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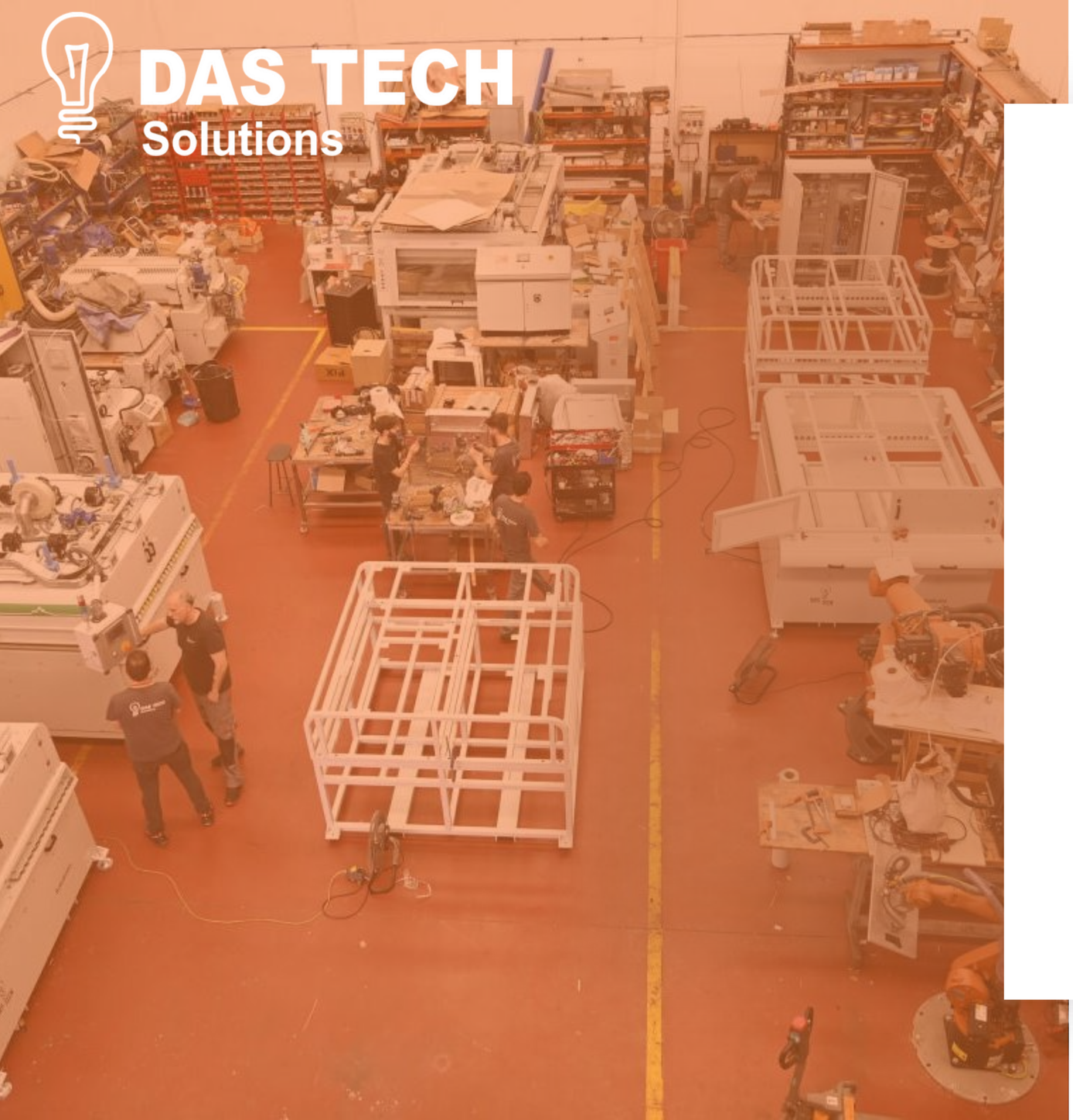
Vicente Alcácer | CEO

DRYING OF DIGITAL ENAMEL IN RELIEF DESIGN FOR X X L FORMATS

ATC
ASOCIACIÓN ESPAÑOLA TÉCNICOS CERÁMICOS



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Company

Company A technology-based company founded in 2013, but with more than 30 years in the Ceramic Industry, it has developed drying equipment using infrared and ultraviolet radiation with a unique power control system on the market, which allows a precise adjustment of power and temperature, making its processes efficient and low maintenance cost.

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Background

Industry 4.0 and VPN communication remote, use the latest Technologies in control, and apply all CE regulations necessary for compliance both in Europe, the USA, and the rest of the continents.
Exporting its machines to more than 20 countries.

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Thanks to its patent PCT/ES2014/070742 and the patent International WO2016/001456 A1, Das Tech has been one of the companies that has contributed the most to extending this technology in the drying of materials, both laminar and bulk, slips and drying in general.

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Machines from 2013

A world of solutions

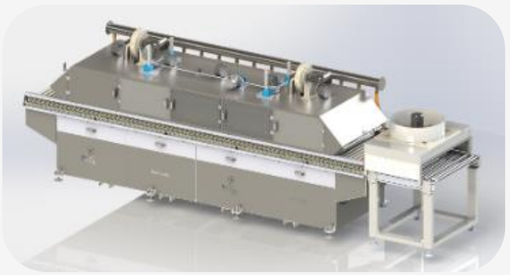








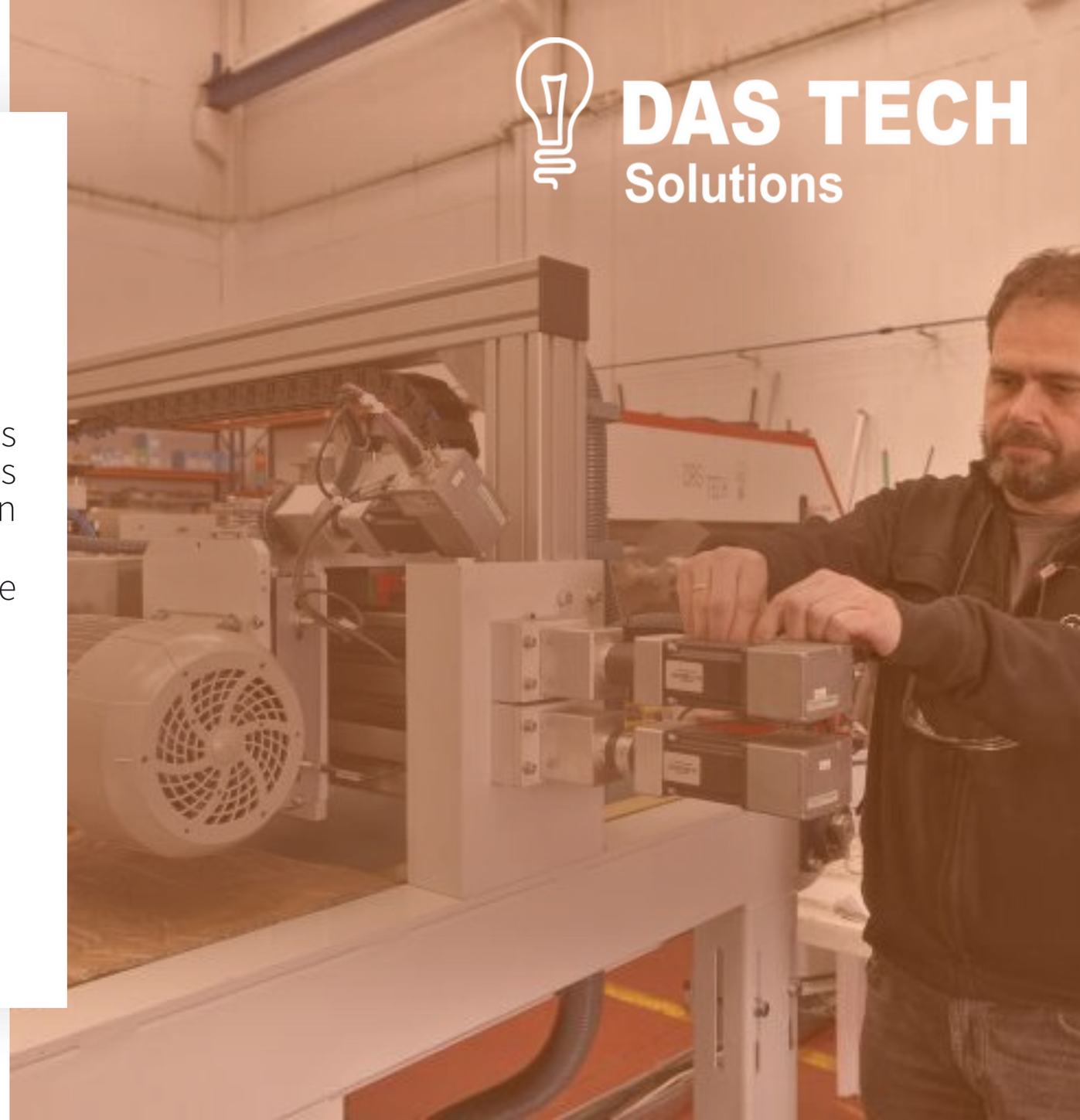




History

In digital decoration processes, ceramic inks provide design and naturalness. Precious metals and applications of soluble salts were then applied digitally (third fire).
Also at Tecna 2024, the Rimini trade fair, we have seen two major trends:

- **XXL Formats**
- **Design of reliefs applied with a digital design, not only that which comes from pressing**



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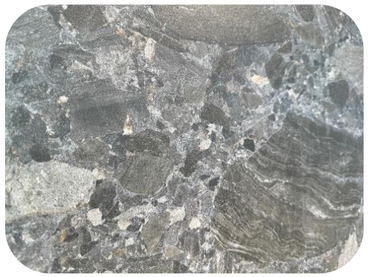
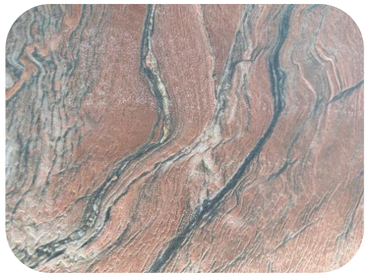
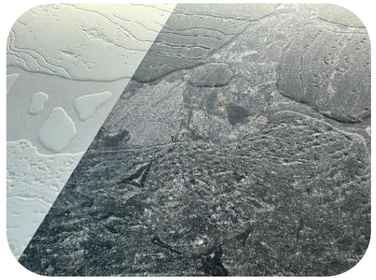
Tecna 2024 News

3D Designs






TECNA
How to make it

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The market for electric ovens for cooking is possible, and has been used in glass for more than a decade, but they are currently used for small formats, not differentiating between resistive emitters and infrared emitters.

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While resistive emitters are resistors that allow cycles of 1200ºC to be reached, they are suitable in certain cycles, where the material is already dry, and the only objective is to increase large gradients in cycles of hours or several minutes and where homogeneity is limited and a fast response time is not necessary

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Where the operation is through heating the air, similar to combustion, but without CO2 emissions. This is expensive and inefficient, with large heat losses.

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The market has evolved and given the need to decorate large formats, Das Tech presents its new IR2000 dryers.

CO_2 FREE

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¿WHAT MAKES DAS TECH DIFFERENT THAT MAKES IT WORK ONLY 3-10 SECONDS?

Das Tech's drying, based on wavelength, with patented designs, with different wavelengths, reflectors of different compositions, are key to improving efficiency and rapid response in industrial processes. In many cases spaces of only 2m, and cycle times of 3 to 10 seconds

Here it is important that the wet material does not reach vapor pressures that make the material explode, and that we can choose the degree of penetration, ranging from superficial drying to microwave drying. That is, from the inside to the surface.

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DAS TECH SYSTEM

The lamp modules manufactured by Das Tech can provide up to 50 kw/m2. The heating and/or cooling time is a few seconds.
The radiation per m2 is almost 100 times that of the sun at sea level.

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MAIN DIFFERENCES FROM OTHER SYSTEMS

The objective is not to heat, but to let the heat energy finish an evaporation process, without needing to reach 100°C, since evaporation does not imply boiling and the objective is to take advantage of the latent heat to increase the resistance to bending, remove traces of moisture, and in certain processes accelerate the cross-linking processes of adhesives and resins, increasing the cross-linking of the links.

We remember: **LATENT HEAT makes it go from liquid to vapor,**
SENSIBLE HEAT raises the temperature

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Latent heat is the amount of energy required by a substance to change phase, from solid to liquid (heat of fusion) or from liquid to gaseous (heat of vaporization). It should be noted that this energy in the form of heat is invested for phase change and not for an increase in temperature.

That is, we can evaporate the water, and practically not raise the temperature.

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On the other hand, if we want the temperature of the material to increase without changing its state, the energy needed to heat or cool a body is directly proportional to the mass of the body and the number of degrees by which its temperature changes. The constant of proportionality is called the heat capacity. Sensible heat can be calculated by:

Qs = ΔHL = L Cp (t1 – t2)

Where Cp is the heat capacity at constant pressure, defined as the amount of heat required to increase the temperature of the unit mass of a body at constant pressure by one degree. If the process were carried out at a constant volume, then the sensible heat would be

Qs = ΔUL = LCv(t1 – t2)

Where Cv is the heat capacity at constant volume. Heat capacities vary with temperature and the physical state of aggregation of substances.

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THE ENERGY CONSUMED IN A HEATING AND EVAPORATION PROCESS

As both energies are added together, the energy used is Qt= Qs+Ql

For us, temperature control is a good control variable, since it will increase much faster when there is nothing to evaporate, and it is all sensible heat. But this fact means that there is a volume of air that does not become saturated, and therefore the air is the vehicle that carries the moisture released from the process.

Other factors to be controlled are excessive air renewal, insulation losses, reflector condition, emitter height and volatile extraction system.

In digital enamel application processes, up to 1000 gr/m2 can be achieved. This requires 2 drying phases: **Preheating and Post-inkjet**

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SECADO DE ESMALTES DIGITAL EN DISEÑO DE RELIEVES PARA FORMATOS XXL

PREHEATING O PRECALENTAMIENTO PRE-InkJET

When the temperatures are below the setpoints, the IR2000 equipment needs to raise the temperature, normally the material comes dry from the line dryer, but it can also come wet after passing through applications of Curtains, Hoods, Airless, but its temperature is below the optimal value. In general, it usually reaches 45-50ºC, and the margin is only 5-10ºC so as not to exceed the limits.

The use of tents, igloo, does not lower the temperature more than 2-3 degrees, but they can improve in some models of printheads that have a limit of 50ºC

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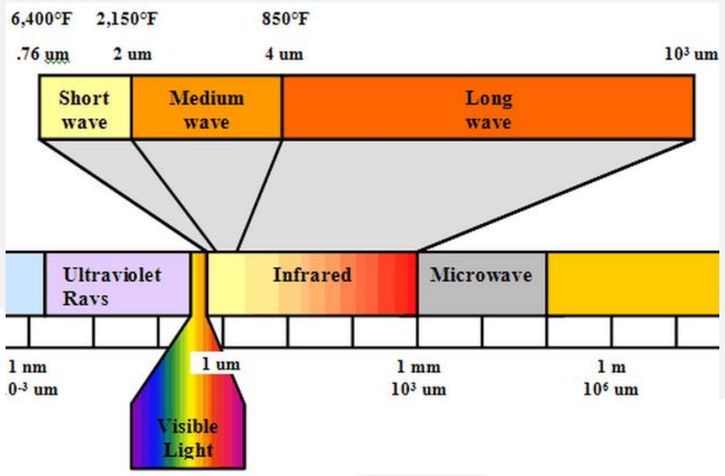
POST HEATING/ESMALTADO POST InkJECT

The aim is to reduce water after the first contact of the enamel with the hot surface. Cold enamel with a high water content must be dehydrated without creating bubbles or punctures.

Here the penetration factor and vapor pressure are very important. Sometimes a final line drying is sufficient, as a safety dryer, where the temperature limit is no longer small and values of 80ºC can be reached, which is difficult to achieve with equipment with low power and poor efficiency.



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Advantages IR2000

1.- IT DOES NOT REQUIRE FOSSIL FUELS, NATURAL GAS, OR OTHER FUEL.

2.- IT DOES NOT EMIT CO2, OR NOx, it does not require a chimney, DECARBONIZATION objective.

NO PROJECT FOR A SINGLE GAS APPLIANCE IS REQUIRED. Easy to install, only requires 2 meters of line.

3.-THERE IS NO RISK OF EXPLOSION, NO IONIZING, NO RISK OF BURNS

4.-IT ONLY REQUIRES A PROTECTED 3-PHASE CONNECTION, NEUTRAL AND GROUND. EASY TO ASSEMBLE AND MOVE

5.-CONSUMES ONLY WHEN THERE IS PART OR PRODUCT, ADJUSTABLE 0-100%, FAST RESPONSE TIME

6.-CONSUMPTION IS LOWERED TO ZERO, IF THE BRACKET FOR

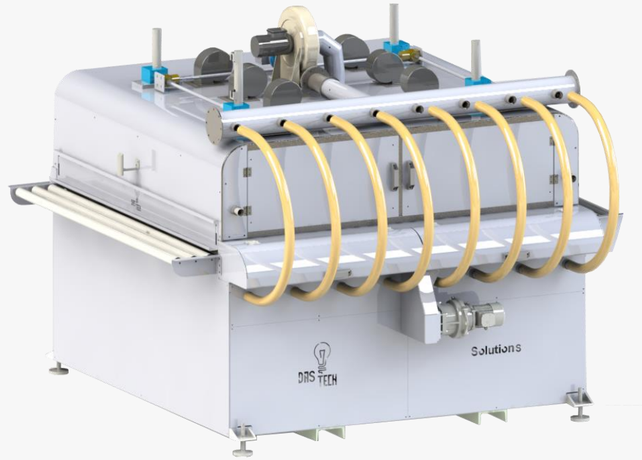
7.-LOW MAINTENANCE, more than 5000h

8.-LOW INVESTMENT COST COMPARED TO OTHER TECHNOLOGIES

9.-TRACTION WITH CERAMIC ROLLER, low maintenance cost.

10.-Possible use of renewable energies, and self-consumption.

11.-Possible application of radiation also from below.



12.-POSSIBILITY OF WORKING AT ONLY 40-60% OF THE INSTALLED POWER, PROCESS STABILITY, NO DEPENDENCE ON THE SEASON, COLD OR HEAT

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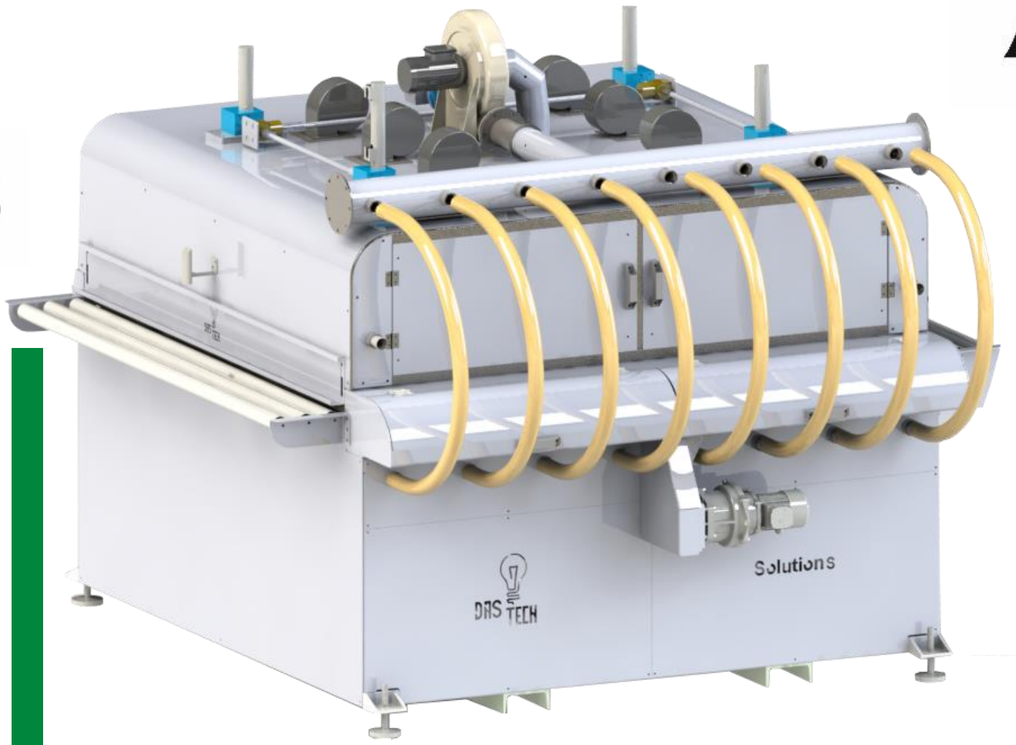
Some of our customers who have opted for the Das Tech system

CO_2 FREE



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