





**EXPERT IN
REACTIVE THERMOPLASTIC PULTRUSION**

- 
- | Company
 - | Core Business and competences
 - | Reactive Thermoplastic Pultrusion Technologies
 - | Advantages of Thermoplastic Composites
 - | Applications



CQFD Composites, **facts**

- | Founded in 2006
- | R&D process development since 2007
- | Commercial approach initiated in 2010
- | Team of 8 persons
- | R&D work place of 800 m²
- | 4 advanced pultrusion lines dedicated to R&D pultrusion work
- | Based in Wittenheim (France) - 20 km from Bâle-Mulhouse airport

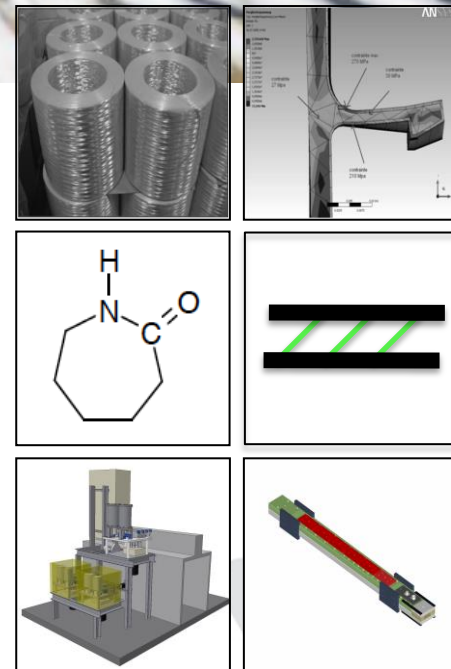


CQFD Composites, **Core Business:**

- | **Development** of innovative composite thermoplastic profiles
- | **Industrialization** of products and processes.
- | **Production**
- | **Technologies transfer**

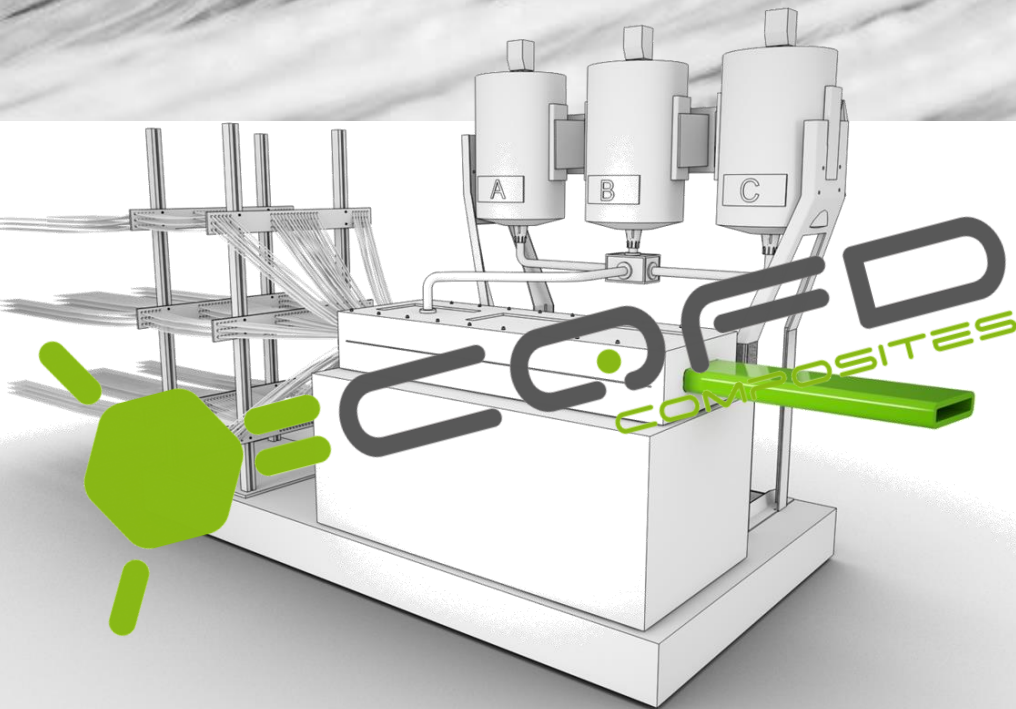
CQFD Composites, **competences:**

- | Development of composites profiles
- | Expertise in thermoplastic composites
- | Design of pultrusion tools and machineries
- | Polymer chemistry and interface
- | R&D project management





Reactive Thermoplastic Pultrusion



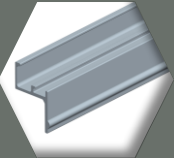
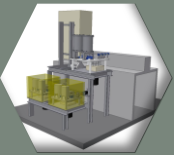


Step 1

Proprietary formulation of low viscosity monomers combining catalyst, activator, additives and suitable fibers are introduced under pressure into to a pultrusion die.

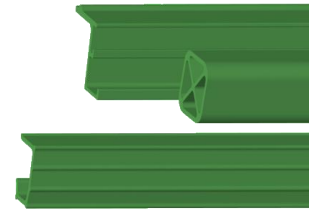
Step 2

The thermoplastic polymer is synthesized « in situ » among the fibers during the shaping step of the profile, under pressure and heat.

KEY ADVANTAGES OF PULTRUDED THERMOPLASTIC COMPOSITES

	<p>PRODUCT</p>	<p>ULTIMATE MECHANICS SHAPABLE PROFILES COMPATIBLE FOR OVERMOULDING</p>
	<p>PROCESS</p>	<p>LOW COST RAW MATERIALS ONE STEP TRANSFORMATION STRAIGHT OR CURVED</p>
	<p>ENVIRONMENT</p>	<p>2,5 x LESS ENERGY CONSUMPTION RECYCLABLE STYRENE FREE</p>
	<p>TIME TO MARKET</p>	<p>MATURE TECHNOLOGY AVAILABLE FOR MASS PRODUCTION AVAILABLE FOR TECHNOLOGY TRANSFER</p>

STRAIGHT

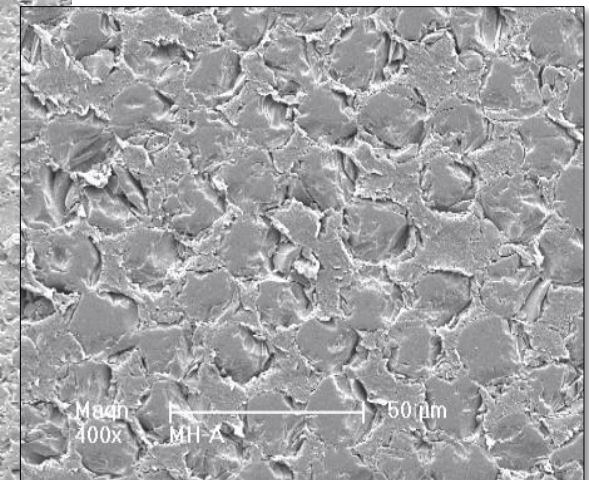
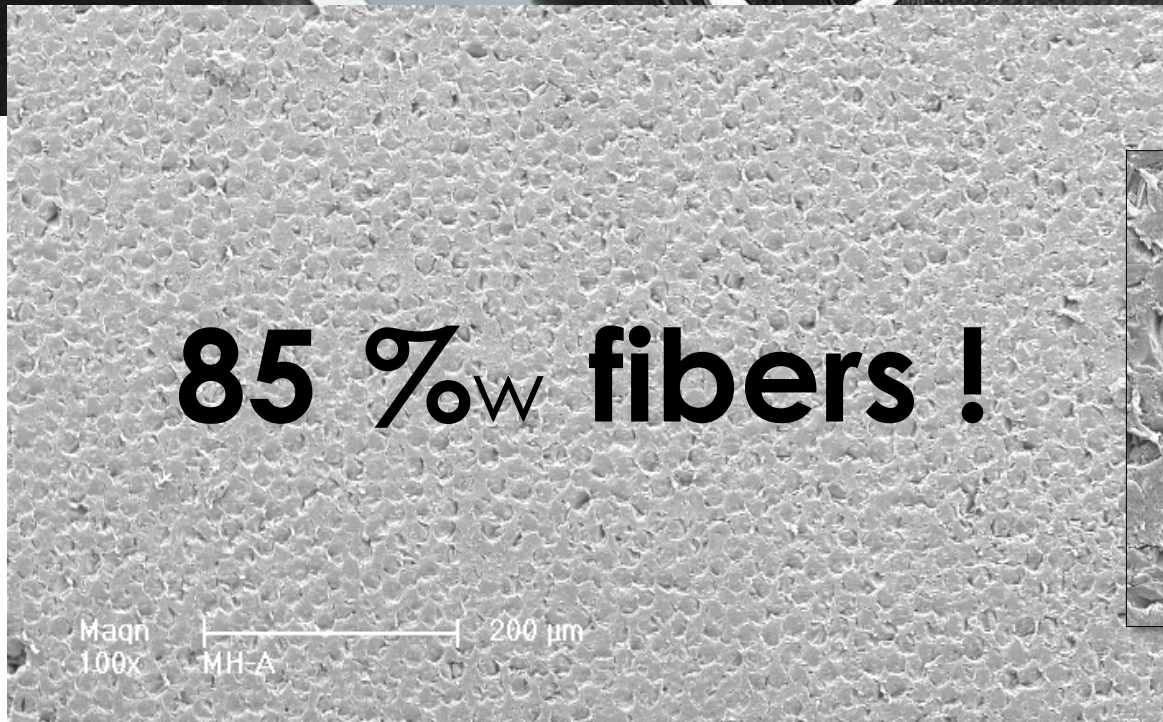
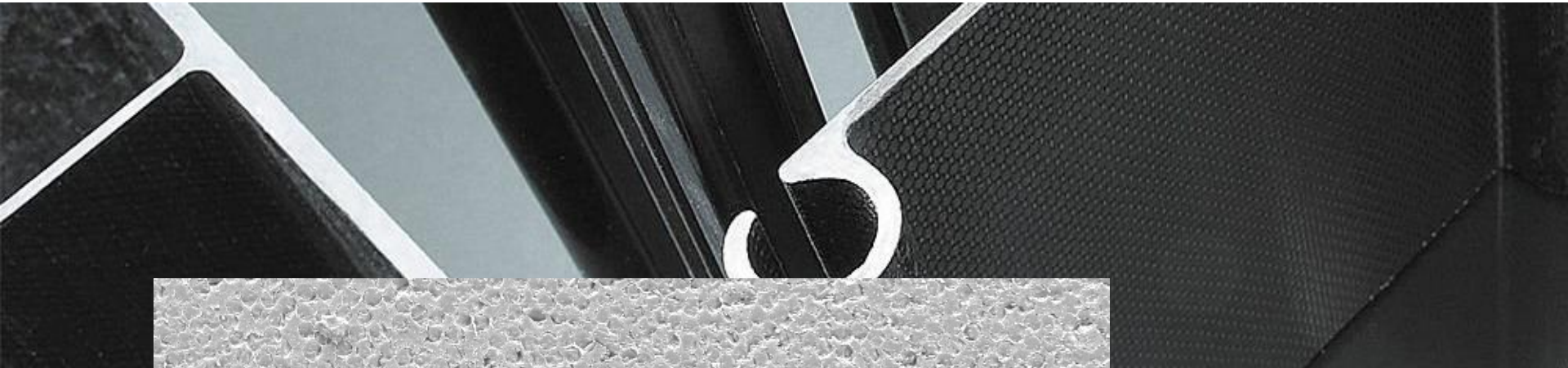


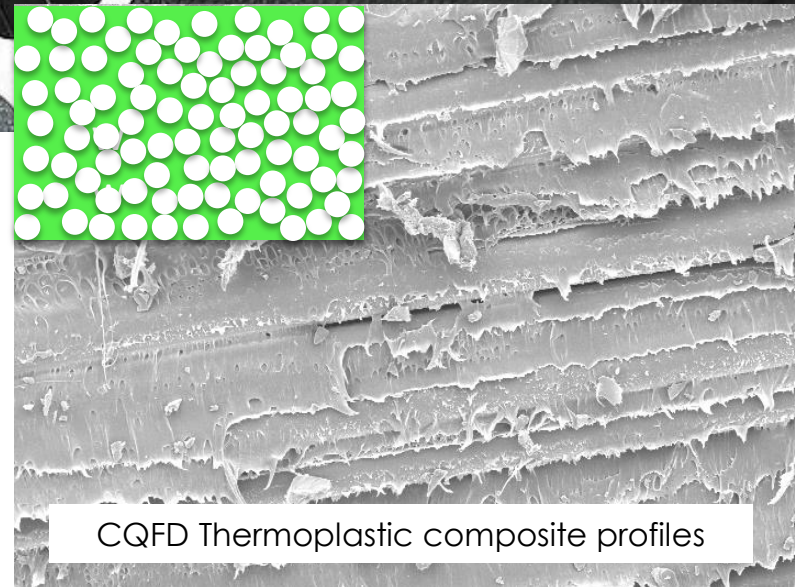
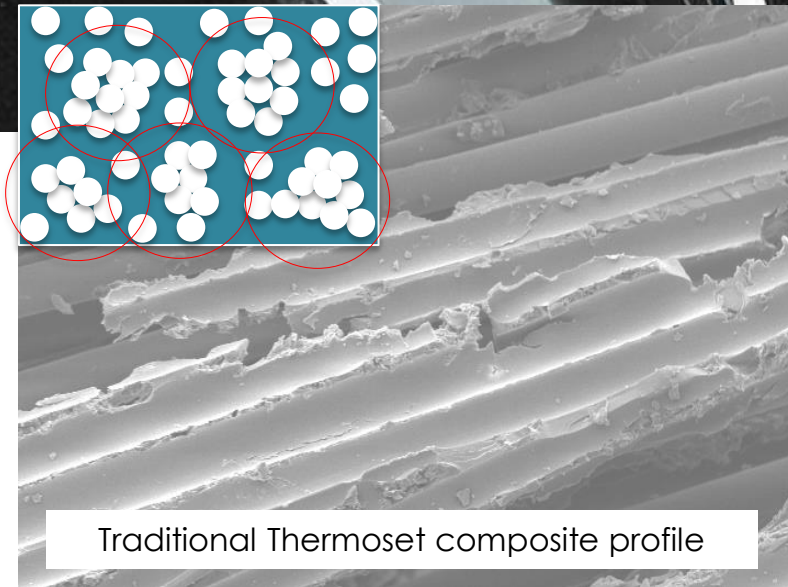
SHAPED



CURVED







SEM pictures obtained on composite profiles after breaking

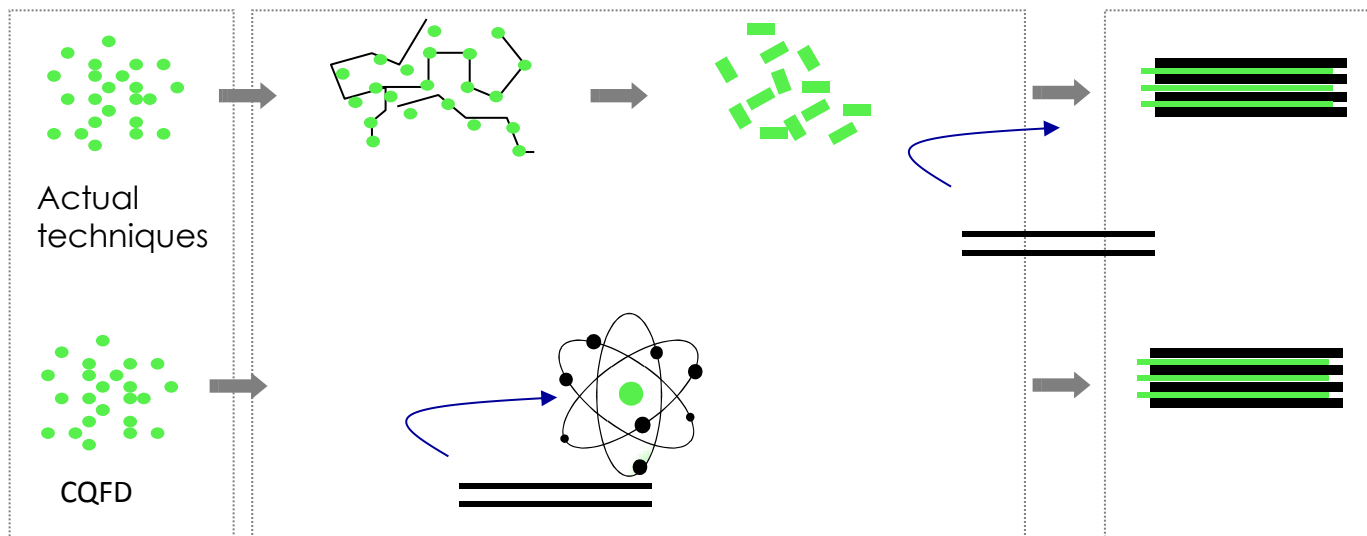
Reduction of composite transformation steps

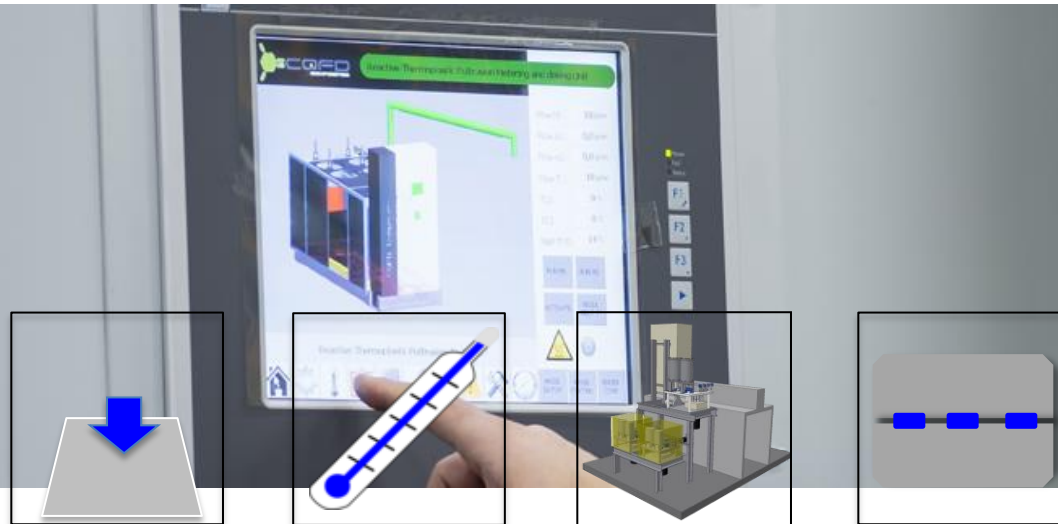
Monomers

Polymers

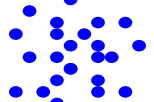
Filament, Granules, Powder

Composite





4800
tex

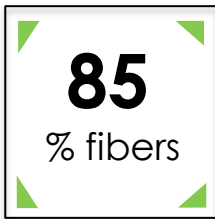
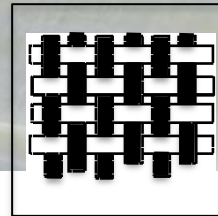
Monomer

Olygomer

Raw materials

- | Lower cost first transformation matrix
- | Lower cost large tow fibers

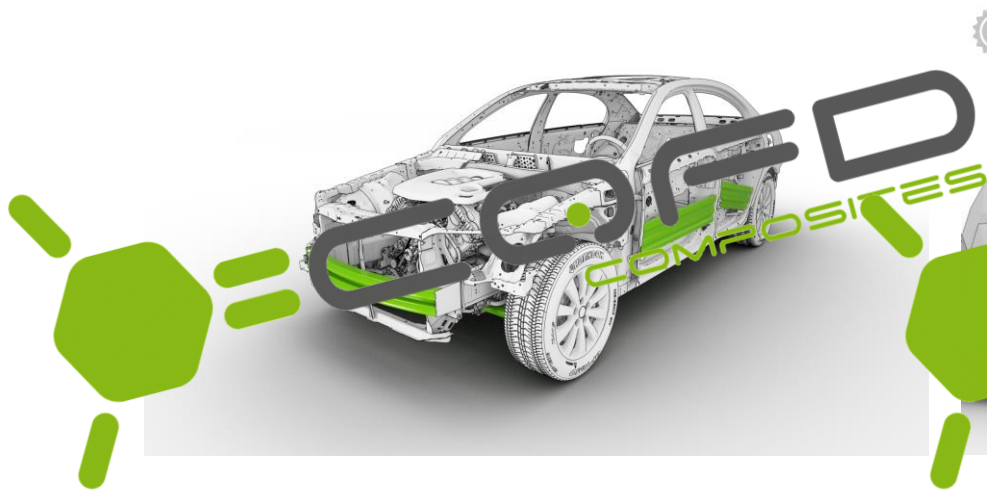
Transformation

- | Low pressure
- | Low temperature
- | On line chemistry
- | Multi cavities die



- | THICK structural profiles
- | INSERTS reinforcements (extrusion & injection)
- | ULTRA HIGH MODULUS
- | PRECISE profiles (connexion / assembly)
- | COMBINAISON of fibers for mechanical /cost optimisation
- | CO_EXTRUDED profiles (surface functionalities /welding)

| Automobile



Structural and semi structural parts

| Construction



Windows, and others structural profiles

From DESIGN...



.... to REALITY

Alternative to aluminum in building applications

	ALU	CQFD UD GLASS	
Density	2,7	2,0	Gpa
Rigidity	70	55-65	Gpa
Resistance	250	1500	Mpa
Spe. Rigidity	26	27	-
Conductivity	220	0,5	W/m.K
Dilatation	24	5	10 ⁻⁶ m/m.K°



CQFD composites **commits** to his customers to :



- | Think about a **performing innovative product solution**
- | Identify **the most efficient process**
- | Propose an industrial **scenario in line with the customer expectations** :
 - Production by CQFD Composites
 - Joint-Venture
 - Technology/Know-How transfer to the customer

Pultrusion
Technologies



Pultruded
Thermoplastic Composites
Solutions

Material
Engineering

Thank you for your attention

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