

Schaeffler Global Technology Solutions

Agriculture

Innovative Chopper Shaft Solution for Combine Harvester

The customer referenced below is a leading manufacturer of agricultural and construction equipment with operations around the world.

Challenge for Schaeffler

The agricultural equipment manufacturer was looking for a high-performing bearing solution – specifically, for the chopper shaft used in the flagship combines produced at its U.S. facility.

The chopper shaft application is routinely exposed to high winds, extreme temperatures, dust, and crop matter. And because of the application's high speeds, effective sealing is typically impossible. In addition, engineers had difficulty maintaining the existing dimensions for the bolt pattern and shaft diameter, while also increasing bearing capacity and adapter sleeve thickness, as well as adapting castings to the larger outer diameter of the bearings.

Schaeffler Solution

In order to solve these multifaceted challenges, Schaeffler engineers from the U.S. collaborated with the Schaeffler engineering design department and sealing experts in Germany. After several design revisions, the joint team was able to come up with a concept that met all of the customer's requirements. The key factor was the cartridge seal design, which highly capsulates the bearing against contamination. Because the seals are routinely subjected to high temperatures, hydrogenated nitrile butadiene rubber (HNBR) was used as the material of choice. Subsequent tests showed that this material performs adequately up to 3 300 RPM. Thanks to the Schaeffler team's ingenious design concepts and revisions, the company was able to successfully accommodate the larger bearing size into the housing.



Technical Information about the Combine Harvester

Engine power:

300 – 590 hp

Threshing principle:

Rotor

Cleaning area:

5,0 – 6,5 m²

Grain tank storage:

9 000 – 12 500 liters

Max. header width:

12,5 m

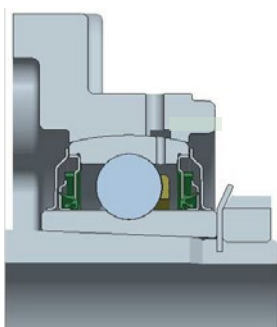
Weight unloaded:

15 000 – 20 000 kg





Schaeffler's engineering expertise helped the customer to find a first class solution



High performance cartridge seal with flinger shield for insert ball bearings



Teamwork and cross-location cooperation are the main ideas of the Schaeffler Global Technology Network

Customer Benefit

Schaeffler's solution far exceeded the customer's expectations, particularly from a technical standpoint. The customer received a high-performing solution that met all of their requirements: trouble-free operation in all environmental conditions as a result of a highly-effective seal solution, and durability under demanding conditions thanks to the use of larger bearings within the existing dimensions. In addition to the bearing solution, the customer was impressed by the coordination and teamwork within the Schaeffler Global Technology Network, as well as the rapid response times throughout the duration of the project. The Schaeffler Global Technology Network combines existing local expertise in the regions with the knowledge and innovative force of experts all over the world. Besides the Schaeffler application engineering departments in Germany and the U.S., the Schaeffler manufacturing team in Slovakia did an outstanding job on the prototype turnaround. Under the technical direction of the Off Highway Equipment Sector, this project has become a great success.

What's special

The described sealing solution is new to this marketplace. Based on the positive feedback from the customer, as well as highly promising field test results, the sealing solution is under consideration for a product-wide rollout in applications with similar requirements.

Technical Information about the Solution

Shaft Support:

Type:

INA Radial Insert Ball Bearing Unit

Designation:

F-609820.01.IBBU

Dimensions:

61,913 x 175 x 70 mm

Nested Drum Support:

Type:

INA Radial Insert Ball Bearing Unit

Designation:

F-609767.01.IBBU

Dimensions:

61,913 x 196 x 116 mm