MAUL-THEET
Vibration Test & Analysis

Vibration Test Stand

VTS

Solutions for Turbine and Engine Blades

- Automatic Determination of Resonance Frequencies
- Frequency Ranges up to 40 kHz
- Frequency Resolution < 1 Hz at 20 kHz

Software

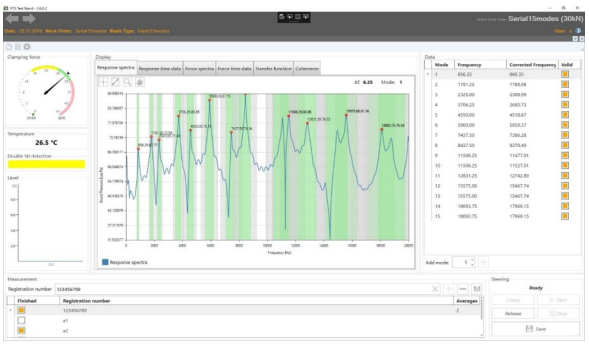
- User Management
- Work Order Management
- Blade Types
- Blade Measurement Data
- Master Blades
- Clamping Force Determination
- Automated Reporting

Hardware

- All In One PC with 24“ Display
- VTS Controller with Pressure and Temperature Input
- Hydraulic Unit
- PLC Controlled Hydraulic Unit
- Clamping Block with Adapter

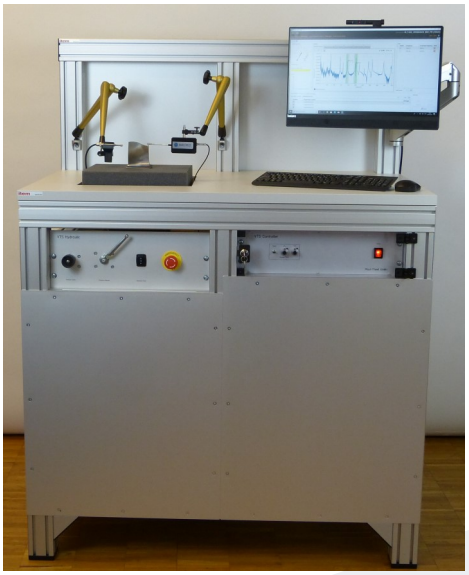
Overview

Maul-Theet offers different configurations to determine resonance frequencies of any type of blade. Depending on the application, different types of excitation and vibration sensors are offered. Inputs for pressure and temperature are available.



VTS with customers own hydraulic

This solutions includes all components to determine the resonance frequencies (Impact hammer, vibration sensor, DAQ) and the PC with the software. It works independent from the clamping device or excitation. If the component is clamped the vibration measurements and the resonance frequency determination can be carried out. The data can be saved and reports can be generated.



VTS Manual Hydraulic Control

This solution includes a manual controlled hydraulic unit. It is integrated in the test rig made out of aluminium profiles which also may house the clamping unit. The design of the test rig can be adapted to the customers application.
The clamping force is detected by the VTS Controller and displayed in the VTS Software. If the clamping force is out of range the VTS Software automatically blocks the frequency measurement.
The clamping force is set via toggle switch, which sets the pressure in the cylinder.

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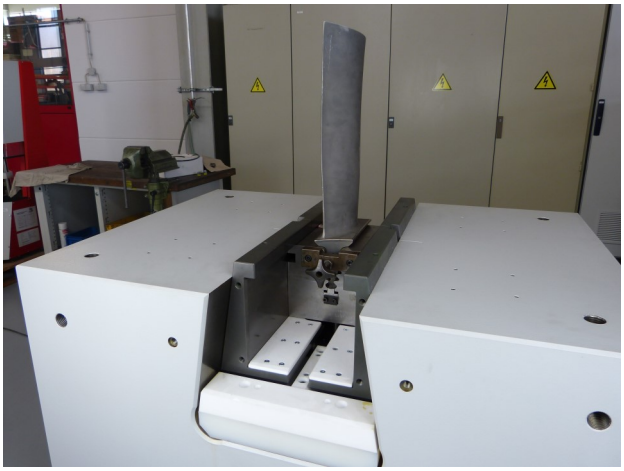
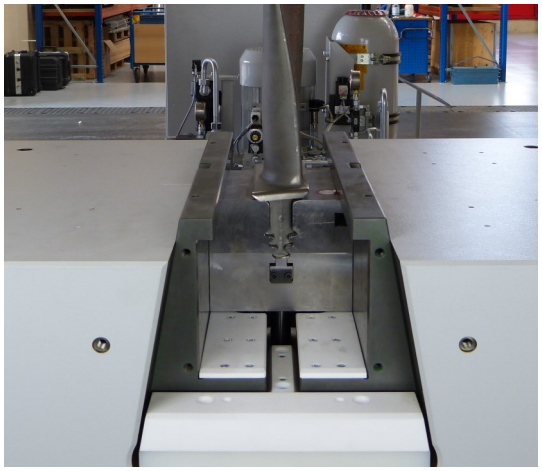
VTS PLC Controlled Hydraulic

This solution has a hydraulic unit with integrated PLC. The PLC controls the proportional valves to start, bias and controls the clamping forces during the vibration measurement. The pressure accumulators ensure that the clamping forces will stay stable during experimental measurements, which also last longer than 20 min. In the case of acoustic vibration measurements no pump operation interferes. Depending of the hydraulic cylinder used, the PLC controlled hydraulic enables clamping forces of up to 650 kN.





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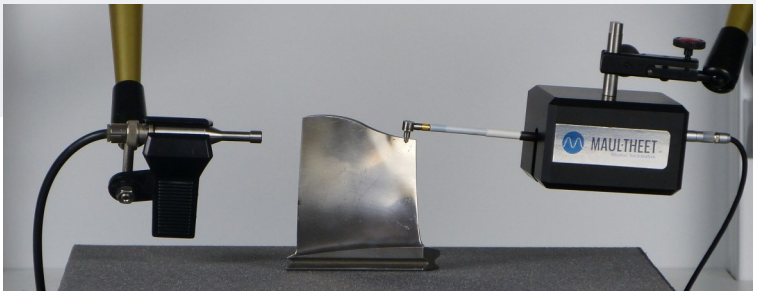

Vibration measurement

Commercially available sensors are offered for measuring the resonance frequency of the blades.

- Microphone: Inexpensive and non-contact, influenced by ambient noise
- Laser Doppler Vibrometer: Non-contact, no influence by ambient noise
- Accelerometer: No influence by ambient noise. Influence by sensor mass and cable (only suitable for big blades)

The ***VTS*** Software has algorithms to improve peak picking for resonance detection in noisy spectra.

A change in the actual blade frequency due to the temperature can be corrected with the help of the integrated compensation software. The temperature is measured with a sensor.

Impact excitation

To determine the resonance frequency the blades are exited with an impact. This broadband excitation is realized with a hammer.

- Automatic Modal Hammer vImpact with force cell
  Excitation triggered by ***VTS*** Controller
- Manual Modal Hammer with force cell
  Manual excitation
- Simple Hammer Excitation
  Manual Excitation, no force measurement

Software

All test rigs are delivered with the ***VTS*** software.

Frequency measurement display

- Time data of vibration and force (if available)
- FFT and Auto Power spectra
- FRF and Coherence (if force available)
- Control and search bands with frequency markers

User and blade administration

- Administrator and User Management
- Blade type settings including Master Blades
- Organization and processing of work order (batches)
- Data storage and Evaluation
- Reporting
- Multi Language Support
- MS SQL Data Base

The ***VTS*** software is easy to learn, easy to handle and easy to use.

Contact us for more information.

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