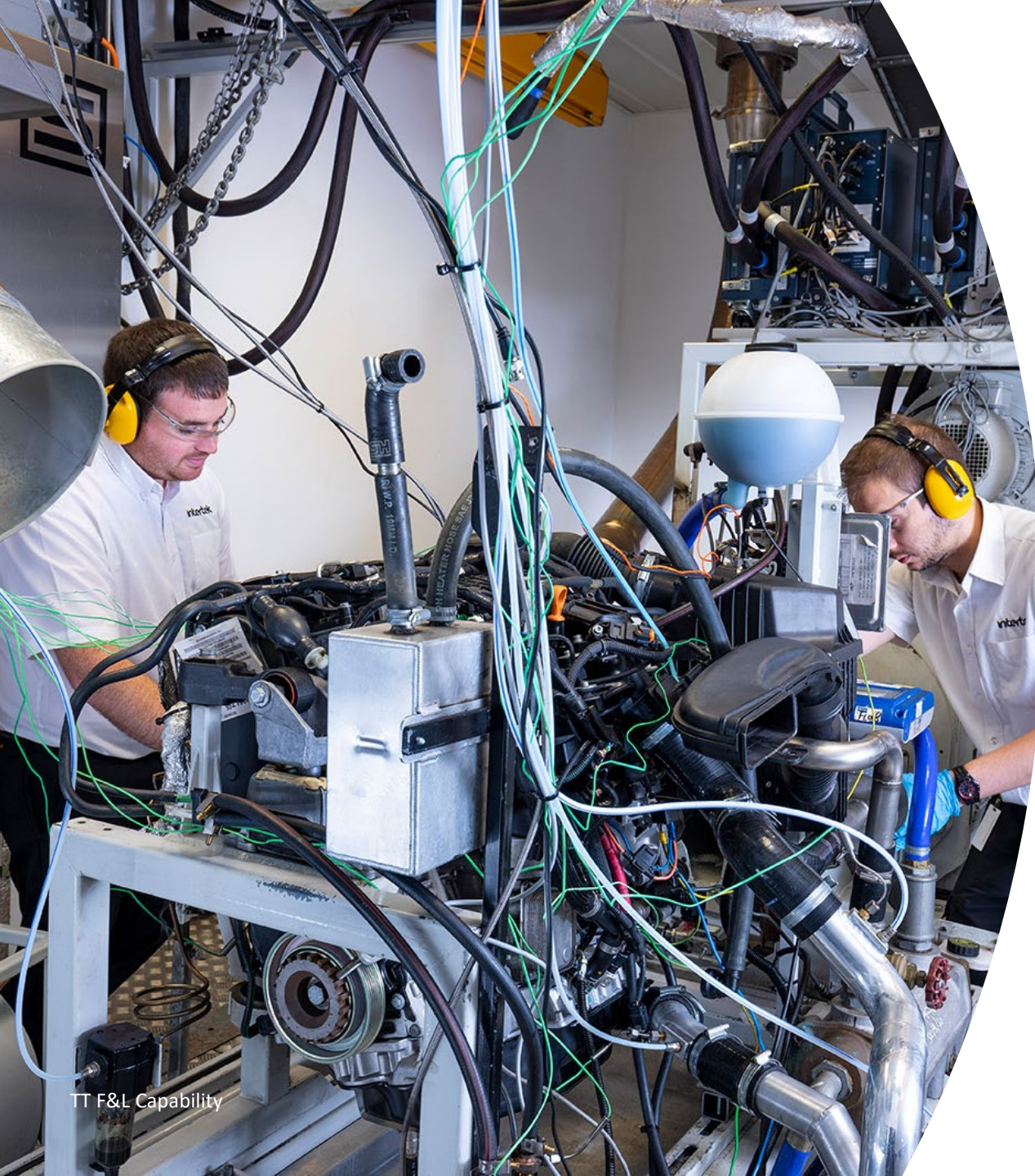
- Full size SUV capable vehicle test chamber
- Climatic capability (+10°C to +40°C)
- Low Inertia Hub Dyno's (1.1kgm<sup>2</sup>)
- Vehicle speed simulation fan up to 150kph
- Full vehicle system shakedown and integration
- System optimization
- Real world simulation

# FLUIDS TEST

04







## FLUIDS TEST OVERVIEW



- Eleven dedicated cells to fuels and fuel additive testing. Further two earmarked for EV Fluids expansion in late 2023
- Experts w/ more than 25 years' experience in fuel and lubricant testing
- CEC requirements are accredited to ISO 17025 with the entire site accredited to ISO 9001 and ISO 14001
- Abundant fuel storage as well as full biofuel handling and blending capacity
- Unparalleled test cell uptime for maximum test efficiency
- Superior speed of response and test parameter control
- Immediate post test analysis and results supply



# FUEL HANDLING

- On site at Tanners Drive, Intertek has storage facilities of up to 16,000 litres of bunded gasoline and 35,000 litres of bunded diesel as well as an additional 20,000 in underground tanks.
- Intertek regularly keeps good stock of all CEC approved reference fuels, as well as many common biofuels for accurate blending to simulate forecourt or future fuels
- Maintained under ISO 17025 accreditation, Intertek are skilled at storing, decanting and blending fuel additives into test fuels to 1ppm accuracy under laboratory conditions.
- A detailed and robust additive and fuel tracking system is in place to minimise the risk of contamination or misfuelling.
- Security in relation to the intellectual property of new formulations is given the highest priority.







\*due in Q4 2023

## CEC TESTING



Intertek is a proud supporter of the Co-ordinating European Council (CEC) who set out and support fuels and fuel additive testing on a wide variety of engines.

These tests examine the performance of a fuel and/or fuel additive to clean an engine's deposits, reduce injector fouling or improve fuel economy.

### Diesel Tests

CEC F-23-01 XUD9 – Indirect injector flow loss due to nozzle coking

CEC F-98-08 DW10B – Power Loss from Injector Fouling

CEC F-110-16 DW10C – Injector sticking from internal injector deposits

### Gasoline Tests

TDG F-05-93 M102E – Inlet valve cleanliness

CEC F-20-98 M111 – Inlet valve cleanliness

TDG F-113-KC EA111 – Gasoline direct injector fouling\*

# BESPOKE TESTING

With access to all the CEC tests shown overleaf, Intertek are confident in supporting any manner of customer project.

Intertek offer the following engine platforms for test work:

- PSA DW10B running an IDID scheme
- PSA DV6 Diesel (Euro 5, turbocharged, EGR circuit)
- PSA EP6 Gasoline (Euro 5, turbocharged GDi)
- GM LE9 PFI Gasoline (ASTM IVD test)

Further to those shown, if there are any engine platforms you wish to discuss (HD and Off-Road, Marine, Aviation), please contact the team to ask for more details about how Intertek can support your company.





# STRIP AND RATE



- Our highly experienced team regularly conduct strip, inspection and ratings. From the mandated M111 and M102e, to bespoke customer test projects.
- Analysis can be conducted on valve weights, combustion chamber deposits and spark plug fouling to 0.1 mg
- The F&L Engineering team are all skilled valve raters as per the TDG F-05-93 M102e test, while several of the technician team can rate to ASTM standards on valves, manifolds, flame-faces and many other engine components.
- Stringent quality procedures are applied to measure function, performance and durability, using standard and tailored methods to meet customers' needs.
- The build area is complete with multiple engine and eAxle build bays, highly skilled fabrication teams to support engine modification and instrumentation, and high-resolution imagery of engine components



## FUEL LOGISTICS



Intertek Transportation Technologies UK works closely with two logistics partners to ensure customer fuel arrives at our facilities safely and on-time.

Given the border situation following Brexit, Intertek strongly recommend all customers engage with these suppliers early to avoid delays at the UK ports of entry. Our team also follows-up closely to make sure tests can be conducted on time.

Small to Medium Quantities (<400 litres)



Large Quantities (>400 litres)





**intertek**

**Total Quality. Assured.**