



IN WHAT WAYS DO YOU APPLY THEIR INPUT TO YOUR R&D ACTIVITIES?

During the development of Omala HD gear oil, as an example, we sought input from companies such as Gamesa, GE Energy, Siemens Wind Power, SKF, Winergy, and Vestas Wind Systems to determine their needs so we could provide the list of requirements to meet their specifications. That performance envelope addresses everything from the temperature of the operating environment to compatibility of the oil with the filters, paints, and various elastomers within the system. That same attention to detail has been applied to the development of all our lubricants for wind applications, which in addition to Omala HD 320 synthetic gearbox oil includes Tellus Artic 32 hydraulic fluid for extremely cold environments and Rhodina BBZ to protect blade bearings against fretting corrosion, moisture contamination, and false brineling. We also offer Tivela S 150 and 320 synthetic gear oil for yaw and pitch drives, Albida EMS 2 electric motor bearing synthetic grease, Stamina HDS main bearing grease, and Malleus GL and OGH grease for open gears. So you can see that we've put a great deal of time and effort into developing highly specific products for all the major contact points within a wind turbine, and we've also formulated these lubricants with a performance profile broad enough to be suitable for the vast majority of wind applications, no matter where they're found. We are also involved with various national and international industry bodies so that we'll have the opportunity to provide input into the development of standards and specifications.

I UNDERSTAND THAT YOU HAVE A GREAT DEAL OF INTERACTION WITH MANUFACTURERS, END USERS, AND OTHERS IN DEVELOPING YOUR LINE OF LUBRICANTS FOR THE WIND INDUSTRY.

It's definitely a teamwork approach. We have product development experts at the Westhollow Technology Center in Houston and also at the Shell Technology Centre Thornton in the United Kingdom. We have what we call OEM liaison contacts who work with manufacturers here in the Americas as well as in Europe and Asia, and then a team of product application specialists such as myself who service those same regions. Our role is to obtain information from the field about how our products are performing, and also to better understand the specific needs of our end users. We work very closely with the OEM liaison team, meeting with gearbox manufacturers, bearing suppliers, and filter manufacturers to understand the issues they're currently facing as far as manufacturing their components and also their reliability out in the field. We do the same thing with wind turbine manufacturers, discussing their current and future needs as we develop the next generation of custom lubricants for the wind industry.

WITH THE EXPECTED GROWTH OF THE WIND INDUSTRY BOTH HERE IN NORTH AMERICA AND AROUND THE WORLD, WHAT ROLE CAN WE EXPECT SHELL LUBRICANTS TO PLAY?

We are a key player in the wind turbine industry and can be a truly value-adding partner to customers throughout the entire wind turbine value chain. This includes not only component manufacture and initial fill, but also transportation of components by sea, land, or rail, and in construction and erection of the turbines through to operation and maintaining by service companies. We will continue working with manufacturers, wind farm operators, service suppliers, and many others to make sure that we understand their requirements and are meeting their needs for current as well as future designs. As the wind industry continues to grow and evolve there will be many opportunities for improvement, such as in the area of lubricant condition monitoring, which can be handled both online and offline. There will also be more wind turbine and component manufacturers from emerging markets such as China and India to factor in, and we'll be there to assist their entry and integration into a mature existing market. Since we're already working with suppliers on every continent, including these emerging markets, we're in a position to share the knowledge and expertise we've amassed over the years with our customers. In addition, we will continue to be mindful of the careful balance that must be maintained between providing the highest quality products possible and maintaining a realistic price point, so that the end user is assured of receiving a healthy return on their investment. It's our job to keep our finger on the pulse of this industry to ensure that our products will continue to meet all of our customers' needs, if not surpass them. ↘