



The brewing of beer is considered an art by many; but behind this art is a science, and a serious one at that.

Today's modern brewing industry demands the same exacting standards of safety as it requires for the quality of its beverages. 3M Gas & Flame Detection, through its innovative and flexible approach, provides solutions specific to brewing requirements.

Brewing Process

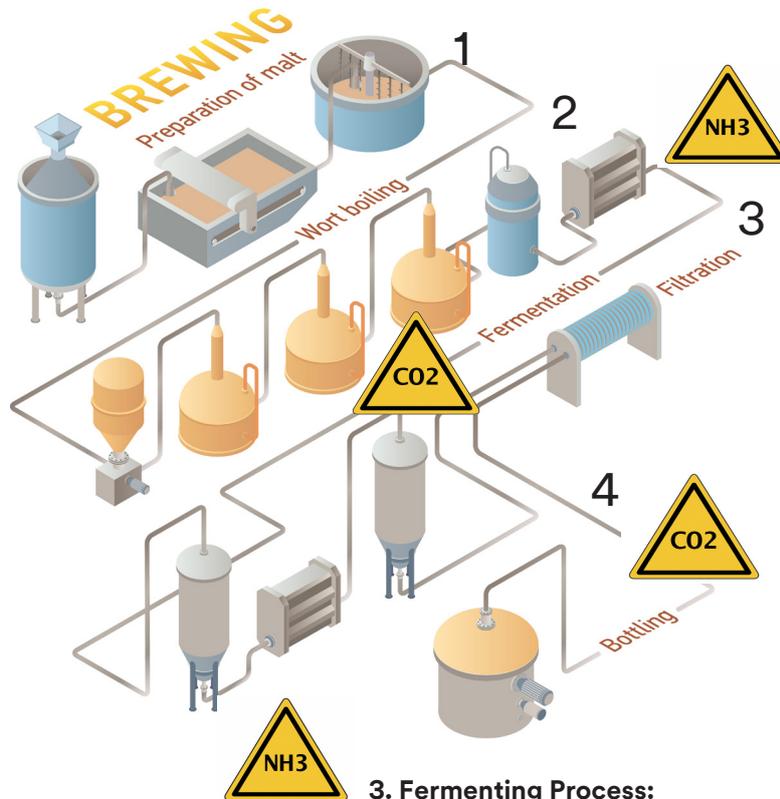
- Milling
- Mashing
- Lautering
- Boiling

1. Malting Process:

In the Malting process, malt is washed and soaked in water (steeped) to induce germination. Once germination is complete, the malt is rinsed and dried in kilns and then separated. Prior to brewing, the malt is crushed and water is introduced, transforming the starch into malt sugar. The Lautering process then commences, separating out the draff, leaving only liquid wort.

2. Preparing the Wort:

Once the liquid wort is collected, it is boiled in the brewing kettle and the hops are added. The extract is then separated from the wort in the whirlpooling process



3. Fermenting Process:

The wort is cooled and then yeast is added in the fermentation process. The process has two main phases: main fermentation and maturing fermentation, which occurs in two separate tanks so the beer can rest and mature suitably. Carbon Dioxide (CO₂) is a bi-product in the fermentation process; high concentrations can be hazardous, even deadly.

In breweries, confined spaces are among the most hazardous places. They include beer storage tanks, pumping stations, bottling areas and the carbonation process where carbon dioxide may be present.

Typical brewery confined spaces

- Bright tanks, fermenters, mash/lautering
- Grain silos, sump pits, others

Fermenting Process

- Whirlpooling
- Cooling
- Fermenting
- Maturing
- Filtering
- Packaging
- Distribution

4. Packaging & Distribution:

Beer can be filled into bottles, barrels or cans for distribution. Some beers go through a filtration process prior to packaging, while others are filled in their natural, unfiltered state. Ammonia leaks in the Refrigeration of the beer product can be hazardous.

*Sanitization



Breweries

Application note

Common Gas Hazards in breweries:

Carbon Dioxide, Ammonia, Nitrogen, Oxygen deficiency, H₂ in forklifts, warehouses, CH₄ in boiler rooms

Dangers of CO₂

5 000 ppm (0.5%)	15 000 ppm (1.5%)	30 000 ppm (3%)	50 000 ppm (5%)	75 000 ppm (7.5%)	100 000 ppm (10%)	300 000 ppm (30%)
Long-term Exposure Limit (LTEL)	Short-term Exposure Limit (STEL)	Shortness of breath	Heavy breathing Sweating Pulse quickens	Drowsiness Headaches Increased blood pressure	Vomiting Unconsciousness	Coma Convulsions Death

Dangers of NH₃

0-25	25 ppm	35 ppm	50- 100ppm	100-500ppm
Eyes, lung & skin irritation	Long-term Exposure Limit (LTEL)	Short-term Exposure Limit (STEL)	Pulmonary Oedema Temporary blindness	Irreversible blindness & lung damages

Key products



MX 43



OLCT 10N



GD 10



Alarm system



Protégé ZM



OLCT 100



700 Series



CTX 300



PS 500

Our quality assurance programmes demand the continuous assessment and improvement of all 3M | Gas & Flame Detection products. Information in this leaflet could thus change without notification and does not constitute a product specification.

AMERICAS - Texas (USA)
4055 Technology Forest Blvd.
The Woodlands, TX 77381
Tel.: +1-713-559-9200
Fax: +1-713-893-6729

EMEA
ZI Est, Rue Orfila,
CS 20417
62027 ARRAS CEDEX, France
Tel.: +33-3-21-60-80-80
Fax: +33-3-21-60-80-00

ASIA PACIFIC
290 Guiqiao Road
Pudong, Shanghai 201206
People's Republic of China
Tel.: +86-21-3127-6373
Fax: +86-21-3127-6365



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