Gears with top in-service performance developed for
hybrid and electric vehicles

Deliverable D4.1 (D6)

Characterization of the hardened layer obtained with each surface hardening treatment and steel variant

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PUBLISHABLE SUMMARY

New combinations of materials and heat treatments for gears are being developed and investigated within the TOPGEAR research project. To evaluate the material and heat treatment combinations, the first step was to characterise the surface properties on simple bolt samples. The characterisation of these bolt samples was carried out for different combinations of material and heat treatment. The characterisation included the determination of the surface hardness, the case hardening depth or nitriding and nitrocarburizing hardening depth and the core hardness as well as the evaluation of the microstructure and the observation of the edge oxidation.

Overall, the investigations carried out showed that the required demands could not be completely fulfilled by any of the heat treatments yet. However, by adapting the process variables used in the heat treatment, it is possible to achieve the desired specifications. As an example, this was shown by means of a follow-up core hardness investigation of a single sample. The characterisation of the previous samples provided the necessary information and findings. The information and knowledge gained with the characterisation can be used for further optimisation of the heat treatment process.