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Extensive Optimisation Analyses of the Piping of 2 large Underground Gas Storage Ariel compressors

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Abstract

Two large identical 6-cylinder Ariel JGB/6 compressors of each 8.5 Mw, are used for the underground gas storage (UGS) plant of Essent in Epe, Germany.
The compressors can be operated at a wide range of operating conditions, e.g. variable suction and discharge pressures, 2-stage mode during gas storage, 1-stage mode during gas withdrawal, capacity control by speed variation and valve lifters.
The system should operate safe, reliable and efficient for the complete range of operating conditions, which could be met with an extensive optimisation analyses during the design stage of the project.
For that purpose TNO has carried out a damper check, a pulsation and mechanical response analysis of the piping, a compressor manifold analysis and a thermal stress analysis.
This paper will indicate the different steps in the optimisation process and will focus on the interaction between the different analyses.
Finally, the results of vibration measurements after start-up of the system will be presented