

Abstract

Method for determining the wear volume of a sliding-ring seal in singular wear events by means of high-temporal-resolution temperature measurement

The invention was developed against the background of the prior art described above, with the problem addressed by the invention being that of providing a method by which the state of wear at the point in time t of sliding rings and counter-rings in sliding-ring seals can be measured. The state of wear allows the calculation of a sealing- and process-specific wear volume, which cumulatively allows the prediction of a failure of the seal. The problem has been solved by a measuring method which measures the temperature at the sliding ring or the counter-ring with high temporal resolution. It has been found that there are typical temperature profiles (figure 4) from which the state of wear can be directly inferred. These temperature profiles differ from the normal temperature profile (T_N) by a brief rise in the temperature T_v followed by a fall to T_N . The underlying wear surface A_v is proportional to the wear volume and to the friction work. The start of a wear event begins with galling (figure 5). Particles are torn out from the surface. The size of the particles is material-specific. They are seal-specifically broken down in the sealing gap and expelled. This ends the wear event and the temperature falls to T_N .

Figure 4