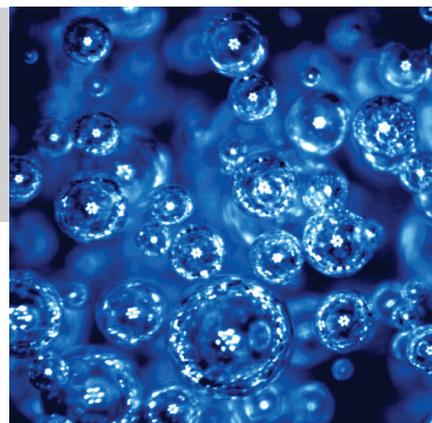


## REACTION TECHNOLOGY



## DYNAMIC PHOSGENE GENERATION & PHOSGENATION

### Dynamic phosgene generation: the safe way to production.

Phosgene is a very versatile raw material commonly used in the production of pharmaceuticals and other organic compounds. Reactions using phosgene produce high purity products with high yields. However, phosgene's reactivity and toxicity make it a particular hazard and as such, regulatory authorities impose stringent safeguards on its storage, transportation and use. Alternative reagents, like thionylchloride or phosphorylchloride, however, pose even greater risks.

Buss ChemTech has developed a unique system for the dynamic production of phosgene that avoids the liquefaction or storage of phosgene and incorporates features that safeguard the health and well-being of personnel and the environment.



### DYNAMIC PHOSGENE GENERATORS

We offer phosgene generators with capacities up to 13,000 kg/h (28'600 lbs/h) using CO and Cl<sub>2</sub> as the starting materials. Their flexible operation allow for an operating range of 10 to 100 % of nameplate capacity. For batch applications, the units can be put in "idle" after the reaction cycle comes to an end. Restarting the unit is simple and only requires a few minutes to produce high quality phosgene. Furthermore, the plant can serve multiple consumers.

The highly flexible design is just one of the many outstanding attributes of Buss ChemTech's phosgene production technology. And for clients who do not own the safety absorption equipment necessary to satisfy the regulations of the local authorities, Buss ChemTech can offer an absorption unit together with the generator.

### SAFETY

**High safety is of paramount importance, therefore, zero compromise is made. Additional reliability plays an important role in Buss ChemTech's intrinsically safe(r) approach**

- No storage of liquefied phosgene
- Low pressure operation with very small gaseous phosgene hold up
- Double containment with continuous air purging
- Double jacketed piping with continuous air purging
- Phosgene detectors in the purge gas stream
- Independent ESD logic
- Continuous monitoring of off gas
- All relevant welds 100 % x-ray inspected
- Heat transfer fluid recirculation and indirect water cooling
- Fully compliant to regulatory requirements

### RELIABLE PERFORMANCE

- Microprocessor auto feedback control with on-demand phosgene generation
- Automatic control between 10 and 100 % of rated output
- In-line product analysis for quality assurance
- Total validation of design and construction for quality assurance
- Auto-control of start-up and shut-down
- Robust and reliable design with minimal maintenance requirements
- Low CO excess (2 vol-%) leading to potential savings
- More than 25 years experience in building phosgene generators
- Extensive know-how of phosgene catalysts
- Superb phosgene product quality
- <50 wt-ppm residual Cl<sub>2</sub>
- 20 to 80 wt-ppm CCl<sub>4</sub> (depending on catalyst used)

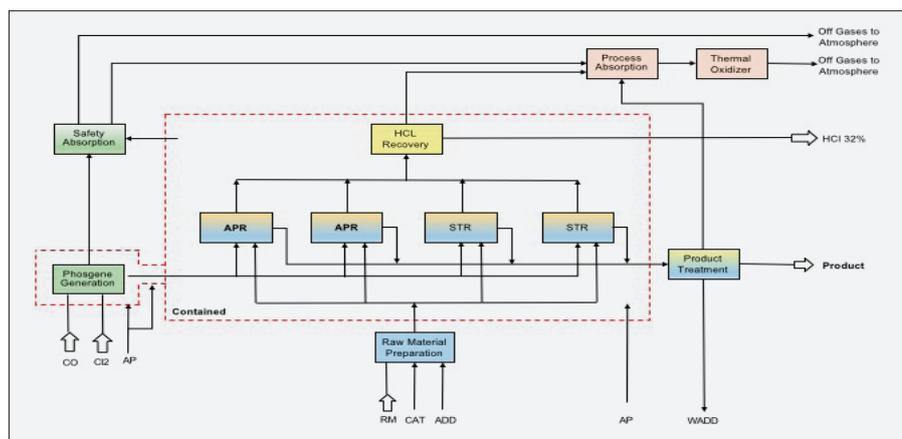


Phosgene Generator, 2 x 12'500 kg/h units (site erected)



Safety Absorption

## SAFE PHOSGENE GENERATION AND PHOSGENATION



### PHOSGENATION

Built on 25 years of experience delivering technology and equipment for the safe and economical production of phosgene, Buss ChemTech can also provide the technology for your downstream phosgenation reaction.

The Advanced Phosgenation Reactor sets new standards for safe and efficient production of phosgene derivatives. It delivers the best possible utilisation of phosgene and thus minimises the required amount of excess phosgene, which

is a benefit to the safety and economy of the process. It is designed to handle the extreme hydraulic and thermal characteristics of the phosgenation process to achieve high yields with excellent selectivity. This often eliminates downstream purification facilities that might otherwise be required.

Ideally, the phosgenation plant is connected via a double jacketed pipe from the phosgene generator, so that safety and reliability is also ex-

tended to the phosgenation step. As an example of our commitment to both, our design includes fully automatic control of the plant with hard-wired emergency shutdown systems. Also, the phosgenation facility is placed within a safety containment shell which is purged with air and continuously monitored against leakage.

The purged air is sent to the safety absorption for neutralisation prior to being released into the atmosphere. The off gas from the plant is sent to process absorption for destruction prior to the incineration of non-destructible components. Minimising phosgene hold-up by maximising reaction rate and plant performance is the mission of our design engineers.

Using our own test centre, we can optimise or develop phosgenation processes for and with our clients.

Our long-term experience with handling highly toxic and hazardous materials, our extensive scale-up know-how and proven safety philosophy results in an intrinsically safe industrial plant design which includes full process and performance guarantees.

**BUSS ChemTech**

[www.buss-ct.com](http://www.buss-ct.com)