CONDOROILSTAINLESS
RECOVERY TECHNOLOGIES

Via Galliani, 50-60 21020 Casale Litta Va
TEL. 0332945872
E-MAIL assistenzaimpianti@condoroil.it WEB SITE: www.condoroil.it
C.F/P.I. IT01553790120

REV. 00
MGR: Zavattoni

**Date: April 2023**

# EQUIPMENTS AND PRODUCTS FOR THE CHEMICAL PAINT STRIPPING

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**SOMMARY**

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Condoroil Stainless
The sustainable chemistry through technology in the treatment of surfaces

Since its foundation in 1992, Condoroil Stainless's mission has been to develop processes with the aim of minimizing the wastes, within the chemical treatment of metallic and non-metallic surfaces.
Using traditional and innovative molecular separation technologies, Condoroil units allow to regenerate oils, solvents and process solutions, to recover by-products having a certain commercial value from the wastewater and, again, to purify and then recycle the rinsing water, up to the zero discharge.
The technologies proposed by Condoroil Stainless therefore represent the best example of how "Green Engineering" makes it possible to reduce the consumption of natural resources, pursuing the philosophy dictated by the circular economy that favours their recovery and reuse directly on site.
The consumption of resources no longer follows, hand in hand, economic development and we are witnessing the so-called "decoupling" phenomenon which sees, precisely, the decoupling between the two growth curves, recognized as fundamental for eco-sustainable development.
It is important to note that the application of technologies of regeneration, recycling and recovery of secondary raw materials to existing realities, and not only to new plants, allows to further amplify the decoupling phenomenon up to reverse the trend that sees, in the collective imagination, economic growth necessarily linked to a greater consumption of natural resources.
There are numerous patents filed and units developed by Condoroil Stainless and, in this context, we recall plants to regenerate degreasing solutions, acids, pickling agents, lubricants and solvents and plants to recover, from wastes, salts, metals, oils or in any case products having a fair commercial value.
Wastes produced by the treatment cycles are no longer seen as wastes to be disposed of but as an economic resource that can be exploited.
And it is precisely the fast return on investment that makes recovery technologies attractive, since there are in fact no regulatory impositions, the driving force can only be economic.
In addition to low-waste technologies, Condoroil Stainless also develops technologies for the chemical treatment of surfaces that allow the elimination of formulations with a strong environmental impact and / or harmful to the operator.
For this area of activity, the main innovation was in the pickling of stainless steels.
The development and construction of a series of particular electrolytic pickling plants has in fact allowed the industrialization of this technology on high productivity lines and the consequent progressive elimination of traditional chemical pickling processes, large users of dangerous acids for the operator and polluting the environment.

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# 1 THE PRODUCTS

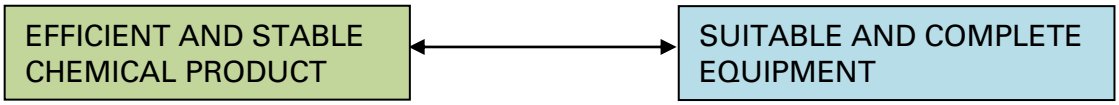
## 1.1 The chemical paint stripping

It is a very simple operation whose cycle can be resumed as follows:

1. first step – contact of the works with the paint stripping until total dissolving or swelling of the film
2. second step - rinse
3. third step – passivation of the bare metal surfaces*

*optional process

But a good paint stripper is not enough to make the paint stripping a comfortable process for the operator.
New paint strippers have been designed and improved neglecting the development of process plants: where and how to use the strippers.
Condoroil proposal is motivated by the knowledge that the chemical paint stripping is a process which can be successfully carried out only if two elements are in balance:




## 1.2 The Products

Paint strippers are those liquid or gel chemicals that are used to remove paint from different works.
The proposed products are of different nature since they must ensure maximum effectiveness on different paints besides being non destructive for the treated works.
For example, two works with powder coat but one in steel and one in aluminum, will be stripped with two different products.
Paint strippers used in the past are very effective in removing paints but, being chlorinated solvents and ammines based, are meeting an even smaller commercial success.
They are still used where the most modern formulae don't give a good result.
In the Table here below they are listed under " special application"
The new formulae are environmentally friendly, are mostly alkaline, waterborne if used on iron, solvent based if used on galvanized steel, aluminium, zamak or magnesium. They are effective at temperatures between 35° and 80°C.
They can be applied by immersion, immersion with ultrasonics, spray and, if gel, by brush.

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## 1.3 Table of paint strippers – SVI/SVA series

| PRODUCT | USE | MATERIAL | KIND OF PAINT | TEMP. | PRINCIPLE OF OPERATION |
|---|---|---|---|---|---|
| ***SVA 581*** | *Hooks, racks, defective works* | *Iron Stainless steel* | *Powder Cataphoresis Anaphoresis* | *50/80 °C* | *Dissolving of powder paint detachment of cataphoresis and anaphoresis* |
| ***SVI 550*** | *Hooks, racks, defective works* | *extruded aluminium, die casting, zamak , magnesium* | *Powder Cataphoresis Anaphoresis* | *35-50°C* | *Dissolving of powder paint of cataphoresis and anaphoresis* |
| ***SVA 582*** | *Hooks, racks, defective works* | *Iron Steel* | *Liquid (automotive)* | *60 °C* | *Dissolving of powder paint* |
| ***SVA 583*** | *Hooks, racks, defective works* | *All metals and some plastic* | *Powder, ED paint* | *Ambient* | *Dissolving of powder paint* |
| ***SVI 590*** | *Hooks, racks, defective works* | *Iron Steel* | *Cataphoresis* | *60 °C* | *Dissolving of powder paint* |

## 1.4 Paint strippers – SVI series for special application*

| PRODUCT | USE | MATERIAL | KIND OF PAINT | TEMP. | PRINCIPLE OF OPERATION |
|---|---|---|---|---|---|
| ***SVI 506*** | *Hooks, racks, defective works* | *Iron Steel Magnesium Aluminium Zamak* | *Universal* | *Ambient* | *Swelling of the paint* |
| ***SVI 506pH*** | *Defective works* | *Magnesium Aluminium Zamak* | *Universal* | *Ambient* | *Swelling of the paint* |
| ***SVI 660*** | *Car wheels, plastic manifactured* | *Aluminium PC-ABS plastic* | *Universal* | *40-60°C* | *Flaking of the paint* |

* PRODUCT BASED ON METHYLENE CHLORIDE

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## 2 PLANTS AND EQUIPMENTS

Different system solutions are proposed.
They can be combined with systems for separation stripper/sludge and sludge removal.

### 2.1 Tanks

Tanks are made with dimensions required by the customer and have the following characteristics:

1. Construction material: carbon steel or AISI 304;
2. Hinged swing lid (option: pneumatic opening);
3. Inclined bottom with drain valve;
4. Optional: Heating by heat exchangers;
5. Agitation system for the liquid with mechanical movement (optional mechanical stirrer);
6. Basket for the works (of specific request);
7. Option: Electrical control-panel for management of resistances by temperature probe and Start/Stop buttons, mechanical stirrer;

Condoroil has defined a series of paint stripping tanks with following standard dimensions:

| ***Model*** | ***Useful dimensions L x l x h mm*** | ***Useful dimensions air agitation L x l x h mm*** | ***Useful dimensions mechanical agitation L x l x h mm*** |
|---|---|---|---|
| **SV 0,7/1,0/0,8** | *750x1.000x800* | *850x1.100x1.000* | *850x1.300x1000* |
| **SV 0,7/1,0/1,0** | *750x1.000x1.000* | *850x1.100x1.200* | *850x1.400x1.200* |
| **SV 1,0/1,5/0,8** | *750x1.500x800* | *850x1.600x1000* | *850x2.000x1.000* |
| **SV 1,0/1,5/1,0** | *1.000x1.500x1.000* | *1.100x1.600x1.200* | *1.100 x2.000x1.200* |
| **SV 1,0/2,0/0,8** | *1.000x2.000x800* | *1.100x2.200x1.000* | *1.100x2.500x1.000* |
| **SV 1,5/2,0/0,8** | *1.500x2.000x800* | *1.600x2.100x1.000* | *1.600x2.500x1.000* |
| **SV 1,5/2,0/1,0** | *1.500x2.000x1.000* | *1.600x2.100x1.200* | *1.600x2.500x1.200* |
| **SV 1,5/3,0/0,8** | *1.500x3.000x800* | *1.600x3.100x1.000* | *1.600x3.500x1.000* |
| **SV 1,5/3,0/1,0** | *1.500x3.000x1.000* | *1.600x3.100x1.200* | *1.600x3.500x1.200* |

As optional they are also built with barrel and/or ultrasonic transducers
A sludge removal with complete the entire system*.
*See description in the section devoted to the topic.

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## 2.2 Immersion Plants

They are built according to the customer needs:

1. Stripping tank (see above)
2. Sludge removing system*
3. Rinse station on grids (complete of collecting basin and filter basket)
4. Passivation tank**
5. Well for drying**

* See description in the section devoted to the topic.
** Optional..

**PAINT STRIPPING EQUIPMENTS**

**ULTRASONIC HYDROKINETIC PLANTS**

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## 2.3 Spray Washer

In a spray washer treatment times are reduced of 70%.
After the first stripping step, a rinse step follows.
The washer are sealed in order to prevent mist or vapours of paint from getting into the environment.
Maximum attention is paid to the sludge removing system in order to prevent sludge, also sticky, to clog the ramps, nozzles or to affect operation of the pumps. At this purpose the washer will be complete of a filtration system which could be or a vacuum system or a decanting system at two phases.*

* See description in the section dedicated to the topic.

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## 2.4 In line plants

**In line plants, ultrasonic tanks and spray tunnels**

We propose two in line applications to paint strip hooks and rack at each passage.
In case of dual rail conveyor, hooks and racks can be diverted at low speed along tracks specially created and paint stripped at batch.

**In line paint stripping by immersion**

The conveyor passes into the tank until the hook or rack are submerged.
In order to reduce the treatment time (and use a tank as short as possible) ultrasonic transducers are placed on the tank walls.

**In line paint stripping by spray**

Spray tunnels very similar to traditional treatment tunnels are proposed. Great attention is paid to systems for fumes and vapours interception, to the dripping phase between paint stripping and rinse, and to the sludge removing system.

## 2.5 Sludge removing system

The dissolved or peeled paint accumulates as sludge on the bottom of the tanks.
This polluting part of the bath shall be removed.
In simple or barrel stripping tanks the presence of sludge can be tolerated (just check that heating elements are not covered), in washers, in continuous tunnels, in tanks with ultrasonics, the removal is necessary to avoid not to compromise the system operation. The waste will be disposed by companies specialized in industrial disposals.

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## 2.6 DF sludge removing system

DF units are equipped with a transfer pump, a high density polyethylene decanter ( truncated cone) and a relevant system of valves and piping for managing load/unload flows of stripper and for the separate sludge evacuation.

Each standard tank has its own sludge removing unit. As option to the standard models, units in stainless steel or units with double decanter – Mod DF-TWIN – are available, when the continuous working of the paint stripping tank is required.

| *Paint stripping tank* | *Sludge removing system* | *Volume (lt)* |
|---|---|---|
| SV 0,7/1,0/0,8 | ***DF 9*** | ***900*** |
| SV 0,7/1,0/1,0 | ***DF 9*** | ***900*** |
| SV 1,0/1,5/0,8 | ***DF 14*** | ***1.400*** |
| SV 1,0/1,5/1,0 | ***DF 19*** | ***1.900*** |
| SV 1,0/2,0/0,8 | ***DF 25*** | ***2.500*** |
| SV 1,5/2,0/0,8 | ***DF 25*** | ***2.500*** |
| SV 1,5/2,0/1,0 | ***DF 30*** | ***3.000*** |
| SV 1,5/3,0/0,8 | ***DF 40*** | ***4.000*** |
| SV 1,5/3,0/1,0 | ***DF 45*** | ***4.500*** |

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## 2.7 Dehydration unit

Since sludge which separates at the bottom of the DF unit decanter is still full of paint stripper, it can be convenient sometime to have a dehydration unit to recover the chemical.
Condoroil proposes standard units with draining bags – our DRY BAGS units.
It is enough to know the right amount of paint removed daily in order to decide the dimension of the unit according to the volume of the bags.
The units are in stainless steel and are supplied with a trolley to move the bags, belts, draining bags, pump for liquid recover and level control.

| Model | N° bags | Volume l | Dimensions mm |
|---|---|---|---|
| DRYBAG 1 | 1 | 80 | 600 x 600 x 1.500 h |
| DRYBAG 2 | 2 | 160 | 1.200 x 600 x 1.500 h |
| DRYBAG 4 | 4 | 320 | 2.200 x 600 x 1.500 h |
| DRYBAG 6 | 6 | 480 | 1.700 x 1.200 x 1.500 h |
| DRYBAG 8 | 8 | 640 | 2.200 x 1.200 x 1.500 h |

In case of high amount of sludge, Condoroil can propose dehydration units with vacuum rotating drum.

These systems allow to reduce the volume to dispose and to recover the paint stripper.

In case large quantities of sludge have to be treated, CONDOROIL is able to offer dehydration units with filter pressing. With these devices, against a higher purchase cost, it is possible to obtain the advantages of a smaller volume to be disposed of and a greater recovery of paint stripping product. To facilitate the filter-pressing operation and therefore produce an easily manageable solid sludge, we propose the use of a suitable filtering aid called Coagulant 51 P.

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## 2.8 Rinsing water purification and recycling plant

If it is desired to close the water cycle to operate with zero waste, the rinses can be purified and then recycled with the aid of our membrane separation plants.

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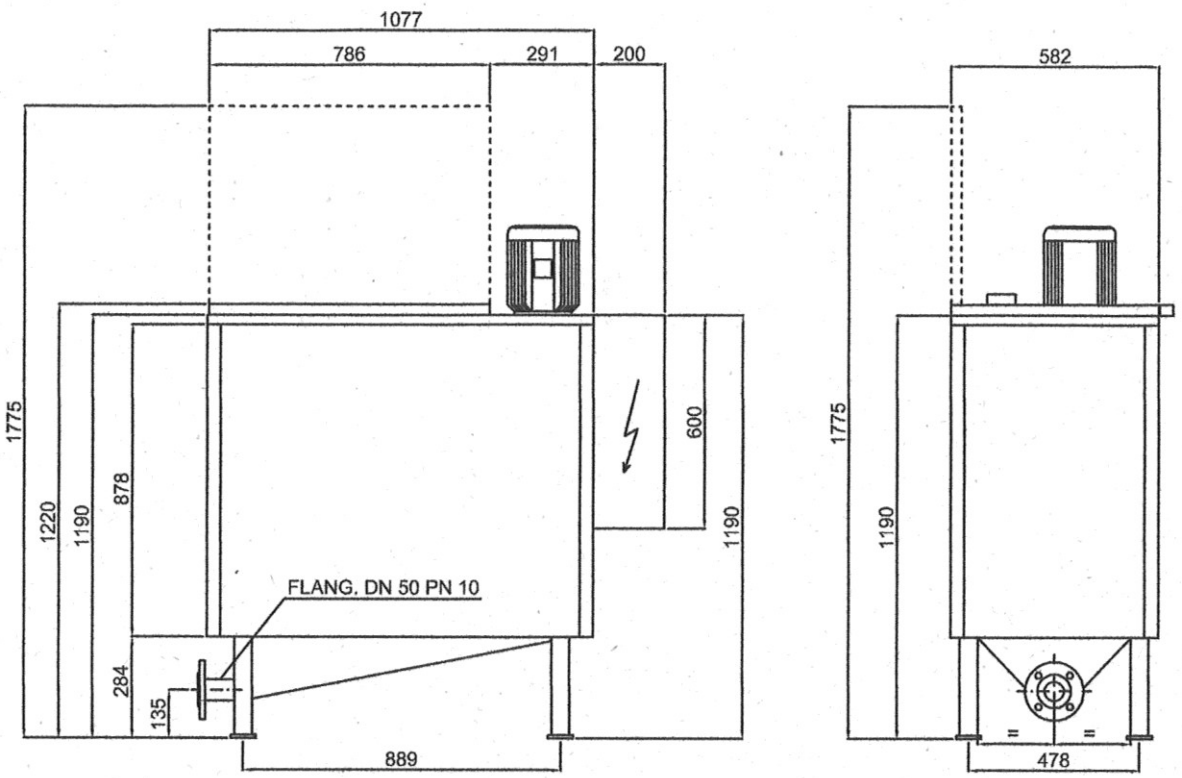
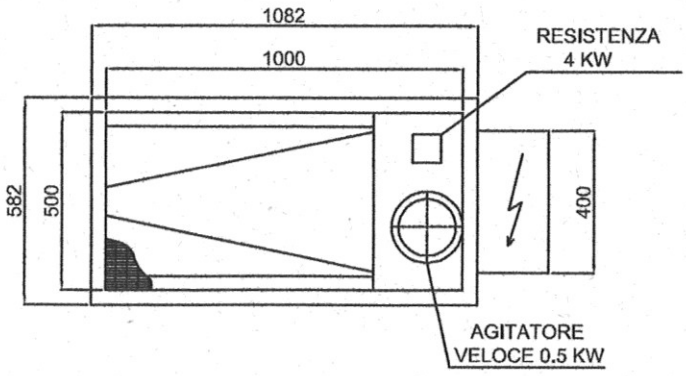
## 3. LAY OUT

TANK



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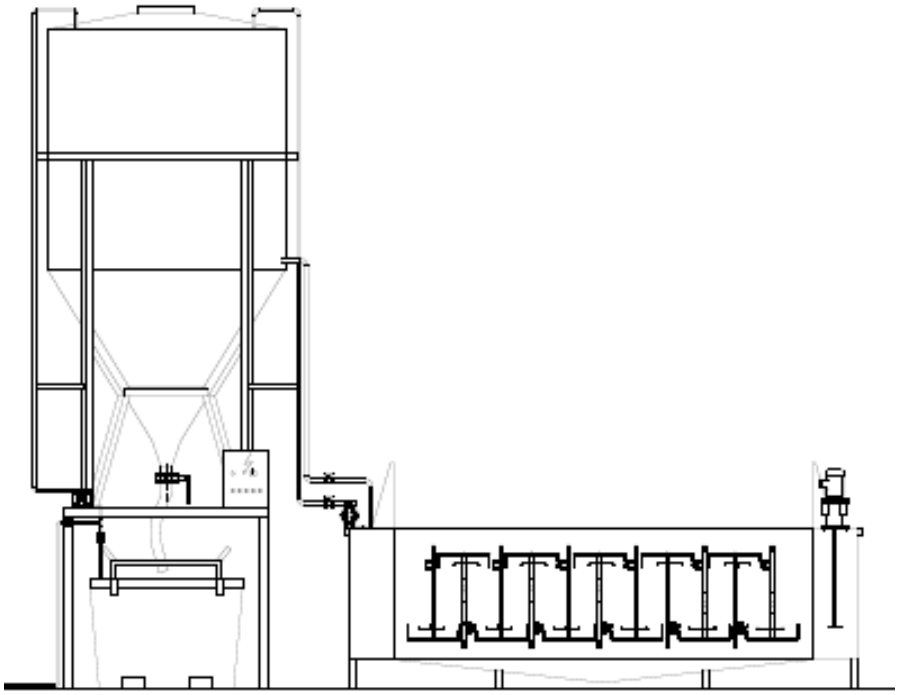
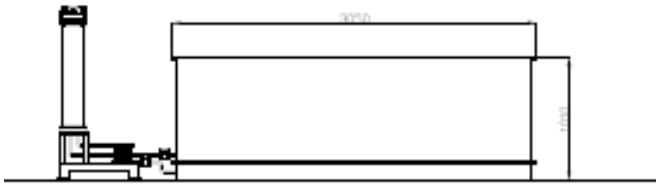
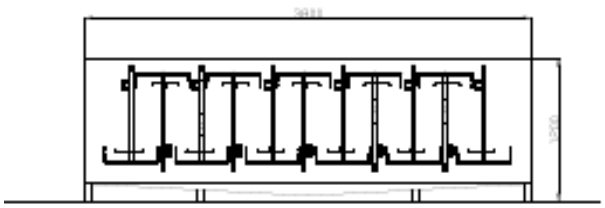
## OVERVIEW OF THE COMPLETE PAINT STRIPPING PLANT



***PAINT STRIPPING TANK WITH SLUDGE REMOVING SYSTEM***



***STAZIONE DI RISCIACQUO CON SISTEMA DI FILTRAGGIO***



***PASSIVATING TANK***

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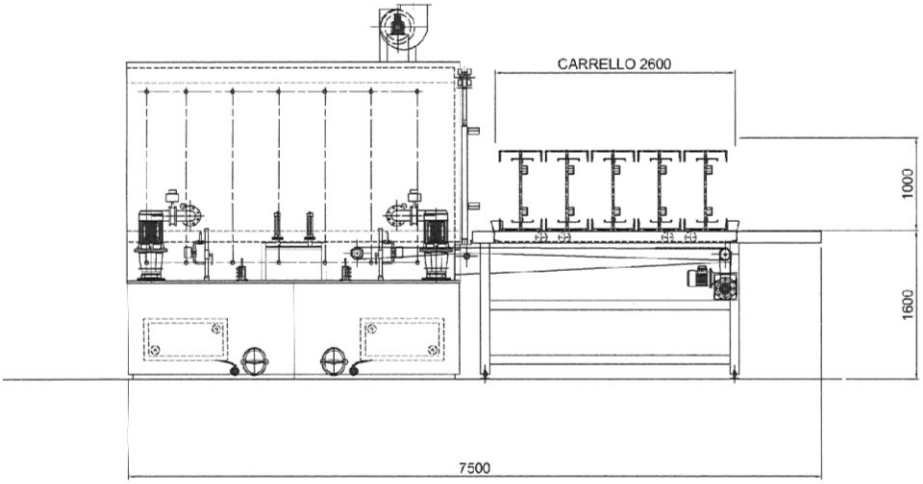
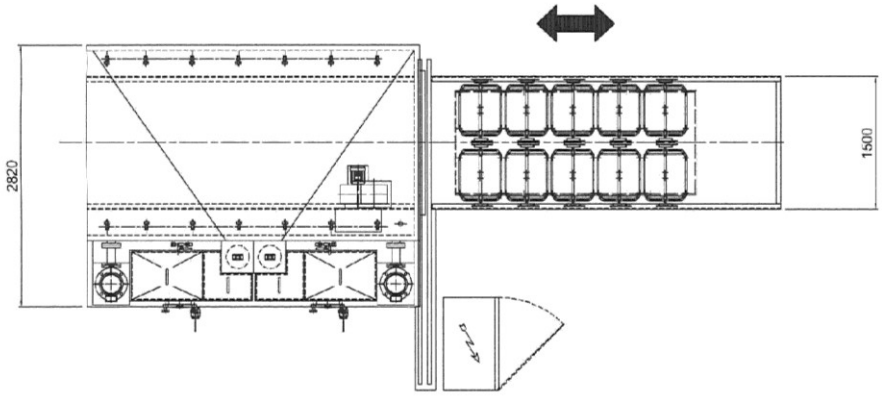
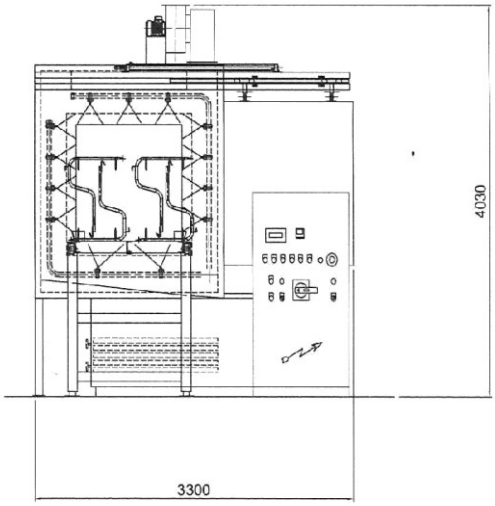
## LAY OUT SPRAY WASHER



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## IN LINE PAINT STRIPPING BY IMMERSION