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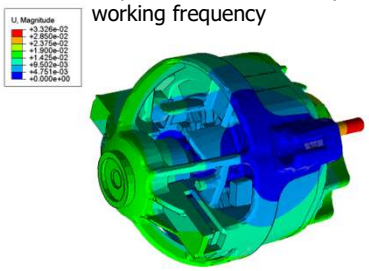
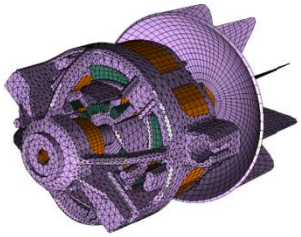
General Industrial Applications

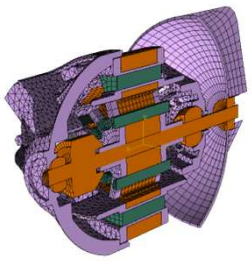
Structural and CFD analysis of an electric motor for noise radiation reduction

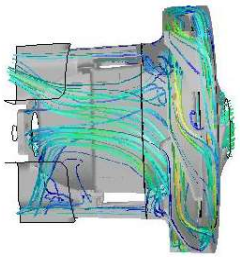
Analysis of the dynamical behaviour of an electric motor plastic cap, whose operational vibrations strongly exceeded the values allowed by the producer quality standards. The analysis consisted in the determination of the critical modal contributions to the vibration at selected points and in their suppression by suitable modifications of the plastic cap structure and of the motor fixation points. Fluid-dynamics analysis of the fluid paths with the evaluation of the noise sources in dB Optimization of the structure aimed at reducing of the noise level

Displacement contour map at the working frequency

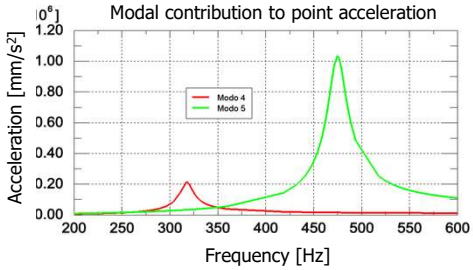


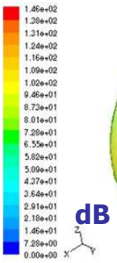




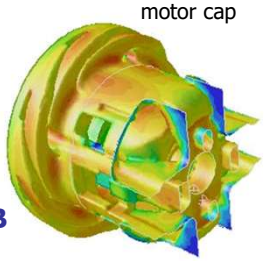


Forced air trajectories resulting from CFD analysis





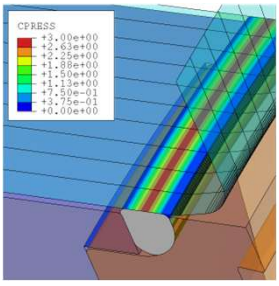
Distribution of noise sources around the motor cap



Positioning of a felt gasket

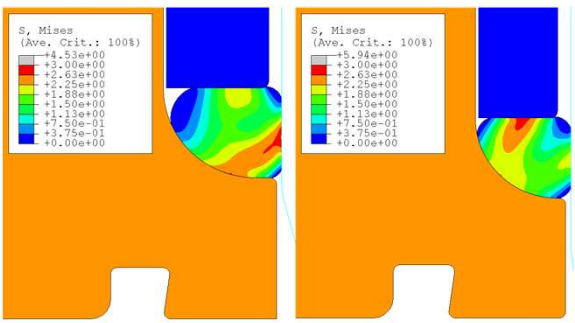
Felt gasket positioning within its operative seat performing:

- the calibration of a suitable material model for the felt gasket on the basis of experimental results;
- the definition of a finite element model for the standard machine and the analysis of the positioning process;
- the comparison of the results for the standard machine with those obtained with the modified geometry;
- the analysis of a new geometry to be designed based on the results of the previous issue.



Contact pressure distribution on the gasket

Standard vs modified machine: stress distribution in the gasket



Calibration of material model for gasket