

AUTO EXPO DELHI

2012



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Valeo



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Valeo present at Auto Expo in Delhi for the first time

Paris, January 2, 2012 – Valeo will be present for the first time at the Auto Expo trade show, to be held in Delhi from 7 to 11 January 2012.

Valeo has been present in India since 1997. In the coming years, the company plans to localize the entire range of Valeo global products. This includes some advanced technologies and innovations, making them accessible to Indian customers.

Auto Expo provides an opportunity to showcase innovations that will support the development of the Indian automobile market in the forthcoming years.

The innovations being presented by Valeo include ReStart, Integrated Speaker Control Unit for parking assistance, LEDs and first shown to the public the Wi-Fi® Rear Camera, Water Cooled Charged Air Cooler.

- **ReStart**, a reinforced starter, is a component of the Valeo Stop Start system which allows the vehicle to start up immediately and silently.

- **Integrated Speaker Control Unit for parking assistance** is an innovative parking assistance solution particularly adapted to the Indian market needs. A loud speaker connected to the ultrasonic sensor, is integrated into the control unit, making this solution a compact and cost effective system which can be easily installed into any vehicle.

- **LEDs** are the most efficient sources for front lighting - two times better than Xenon and 5 times better than Halogen - offering distinctive style opportunities and day-like super white light for safe and comfortable night driving.

- **Wi-Fi® Rear Camera**, is a vision camera using Wi-Fi technology. It enables to directly link a rear vision camera to a Smartphone. Thus, the Smartphone substitutes for the navigation screen.

- **Water Cooled Charge Air Cooler**, is a compact brazed aluminum heat exchanger cooled by water which allows fuel economy and emissions reductions. The system is applicable for charged, diesel or gasoline engines.

All these innovations are designed to improve the relationship between drivers and their vehicles.



Valeo is confirming its status as a global partner for automakers, capable of producing concrete, accessible innovations to make vehicles safer, more economical and easier to drive.

Valeo's presence at Auto Expo is in line with the Group's strategy to reduce carbon dioxide emissions and develop in high-growth countries.

Widely recognized as the most innovative automotive supplier, Valeo channels 6% of its sales into R&D, and files over 600 patents every year.

Valeo in India works with most OEMs supplying products that aim to provide maximum safety, better driving comfort, and more fuel efficiency to help reduce CO₂ emissions. With over 2 000 employees working out of 5 productions sites and an R&D Center in Chennai.

Valeo is an independent industrial Group fully focused on the design, production and sale of components, integrated systems and modules for the automotive industry, mainly for CO₂ emissions reduction. Valeo ranks among the world's top automotive suppliers. The Group has 125 plants, 21 research centers, 39 development centers, 10 distribution platforms and employs 67,900 people in 28 countries worldwide.

Valeo stand: Hall 15 B

For additional information, please contact:

Media Department
Phone: +33 1.40.55.21.75/+33 1.40.55.37.18

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I - Valeo's five highlights at the Auto Expo in Delhi

Restart

Restart, a reinforced starter, is a component of the Valeo Stop Start system which allows the vehicle to start-up immediately and silently. It is a reinforced starter that offers extra durability for repeated stopping and starting. ReStart adapts to all types of engine, and all displacements, and can also start the engine at extremely low temperatures. The system does not require the vehicle's architecture to be modified, and can therefore be fitted very quickly. The system operates when the vehicle is at a complete stop. Valeo is currently working on developing a reinforced starter capable of restarting an engine while still rotating, allowing for increased functionality.

Integrated Speaker Control Unit for parking assistance

Valeo's Integrated Speaker Control Unit for parking assistance system is a world premier at Auto Delhi.

Valeo presents at Auto Expo in Delhi a new derivative of its park assist system for the local Indian market providing a seamless integration into the existing vehicle electronic architecture and thus being universally applicable.

This is great news for consumers in regards to broad adoption and availability of this product in the near future at an affordable price.

Valeo starts to deploy advanced technological bricks of its Driving Assistance portfolio which are compatible with the Indian market and contribute to Valeo's 2020 vision of autonomous parking & manoeuvring which has been presented at the last IAA in Frankfurt with the "Park4U Remote".

The Integrated Speaker Control Unit for parking assistance system is available as a 3 or 4 channel system with the rear loud speaker and the electronic control unit being integrated into one housing (eliminating one component and reducing wiring harness costs). The obvious benefits are low weight, small packaging space, less required hardware and assembly time.

This stand-alone system is independent of a display or extra on/off buttons. The power supply is ensured through various options, either through the reversing light or a clamp or through separate reverse gear input leading to seamless integration into existing vehicle electronic architectures.

The digital sensors meet the highest automotive quality standards at Valeo as well as the high-performance software modules enabling different functionalities from standard park assist to fully automatic parking "Park4U Remote" as shown at the last IAA in Frankfurt. The scalable software modules offer car manufacturers' the opportunity for differentiation.

Water Cooled Charge Air Cooler

Water Cooled Charge Air Cooler is a compact brazed aluminum heat exchanger cooled by water which allows fuel economy and emissions reductions. The water-cooled charge air cooler improves acceleration and reduces consumption by up to 2% compared to a conventional air-air cooler.

Most diesels, and an increasing number of gasoline engines, are turbocharged. Turbocharging increases power for the same cubic displacement, or produces the same level of power with reduced fuel consumption and pollutant emissions.

The intake air entering gasoline or diesel turbocharged engines is traditionally cooled by an air-air heat exchanger located at the front of the vehicle. Valeo has developed a different concept for improved air cooling: an air-to-water heat exchanger in which the air leaving the compressor is cooled by a cold water flow. The main benefit is more efficient cooling, thanks to the heat capacity of water, which is four times greater than that of air. Furthermore, the intake air circuit is shorter, which reduces the engine's lag time when accelerating sharply.

It is located in the engine's intake manifold, eliminating the need for hoses between the engine and the front end of the vehicle. The reduced volume between the compressor outlet and the intake valves reduces response time when accelerating.

The time taken to reach maximum turbocharging pressure at the engine intake is cut by about 250 milliseconds at 1,500rpm, or 14%.

LEDs

Reducing CO₂ emissions also means improving the overall energy equation of an average automobile. LED lighting is one part of the solution. Its light output makes it the most efficient source of light for automotive vehicles. For an equivalent quantity of light, LEDs will consume 12W in low beam by 2013, whereas halogen bulbs need 65W. A vehicle using LEDs instead of traditional bulbs for all lighting and signaling functions would save 2.8 grams of CO₂ per kilometer.

Wi-Fi® Rear Camera

The Wi-Fi® Rear Camera is a vision camera using Wi-Fi technology. It enables direct link between a rear vision camera and a Smartphone. Thus, the Smartphone substitutes for the navigation screen.

The Wi-Fi® Rear Camera is stand alone. The kit includes a wireless rear camera and a Smartphone application. First shown to the public, it limits the risk of accident with pedestrian, objects and other vehicles. The system also enables quicker and easier parking manoeuvres and driving assistance. The Wi-Fi® Rear Camera requires less mounting time compared to wired solutions, making assembly easier for OEM's.

■ II - Valeo's strategic priorities

A strategy focused on curbing CO₂ emissions

Valeo is a world leader in almost all its product lines. It is organized into four Business Groups: Powertrain Systems, Thermal Systems, Comfort & Driving Assistance Systems and Visibility Systems.

Valeo's ambition is to be the partner of choice of automakers for CO₂ emissions reduction in all market segments. Innovations developed by the four Business Groups include solutions for fuel, electric, and hybrid vehicles.

Powertrain Systems

The Powertrain Systems Business Group covers all activities relating to the vehicle's powertrain. Its mission is to develop solutions that reduce fuel consumption while maintaining driving pleasure. Innovations target conventional engines (see Stop-Start, p.8, SAT, p.9) and systems designed for hybrid and electric vehicles (for example the electric motor and inverter for hybrid and electric vehicles).

Thermal Systems

The Thermal Systems Business Group develops energy management solutions for propulsion systems and comfort solutions for the passenger compartment. A/C compressors and innovative front end module solutions complete the product portfolio. These solutions contribute significantly in reducing consumption and the emission of polluting gases and harmful particles from thermal engine vehicles.

In addition, the Business Group engineers systems designed to improve the range and maximize the lifespan of batteries for hybrid and electrical vehicles.

Comfort & Driving Assistance Systems

The Comfort & Driving Assistance Systems Business Group designs systems relating to the driver's interface with his or her environment and the vehicle. These smart driving systems create a bridge between a vehicle and a Smartphone or a tablet computer. Other products automate certain maneuvers like Park4U[®], semi automatic parking assistance. Sensors (radar, ultrasound, cameras) have also been developed that allow the driver to survey the driving environment (see 360Vue[®], p.10).

Visibility Systems

The Visibility Systems Business Group develops lighting and wiper systems that support the driver in all driving situations. The mission of this Business Group is to produce systems that weigh less and are more energy efficient, while improving safety and comfort (see BeamAtic PremiumLED p.12).

The entire range of systems is designed for all market segments.

All the Business Groups contribute to Valeo's growth. Their activities break down as follows:

BG	Powertrain Systems	Thermal Systems	Comfort & Driving Assistance Systems	Visibility Systems
2010 sales (€ bn)	2.7	2.9	1.7	2.3
Headcount	14,800	14,400	10,699	16,600
Production plants	30	36	22	35
Research centers	4	4	10	6
Development centers	15	11	10	24
Patents filed	122	191	186	116

The Group is also looking to boost its position in high-growth markets such as emerging countries and Asia. It plans to generate 30% of sales in Asia by 2015. As the world's largest automobile market with 17 million vehicles produced in 2010, Valeo should be able to double its sales in the Chinese market by 2015 (48% growth registered between 2009 and 2010). The Group has also strengthened its business in India (up 81%) and Korea (up 38%).

In order to ensure "above average" organic growth in every region, Valeo's R&D is supporting the Group's growth all over the world. Valeo invests 6% of its sales in Research and Development and plans has recruited over 1000 engineers in 2011.

Technical solutions designed to cut CO₂ emissions and promote growth in emerging countries lie at the heart of Valeo's strategy. Valeo's ambition is to outperform global automotive production by 3% a year from 2011 to 2015 and to post €14 billion sales by 2015. In the first half of 2011, the Group recorded net income of €218 million, up 30% - its best growth for 13 years.

III - Valeo technology serving the environment

Valeo designs new technologies to help deal with today's major environmental challenges while improving driving comfort, performance and safety.

80% of Valeo's product portfolio is linked to reducing CO₂ emissions, for all types of vehicles.

Reducing fuel consumption

There are several areas where improvements can lead to reduced CO₂ emissions in internal combustion engines, starting with fuel consumption. Valeo offers opportunities to optimize powertrain systems in three areas:

- **Improved thermo-dynamics in internal combustion engines through:**
 - Downsizing the engine, reducing engine displacement while maintaining overall performance.
In order to maintain the same power as the original engine, downsized engines need to be charged by a turbocharger. Valeo provides both cooling systems and an electric supercharger for the intake air that allows for higher charge pressures and direct fuel injection systems to improve combustion and avoid engine knock.
 - Optimizing the engine's compression ratio.
Valeo's innovative cooled EGR solution for gasoline engines enables significantly increased compression ratios (and therefore performance) without negative effects on the engine (such as engine knock). The system is adapted from diesel engine EGR systems and allows real-time optimal combustion control in gasoline engines, thereby providing a fuel saving of 4 to 7%.
 - Engine thermal management, with real-time, precision control of the cylinder-head temperature thanks to the Themis™ electronic control valve.

- **Low speed engine optimization**

Optimizing engines at low RPM, or "down speeding", can be achieved using longer gear ratios. To maintain driving comfort, vibrations need to be filtered out at low engine speeds, and more torque supplied. Valeo has three solutions that contribute to this goal:

- High performance long travel dampers to dampen torsional vibrations.
- Dual clutch transmissions.
This continuously optimizes gear ratios for optimum energy efficiency. Valeo has opted for a dry clutch solution with electro-mechanical actuators as the best energy-saving solution. The reduction in CO₂ emissions is approximately 2% on a manual transmission and 8% on a hydraulic automatic transmission.
- Air intake modules.
These improve response time for turbochargers by up to 500 ms, thus enabling faster acceleration rates at low RPM.

- **Electrification / hybridization of powertrains**

The addition of an electric motor allows the internal combustion engine to be used more efficiently, thereby using less fuel for the same workload. Different hybrid systems exist depending on the power of the electric motor. They start with Stop-Start which shuts off the combustion engine temporarily during short stops.

The next step in electrification, called "Affordable Hybrid", recovers energy during deceleration and re-uses it during acceleration (regenerative braking), assisting the combustion engine. Valeo's "Affordable Hybrid" is a low voltage system (48V) with a new compact motor-generator. This is a much cheaper solution than current high-voltage hybrid systems.

Energy efficiency

Valeo offers LED systems for all front and rear lighting applications. The Volkswagen Passat, Peugeot 508 and Citroën C5, for example, all have LED daytime running lights. The BMW 6 series GT and Land Rover Evoque both have Valeo LED fog lamps, and the first mass-market electric car, the Nissan Leaf, features LED low beams developed by Valeo and its partner Ichikoh, a product that received the Nissan Global Innovation Award in July 2011.

Smart driving

One of the Group's priorities is to reconcile CO₂ emissions reduction with improved driving quality. Smart driving has three objectives: facilitating urban manoeuvres like Park4U[®], driving assistance system the 360Vue[®] system, p.10), enhancing the Human Machine Interface and the development of remote interaction between the driver and the vehicle.

IV - A range of innovative technologies supporting Valeo's global development

Several Valeo technologies that are already available on the Indian market are likely to see significant up-take in the years to come. They include Stop-Start systems, Clutch Self Adjusting Technology (SAT), Valeo's Exhaust Gas Recirculation, 360° vehicle vision, Rain-Light-Humidity Sensor, Flat Blade, BeamAtic® PremiumLED and Compact Module air-conditioning systems.

Stop-Start systems

A comprehensive Stop-Start range: i-StARS starter-alternator, ReStart reinforced starter

The Stop-Start function cuts off the engine automatically when the vehicle is stationary. Two Valeo systems, the i-StARS starter-alternator and the ReStart reinforced starter, make this possible by allowing the engine to restart immediately and silently. They can be adapted to different transmissions.

In the city, cars are at a standstill for almost 35% of the time, with their engines idling needlessly. Automating engine cut-off and restart has therefore become a significant technology in efforts to reduce CO₂ emissions. The automated Stop-Start function provides fuel savings of around 6% in European standard mixed cycle use, and up to 15% in congested city driving.

The first system, the i-StARS starter-alternator, replaces the alternator. The engine is started immediately and silently via the belt drive that permanently links the system to the crankshaft. In alternator mode, the power electronics improve the system's electrical efficiency making it also the most efficient alternator on the market. The integration of control and power electronics in the unit makes it easier to install in the engine compartment and reduces the system cost. The i-StARS starter alternator can be adapted to any engine Stop-Start strategy specified by the automaker. i-StARS shuts off the vehicle's engine when vehicle speed drops below 8 km/h for automated transmissions, and below 20 km/h for manual transmissions. Engine restart is immediate (400 msec), noise and vibration-free, even if the driver unexpectedly changes his or her mind while stopping. The system adapts to all manual and automatic transmissions.

In vehicles equipped with the Start-Stop function, Valeo's Stop-Stay-Cool system keeps the air conditioning running when the compressor is shut off.

StopStayCool represents an air conditioning technology specifically developed for vehicles with the stop-start function and ensures passenger comfort during the motor stop phases. The core component is a new type of storage evaporator that works exactly like every state-of-the-art evaporator, but can as well "store cold". This stored cooling power allows the air conditioning to remain running in the passenger compartment even during the periods in which the stopped combustion engine cannot power the mechanical climate compressor any more.

The storage function is enabled by a specific phase change material (PCM) that is embedded in the evaporator. This material is charged during the engine-on phases with cooling power, stores this power and releases the stored cooling power during the engine-off periods. The storage capacity is sized to cover nearly 95% of all expectable stop phases.

Over 50 vehicle models will be fitted with Valeo Stop-Start systems by 2015.

Clutch Self Adjusting Technology (SAT)

In an older vehicle that has been driven a lot, the consumer would expect the drivability to remain constant.

Valeo Clutch Self Adjusting Technology enables to keep a constant pedal effort over clutch lifetime.

The Valeo compact patented device detects mechanically any facing wear by pressure plate and diaphragm position. The wear is compensated through a toothed ring turning slightly the fulcrum ramp, allowing a constant bearing and diaphragm position over time.

This incremental actuation by an irreversible worm gear is neither sensitive to shocks and vibrations nor to centrifugal forces. This makes the operating mode independent of the diaphragm shape without any sensitivity to disc cushion or any load balance changes during life time.

Thanks to Valeo Self Adjusting Technology, the driver enjoys changing gears with constant effort on the clutch pedal.

Exhaust Gas Recirculation (EGR)

Valeo's Exhaust Gas Recirculation (EGR) is an efficient, cost-effective system for reducing NOx. The high-pressure EGR looptakes part of the exhaust gases at the cylinder head outlet and re-injects them into the air intake. The main benefit is that NOx is reduced at the source by limiting the quantities formed in the combustion process rather than by post-treating the gases. The result is a cleaner combustion process.

The electric EGR valve is made up of an electric motor, gearing, a cam system, a valve and a position sensor. With a high-power DC motor, the valve can be fully opened or closed in just 100 and 75 milliseconds respectively. One of the system's most distinctive features is the progressive cam-driven control device that converts the rotary movement of the engine into a controlled downward travel of the valve. The cams can be used to address several priorities according to valve travel.

Firstly, the valve's opening mechanism must be very reliable. In a highly corrosive environment, there is a danger of the valve being jammed by soot deposits or oil combustion residues. The rotation/travel ratio of the cam increases the thrust force by significantly gearing down the movement. Once the valve is open, the second priority is the speed of travel of the valve. The gradient of the cam is then gradually increased. The cam also ensures that the valve can be closed tightly and quickly. The cams are linked to the valve by two bearings that eliminate friction and risk of seizure.

Valeo has opted for an outward-opening valve for greater dependability since the high exhaust gas pressure generated by a turbocharger applies a force that tends to close the valve. Pressure loss in the gas recycling circuit is low thanks to the clearance area, the aerodynamics of the valve head, and the small diameter of the shaft. This property is especially important when idling and with very low loads. A Hall-effect sensor precisely measures the position of the valve. This is an important point since a precise recirculation rate reduces the flow tolerances and, importantly, enables the engine to meet the Euro V.

The capacity to cool exhaust gases is another major factor contributing to the reduction of NOx and Valeo has succeeded in improving the heat exchange capacity with the engine coolant. The round corrugated tubes developed for Euro IV have been replaced by flat corrugated tubes to meet Euro V and Euro VI emission standards. This increases the heat exchange surface, resulting in thermal efficiency of 85% and a reduced exhaust gas pressure drop. The U-shaped heat exchange circuit reduces the dimensions of the part. The gases can bypass the cooler via a pneumatically controlled flap. This function is essential for Euro V-compliance and is useful after engine cold start, when the temperature in the combustion chamber must increase quickly in order to minimize HC and CO emissions.

360Vue® system: all-round vehicle vision

360Vue® gives the driver an aerial view of the vehicle on the dashboard's central display, offering complete visibility of the vehicle's immediate environment. The driver can carry out maneuvers in complete safety, around low obstacles, near blind corners and exiting parking spaces.

The system consists of four miniature digital cameras and image-processing software. The cameras are embedded in the external rearview mirrors, the front bumper and the tailgate, providing the driver with a consistent wide-angle image on the multifunction screen located on the center console and offering a real bird's-eye view of the car. The system can either display a single image or several views simultaneously on a split screen, and the driver can also select images on the screen, by choosing the wide-angle rear view, for example, during parking maneuvers. This technology is intuitive and user-friendly: it was designed for the greatest possible precision during maneuvers, using a dynamic grid overlaid on the image.

By the end of 2011, 17 models representing five different brands will be equipped with Valeo's multi-camera all-round vision solution. Vehicles already offering the system include the BMW 5 Series and 7 Series, the Volkswagen Touareg and the Range Rover Sport.

Rain-light-Humidity Sensor

Driving in the rain is one of the more unpleasant situations for drivers. Restricted visibility, reflections and changing volumes of rainfall tax the driver's concentration. Sensors which automatically control the windshield wipers lighten this load considerably and are more and more becoming standard equipment on new cars.

In addition to the normal function of measuring the rainfall, the sensor also automatically switches on the lights in low light, and turns them off as soon as the light improves. Tunnel entrances are recognized early, in order to turn the lights on in time. Valeo has combined all these functions in a single sensor, which is so small that it can be integrated almost invisibly into the mirror arm.

This generation named **Rain-Light-Tunnel Sensor** is already in production with the Indian carmaker Tata.

With the new **Rain-Light-Humidity Sensor**, Valeo has now expanded the so-called Rain-Light-Tunnel sensor with another consumer-friendly function: the sensor module measures the temperature and relative humidity at the windshield and accurately assesses the danger of misting up. By intelligently controlling the air-conditioning, this can be prevented even before the driver is aware of impaired visibility. In addition to clear vision improving safety, the sensor also helps to reduce fuel consumption and emissions by enabling an intelligent use of the air-conditioning compressor. In addition, the humidity inside the vehicle can be controlled more precisely, thus improving the well-being and the concentration of the driver, particularly on long stretches. The Rain-Light-Humidity sensor is making its debut in the brand new Porsche Panamera.

Valeo is already working on further functions for this unassuming, but now irreplaceable, multifunction sensor. The main priority is to retain the compactness of the sensor. This is becoming increasingly important as the sensor frequently has to share space at the rearview mirror with a video camera. Valeo is doing its part by offering the world's smallest rain sensor and one of the smallest front cameras available, thus ensuring that the driver's field of view is not impaired, as well as preserving the design of the interior. Even today, the camera and sensor together offer an abundance of functions to make driving more convenient, safer and more environmentally friendly.

Valeo, one of the world's leading suppliers of rain sensors, has further developed this technology, creating a true multifunction sensor. In addition to making things easier for the driver, the aim is to make driving safer and reduce fuel consumption.

Flat Blade

The large three-dimensional windshields of modern vehicles can often causes problems of visibility for motorist. The wiper blades are longer than ever and the multitude of articulated levers is insufficient to press the blade uniformly against the windshield at high speeds or when driving in bad weather.

The travel of the wiper blade must follow the curve, three dimensional shape of the windshield, while applying sufficient pressure along the entire length of the blade to expel the water.

Flat Blade 2 features a single spline that is built into the blade and a hard rubber spoiler. This concept distributes the pressure across the entire surface of the blade more evenly than wiper arms with articulated levers. The wiping capacity is increased under all circumstances, especially up to 220 kph, and the accumulation of snow on the blade is reduced.

Flat Blade 2 models are available in length ranging from 350 to 700 mm, which cover most of the market.

The aerodynamic flow applied to the wiper blade deflector is determined by the vehicle speed and the positive or negative wind speed. This observation explains why it is so important to increase the limit at which the blade lifts from the windshield. In order to achieve sufficient contact pressure between the blade and windshield up to air flow speeds of 220 kph, Valeo separated the spoiler from the blade, changed its shape and make it using rubber that is more rigid than the rubber used to make the blade. These aerodynamic improvements also apply to the lower part of the blade, which was changed to avoid the generation of positive lift.

The single built in spline reduces the width, while improving visibility and reducing the risk of the accumulation of snow, thanks to the reduced volume beneath the spline. Another critical point is that the wiping capacity remains optimal right up to the ends of the blades. This development is significant especially in view of the increase in the height of windshields, which now require a greater wipe radius.

The blade is also 50% lighter than blades with traditional wiper arms. A 600mm Flat Blade weighs just 101 grams!

BeamAtic® PremiumLED

BeamAtic® PremiumLED headlamps allow high-beam lamps to be used at all times, in all circumstances. The shape of the beam is adjusted to avoid blinding oncoming motorists, leaving the road fully lit, apart from the portion occupied by the vehicles detected by the system.

Powerful data-processing software and a BeamAtic® camera located at the top of the windshield are used to detect oncoming and overtaking vehicles.

The system also anticipates variations in altitude (going over the top of or down a hill) and adjusts the vertical direction of the beam, so that the headlamps can always stay on high beam without blinding other drivers.

BeamAtic® PremiumLED technology is twice as efficient as Xenon and five times as efficient as halogen headlamps. LEDs have a lifespan significantly exceeding that of the vehicle itself. In addition, the color of the light - equivalent to daylight - provides greater visual comfort. LED lighting systems also offer greater style differentiation, giving designers considerably more freedom in the styling and customization of the vehicle's front end.

The BeamAtic® PremiumLED system will be equipping a mass-market vehicle by 2013.

Compact Module air conditioning

The compact Module is composed by a Fan system, mechanically fixed to a radiator core with simplified brackets, which allows a low cost and light Engine Cooling Module.

This module allows an optimization of the packaging, specially in X axis. Costs and weight benefits are achieved due to focus on basic functions of the sub-assembly.

The overall concept is adapted to the mechanical Radiators.

The Compact Module is adapted for vehicles with small engines and low pressure drop engine cooling modules.

It has been launched in production and equips A-segment cars in Europe and South-America.

The Fan system can be located anywhere on the radiator core which brings packaging flexibility and facilitates the installation in the engine compartment.

The fan is made with a bell mouth ring which enables an electrical power up to 150 W.

V – Valeo profile

Valeo is the world's leading automotive supplier that designs and manufactures auto components, integrated systems and modules for cars and trucks in the original equipment market and the after market. Present in 28 countries, the Group employs 67,900 people at 125 production sites, 21 Research centres, 39 Development centres and 10 distribution platforms.

Valeo focuses on the development of innovative technologies that provides maximum safety, better driving comfort and more fuel efficiency. The Group offers solutions for reducing the consumption of internal combustion engines, as well as for hybrid and electric vehicles, and for lowering the energy consumption and weight of components. Valeo has a streamlined organization comprising four Business Groups (Powertrain Systems, Thermal Systems, Comfort and Driving Assistance Systems, and Visibility Systems) and the Valeo Service aftermarket activity.

Valeo entered the Indian market through a JV with Amalgamations Group in 1997 and the production of Clutches started. In 2005, the R&D center of Valeo in India was set up to provide research and development support to Valeo's engineering activities across the globe. Valeo joined hands with the Minda Group, Pune in 2007, to start production of starters and alternators. This was followed by the setting up of Valeo Lighting Systems and Valeo Engine & Electrical Systems in 2008.

Today Valeo India is one of the key players in the auto components industry and the only player to offer a wide product portfolio to the OEMs. With over 2000 employees working out of 5 production sites and a Research Center in Chennai, Valeo supplies for all major OEMs in the country. The company plans to localize the entire range of Valeo global products, including some of the advanced technologies and innovation and make it accessible for the Indian customers.

Global Milestones:

Valeo's beginnings can be traced back to 1923, when Eugène Buisson, the French representative for Ferodo brake linings, opened workshops in Saint-Ouen (France) to manufacture, under license, his own brake linings and clutch facings. A few years later, he began manufacturing complete clutches. In 1932, the company was listed on the Paris Bourse. On the eve of World War II, the company owned almost all patents on clutches.

The company then made a series of acquisitions, created new subsidiaries in Spain and Italy, built plants and became a key player in the modernisation of automotive components. By acquiring Sofica and becoming a shareholder in Usines Chausson, the company was able to integrate a third core business - thermal systems. The subsequent acquisition of SEV-Marchal enabled the company to incorporate electrical and then electronic activities. The electrical activity was later strengthened by the acquisition of Cibié-Paris-Rhône and Ducellier.

In 1980, the shareholders chose the name VALEO, which means "I'm fine" in Latin, to unite the different brands and teams under the same name. In 1987, the Group adopted a major international expansion strategy. With the acquisition of Neiman and its subsidiary, Paul Journée, Valeo entered the security systems business and was able to strengthen its wiper and lighting activities. By acquiring ITT Industries' electrical systems business, the company was able to assert its leadership position as leader in wipers and park-assist systems.

For more information see www.valeo.com