

France TEEM-Lab.

Alban MARINO
MLS Laboratory Director

Nidec Tech Week

May 5, 2026
Angoulême, France

 Nidec



TEEM-Lab

Thermal, Environmental, Electrical &
Mechanical Testing Laboratory



Engineering Excellence Through Material and Component Control

Mastering and optimizing material and component properties is essential to ensure reliability, efficiency, innovation, and safety in electric machines, meeting evolving industry demands and guaranteeing long-term performance and compliance.

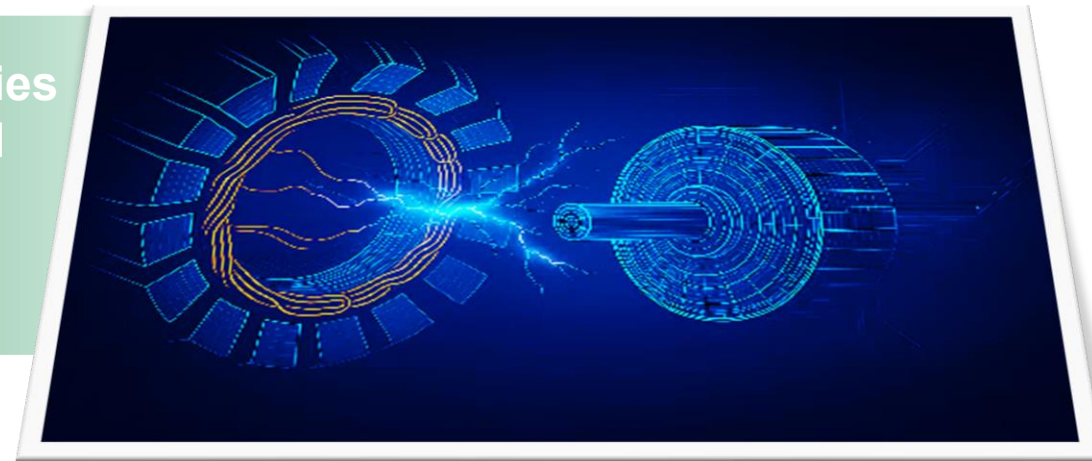
To secure electric machine reliabilities, we specialize in

- *material and component qualification,*
- *advanced failure analysis,*
- *and predictive aging tests.*

Our methodologies combine rigorous standards with innovative modeling, supported by a global network of research partners and industrial collaborations.

Equipped with high-end resources—from PDIV measurement systems to multi-stress aging chambers—we deliver precise insights and actionable results.

Transparent cost structures and flexible engagement models make us an agile partner for R&D and industrialization.



Alban MARINO

TEEM-Lab Director
Leroy-Somer

France "TEEM-Lab"

Angoulême – near Cognac and Bordeaux



Angoulême, France



Agenda

1 Global Activities

2 Component characterization

3 Competitive cost

4 Use Case and collaboration

The “Central Laboratory” becomes

TEEM-Lab

Thermal • Environmental • Electrical • Mechanical testing Laboratory

Why

- Clearer definition of our testing domains
- Clearer and more “down-to-earth” communication within NIDEC

Our Expertise

- Characterizing, qualifying, ageing materials & sub-assemblies
- In the fields of Thermal / Environmental / Electrical / Mechanical testing

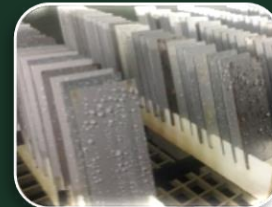
What’s changing

- Open to local & regional stakeholders
- Upcoming open-house events + networking initiatives

SCAN ME



Nidec



TEEM-Lab

Thermal, Environmental, Electrical and Mechanical
Test Laboratory

From material to system characterization



TESTING AREA



Thermal

- Thermal characterization
- Thermal aging (passive and active)
- Thermal cycling (passive and active)
- Sealed tubes
- Weight loss test



Environmental

- Relative Humidity (>96%)
- Salt Spray
- Water , Oil, refrigerant...
- Abrasive/aggressive particles
- Moisture condensation
- dirt/contamination: independent or in combination with other stresses



Electrical

- HiPot test up 40kV
- Electrical stress
- Partial discharges
- Polarization index
- Comparative Tracking Index
- repetitive voltage surges
- High Amps DC supply



Mechanical

- Tensile, bending and shear tests
- Bearing characterization
- Vibration tests
- Packaging test

TEEM Laboratory: Global activities

The France Laboratory of Nidec plays a crucial role in maintaining the company's leading position, Study of **Electrical insulation system aging** (with a strong partnership with a French research Institute “**IRT**”)

1. Product Qualification

Components, sub-assemblies, systems, and special processes → ensure the reliability and performance of Nidec products.

2. Failure Analysis

Conduct in-depth analyses to identify the origins of failures. Essential both for **after-sales expertise** and to guide **new product developments**.

3. Aging Tests

Specific aging tests, particularly on **insulation systems**, for comparative analysis and estimation of potential risks when launching new products.



France TEEM Laboratory - Our strength

The Central Lab team is highly involved in centralization of the knowledge and watch

A Facilitator of Knowledge Sharing

A Facilitator of Knowledge Sharing

Thanks to its strategic position as a **"shared"** resource, the Central Laboratory plays a facilitating role in accessing and sharing knowledge within the company.

It collaborates closely with teams from various Business Units and all Nidec sites, including:

Technical / Purchasing / Quality and Methods/Industrialization



Technological and regulatory Watch

The laboratory actively participates in **normative and scientific monitoring.**

It regularly collaborates with major external laboratories, including academic institutions and private laboratories, as well as those belonging to the Nidec group.



Specific Resources and Invest.

The Central Laboratory has exclusive specific resources dedicated to its missions.

Significant **investments** have been approved and implemented to further enhance the relevance of its analyses and advice.

These investments demonstrate Nidec commitment to maintaining a **high level of performance and innovation.**



Main TEEM-Lab intervention

Process

- Additive manufactu 
- Winding
- Impregnation / Potting
- Gravity and die casting process
- Crimping
- Robot Chipping 
- ...

Material & component For mechanical use

- Bearing
- Seals
- Fasteners
- Alu / Cast Iron (Foudary)
- rolled or press steel
- Plastics
- ...

Material & component for electrical use

- Enameled wire
- Impregnation varnish / resin
- Insulation
- Adhesive
- Cable
- Protective Sleeve
- Encoder – Sensor (T)
- ...




Magnetic Materials

-  Magnetic Lamination 
-  Magnetic Powder 
- Magnet 
- ...

Group of component & full machine

- Coating - Painting
- Packaging
- IP/IK ...
- Life Cycling
- ...

Electrical Insulation System

-  Modélisation / Characterisation
-  PDIV / Frequential Impedence / ...
-  Aging test (thermal, electrical, environnemental...)
- ...

Standards & Directives

- UL/CSA
- Integration in IEC standards
cobaz.afnor

The TEEM Laboratory works closely with several governmental and university Lab as CEA and IRT

Our daily activities

• HighLight : Enamelled wires (See EN 60851)



UL Certification
 • The wires must be UL recognized in category OBMMW2 8, meeting the definition MW35C or equivalent for 200°C wires.



Chemical Properties
 • Compatibility of enamel varnishes with impregnation varnishes, oil, solvent...
 • PINHole test



Appearance and Dimensions
 • The surface of the wire must be smooth, clean, and free of localized overthickness. Dimensions must comply with NF EN 60317-0-1 standard.



Electrical Properties
 • Breakdown voltage in bead bath, breakdown voltage on twisted samples, detection of microcracks by electrolysis, PDIV



Mechanical Properties
 • Elongation, spring effect, flexibility and adhesion, unwinding capacity, sliding capacity.



Thermal Properties
 • Thermal shock, thermoplasticity.

• Characterize our std enameled copper but also High Temp, VSD dedicated, rectangular form, aluminium...

• HighLight : Impregnation Resins



Mechanical Properties
 • bond strength
 • Traction/Compression effort (part out of the slot)



Electrical Properties
 • Flash Point - Viscosity - Gel Time
 • Dielectric strength > 50kV/mm @ 155°C
 • TanDelta - Capacity



Thermal Properties
 • Weight losses
 • UL (No VOC)



Compatibility
 • Wires - Cables - Insulation component (See ASTM 4880)
 • Environnement (Humidity)



• HighLight : Cable & INSULATIONS (Sleeves, tapes, Flat)

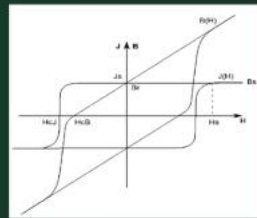
- Appearance and Size
- Mechanical Properties
- Chemical Properties
- Electrical Properties
- Thermal Properties



• HighLight : MAGNETIC STEEL Fully & Semi Process - Permanent Magnet

Mechanical Properties	Breaking load, Elongation at break, Hardness, Fatigue test (sample, gyroscopic force at high temp)
Chemical Properties	Varnish, humidity, solvents, Surface insulation (thickness), Slat spray test
Magnetic Properties	Polarization, Losses, Anisotropy, B(H) Curve (Tamb to 200°C), H_knee
Thermal Properties	Resistance to high and low temperatures

• Magnetic steel test subcontracted to NIDECE Italy



• HighLight : Bearing / Grease - SPRING WASHERS - Fastening



Size
 • Dimensional precision
 • Internal clearance



Mechanical test
 • Static and dynamic load capacity
 • Materials temperature class
 • Life duration - Noise analysis



Others
 • Lubricant - Marking - Sealing



Protection against corrosion

• After sales analysis - Demerits test - bearing noise characterization

• HighLight : Painting - Temporary protection - Winding Protection - Packaging ...

- Covering power
- Viscosity
- Color and appearance
- Packaging test



• HighLight : Enamelled wires (See EN 60851)



UL Certification

- The wires must be UL recognized in category OBMW2-8, meeting the definition MW35C or equivalent for 200°C wires.



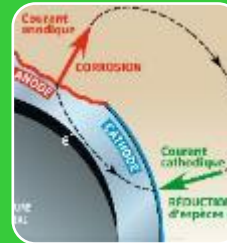
Appearance and Dimensions

- The surface of the wire must be smooth, clean, and free of localized overthickness. Dimensions must comply with NF EN 60317-0-1 standard.



Mechanical Properties

- Elongation, spring effect, flexibility and adhesion, unwinding capacity, sliding capacity.



Chemical Properties

- Compatibility of enamel varnishes with impregnation varnishes, oil, solvent...
- PINHole test



Electrical Properties

- Breakdown voltage in bead bath, breakdown voltage on twisted samples, detection of microcracks by electrolysis, PDIV



Thermal Properties

- Thermal shock, thermoplasticity.

• Characterize our std enameled copper but also High Temp, VSD dedicated, rectangular form, aluminium...

• HighLight : *Impregnation Resins*



Mechanical Properties

- bond strength
- Traction/Compression effort (part out of the slot)



Electrical Properties

- Flash Point - Viscosity – Gel Time
- Dielectric strength > 50kV/mm @ 155°C
- TanDelta - Capacity



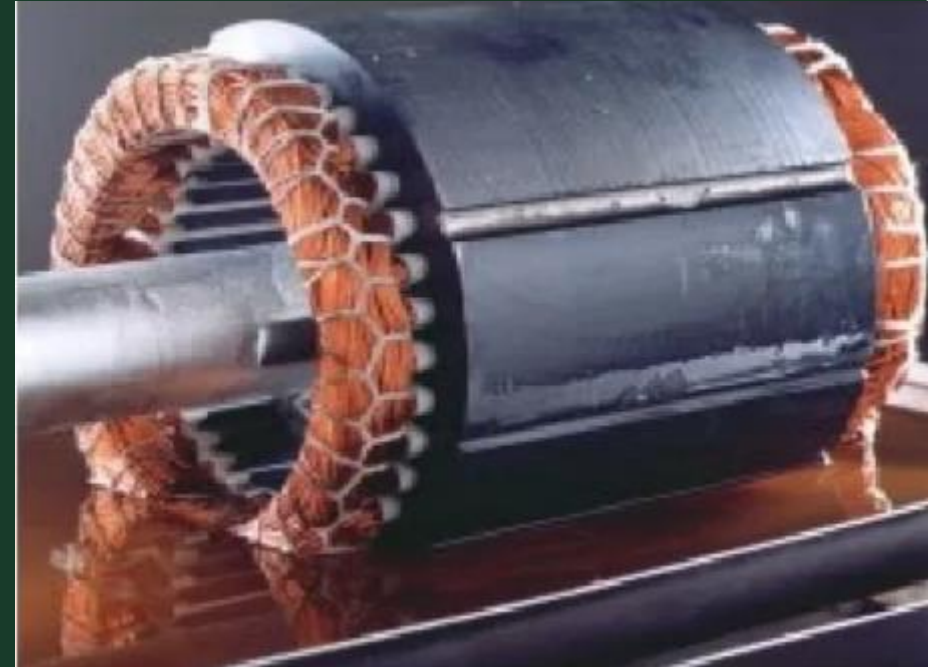
Thermal Properties

- Weight losses
- UL (No VOC)



Compatibility

- Wires – Cables – Insulation component (See ASTM 4880)
- Environnement (Humidity)



- **HighLight** : *Cable & INSULATIONS (Sleeves, tapes, Flat)*

Appearance and Size

Mechanical Properties

Chemical Properties

Electrical Properties

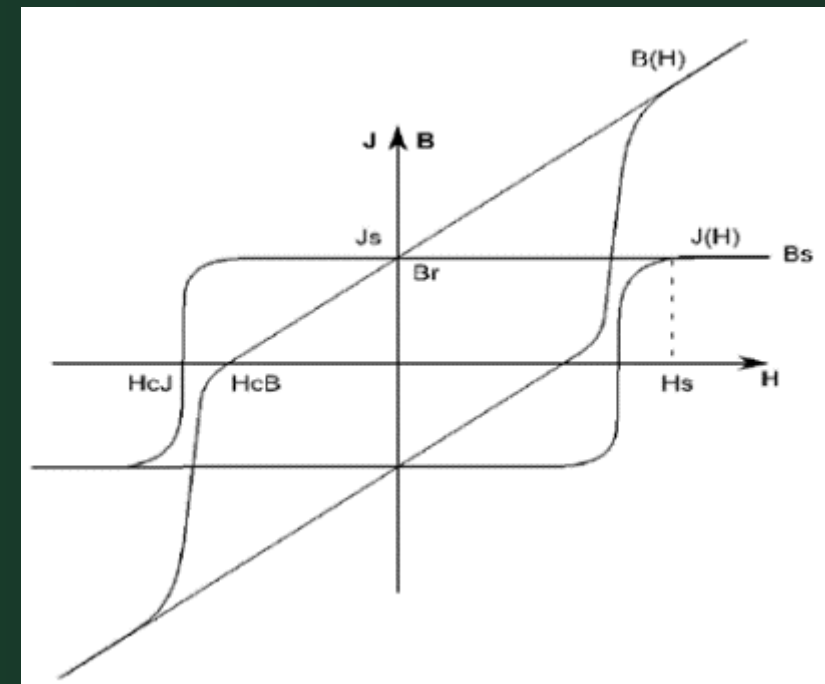
Thermal Properties



• HighLight : *MAGNETIC STEEL Fully & Semi Process - Permanent Magnet*

Mechanical Properties	Breaking load, Elongation at break, Hardness, Fatigue test (sample, gyroscopic force at high temp)
Chemical Properties	Varnish, humidity, solvents, Surface insulation (thickness), Slat spray test
Magnetic Properties	<i>Polarization, Losses, Anisotropy, B(H) Curve (Tamb to 200°C), H_knee</i>
Thermal Properties	Resistance to high and low temperatures

- *Magnetic steel test subcontracted to NIDEC Italy*



- **HighLight** : *Bearing / Grease - SPRING WASHERS - Fastening*



Size

- *Dimensional precision*
- *Internal clearance*



Mechanical test

- *Static and dynamic load capacity*
- *Materials temperature class*
- *Life duration – Noise analysis*



Others

- *Lubricant – Marking - Sealing*



Protection against corrosion

- **After sales analysis – Demerits test – bearing noise characterization**

• **HighLight** : *Painting* - *Temporary protection* - *Winding Protection* – *Packaging...*

Covering power

Viscosity

Color and appearance

Packaging test



Adhesion
(Cross-cut test,
glued pads) -
Skrewing test

Corrosion,
Condensation,
UV, Chemical
resistance

Chemical
resistance,
Aging

Electrcical
insultation for
winding
protection

TEEM-Lab : A Competitive solution



100% Hourly Billing

1. **Zero resource lock-in** (no fixed fees for equipment or space).
2. **No energy cost markups:** You pay only for work hours.



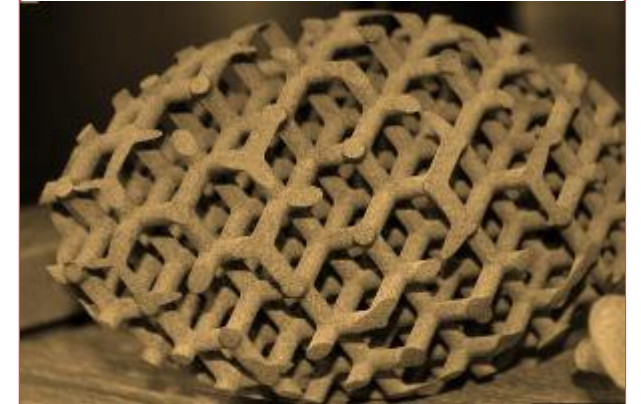
Transparent Rates

1. **Technicians:** sample prep, testing, hands-on work
2. **Engineering Support:** technical expertise, results analysis



Maximum Flexibility

1. **Adaptability** to client needs with no volume commitments.
2. **Optimized value-for-money** through a lean structure.



Transparency & Efficiency: Our Electrotechnical Lab, an Agile Partner with No Hidden Costs



TEEM-Lab

Thermal, Environmental, Electrical &
Mechanical Testing Laboratory



Contact us



SCAN ME