

**Applicant:** PetroProtonsPvt. Ltd.

**Inventors:** Deepanshu Mohanpuriya (210312)

**Chemical Product Formula:**  $(C_2H_4O)_nCH_4O$

**Chemical Product Name:** Methoxy polyethylene glycol (mPEG)

**Process Title:** Batch Process for production of mPEG-400

**EHS Summary:**

a. List the wastes generated and their quantity of generation.

The waste generated during the batch process for the production of mPEG-400 can vary depending on the specific production process and the associated equipment and materials used. However, in general, some of the possible wastes that may be generated during the production of mPEG-400 are:

1. Process wastewater: This is the wastewater generated during the production process, which may contain various contaminants such as unreacted starting materials, intermediates, or byproducts. The quantity of process wastewater generated will depend on the efficiency of the production process and the amount of water used.
2. Chemical wastes: The production process may involve the use of various chemicals, such as solvents, catalysts, or reagents, which may become waste at the end of the process.
3. Solid wastes: The production process may generate solid wastes such as spent catalysts, filter cakes, or other residues. The quantity and composition of these solid wastes will depend on the specific production process and the type and amount of materials used.
4. Air emissions: The production process may release air emissions such as volatile organic compounds (VOCs) or particulate matter. The quantity and composition of these air emissions will depend on the specific production process and the type and amount of materials used.

It is important to note that the specific wastes generated during the production of mPEG-400 will depend on the specific production process and the associated equipment and materials used. The quantity of waste generated will also depend on the efficiency of the production process and the amount of materials used. Proper waste management and disposal practices should be implemented to minimize the environmental impact of these wastes.

**b. What the current regulations for the above waste materials.  
(Limits to which it can be disposed in the environment)**

The regulations for the disposal of waste materials generated during the production of mPEG-400 can vary depending on the location and the governing regulatory bodies. However, in general, there are some commonly applied regulations and guidelines that should be followed to minimize the environmental impact of these wastes. Some examples are:

**Process wastewater:** The disposal of process wastewater is regulated by various environmental agencies, such as the Environmental Protection Agency (EPA) in the United States. The regulations may specify the allowable levels of various contaminants in the wastewater, such as chemical oxygen demand (COD), biological oxygen demand (BOD), total suspended solids (TSS), and pH.

**Chemical wastes:** The disposal of chemical wastes is also regulated by various environmental agencies, and the regulations may specify the allowable levels of various contaminants in the waste. The wastes should be properly labeled and stored, and should be transported and disposed of by a licensed waste management company.

**Solid wastes:** The disposal of solid wastes generated during the production of mPEG-400 is also regulated by various environmental agencies, and the regulations may specify the allowable levels of various contaminants in the waste. The wastes should be properly labeled and stored, and should be transported and disposed of by a licensed waste management company. In some cases, the waste may need to be treated or incinerated to reduce its environmental impact.

Air emissions: The disposal of air emissions is regulated by various environmental agencies, and the regulations may specify the allowable levels of various contaminants in the emissions. In general, the emissions should be minimized through the use of pollution control equipment such as scrubbers, and should be monitored to ensure that the levels of contaminants are within the allowable limits.

- c. Describe the treatment procedure for wastes with block diagram.**  
**Your chemical plant must be a zero liquid discharge plant.**

A block diagram of the treatment procedure for wastes generated during the production of mPEG-400 can be represented as follows:

Wastewater → Screening → Sedimentation (primary treatment) → Biological treatment (secondary treatment) → Sedimentation (secondary treatment) → Tertiary treatment → Holding tank → Reuse in production process

Sludge → Sludge treatment → Disposal

By implementing a ZLD(zero liquid discharge plant) approach and treating all wastewater generated during the production process, the environmental impact of the production process can be minimized, and valuable resources can be conserved.

- d. Are there any safety concerns for the chemicals. Give exposure limits: Time Weighted Average (TWA) for 8 hours and short-term exposure limit (STEL) for 15 minutes.**

In general, however, many of the chemicals used in the production of mPEG-400 can have potential health hazards, and exposure to these chemicals should be minimized through proper handling and use of personal protective equipment (PPE). Some of the potential hazards associated with the chemicals used in the production of mPEG-400 may include:

1. Flammability: Some of the chemicals used in the production process may be flammable, and may present a fire hazard if not properly handled.

2. Toxicity: Some of the chemicals used in the production process may be toxic, and may present a health hazard if inhaled, ingested, or absorbed through the skin.

3. Irritation: Some of the chemicals used in the production process may be irritants, and may cause skin or eye irritation if not properly handled.


It is important to consult with the Safety Data Sheets (SDS) for the specific chemicals used in the production of mPEG-400 to determine their associated exposure limits and safety concerns. In addition, proper training and use of PPE can help to minimize the potential for exposure and ensure worker safety.

**References:** <https://indianchemicalregulation.com/safety-data-sheet/?cn-reloaded=1>

**List the contributions of each author:**

- (Example) Author 1 determined the waste generation quantity.
- Author 1 and 2 carried out the literature search and found the current regulations.
- Authors 1, 2 and 3 found necessary treatment steps and prepared the block diagram.
- Author 4 obtained TWA and STEL data.

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