

FIBRE LASER FOR THE BUILDING SECTOR

A STORY ABOUT PASSING FROM CO₂ TO FIBRE TO SET UP A SYSTEM TO CUT DIFFERENT MATERIALS WITHOUT DEBURRING BOTH FOR CHIMNEY FLUES, GUTTERS AND METAL COVERS.

by Antonio Vendramini

We were curious to see the new version of the Prima Power Platino system in operation, equipped with a fibre laser source. The unit, called the Platino Fiber, first of all has a new protection cabin and new mechanical structures on the inter-changeable work tables. The mechanical units of the tables are more compact and enable insertion of mandrels to work on tube structures. This use is important because it allowed us to sell this unit to the company Fibrotubi, which

was looking for a fibre laser solution (to work on structures in copper and other materials which had high reflection of CO₂ source wavelengths) and the possibility of cutting already moulded tubular parts.

CUTTING METAL FOR CONSTRUCTION

This first Platino Fibre unit was installed in the Eterinox division of Fibrotubi Group, with headquarters in Bagnolo in Piano (Re). We are met by Mr. Cesare Ilari, Product Manager for the Eterinox division of Fibrotubi. He introduces the company to us: «Fibrotubi was established in 1958, at a time when

FIG. 1 – THE MACHINE

Platino Fiber system produced by Prima Power for 2D sheet cutting using fibre sources. The system also uses a mandrel to cut tube parts up to 1200 mm long (photo Prima Power)

FIG.B – OBJECTS TO MANUFACTURE

Set of typical structural parts for chimney flues manufactured by the Eterinox division of Fibrotubi srl. (photo Fibrotubi)

Italy experienced its first building boom. The company immediately specialised in the manufacture of chimney flues (Eterinox division business) and fibrocement tubes (GEA division business), so much so it quickly became the sector leader. At the end of the Eighties, the parent company set up a new enterprise, Alubel, to specialise in the production of metal covering. Subsequently, the company Orchidea became part of Fibrotubi. This company specialises in the manufacture and sale of sliding, concealed doors, becoming another division of Fibrotubi. Choosing a laser system came about due to Eterinox's requirements and, partially, those of some other associates, to have a system that would enable cutting without different material deburring both for the chimney flues and gutters and metal covers. These materials range from natural steel, coated in a protective and pre-vernished film, to copper and aluminium alloys. We used to use a plasma system for this, however it created more or less thick deburring on many materials (especially coated and/or pre-vernished steel and copper) which would cause "pitting" corrosion problems. We also had the lesser need to add tube finishes on both our steel and copper chimney flues». Since we prepared for the visit, we note the company should have already installed two German units using CO₂ sources. «That's right, we have two lines with these units. However, we have cutting problems with them, partly due to how old the systems are (such as cleaning the optical path) and partly due to their type which means, for example, we have to make two cuts in succession to work on coated sheets. They also do not allow



work on copper or aluminium alloy parts. We wanted to have a laser system equipped with a fibre source to solve these problems both on flat sheets (mainly used) and on tubes». For further details, we ask about the advantages Eterinox has witnessed in the possible use of laser technology. Mr. Illari gives us a summary of the anticipated advantages of laser use: «Let's talk about the advantages we have seen when using a laser to simply frame sheets. The first was already



mentioned and for us is the most important: cleaning the edges for welding without having short term corrosion

problems. The second is the absence of tools wear given that up to now, to avoid the effects mentioned on the edges, we were also using shears. The third and lesser advantage is the possibility laser offers to directly brand the cut parts for better product tracking».

THE MACHINE

The Platino Fiber system installed in Fibrotubi has a working range of 1560 x 3065 mm (with a dual automatic inter-changeable table) and uses an IPG fibre 2000 W source (the machine can also integrate 3 kW units). Mr. Barberis, Sales Manager of Prima Power systems in Italy, who accompanies us on the visit, informs us of the further features of the machine. «Integration of fibre laser technology in this Platino Fiber system represents a further milestone in the vast range of Prima Power products and demonstrates its competence in using every type of laser source to provide quality solutions for sheet metal cutting processes.

In this case, Fibrotubi's main requirement was to also cut sheets in copper, aluminium alloys and

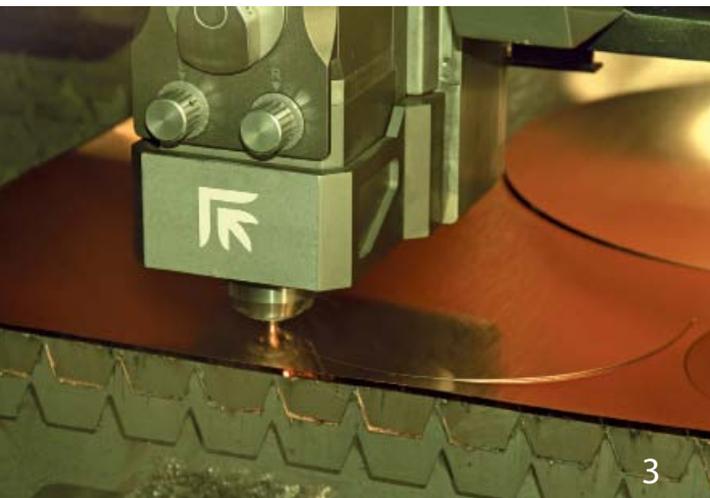


FIG. 3 – COPPER CUTTING
Cutting copper sheets on the Platino Fibre system. The unit installed by Fibrotubi uses a 2 kW fibre laser source.



FIG. 4 – TUBE LOCKING
Tubular structure cutting in Fibrotubi using a manually controlled mandrel installed on the Platino Fibre system.

(photo Prima Power)
FIG. F – COPPER CUT FOR CHIMNEY FLUES
Copper parts for chimney flues cut in Fibrotubi using the Prima Power Platino Fibre system (photo Lasertec).



steel sheets pre-varnished and difficult to work with CO₂ sources in our production. To meet customer requirements, we then chose to use fibre lasers which, thanks to their wavelength emission of circa 1 μm offers better absorption by the aforementioned parts, making processing of these materials industrially acceptable. By doing so, Prima Power broadened its range of products to try and meet the new demands of its customers».

TRIPLED CUTTING SPEED

One must consider that the Platino Fibre is not Prima Power's first approach to this fibre source technology. These were widely used in the Rapido systems for 3D cutting of high strength steel sheets (mainly for vehicle applications) and on the Sincrono systems, a machine designed for high speed cutting of thin sheets, whose characteristics are enhanced by the fact that high brilliance laser use, due to greater absorption of the wavelength beams around 1 μm, enable considerably increased cutting speed for

sheets under circa 4 mm thick: based on the data supplied by Prima Power, using a 3 kW fibre source, a 1mm stainless steel sheet can be cut at least three times faster than with a CO₂ 2.5 kW laser and, for double thickness sheets, this difference is around factor two. Mr. Ilari interjects: «This is the second reason we preferred to purchase this system». Mr. Barberis continues: «Before taking a look at the other reasons for Fibrotubi's purchase of the Platino Fibre system, perhaps we should highlight the other innovation offered by this machine, which is decisively innovative compared to the previous series. Since we wanted to improve the performance of the "old" Platino system, we decided to adapt the new model structure to solutions already present in our Zaphiro unit, our top of the range machine for 2D cutting. For example, we took the X cart from the Zaphiro designed in cast aluminium and availing of FEM simulations to optimise structure robustness. The focus head also derives from that used on the Zaphiro, updated to accept source output fibre for fibre laser amplification: with the rapid change of slow-passage drawers with pre-centred units, the magnetic, anti-collision SIPS system, automatic fast calibration (OPC, Optical Precision Control, centring software) and final surface cleaning of the nozzle, naturally with the support of the capacitive sensor to control the distance from the surface to cut». We try to get back to discussing with Mr. Barberis the reason for our visit and to conclude the previous presentation. We ask

him about the kinematic characteristics of the unit in question. «The maximum speeds and accelerations on the individual axes are 100 m/min and 1.2g. Getting back to the customer, I am informed their third requirement was to trim the chimney flue tubes obtained by forming the cut sheets. Mr. Ilari therefore concludes: «We are happy with the solution proposed. To improve cutting conditions, we used support counter-flanges to avoid any tube deformation».