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## **Cleaning procedure of 3D printed warm nose heat exchanger and other applications**

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The warm nose heat exchanger are used to control the temperature in the ATLAS detector through CO<sub>2</sub> liquid/2phase heat exchange without any heater in the unreachable areas of the detector. Due to the limited space, these heat exchangers are produced with 3D metal printing. A large campaign is done to study different cleaning solution in order to reduce/eliminate any powder residues. This work describes all the work done for this difficult geometry. As additive manufacturing is spreading also in other experiment, the aim of this work is to describe also the solution found in other applications.

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