



**University of Technology**  
**Chemical Engineering Department**  
**Graduation Project Summary**



- **Supervisor:** Asst. Prof. Dr. Adel Sharif Hamadi
- **Branch:** Oil and Gas Refinery Engineering
- **Groups No. :** R6
- **Students Name:** Elaf Fakher Jasiem  
Amna Fadhel Atia
- **Project Title:** Extraction Unit by Furfural
- **Specific Objective:**



### 1- Definition and Chemical Formula:

The Furfural Refining process is a **solvent extraction** process used to remove undesirable components of low lubricating oil quality naturally present in crude oil distillate and residual stocks. The unit produces paraffinic or naphthenic raffinates suitable for further processing into lube base stocks. Solvent (**extraction**) treating is a widely used method of refining lubricating oils as well as a host of other refinery stocks. The most widely used extraction solvents are **phenol**, **furfural**. Other solvents less frequently used are NMP "N-methyl-2- pyrrolidone".

### 2- Other Names:

**Furfural**, 2-furancarbal, 2-furaldehyde, furfuraldehyde,  $C_5H_4O_2$ , *Mr* 96.08, has an aromatic odor reminiscent of almonds. Its exceptional physical properties make this heteroaromatic aldehyde a selective extractant for removing aromatics from lubricating oils and diesel fuels.

### 3- Goal of Project:

The purpose of solvent extraction is to prevent corrosion, protect catalyst in subsequent processes, and improve finished products by removing unsaturated, aromatic hydrocarbons from lubricant and grease stocks. The solvent extraction process separates aromatics, naphthenes, and impurities from the product stream by dissolving or precipitation.

### 4- Production Methods:

#### i) Furfural Extraction

The process flow through the furfural extraction unit is similar to that of the propane de-asphalting unit, except for the solvent recovery section, which is more complex. The oil feedstock is introduced to a continuous counter-current extractor at a temperature, which is the function of the feed's viscosity; the greater the viscosity, the higher the temperature used.

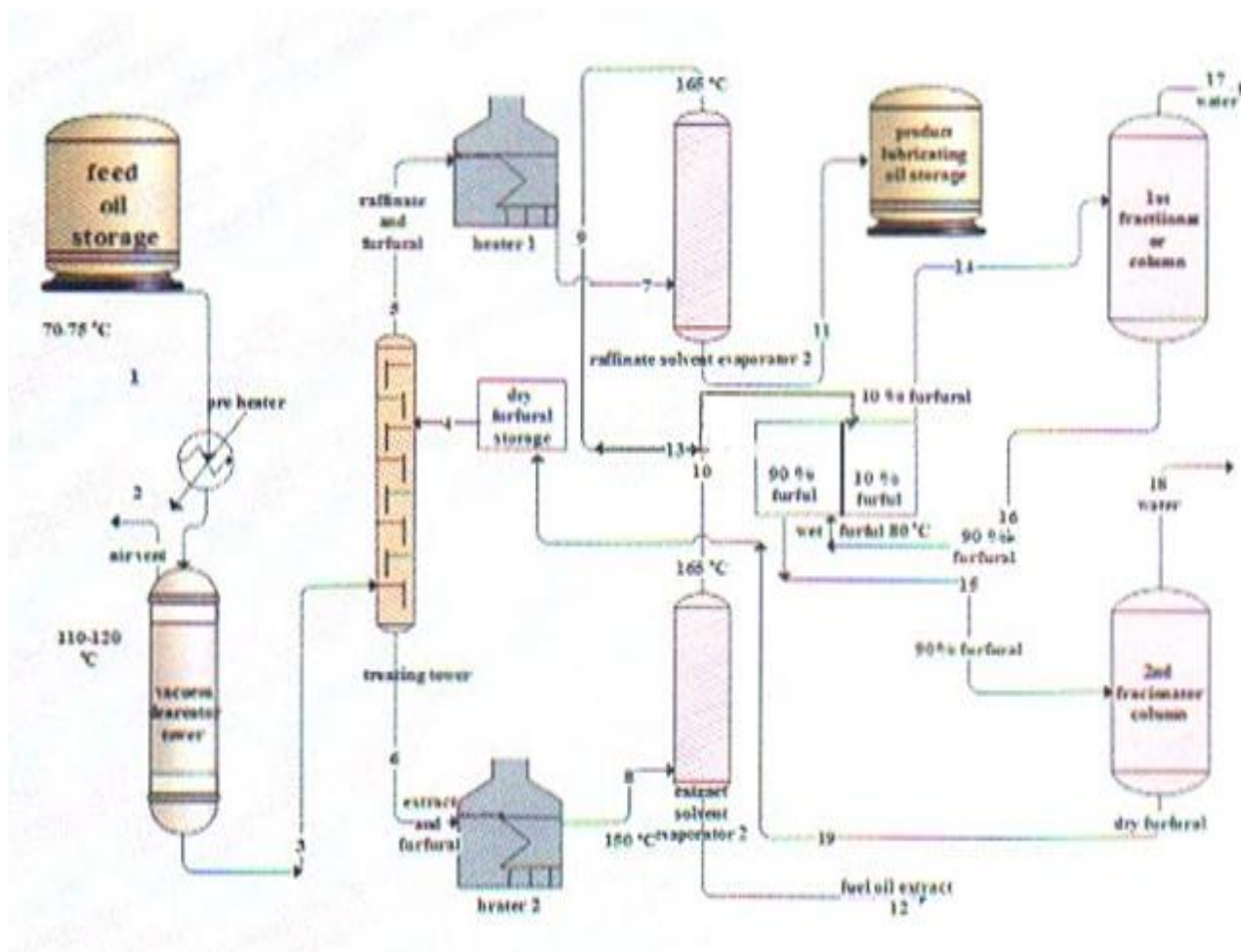
## ii) Phenol Extraction

The process flow for the phenol extraction unit is somewhat similar to that of the furfural extraction unit, but differs markedly in the solvent recovery section because phenol is easier to recover than furfural.

## iii) NMP Extraction

NMP extraction uses N-methyl-2- pyrrolidone as the solvent to remove the condensed aromatics and polar components from the lubricating oil distillate brightstocks. This process was developed as a replacement for phenol extraction because of health, safety and environmental problems associated with phenol use.

## 5- Flow Sheet for Selected Production Method:



Extraction Unit by Furfural



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