

# AALBF

## Manufacturing Capabilities Within Operation Excellence

*Your Satisfaction, Everyday, Everywhere*

[www.amphenol-airlb.fr](http://www.amphenol-airlb.fr)



## Few words from Management:

**Eric:** *“With the downturn in the Comair market hitting our facility very hard, we are finding that we have capacity available to support production requirements. Our facility in Carignan has an excellent reputation for high quality and high service. It’s our objective to make this available to sister Amphenol companies at a competitive cost as a manufacturing cost center. While we are working hard on the diversification of our business, this will take time and today, we have capabilities and capacity available to support production requirements. The following presentation is intended to share the breadth of our experience, technology and capabilities. Our experience with composite molding, overmolding, plating and assembly, makes us uniquely qualified to manufacture products in the interconnect and accessories space. In our overmolding expertise, we have developed bi-injection capabilities to reduce the production steps between the injection molding and the overmolding process leading to improved quality and reduced cost. We are prepared to support our sister divisions with our services at a reasonable cost. In addition to our manufacturing services, we are prepared to offer, Engineering and Re-engineering services as well at laboratory testing.*”

**Gilles:** *“The Covid crisis has caused an earthquake in AALBF’s N°1 market, which is aeronautics. This crisis is likely to last and we would like to share with you all our capacities and know-how which can make our company a subcontractor of your activity. In your future projects “think of us”, we can perhaps make added value for the AMAO group.”*

## AALBF values:

- Passionate about serving customers & collecting total customer satisfaction recognition
- Paranoiac about preventing risk , Factory Mutual insurance global excellence @ 100% when benchmarked industry at 65
- Operational excellence

## Performances:

2019 yearly average OTD @ request %	96,4 %
2019 yearly average OTD @ acknowledge %	97,5 %
2019 yearly average past due @ request (equivalent days of sales)	1,2 Day or K€ 348
2019 yearly average past due @ acknowledge (equivalent days of sales)	0,8 Day or K€ 246
2019 yearly average Customer PPM	80 PPM

## Diversification:

**In 2017 AALBF has initiated a diversification strategy & effort to become less dependent from its historical main customer AIRBUS, targeting other markets than traditional COMAIR despite being our bread and butter for decades.**

**The COVID 19 crisis is accelerating this process while the COMAIR demand & especially IFE is collapsing & will take years to resume with 2 digit growth**

Our adjusted strategy is based upon 4 main axis

1. Defend our base business via aggressiveness toward our competition
2. Explore / accelerate new market / market segments
  1. New Comair (EVTOL, Flying cargo.....)
  2. Military
  3. RMT signalization
  4. Industrial
  5. Medical
3. Introduce our new products embracing our new technology (optical, press fit, quick mount, bi-injection)
4. Support AMAO as a leading pioneer on Overmoulding, offering our legacy knowhow to design or re-design product or component, ensure the whole manufacturing in a sustainable, high service & adequate cost manner

## **Awards:**

Numerous recognition over years from APH as well as from customers such as AIRBUS, AH, MBDA, ZODIAC.... As best supplier of the year, best performer, best logistic & quality, best project management, best innovation...

## **Quality certification:**

ISO 9100

EN 9100 certified

ISO 14001 certified

## **Internal tools:**

APQP / PPAP / Design & Process FMEA / Value Chain analysis / SPC / RMA / PPM / QOS KPI / PM

Daily QRQC & Supply chain team review

ERP Microsoft Dynamics AX, linked with EDI

## **Our service to AMAO:**

### **1. Your current product range**

- In house Manufacturing processes: crimping, ultrasonic welding, marking, assembly, molding, overmolding, bi-injection
- Subcontracted Manufacturing processes : Crimping, ultrasonic welding, marking, assembly, overmolding at our TTEI partner in Tunisia (15 years collaboration) & Handicap labor cell integrated in our premises, as well as local centers around Carignan

### **2. Your new projects or cost reduction via re-design (PTC CREO)**

- Proven re-engineering & cost reduction capabilities, based on historical mastered technologies such as overmolding & dual injection (silicone sealing made from overmolding instead of traditional bounding)
- Innovation cell with maturity mapping bringing latest technologies & processes at your design

## Overmoulding versus bounding seal:

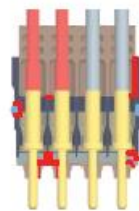
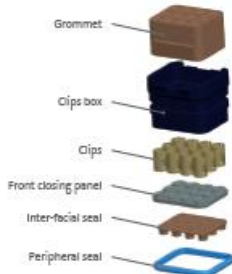
**Bounding**

**Overmoulding**

**Traditional  
gluing method  
and associated  
factors of risks**

Humidity ingress

Arcing



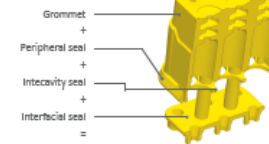
- Molding problems
  - Polishing problems
  - Plasma problems
  - Primary problems
  - Gluing problems  
(Migration of glue into cavities under pressure during process may lead to cavities partially filled)
  - Polymerisation of gluing
- Risk of humidity ingress leading to arcing

The solution of  
Amphenol Air LB :  
**OVERMOLDING**

Second to none sealing

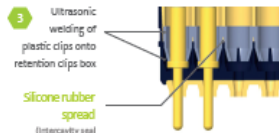
Best of class dielectric

1



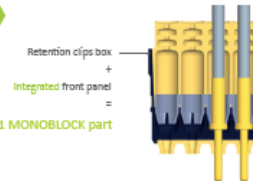
1 overmolded element  
in 1 single operation

3



Ultrasonic  
welding of  
plastic clips  
onto  
retention clips box  
**Silicone rubber  
spread**  
(Intercavity seal)

2



1 MONOBLOCK part

1 overmolded element  
+  
1 monoblock element  
+  
Plastic clips

**END RESULT :**  
Optimized design for second to none  
performances

## Features / Performances :

Key features		Second to none performances
<ul style="list-style-type: none"> <li>■ Full control of processes</li> <li>■ Simplified manufacturing processes</li> </ul>		<ul style="list-style-type: none"> <li>■ Most of risks associated to production such as molding, polishing, plasma, primary, gluing, compression and curing become non existent</li> </ul>
<ul style="list-style-type: none"> <li>■ 1 monobloc element</li> </ul>		<ul style="list-style-type: none"> <li>■ No risk of disbonding under mechanical stress</li> <li>■ Possible cavity fill during gluing process becomes irrelevant</li> </ul>
<ul style="list-style-type: none"> <li>1 overmolded process</li> </ul>	<ul style="list-style-type: none"> <li>■ No weak point</li> <li>■ No layers of glue</li> <li>■ No creepage</li> <li>■ No added-after peripheral seal</li> </ul>	<ul style="list-style-type: none"> <li>■ No risk of cavity humidity ingress</li> <li>■ No risk of arcing</li> <li>■ Optimum sealing of module inside connector shell</li> <li>■ Peripheral seal overmolded from inside/out : up to 75 cycles guaranteed</li> </ul>
<ul style="list-style-type: none"> <li>■ Silicon rubber spread</li> </ul>		<ul style="list-style-type: none"> <li>■ No sealing problem between cavities : no creepage</li> <li>■ "Full material" overall performances : 1 shot overmolding</li> <li>■ Improved dielectric performances : 2 to 3 times superior to current standards</li> </ul>
<ul style="list-style-type: none"> <li>■ Use of sealing plugs optional</li> </ul>		<ul style="list-style-type: none"> <li>■ Time saving during cable harness wiring</li> <li>■ Cost saving</li> <li>■ Quick implementation</li> </ul>

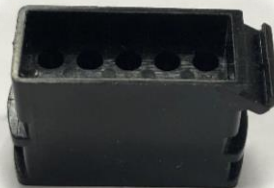


## Manufacturing equipments

### 9 x Arburg horizontal press

#### Thermoplastic molding:

- Materials center with desiccator
- Sepro robot 3 axis
- Max closing force 50 to 130T
- Processed materials : ULTEM, PEEK, PPS, PA...
- Processing temperature 450°C
- Max injection Pressure 2500 bars
- Max distance between trays from 575 to 850 mm
- Max injectable volume 140 cm<sup>3</sup>
- 0,2 mm min wall thickness injected (plastic clip)



## Manufacturing equipments

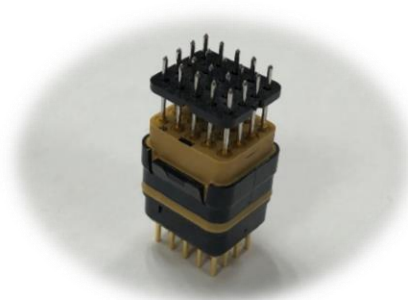
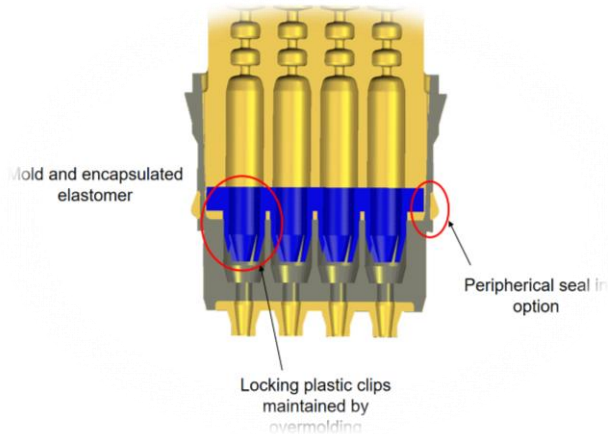


### 6 x Engel vertical press

4 x Engel Silicone pasty over molding:

2 x Engel Silicone liquid over molding:

- Max closing force from 35 to 45T
- Max distance between trays 450 mm
- Max injectable volume 23 cm<sup>3</sup>
- Liquid or pasty silicone with a wide range of dyes (elongation at break > 500 % )
- All over molding pins produced internally





## Manufacturing equipments



BI-INJECTION

## 4 x Dual injection

Thermoplastic and Silicone over molding:

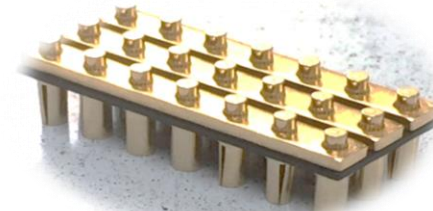
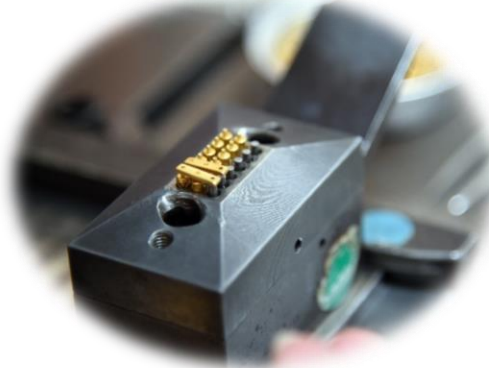
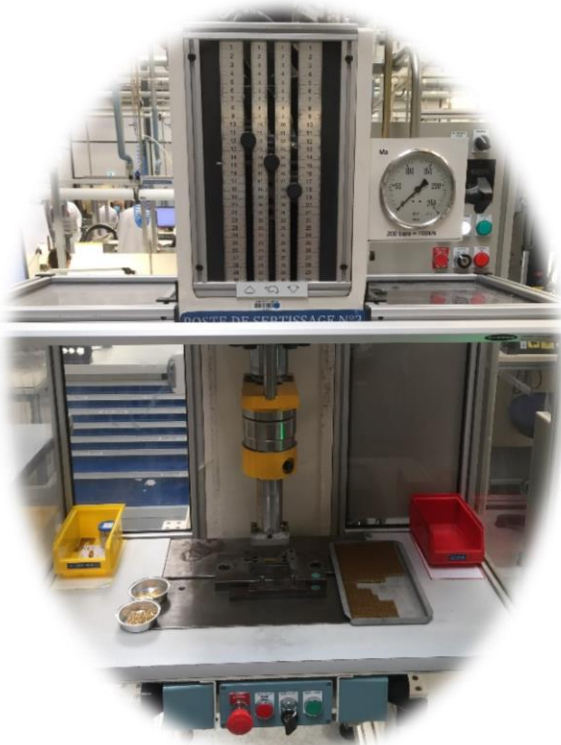
- Max closing force from 150 to 250T
- Max distance between trays 950 to 1300 mm
- Max injectable volume 22 cm<sup>3</sup> LSR



## Manufacturing equipments

### 3 x Crimping press LBM

- Max closing force 10 T



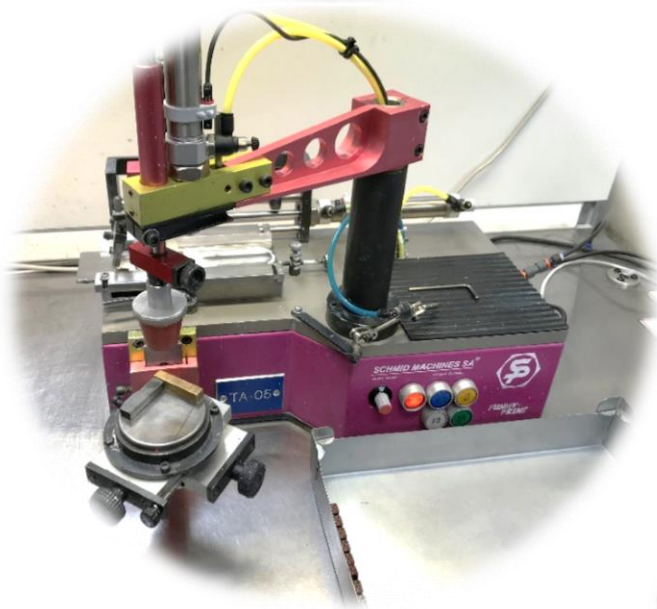
## Manufacturing equipments

### 3 x Branson Ultrasonic welding

- Frequency 20 or 40 KHz
- Welding time 0,1 s

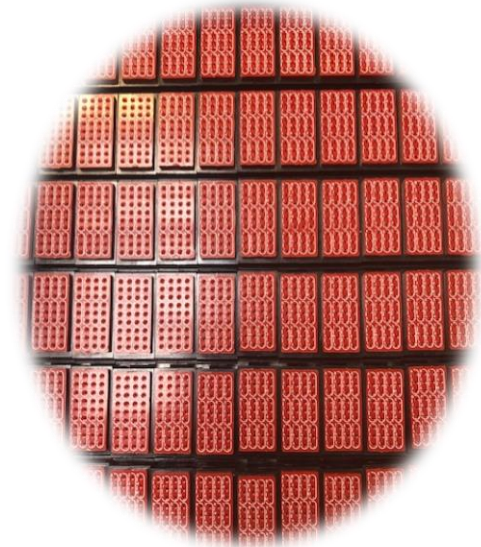


## Manufacturing equipments



### 3 x Schmidt Tampoprint

- High rate
- Size printing 70 x 70
- Wide range of inks



## Manufacturing equipments



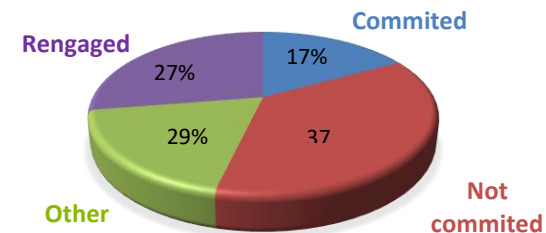
### 1 x Schmidt electrical assembly press

- Max closing force 4 kN
- Force and distance curve control



## Supply Chain Activity :

- Daily reviews set up to optimize / maximize monthly Sales forecasts.
- A leading team involving Supply Chain, Purchasing, Manufacturing, Quality, Logistics & Operations Managers
- In 2019, **35%** of 73,6 M€ Sales were tracked in Supply Chain. (28% in 2018)
- This represents more than 500 POs.
- 6,8 M€ ( 9,2 % yearly Turn over) were reengaged & shipped in the month thanks to SC.
- Almost 2 200 points (Purchasing & Manufacturing) followed during 2019  
→ average of 180 topics each month.



## Testing Equipment



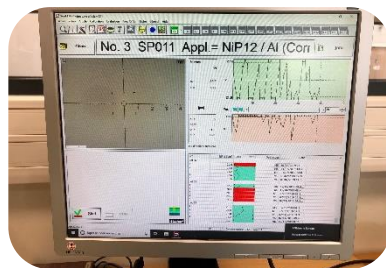
Tri Dimensional Machine  
by sensor and camera  
(Microvu)



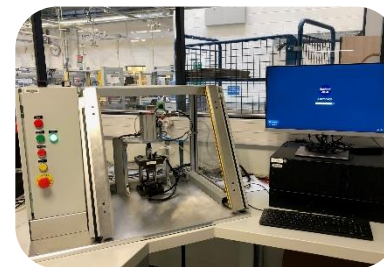
Visual Control  
Machine (KEYENCE)



Traction control machine for  
insertion/extraction force for  
pins, test of the US welding...



Fluorescence X Machine for  
plating thickness measurements



Automatic Electrical Tester  
(CIRRIS)

## Testing Equipment



Injection molding melt flow index(MFI)



Automatic plastic plate retention control machine



Sealing test machine for SIM modules



%H tester for plastic raw material (AQUATRAC)



## **Laboratory Equipment**

### **Environmental tests:**

- Cold temperature until  $-70^{\circ}\text{C}$  minimum
- Hot temperature until  $+260^{\circ}\text{C}$  maximum
- Thermal shock from  $-70^{\circ}\text{C}$  to  $220^{\circ}\text{C}$
- Humidity until 99%HR
- Salt spray:  $35^{\circ}\text{C}$
- Sorbonne for immersion test in fluids
- Vacuum chamber until 10 mbar
- Overpressure test until 2 bars
- Data acquisition system for recording temperature until 10 channels

### **Mechanical tests:**

- Tensile strength machine for traction and compression load from 1 N to 10000 N
- Dynamometer for traction and compression load from 1 N to 1000 N

## **Laboratory Equipment**

### **Electrical tests:**

- Different Power supply for DC current until 150 A dc
- Power supply for AC current until 750 A ac
- Different multimeters
- Micro voltmeter until 0.1 $\mu$ V
- Micro ohmmeter for 4 wires measurement
- Voltage proof test until 5 KV ac & 6 KV dc
- Insulation resistance until 2.10<sup>6</sup> M $\Omega$  and a voltage until 1000 V dc
- Ethernet cable certifier



### **Optical tests:**

- Led source at 850 nm for 12 channels
- Optical power meter from – 60 to + 26 dBm for 12 channels
- IL and RL meter for 12 channels
- Modal conditioner 85/85
- Optical faces inspection

### **Visual Examination:**

- Binocular with a magnification from x7 to x45 coupled to a camera
- Endoscope with a diameter of 0.9 mm coupled to a camera
- 3D measuring machine with a magnification x100;
- Numerical microscope with a magnification x20 to x 200.

## Laboratory equipment capabilities - Equipment for Environmental tests

Type	Range	Internal volume	Photos
Dry heat oven Mettmert UNE 500	Ambient → 250°C	108 liters	
Dry heat oven Mettmert UN 110	Ambient → 300°C	108 liters	



## Laboratory equipment capabilities - Equipment for Environmental tests

Type	Range	Internal volume	Photos
Dry heat oven Votsch VTL 60/60	Ambiant → 250°C	216 liters	
Climatic chamber Votsch VC 7018	-70°C → 180°C 30% HR → 95% HR	190 liters	
Thermal shock oven Votsch VT3 7006 S2	-70°C → 220°C	60 liters	


## Laboratory equipment capabilities - Equipment for **Environmental** tests

Dry heat oven MPC 454 HT	Ambiant → 350°C	136 liters	
-----------------------------	--------------------	------------	---



## Laboratory equipment capabilities - Equipment for Environmental tests

Type	Range	Internal volume	Photos
Salt mist oven BRANDT V.711.062.000	35°C with 5% of NaCl	400 liters	
Sorbonne ICP 150	/	750 liters	

## Laboratory equipment capabilities - Equipment for Environmental tests

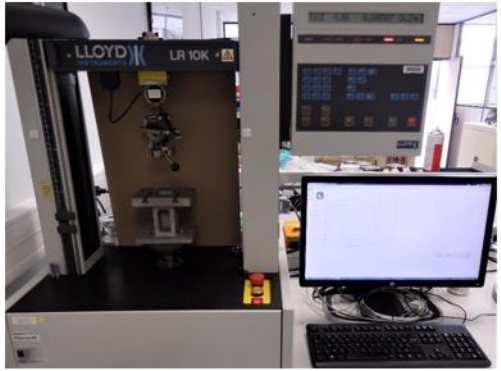

Vacuum chamber	Ambient to 10 mbars	10 liters	
----------------	---------------------	-----------	---

## Laboratory equipment capabilities - Equipment for Environmental tests



Type	Range	Internal volume	Photos
Over pressure test bench	Ambient to 2 bars	3 liters	 A photograph of an over-pressure test bench. It features a white metal frame with three pressure gauges mounted on the left side. A cylindrical test chamber is positioned on a blue mat in front of the gauges. Various tubes and connectors are visible, linking the chamber to the gauges.
Data acquisition system GRAPTEC GL 220	-40°C to 400°C	N.A.	 A photograph of a GRAPTEC GL 220 data acquisition system. It is a black, handheld device with a small screen and a control panel featuring a directional pad and several buttons. The text 'GRAPTEC' and 'mini LOGGER GL220' is visible on the device.




## Laboratory equipment capabilities - Equipment for Mechanical tests

Type	Range	Photos
Tensile strength machine LLOYD LR 10 K	1 to 10000 N	
Manual test bench with dynamometer	1 to 1000 N	





## Laboratory equipment capabilities - Equipment for **Electrical** tests

Type	Range	Photos
Power supplies Lambda	0 → 500 V dc 0 → 6 A dc	
	0 → 60 V dc 0 → 14 A dc	
	0 → 36 V dc 0 → 24 A dc	
	0 → 16 V dc 0 → 150 A dc	
		

## Laboratory equipment capabilities - Equipment for Electrical tests

<p>Power supply ZENONE</p>	<p>0 → 9 V dc 54 → 530 A dc</p> <p>0 → 6.7 V ac 40 → 750 A ac 10 → 1000 Hz</p>	
--------------------------------	--	---


## Laboratory equipment capabilities - Equipment for Electrical tests

Type	Range	Photos
Multimeter Keithley 2000	$1 \mu\text{V} \rightarrow 500 \text{ V dc}$ $1 \mu\text{A} \rightarrow 3 \text{ A dc}$ $1 \text{ m}\Omega \rightarrow 100 \Omega$ Diode test	
Micro Voltmeter Agilent 34420 A	$0.1 \mu\text{V} \rightarrow 120 \text{ V dc}$ $1 \mu\Omega \rightarrow 1 \text{ M}\Omega$	
Micro ohmmeter AOIP OM 21	$1 \mu\text{A} \rightarrow 1 \text{ A dc}$ $20 \mu\Omega \rightarrow 20 \text{ k}\Omega$	
Dielectrimeter SEFELEX DSX5000	$100 \rightarrow 6000 \text{ V dc}$ $100 \rightarrow 5000 \text{ V ac}$ $100\text{k}\Omega \rightarrow 2 \text{ T}\Omega$	

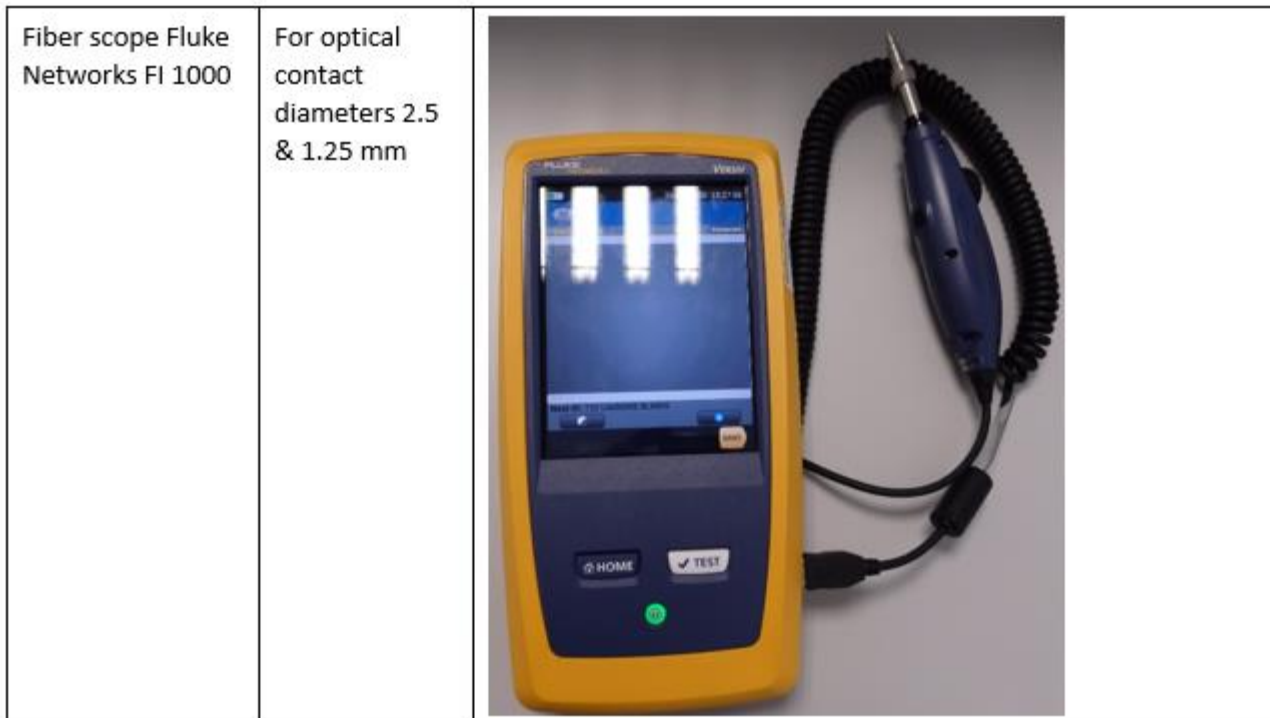
## Laboratory equipment capabilities - Equipment for **Electrical** tests

<p>Ethernet Cable certifier FLUKE DSX 5000</p>	<p>Until class 6A or</p>	
--	--------------------------	--

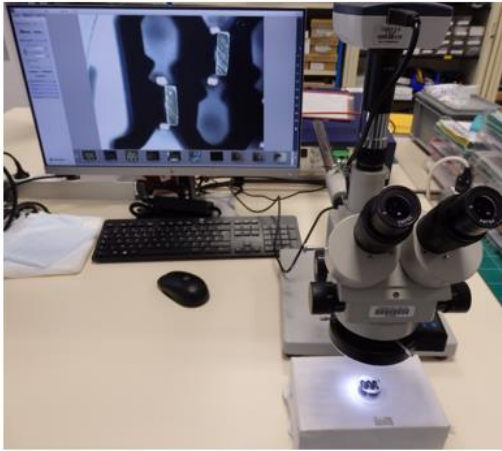

## Laboratory equipment capabilities - Equipment for Optical tests

Type	Range	Photos
Multi channel LED source OPTOTEST OP 750	Source at 850 & 1310 nm on multimode fibers 50/125	
Multi channel power meter OPTOTEST OP 710	Measure at 850 & 1310 nm on multimode fibers 50/125	
Modal conditioner OPTOTEST OP 752	85/85 on multimode fibers 50/125	
IL and RL meter for 12 channels OPTOTEST OP 940	Measure at 850 & 1310 nm on multimode fibers 50/125	

## Laboratory equipment capabilities - Equipment for **Optical** tests


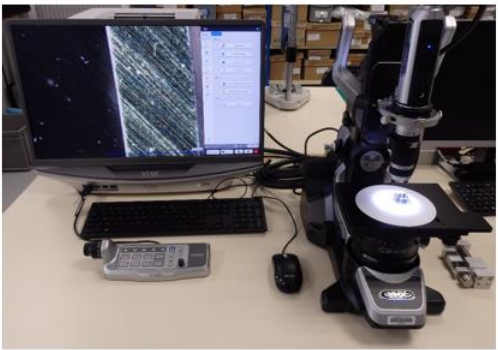


## Laboratory equipment capabilities - Equipment for Visual Examination

Type	Range	Photos
Binocular Euromex with camera	Magnification x7 → x 45	
Endoscope STORZ	Diameter of the fiber = 0.9 mm	



## Laboratory equipment capabilities - Equipment for **Visual Examination**

3 D measuring machine VERTEX 110	Magnification x21 → x 100	
Numerical microscope KEYENCE VHX 970 F	Magnification x20 → x 3000	

## Warehouse equipment



### 8 x rotary store 1 vertical lift Shelves

- 19 000 storage locations
- 9700 references on stock
- More than 200 000 transactions per year (stocking, picking...)



## Marking/Packaging Department



5 Marking machines for metal & composite



3 Packing machines



## Shipping Department



### 2 Vertical lift

#### SHIPPING DATA

In 2019 :

- About 60 000 parcels shipped
- About 159 T shipped
- Multi worldwide carriers (DHL, FEDEX, UPS....)

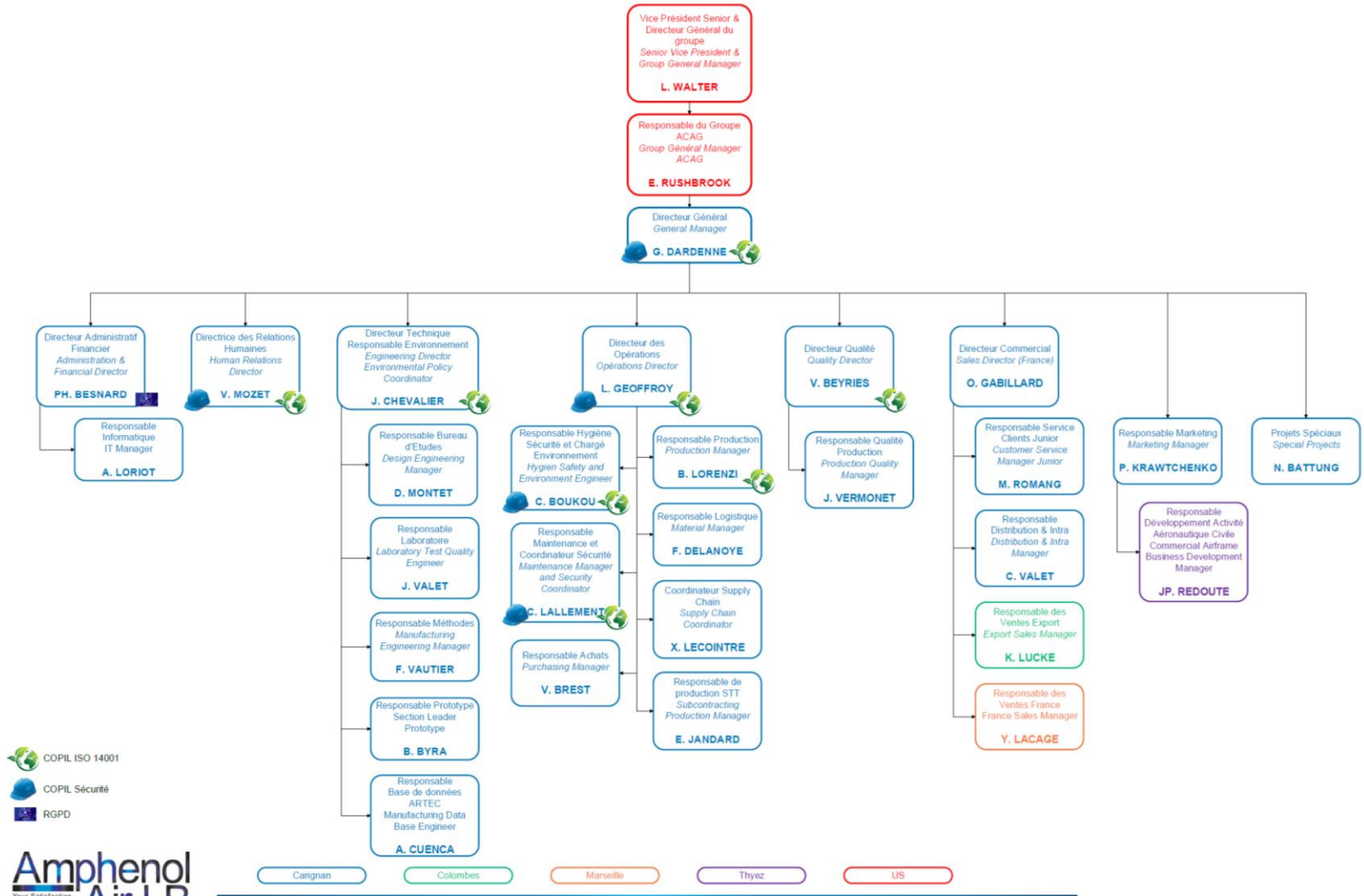


#### CUSTOMS AGREEMENT

- AEO-C (CUSTOMS) AND AEO-S (Security) in 2019 / approval application CTPATH in progress
- Approved Exporter
- Registered Exporter



# Manufacturing mission for AMAO



- COPIL ISO 14001
- COPIL Sécurité
- RGPD

## **Key Personnel Assignments :**

the following persons are working on this project :

- **Olivier Gabillard:** Sales Director

[o.gabillard@amphenol-airlb.fr](mailto:o.gabillard@amphenol-airlb.fr)

+33.6.08.22.53.06

- **Jerome Chevalier:** Engineering Director

[j.chevalier@amphenol-airlb.fr](mailto:j.chevalier@amphenol-airlb.fr)

+33.6.74.04.48.04

- **Luc Geoffroy:** Operation Director

[l.geoffroy@amphenol-airlb.fr](mailto:l.geoffroy@amphenol-airlb.fr)

+33.6.82.89.94.27

- **Gilles Dardenne:** General Manager

[g.dardenne@amphenol-airlb.fr](mailto:g.dardenne@amphenol-airlb.fr)

+33.6.33.82.46.97

## **Come & visit AALBF**

[https://www.youtube.com/watch?v=xW95Ktg3a\\_Q&t](https://www.youtube.com/watch?v=xW95Ktg3a_Q&t)