

# DOMO WEBINAR



May 5, 22 | 14–15 CET (8 am EST)  
Register now!



# POLYAMIDE-BASED FLAME RETARDANTS MEETING E&E MINIATURIZATION NEEDS

Speaker:



**Florence Schutz**  
Marketing Manager  
C&E

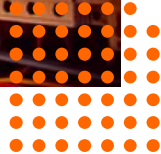


DOMO



# SUMMARY

- 1. About DOMO Chemicals**
- 2. E&E market revolution & miniaturization challenges**
- 3. Answering miniaturization constraints**
- 4. Domo solutions for critical E&E applications**



WHO WE ARE

# DOMO AT A GLANCE

 **2,200**

 **€1.8 Bill.**

 **9**  
OPERATION SITES

 **6** INNOVATION &  
TECHNICAL centres

## MARKETS



**AUTOMOTIVE**



**INDUSTRIAL &  
CONSUMER  
GOODS**



**ELECTRIC &  
ELECTRONIC**

## POLYAMIDES

**PA 6   PA 6.6   PA 6.10   PA HT**

## E&E TRADEMARKS

**TECHNYL®**

**TECHNYL® PROTECT**   
Flame retardants

**TECHNYL® ONE**   
Enhanced electrical properties

**TECHNYL STAR®**   
High-flow PA6 & PA66

**TECHNYL® 4EARTH®**   
Sustainable polyamide

# DOMO

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WHO WE ARE

# DOMO MILESTONES

## Successful transformation towards polyamide integrated solution provider

- 1994**  
Acquisition of Caprolactam Leuna
- 2002**  
Acquisition of Engineering Plastics Premnitz
- 2013**  
European expansion of nylon 6 material engineering
- 2015**  
Global expansion of nylon 6 material engineering
- 2018**  
Strategic investment in window films
- 2020**  
Acquisition of Solvay's Performance Polyamides Business in Europe
- February 2022**  
TECHNYL® will be commercialized globally
- 2022**  
Organic capacity expansion in US & Asia

NYLON SPECIALIST

MATERIAL ENGINEERING

INTEGRATED AND GLOBAL LEADER IN POLYAMIDE SOLUTIONS



**GLOBAL OPERATIONS | R&D | TECHNICAL SERVICE**

OUR GLOBAL NETWORK = COMMITMENT TO OUR CUSTOMERS



**DOMO CHEMICAL'S GLOBAL LOCATIONS**

- ★ Headquarter
- Locations
- Downstream
- Joint Venture
- Upstream
- Sales office



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is our formula



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# 5 Megatrends that trigger a HUGE IMPACT on the DEVELOPMENT of E-MOBILITY, SMART CITIES and CIRCULARITY



**Rapid urbanisation**



**Climate change and resource scarcity**



**Shift in global economic power**



**Demographic and social change**



**Technological breakthroughs**



**RESHAPING THE CITY OF THE FUTURE**

Smart cities

Autonomous Driving

New mobilities

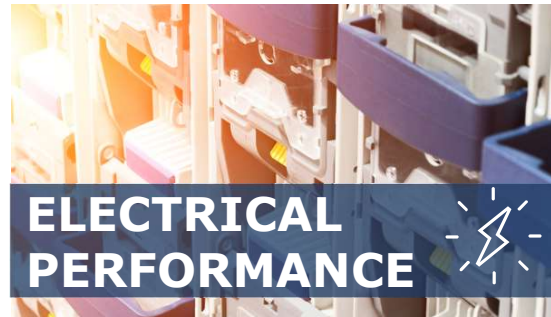
Renewable energy

# THIS REVOLUTION IS CREATING NEW EXPECTATIONS!





From all these EXPECTATIONS,  
MINIATURIZATION has increased the CRITICITY  
on 3 FUNDAMENTAL requirements



DOMO CHEMICALS: A SOLUTION PROVIDER

▼  
**Solution to remain at the right  
level of safety**

▼  
**Solution to comply with the  
new and increasing level of  
electrical protection**

▼  
**Solution to resolve the  
complexity of new design**



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## MINIATURIZATION & EXPERTISE

# CERTIFICATIONS to ensure a high SAFETY level of YOUR solutions

### Yellow Cards creation according to UL certification and international standards:

- **Flammability UL94**
- **GW:** IEC 60295-2-10 at -13
- **HWI:** ASTM D 3874
- **Dielectric Strength:** IEC 60243 & ASTM D149
- **CTI:** IEC 60093 & ASTM D 3638-07
- **Tensile Strength:** ISO 527 & ASTM 638
- **Impact:** ISO 179
- **RTI:** UL746B

### Expertise on fire & smoke certification according to European norm EN 45545-2\*

\* (*France: NF F 16-101 & USA: ASTM E 162 ASTM E 662, ASTM E 1354, SMP 800 C*)

**Better control of time & quicker reactivity**

**Close relationships with UL engineers for expertise sharing**



**in-house certified UL lab since 2004**





## MINIATURIZATION & EXPERTISE

# A diversified expertise on COLOUR to answer to CRITICITIES of ALL requests

### Automotive requirement



### E&E requirement



### E-Mobility requirement



- 1. In house expertise at every stage of development of colour : from R&D to production**
- 2. Selection of the most appropriate colour technology**
- 3. Development of tailor-designed colour to meet customer requirements**



MINIATURIZATION & EXPERTISE

# Cutting-edge LASER MARKING expertise and in-house LASER MARKING facilities

## LASER MARKING =

**technology used \* laser marking conditions \* product**

**Key to well-select laser technology of interest**  
(YAG 1064/532 or UV)

**Key to well-select laser conditions to optimize contrast for a defined grade**

**Key to well-select the grade suitable for technology forecast(YAG or UV)**

**UV (355 nm)**

**GREEN (532 nm)**

**IR (1064 nm)**



TRUMPF LASER TM 6330  
Frequency : 1-120 kHz



ROFIN/ COHERENT LASER Powerline 532-10  
Frequency : 200-800 kHz



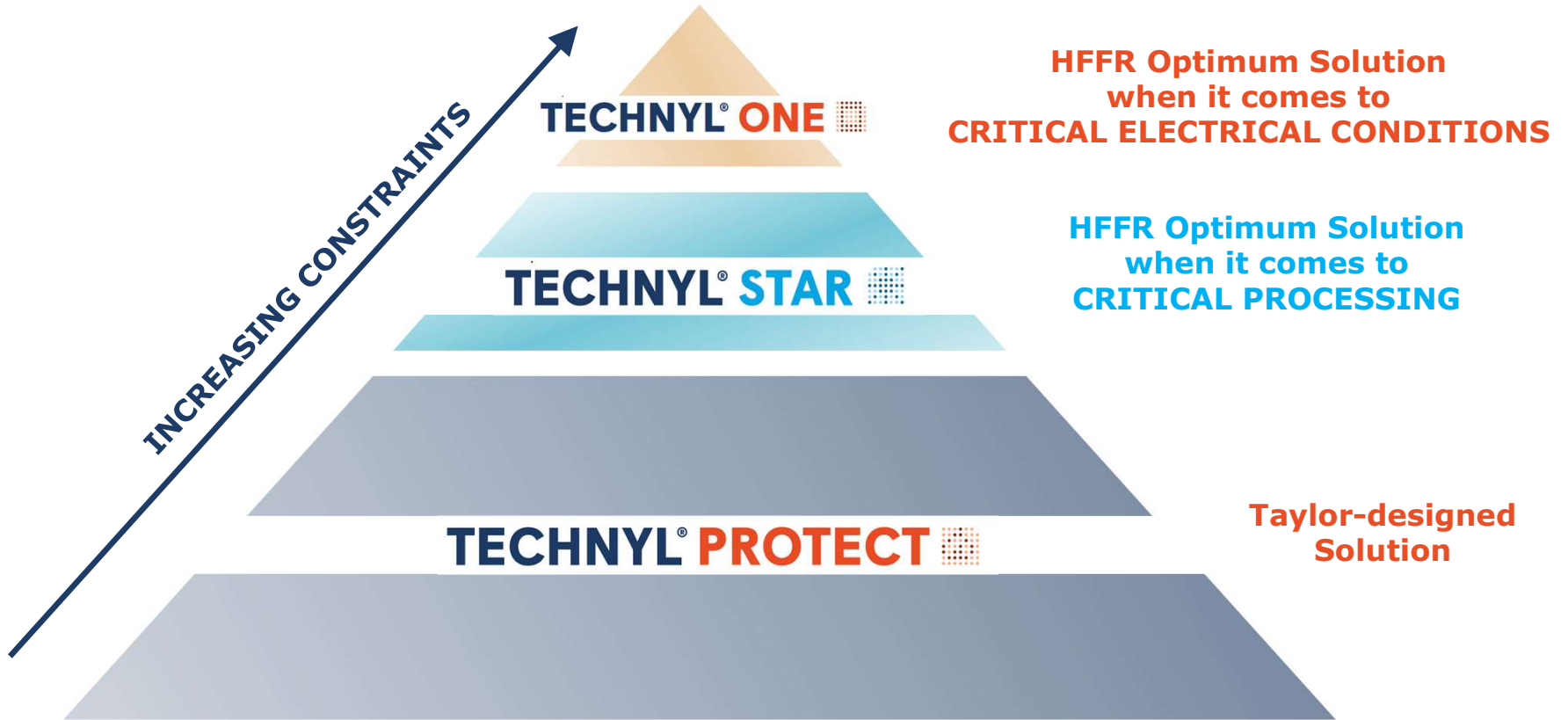
TRUMPF LASER TM 3020  
Frequency : 1-100 kHz

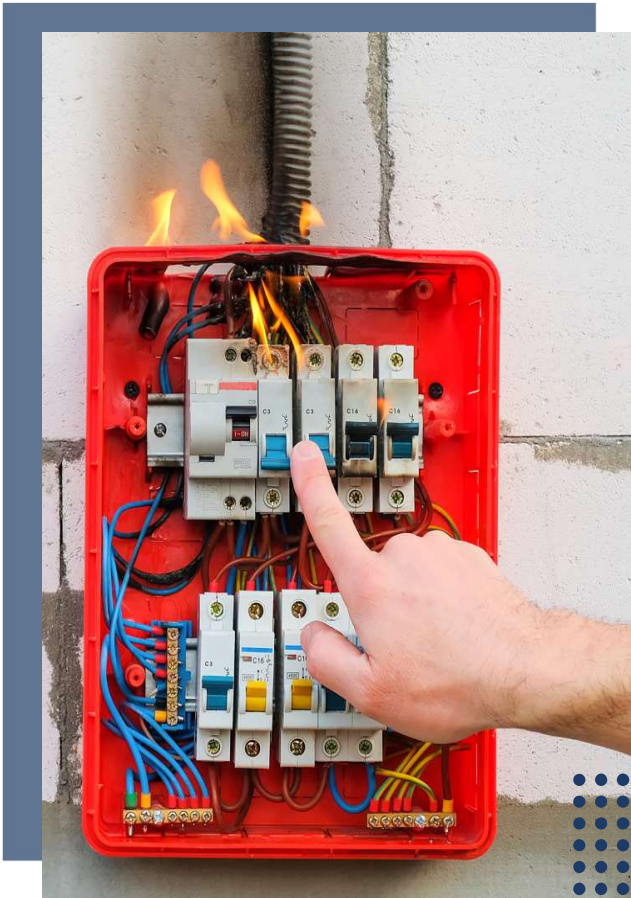
- 1. Tailor-made laser-markable products also without Antimony trioxide**
- 2. Selection of the most appropriate laser technology**
- 3. Support customers in defining most accurate laser conditions**





# MINIATURIZATION: OUR PROBLEM SOLVING PYRAMID





MINIATURIZATION & SAFETY

MEETING THE most STRINGENT STANDARD REQUIREMENTS for safer parts!

# TECHNYL<sup>®</sup> PROTECT

for

# SAFETY

*Complete and customized range of flame retardant products keeping people safe and protecting them from the spread of fire*

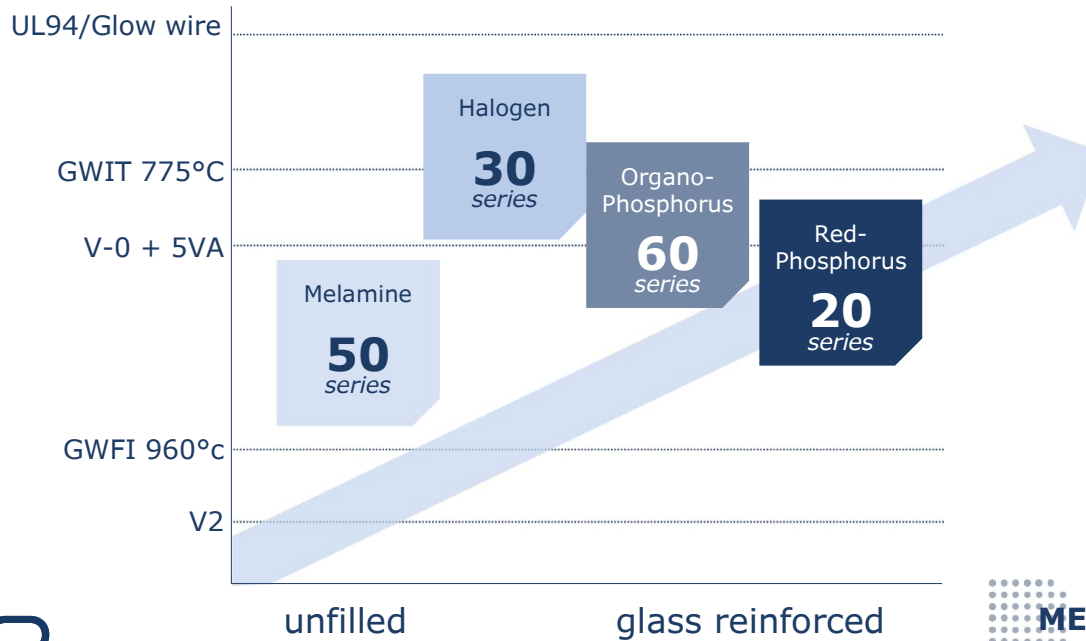


MINIATURIZATION & SAFETY

# TECHNYL® PROTECT

## An IMPRESSIVE range to ANSWER to ALL SPECIFIC requirements

### FLAME RETARDANCY



- Fire rating class: UL 94 V0, V1 or V2 depending on grade
- Yellow cards available, including RTI



- EN 45555 Railway standard



- Compliance with EU environmental waste management directives and WEEE2 2002/96/CE\* for our HFFR range



### MECHANICAL PROPERTIES

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MINIATURIZATION & SAFETY

# TECHNYL® PROTECT A 50X1

## An OPTIMIZED offer for THIN WALL SAFETY needs

TECHNOLOGY



**Optimized blend of PA66 & PA6**  
**Unfilled material**  
**& Halogen Free Flame Retardant**

SAFETY



**Full yellow card available,**  
**included regrind approval**  
**UL94 V0 at 0.4mm**  
**GWIT minimum 775°C**

PERFORMANCE



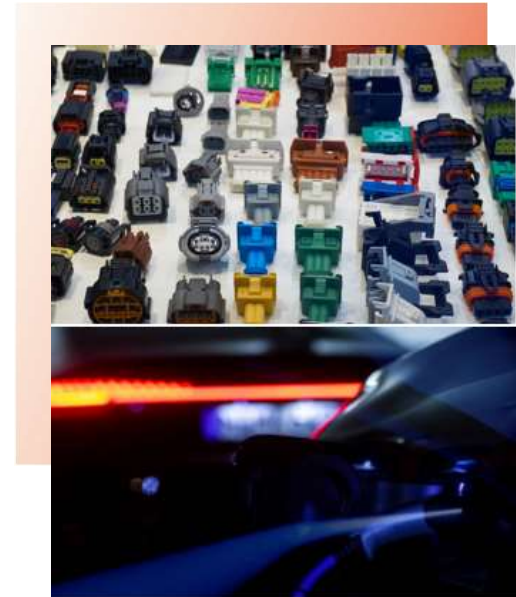
**Pin retention and toughness**  
**Thermal resistance**  
**Customized color available**  
**UL f1 for outdoor application**

PROCESSING



**Easy molding and productivity**  
**Better flowability and improved cycle time**

DOMO



SAFETY



MINIATURIZATION & SAFETY  
**TECHNYL® PROTECT AT 20 V25**

A unique COMBINATION to  
ENLARGE the power of RED PHOSPHORUS

TECHNOLOGY



**Special polymer blend of PA66 & PET  
Filled material & cost-effective Red  
Phosphorus technology**

SAFETY



**Full UL YC available at 0.8mm  
UL 94 V0 at 0.8mm  
GWFI 960°C & GWIT 775°C at 0.8mm**

PERFORMANCE



**Electrical performances : CTI 600V and above  
Electrical RTI 150°C at 0.8mm  
Dark grey color available in addition of black  
Reduced water uptake vs standard PA66 Red P**

PROCESSING



**Low phosphine emission  
Lower tool corrosion vs standard PA66 Red P**







MINIATURIZATION & PROCESSING

SAFER and THINNER!

**TECHNYL<sup>®</sup> STAR**   
for  
**PROCESSING**

*Halogen free PA6 and PA66 high flow technology to comply with increasing requirements of low thickness and safety compliancy!*

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MINIATURIZATION & PROCESSING

# TECHNYL STAR<sup>®</sup> S 60X1 V30

## A UNEQUALLED solution to CHALLENGE the boundaries of MINIATURIZATION

TECHNOLOGY



**A patented PA6 branched polymer & Halogen free flame retardant**

SAFETY



**Full YC listing available with RTI ratings  
UL 94 V0 at 0.8mm  
GWFI 960°C at 0.8 mm**

PERFORMANCE



**UL f1 rating expected end Q2 2022  
UL MB approved for colors**

PROCESSING



**Benchmark process thanks to high flow technology  
Excellent surface aspect  
Injection tool corrosion reduced  
Mold deposit reduction**

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PROCESSABILITY

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MINIATURIZATION & ELECTRICAL PERFORMANCE

COMBINING unparalleled  
ELECTRICAL performance with  
OPTIMUM processing!

**TECHNYL® ONE** 

for **ELECTRICAL  
CONSTRAINTS**

*The unique range of materials resolving the brain  
teaser of fire, electrical and processing for  
demanding electrical protection and new mobility  
requirements : all in ONE!*

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MINIATURIZATION & ELECTRICAL PERFORMANCE  
**TECHNYL® ONE J 60X1 V30**

Enhanced electrical properties

THE ALL in ONE material!

TECHNOLOGY



**A unique high flow PA66.6T polymer technology  
& Halogen free flame retardant range**

SAFETY



**Full UL yellow card available  
UL 94 V0 at 0.4mm - UL 5VA at 0.75mm  
GWFI 960°C, GWIT 800°C at 0.4mm -  
Railways certification: R22 (HL3) & R23 (HL3) - EN 45545-**

PERFORMANCE



**CTI ≥ 700V, IPTI 1kV  
RTI Electrical 150°C at 0.4 mm  
UL MB approved for colors  
High temperature resistance**

PROCESSING



**Standard mold thermoregulation as for PA6 and PA66  
Reduced injection tool corrosion**

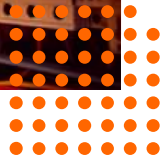
**DOMO**





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# DOMO SOLUTIONS ON POWER DISTRIBUTION EQUIPMENTS

## Key requirements

- Mechanical properties for resistance to arc pressure or to part explosion
- Dielectrical strength for electrical insulation properties during part life-time
- FR properties for applications safety during part life-time
- Color & laser-marking stability for security information retention during part life-time



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### TECHNYL® PROTECT for low amperage MCB

TECHNYL® PROTECT C 52G1 V25 & V20 / TECHNYL® PROTECT C 52G1 MX25

- ✓ PA6 halogen free, glass fiber or mineral reinforced
- ✓ Optimum mechanical properties to allow swelling of the part for arc dispersion
- ✓ GWFI 960°C at 1mm

### TECHNYLSTAR® for low to medium amperage MCB

TECHNYLSTAR® AF 60SX V25 & V30

- ✓ PA66 high flow Glass fiber reinforced
- ✓ Optimized material for reduced corrosion and exsudation/blooming phenomenon

### TECHNYL® ONE for high amperage MCB, MCCB and critical electrical protection devices

TECHNYL® ONE J 60X1 V30 for demanding conditions such as Temperature & Humidity

Soon to come..... 50% reinforced version for structural electrical applications

# DOMO SOLUTIONS ON CONNECTIVITY SYSTEM

## Key requirements

- Mechanical : Pin retention strength, Connection and pull-force, Impact resistance
- Tracking Resistance Performance
- Processing to cover thin multiple-cavity molds, fast cycle solutions and productivity
- Fire properties as GWIT minimum 775°C and UL 94 V0 at 0.4mm



### TECHNYL® PROTECT - unfilled

TECHNYL® PROTECT A 50H1 / TECHNYL® PROTECT A 50X1 / TECHNYL® PROTECT B 50H1

- ✓ Extensive unfilled range of PA 66, blends & copolymers products
- ✓ Fully UL certified, included RTI at 0.4mm
- ✓ All colors available, with MB registration for self-coloring

### TECHNYL® ONE - filled

TECHNYL® ONE J 60X1 V30

- ✓ CTI minimum 700V and above to answer to new high voltage requirements
- ✓ Full yellow card available at 0.4mm, RTI at 150°C
- ✓ GWIT 800°C

Soon to come..... 15% reinforced TECHNYL® ONE development to combine electrical benefit, critical conditions and ductility

# THE FUTURE IS ELECTRIC : DOMO IS LEVERAGING FLAME RETARDANT EXPERTISE TO MEET THE NEW EXPECTATIONS



## TECHNYL® 4EARTH A1E/C1E

### THE SOLUTION COMBINING HFFR AND RECYCLED FEEDSTOCK

- Up to **100% recycled polymer**
- Glass fibre reinforced **PA66 & PA6 compounds**
- Excellent **mechanical properties**
- Available FR >Halogen & phosphorus **free**
- REACH & RoHS **compliance**
- High quality **consistency**
- Available **natural** and **colored**
- TiO<sub>2</sub> free**



## TECHNYL® ORANGE

### THE SOLUTION FOR HIGH VOLTAGE CONNECTORS

- Available from **PA6 to High Temperature matrix**
- From unreinforced to filled material
- Available FR >Halogen & phosphorus **free**
- All orange** shade suitable : RAL 2003, RAL 2008, RAL 2011
- Stabilized colour under temperature**
- Laser marking**



# POLYAMIDE BASED MATERIALS MEETING MINIATURIZATION NEEDS KEY TAKE-AWAYS

**Pioneer in HFFR technology**



**One challenge = one solution**



**UL and railway certified**



THANK YOU  
FOR YOUR  
ATTENTION



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**OUR AMBITION  
AT YOUR SERVICE**

Q&A

**DOMO**

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