



SNS COLLEGE OF TECHNOLOGY

(An Autonomous Institution)

COIMBATORE-35.



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DEPARTMENT OF AUTOMOBILE ENGINEERING

COURSE NAME : 19AUB301 – AUTOMOTIVE FUELS AND LUBRICANTS

III YEAR / V SEMESTER

Unit 1- Manufacture of Fuels and Lubricants

Topic : Manufacture of lubricating oil base stocks



PROCESS



The manufacture of lubricant base oils consists of five basic steps

- **Distillation**
- **Deasphalting** to prepare the feedstock
- Solvent or **hydrogen refining** to improve viscosity index and remove undesirable constituents
- Solvent or catalytic **dewaxing** to remove wax and improve the low temperature properties of paraffinic base oils
- Clay or **hydrogen finishing** to improve the colour, stability and quality of the lubricant base stocks.



DISTILLATION



- In a lubricant base oil and wax manufacturing plant, crude oil is first distilled in an atmospheric distillation unit (ADU) to remove gases, gasoline, naphtha's, kerosene and light gas oil.
- The atmospheric residuum (reduced crude) is then fractionated in a vacuum distillation unit (VDU) into fractions of the desired viscosity and flash for further processing.



DEASPHALTING



- The vacuum residuum contains recoverable lubricant stock of high viscosity mixed with asphalt and resins.
- This oil is separated from the asphalt and resins using **propane deasphalting**, an extractive precipitation process.



REFINING



- The deasphalted oil and the distillates usually contain undesirable constituents such as aromatics and naphthenes.
- It must be removed to yield an oil of high viscosity index and high lubricating quality.
- These undesirable constituents are removed by treating the stocks separately with a solvent (furfural, phenol, N-methyl-2-pyrrolidone or liquid sulphur dioxide).



REFINING



- **Hydro extraction**, a mild solvent extraction of distillates and deasphalted oils followed by moderate severity hydro treating (mild hydrocracking) is conducted by some refiners for the purpose of decreasing hydrogen consumption and increasing refined oil yields.
- **Hydrocracking** followed by distillation is sometimes used as an alternative to solvent refining. The stabilization of hydrocracked base oils is usually done using a high pressure-low temperature hydrogenation called high severity hydro finishing



DEWAXING



- The refined paraffinic oils contain waxes which crystallize out at low temperatures
- The wax is removed by solvent dewaxing (a crystallization-filtration process).
- The slack waxes from the dewaxing process are used as FCCU feed or deoiled using a warm-up or recrystallization process to produce a hard wax and a soft wax.
- The soft wax or foots oil is frequently used as a seal oil or as FCCU feedstock.
- A selective hydrocracking process called catalytic dewaxing is used as an alternative to solvent dewaxing



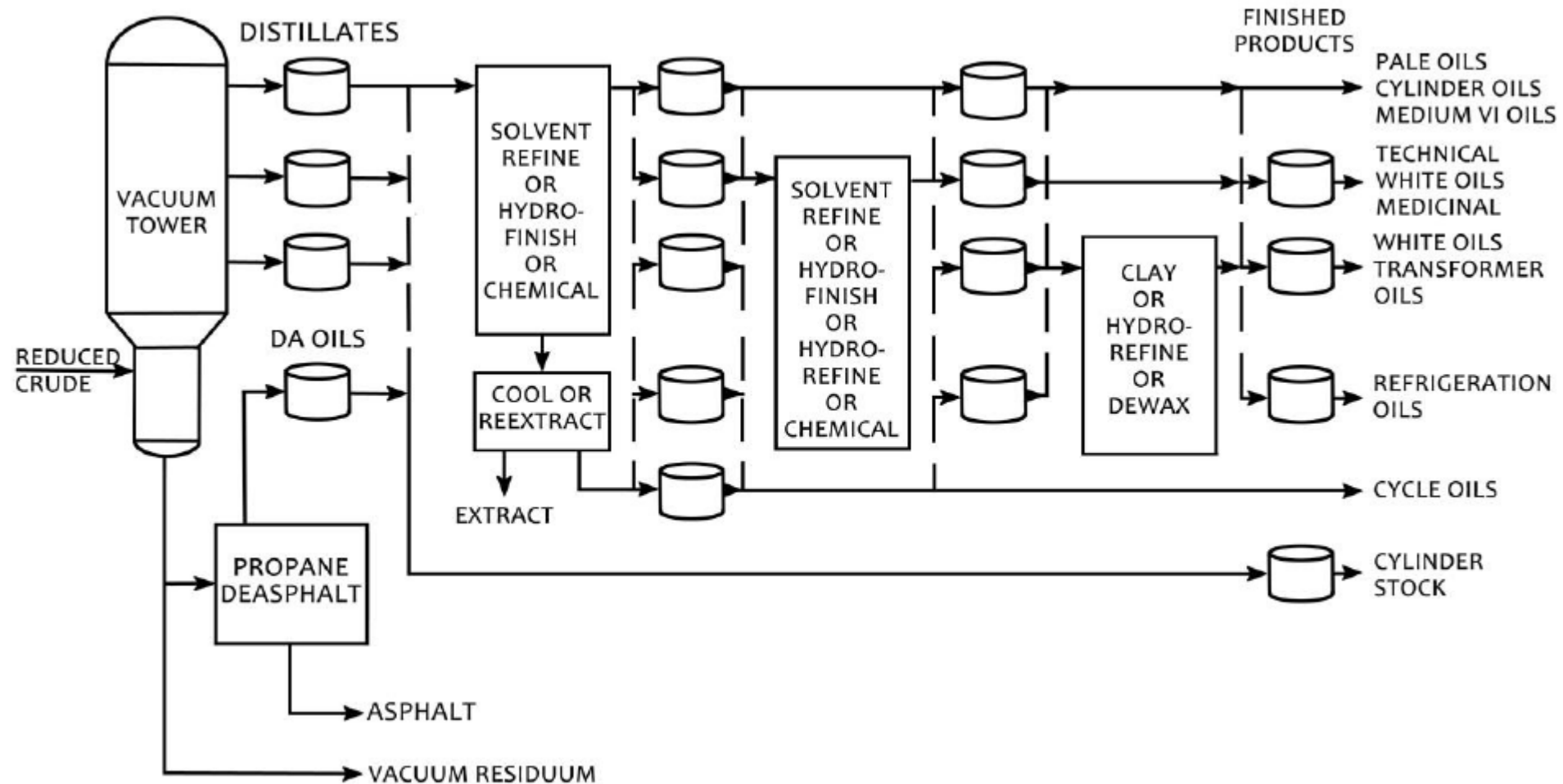
FINISHING



- Both the dewaxed oil and the product wax are normally hydrofinished or treated with adsorbent clay to meet the colour and oxidation stability requirements of a marketable product.
- A severe hydrogen finishing process, hydrorefining, is used to remove large amounts of sulphur and nitrogen and trace impurities.



LAYOUT OF THE PROCESS





REFERENCE



➤ https://en.wikipedia.org/wiki/Base_oil



THANK YOU !!!