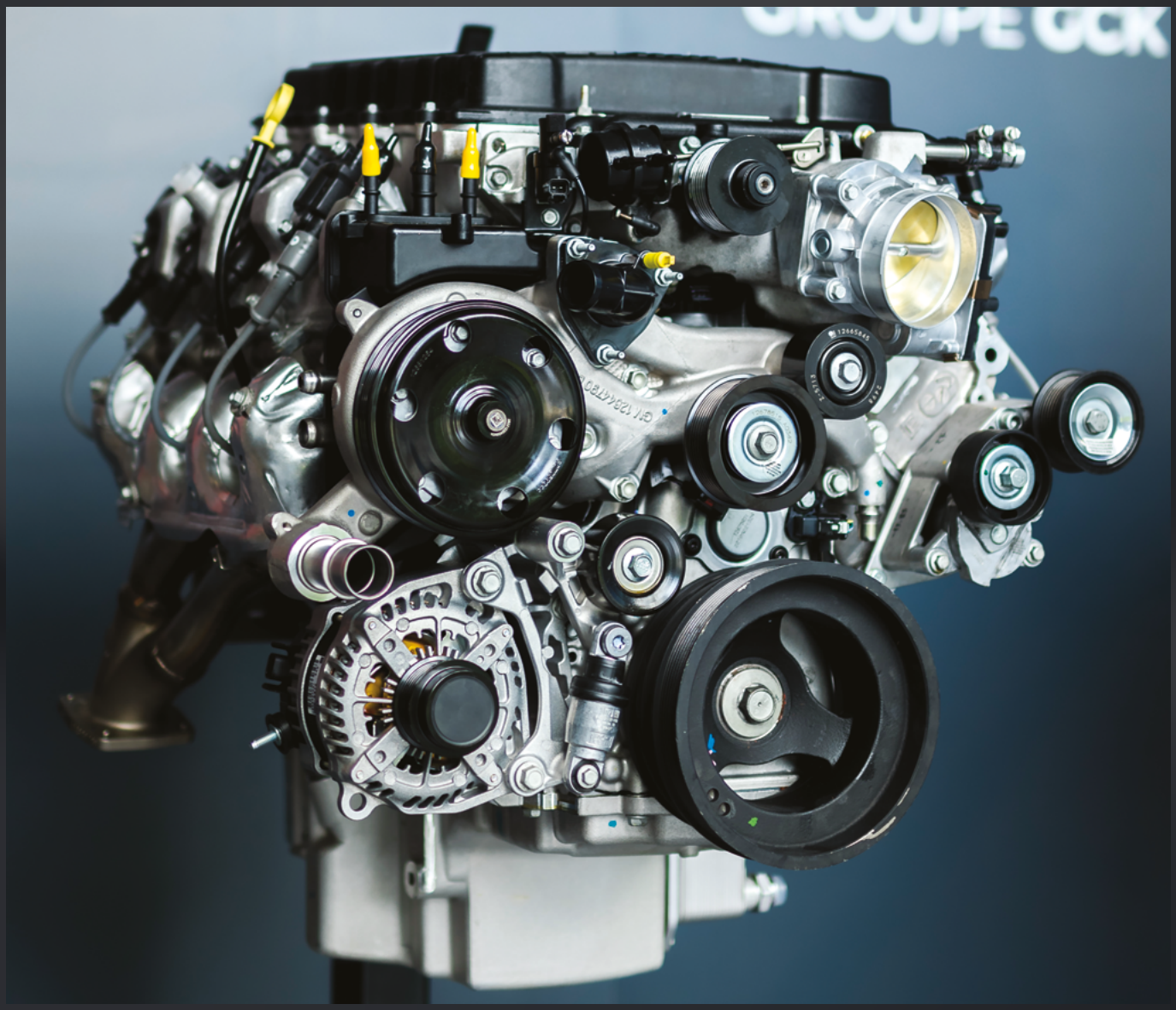
SOLUTION F

GROUPE GCK

THE HICE TECHNOLOGY AT ITS BEST

Hydrogen combustion engine : the future of mobility



H2 ENGINE

Hydrogen internal combustion engine

Hydrogen internal combustion engines (HICE) have gained attention as a potential alternative to traditional gasoline-powered engines. They use hydrogen as a fuel source, offering several advantages over conventional engines. One of the main advantages of HICE is their environmental friendliness. Hydrogen is a clean-burning fuel that produces only water vapor as a byproduct, reducing greenhouse gas emissions and air pollution.

Solution F specializes in the retrofit of thermal engines to hydrogen and has developed a 6.2L V8 hydrogen internal combustion engine. Based on a tried and tested classic 4-stroke architecture, this engine integrates an innovative hydrogen direct injection system that enables this gas to be used as a fuel. The dihydrogen molecule has a high energy density by mass (1 kg of this gas is equivalent to around 3 kg of petrol), and its combustion generates only water vapour and a small quantity of nitrogen oxides.

BENEFITS

- *Zero CO2 emission.*
- *Speed to fill up with hydrogen, which takes between 3 and 4 minutes.*
- *Versatility: hydrogen can be produced from a variety of sources, including renewable energy such as wind and solar power.*

TECHNICAL SPECIFICATIONS

ENGINE
6.2L V8 in front position
Hydrogen power supply (H2)
Supercharged by a mechanical compressor
Bosch Motosport ECU
BorgWarner / Phinia H2 direct injector
Dry sump lubrication
500 hp at 6500 rpm
700 Nm at 4500 rpm

APPLICATIONS

RETROFIT OF ON-ROAD VEHICLES

MOTORSPORT

MARINE

GENSET

FOENIX H2

RACING GT EQUIPPED WITH HYDROGEN INTERNAL COMBUSTION ENGINE

After 15 years of preparing competition silhouettes inspired by touring cars, Solution F sets itself the challenge of designing a GT-type competition silhouette intended to compete in sprint and endurance races. Our teams focused on the aerodynamic efficiency of the CFD-designed full-carbon bodywork. The Foenix is powered by a V8 engine that offers the best cost/performance ratio for this level of power. Given its low running costs, proven reliability and ease of handling, it represents a real alternative to current GT cars.

CHASSIS
Space frame, carrier gearbox
S002 - GT3 homologation
H2 FORVIA tank 8.5 kg
Air Jack system
DIMENSIONS AND WEIGHT
Wheelbase : 2750 mm
Length : 4950 mm
Width excluding mirrors : 2000 mm
Height : 1240 mm
Weight : 1,100 kg
TRANSMISSION
6 sequential speeds SADEV
Electric paddle shift
Max torque : 900 Nm
WHEELS
Flow formed rim
Front : 12x18 / Rear : 13x18
Michelin tyres with a high proportion of recyclable materials
BRAKES
Front & Rear 6 pistons calipers
Floating steel disc on aluminium bowl
Break balance adjustable on switch board
Bosch M5 ABS

ELECTRONICS
XAP Dashboard
Data acquisition PI
Telemetry
Electric BV control XAP
Driver adjustable traction control
BODY
Optimised aerodynamics in CFD
Full carbon bodywork
COCKPIT
Front/lateral crash boxes
Adjustable steering column
SUSPENSIONS
Aluminium machined housing hub-rights
Adjustable anti-lift - Front & Rear adjustable anti-roll
Multimatics 4-way shock absorbers
Separate, double wishbone Front & Rear
Welded wishbones - Rear push rod

THE 1ST JEEP CHEROKEE CHIEF POWERED BY A HYDROGEN COMBUSTION ENGINE

Solution F and GCK have integrated the 6.2L V8 hydrogen internal combustion engine into a fully restomodded 1976 Jeep Cherokee Chief. This vehicle serves as a demonstrator enabling GCK to explore the hydrogen retrofit market in the US.

A TECHNICAL CHALLENGE

In addition to the engine integration, we have done a complete upgrade of the suspension system, transfer case, gearbox and chassis :

4L80E automatic gearbox (upgraded) - 4 speed auto + electronic management
NP231 transfer case (upgraded) - 2 gears + electronic management
Reinforced Curries Extreme 60 axle (70" wide) Ratio 5.38 + Electric diff locks
Ford RAPTOR brake kit with Hydroboost system
Upgraded KING suspension with 10 inches travel + chassis adaptation + Hydraulic bump stops
Chassis modification (3 links front & 4 links rear suspension system) + reinforcements
Body lift 3 inches
Added cooling systems for compressor and integration in front grill
Custom TIG welded stainless steel exhaust system

SOLUTION F

GROUPE **GCK**

Founded in 1985, Solution F has been one of France's references in competition and production automotive engineering.

During its rich history, the company has also specialized in propulsion systems and engine manufacturing with a strong orientation towards hybridization for both the automotive and aeronautics industries.

In July 2022, GCK took over this well-known company to entrust it with the development of new generations of electric motors and the conversion of combustion engines to hydrogen.

MOTUL

Motul supports GCK and Solution F in the development of its hydrogen combustion engine. This type of motorization requires a lubricant adapted to cope with the constraints induced by hydrogen combustion, such as the sensitivity to abnormal combustions accentuated with hydrogen, the risk of lubricant emulsification due to the greater production of water, and particulate emissions in the exhaust due to the lubricant.

SOLUTION F
299, Allée du Verdon
13770 **Venelles**, FRANCE
contact@solutionf.com
+33(0)4 42 54 20 20