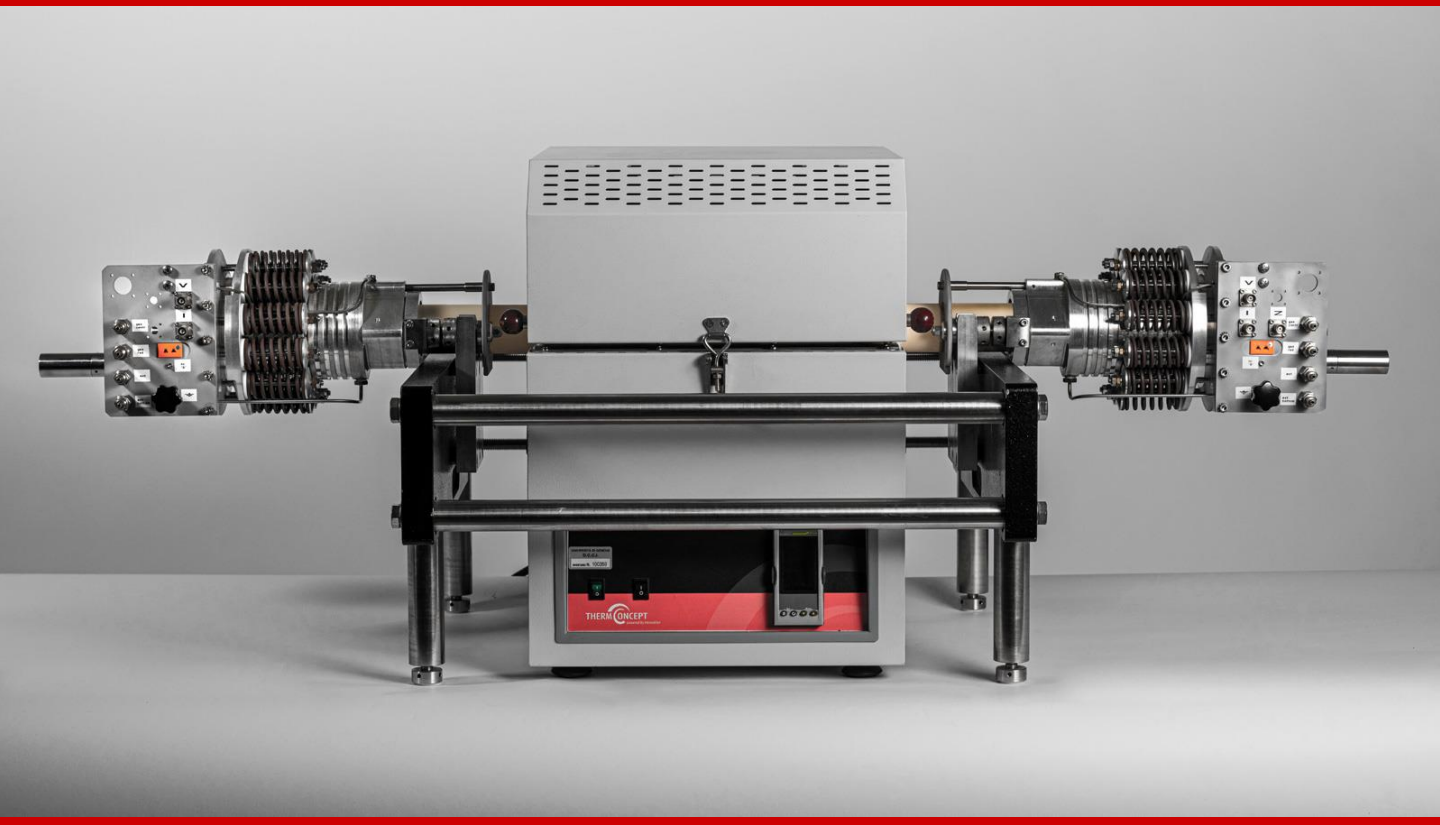
REAL LIFE TESTER



CASE STUDY AUTOMOTIVE

EXHAUST SYSTEM

Analysis of phenomena that reduce the life cycle of endothermic engine exhaust systems

ERGO

REAL LIFE TESTER

EXHAUST SYSTEM

PROBLEM: Analyze the phenomena that cause the deterioration of the exhaust system of an endothermic engine to increase its operating life cycle.

SOLUTION: Analyze with Real Life Tester the corrosion and oxidation phenomena of the steels used in the exhaust system, recreating in the laboratory the operating conditions to test the phenomena on different types of alloys and choose the one that guarantees the best performance.

The exhaust system of the endothermic engine is one of the elements that are most subject to wear and tear in means of locomotion.

The alloy that composes it is in fact subject to strong temperature changes, corrosion of exhaust gases acting from the inside, and oxidation resulting from atmospheric conditions acting from the outside.

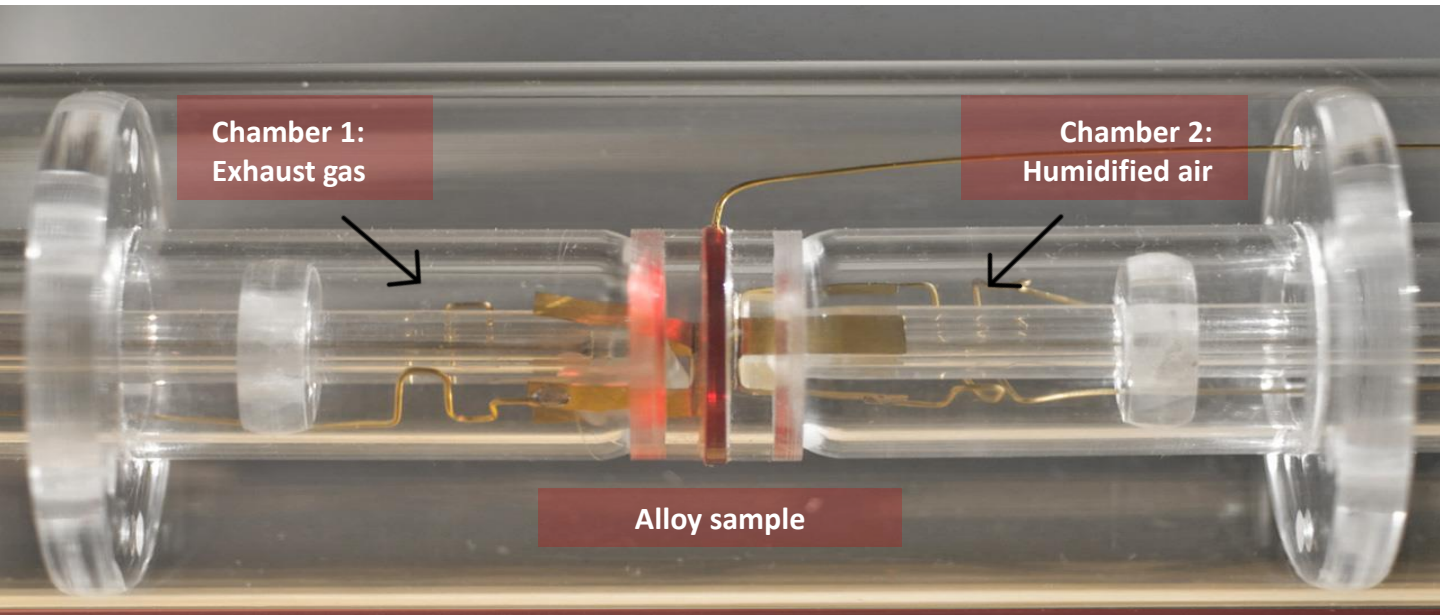
Therefore, being able to bring a small sample of material to the working temperature and apply both the exhaust gases and the oxidizing air conditions simultaneously on both sides is the best way to faithfully reproduce the operating conditions of the material and study the effects of deterioration.

REAL LIFE TESTER

EXHAUST SYSTEM

PROCEDURE

Insert the alloy sample inside the Real Life Tester, bring the environment to a working temperature of about 500°C and let the combustion exhaust gas flow in one chamber and humidified air in the other (each chamber is in contact with only one side of the sample). A further increase in temperature and pressure will speed up the processes that are the subject of the study.



Detail of the material sample inside the Real Life Tester.

RESULTS

By performing long test cycles under operating conditions that are multiple of the normal operating conditions, it's possible to increase the rate of material deterioration and estimate the failure point of the steels used.

MEASUREMENTS

The 4-pole measurement of material resistance is considered a very effective method. The degree of oxidation of the steel used increases in fact the resistance to the passage of current. The addition of a fifth pole gives the possibility to separate the contributions and monitor the behaviour of the sample on each face. The circuit made in platinum avoids any possible alteration and allows to collect data even in extreme operating conditions.

REAL LIFE TESTER

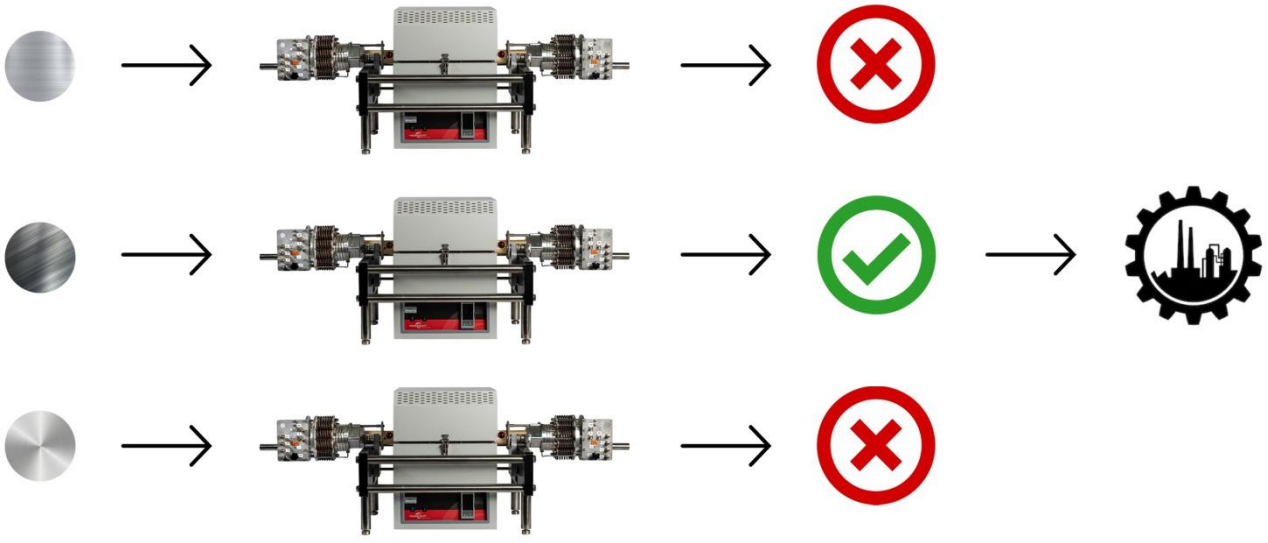
EXHAUST SYSTEM

ENHANCE THE PRODUCT PERFORMANCE

Thanks to test cycles that can last from a few hundred to several thousand hours, it is possible to calculate the material's behaviour and thus its life cycle. In this way it is possible to compare several candidate materials for the same function in order to choose the one that guarantees the best performance in the long term.

REDUCE TIME-TO-MARKET BY UP TO 5 TIMES

By placing more Real Life Testers to work in parallel on different samples, at the end of a single test cycle it is possible to immediately compare the data collected on the various types of steel and choose the most performing one.



REAL LIFE TESTER

REAL LIFE TESTER HAS BEEN DEVELOPED IN COLLABORATION WITH

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REAL LIFE TESTER HAS PRODUCED DEMONSTRABLE RESULTS IN THE FOLLOWING EUROPEAN RESEARCH PROJECTS

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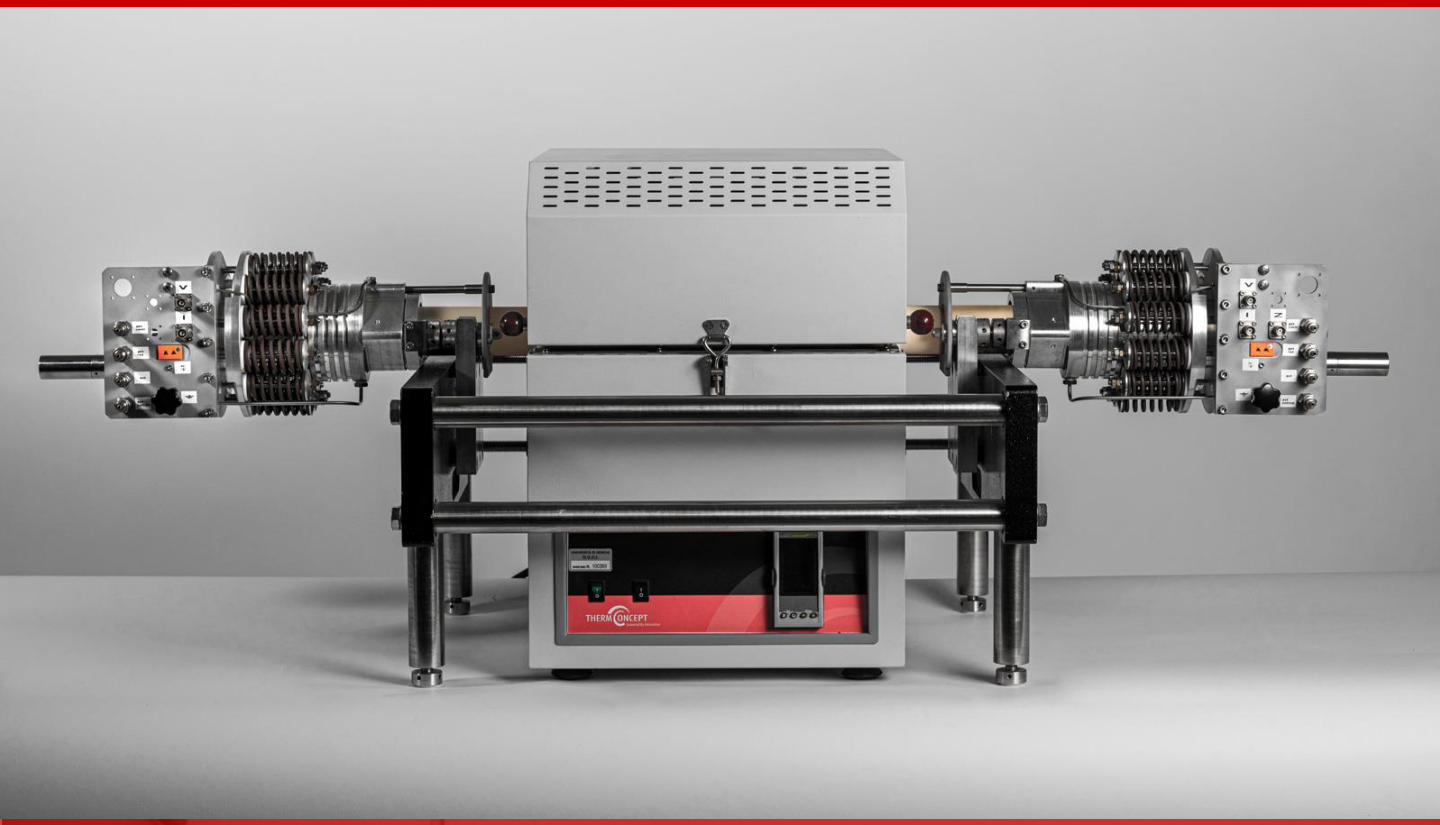
REAL LIFE TESTER



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Real Life Tester

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