

GLOBAL FILTER

OPTIMIZING THE FERMENTATION PROCESS THROUGH FILTRATION

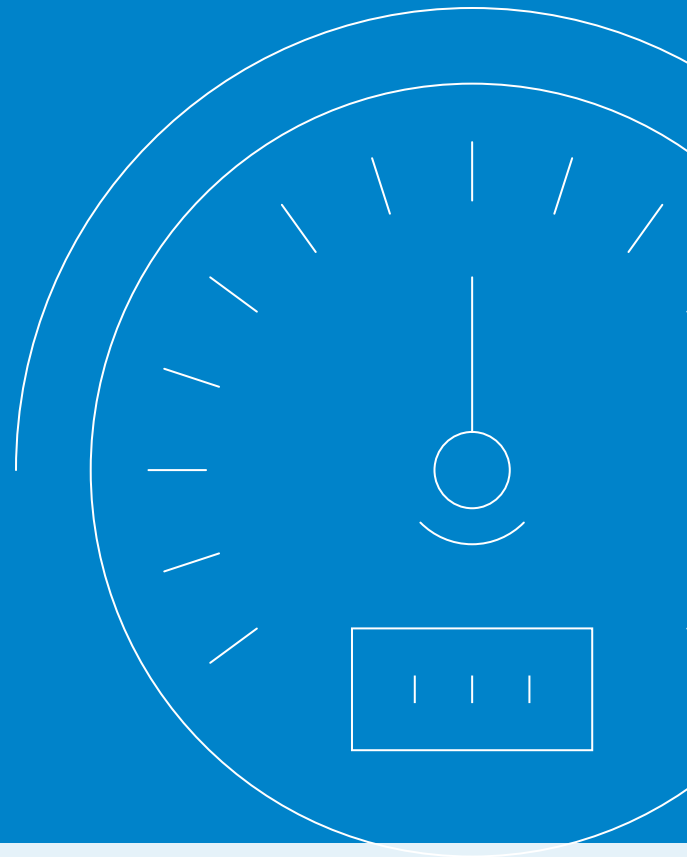


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WHAT IS FERMENTATION



WHAT IS FERMENTATION

FERMENTATION DEFINED:

Fermentation:

The metabolic process (anaerobic decomposition) of carbohydrates (sugars & starches) utilizing bacteria, yeast, or other microorganisms to produce acids, gases, or alcohols.

Industrial Fermentation:

The use of fermentation on a very large scale to produce products ranging from biofuels, citric & acetic acid, vinegar, and food-grade enzymes.

PRODUCTS MANUFACTURED BY INDUSTRIAL FERMENTATION:

- Alcohols
- Polyols
- Lactic Acid
- Acetic Acid
- Polysaccharides
- Biodegradable Plastics
- Industrial Enzymes & Proteins
- Vitamins
- Biofuels (ethanol)
- Acetone
- Amino acids
(lysine, MSG, serine, etc)

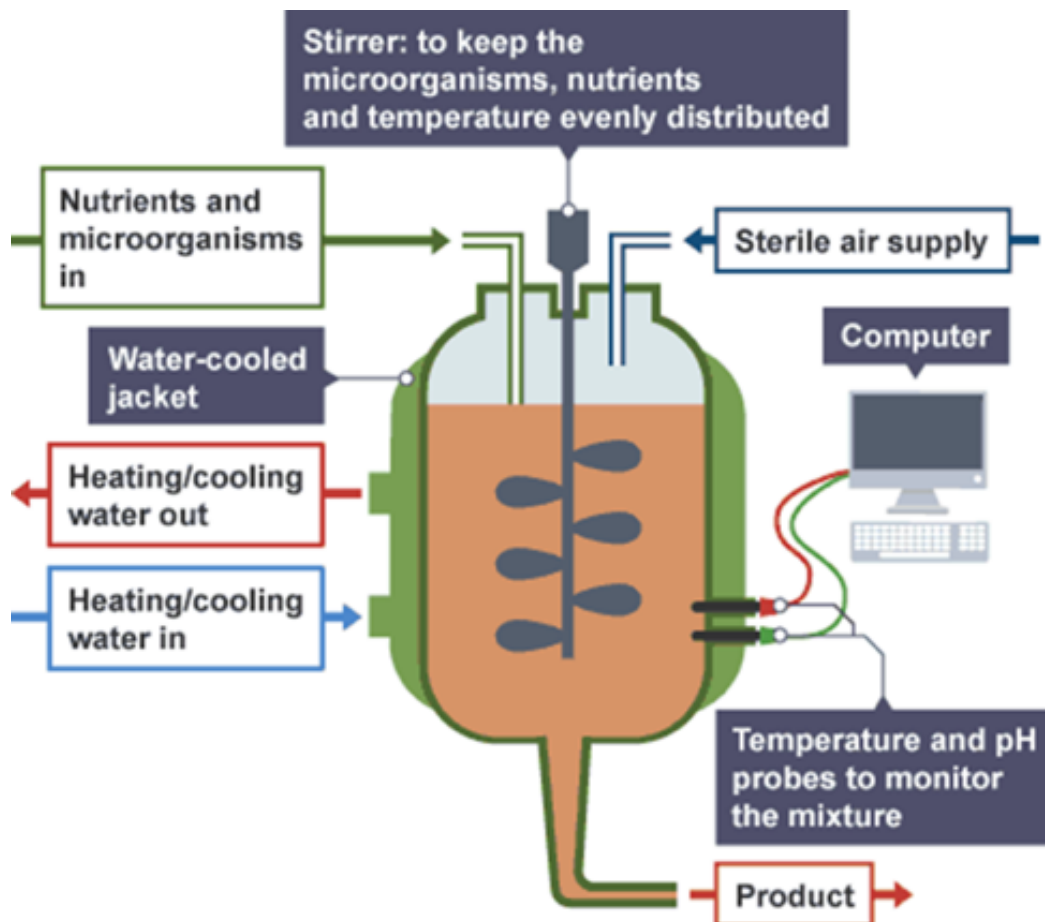
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FERMENTATION PROCESS

GENERAL FERMENTATION PROCESS

In most industrial fermentation processes, the microorganisms are submerged in a liquid medium (usually called a broth). The broth provides nutrients to the microorganism to feed growth. In order to ensure against contamination, the broth, feed air, and all equipment is sterilized.

Feed air needs to be free of particulates, outside organisms, and moisture. Ph and temperature are constantly monitored and adjusted.





ROLE OF FILTRATION IN THE FERMENTATION PROCESS



ROLE OF FILTRATION IN THE FERMENTATION PROCESS

The metabolic process (anaerobic decomposition) of carbohydrates (sugars & starches) utilizing bacteria, yeast, or other microorganisms to produce acids, gases, or alcohols.

FILTRATION APPLICATIONS

Cooling Water

Bulk solids: Nominally rated pleated polypropylene, string-wound, or meltblown cartridges (1-5 microns). Changed on DP

Broth (maceration) Prefiltration:

Absolute rated pleated polypropylene (PP) or microglass (FG) depth cartridges (0.45-1.0 microns). Changed on DP.

Final filtration:

Bacteria-retentive membrane cartridges rated at 0.2 micron (BRPES or PPES). Cartridges are typically changed based on pre-set number of batches processed (steam sterilized & integrity tested between batches).

Feed Air Prefiltration:

Absolute rated polypropylene (PP) or microglass (FG) pleated depth cartridges (0.45-1.0 microns). Cartridges require endcap support ring for steam sterilization. Cartridges are typically changed based on DP or PM.

Global Filter offers nearly every variation of technology used throughout the fermentation processes.

Water removal (if necessary):

Air/liquid coalescer

Final Filtration:

Sterilizing grade hydrophobic membrane rated at 0.2 micron (BRPTFE or PPTFE). Many users are satisfied with an aerosol validated cartridge rather than a liquid validated cartridge (significantly less costly). Changed based on PM (usually quarterly or bi-annually).

Tank vent

Final Filtration:

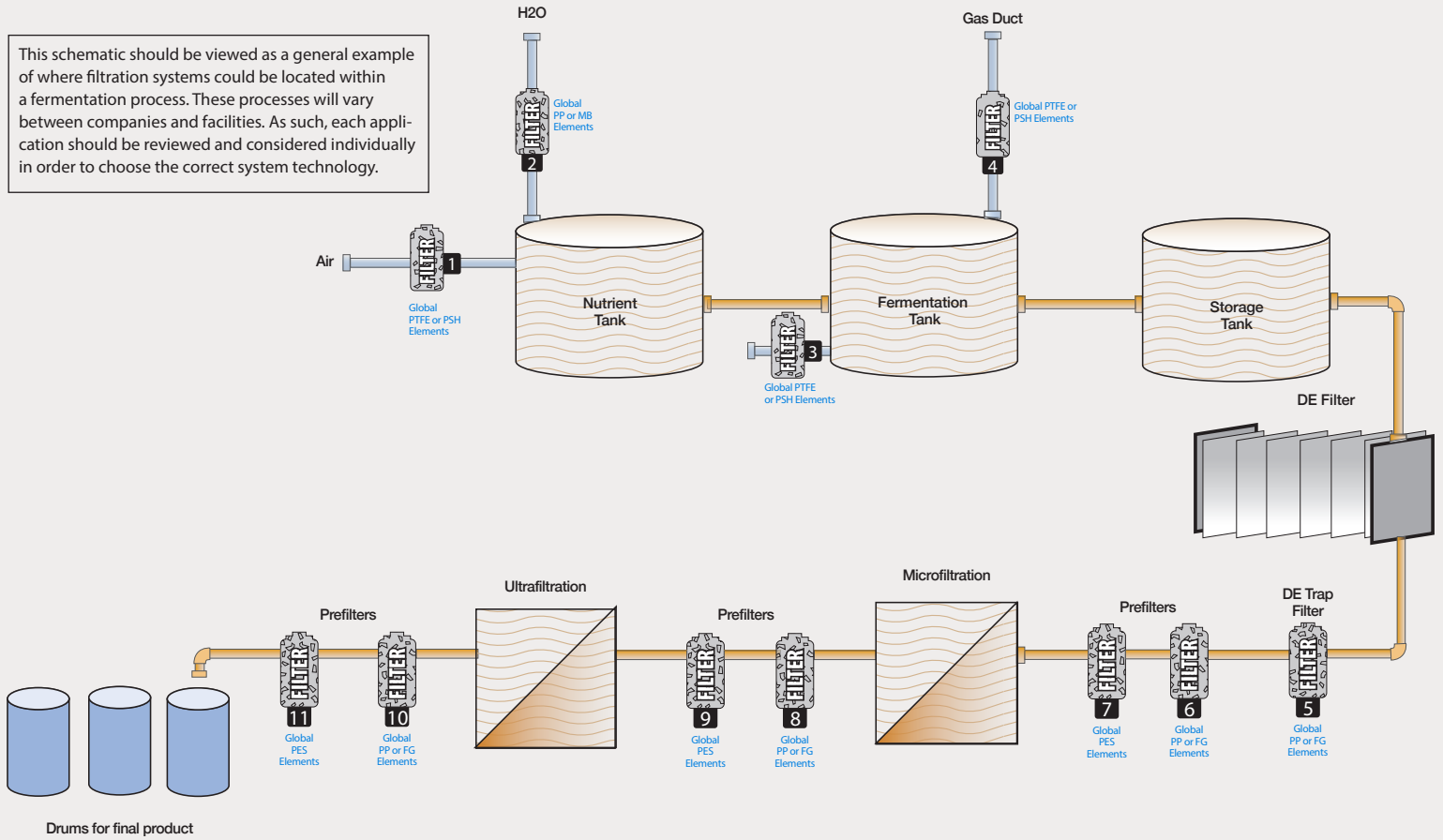
Sterilizing grade hydrophobic membrane rated at 0.2 micron (BRPTFE or PPTFE). Changed based on PM (usually quarterly or bi-annually).

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PLACEMENT WITHIN THE
FILTRATION PROCESS

FILTER PLACEMENT WITHIN THE FERMENTATION PROCESS

This schematic should be viewed as a general example of where filtration systems could be located within a fermentation process. These processes will vary between companies and facilities. As such, each application should be reviewed and considered individually in order to choose the correct system technology.



Filter Solutions for Stages of the Fermentation Process

Location	Global Filter Solutions		Filter Purpose	Filter Benefit
1. Inlet Air	PTFE Hydrophobic Membrane General Grade • GGPTFE, BRPTFE, PPTFE Series	PS Hydrophobic Membrane • Polysulfone - PSH Series	Removal of particulated such as sediment, suspended solids, pipe scale, etc. from process water	Maintains aeration efficiency for bacterial growth and production
2. Inlet H ₂ O	Polypropylene Meltblown • GWTB, GCTB, GATB Series	Pleated Polypropylene • PP, PPE Series	Removal of particulate and bacteria from process air	Maintains water quality as an ingredient
3 - 4. Fermentation Tank	PTFE Hydrophobic Membrane General Grade • GGPTFE, BRPTFE, PPTFE Series	PS Hydrophobic Membrane • Polysulfone - PSH Series	Fermentation tank vent filtration	Allows for bacteria free air passage during filling and evacuation, protecting the fermentation tank and its contents from contamination
5. DE Trap Filter	Pleated Microglass • FG, FGE Series	Pleated Polypropylene • PP, PPE Series	Installed downstream of the Diatomaceous Earth (DE) filter to prevent DE bleed-through fines from entering product	Maintains high quality of the process and minimized sediment and poor quality perception of the final product
6 - 11. Pre and Post Filtration to Micro and Ultrafiltration	Pleated Microglass • FG, FGE Series Pleated Polypropylene • PP, PPE Series	Pleated Polyethersulfone • GWPES, WCPES, GGPES, GFPES, GBPES, BRPES, PPES Series	Removal of coarse and fine particulate	Pre-filtration of finished product before micro and ultrafiltration

LET GLOBAL FILTER OPTIMIZE YOUR FERMENTATION PROCESS



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