

NVH-Testing in Zeiten des Technologiewandels

— 12. Symposium
Aggregate- und Antriebsakustik

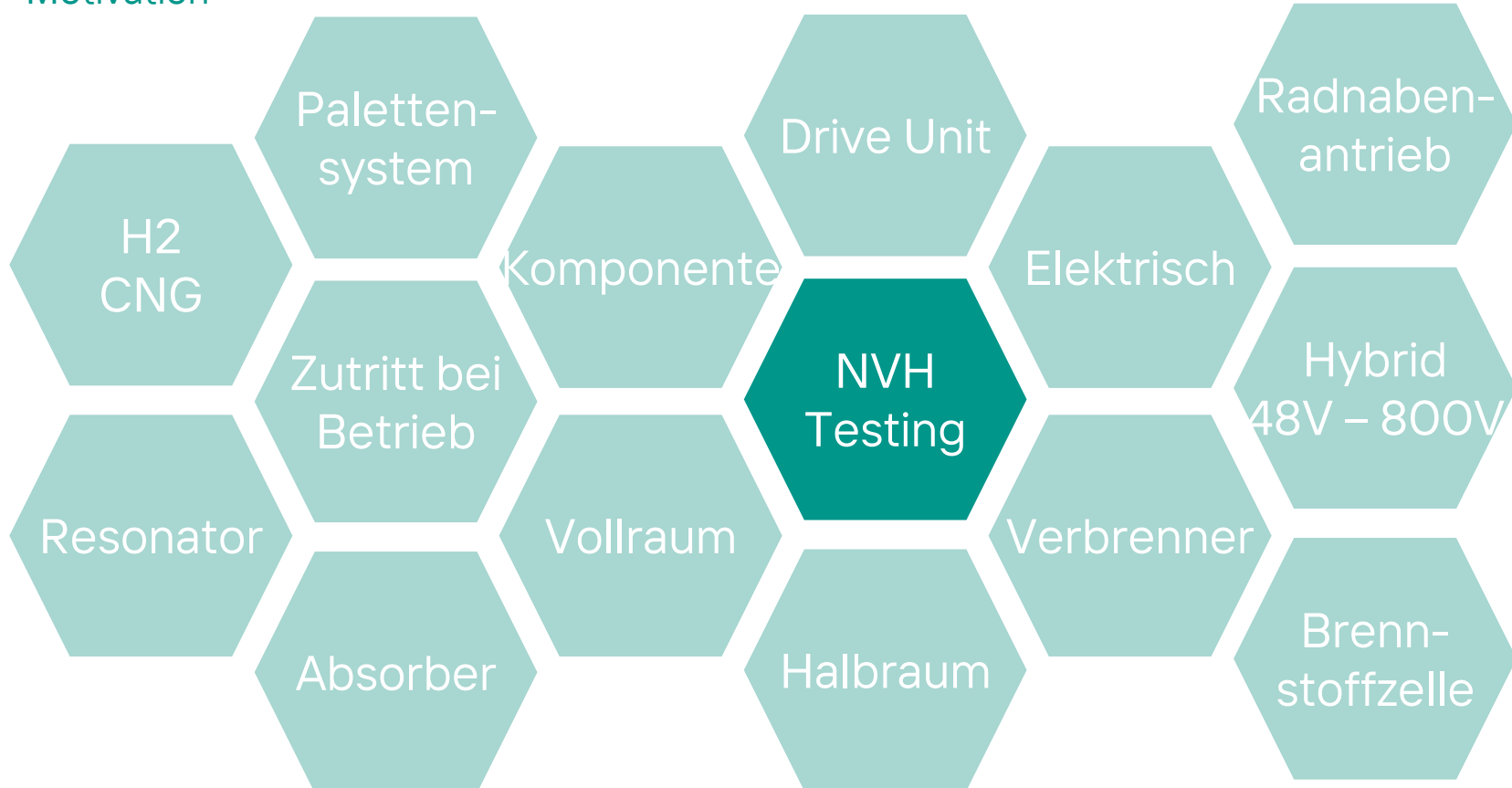
Dr.-Ing Marco Leonetti

NVH-Testing in Zeiten des Technologiewandels

1. Motivation
2. Konzept
3. Wellenmechanik
4. Isolationskonzept
5. Elektrische Komponenten
6. Betriebsschwingungsüberwachung

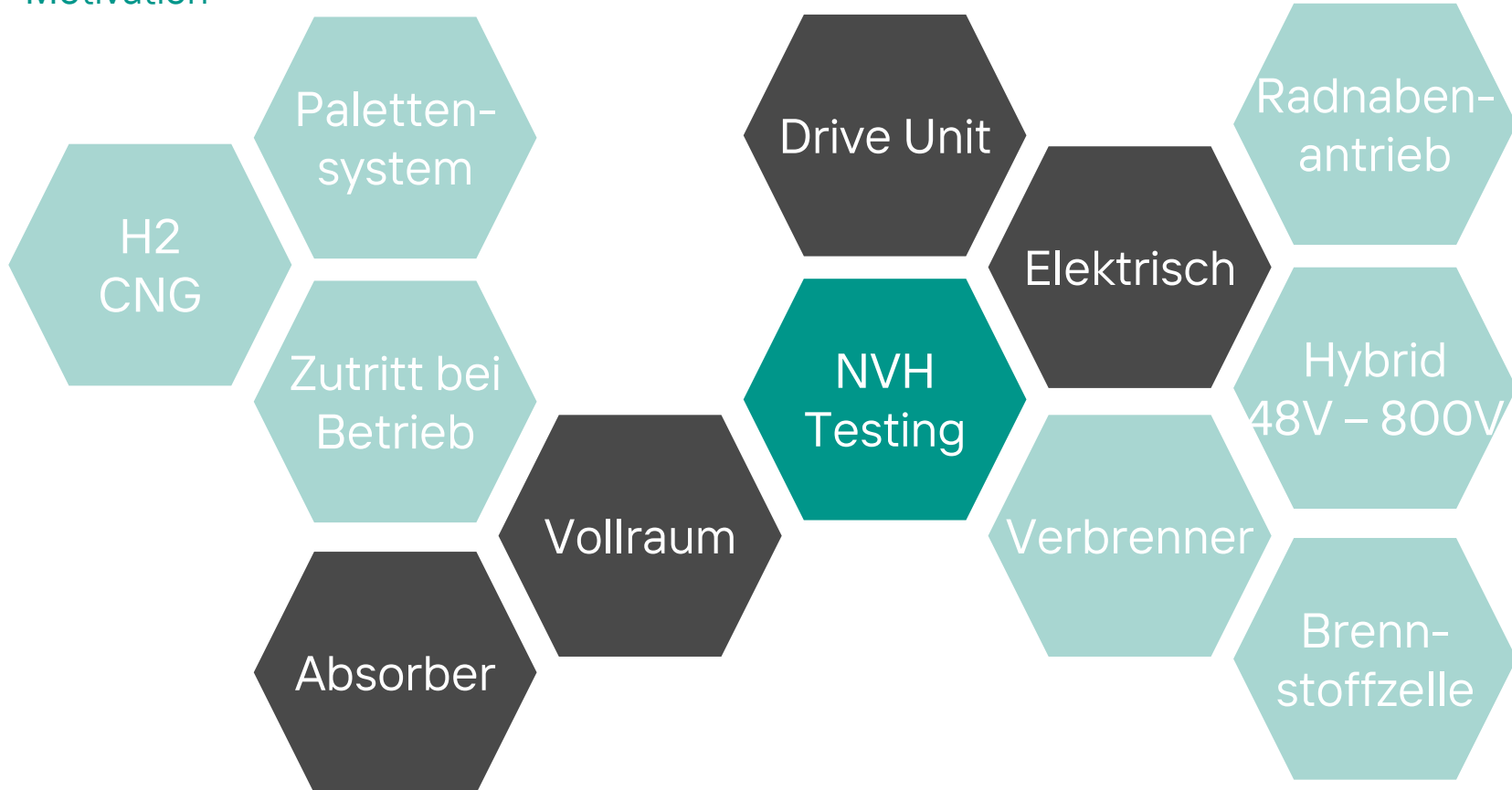
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Motivation



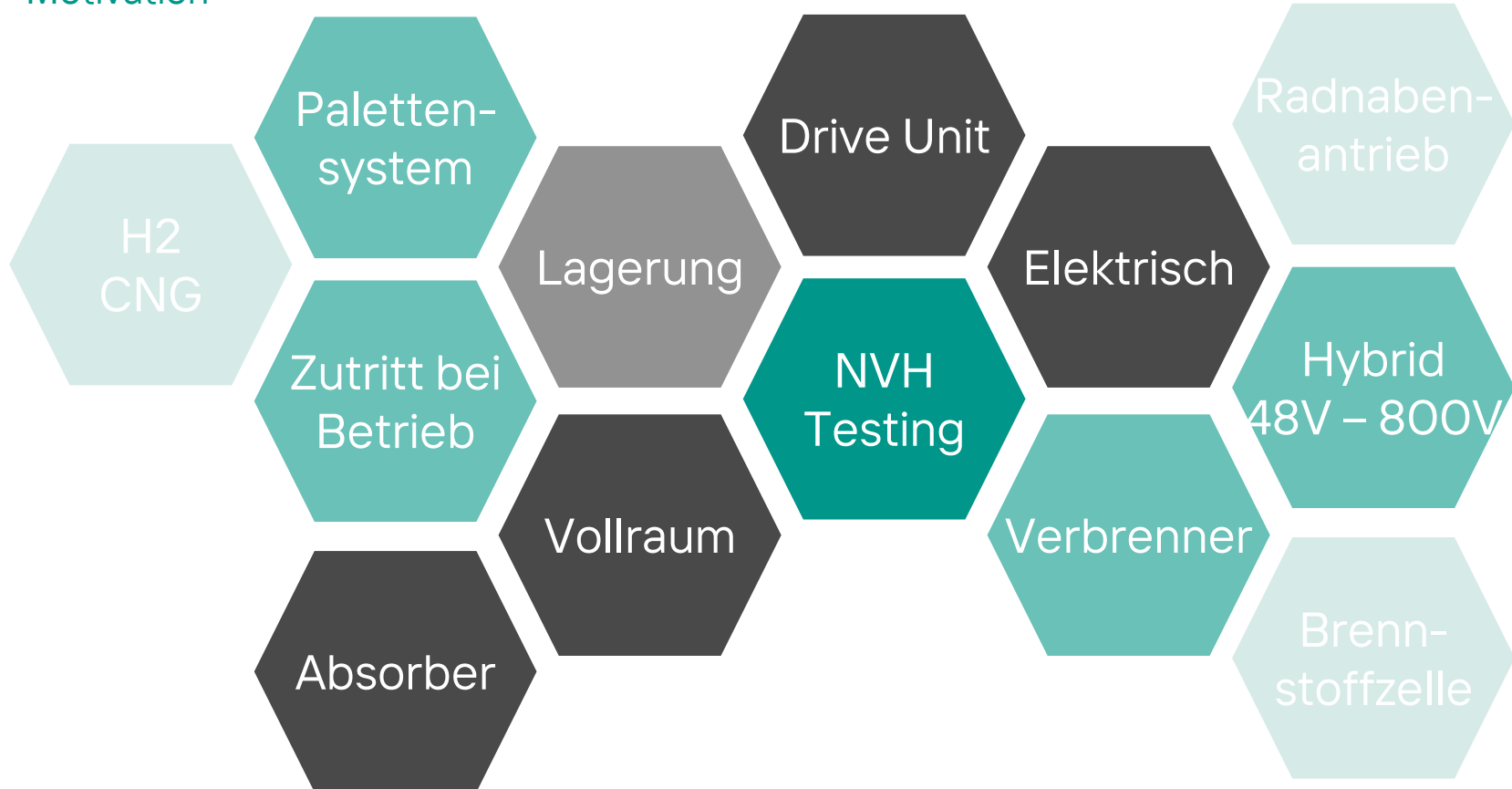
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Motivation



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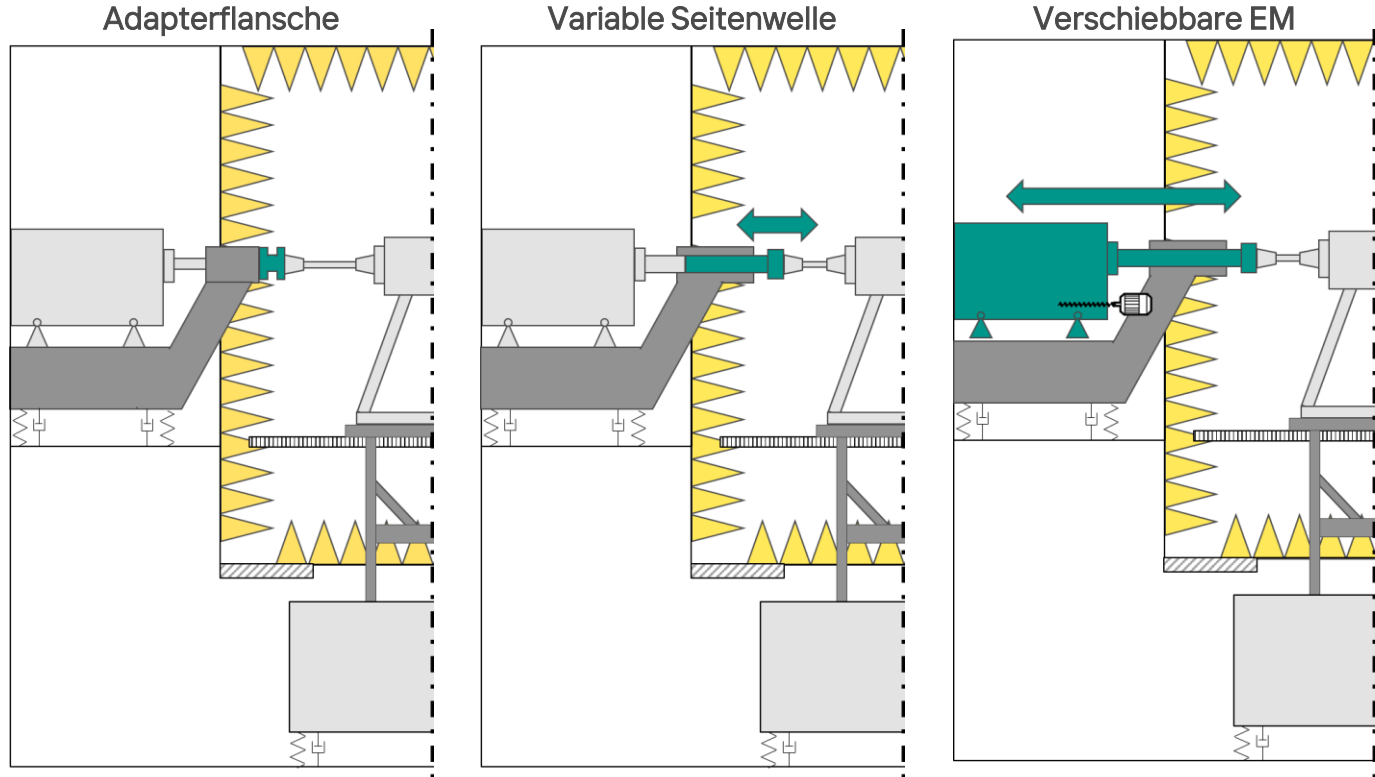
Motivation



Konzept

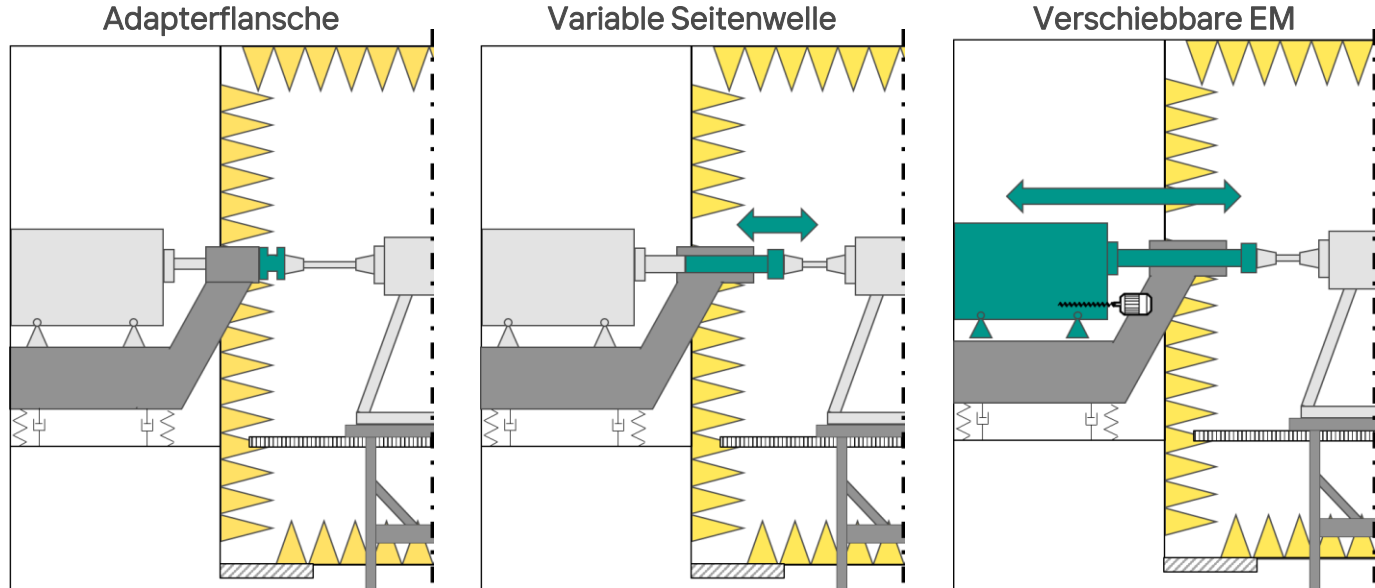
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Konzept



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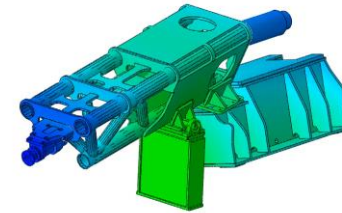
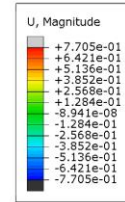
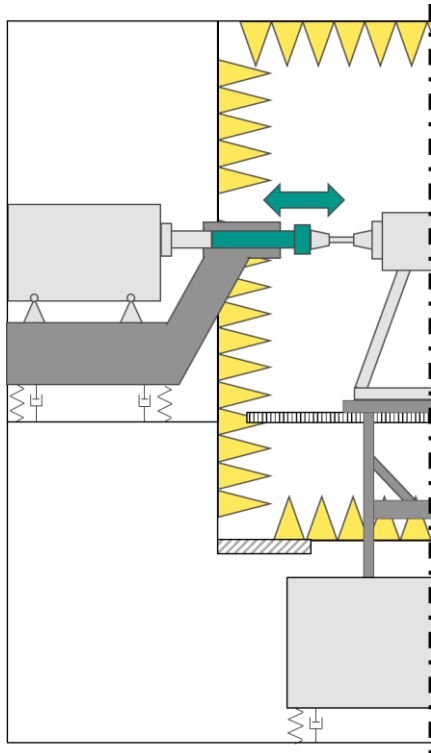
Konzept



Initialkosten	+	--	---
Betriebskosten	--	++	-
Rüstzeiten	--	++	+
Schwingungsisoliation	+	+	+
Luftschallisolation	++	+++	---

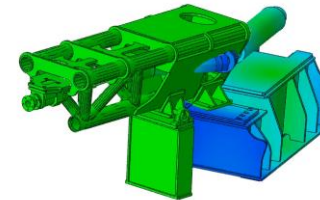
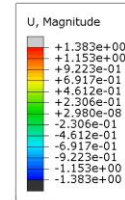
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Konzept – Variable Seitenwelle



Scale Factor: -1.00

Y
X
Z
ODB: M07_FKFS_WellenStrangModel1-EF-ASv2-vorsp2_1.odb Abaqus/Standard 3DEXPERIENCE R2018x
Step: EF
Mode 2: Value = 251.53 Freq = 2.5241 (cycles/time)
Primary Var: U, Magnitude
Deformed Var: U, Deformation Scale Factor: 1.5328e-02

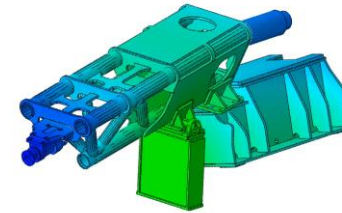
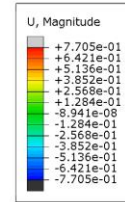
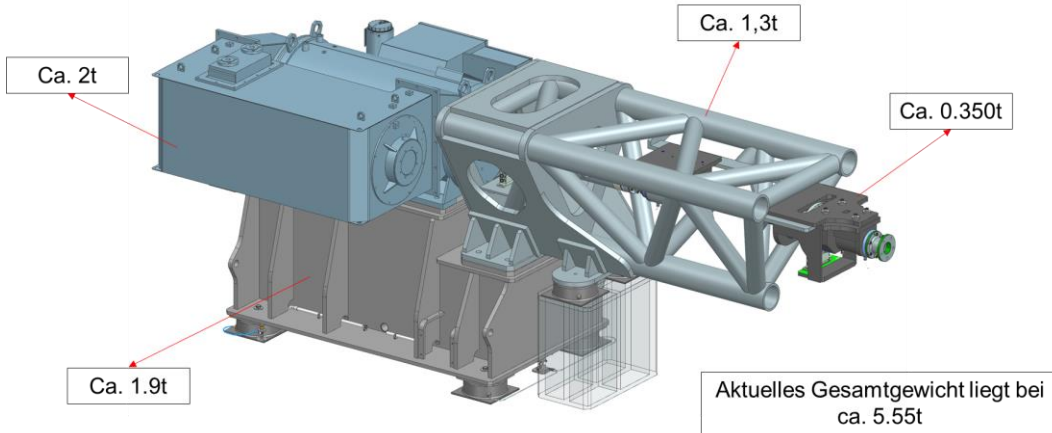


Scale Factor: -1.00

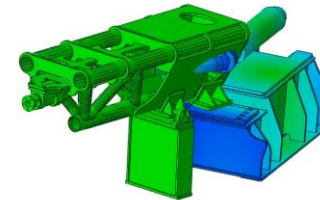
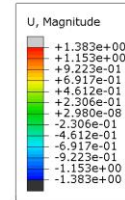
Y
X
Z
ODB: M07_FKFS_WellenStrangModel1-EF-ASv2-vorsp2_1.odb Abaqus/Standard 3DEXPERIENCE R2018x
Step: EF
Mode 12: Value = 4328.1 Freq = 10.471 (cycles/time)
Primary Var: U, Magnitude
Deformed Var: U, Deformation Scale Factor: 1.2354e-02

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Konzept – Variable Seitenwelle



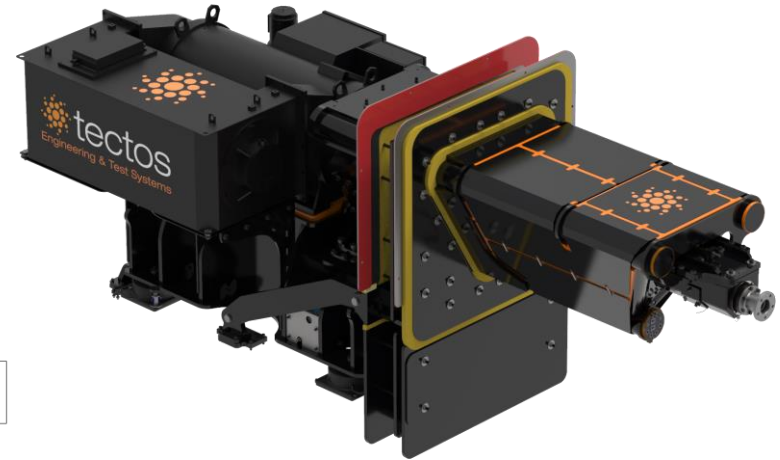
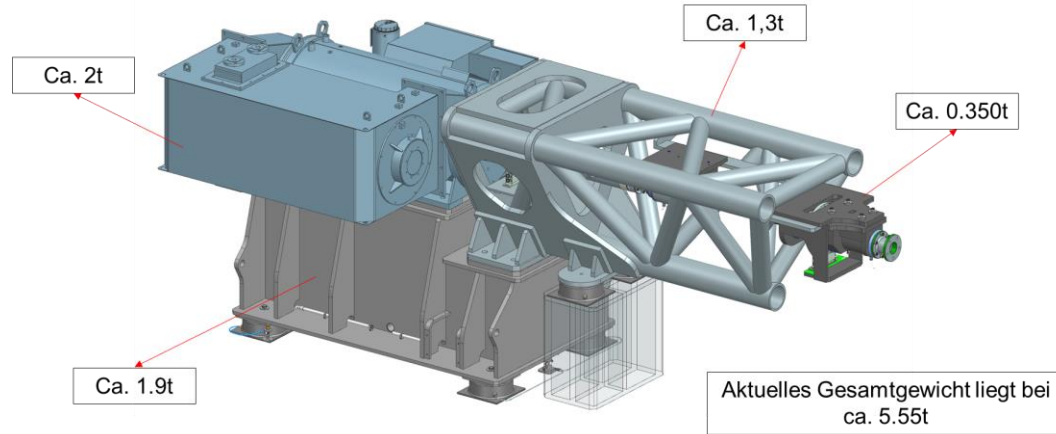
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Step: EF
Mode 2: Value = 251.53 Freq = 2.5241 (cycles/time)
Primary Var: U, Magnitude
Deformed Var: U, Deformation Scale Factor: 4.532e+02



Y
X
Z
ODB: M07_FKFS_WellenStrangModel1-EF-ASv2-vorsp2_1.odb Abaqus/Standard 3DEXPERIENCE R2018x
Step: EF
Mode 12: Value = 4328.1 Freq = 10.471 (cycles/time)
Primary Var: U, Magnitude
Deformed Var: U, Deformation Scale Factor: 4.235e+02

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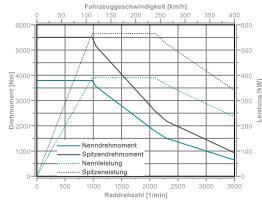
Konzept – Variable Seitenwelle



Wellenmechanik

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Wellenmechanik



Hersteller ELIN Motoren GmbH

Bauart Asynchronmaschine

Maximaldrehzahl 3500 min⁻¹ (~ 400km/h)

Nennleistung 390 kW

Nennmoment 3500 Nm

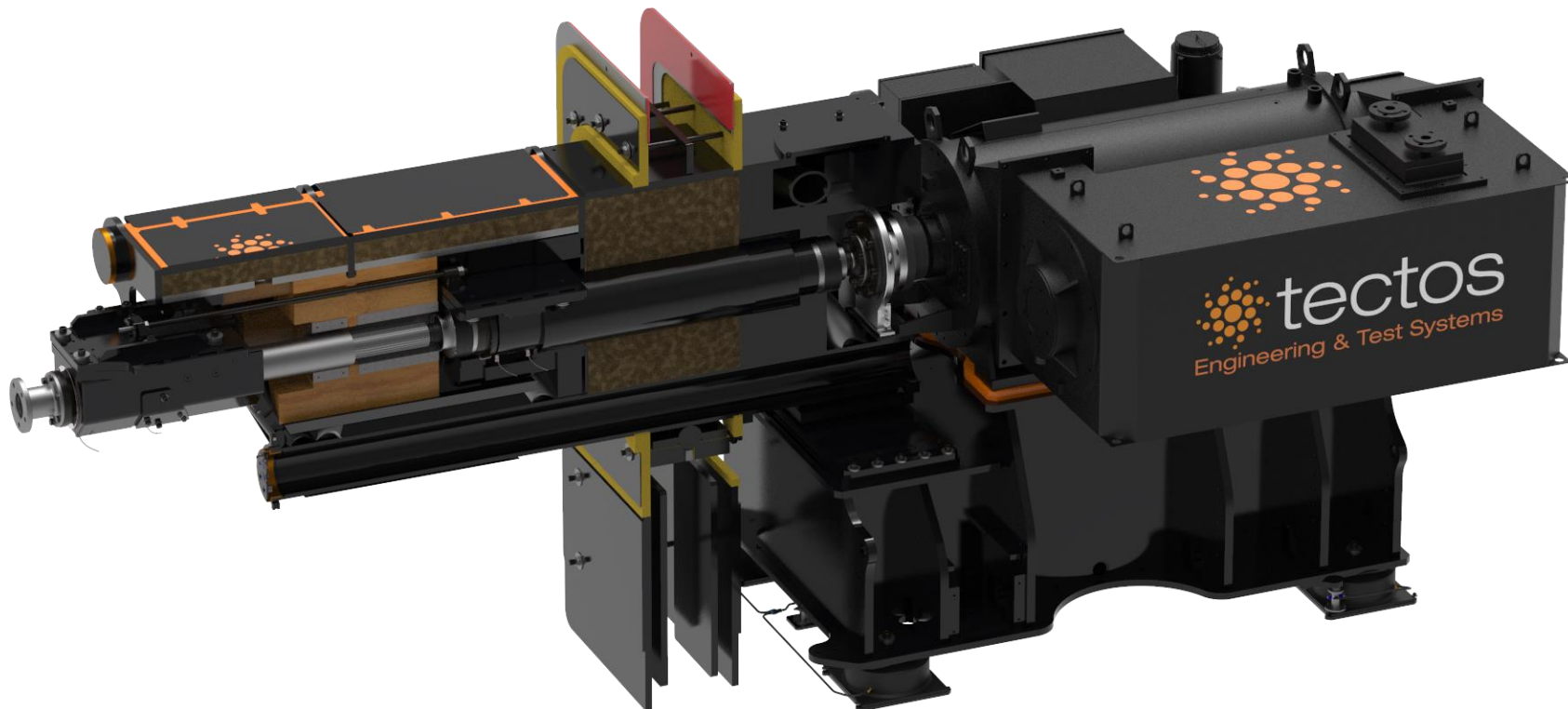
Eckdrehzahl 980 min⁻¹

Spitzenleistung 566 kW
(max. 10 Sek.)

Spitzendrehmoment 5500 Nm
(max. 10 Sek.)

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Wellenmechanik



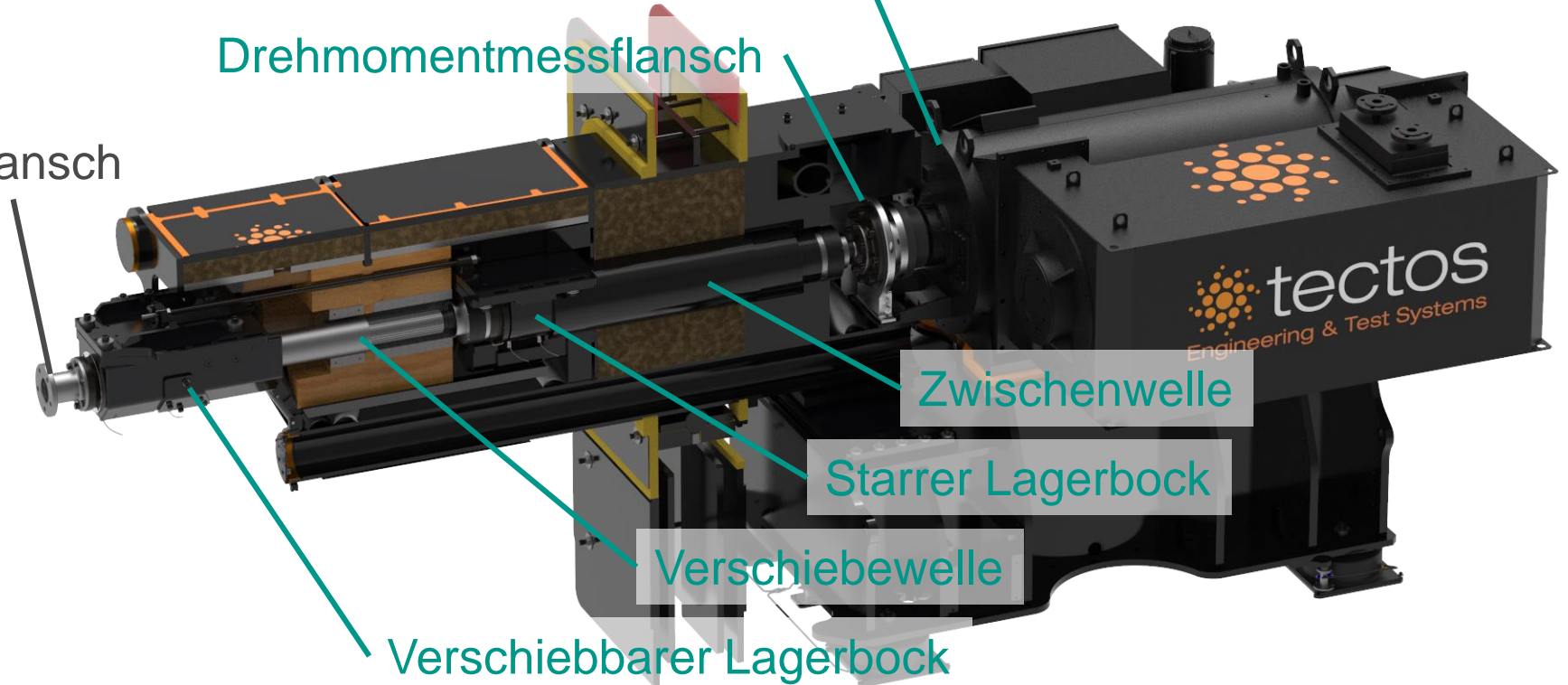
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Wellenmechanik

Asynchronmaschine

Drehmomentmessflansch

H-Flansch



Zwischenwelle

Starrer Lagerbock

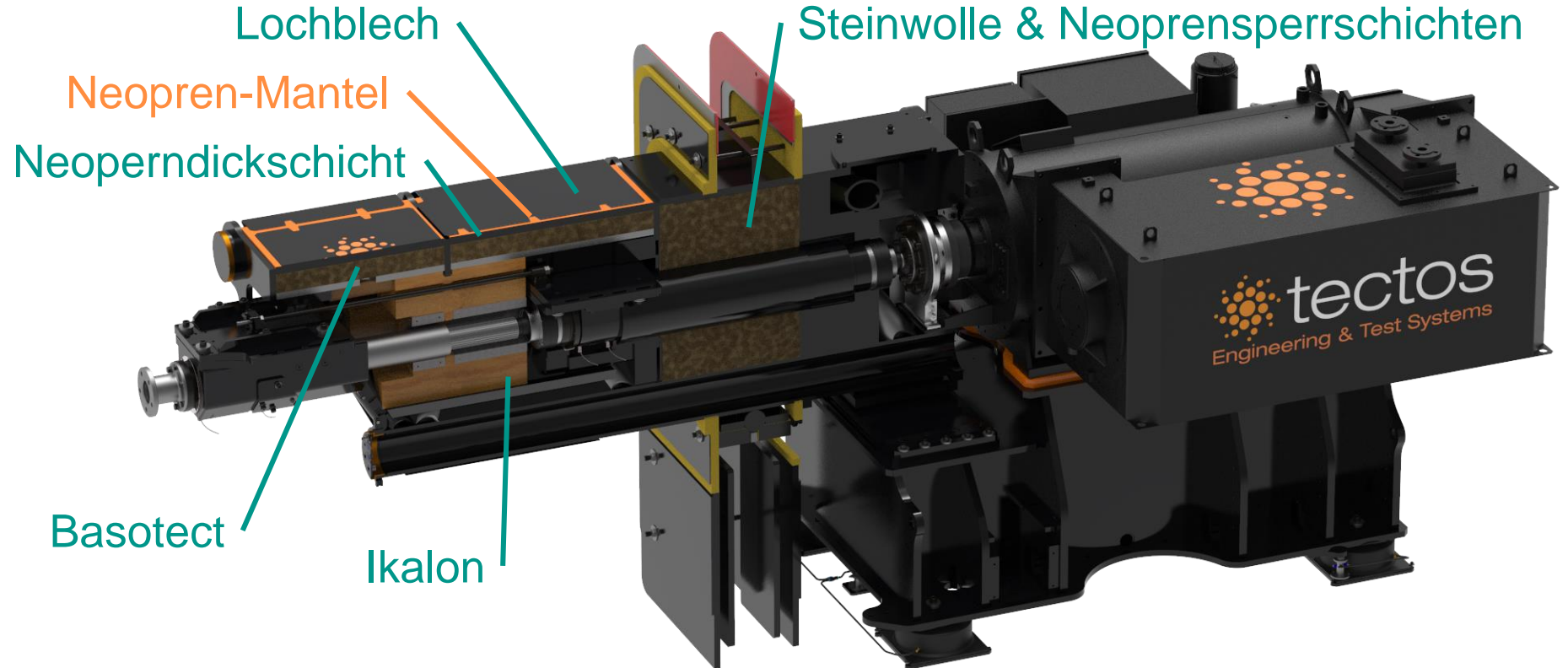
Verschiebewelle

Verschiebbarer Lagerbock

Isolationskonzept

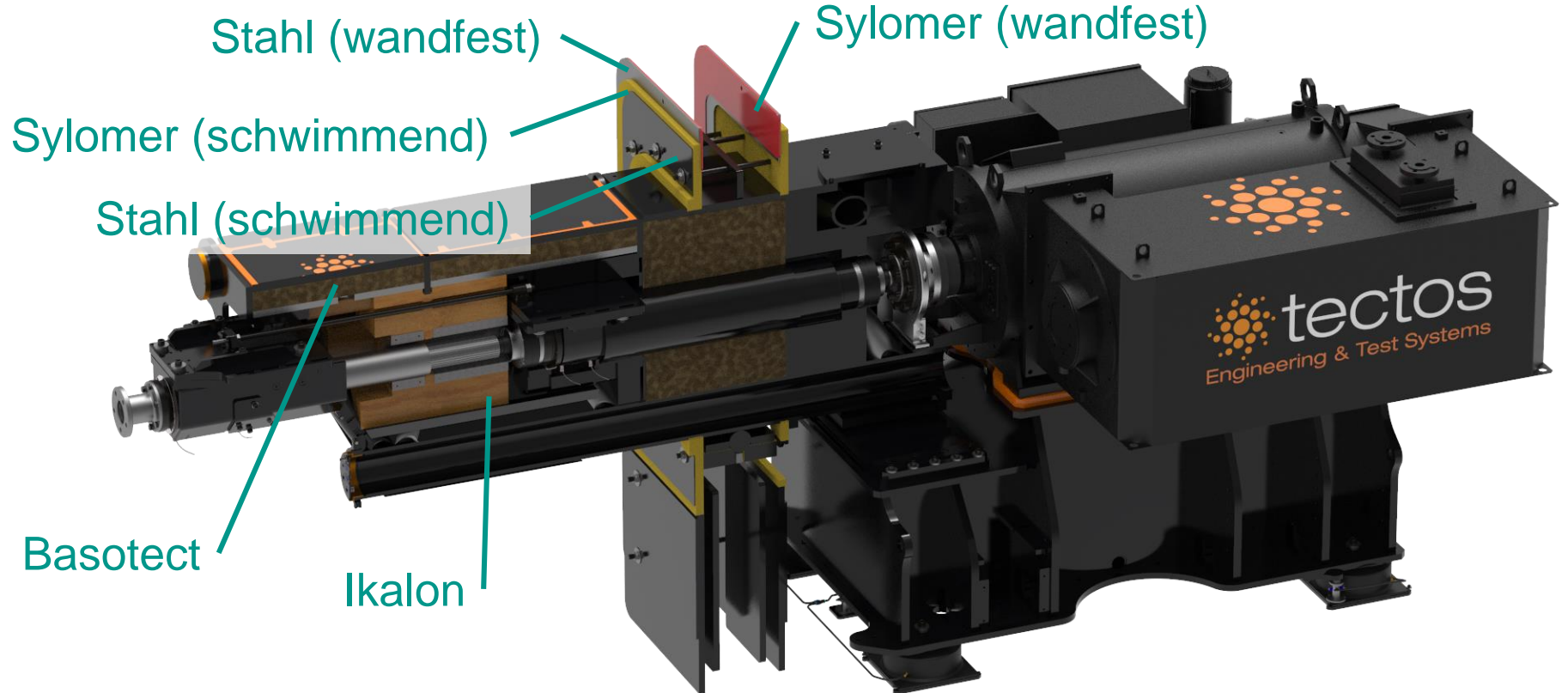
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Isolationskonzept – In der Wellenbrücke



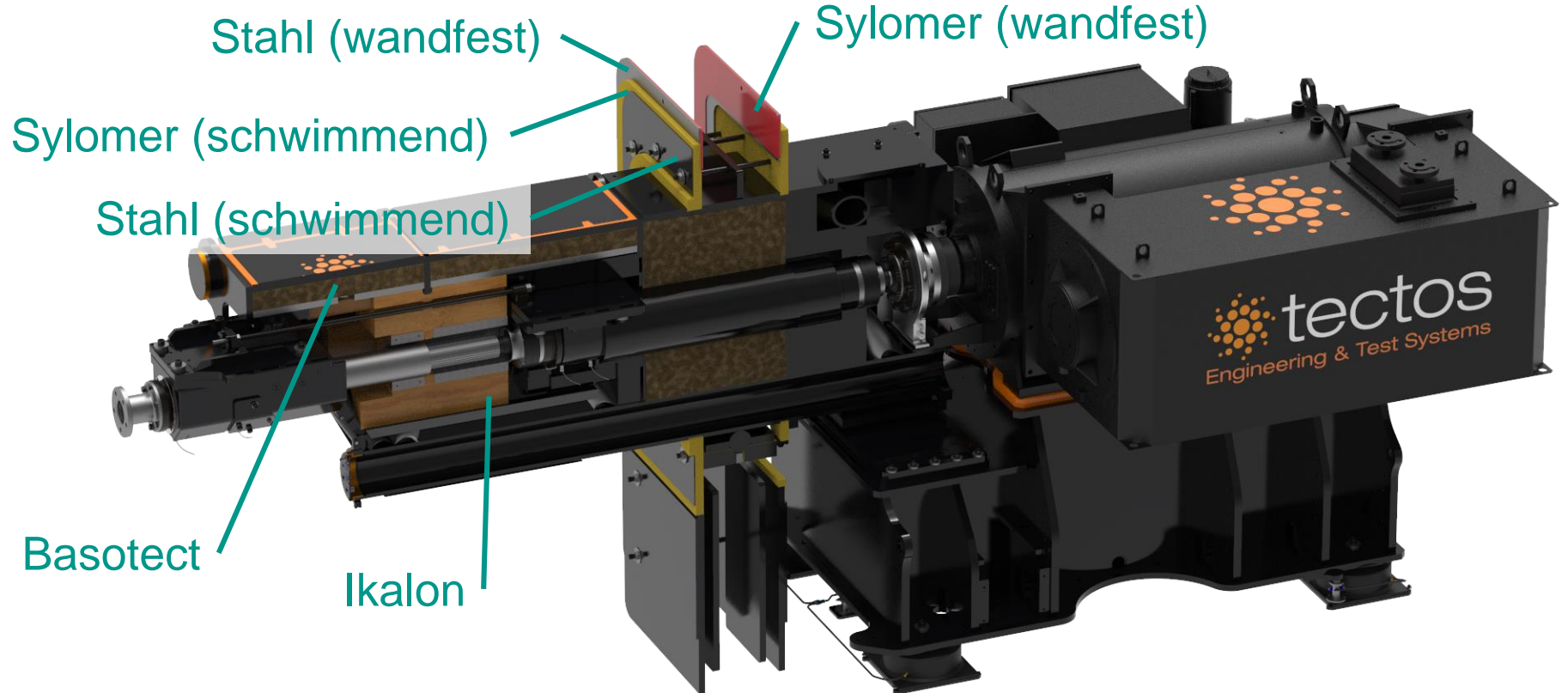
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Isolationskonzept – Wellenbrückenbrückenkontour



NVH-Testing in Zeiten des Technologiewandels

Isolationskonzept – Wellenbrückenbrückenkontour



NVH-Testing in Zeiten des Technologiewandels

Isolationskonzept – Wellenbrückenbrückenkontour

Stahl (wandfest)

Sylomer (wandfest)

Sylomer (schwimmend)

Stahl (schwimmend)



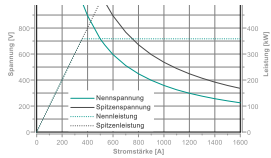
Basotect

Ikaion

Elektrische Komponenten

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Wellenmechanik



Hersteller KS ENGINEERS

Maximalstrom 1600 A

Maximalspannung 1000 V

Regelfrequenz 4 kHz

Dynamik Strom < 1 ms für 1600 A

Nennleistung 358 kW

Eckstrom nenn. 358 A

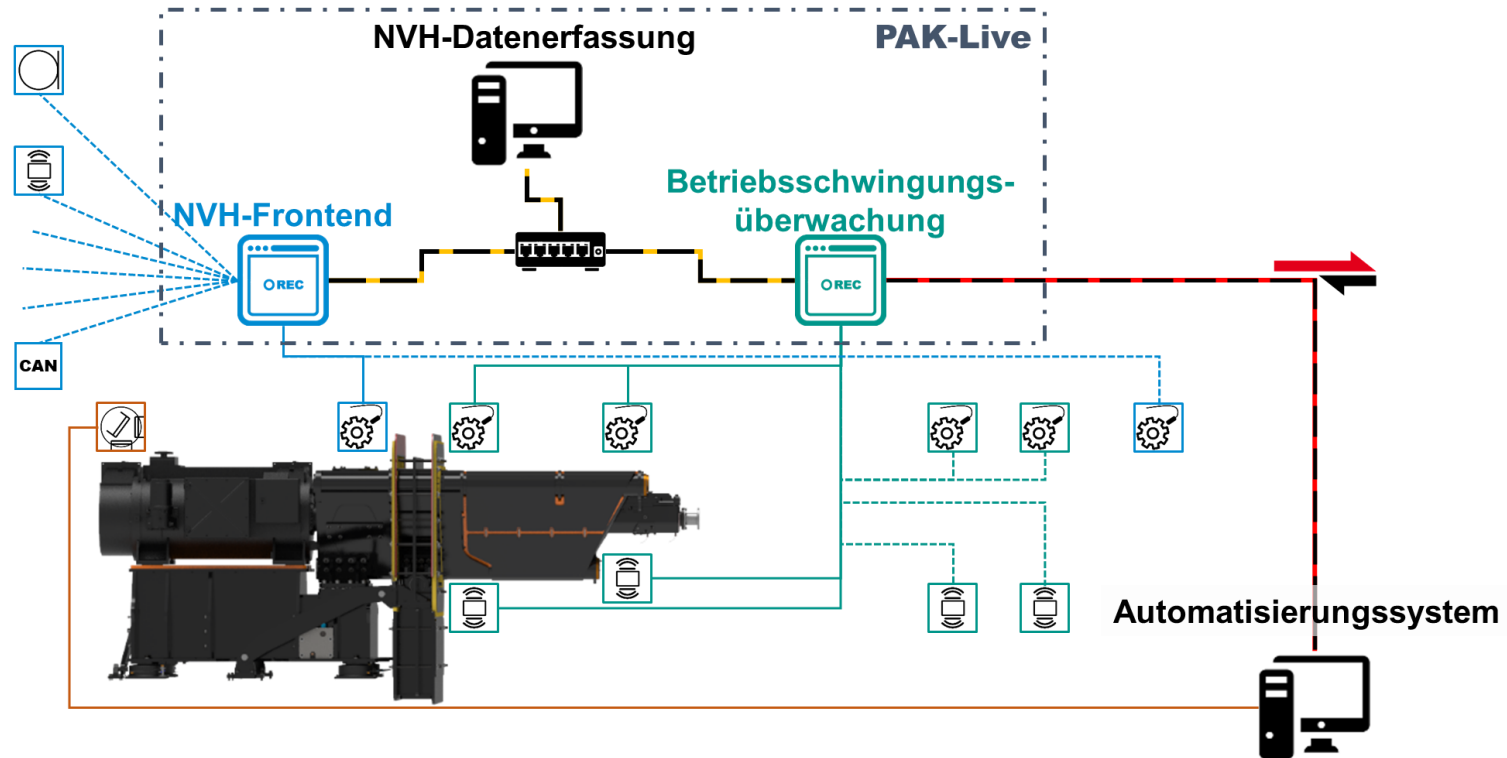
Spitzenleistung 537 kW

Eckstrom spitze 537 A

Betriebsschwingungs- überwachung

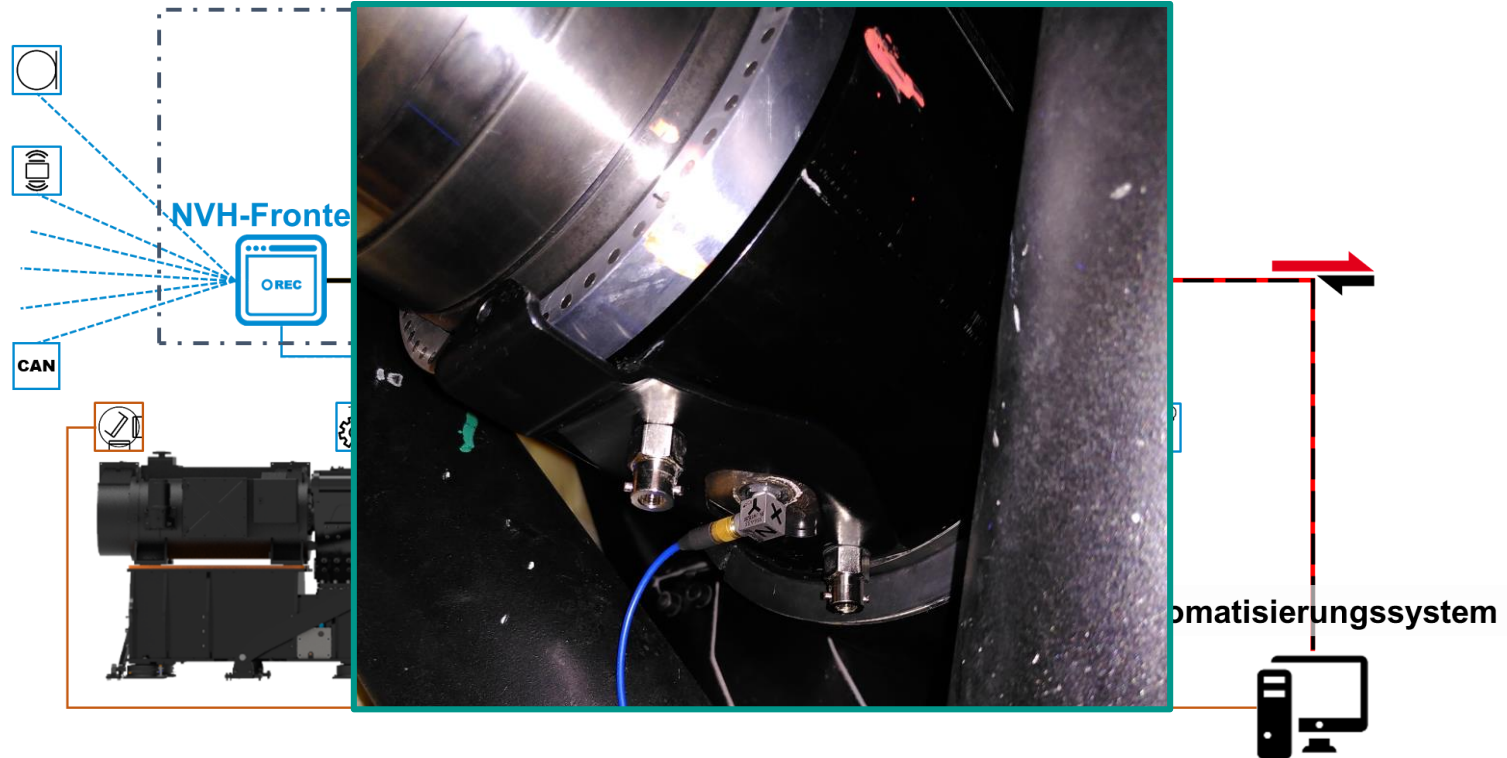
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Betriebsschwingungsüberwachung



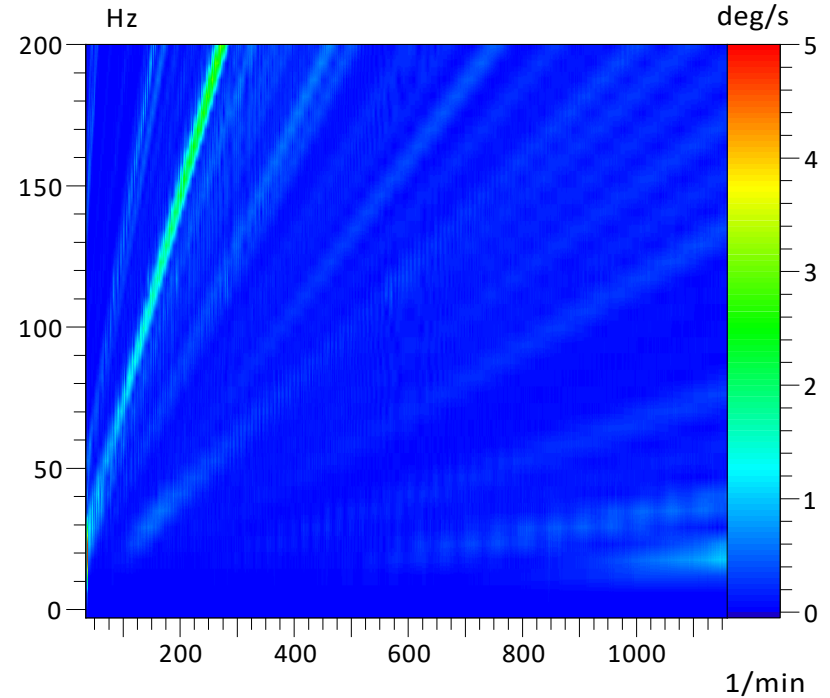
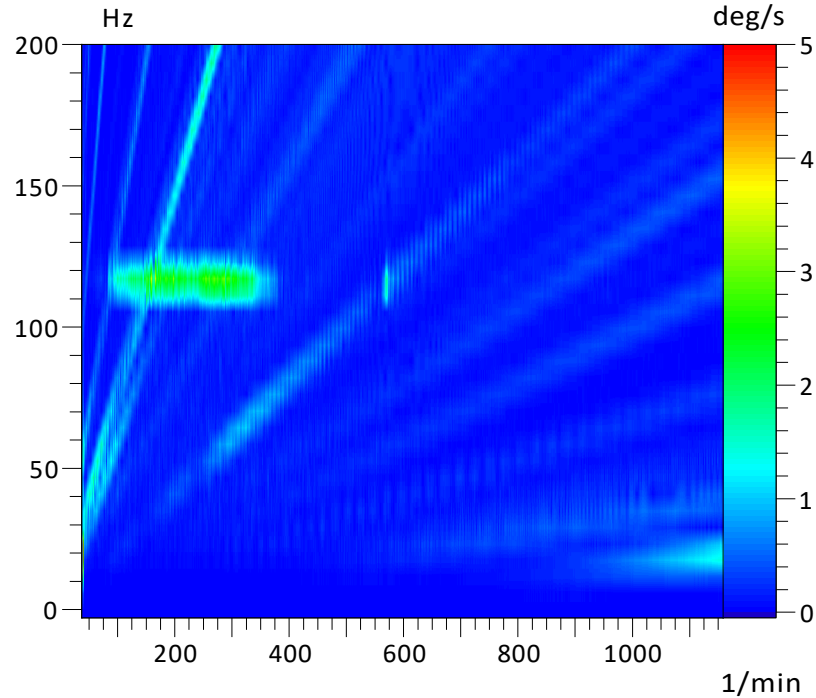
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Betriebsschwingungsüberwachung



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Betriebsschwingungsüberwachung



**Vielen
Dank.**

Dr.-Ing.

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