



Pump Users  
International Forum 2008

# Technical Paper

## Energy efficient pump systems

### Session 14-1

## Frequency Converters and Hydrodynamic Couplings as Pump Drives

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## Summary

The Stadtwerke Düsseldorf AG is operating both frequency converters and hydrodynamic variable-speed couplings as speed control devices of centrifugal pumps for potable and raw water.

Economic and energetic performance of these drives depend not only on basic technical concepts but also on operating conditions encountered in practice: While frequency converters tend to present relatively constant losses independently of the chosen speed, the losses of hydrodynamic couplings increase with the speed reduction rate between motor and pump. Actual mechanical energy consumption of centrifugal pumps, however, is not only determined by rotation speed. The present pump head, determined by the installation at hand, and the individual pump's hydraulic characteristics play an equally important role in the conclusive evaluation of the achieved drive-efficiency.

In the present work the theoretical concepts of both drives are evaluated in terms of efficiency and then compared to values practically measured in day-to-day operation at the SWD-AG's installations. A preliminary Life Cycle Cost analysis for the two investigated types of drives is derived from these values.