The French company Silfax specializes in tube-bending machines. These machines are used to produce bent metal tubes with thin walls. Jean-Paul Bruyas, one of the founders and the company’s CEO, stresses, “As a specialist company for tube-bending machines, we always strive to fulfill our customers’ wishes. To do this we have developed machines that are specifically adapted to certain markets.”

Manual intervention is unnecessary thanks to new technology

The Silfax machines enable a wide variety of forming and bending applications for metal tubes. According to Bruyas, “The aerospace and automotive industries are two segments where we are particularly well represented. And with our range, which consists of bending and forming machines plus hydroforming machines, we can satisfy the requirements of both of these industries to a high level.” For the aerospace industry, for example, the Silfax machines are used to bend titanium tubes for the Airbus A380. Silfax’s CEO explains, “When it comes to bending tubes for the automotive industry, it is virtually impossible for any of the relevant industry representatives to avoid us.” The company’s success began in the automotive industry in 1998. Back then, Silfax developed the first completely electric production machine for vehicle exhaust pipes. In the case of tube-bending machine SE 76, the hydraulics gave way to electrical motorization of the power axes, which resulted in better repeat accuracy of the procedures, substantial

Inserting the tubes that are to undergo the hydroforming process

Silfax, France

Precise Repeatability

Thanks to its precision and repeat accuracy, the Sinumerik 840D sl CNC has enabled tube-bending machine manufacturer Silfax to hydroform tubes for exhaust gas recirculation.
energy savings, and a 30 percent productivity increase. Bruyas explains, “As a result, all the previous problems that we were used to from using hydraulic machines became a thing of the past. There were no longer any heating times, and it was not necessary to make adjustments between the operating times. Instead, the settings were permanently fixed. This was a fantastic innovation for us and made any manual intervention completely unnecessary. It also brought noticeable advantages for the user – from material savings to increased reliability in production.”

**Sinumerik enables hydroforming in the automotive industry**

This innovation enabled Silfax to conquer the crucial automotive market completely. Bruyas says, “Silfax’s technology is also suitable for what is known as hydroforming, which is used to manufacture bellows.” Bellows are stainless steel tubes with thin walls that can withstand thermal expansions in high-temperature ranges and are therefore used in the exhaust gas recirculation systems of motor vehicles. This is an environmental protection device with which a proportion of the exhaust gases from internal combustion engines can be recirculated to the intake manifold. The “bellows” enable the tube to expand in high-temperature environments without fracturing at some point.

“Using the Sinumerik 840D sl guarantees the precision and repeat accuracy of the hydroforming process. Of course, choosing the right controller played a very important role,” emphasizes Bruyas. The Sinumerik 840D sl can manage up to 93 axes with its Sinamics S120 converters. The open, distributed, scalable, and network-capable system has its own Simatic S7-300 PLC and a distributed Simatic ET 200S peripheral system. Bruyas says, “The low-voltage devices that are used in this case also come from Siemens.” He lists the advantages of this solution: “In view of the large number of axes and the complexity of the axis system in Silfax machines, this controller offers us the necessary flexibility and also the axis interpolation function that is essential for saving time and achieving precision during the various movements.” The folding process is carried out on the Silfax SHD4 machine. The complete cycle takes only 14 seconds. Bruyas says enthusiastically, “The speed of the process is impressive. With our machines it is possible to produce up to 40 successive folds in one single process step, while with other processes this figure is only around 10. This means that not only is our process faster and more reliable but at the same time it is also distinguished by greater repeat accuracy. And all this is because the movements conventionally carried out using hydraulics have been replaced by NC axes, which are operated in turn by a CNC controller.”