

Load on the bearings in the hub carrier of the "Exige" rear axle

The encapsulated bearings, which form the connection to the upper and lower control arms in the rear hub carrier of the "Exige", can reach their load limits during motorsport use and track days.

The high deceleration values achieved with semi-slick tires, aerodynamic downforce on the rear axle, and driving over curbs can especially lead to significant axial forces in the lower bearing, resulting in greatly increased bearing play and ultimately pushing the bearings out of the bore.

(Figure 1 - Photo of the hub carrier after an accident on the racetrack)

We have made a rough calculation of the axial forces on the lower and upper bearings of the hub carrier and, as a worst-case scenario, come to an axial force on the lower bearing (force B_z) of 1,920 kg and on the upper bearing (force A_z) of 960 kg. (see drawing)

The following values were used for the calculation:

Static wheel load: 375 kg

Dynamic wheel load (2g): 750 kg

Wheel radius: 350 mm

Tire friction coefficient: 1.35

The standard bearings (see sectional views) have a sharp-edged outer housing, so that the axial forces can only be supported on the plastic bearing shell. Under extreme loads, the plastic in this area can be overloaded.

We have therefore developed a technical solution with a special spherical bearing from motorsport, which can withstand radial dynamic forces up to 9,300 kg and axial forces significantly exceeding the maximum values of our calculation.

