

How should I store my gasket? Storage and shelf life prediction for flange gasket materials.

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We all know and work with storage recommendations and best-before dates in our daily lives. Many consumable and household products have manufacturer recommended storage requirements. These practices are followed because we prefer not to waste valuable funds spent on food and consumables by improperly storing or refrigerating them. We also don't want to knowingly become ill as a result of eating out of date products. Whilst we typically know where and how long to store meat and eggs, etc. it is sometimes not so obvious or clear-cut for gasket materials. Even current storage practices for gasket materials are generally not optimal or controlled well enough. Gasket materials often remain in storage for a long time before they are used. This article gives an overview of typical practices and should be seen as a guideline for the storage of different gasket materials in order to preserve their integrity.

Storage

The base guideline of most gasket manufacturers is to store gasket materials in a cool, dry location away from heat,



excessive humidity, direct sunlight and chemicals.

The optimum storage conditions are defined as between 4 and 27°C with 40% to 75% relative humidity, in a room

with no windows and non-UV or low-UV producing lights, minimal dust and no chemical storage nearby.

Where can a location like that be found in most facilities?

Gasket storage areas are more commonly found near a large receiving door, lit by fluorescent lights and subject to frequent temperature and humidity fluctuations. Heavy metallic gaskets are often stacked on shelves, and soft gaskets are often stored on a pegboard hanging from a wall. Sheet material is sometimes stored flat on an open-air rack or partially rolled up and stored stood up in a corner, or along a wall.

Optimum storage can influence the gaskets' shelf-life significantly.

Shelf-life prediction

The time from manufacturing to the point at which the quality/performance of the product becomes unacceptable is referred to as the shelf-life.

The product shelf-life is affected by the composition of the product and the environment to which the product is exposed during manufacturing, distribution and storage.



Gasket materials typically remain in storage for several months, sometimes years, before they are used. Their shelf life is an important piece of information for the user. Metallic, semi-metallic, graphite and PTFE materials are not greatly affected by the storage time and, correctly stored, they can be kept on the shelf for over 10 years with no degradation. Some manufacturers even state an indefinite shelf-life for their products.

Although these products are not susceptible to poor storage conditions, it must be considered that excessive dust can settle on them and cause compatibility issues with the media being sealed. High humidity and moisture can also cause metallic components to oxidize and adhesives to lose their ability to stick over time.

These materials are the easy ones, however for sheet jointing and cut gaskets which use elastomers bonded with fibres as a base, it is a totally different story.

Elastomer bonded fibre materials

These gasket materials are widely used in many industries and have proven to provide reliable service in many bolted flange connections.

Fibre based gasket materials are not designed to be stored for extended periods of time under some of the common storage conditions previously described. Due to aging effects the sealing properties of elastomer bonded fibre sheet materials and gaskets change during storage.

Elastomer bonded fibre materials can be made of complex materials. The principal components include a rubber (elastomer) binder, reinforcing fibres and filler components.



The reinforcing fibres are often considered the most stable of the components and practically unaffected by storage. Before the conversion to man-made fibres it was the case but modern fibres do gradually dry out, weather and deteriorate. Filler components can be the largest contributor to gasket deterioration. These components come in many forms from many different chemical families and are generally unique to every manufacturer. They are selected and combined to optimize gasket performance and maintain a cost level that the end user can afford. Binders, generally rubber, combine all the components together in the manufacturer's individual mixing and production process, so these components greatly contribute to the material's flexibility.

As these gasket materials age, the way the finished gasket or sheet was stored will affect the shelf-life. The aging process of an elastomer bonded fibre gasket material involves irreversible chemical processes, primarily scission and cross-linking events resulting from the breakage and formation of covalent bonds. The speed at which this change occurs varies depending on the product type, quality and storage. The sheet manufacturers give recommendations about their maximum shelf-life, typically around 2-5 years.

Summary

Gaskets are one of the most critical components in a piping system. To give them a chance to work the way they were designed to, they need to be stored in a way that minimizes deterioration or damage. It is easy to recommend storage and, in a perfect world all sites would have perfect storage areas, but as we don't live in a perfect world improving existing storage practices and locations to as near perfect as they can be is a good initial step.

Recommended storage

Store the sealing materials in a covered place, protected from the weather. Minimise dust, high/low temperatures and fluctuations, exposure to UV light and chemical vapours. If you store cut gaskets on a pegboard, it is important that they aren't left there for a long period of time as they will stretch and distort. Store them horizontally on a shelf whenever possible.

All gaskets need to be branded/labelled so they can be clearly identified. Also the age/storage time in the warehouse needs to be tracked correctly.

Handle the gaskets with clean hands or gloves and take care of the designated application (e.g. for Oxygen or in the pharmaceutical industry).

Ensure that spacers are in place when stacking pipeline spiral wound gaskets. If possible, keep the gasket storage area away from large receiving doors. Install a curtain around the area to avoid direct draughts. Covering the immediate top of gaskets from direct light exposure and dust.

Store sheet materials preferably flat. Stack the sheets neatly on top of each other and keep the identification stamp (branding) facing the same direction (i.e. upwards) on all sheets. To avoid any damage to the sheets at the bottom do not place too much weight on the crates and stack to a maximum of 8 cases.

Please note, especially for elastomer bonded fibre sheets, although boxes and cardboard tubes are approved methods of transportation of sheets in rolled form (to save on shipping costs) they should under NO circumstances be used as a method for long term storage. The reasons being that the sheets will "set" in the rolled shape and subsequently resist being opened flat. This will then result in an uneven corrugated shape when rolled out. When trying to flatten out sheets which have been rolled for a certain amount of time, small cracks or fissures may develop which could later lead to leaks.

These steps will help ensure the best sealing performance for the longest possible time for your gasket materials. For further details or advice please consult your sealing material manufacturer or the ESA.

The European Sealing Association (ESA) has produced this article as a guide towards Best Available Techniques for sealing systems and devices. These articles are published on a regular basis, as part of their commitment to users, contractors and OEM's, to help to find the best solutions for sealing challenges and to achieve maximum, safe performance during the lifetime of the seal. The ESA is the voice of the fluid sealing industry in Europe, collaborating closely with the Fluid Sealing Association (FSA) of the USA. Together, they form the key global source of technical knowledge and guidance on sealing technology, which is the basis for these articles. For more information, please visit www.eurosealing.com