



ISOJET SOLUTIONS INJECTION & INFUSION RESIN 1K / RESIN 2K AEROSPACE

ISOJET, SPECIALIZED in METERING, MIXING and INJECTION MACHINES

ISOJET EQUIPEMENTS



- **432 aerospace Machines sold including more than 98 pistons, 150 tanks and 120 DPE machine.**
- **Large experience with 1K or 2K resin**
- **Various possible ways to operate the resin injection / mixing**
- **Isojet Machines for one-component resin systems :**

- Preparation tank / batch unit for injection & infusion (1 K and Premixed 2K)
- Injection piston (1K and premixed 2K)

Tank or piston = Mixing of parts A and B can be done in situ but metering is manual.

- **units two-component resin systems**

- “BI COMPONENT BATCH MIXING RTM UNIT” : sequential pumping of components and simultaneous mixing / degassing. Adapted for resin with not too short pot life once mixed.
- “BI COMPONENT CONTINUOUS MIXING RTM UNIT” DPE : continuous pumping of components and continuous mixing. Adapted for resin with short / long pot life once mixed

Aeronautics References and quality partners



Business in Aeronautic = 53,75 % of our activities : 28 countries on 150 customers.

Our equipments for 1K or 2K are referenced to process :

- HEXCEL resins : **HexFlow® RTM 6, HexFlow® RTM230ST, HexFlow® RTM 250ST, HexFlow® RTM 6-2, HiFlow® HF610 FS - HiFlow® 1078-1**
- SOLVAY CYTEC resins : **PRISM EP 2400, PRISM EP 2410 and PR 520**
- HEXION : **EPIKOTE®**

Preparation tank / batch for infusion &RTM - Injection Piston - DPE INDUS - High Viscosity machine



Aeronautics References and quality partners



1. High performance Unit – 1K

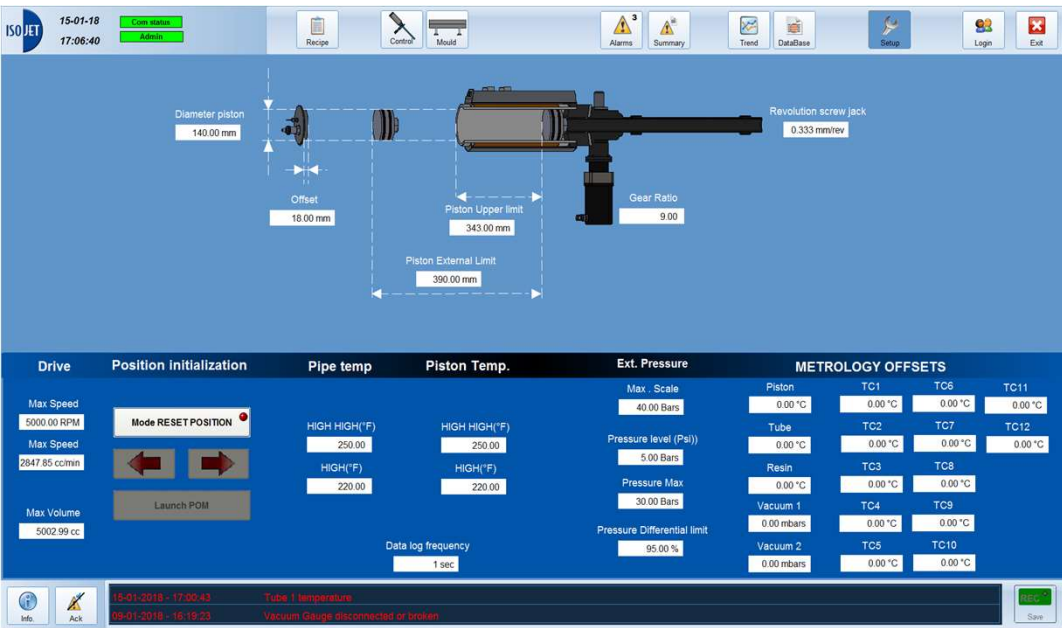
1.1 Injection Piston 1K

Injection Piston : SQRTM / RTM /HT RTM



<i>Application</i>	Inject parts in RTM
<i>Flow</i>	15 → 2500 (cc/min) ± 1
<i>Pressure</i>	0 → 30 bar ± 0.1
<i>Piston capacity</i>	3/5/10/15 L
<i>Temperature</i>	170°C standard +/- 5°C 300°C optional
<i>Degassing</i>	Option
<i>Vacuum</i>	0,5 mbars
<i>PLC Control</i>	PLC connected to a PC 19" touchscreen (Softwares Schneider)
<i>Supply</i>	230 Volts - 50 HZ – 16A

Production & Control Screens Piston



Specific tools for Injection piston- HT RTM Piston

Mixing in piston solutions



HT RTM Piston – T°C 300°C
(310°C for regulation of heating elements)
Included 1 heated cap for the 310°C mode



Complex and structural parts made with piston.



Applications:

- ✓ Composite blades
- ✓ RTM Landing Gear parts for 787 aircraft
- ✓ Part cargo doors
- ✓ Parts RTM : propellers A400 M or Avic planes

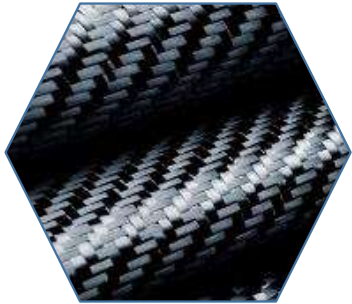


Photo: Isojet / Composite world

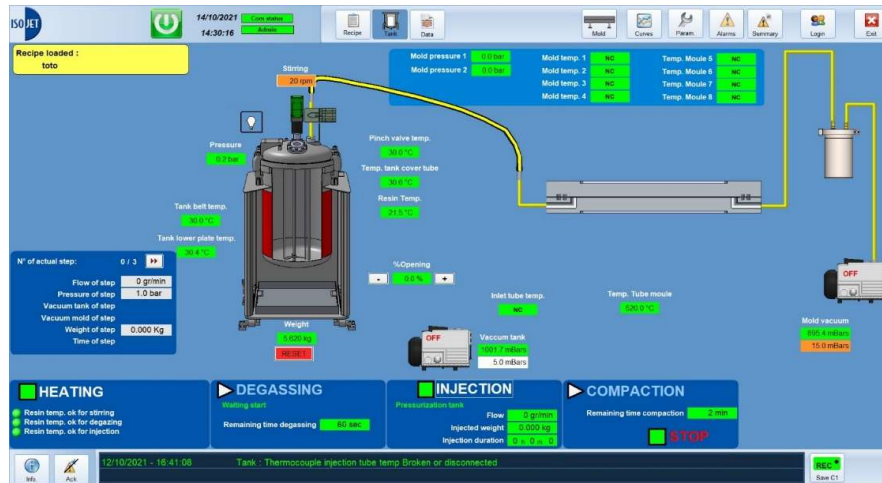
1.2 Preparation tank for infusion & RTM injection

Preparation tank for infusion & RTM injection

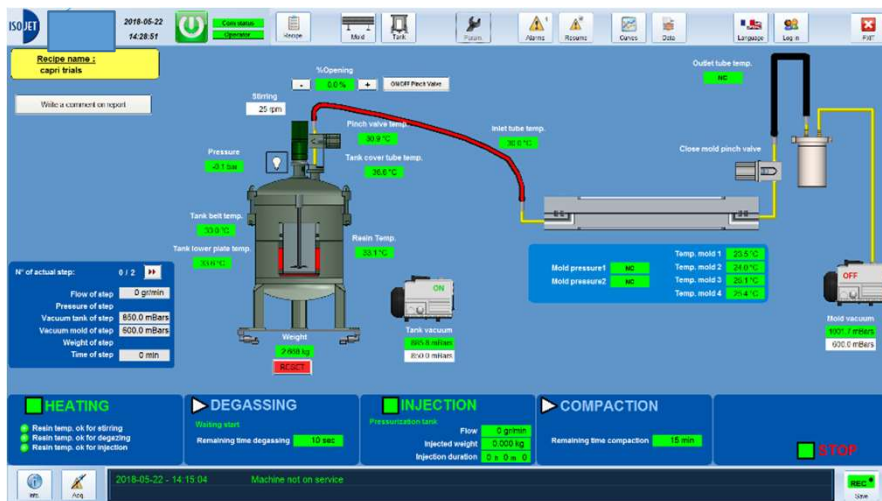


<i>Application</i>	RTM& Infused parts from a drum
<i>Pressure max</i>	10 bars on the tank
<i>Tank capacities</i>	Process capacities : 3L - 70 L
<i>Temperature</i>	150°C +/- 5°C (special design can be 300°C)
<i>Scale</i>	Précision : +/- 10gr
<i>Vacuum pump</i>	25 or 40 m3/ H
<i>Vacuum</i>	5 mbars or 1 mbars
<i>Control & security</i>	Exothermic control Cleaning very simple Evacuation and gas collection
<i>Supply</i>	400 or 230 Volts - 50 HZ - 16A

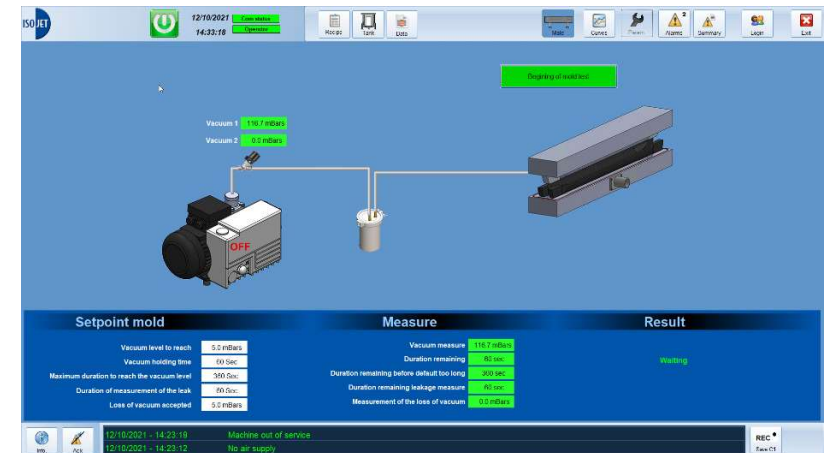
Production & Control Screens



Direct filling
(up to 70 L)



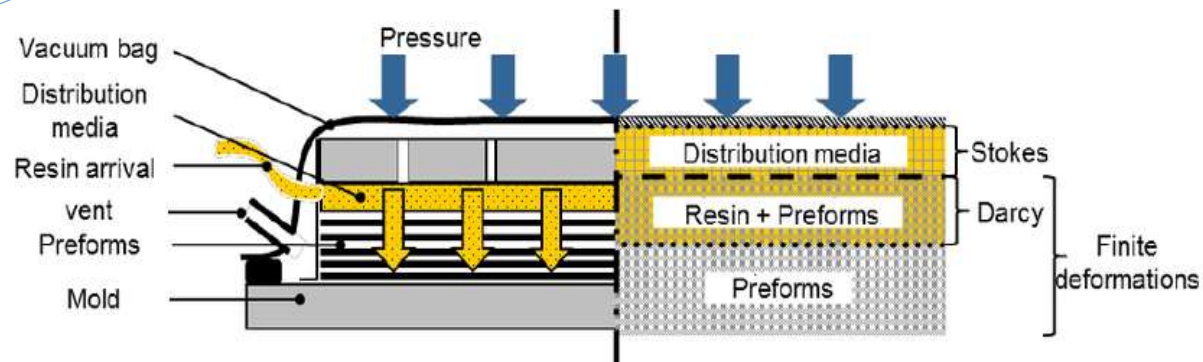
Version with
inner pails
(5 to 30 L)



Versatile Infusion/Rtm process – Out of autoclave ISOJET EQUIPEMENTS



System with pails



Infusion process – Technology : out of autoclave



According the size of the composite part you want to manufacture, we can proposed you **taylor-made machines** : with 1 tank , with 2 tanks or with 4 tanks



Combination with preparation tank for high volumes



3 units for 12 tank infusion Parts MC21 (russia) with an Oven of 22 m supply by one of our partner SAT - Target = high volume injection up to 600 L



Photo: Isojet /Aerocomposit

Some Composite parts made with injection tank



Helicopter seat of Bell B525



Flap ATR 72 : AIRBUS



Stringers:



Photo: Isojet / Airbus/ NLR /
MTORRES/ composite world

2.

Machines 2K

Part A + PART B

Low cure or fast cure

2.1 “2K BATCH MIXING RTM UNIT”

2K Batch mixing RTM unit



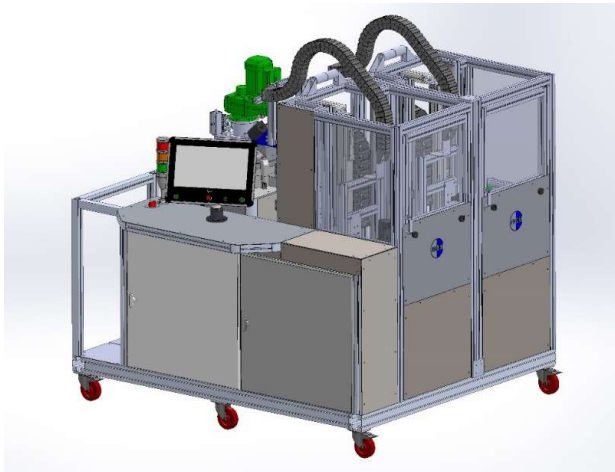
<i>Application</i>	Dosing and Manufacture Resin batches of 2K resin (part A + part B)
<i>Cycles</i>	Manual / Automatic
<i>Pressure max</i>	10 Bars on tank
<i>Tank</i>	Heated up to 140°C
<i>Tank capacity</i>	50 L / 75 l
<i>Temperature</i>	140°C +/- 5°C
<i>Mix</i>	Weight mini 15kg and maximum 75 kg
<i>scale</i>	Accuracy : +/- 10gr
<i>Vacuum pump</i>	40 m3/H
<i>Vacuum</i>	5 mbars
<i>Supply</i>	400 Volts - 50 HZ - 16A

2K Batch mixing RTM unit



<i>Strirring</i>	Max speed 366 rpm
<i>PLC Control</i>	PLC connected to a PC 19" touchscreen (Softwares Schneider)
<i>Dosing control</i>	Accurate dosing part A and part B in 2 steps - Recalculation according weight of part A Heating separate of each part
<i>Temperatur control</i>	All controlled part A and part B - Box and tank/ No cold points (solid resin or hardener)
<i>Sécurité control</i>	Temperature Sensor on central heating Temperature Sensor on box and on Resin
<i>Exothermic control</i>	Valve on lid to trigger alarm => heating disconnection, opening valve discharge tank pressure and purge.
<i>Control of mix Temperature</i>	If temperature of mixed resin >XX° C => Alarm message

2K Batch mixing RTM unit

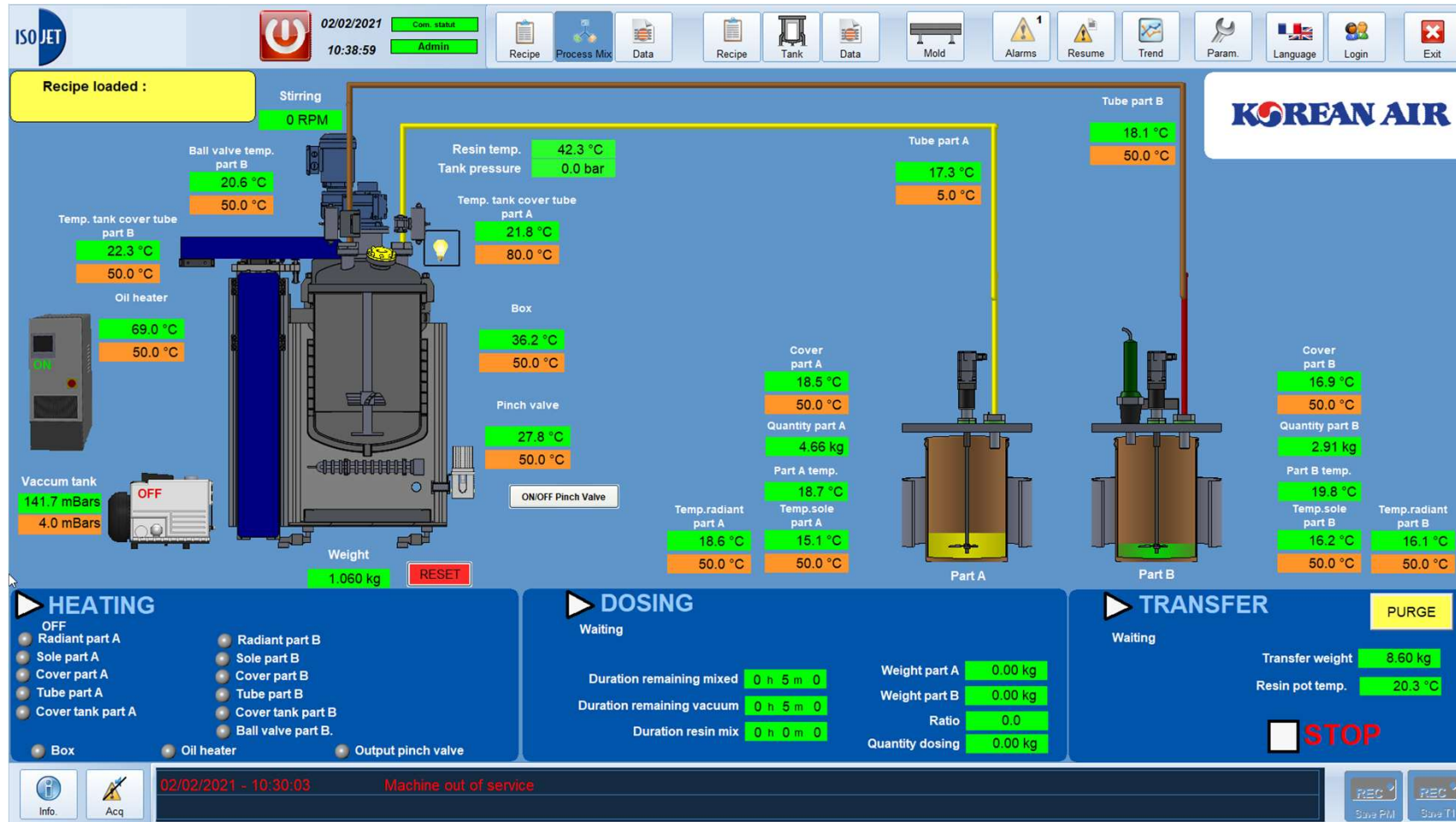


Main advantages = the metering of phase is accurate and easy to operate by sequence of metering

- Weight part A (measured by scale)
- Weight part B (measured by scale)
- Mixing and/ degassing
- Direct injection (RTM or infusion)
- Requires pot life long once mixed



Page screen: 2K Batch mixing RTM unit



2.2

« 2K CONTINUOUS MIXING RTM UNIT »

2K Continuous mixing RTM unit



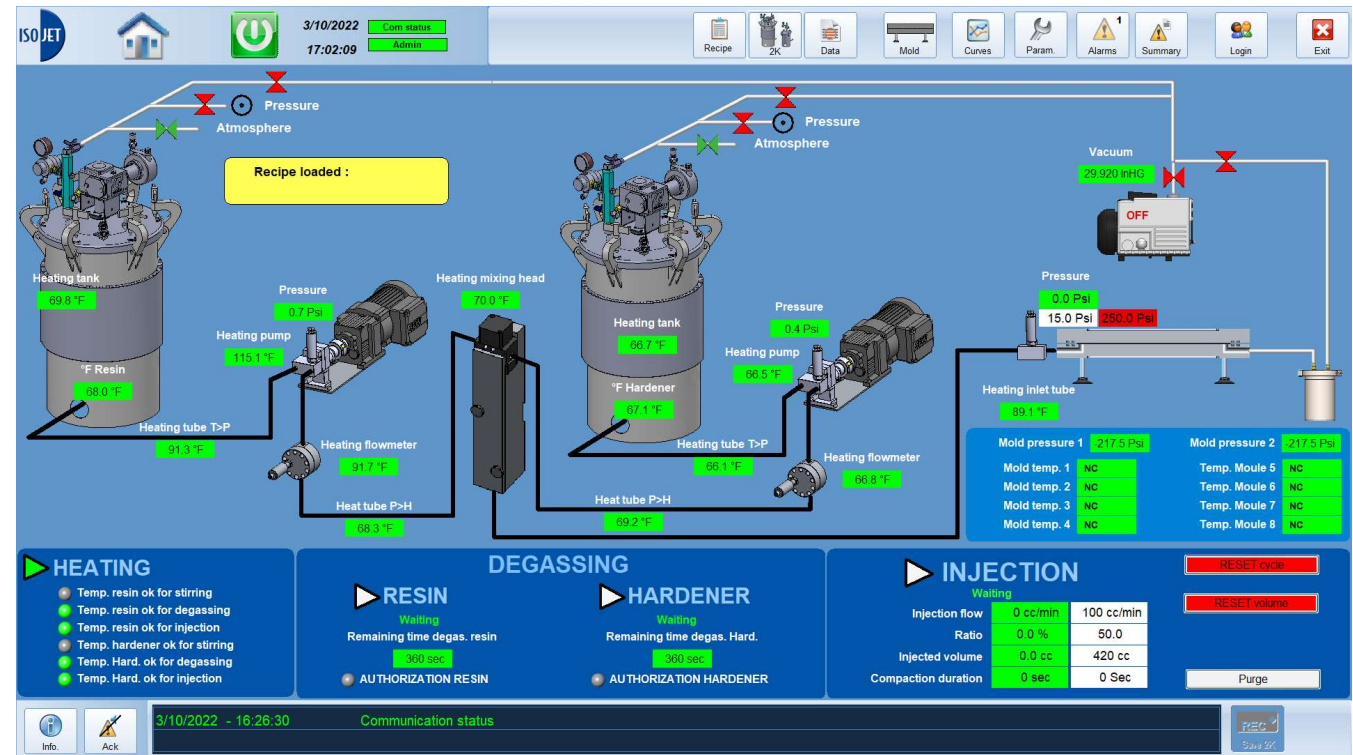
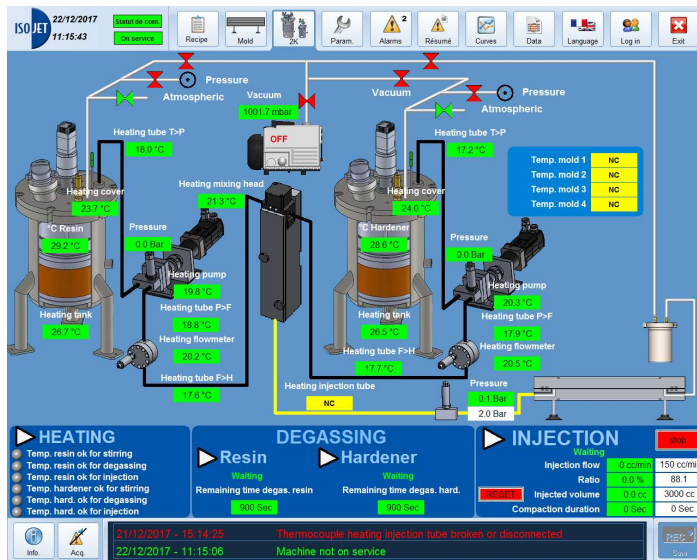
<i>Application</i>	Dosing and injecting part A + part B in closed mold
<i>Flow</i>	50 gr/ min to 500 gr/min (2K) Typical can be adjusted
<i>Pressure max</i>	10 bars on each tank 25 bars on pumps 16 bars for injection
<i>Tank A</i>	10/12L (can be enlarged)
<i>Tank B</i>	10/12L (can be enlarged)
<i>Temperature</i>	130°C +/- 5°C
<i>Vacuum pump</i>	20 m3/ H – Possible 25 m3/ H
<i>Vacuum</i>	3 mbars
<i>Supply</i>	400 Volts - 50 HZ - 16A

2K Continuous mixing RTM unit



<i>Stirring</i>	Max speed 155 rpm
<i>PLC Control</i>	PLC connected to a PC 17" touchscreen (Softwares Schneider)
<i>Heating T°C Control</i>	Line A and B fully heated: Tank + pump + flowmeter + hoses Heated mixing head with insulation
<i>Safeties</i>	Temperature control probe on each tank, Pressure sensor on each pump Pressure sensor at the outlet of the static mixer Exothermic control Evacuation and gas collection

Control screen

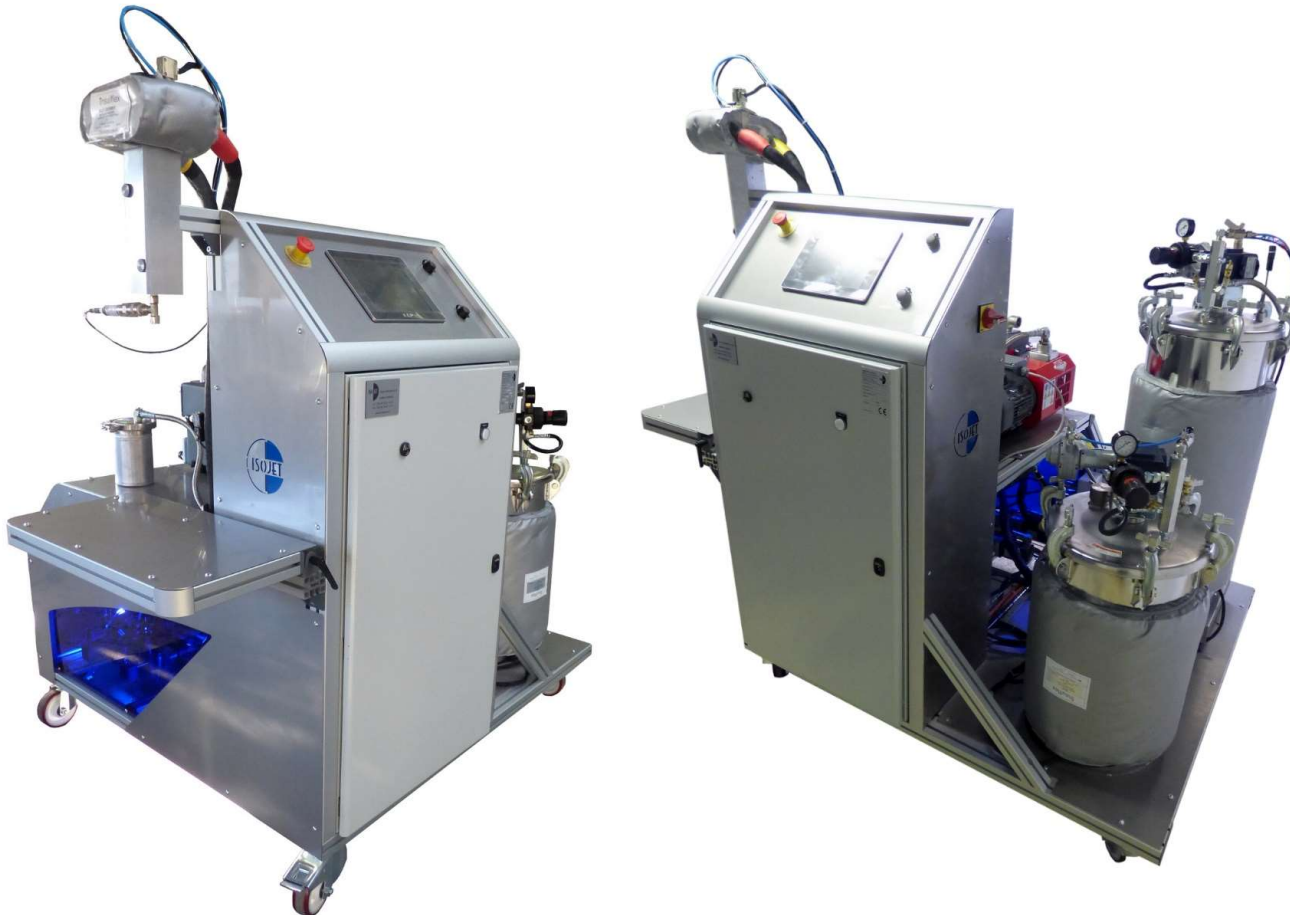


2K UNIT – Short or Long Pot life resins

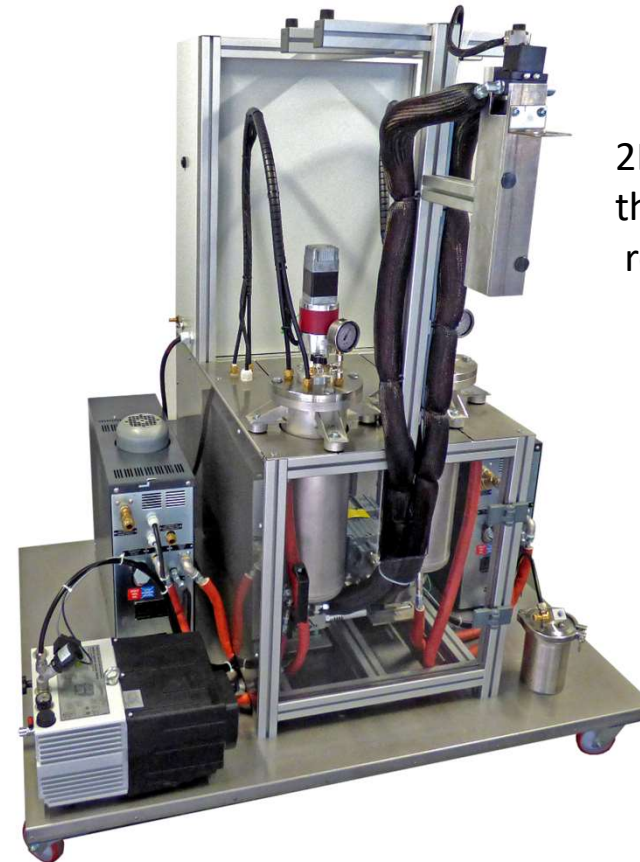


- Suitable for 2 components resins in Polyurethane, in Epoxy or in Silicone
- Resin /hardener ratio controlled by volume and flow meter
- **Flow rate (cc/min) : 50 to 3000**
- **Mix ratio : 100/10 to 100/100**
- **Viscosity resins (mPas) : 10 to 70000**
- **Tank volume : 7.6L to 200L**
- Stirring and degassing . Vacuum up to 5 mbars
- **Pressure up to 15 bars**
- **Heating up to 120°C**
- 10" Touchscreen - PLC/PC logging
- Pressure or flow controlled on each component
- Static mixer

2K UNIT – Short or Long Pot life resins

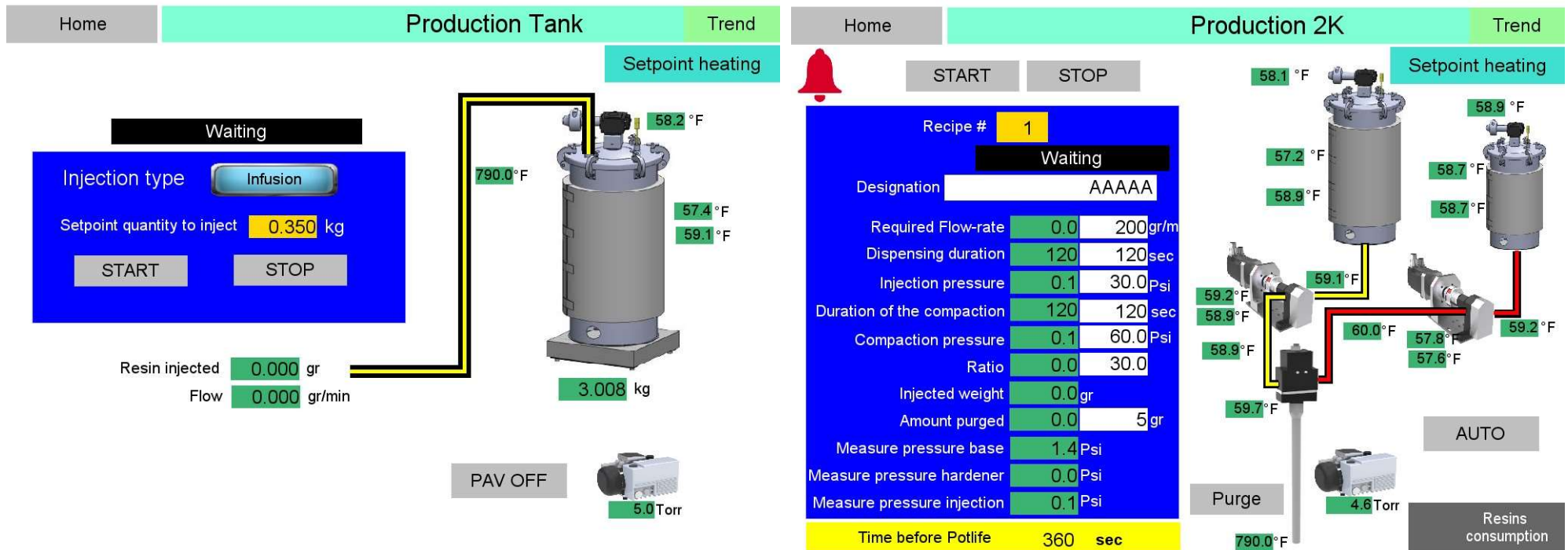


Laboratory 2K metering thermoplastic reactive

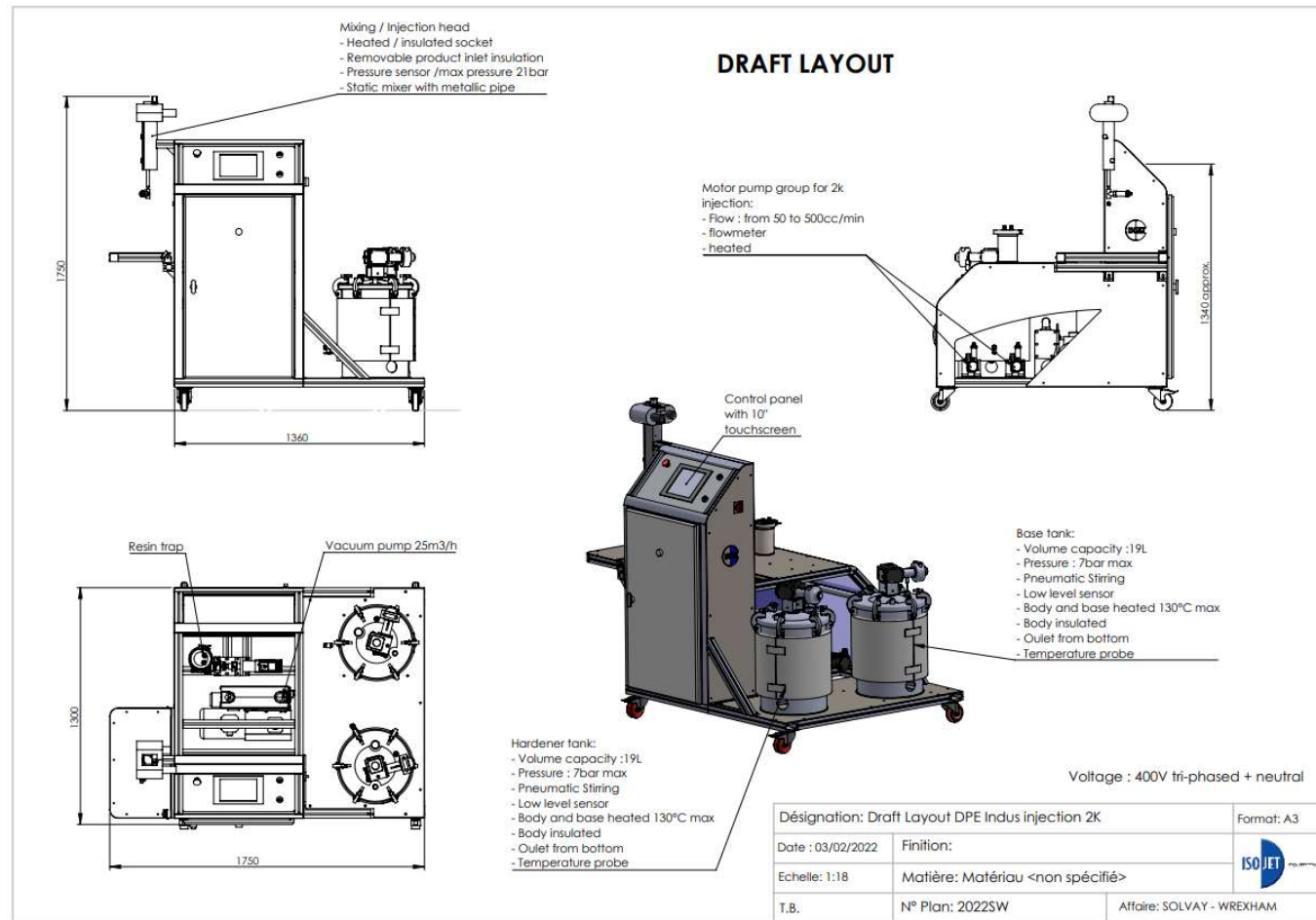


2K metering
thermoplastic
reactive (max 170°C)

Page screen 2K continuous can be combined for 1K ISOJET EQUIPEMENTS



2 K UNIT – Short or Long Pot life resins

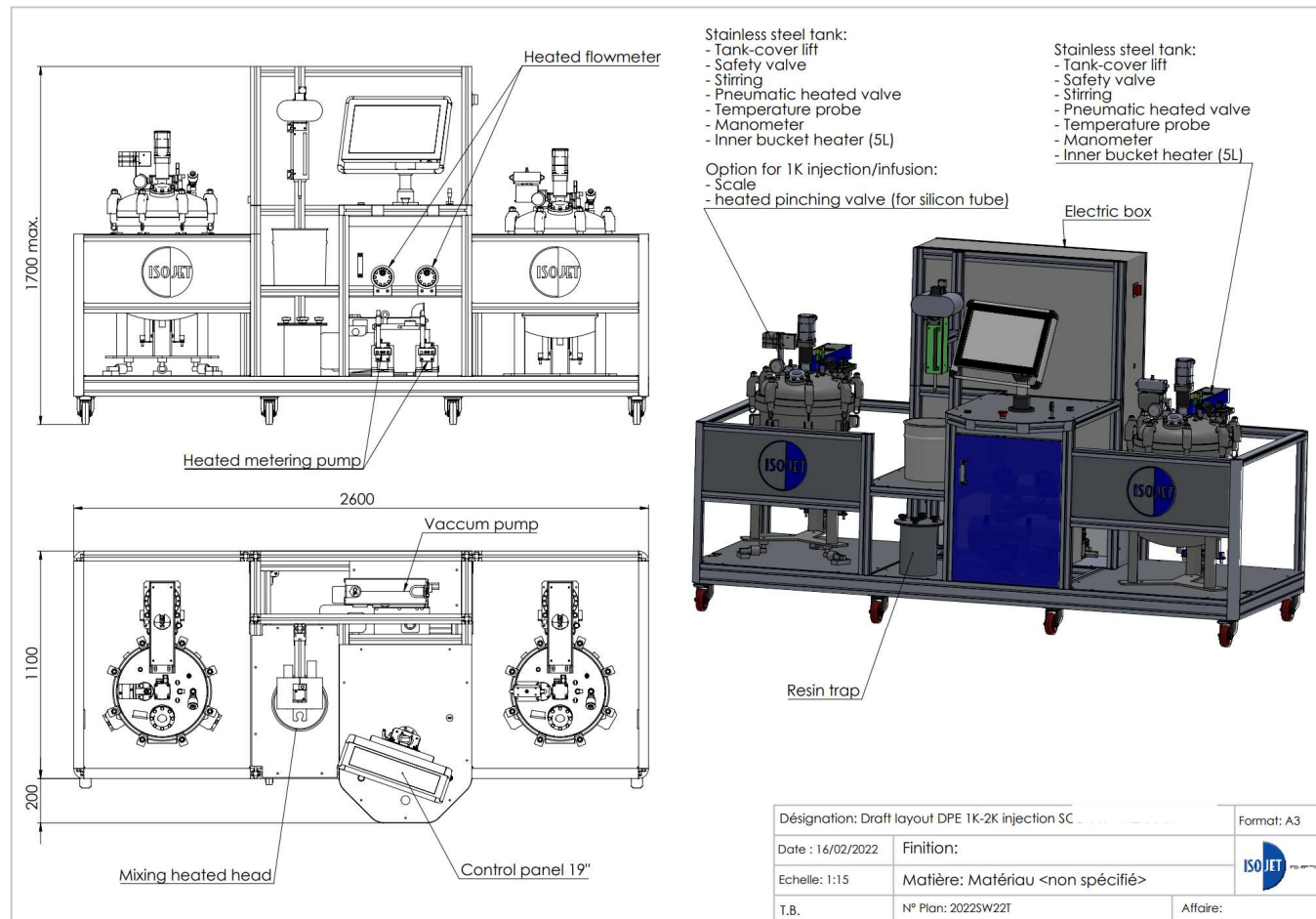


2 K/1K combination UNIT – Short or Long Pot life resins And 1 K aerospace resins

Tank
(part A or 1K resin)

And

A+B tank for long
or fast cure resin in
continuous mixing





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- Resin /hardener ratio controlled by volume and flow meter
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- 10" Touchscreen - PLC/PC logging
- Pressure or flow controlled on each component
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Page screen DPE indus

Accueil

Production

N° de la recette : **2**

Désignation :

Débit demandé : gr/mn

Durée : sec

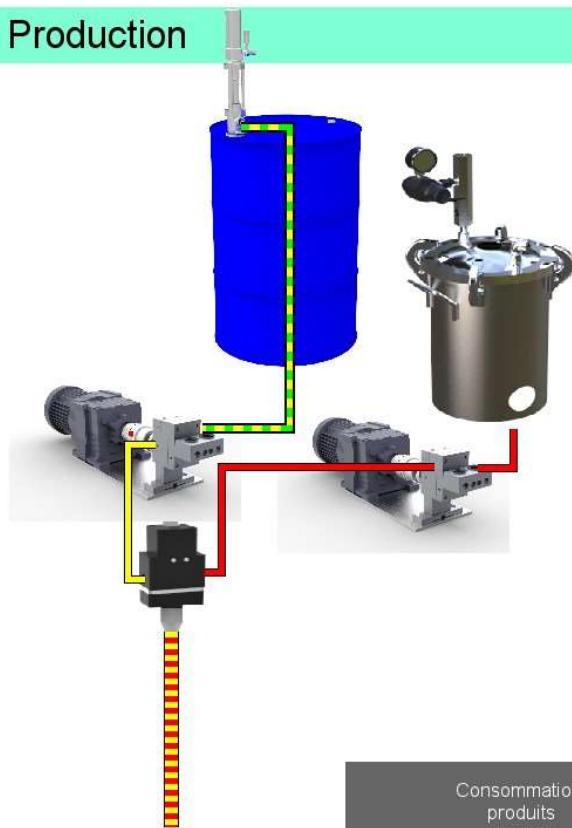
Ratio

Estimation quantité coulée gr

Mesure pression base Bars

Mesure pression durcisseur Bars

Temps avant potlife : **5763** sec



Consommation
produits

High VOLUME mixing DPE for wind blade infusion



- Metering unit high volumes epoxydes (up to 1000 l)
- High flow (25/30 kg/ min
- Degassing and temperature controled



3.SPECIALS MACHINES

Combinations of possibilities

Full automated units (and controls)

Injection piston + preparation tank + Press

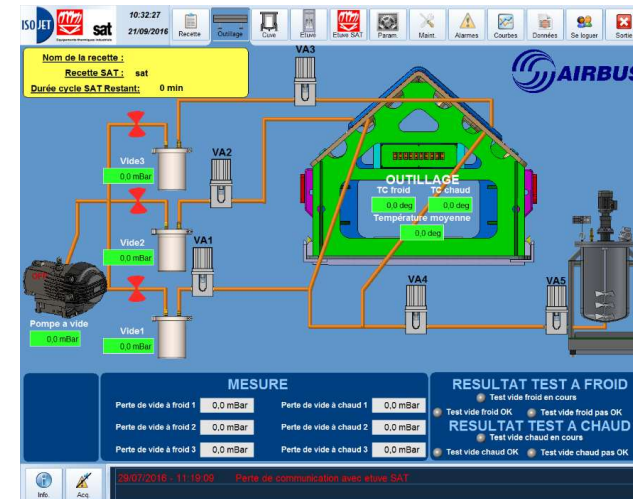


Open configuration for integration

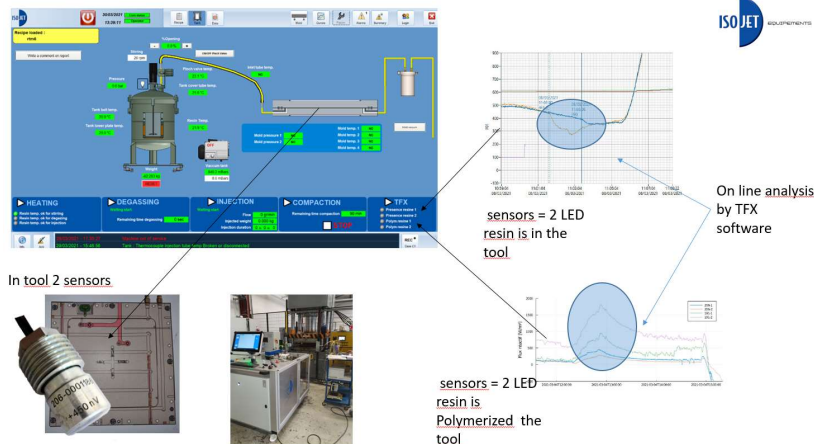
Tool
Control
Heating



Process
automation



Sensing



Control
external
elements
Presses
Oven
Oil heaters

