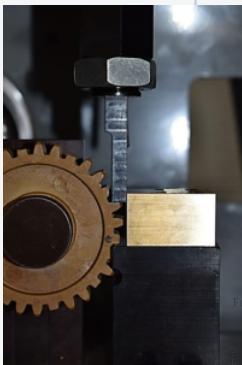


Fatigue

APPLICATIONS		THEORY, KNOWLEDGE, & MODELS		CAPABILITIES	
Thermal shock (busbars)		Introduction to Fatigue (why does material respect SN ?)		Basics about Fatigue tests	
	Thermal Shock on Demonstrator Grades prioritized for Thermal Shock characterization	Difference between Fatigue and Creep		List of Fatigue data available, SSP	
Gears		CTD presentation - March'26		Upload Fatigue data (systematically linked to material center)	
		VE presentation (more detailed) - March'26			
Metal to plastic applications		Definition and notations		• Core Labs Capabilities	
		Influence of Various Factors on Lifetime		Electro-mechanical machines are generally used for static tests, as they provide better control over applied force or displacement. For polymers, these machines can also be used for mid-range fatigue tests; note that at Alpharetta, only a contact strain gauge is available for strain acquisition.	
Compressor	High Frequency Fatigue loadings Identified cases for the year 2025	Life prediction methodologies		• Corporate Capabilities	
		Fatigue modeling of fiber reinforced polymers		Creep-Fatigue interactions, Self-heating at high frequency	
				Multiaxiality, Maximal Loading Shape	
				Numerical: Effect of Mesh size, Effect of Mesh type	
				At the Brussels site, in-house developed demonstrator parts and testing setups enable us to conduct fatigue bending tests on L-shaped samples with various radii and on different approaches with or without ribs and weld lines.	
				Stress based approach	
				Energy based approach	
				Effect of ageing	
				Effect of Harsh environments (Chemical, ...)	
				Effect of Recycled fibers	
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Workflow	Life time prediction for cyclic loading	3x Servo-hydraulic machines (DIC, Extenso)	10kN	-40
	Life time prediction for thermal cyclic loading	Composite testing	100kN	-80
Validation	Contacts: Michel Houba, Dominique Delcourt			

• ADL Capabilities

Although tooth bending is not a classic fatigue test, this can be used to validate the FE models, with capacity to test higher frequencies.

Tips: The current FE model for fiber filled polymers, can be applied only if the failure mode is slow crack growth controlled failure or brittle failure, which typically occurs at the root of the teeth in gear tooth bending.

Region	Equipment	Load	Tem
		max	min
Bollate	Gear tooth bending		ai

Contacts: Matilde Scurria, Lorenzo Mancin

• Potential external partners

Syensqo has engaged Leartiker to generate fatigue test data (including hysteresis measurements), to support the creation of [Digi mat fatigue cards](#) across different temperatures. Other capabilities include [sample molding](#), [creep analysis](#), [advanced...](#)

Laboratory	Equipment	Load	1
		max	
Leartiker, Spain	Electro-mechanical MTS Insight 100 (2D & 3D)	100kN	
	Servo-hydraulic machine MTS Bionix, +Torsion	15kN	
	Metravib DMA +300, +2000	2kN	

Contacts: Jose Javier jjegurrola@leartiker.com, Kipa Zulueta kzulueta@leartiker.com