

**SL4 - FF**

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**New standard in  
PVC windows fabrication**



# GRAF SYNERGY

INTEGRATED WINDOW SOLUTIONS

GRAF Synergy produces machines, tools and systems for PVC and aluminum windows and doors fabrication. The first objective is the customer that points to the technological development of his company.

GRAF Synergy is based in Modena, Italy, the cradle of the world mechanical engineering. We distribute worldwide high-tech machines, safe, reliable and easy to use. We meet the needs of the artisan as those of huge company which produces thousands of pieces a day. The applied research reflects our dynamism and enterprise results confirm our commitment.

## SL4 - FF

# New seamless PVC welding



Graf Synergy has gone all over many roads for carrying out its new four head welder, spending thousands of hours in designing and testing during last six year. We have invested a lot in equipments, materials and software development. Meanwhile we have kept on producing conventional welding and corner cleaning lines, collecting a unique expertise on PVC welding process, working together with major PVC profile producers and best customers of ours. We have got finally an extraordinary result: SL4 FF, "Fast & Forte", (Patent Pending).

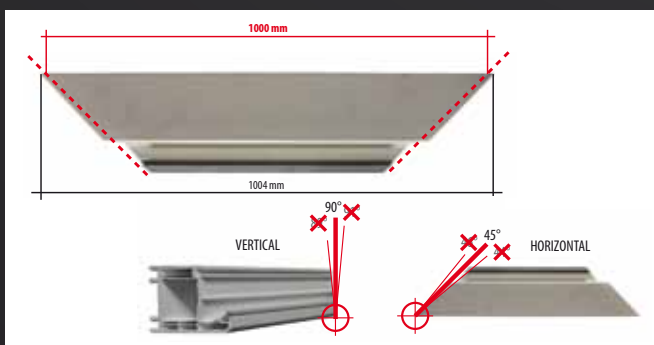
PVC windows fabrication process has been revolutioned.

Another point to be on top, even for those who already have welding lines, the welding quality! The system without cleaning (Patented Pending) creates a perfect angle that sets a new standard in window production.

## Weld seam elimination (welding shaping)

Biggest SL4 FF innovation consists in the elimination of welding seam. This concept has been surpassed by the new system, where welding seam simply doesn't exist anymore. Further, external welding finishing can be shaped in two ways: full zero seam (non visible welding) or engraved welding junction, mainly used in white profile. Round shaped profile with invisible welding junction look naturally perfect!

## VHL, tolerance error compensation system

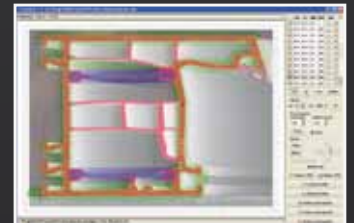


New cutting error compensation system (Vertical, Horizontal, Length) can balance profile length error up to 2 mm and vertical/horizontal angle error up to 1 degree.

## Profile height tolerance compensation

In case of different profile height due extrusion tolerance, an embedded precise measuring system looks for the medium welding height automatically, compensating difference between two profile up to 0,7 mm. (well beyond normally accepted value). In case of bigger difference, machine asks the operator for confirmation to go ahead to weld.

## "WYSIWYG" profile programming



What You See Is What You Get. A problem to solve on automatic conventional welders is to upload the profile drawing, shown on a computer display or on paper. For SL4 FF welder programming it's no more necessary to use 3D CAD programs, DXF profile drawing, selfteaching procedure or complex ISO programs. It's enough to make a photocopy or a scanning of the real profile in your hand and upload the JPEG photo file into the machine. Expert engineer assistance or machine manufacturer intervention is absolutely no more necessary for assisting a production change or insert a new profile to weld in the machine program.

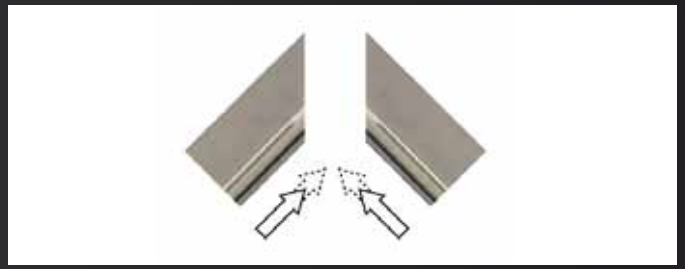


## Simplified profile countershims



Profile supporting inside welding heads is much more simple compared that one of conventional welders. Sophisticated, complex and expensive fixtures are no more necessary. The majority of fixtures can be simple metal support, allowing considerable money saving on machine tool equipment.

## Parallel welding



The welding system used is naturally and absolutely parallel.

## Increased welded angle breaking force.

Each profile has its own breaking force limit value, depending by PVC compound, profile dimension and welding process quality. New SL4 FF welder performs, with same profile type, higher breaking force compared to conventional welding-corner cleaning line.

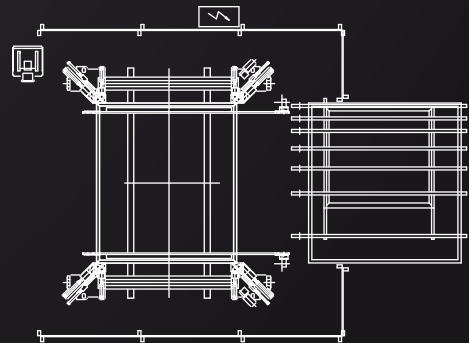
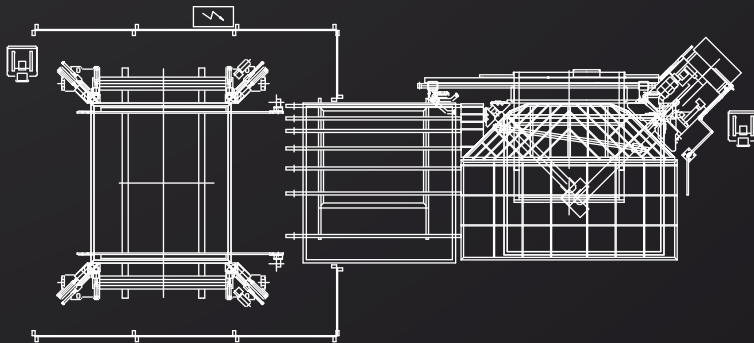


## Higher productivity

Welding process duration has been dramatically reduced. Welding time can vary between 55 and 65 sec. max, depending by profile type. Extra time to add for machine loading and unloading only. Production increase of 30% up to 200% can be obtained compared to that of conventional line.

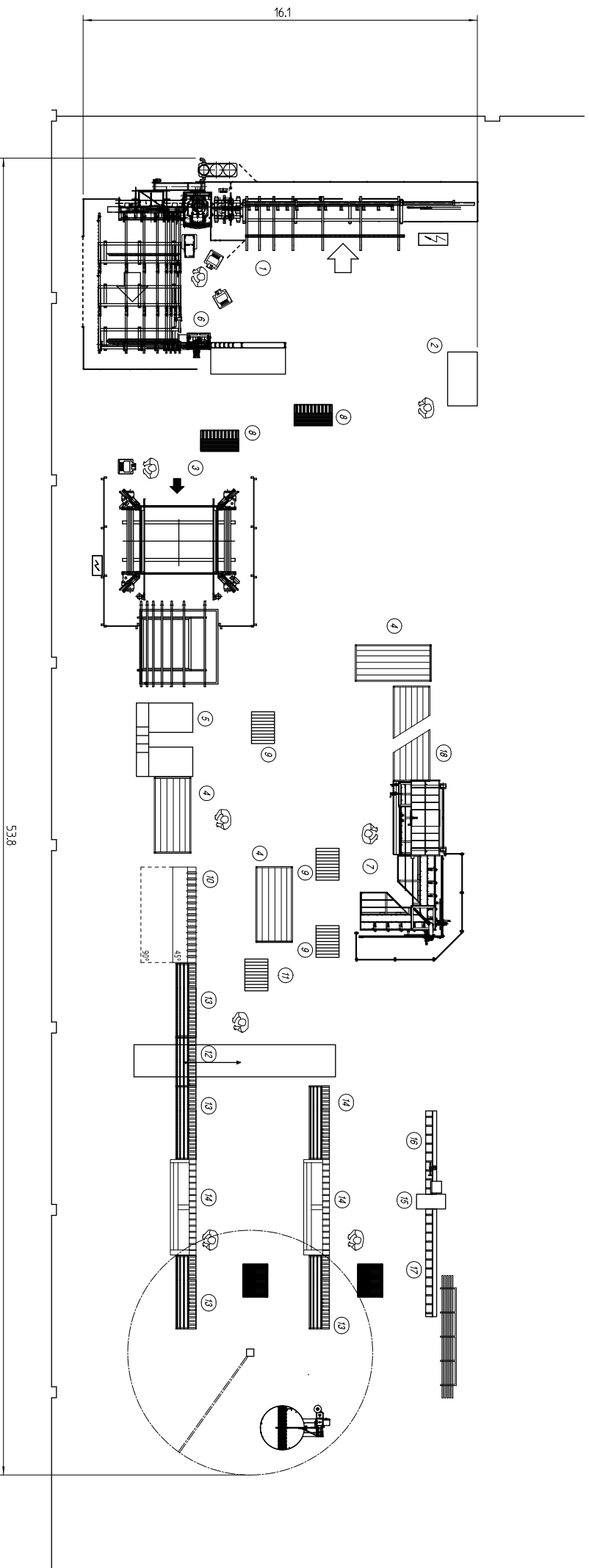


## Reduced space need: from 3 machine to 1



SL4 FF doesn't need anymore cooling table, corner cleaning and related rotating table. Conventional welding lines on market occupy 85-120 sqm, some time even more. New 4 head welder has a footprint of 25 sqm. only.

# Factory layout for PVC windows fabrication



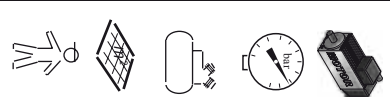
Potenza totale installata (compressore escluso)  
 Total power supply (compressor excluded) **38 kW**

Consumo totale aria  
 Total air consumption **4164 NI/min**

Potenza compressore  
 Air compressor power **18 kW**

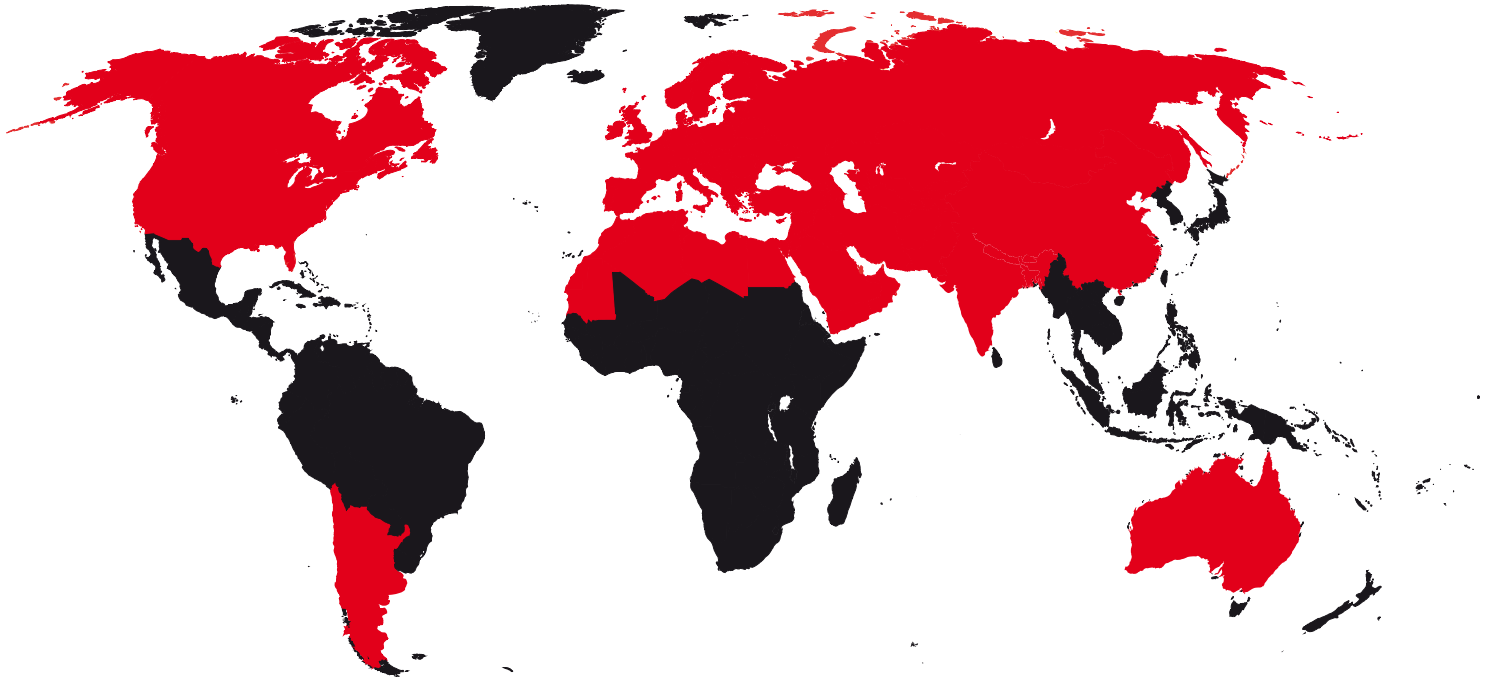
Superficie min. occupata  
 Floor space of plant **950 m<sup>2</sup>**

N. operatori  
 N. operators **7-8**



1	LINEARCATS00FAB	FABRICATION AND CUTTING CENTER
2	F126	END-MILLING
3	SL4HF	FAST FOUR HEAD WELDER SL4HF
4	AT5.2130	WORKING TABLE
5	F16	FRAME DRILLING BENCH
6	ASR1 HDWF	SCREWING CENTER WITH HANDLE DRILL AND WALL FIXING HOLE
7	FAZII	AUTOMATIC HARDWARE FITTING TABLE
8	ELDORADO	CUT PROFILES CARRIAGE
9	TR100/10	SASH CARRIAGE
10	BFA60	TILTING ASSEMBLY TABLE
11	TR56/10	FRAME CARRIAGE
12	NAVM1	MANUAL SHUTTLE
13	C50-300	VERTICAL ROLLER CONVEYOR
14	WK3522H	GLASS MOUNTING TILTING TABLE
15	GS2225A+SJM225	GLAZING BEAD SAW
16	RP3E59	STOP ROLLER CONVEYOR
17	RP35	ROLLER CONVEYOR
18	ATS2130P	WORKING TABLE





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