

---

## Flammable Gas Classification Changes under ISO 10156: 2010.

---



**Background** When filling compressed gases, gas companies are required to follow national and international standards to determine the correct product classification and identification. A gas classified as non-flammable will have a different transport label to a flammable gas. In some countries, regulations regarding the cylinder valve connection, as well as the cylinder shoulder colour are also used to differentiate a flammable gas from a non flammable gas.

**ISO 10156: 2010** ISO 10156 defines a standard method for determining the flammable or oxidising potential of a gas or gas mixture. This is the international standard followed by BOC. A new revision of this standard - ISO 10156: 2010 has been published. There are no changes to the classification of pure gases under this revision but there are changes which affect the classifications of various mixtures currently being produced by BOC.

**New Tci Values** Tci is defined as the maximum content of a flammable gas which, when mixed with Nitrogen, is not flammable in air. Tci is also used as a reference parameter in any kind of mixture that contains a flammable component. The new standard includes changes to these Tci values for a number of gases. Under the 2010 revision, new Tci values have been assigned to a variety of existing mixtures. Depending on the mixture the Tci value may be higher (less restrictive) or lower (more restrictive) than in the previous version of the standard.

**Direct implications** Products that have been affected will see changes in the following areas.

- A new transportation identification label may be required
- In some countries, a new cylinder shoulder colour may be required to indicate the change from either a non flammable to a flammable mixture, or from a flammable to a non flammable mixture.
- The Safety Data Sheet (SDS) will need to be updated to include the changes for cylinder safety and transport.
- In some countries, a different cylinder valve outlet may be required.

**Indirect implications  
for the user**

- Storage conditions may need to be reviewed.
- Transport conditions may need to be reviewed.
- Risk assessments may need to be reviewed.
- Gas control equipment and supply system compatibility may need to be checked, as changes may be required for both cylinder connections and supply line labelling.

## Some examples

Gas	T <sub>ci</sub>	T <sub>ci</sub>
	ISO 10156: 1996	ISO 10156: 2010
Hydrogen (H <sub>2</sub> )	5.7	5.5
Methane (CH <sub>4</sub> )	14.3	8.7
Ethylene (C <sub>2</sub> H <sub>4</sub> )	6.0	4.1
Ethylene Oxide (C <sub>2</sub> H <sub>4</sub> O)	3.1	4.8
R152a	4.6	8.7

A mixture with 7.5% Methane in Argon was classified as non flammable according to ISO 10156:1996, but became flammable according to the 2010 version. This will require a different UN number and proper shipping name, i.e. – from UN1956 to UN1954 – and where required, the shoulder colour will change from green to red. As noted, a new cylinder valve designation may also be required.

A mixture with 4% Ethylene Oxide in Nitrogen was classified as flammable according to ISO 10156:1996, it became non flammable according to the 2010 version. This will require a different UN number and proper shipping name, i.e. – from UN1954 to UN1956 – and where required, the shoulder colour will change from red to green. And as noted, a new cylinder valve designation may also be required.

In both cases there will be changes required to the Safety Data Sheet.

## BOC

The Priestley Centre, 10 Priestley Road, The Surrey Research Park, Guildford, Surrey GU2 7XY, UK  
Tel +44 1483 579 857, Fax +44 1483 505 211, [www.BOCOnline.co.uk](http://www.BOCOnline.co.uk)