



USE OF BOILER CHEMICALS IN ORGANIC PROCESSING & HANDLING

Guidance

Boiler chemicals are used in food processing facilities to protect steam generating pipes and equipment from corrosion. PCO must review all boiler chemicals used in the production of organic products. Proper maintenance of boiler is required and maintenance records must be available at inspection.

DEFINITIONS

- Boiler Chemicals– materials used in boiler systems to protect steam generating pipes and equipment from corrosion
- Volatility– tendency of a substance to evaporate at normal temperatures. A volatile substance can be defined as (1) a substance that evaporates readily at normal temperatures and/or (2) one that has a measurable vapor pressure.

APPROVED INPUTS

All inputs must be reviewed and approved by PCO prior to use, so be sure to check with us or consult a current PCO Approved Materials List, OMRI, or WSDA list prior to purchasing or using a product. Please contact PCO if you have any questions on materials or restrictions.

STEAM WITH NO FOOD CONTACT

In boiler systems where there is no contact between the steam and the organic food product, (i.e. closed boiler system or steam only used for heating product in sealed containers), any substance may be used.

Chemicals that can be used in closed boiler systems include:

- Filming amines – boiler chemical additives used to form a protective barrier that inhibits corrosion from both oxygen and carbonic acid. Filming amines are considered to be volatile. Common filming amines include
 - Octadecylamine
- Neutralizing amines – high-pH chemicals that react with carbonic acid to neutralize acidity and maintain a strongly alkaline pH in the boiler system. Neutralizing amines are also considered to be volatile. Common neutralizing amines include:
 - Morpholine
 - Cyclohexylamine
 - Diethylamino ethanol
 - Methylpropylamine
 - Hydrazine

Boiler chemicals that contain materials that are not on the National List and carry over into the steam will have the following restriction:

- Closed Boiler Systems [Processing]. Steam is not allowed in direct food contact. Allowed in closed systems only. §205.272

STEAM WITH FOOD CONTACT

In boiler systems with direct contact or potential for direct contact between the steam and the organic product, only materials specifically allowed on the National List at §205.605 or non-volatile materials that do not carry over into the steam are allowed as active ingredients. Operators must have documentation available on-site to show that non-volatile materials do not carry over into the steam.

Chemicals that can be used in open boiler systems include boiler chemical materials listed at §205.605.

Boiler chemical materials listed on the National List at §205.605 include:

- Ascorbic acid
- Citric acid
- Potassium carbonate
- Potassium hydroxide
- Sodium bicarbonate
- Sodium carbonate (soda ash)
- Sodium hydroxide (caustic soda)

Volatility of boiler chemical materials is determined based on PCO's Boiler Chemical Volatility policy. If a material contains non-volatile ingredients, the operator must document methods used to ensure that the material does not carry over into the steam.

- Oxygen scavenging compounds that react with free oxygen and precipitate out of the boiler water are considered materials that do not carry over into the steam. Allowed oxygen scavengers include:
 - Sodium sulfite, bisulfite, metabisulfite, sulfide, sulfonate
 - Potassium sulfite, bisulfite
- Acrylamides/Polymers are used to form a barrier to protect boiler systems from carbonic acid and are considered non-volatile. The exception is trisodium nitrilotriacetate, which is considered to be volatile.
- Phosphates, chelating agents, and polymers are used to protect boiler systems by reacting with mineral deposits and are considered non-volatile. Commonly used phosphates include:
 - Mono, di, and tri-sodium phosphate
 - Sodium polyphosphate
- Commonly used chelating agents include ethylenediamide tetra-acetic acid (EDTA)

Boiler products containing only materials allowed on the National List at §205.605 will have the following annotation:

- Direct Food Contact Boiler Chemical [Processing]. Steam is allowed in direct food contact. *§205.272(a), §205.605*

Boiler products containing only non-volatile materials will have the following restriction:

- Non-volatile Boiler Chemicals [Processing]. Steam is allowed in direct food contact if documented that material does not carry over into steam. *§205.272*

Volatile materials not on the National List are prohibited from direct food contact.