



Communiqué de presse
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RENAULT TRUCKS TESTS AN EXTENDED RANGE 16 T ELECTRIC TRUCK IN PARTNERSHIP WITH NORBERT DENTRESSANGLE

Renault Trucks is continuing its research into urban delivery vehicles. The manufacturer is currently carrying out experiments with Norbert Dentressangle into the viability of an electric truck with an autonomy extender. This 16 t vehicle, built around a Midlum chassis, makes it possible to carry out assignments covering 60 km in all-electric mode, while having a total operating range of more than 400 km. The vehicle will be tested between June 2013 and January 2014 in the Paris region on behalf of ThyssenKrupp Materials France. This project is part of the ongoing technological partnership between Renault Trucks, PVI and IFP Énergies nouvelles.

Renault Trucks is testing a 16 t truck running on electricity with an autonomy extender in partnership with Norbert Dentressangle and ThyssenKrupp Materials France, a vehicle resulting from work carried out with IFP Energies nouvelles and PVI.

Transport is a pivotal element in the activities of ThyssenKrupp Materials France, which carries out 500 deliveries a day. It represents a cost centre subject to the pressures imposed by oil prices, European social regulations and various taxes. Saving money - whether in terms of energy or optimising costs - is a key goal in the everyday working of ThyssenKrupp Materials France. *"This project seemed to us as an opportunity to prepare for the future. All the more so since our head office is in the Paris region where congestion and pollution are higher,"* states Jean-Michel Auriac, Senior Vice-President.

For this project, Norbert Dentressangle has once again demonstrated its willingness to be in the forefront of the fight against greenhouse gas emissions and all other types of pollution. Deeply committed to reducing the environmental impact of its activity, the haulier makes trucks one of its core concerns. *"The experiments being carried out with this new hybrid vehicle reflect the partnership agreement we have had with the ADEME since 2005,"* explains Martial Valente, Transport division Purchasing director. *"Since road haulage is, and for a long time will remain, the most efficient way of transporting goods, we make a special effort to research all the efficient means possible for reducing the environmental impact made by trucks. Together with Renault Trucks, we are providing unique solutions which will make it possible for us to have a modern means of transport, one that is efficient, safe and environmentally friendly."*

The "hybrid series rechargeable" technology used by this vehicle makes it possible to combine considerable autonomy in all-electric mode with an overall operating range of several hundred kilometres in hybrid mode. The vehicle can therefore carry out assignments

in "zero emission" zones (generally town centres) and in industrial zones on town outskirts in the same day.

In operational terms, this means that the experimental vehicle has a total operating range of over 400 km, 60 km of which can be in all-electric mode, i.e. emitting no noise, polluting emissions or CO₂. It is fitted with electric traction by PVI, using a 103 kW/400 V asynchronous electric motor, Li-Ion batteries packing a total energy of 85 kWh and a Diesel DXi 5 engine combined with a 70 kW generator. This generator will make it possible to produce electricity for recharging the batteries while the vehicle is travelling, thereby ensuring its autonomy while it is on its round. Furthermore, every time it brakes or decelerates, the kinetic energy is recovered by the electric motor and stored in the batteries. These batteries can be recharged in four hours using a 380 V, 64 A three-phase supply.

This Midlum electric with autonomy extender will be operated by Norbert Dentressangle on behalf of ThyssenKrupp Materials France in the Paris region. Offering a payload of 6 t, it will be devoted to carrying steel bars between 3 and 7 m long, or palettes of small format steel, as well as sheet steel between 1 and 3 m long. It will carry out its assignments between 5 AM and 2 PM, covering a daily distance of between 170 and 220 km in the north-west of the Île-de-France region supplying some 20 of ThyssenKrupp Materials France's customers.

Thanks to the hybrid management program developed by IFP Energies nouvelles, the Diesel engine will always be operated under optimal conditions in terms of fuel consumption and thus for reducing CO₂ emissions. IFP Energies nouvelles has drawn upon its expertise in the fields of control and hybrid powertrains, to produce an energy management calculator and all its calculating functions. These optimise the flow of power around the battery, decide when it is best to start up or shut down the internal combustion engine according to the situation, particularly in urban areas and ensure that the engine operates only under optimal conditions. The main objective is to enable the vehicle to reduce its consumption throughout its entire assignment as well as limit the sound nuisance it generates in urban environments.

Several on-board energy management modes are available and the driver can choose between the two following modes in real-time:

- Automatic:

This is the default operating mode: the hybrid calculator automatically manages the battery charge by starting and stopping the autonomy extender. It constantly optimises electrical and internal combustion energy management to reduce the overall consumption by as much as possible. To obtain the best combination of the two energies, the hybrid calculator uses the data relating to the delivery round and any "zero emission" zones on the route which will already have been entered into the hybrid calculator.

- Manual :

The driver can activate the all-electric mode at any time, particularly for deliveries in controlled or "zero emission" areas. In this case, the autonomy extender will not operate as long as there is a minimum amount of energy in the batteries.

A specific display and an additional screen serve as an interface for the driver to monitor and observe the flows of energy.

The results this experiment is expected to produce are as follows:

- A reduction in CO₂ emissions of around 30% compared with an equivalent Diesel vehicle, taking the entire assignment into account
- A mobility equivalent to that of a Diesel vehicle while making sure energy is still available when the vehicle is stationary
- A significant improvement in noise levels, corresponding to expectations of those in the vicinity of the vehicle's operations which should allow customer users to extend their timeframe of deliveries to early mornings or during the night.

This unique vehicle is the second experimental vehicle resulting from a close collaboration between Renault Trucks, PVI and IFP Énergies nouvelles. It has been developed as part of the Melodys project supported by the ADEMA demonstration funds. It is part of an experimental program designed to test technologies under real life conditions that have the potential of being applied to production vehicles in the future.

Technical characteristics

Renault Midlum electrical 16 t vehicle with autonomy extender

- Operating range in electrical mode: approximately 60 km
- Total operating range: over 400 km
- Recharging time: 4 h
- Electric motor power: 103 kW
- 1 Lithium-ion (iron phosphate) battery pack
 - on-board energy: 85 kWh
 - capacity: 138 Ah / 615 V
- Diesel tank capacity: 130 l
- Payload: 6.5 t
- Bodywork: Tautliner, equipped with 500 mm body side boards, together with sliding curtains and roof

About Renault Trucks

Encouraged by the enthusiasm, experience and determination of its 14,000 strong workforce, as well as by its presence in over 100 countries via 1,500 sales and service points, Renault Trucks is a leading producer of commercial vehicles. The designer, manufacturer and distributor of commercial vehicles from 2.7 to 60 t, Renault Trucks constantly demonstrates its commitment to bringing the prestige back into road transport, a noble profession without which society would be unable to survive.

About Norbert Dentressangle

Norbert Dentressangle is an international player in the fields of Transport, Logistics and Freight Forwarding, having generated an annual income of €3.9 billion in 2012. Norbert Dentressangle develops solutions with high added value in Europe, the Americas and Asia, while making sustainable development one of its core concerns. It is established in 26 countries, has a total workforce of 32,500 and currently generates 59% of its income outside France. With Hervé Montjotin as its CEO, Norbert Dentressangle is quoted in the CAC Small and CAC Tradable indexes.

Euronext Paris, catégorie B. Code GND – Isin FR0000052870
www.norbert-dentressangle.com

About ThyssenKrupp Materials France

ThyssenKrupp Materials France is specialised in the distribution of steels and nonferrous metals. ThyssenKrupp constantly invests in providing its customers with material and technological solutions via 320 shades (available in all forms) and integrated transformation services as well as a metallurgical advice centre.

Limiting the impact of its activity on the environment concerns everyone. Fully aware of environmental issues, the ThyssenKrupp Group has made this approach an integral part of its day-to-day operations.

About IFP Energies nouvelles

IFP Energies nouvelles is a public research, innovative development and training organisation in the energy, transport and environmental fields. Its purpose is to provide efficient, economic, clean and sustainable technologies to public players and industry in a bid to take up the societal challenges associated with climate change, energy diversification and water resource management. It is recognised internationally for its expertise in these areas.

About PVI

PVI is specialised in the development of commercial vehicles devoted to work and transport in urban environments as well as producing them in small and medium-sized runs. Over the past 20 years, the company has acquired unique expertise and an excellent reputation in the field of alternative energies and electric traction applied to commercial vehicles. These include refuse collection, delivery and light commercial vehicles as well as buses. This experience is based on the feedback received on around 1,000 electric and CNG vehicles currently being operated in France and Europe,

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