

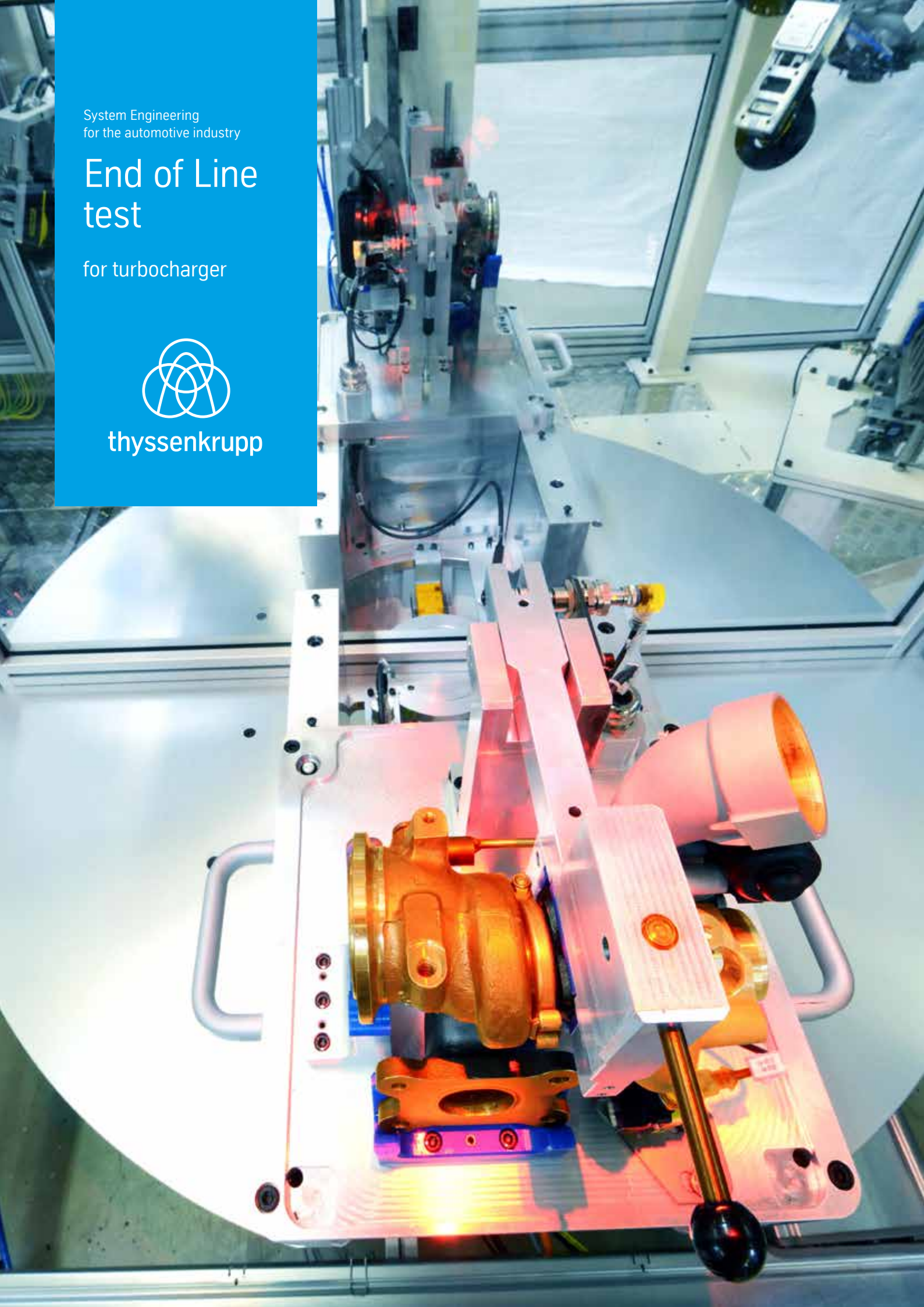
System Engineering  
for the automotive industry

# End of Line test

for turbocharger



thyssenkrupp





# End of Line test for turbocharger

Nowadays, it is state of the art to perform a final test on turbochargers before consigning them to the engine manufacturer. thyssenkrupp System Engineering succeeded in developing and launching an appropriate concept for this testing task. With our product, we help to ensure the high quality standards for the manufacturing of turbochargers.

Already in 2011, the first turbocharger function test stations were brought in production by thyssenkrupp System Engineering. Since then, further installations for different turbocharger suppliers followed. The newly developed compact and highly flexible system concept is the result of our experiences with the existing machines and current requirements of the turbocharger suppliers.

With this system concept we are able to carry out leak tests, function tests as well as combined leak and function tests in one single station consuming very little floor space. The scalability allows a continuous adaption of invest to the production requirements.

- The leak test verifies
- tightness of turbine and compressor housings
  - internal leakages (blow-by)

This allows the detection of casting or assembly defects such as missing or wrongly assembled components like V-clips, sealing rings, piston rings, etc.

- The function test
- checks the turbocharger in dynamic condition for correct operation by a sophisticated evaluation of different measuring values, e.g. speed and boost pressure
  - includes the verification of installed sensors and actuators (e.a. waste gate, dump valve, adjustment of the turbine blades (VTG) of the turbochargers, ect.)

The evaluation of structure-borne or airborne noise can also be used for an extended analysis. Additionally, the correct assembly of components can be verified with an optional camera system.

The evaluation of the measuring signals is done with the thyssenkrupp System Engineering test stand software ups64, gathering more than 25 years of experiences in software development for test stations - the ups64 software is powerful tool for statistical quality evaluations and convenient parameter settings. The ups64 HMI is available in many different languages (Chinese, Russian, English, etc.).

By the use of robots our test stand features the required flexibility with regard to the type variety. New turbocharger variants can be implemented significantly easier. The part supply to the station can be done either manually or fully automatically (e.g. gantry, robot, etc.).

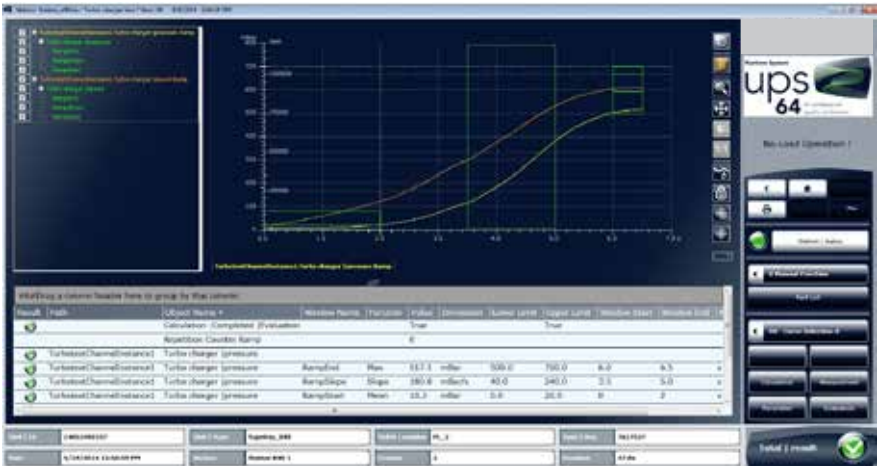


Example of an End of Line Test bench for turbochargers

The following turbocharger faults can typically be detected:

leaky turbine/compressor housing	S/X
damaged compressor wheel	X
damaged turbine wheel	X
defect VTG and WG actuator	X
insufficient boost pressure	X
noise & pulsation	(X)
turbocharger response	X
pre-damaged (seized) bearing	X
tight bearing (increased friction)	X

- S = static test  
X = usually  
(x) = mapping required



ups64 display of the turbine speed and the boost pressure over time

In summary, the concept offers the following features:

- field-tested measuring concept for reliable quality assurance
- a small footprint in the “whole”
- consideration of accessibility and maintainability
- convenient setup of the system for new turbocharger variants within a few minutes
- scalability of the invest by flexibility with regard to the test scopes depending on the cycle time (function test, leak test, combined)
- use of the proven thyssenkrupp System Engineering measuring software ups64 with all its advantages

Automotive Technology  
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