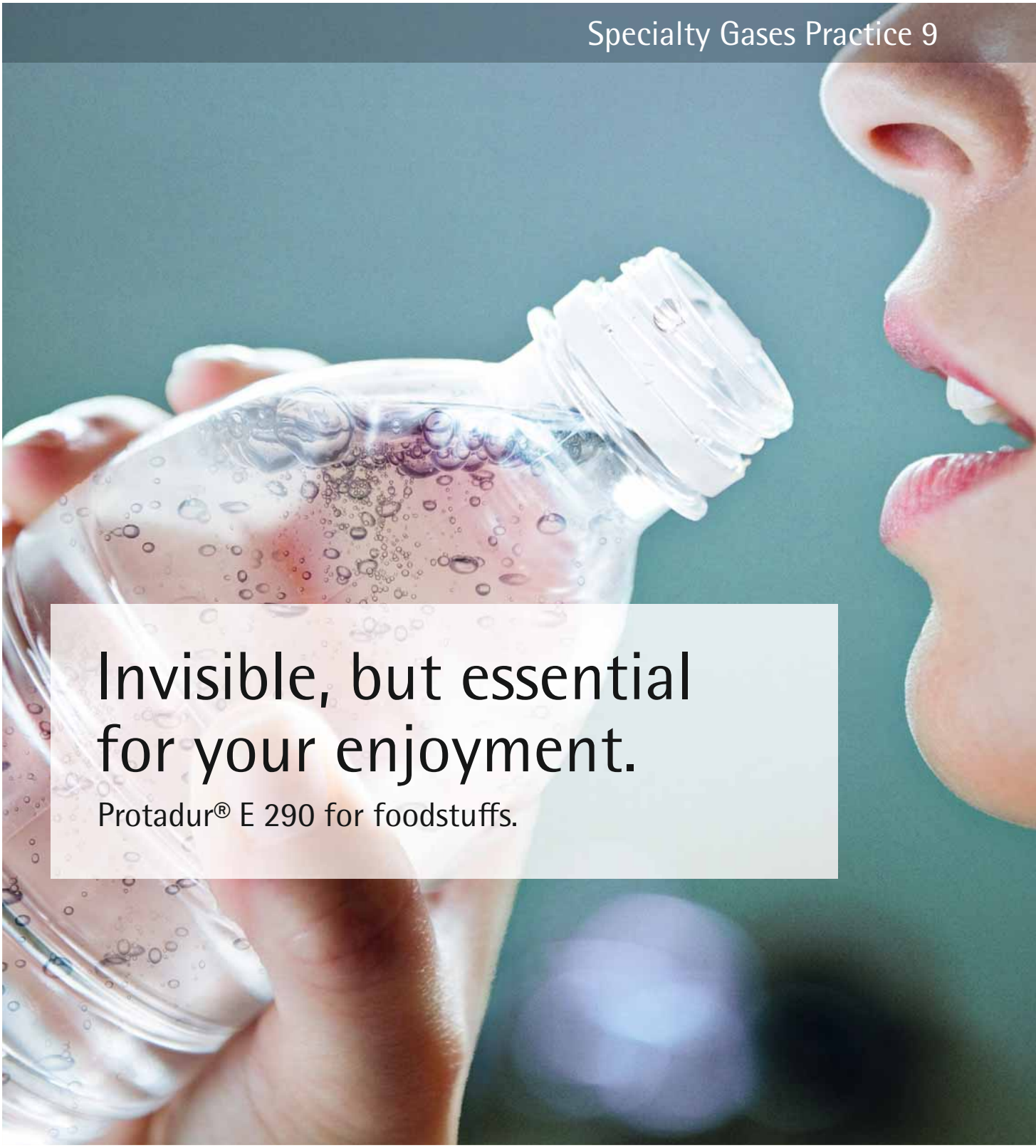
Westfalen

Specialty Gases Practice 9



Invisible, but essential for your enjoyment.

Protadur® E 290 for foodstuffs.

Carbon dioxide in the foodstuffs industry.

CO_2 In the food products industry Protadur® E 290 – or carbon dioxide – is a real all-rounder. It cools, protects, carbonates and also makes some manufacturing processes possible. In this issue of "Specialty Gases Practice" we'd like to introduce you to the specific properties and various uses of Protadur® E 290. We'll also tell you about what legal requirements need to be considered - and which of our gases safely comply.

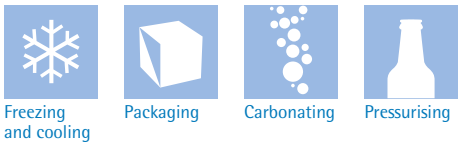
Versatile in application

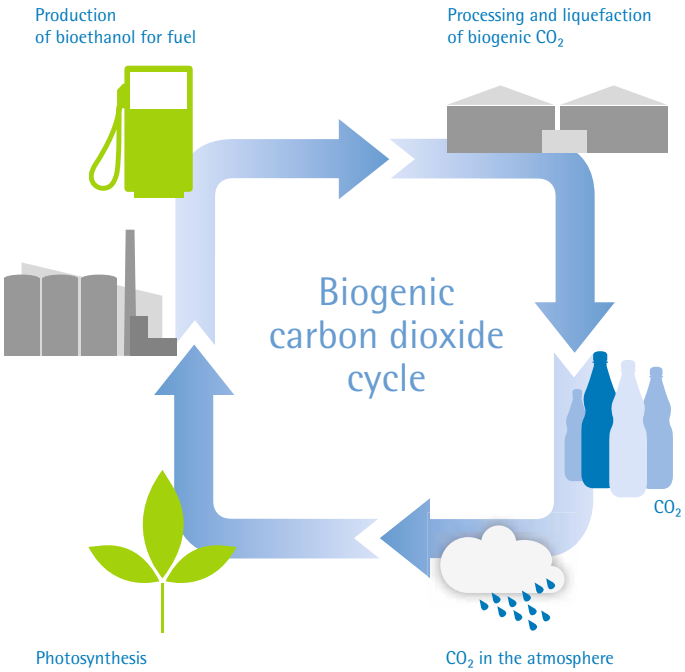
Protadur® E 290 is used in foodstuff production - pure or as a component in a mixture - primarily for packaging under protective atmosphere or for chilling and freezing. In the beverage industry it's needed to carbonate drinks or pressurise product packaging. Outside the foodstuffs industry uses for CO_2 - as a high quality manufactured gas - include welding technology, the pharma industry, medicine and as a refrigerant, as well as in chemical processes.

What is Protadur® E 290?

Protadur®E290 is carbon dioxide from Westfalen that is suitable for use in foodstuffs. It is colourless, odourless, tasteless, an oxidation retardant and poses no nutritional risk. It also has bacterio- and fungistatic properties, meaning it inhibits the growth of fungi and bacteria. Protadur® E 290 is derived from combustion and other chemical processes as well as other natural sources, and from alcohol fermentation. Carbon dioxide from brewing is not permitted in the manufacture of Protadur® E 290.

Protadur® E 290 contains no genetically modified organisms in accordance with Regulations 1829/2003/EC and 1830/2003/EC, no allergens in accordance with Directive 2003/89/EC and no ingredients which must be declared on foodstuff labels as per Directives 2000/13/EC and 2006/142/EC.





Production of carbon dioxide for use in foodstuffs.

Carbon dioxide from combustion and other chemical processes

Fossil fuels such as coal, oil and gas are burnt with (atmospheric) oxygen to make carbon dioxide. In chemical processes such as ammonia synthesis or ethylene oxide manufacture carbon dioxide is collected. These different sources of carbon dioxide are included in the EIGA-ISBT Standard and comply with those requirements.

Carbon dioxide from natural sources (natural carbon dioxide)

Natural carbon dioxide is derived from natural sources, which are predominantly of volcanic origin. This source is also accounted for in the EIGA-ISBT Standard, and as a designated carbon dioxide source complies with those requirements.

Carbon dioxide from alcoholic fermentation (Biogenic carbonic acid)

During the manufacture of ethanol through the fermentation of grain or other suitable biomass carbon dioxide arises, designated as biogenic carbon dioxide. Biogenic carbon dioxide is included in the EIGA-ISBT Standard and complies with those requirements. Of interest here is the environmentally neutral carbon dioxide process cycle.

Carbon dioxide from brewing

During alcoholic fermentation, such as in the brewing of beer and wine, carbon dioxide is also generated. This carbon dioxide will be designated as carbon dioxide from brewing. Carbon dioxide from brewing is not included in the EIGA-ISBT Standard. Carbon dioxide from this source is not used in the manufacture of foodstuffs, particularly drinks, due to concerns over contamination of the carbon dioxide with e.g. odour-carrying substances from the brewing process.

Many uses for Protadur® E 290.

Production and Packaging

Applications for Protadur® E 290 in the food products industry are many and varied. As dry ice snow or in liquid form it serves to chill or cryogenically freeze various foodstuffs. It's often used to cool foodstuffs in order to be able to e.g. better process them. Used in mixtures with Protadur® E 941 (nitrogen for use with foodstuffs), it allows foodstuffs to be packaged for a longer shelf life - mostly under a protective atmosphere.

Beverage industry

There are two particular areas of application for Protadur® E 290 in the beverage industry. With water, carbon dioxide produces carbonic acid (H_2CO_3) - the so-called "carbonation" that provides the desired fizziness in many soft drinks. By contrast, in the brewing industry carbon dioxide is added to the bottle or barrel rather than the beer. That's because according to the German Purity Law, the carbonic acid in beer can only be that produced through the natural fermentation process. Using gas at gentle pressure to pressurise bottles and casks makes foam-free filling possible.

Drinking water

Protadur® E 290 can be used as a product to treat water for human consumption. The EIGA-ISBT specification was used as the basis for EN 936:2013 (Chemicals used for treatment of water intended for human consumption - carbon dioxide).

Always be on the safe side with Protadur® E 290.

Legal requirements

As a food additive carbon dioxide is counted as a foodstuff. Regulations (Laws) and Directives regulate the handling of food, in addition to Specification (231/2012/EU) and Directive (95/2/EC). Food safety is right at the forefront (178/2002/EC). We first of all comply with this during manufacture, which is in accordance with the requirements of DIN EN ISO 22000 and includes an HACCP system. Further requirements with which we comply regulate the use of suitable food packaging (1935/2004/EC) and the correct product labelling (2000/13/EC and 2006/142/EC). In addition to traceability, shelf life and content are specified. All of our manufacturing facilities (852/2004/EC) are also officially registered.

Institutional regulations

The International Society of Beverage Technologies (ISBT) and the European Industrial Gases Association (EIGA) have developed a common European standard which exceeds the legal requirements (IGC Doc 70/08/E), which also takes into account the origin of the carbon dioxide.

Further requirements

Further requirements exist, particularly in the beverage industry, that amongst other things relate to the specification as well as the origin.

The provision of natural mineral water, spring water and table water (Mineral and table water provision) contains amongst other things a description of the origin of carbon dioxide in foodstuffs and the distinguishing characteristics of mineral water, spring water and table water.

The product requirements as defined in the specification of the Association of German Mineral Sources (VDM - Verband Deutscher Mineralbrunnen) are not compatible with those of the EIGA-ISBT Specification.

Features of Protadur® E 290

Since in addition to the specification, origin can also be important, Westfalen distributes carbon dioxide for food use as "Protadur® E 290 (classic)". This is the technical origin. The source carbon dioxide is distributed as "Protadur® E 290 naturell". "Biogenic carbon dioxide" from fermentation can be provided on request.

Other uses of carbon dioxide

Carbon dioxide as an all-rounder: uses include welding, use in the pharmaceutical industry, as a refrigerant and in chemical processes.

- Welding technology: Carbon dioxide in accordance with DIN EN ISO 14175
- Pharmaceutical industry: Pharmagas Secudur®
- Medicine: Carbon dioxide as a medical device acc. to Medical Devices Act
- Refrigerants: R-744

Our advice is available for your requirements

Do you have further questions about the use of Protadur® E 290 in foodstuffs or about other Protadur® food gases and their uses? Just contact us! Our experts from Specialty Gases Product Management will be happy to help.

WWW

For more information see westfalen.com

Westfalen AG · Industrieweg 43 · 48155 Münster · Germany · Tel. +49 251 695-0 · Fax +49 251 695-194 · www.westfalen.com · info@westfalen.com

J5 1503 0.5T PSG-G-9.0/15 EN