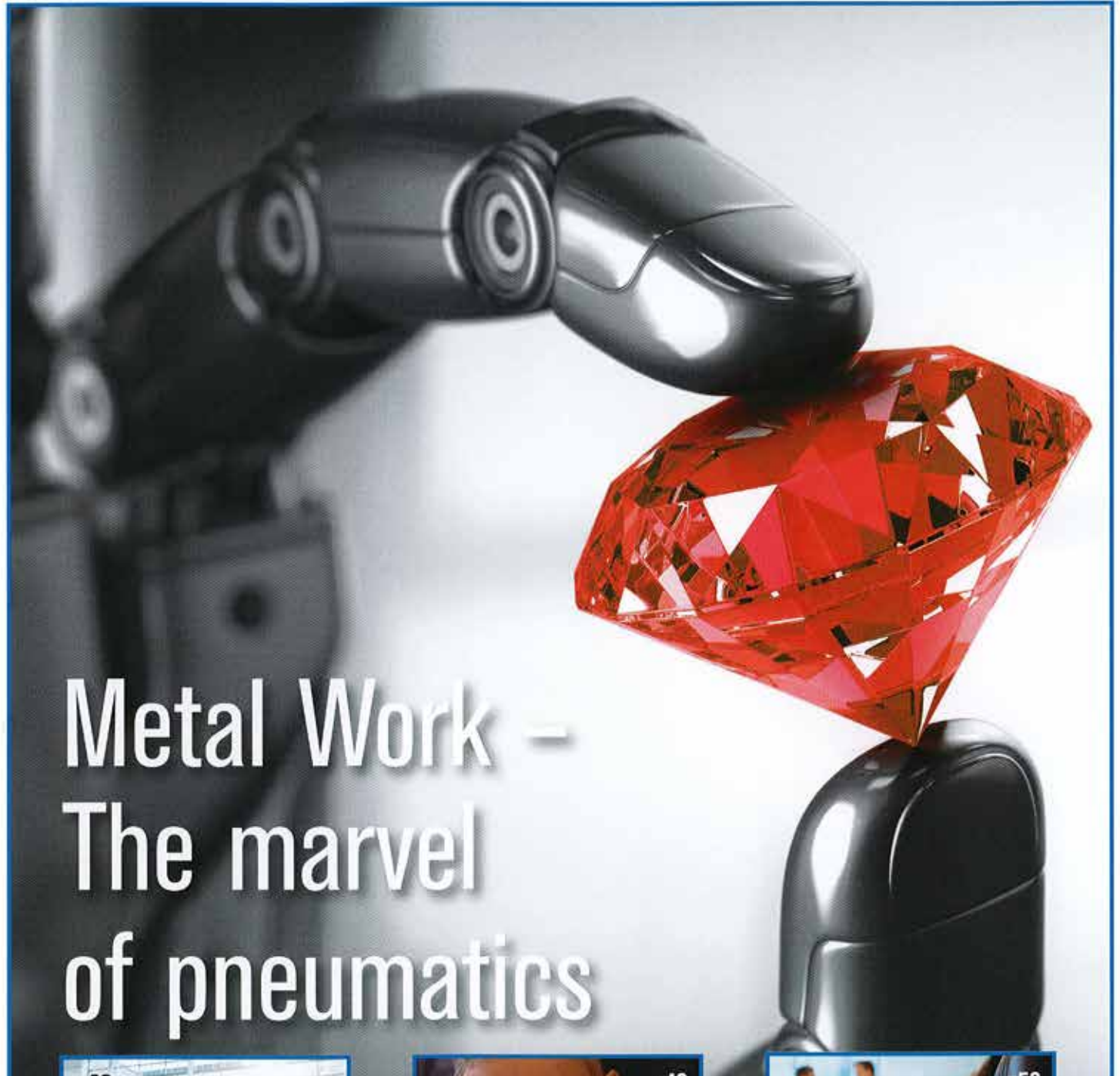


Hydraulics & Pneumatics

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Metal Work – The marvel of pneumatics



Fluid Power & Systems and
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Annual Boardroom Report

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Additive manufacturing in hydraulics - metal 3D printing

Aidro Hydraulics, the Northern Italian hydraulic systems specialist, offers metal 3D printing as a new technology for the hydraulic components. Beside its traditional production of hydraulic component and blocks, Aidro has introduced Additive Manufacturing to produce innovative hydraulic manifolds to take advantage of the benefits of 3D printing, such as lightweight, space saving, complex forms.

In the illustrations shown below, a comparison can be seen between the traditional Aidro manifold for mobile applications and a redesigned version produced with a metal 3D printer machine. This manifold has exactly the same function as his predecessor: it controls a doubled acting cylinder with two solenoids valves and two pilot operated check valves. The complete new solution has achieved a 75% weight reduction and is half the size of the traditional manifold.

Aidro has created a Solutions Centre for Additive Manufacturing in Hydraulics (SCAMH) where the company's AM specialists design new hydraulic solutions in line with customer requirements. 3D printed parts are made using Direct Metal Laser Sintering (DMLS) technology with the EOS printer machines.

All the 3D printed components are validated and tested. Aidro reports that the pressure tests have demonstrated that the 3D printed manifold works perfectly. The mechanical properties such as tensile

strength, elongation, impact toughness and hardness are good; even better than the traditional manifold. The density of the 3D printed material is 99.7%.

According to Aidro, performance is comparable to, or even better than, those of conventionally manifolds due to the internal channels curved shapes and the elimination of 90-degree intersection angles.

Aidro SCAMH takes care of all phases: from the design to the production and testing, to guaranteeing good quality products. The freedom of design offered by additive manufacturing allows Aidro to create a modular solution (see illustration, right).

Activities at Aidro SCAMH

Design

New hydraulic products are designed with complex geometries and traditional hydraulic parts are redesigned to reduce weight, save space and consolidate multiple parts into one. The design process also involves FEM analysis and stress testing.

Production

Production is undertaken using metal 3D printer machines (DMLS technology) and a wide range of high quality metals; the most common being stainless steel (AISI316L) and aluminium (AlSi10Mg).

Testing

Testing is undertaken on material properties, pressure resistance,

mechanical and microstructural properties and functional characteristics.

Measurement

Measurement is undertaken using dimensional control by 3D scan and reverse engineering.

CNC finishing

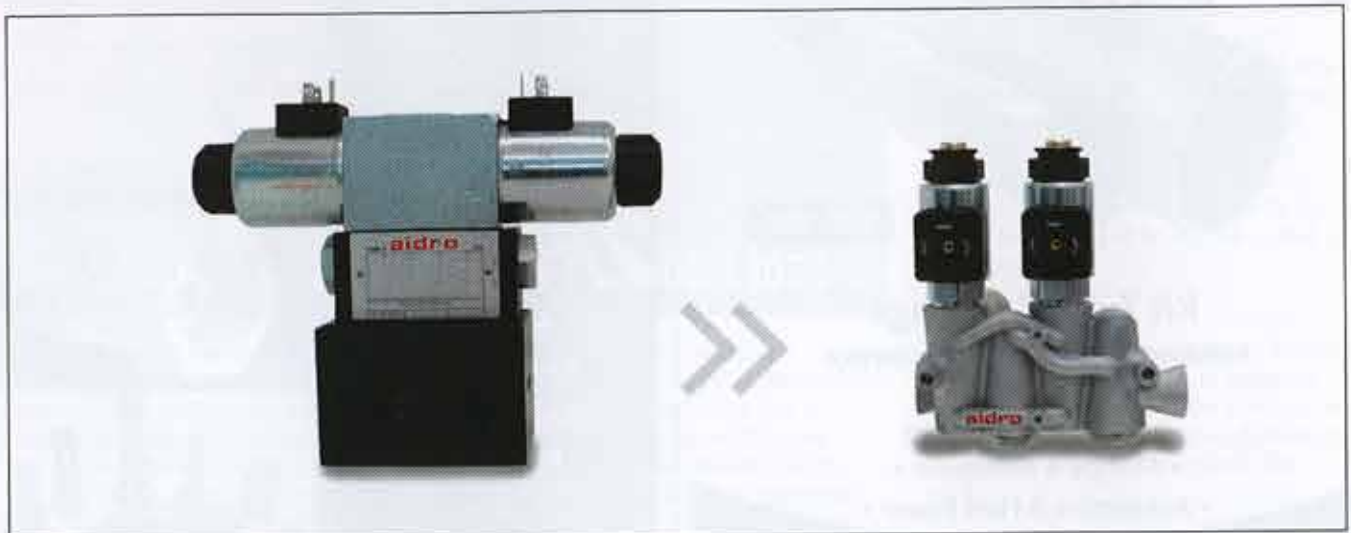
With its flexible vertical machining centre, Aidro provides the machining of cavities, surfaces and parts of the 3D printed products that require CNC finishing.

Aidro Hydraulics will be exhibiting at Fluid Power & Systems (NEC Birmingham from 10-12 April), booth AF1406.

www.aidro.it



The freedom of design offered by additive manufacturing allows Aidro to create a modular solution.



A comparison between the traditional Aidro manifold for mobile applications and a redesigned version produced with a metal 3D printer machine.