

Phosgene Safety Practices

for design, production and processing

Introduction

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III caveat

The information herein is presented in good faith, is believed to be accurate and reliable, but may well be incomplete and /or not applicable to all conditions or situations that may be encountered.

No representation, guarantee or warranty is made as to the accuracy, reliability or completeness of this report, or that the application or use of any of the information, analysis, methods and recommendations herein will avoid, reduce or ameliorate hazard, accidents, losses, damages or injury of any kind to persons or property. Readers are therefore cautioned to satisfy themselves as to the applicability and suitability of said information, for the purposes intended, prior to use.

Authorship, aims and cautions

This text was prepared by an international team of authors having extensive and detailed practical knowledge of safety aspects of the production, processing and handling of phosgene. The intent is to share as widely as possible their long-term experience and knowledge, as a contribution to global phosgene safety.

A key objective of the phosgene production and processing industry is the safety of its employees, neighbouring plant and site personnel and communities beyond the fence line.

To avoid exposure of any person to phosgene, the authors and their companies have implemented and strongly promote a concept that adds a second safety layer of protection (secondary containment and associated procedures or secondary measures) in case any of the primary layers of protection (primary containment and associated procedures or primary measures) should fail.

A holistic approach to safety is important in plants using phosgene, taking into account all elements outlined in this text. No single element will ensure the high level of safety performance desired for phosgene plants: it is the careful review of these elements and selection of them for implementation that will make the difference.

Safety strategies may vary based on the process, company requirements, local conditions, government regulations and other individual factors.

It is prudent for companies to have an auditing process in place for regularly reviewing all processes, procedures and standards and for assessing the effectiveness of the safety program.

Phosgene and its use

Phosgene, also known as carbonyl chloride, has unique chemical properties. Phosgene serves as a highly efficient intermediate, or building block, in the production of a wide range of products. Its predominant use is for the production of di-isocyanates and polycarbonates: however, it is also used in a diversity of other applications, which include the synthesis of pharmaceutical and agrochemicals.

Millions of tons of phosgene are produced per annum globally. Almost all of this is used in reactions to further products, in continuous processes, immediately after being produced, rather than stored.

In phosgene processes the phosgene may be in the gaseous form, dissolved in a solvent or in condensed (liquid) form. Diphosgene and triphosgene are further sources of phosgene in industrial processes. These are transported in their respective liquid and solid states and can liberate large volumes of phosgene gas in the case of uncontrolled decomposition.

Phosgene is very toxic and exposure can lead to death. Consider using phosgene only in a well designed plant with adequate control measures and well trained personnel.

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