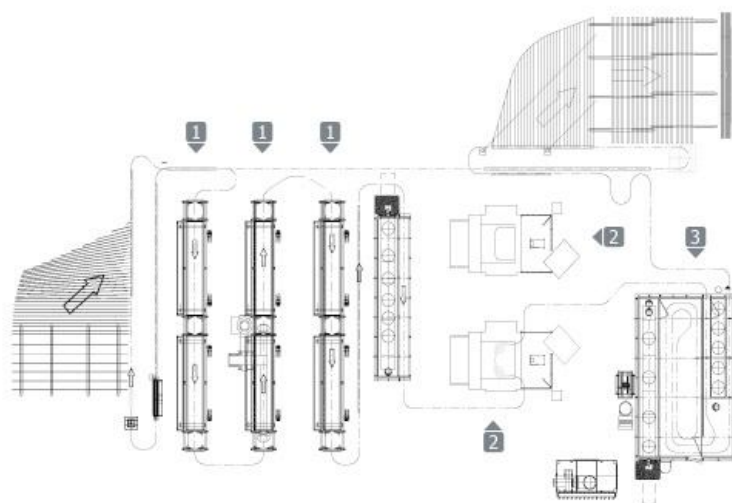


VERTICAL POWDER COATING LINES



The first vertical powder coating plants were introduced in Europe by Trevisan at the beginning of the '80 reprising the vertical liquid plants concept already in operation in the U.S.A. to coat aluminium profiles on a large scale.

The increasing demand for aluminium in the building sector, the need to optimize running costs and at the same time the productivity of the lines (a vertical line means less operators and more output if compared to an horizontal plant), allowed a large spread of this kind of plants all over the world.

In these last thirty years, in the most demanding powder coating markets in terms of industrial performances, a great change as far as concerns the aluminium coated profiles market has occurred: the range of colours and finishings required has enlarged and the big white lots demand has been replaced by a small polychrome groups of profiles request.

We have to point out, all over these years, Trevisan has always interpreted these signs of the market extremely fast.

Very often the innovations introduced by the Trevisan brand have also anticipated some circumstances job coaters would have had to run up against in a following moment.

SAT S.p.A. is proceeding with the same philosophy: innovations suitable for the scenario prefigured by the signs of the market. This means plants with a relevant technological content.

Thanks to a skilful and experienced staff as far as concerns industrial lines for aluminium, SAT S.p.A. has already developed solutions capable to create substantial benefits in terms of running costs and plant automation level.

Among them we can include:

Pre-treatment Tunnel with PVC body

Energy Saving Drying Oven

Curing Oven with "Revolving Doors" constantly closed (*SAT Patent pending*).

SAT S.p.A. is a company projecting, producing, installing and providing technical assistance as far as regards lines able to carry out surface finishings and packaging solutions on aluminium extrusions. **SAT S.p.A.** can supply vertical powder coating plants, anodizing lines, sand-blasting machines and packaging systems for aluminium profiles, proposing multiple configurations and advanced technical solutions.

SAT S.p.A. is as a company strongly oriented to innovation, in fact, thanks to a skilful and experienced staff as far as concerns industrial plants for aluminium, we project and realize applications capable to produce relevant changes in traditional lines running models. Our philosophy aims to convert the market's needs and impulses into instruments to make as efficient as possible a production cycle.

Our constant research allows us to project and realize plants with innovative elements in order to grant to our customers extremely high performances.



VERTICAL POWDER COATING LINES



1) PRE-TREATMENT TUNNEL

The pre-treatment tunnel is the part of the plant that treats the profiles' surfaces to prepare them for subsequent powder coating process.

SAT S.p.A., for the pre-treatment tunnels, makes use of the "cascade" technology, which gradually replaced the "spray" system since it grants the following advantages:

- 1) Less maintenance required (no nozzles to clean periodically)
- 2) A more strong chemical attack (the chemical solution covers the piece in a similar way to immersion)
- 3) Reduced consumption of chemicals (due to the regular flow of the liquid along the profiles only few drops are generated and the drag out between two contiguous tanks is lower)
- 4) About 70% reduction of electrical power installed (pump with lower prevalence and flow, and therefore smaller electric motors)

By the end of 2009 SAT S.p.A. introduced a new "Modular" version of pretreatment tunnel with stainless steel tanks and external structure and PVC walls.

The modularity of the tunnel grants:

- 1) A standard module to be used for each stage
- 2) A time reduction as far as regards the installation period
- 3) A simplification of the maintenance operations
- 4) The spare parts interchangeability (all the pumps have the same prevalence and flow).

CASCADE
ADVANTAGES
COMPARED WITH
NOZZLES
TECHNOLOGY

LESS MAINTENANCE
LESS ELECTRICAL POWER
REQUIRED
IMPROVED CHEMICAL
ATTACK
LESS CHEMICALS
CONSUMPTION
LESS THERMAL POWER
REQUIRED
REDUCED INSTALLATION
TIME



VERTICAL POWDER COATING LINES



2) FAST CLEANING BOOTH

This booth has been developed in compliance with the need of the most demanding powder coating markets in terms of industrial performances, healthy working environment, ergonomic use, cost effectiveness and quality of the final product. The entire powder coating application system has been re-design with the aim to get a colour change time in less than 5 minutes. The booth foresees the recovery circuit for the over-spray and is provided with electrostatic powder coating deposition equipment.

The booth is suitable also for refitting of existing vertical powder coating plants replacing the old equipment.

1) CLEANING

a) the cleaning process of the booth foresees a series of operations scheduled, according to a logic sequence automatically managed
b) the whole cleaning process of the booth (including the guns) does not require any intervention of the operator
c) Thus the booth cleaning time takes less than 5 minutes.
Solutions studied to reach that result:

1) Four sliding belts (vertical walls and booth bottom floor) automatically cleaned in continuous.

2) As far as regards the powder hoses, inner part and external surface of the guns a cleaning process automatically managed through an optimized sequence of operations has been studied.

FAST CLEANING BOOTH ADVANTAGES

COLOUR CHANGE TIME:
5 MINUTES
MORE FLEXIBLE LINE
FINAL PRODUCT
IMPROVED QUALITY
RUNNING COSTS
REDUCTION
IMPROVED
ENVIRONMENTAL
CONDITIONS
INCREASED SAFETY
LEVEL



VERTICAL POWDER COATING LINES

2) QUALITY

a) With reference to previous generation of booth models, thanks to an accurate study of the air extraction system and of the profiles path in the booth the powder deposition efficiency has been improved that is an increase of the share of powder that applies directly on the profiles. With the same number of guns it is possible to increase the conveyor speed even with profiles difficult to be painted.

b) Quality of the coating improvement both in terms of uniformity of the layer thickness and in terms of powder penetration: thanks to the cloud of powder which surrounds the profiles all around in the booth before being extracted through the vertical slots.



3) RUNNING COSTS

a) The high efficiency of the deposition allows also a relevant reduction of the powder consumption in case of very small lots that are painted in powder-waste modality and in general, with all lots, during the waste-powder phase that occurs at the beginning of a new lot after a colour change (before switching to the powder-recovery modality). Thanks to the four sliding belts automatically cleaned, the powder, during the powder-recovery modality, is recovered in continuous so comparing with the situation of the previous generation booth model (where the powder lays on the walls until the colour change operations are carried out and finally is wasted), the fast cleaning booth will allow to have an additional share of saved powder.

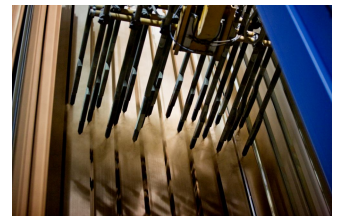
4) SAFE ENVIRONMENT

a) The booth is equipped with a "dynamic" air extraction system that allows to adjust the extracted air flow-rate along the height of the reciprocator trucking the position of the guns; in this way the powder does not escape the spraying zone.

Thanks to the automatic cleaning of booth walls, guns powder hoses, the operator of the booth remains outside to control the process, to clean the powder centre and to feed the booth with required powder.

The area of the booth can be surrounded by protective fences and the personnel will not be forced to have contact with the booth and the guns anymore.

b) The whole system has been studied in compliance with ATEX directive.



5) PLANT FLEXIBILITY LEVEL

a) Thanks to the reduced colour change time, the flexibility of the line will increase.



VERTICAL POWDER COATING LINES



3) OVENS

The drying oven evaporates the water film left on the profiles' surfaces after the chemical treatment in the tunnel. The operation must be carried out before applying powder. The polymerization oven is where the powder polymerization takes place at a temperature generally between 170 and 200° C.

Drying Oven

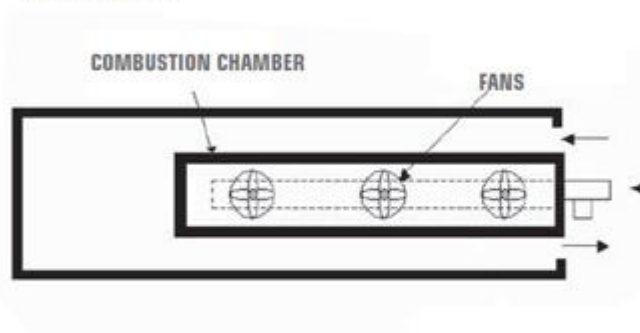
As far as regards the drying oven, SAT S.p.A. can propose two versions:

1) The "U" shape path drying oven: drying chamber with "U" shape path and environment heating carried out by means of a cylindrical heat exchanger fed by a burner.

ENERGY SAVING

SAT S.p.A. TAKES GREAT CARE OF ENERGY CONSUMPTION WITH RELEVANT REDUCTIONS ACHIEVED THANKS TO: CASCADE SYSTEM ON PRE-TREATMENT TUNNEL ENERGY SAVING DRYING OVEN REVOLVING DOORS SYSTEM APPLIED TO CURING OVEN

DRYING OVEN

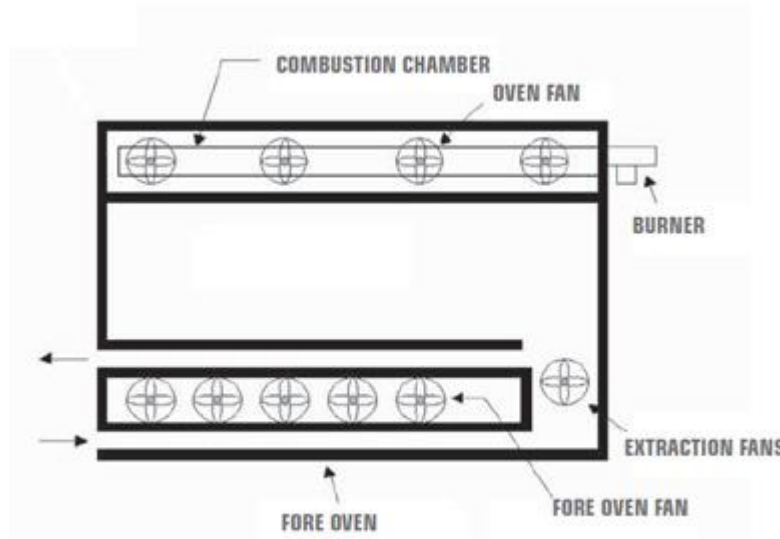


VERTICAL POWDER COATING LINES

2) The "Energy saving" drying oven: drying chamber with straight path and environment heating carried out by means of hot water battery . The advantages of this configuration are:

a) Reduction in thermal energy consumption (no burner installed but hot water battery heated by the water of the burner closed circuit. The energy required by the drying oven is partially provided by the curing oven fumes heating recovery).

Polymerization Oven



REVOLVING DOORS
SYSTEM
ADVANTAGES
IR OVEN NOT NEEDED
ONE OPERATOR LESS IN
THE LINE
REDUCTION OF THERMAL
AND ELECTRICAL ENERGY
CONSUMPTION
IMPROVED FINAL
PRODUCT QUALITY

As far as regards the polymerization oven, SAT S.p.A. can propose two versions:

1) A polymerization oven consisting of pre-oven, curing chamber, heating group made up by a cylindrical heat exchanger fed by a burner.

2) A polymerization oven with "Revolving Doors"/ "Constantly Closed" (Patent). It consists of a curing chamber and a heating group made up by a cylindrical heat exchanger fed by a burner. The difference with the other version is represented by the three "Revolving Doors" insertion in correspondence of the oven front side. The "Revolving Doors" allow the entrance/exit of the profiles from the oven keeping the same entrance/exit constantly closed creating therefore a barrier between the internal side of the component and the external environment. This innovation introduces important advantages if compared with the other version.

a) No need of an IR oven to jellify statically the powder on the profile surface before the curing oven entrance (thanks to the lack of relevant swinging of the profiles along their path throughout the curing oven and thanks to the absence of a strong air flow against the profiles covered with fresh powder).



VERTICAL POWDER COATING LINES

b) No need to foresee an operator to clamp a chain at the bottom of the profiles in order to limit the mobility of the profiles and avoid that the swinging of the profiles in the curing oven could allow the profiles to touch each other with consequent release of fresh powder (risk of color cross contamination) or damage/jam of the profiles (one worker less per shift);

c) Drastic reduction of the energy consumption of the whole system: no energy consumption for the IR oven (thermal energy for the gas catalytic combustion and electric energy for the pre-heating of the IR oven catalytic panels); reduction of the thermal consumption of the curing oven, thanks to the permanently closed doors of the oven and to the elimination of the flow-rate of exhausted air from an extraction point placed inside the curing oven;

d) Final product quality improvement: due to the physical separation between the building environment and the curing oven, the exchange of air between the oven and its surrounding environment results to be drastically reduced therefore the quantity of pollutant airborne dust particles that can enter into the curing oven and deposit on the profiles surface will be reduced as well.



VERTICAL POWDER COATING LINES

SAT'S VERTICAL POWDER COATING PLANTS MEANS:

ENERGY SAVING

Thanks to

- 1) Cascade system technology applied on pre-treatment tunnel,
- 2) Energy saving drying oven
- 3) "Revolving doors" system applied to curing oven

HIGH FLEXIBILITY

The fast cleaning booth means reduced time for colour change and consequently high flexibility. That implies the general efficiency of the plant in terms of production will increase

SAFE ENVIRONMENT

The design of the fast cleaning booth has been conceived to forbid the powder to escape from the spraying zone: no contact between operator and powder. All the operations are automatically managed: the personnel will not be forced to have contact with the booth and the guns anymore.

The whole booth system has been studied in compliance with ATEX directive

QUALITY

The biggest risks for the final product quality come from the curing oven.

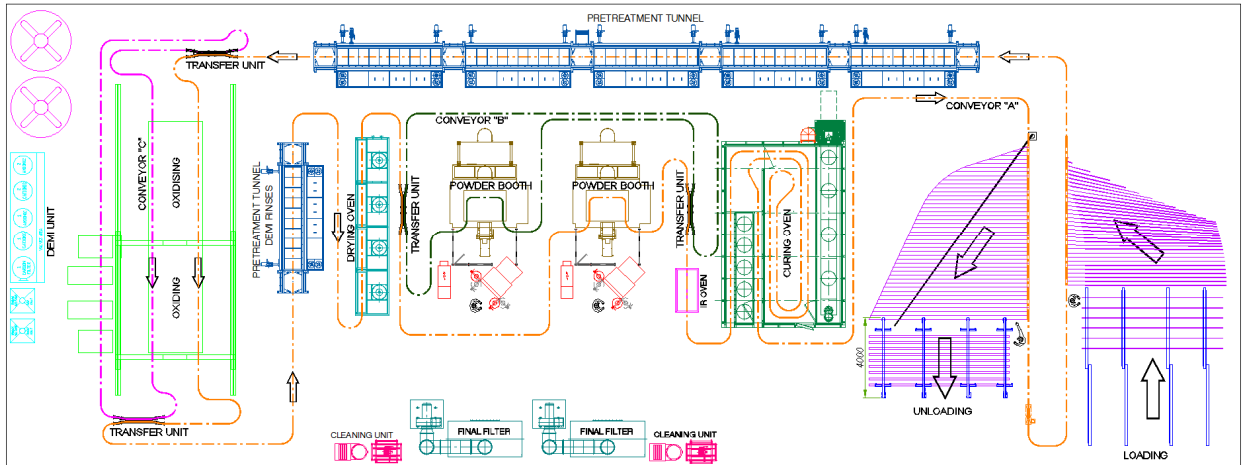
The "revolving doors" system placed in front of the curing oven produces a physical separation between the building environment and the curing oven. Thus less dust particles can enter into the polymerization oven: the quality of the final product will improve. Fast cleaning booth means improvement both in terms of layer thickness, powder deposition efficiency and penetration



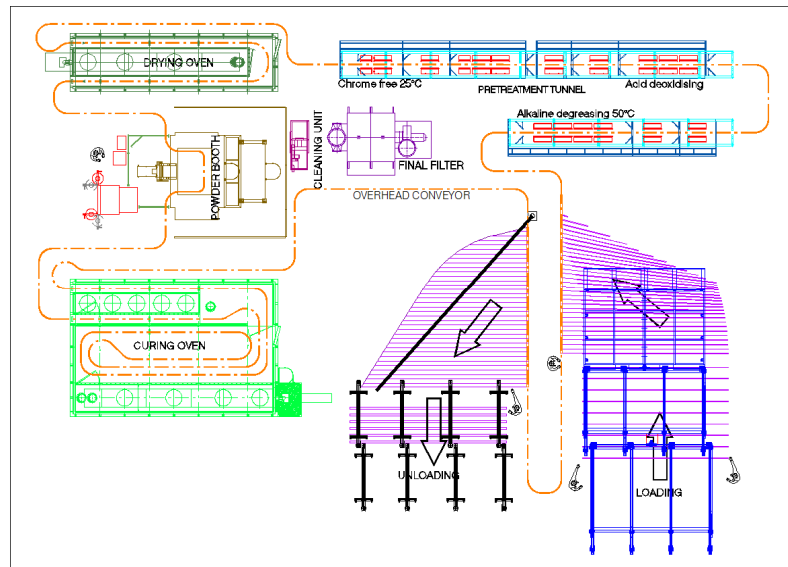
VERTICAL POWDER COATING LINES

Our Flexibility

Example n. 1



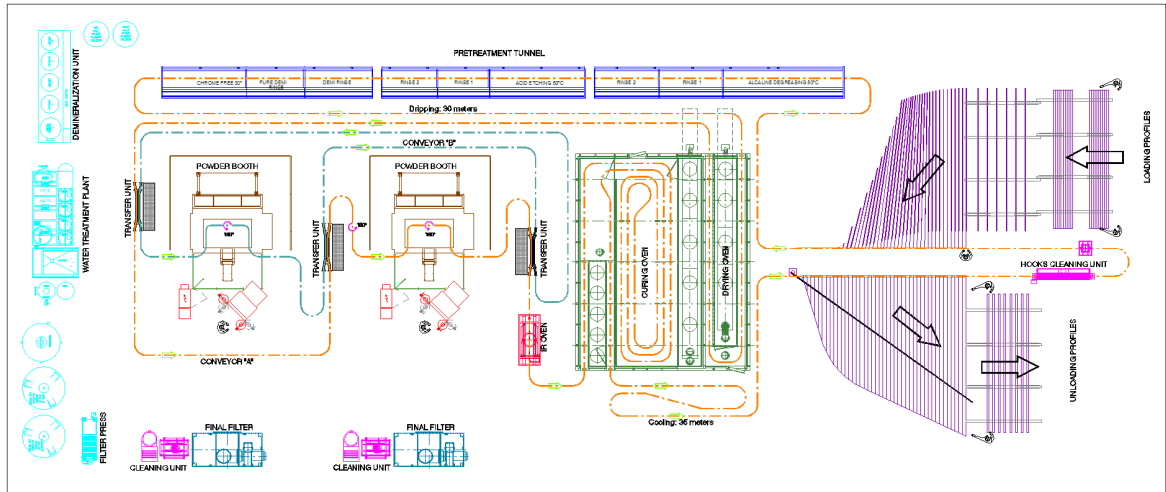
Example n.2



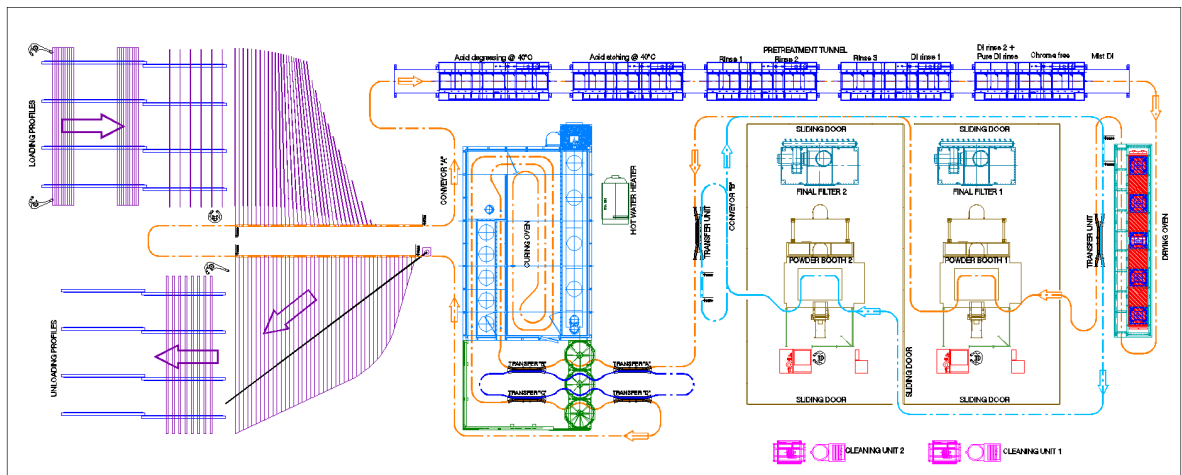
VERTICAL POWDER COATING LINES

Our Flexibility

Example n.3



Example n.4





MULTIMETAL S.r.l.

As far as concerns the line's components production, SAT S.p.A. makes use of an internal carpentry (Multimet S.r.l., a Subsidiary company) offering therefore the fullest guarantees with reference to the final product quality standards.

The building where the carpentry operations take place covers 4000 m2 area and it is located just outside Verona (Italy).



CERTIFICATION

The final product quality is granted by the first-class material Multimet S.r.l. uses, coming from Italian suppliers and furnished with adequate certification.

Thanks to a skillful personnel and to last generation bending, laser cutting machines and calenders, Multimet S.r.l. can cover each working phase following step by step the production of the whole plant.

Through its own carpentry, SAT S.p.A. can therefore grant a high quality production standard (constant control of the entire working process and direct relationship with the material suppliers) and a high flexibility as far as concerns the realization and the delivery of the lines.



CONTACT US

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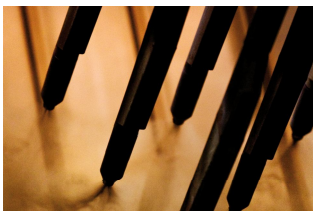
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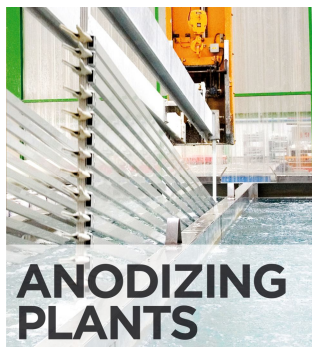
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