

## Fast Gas Inlet Valve insensitive to Magnetic Fields

Category: Mechanical Components

Reference: TDF0001

Broker Company Name: cesah

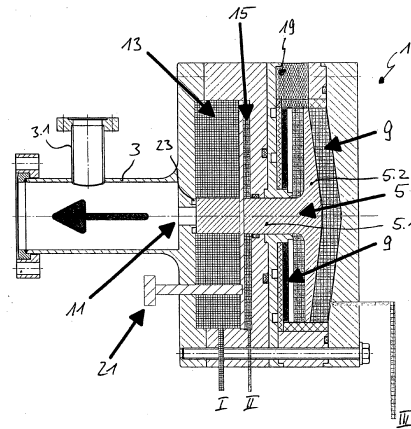
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### Abstract

The object of the invention is to provide a fast gas inlet valve, primarily for emergency situations, fitted inside a magnetic field device, but not sensitive to the magnetic field. This device was originally developed for use within the nuclear fusion domain, but is also available for use in other domains with similar demanding environments.



Fast gas Inlet Valve insensitive to Magnetic Fields (source EP1 380 781 A2)

### Description

When installing a gas inlet valve in a fusion reactor, it must be mounted within the magnetic field configuration to achieve rapid injection of gas, which demands short gas lines. The injected gases are usually noble gases in the case of a fusion experiment. However such fast gas inlet valves may also be used for injection of other gases such as reactive gases. The valve is capable of injecting large volumes of gas in the order of up to several mbarL within very short times such as within less than 10 milliseconds. This is achieved even inside a strong electromagnetic environment.

The device includes a valve body with a refilling cavity formed in it and sealed off by a slide from a valve aperture. The valve body also contains a return cavity, an induction coil to move the slide from valve-closed to valve-open position and a separating slide to separate the refilling volume to be injected.

### Innovations and advantages of the offer

The requirements of injecting large volumes of gas in the order of up to several mbarL within very short times such as within less than 10 milliseconds inside a strong electromagnetic environment cannot be met by conventional electromagnetic, piezoelectric or pneumatic valves.

### Application

Beside the actual application domain – heavy electromagnetic environments in nuclear fusion - this device will also be of use in any domain where similar environments exist and where high volumes of gas (noble or reactive) will have to be injected within short periods of time. Applications could be in the space propulsion

domain (but limited to test facilities on ground due to the weight of the valves) as well as for accelerators in a supra-conductive environment.

### **Comments on the technology by the broker**

This technology was identified during a screening process on behalf of ESA within the EU project FUTTA (Fusion Technology Transfer Action). It constitutes an example for a promising technology that is expected to provide a substantial transfer potential from the Nuclear Fusion domain towards other domains including Space.

### **Description of Fusion Heritage**

The method was developed and patented at the Forschungszentrum Jülich for use in the nuclear fusion domain, in particular for future use in the ITER facility for disruption mitigation via massive gas injection.

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