INJECTION PRODUCTS

Test range for direct injection

Diesel or Gasoline
For over 30 years, EFS has specialized in injection flow measurement, with more than 2500 shot-to-shot flowmeters installed all over the world.

This technique has enabled the development of diesel HDi and TDi motors, injector pumps, unit pumps and common rail equipment.

Some of these devices are used for research and development in laboratory settings and over a thousand others are in use on production lines 24/7 throughout the year.

An EFS test bench can be used for flow rate measurement using the IFR, MIQ, EMI2 flow-meters for direct diesel or gasoline injection and the LPF for indirect gasoline injection or urea injection; spray visualization with the InjetVision system; power driving of all types of injector using the IPoD range of power drivers.

EFS injection testing equipment guarantees the efficient running of pumps, rails, injectors, ECU (Engine Control Units) or MCM (Motor Control Modules).

EFS also makes complete injection test benches, custom-designed to meet our clients’ needs.
Our products

HPR  High Pressure Regulator  EFS 8244
HPC  High Pressure Controller  EFS 8549
IFR  Injection Flow and Rate  EFS 8420
MIQ  Mono Injector Qualifier  EFS 8246
APC  Angular Pulse Converter  EFS 8358
ICU  Injector Control Unit (vision)  EFS 8412
ICU  Injector Control Unit  EFS 8413

IPoD  Injector Power Driver  EFS 8532
  - Ipod coil  EFS 8472
  - 6-channel IPod coil  EFS 8370
  - IPod piezo  EFS 8478
  - 6-channel IPod piezo

Injetvision  EFS 8212

And all the ITBxxx (Injection Test Benches) are presented at the end of this brochure.
R&D

SYNOPTICS

N°1: FLOW MEASUREMENT & INJECTION RATE

Injection rate at different pulse lengths and at different pressures

xIFR software or SiFBench software (as an option)
R&D

3: INJECTOR PUMP CYLINDER HEAD TEST

Angular Pulse Converter
EF5835B

ECU/MCM driving signals (option)

Motor

Mechanical transmission

Unit injector

Injection Flow and Rate
EF58420

Injector Power Driver
EF58532 or EF58370

4 IFR
Provided with the bench or MFTS adapted to your existing bench
N°5: ACCESSORIES FOR REPLACING & ECU/MCM ON A MOTOR

WinICU software

WinHPC software

xIPod software
Mission 6: Injector Flow Verification

Maintenance

SiFBench software

Quantity versus pulse length at different pressures
Quality After-sales service

**N°7: Complete test system (unit pump or inline pump)**

To complete an existing bench
Quality After-sales service

**N°8:** UNIT PUMP OR INLINE PUMP VERIFICATION BENCH

*In-line pump or unit pump*  
*Motor*

*Multi Cylinder Flowmeter EF58342*

*Injector Power Driver EF58473 (6 channel Ipod coil)*

*Injector Power Driver EF58472 (6 channel Ipod coil)*

*xMCF software*
This high performance device for injection rate treatment and measuring shot-by-shot injection volumes will enable you to control high-energy systems as featured on modern diesel motors.

It is ideal in a Research & Development context or for injector production applications as it provides a highly detailed analysis of a single injector channel.

This unique jet visualization system enables you to study and observe jets coming from high-pressure diesel injectors.

You can measure jet surface, volume and penetration as well as the spray cone angle and the jet opening angle.

The intuitive user interface enables you to perform statistical analyses and the fog extraction system guarantees reproducibility.
8246 - MIQ

The natural successor to the EMI2, the MIQ flow-meter responds to the current market demands for diesel injection systems with lower consumption and pollution levels.

Different models are available for use with cars and trucks or with heavy duties, trains and boats.

8342 - MCF

This high performance instantaneous mass flowmeter will enable you to verify, regulate and qualify complete diesel injection systems using unit pumps, inline pumps and distribution pumps.

The MCF can also be used for testing common rail systems.

One single device will enable the simultaneous flow control of up to 6 injectors.
Latest addition to the IPoD range, this IPoD Coil is a power driving module for injectors using magneto-electric technology. It features several different driving modes and its numerous advanced functions mean that it can adapt to most commercially available injectors.

Whatever your application, R & D, Production or Quality Control, the IPoD Coil can work for you. And all this comes at an unbeatable price...

This module is able to power and drive up to 6 injectors using magneto-electric technology in multiplex mode.

It features several different driving modes and numerous advanced functions enabling it to adapt to most commercially available injectors.

This power driver is ideal for motor development in R&D applications or for after-sales service and endurance tests in Quality Control applications.
8370 - IPOD PIEZO

This is a power driving module for injectors using piezo-electric technology.

It features several different driving modes and numerous advanced functions meaning that it can adapt to most commercially available injectors.

Whatever your application, R & D, Production or Quality Control, the IPoD Coil can work for you.

8478 - 6-CHANNEL IPOD PIEZO

This module is able to power and drive up to 6 injectors using piezo-electric technology in multiplex mode.

It features several different driving modes and numerous advanced functions enabling it to adapt to most commercially available injectors.

This power driver is ideal for motor development in R&D applications or for after-sales service and endurance tests in Quality Control applications.
This unit handles the regulation of high pressure in common rail diesel injection systems.

It comes in a 3U 19” rack format and is driven by a supervision PC by means of a serial link.

The HPC module takes up all functionalities existing on the HPR (High Pressure Regulator) system, with some additional ones:

- The test of the pressure sensor on the client’s rail.
- The test of the security valve on the client’s rail.
- The test and driving of up to 4 actuators with up to 2 mixed regulations.
8358 - APC

The APC rack is designed for generating the synchronization signals found on the different components of a motor as well as the signals necessary for the measurement devices of an injection test bench.

All of these signals are fully programmable.

8413 - ICU

The ICU module, which replaces the ECU/MCM functions in a vehicle, generates logic signals to drive up to 6 injectors with 10 injections per revolution and a frequency range of 0.5 Hz to 50 Hz or 30 to 3000 rpm.

It works in conjunction with the IPoD power modules.
As well as being made-to-measure to your specifications, this test bench will give you the maximum in flexibility for your Research and Development application.

with an EFS bench, whatever you want to test, you can..
This test bench, designed essentially for research and development applications, automatically analyzes gas or diesel injector jets by means of the Injetvision image processing system, giving you the user all the advantages of a high-performance test bench together with the in-depth jet analysis provided by Injetvision.

It can also be used for sample testing in a production application.
**Production**

The custom-built EFS Production test benches are designed to allow you a maximum of flexibility in determining the testing cycles that correspond to your application.

What’s more, our trademark shot-to-shot flow measurement equipment will give you immediate results, saving you both time and money.

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**Quality Control**

The custom-built EFS Quality Control test benches will enable your application to operate quickly and economically by providing you with fully programmable cycles and high-performance measurement equipment.
The **MFTS** (Multi Flowmeter Test System), made up of several different flowmeters, will enable you to characterize a complete injection system automatically, on an electrical test bench.

It can be adapted to any existent bench.

The **ITB 105** bench is used for testing "common rail" injectors one by one, giving you complete characterization of the injector.

It is an essential tool for injector development.
Analysis of the quantity injected and the injection rate

Controls all types of injectors with real-time parameter adjustment

Measures 6 channels simultaneously and in real time

Spray analysis
REFERENCES

BMW
BOSCH and subsidiaries
CATERPILLAR
CONTINENTAL
DELPHI
DMC
FAW group
FERRARI
FIAT Powertrain
IVECO
KIA MOTORS
LIEBHERR
MERCEDES
NIIGATA
PEUGEOT- CITROËN
RENAULT
SAIC
STANADYNE
VALEO
VOLKSWAGEN
VOLVO Global Trucks
WÄRTSILÄ
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ACCESS MAP

SUBSIDIARY IN CHINA
to provide technical support
(installation, training, maintenance, calibration).

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