

# R744 Refrigerant Grade CO<sub>2</sub>

High quality natural refrigerant



# Cool by nature. Meet environmental regulations with R744 refrigerant grade CO<sub>2</sub>.

As a world renowned company with far-reaching technical expertise, Linde is ideally positioned to make a valuable contribution to the protection of our environment. We have therefore committed ourselves to the responsible use of natural resources, the development of clean technologies and the replacement of harmful substances with more eco-friendly alternatives.

Whether your application is air conditioning, commercial refrigeration, process chilling or heat extraction, we can help you meet environmental regulations.

Our high quality, low moisture content R744 refrigerant grade CO<sub>2</sub> can provide you with a cost efficient solution that perfectly suits your requirements. It's a natural choice.

## Introduction

R744 is a high purity carbon dioxide (CO<sub>2</sub>) based refrigerant gas with a typical moisture content less than 10 parts per million. The low moisture content enables the refrigerant to work more effectively and more importantly, have less corrosive impact on your refrigeration systems.

Linde has been a leading supplier of refrigerants for over 40 years, operating in 40 countries in 5 continents. We have long experience working with natural refrigerants. We are a leading global producer of industrial carbon dioxide, providing strong operational capabilities for R744. Our industrial gases heritage also provides extensive experience in logistics and a wide product range including leak detection, cutting and welding gases.

Linde R744 – Cool by nature.

## Background

Carbon dioxide has been used as a refrigerant since the mid to late 19th century. With the introduction of fluorocarbons in the 1930s, CO<sub>2</sub> fell out of use by the 1950s. However, due to its low environmental impact, CO<sub>2</sub> is now regaining popularity from refrigeration system designers when an alternative to fluorocarbons is being sought.

CO<sub>2</sub> suitable for use as a refrigerant is commonly named R744 in the refrigeration and air conditioning industry.

## Advantages of R744

R744 is now regaining popularity due to a number of advantages:

- Low toxicity
- Non-flammability
- Zero ozone depletion potential
- Very low global warming potential (GWP=1)
- Excellent thermodynamic properties and low energy requirements

## Common applications

Applications include static and mobile air conditioning systems, chilled warehousing, commercial refrigeration, chill cabinets and vending machines, industrial heat extraction, process chilling, low and ultra-low temperature applications.

R744 is often used as secondary refrigerant, for example, alongside ammonia.



R744 – used in commercial refrigeration such as in supermarkets.

### Purity and moisture

Moisture in R744 based refrigeration and air conditioning systems will create carbonic acid. This acid then causes corrosion in the steel pipe work. There is also a risk of ice formation that can block small capillary tubing and lead to serious damage and eventual system failure. This is also true when R744 is used as a secondary refrigerant, as moisture could separate out of the R744 and become ice, damaging pumps and other system components.

### Linde advantage: high quality low moisture R744

Linde's cylinders are specially prepared so that our R744 has very low moisture content and low non condensable gas content. Typically, Linde's R744 is a high purity gas that is over 99.9% purity, with a moisture content of less than 10 parts per million (by weight). Due to the extra work involved in meeting the demanding specification for R744, refrigerant grade CO<sub>2</sub> is more expensive to produce than industrial grade products. However the product remains extremely competitive compared to synthetic fluorine based refrigerants.

### Product specifications

R744 is commonly available in cylinders. For larger demands, it is also available in liquid deliveries in some countries.

Due to the physical properties of R744, the product is stored in the cylinders as a liquid and is filled in solid drawn steel cylinders. These cylinders are heavier than standard low pressure welded refrigerant cylinders.

#### Typical specifications<sup>†</sup>

Purity	>99.9%
Moisture	<10ppm (weight)
Contents (kg)	
Cylinders	5–40 kg
Bulk supply	
Pressure @ 21°C	50–60 bar

### Further information

For local specifications, or to order, please contact your local Linde supplier. You can also visit us at [www.linde-gas.com/refrigerants](http://www.linde-gas.com/refrigerants)

<sup>†</sup> Exact specifications vary locally please refer to your local Linde supplier.

# Getting ahead through innovation.

With its innovative concepts, Linde is playing a pioneering role in the global market. As a technology leader, it is our task to constantly raise the bar. Traditionally driven by entrepreneurship, we are working steadily on new high-quality products and innovative processes.

Linde offers more. We create added value, clearly discernible competitive advantages and greater profitability. Each concept is tailored specifically to meet our customers' requirements – offering standardised as well as customised solutions. This applies to all industries and all companies regardless of their size.

If you want to keep pace with tomorrow's competition, you need a partner by your side for whom top quality, process optimisation and enhanced productivity are part of daily business. However, we define partnership not merely as being there for you but being with you. After all, joint activities form the core of commercial success.

**Linde – ideas become solutions.**

## Linde AG

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