Toho Tenax

Human Chemistry, Human Solutions TEIJIN

Feiplar Sao Paulo, Brazil November 2016

Toho Tenax Thermoplastics

Downstream Applications

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Toho Tenax America

Content

- Toho Tenax Global Network
- Toho Tenax TP Products & Part Making
  - ▲ HTS/IMS PEEK/PEKK/PPS UD Tapes (TPUD)
  - ▲ HTS/IMS PEEK/PEKK/PPS Laminates (TPCL)
  - ▲ HTS & IMS PEEK/PEKKPPS Semi-preg (TPWF)

Toho Tenax Global Network

Europe

Head Office:	Wuppertal, Germany
Rep. Office:	France
	Italy
	Finland
CF Prod.	Oberbruch, Germany

Asia

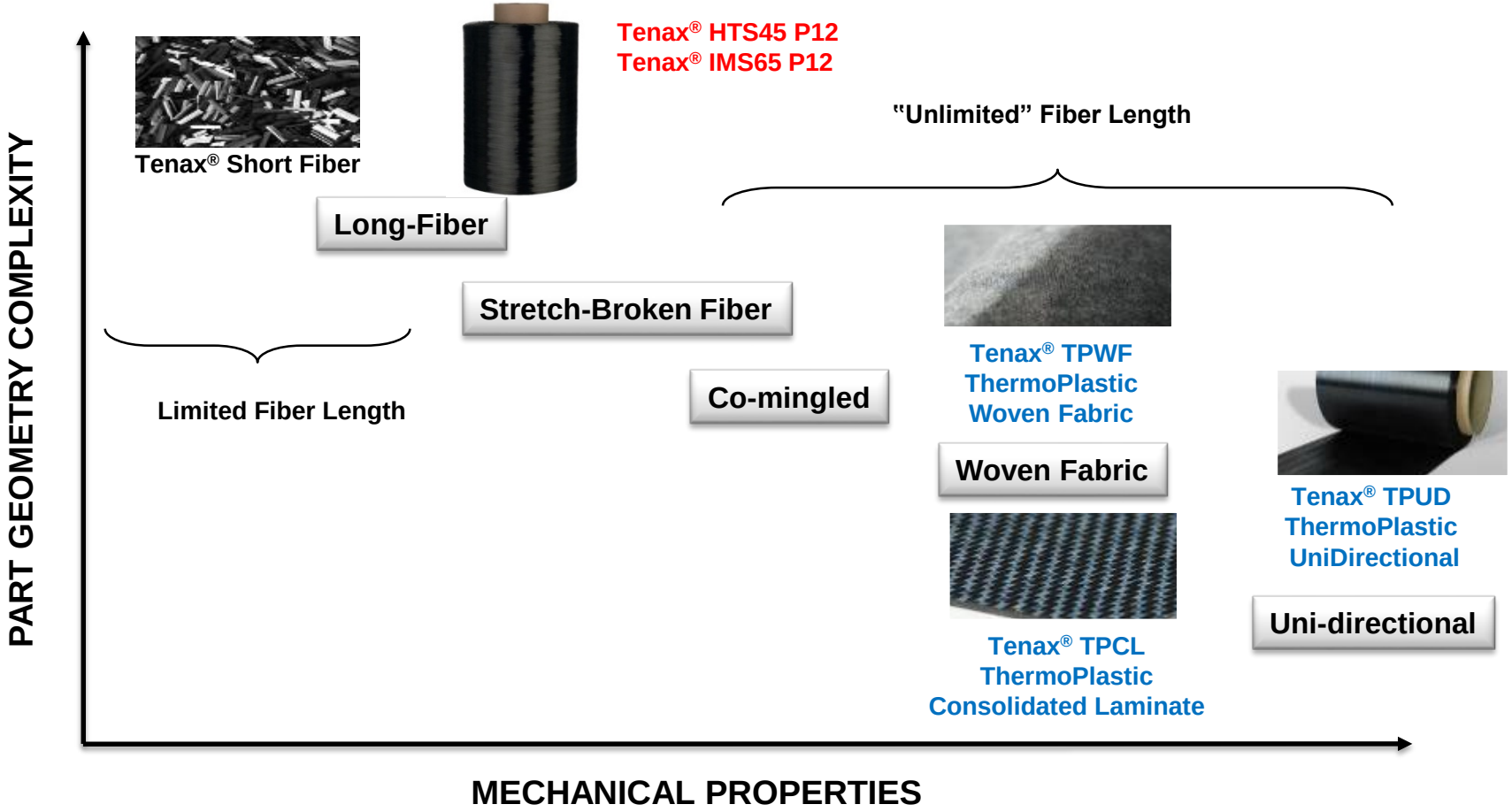
Head Office:	Tokyo, Japan
Office:	Shanghai, China
	Singapore
CF Prod.	Mishima, Shizuoka
Composites	Ibigawa, Gifu
	Gotenba, Shizuoka

Americas

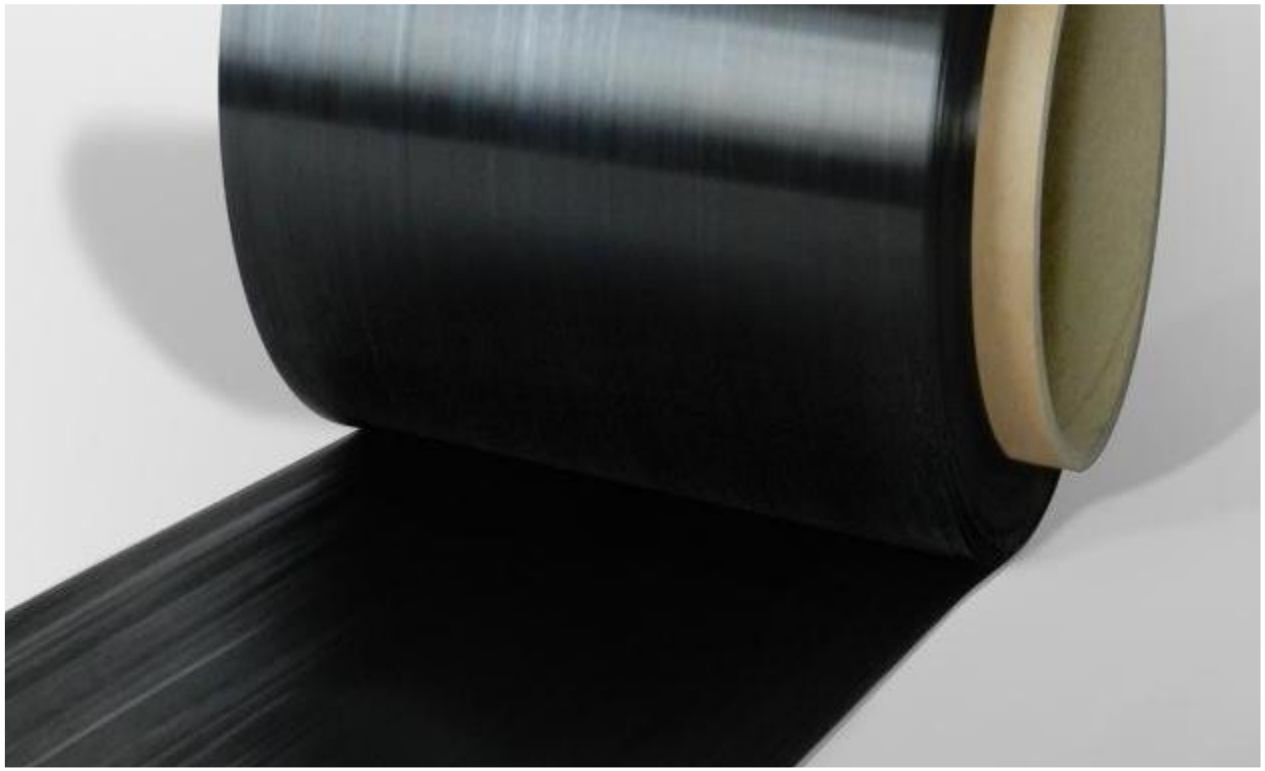
Head Office:	Rockwood, TN
Sales Office:	Huntersville, NC
Tech. Support:	Seattle, WA
	Portland, OR
	Sao Paolo, Brazil
CF Prod.	Rockwood, TN
Composites	Erlanger, KY

Tenax® CARBON FIBERS
REINFORCING EXCELLENCE

Toho Tenax CFRTP* Product Families

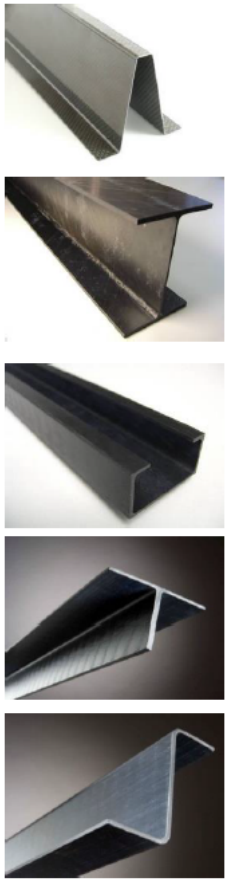


*CFRTP: Carbon Fiber Reinforced ThermoPlastics



ThermoPlastic UniDirectional

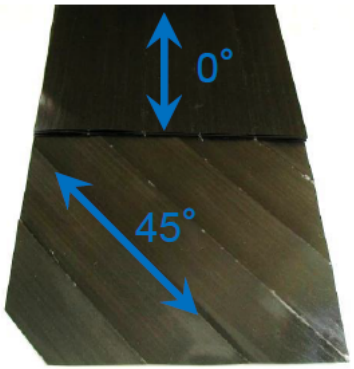
Tenax® TPUD PEEK-HTS45 - Part Making

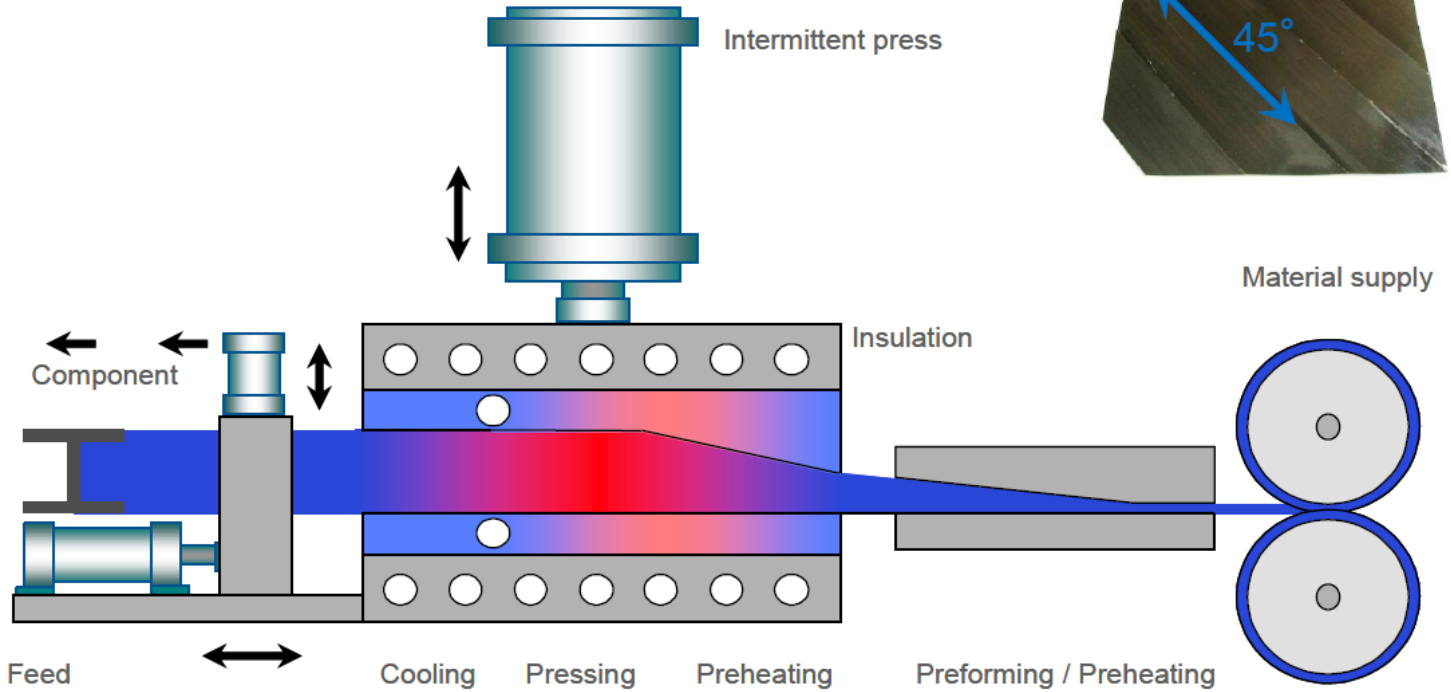


Semi-automated, Complex and continuous shape

CCM process:

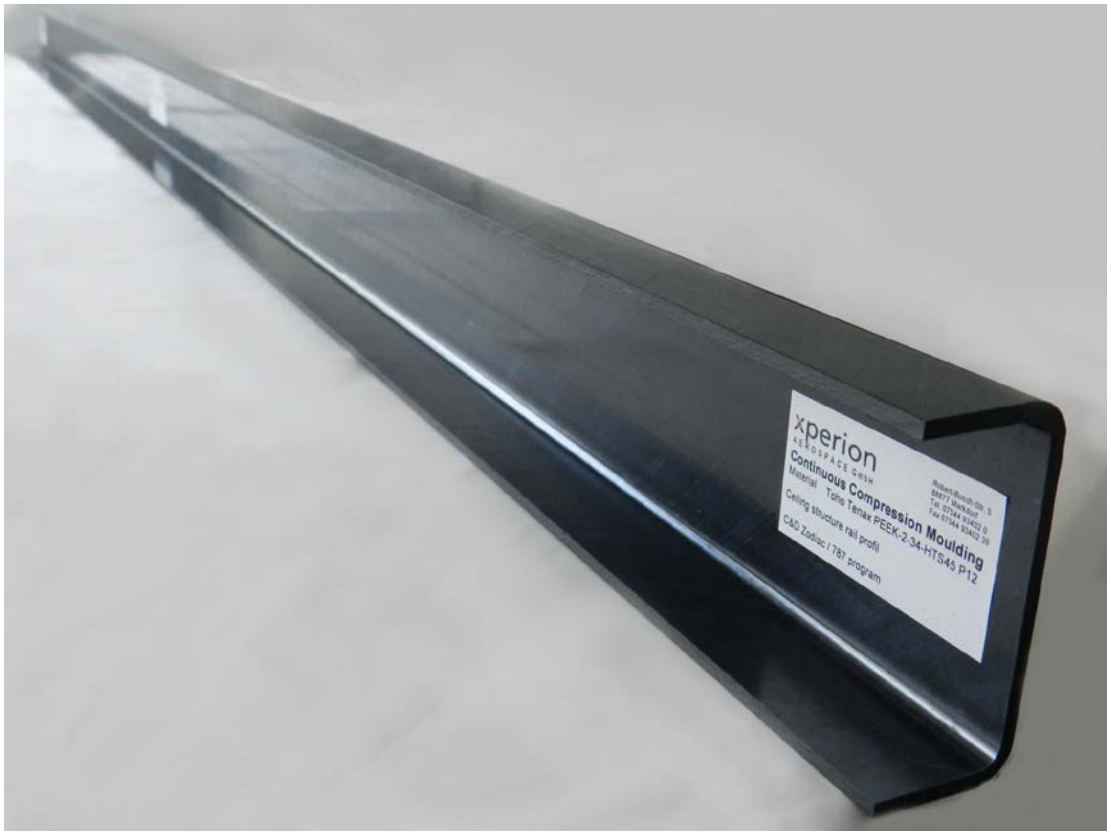
xperion AEROSPACE GmbH

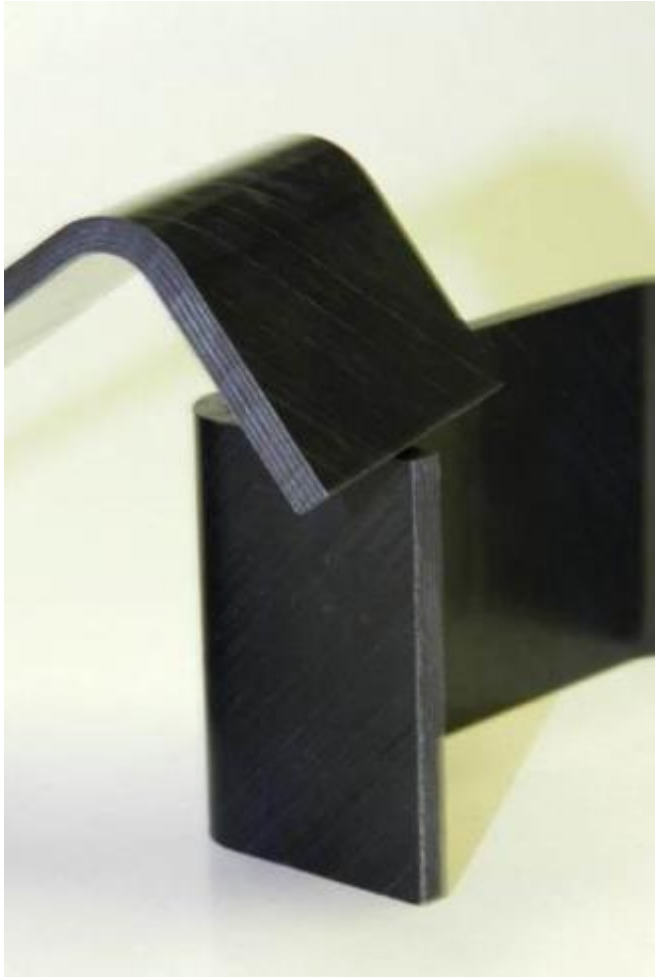




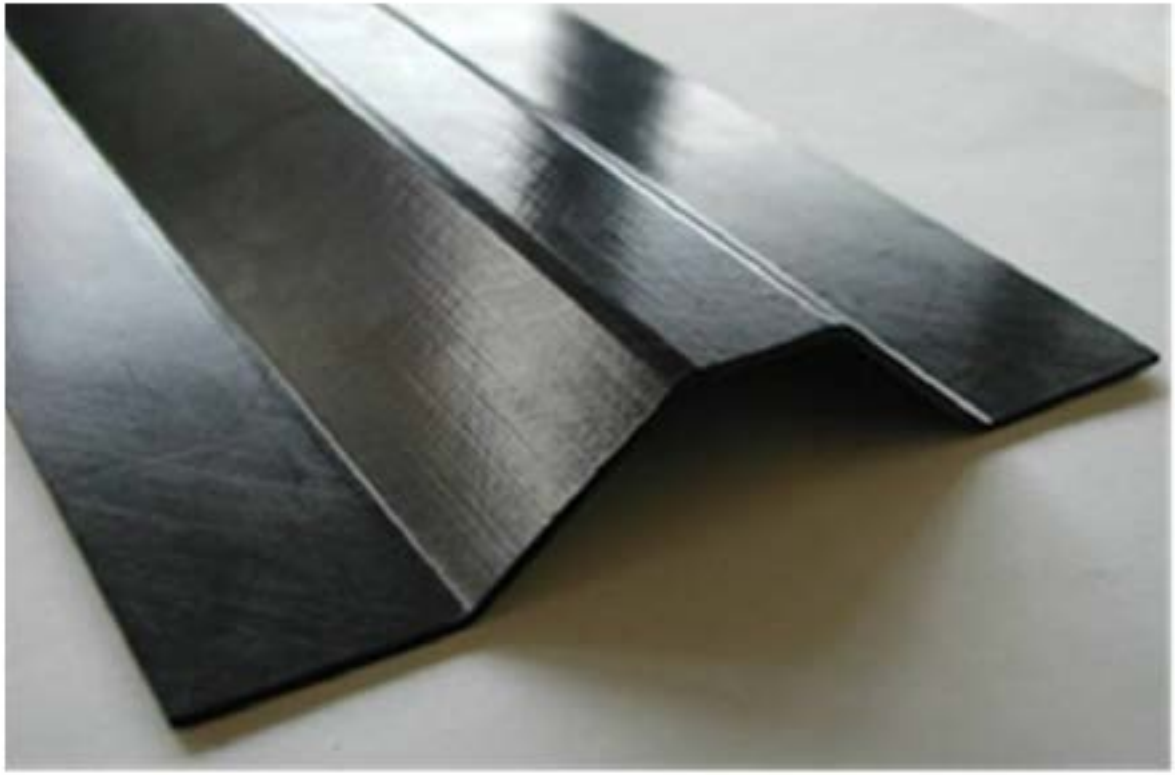
Tenax® CARBON FIBERS
REINFORCING EXCELLENCE

Tenax® TPUD PEEK-HTS45 - Part Making





Tenax® TPUD PEEK-HTS45 - Part Making



Tenax® TPUD PEEK-HTS45 - Part Making

Manufacturing of complex shape (ribs) with ATL and Stamping:

ATL

Laminate

preform

IR

stamping tool

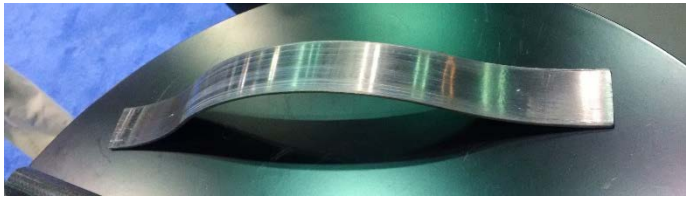
semi finished part

final triming

TPUD Industrial Applications:

1). Riser/Piping Demonstration Part using ¼” slit TPUD

2). Umbilical Spring using 2.0” wide slit TPUD



Tenax® TPUD PEEK-HTS45
- Chopped Material (Compression Molded)

Current Development & Future 3D Part Making

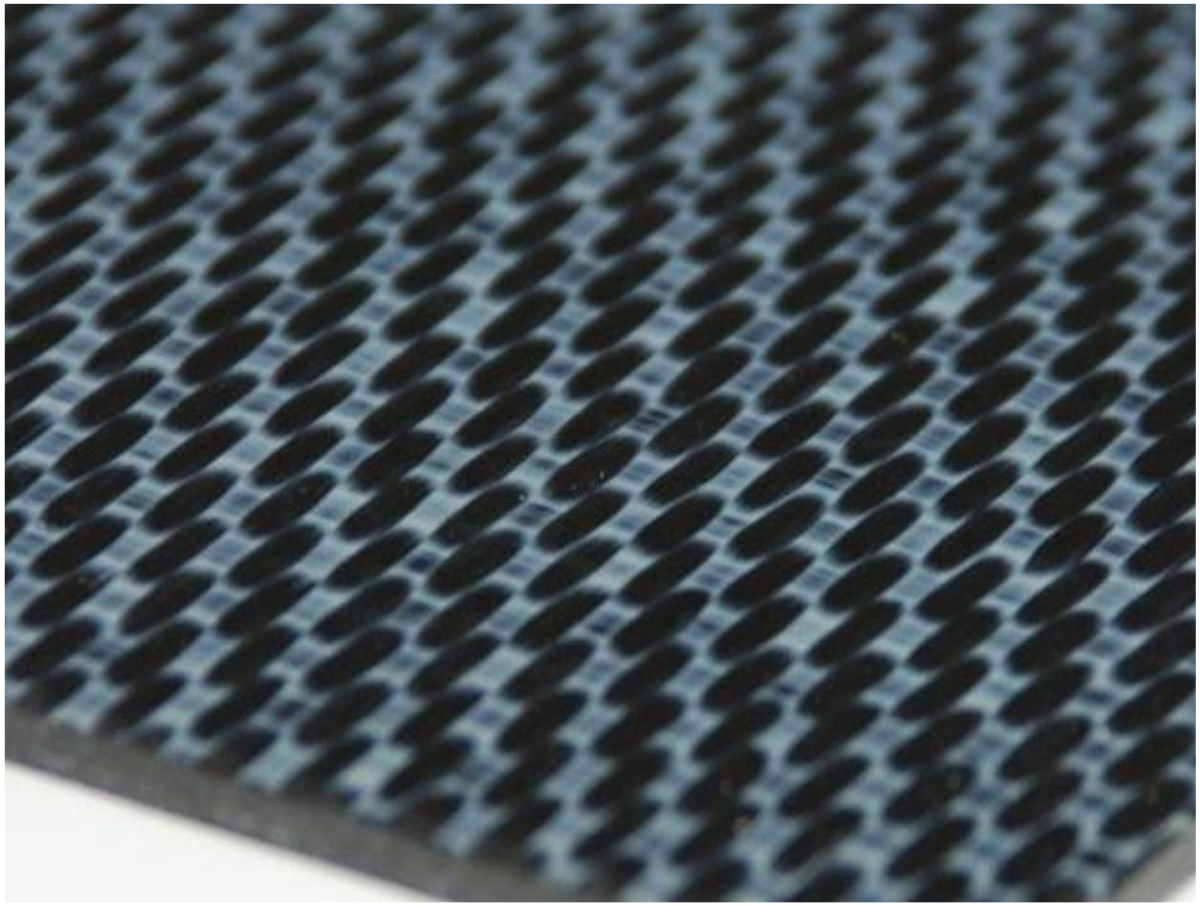
TPUD:

1). Tenax® HTS45 PEEK UD Tape (P12 sized)

(a). Compression/cavity molded

- Cut TPUD PEEK "UD Tape" – 1 X 3 cm strip.
- Special Compression-Molded Processing with Stainless Steel Inserts

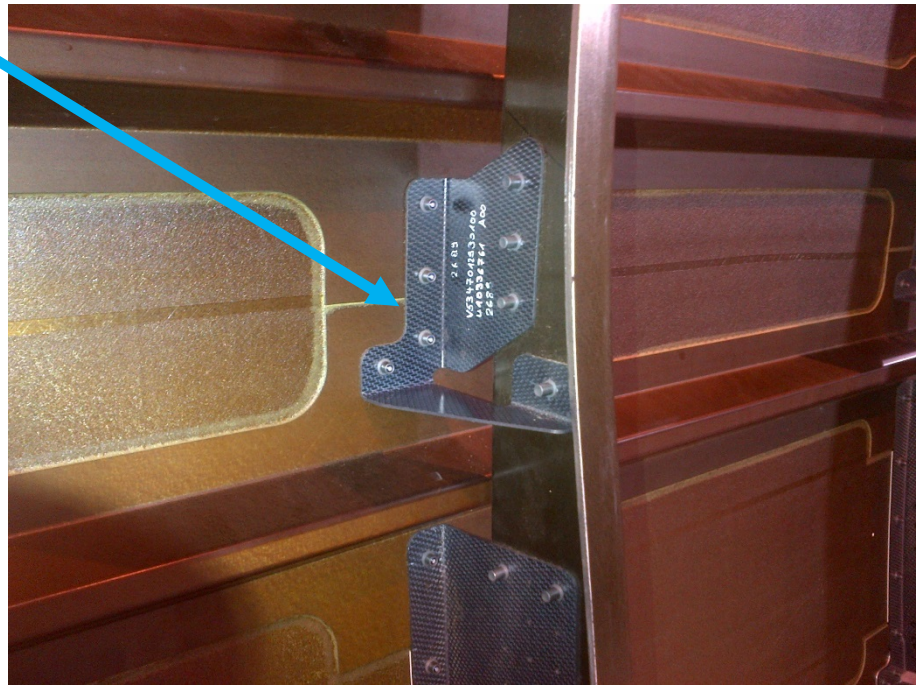
*TPUD: ThermoPlastics Uni Directional



ThermoPlastic Consolidated Laminate

Tenax® TPCL PEEK-HTA40 on board the Airbus A350XWB

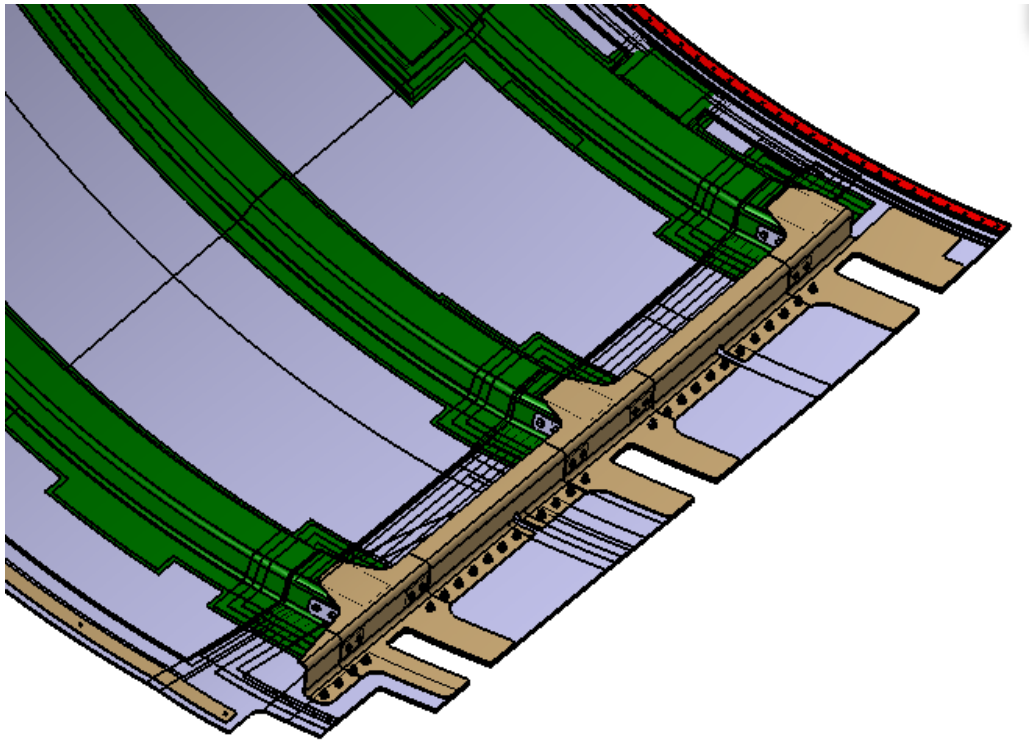
Fuselage Structural Clip (Compression Molded)



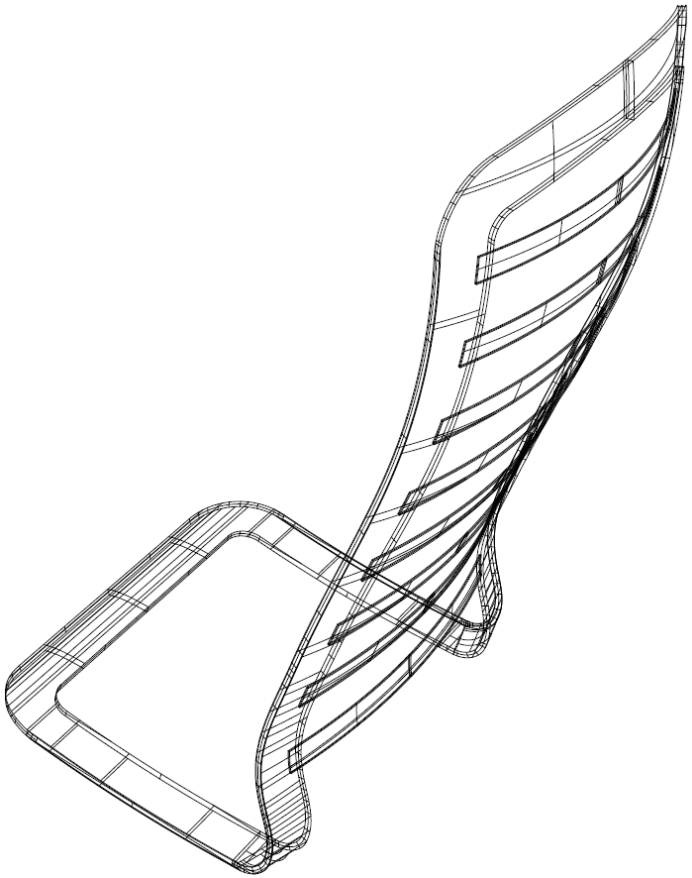
Thermoplastic Longeron (Aerostructure):

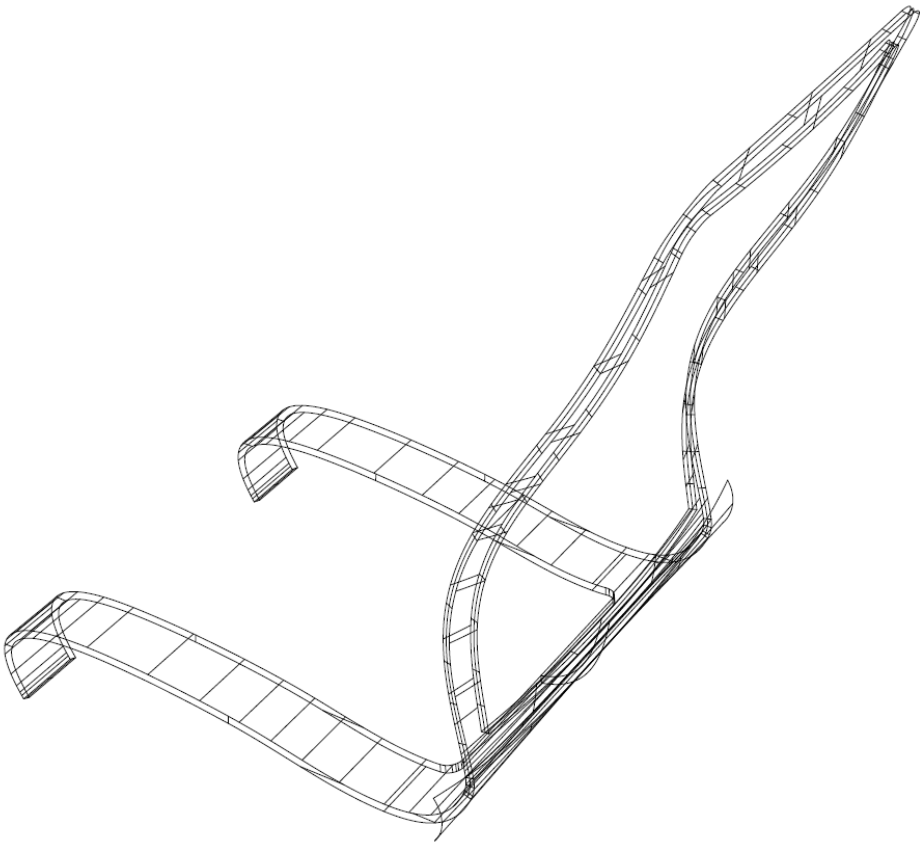
1). Development Project for the A320neo Fan Cowl Panel

(a). Support Structure.

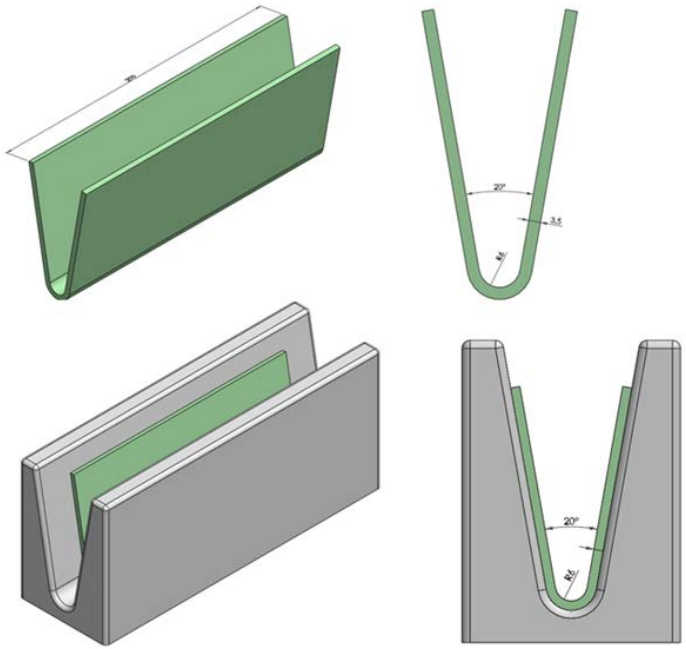


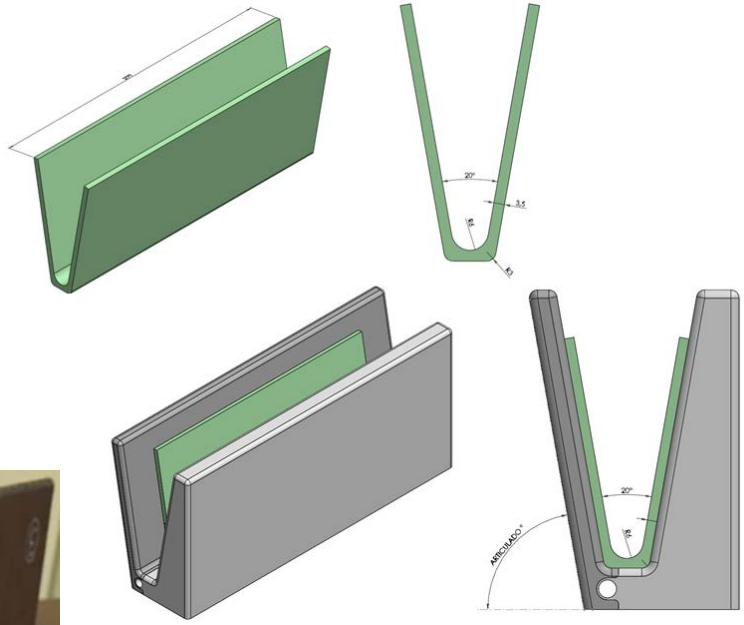
Thermoplastic Seat Frame/Support Structure (TPCL):



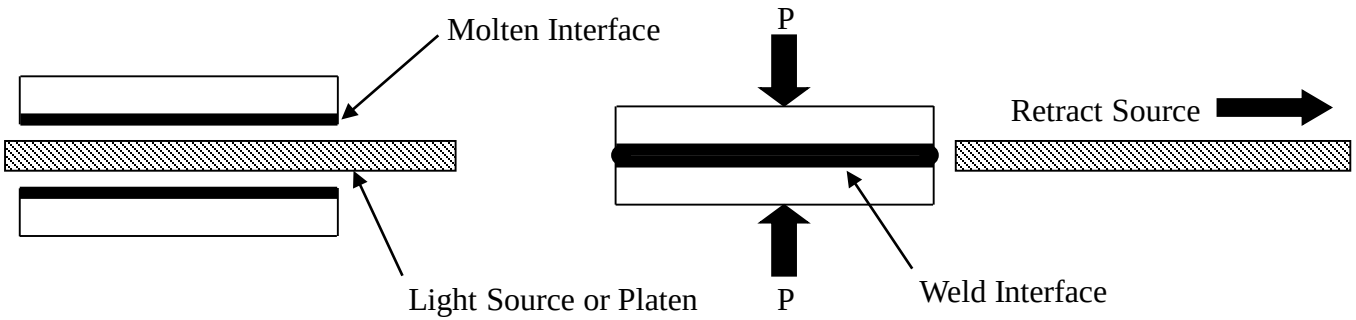


Wing Structure/Flap (tight radius w/ lightning strike) Forming:



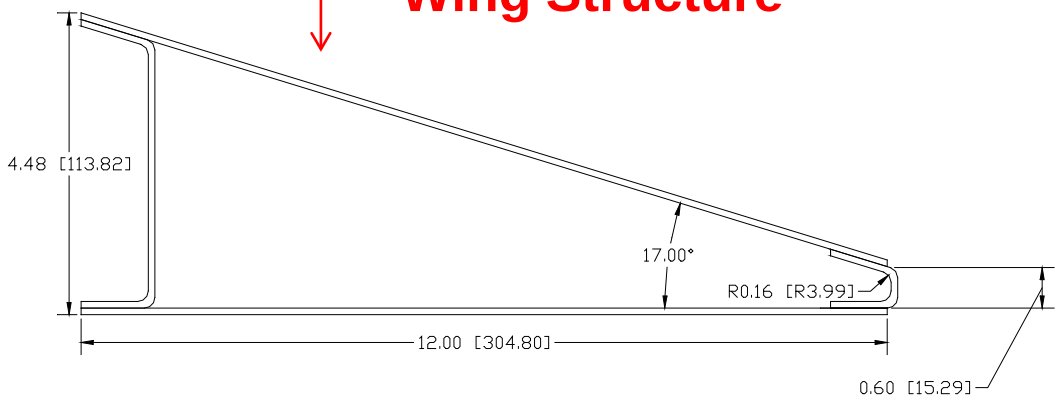


Infrared Heating / Welding Process

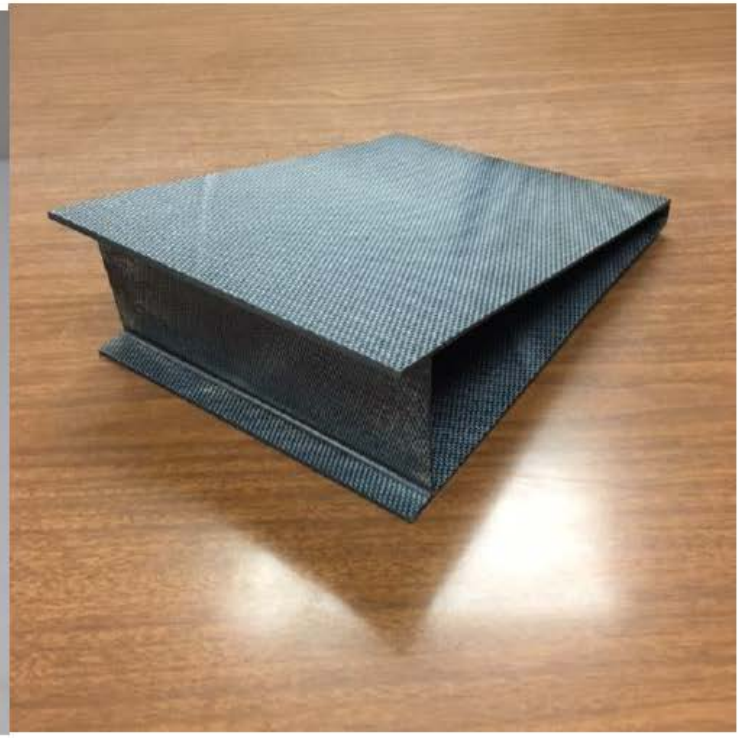


STEP #1 **STEP #2**

Typical Proof of Concept Wing Structure



Infrared Heating / Welding Process – POC & typical stiffened structure

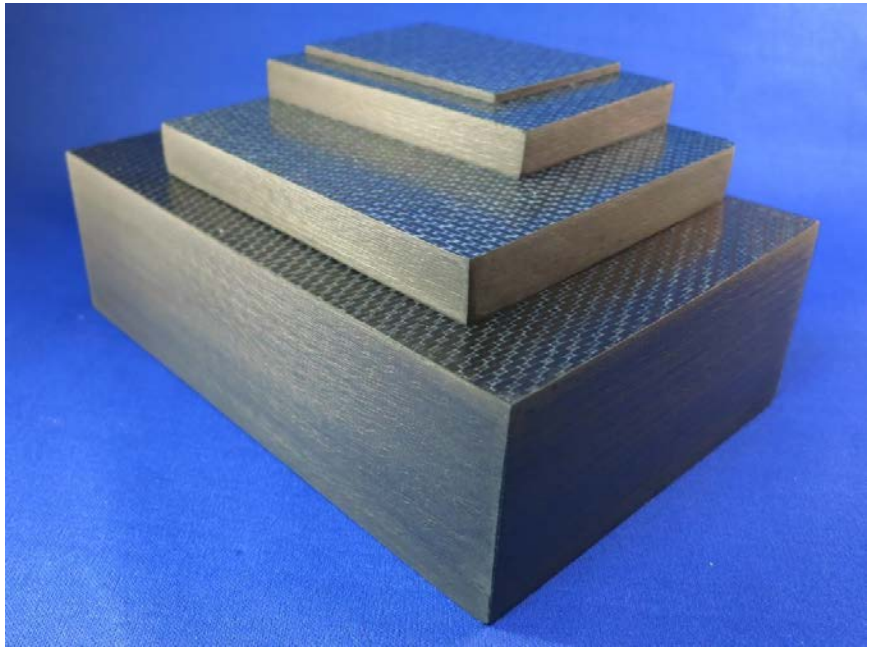


TPCL Industrial & Medical / Thick TPCL:

1). B-Grade laminate (Airbus program remnants)

2). Thick TPCL – O&G pressure plate and medical devices

- Currently made by Toho Tenax America (TTA)



"Recycling" (TPCL) :

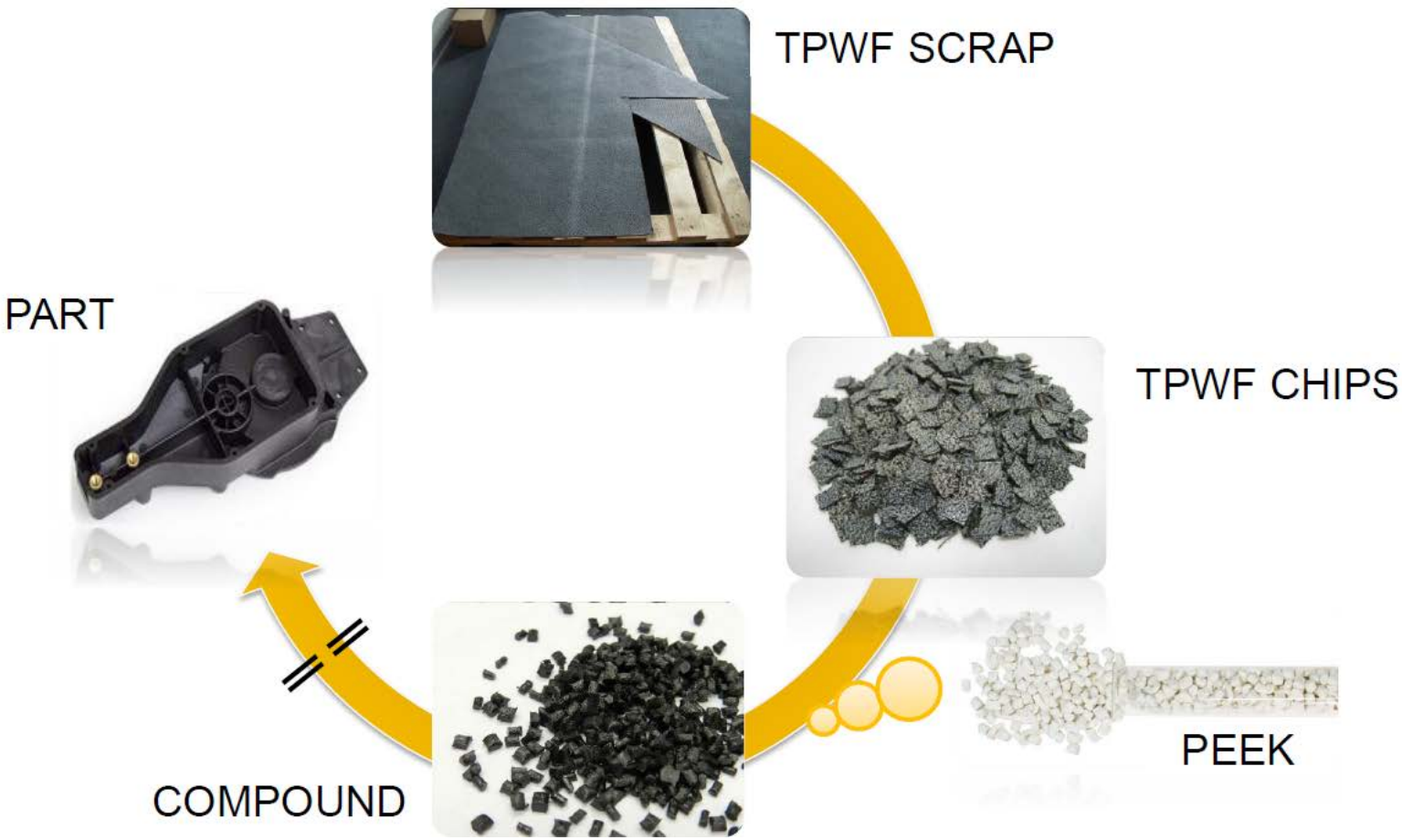
ThermoPlastic Woven Fabric

"Recycling" (TPWF) :

1). Material characterization currently being performed by local Universities and Aerospace Manufacturers

- Pre-cut HTA40 PEEK "Prepreg - .5 cm squares (Airbus offal)
- Special Compression-Molded Processing with Inserts

"Recycling" (TPWF) :



Conclusions

- High-Performance Mechanical Properties (Structural).
- Automated Production (Forming & Welding).
- Short Cycle Time and Rework Compliant.
- Welding Technologies to Compliment Design or Shape.
- Opportunities for Automated Repair Techniques.
- Recycle and Reuse Opportunities.

Thank you for your attention !

QUESTIONS?