Quick-action couplings with shut-off valves for welding, cutting and allied processes Basics and Prevention

Manufacturers guidelines must be strictly respected

Basic principle

Oxy-fuel technology means thermal processes, e.g. flame welding, oxygen cutting, brazing, flame straightening and various pre-heating methods. For such applications, the blowpipes are connected with the fuel gas or oxygen tapping points by means of flexible hoses fitted with screwed connections according to EN 560. Various fuel gases can be used: Acetylene, Propane, LPG, Natural Gas, Hydrogen, Propylene, and Ethylene. An easy and safe alternative is to connect the blowpipes and the tapping points by means of flexible hoses and quick-action couplings with shut-off valves according to EN 561/ ISO7289.

The Oxy-fuel technology is a safe and effective process in the metal industry. This however requires that suitable and high quality equipment is used.

Potential hazards when using coupling systems

The following basic phenomena can occur in the event of incorrect handling of quick-action couplings: incompatibility, mixing up, leaky connections and wearing.

- **Incompatibility** can occur if **non-standard** coupling systems from different manufacturers are used. This results in leaky coupling connections**.**

- **Mix-up** of couplings for fuel gas, oxygen or compressed air can occur if couplings systems are used which are not standard-compliant. Such systems do not offer coupling body/coupling pin combinations specifically coded to the respective gas types. This results in incorrect connection of the fuel gas-oxygen/compressed air hoses.

- **Leaky connection** can occur if coupling systems are used which do not meet the special material requirements according to EN ISO 9539 and which do not comply with additional test requirements of accredited test institutes for certification of metallic and non-metallic materials.

- Increased **wear of the coupling pins** can occur if coupling pins are used which do not fulfil the requirements regarding the hardness according to EN561 / ISO7289. On the market there are two types of coupling pins according to EN561 / ISO7289. Brass coated coupling pins with a hardness of 310HV0,2 and stainless steel coupling pins with a hardness of 270HV10.

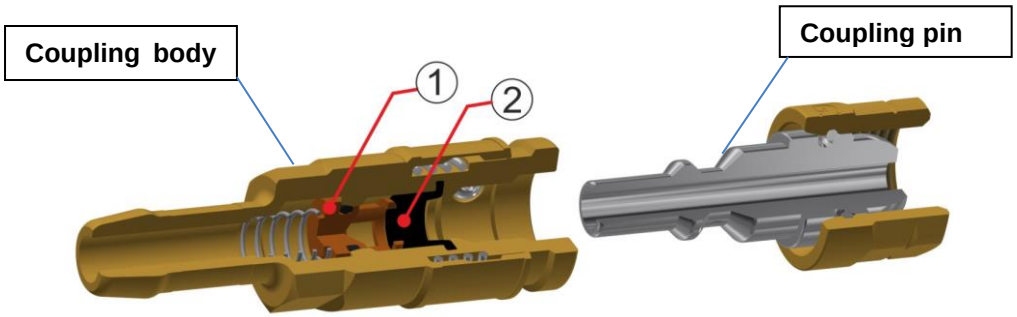
Prevention

The most effective way of preventing hazards related with the use of quick-action couplings in oxy-fuel processes is to use quick-action couplings complying with the standard EN 561/ ISO7289 “Quick-action couplings with shut-off valves for welding, cutting and allied processes”

- **Quick-action couplings with shut-off valves** according to EN 561 / ISO 7289 consist of

- a **coupling body (female element)** fitted with an automatic shut-off system ① which prevents gas leakage when the quick coupling is uncoupled. The outlet connection of the coupling body is designed to ensure that the elements for the different gas types (such as fuel gas and oxygen) are not interchangeable. The proper sealing ② between coupling pin and coupling body is provided by a moulded seal. External tightness must be ensured before the coupling pin opens the shut-off valve and releases the gas flow.

- a **coupling pin (male element)** with standard-compliant dimensions related to the respective gas types (fuel gas, oxygen and other gases specific for welding processes). This kind of coding prevents the mutual connection of two lines containing incompatible gases.



Requirement for standard-compliant marking of quick-action couplings according to EN 561/ ISO 7289

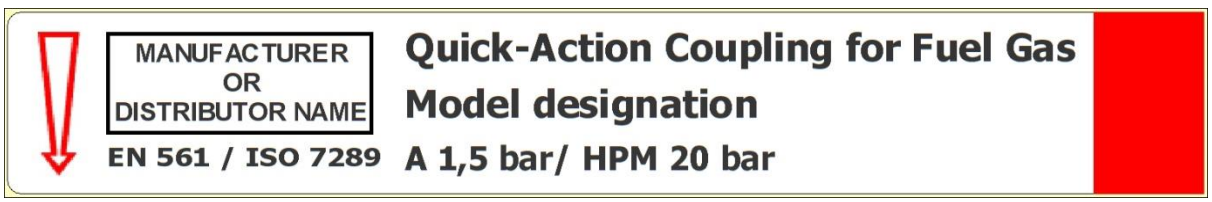
Every manufacturer applying an EN 561/ ISO 7289 marking to a new product has to do a type test according to this standard before launching the product.
The high safety level can be documented by an accredited external testing institute (third party such as BAM, U.L. or APRAGAZ).

Production tests

The manufacturer of a quick-action coupling shall subject each unit to a gas tightness test in uncoupled position (to test the gas shut-off valve) as well as in coupled position (to test the tightness of the connection between coupling body and coupling pin).

Quick-action couplings according to EN 561/ ISO 7289 shall be marked in a durable manner with the following information

a) Number of standard EN 561 / ISO 7289
b) Type of coupling (i.e. “O” for oxygen, “F” for fuel gas and “N” for other gases specific for welding processes)
c) Name or trade mark of the manufacturer / distributor
d) An arrow indicating the direction of gas flow



Maintenance

Provide a visual examination of the coupling and the coupling pin and a replacement in case of shock or deformation

Indicate that the the coupling or the coupling pin must be replaced in case of difficulty in handling them.

Annual test of quick-action couplings

To maintain the high level of safety during the life cycle of the device, the quick-action coupling should be tested under working pressure for gas tightness (in coupled and uncoupled position) by a trained and authorised person every year (depending on the country-specific regulations). Items which do not pass the test have to be replaced. The country-specific regulations or recommendations should apply in term of maintenance and replacement.

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