
LUBE OIL
MANUFACTURING
PROCESS INTRODUCTION

INTRODUCTION

- Lubricating oils are used to reduce friction and wear , remove heat generated by friction and prevents corrosion .

- Lubricating oils of various grades are manufactured by mixing of selected lubricating oil and additives.

- Lubricating oil are produced from heavy waxy distillate fractions obtained from vacuum distillation of atmospheric residue.

- The straight run vacuum distillate fractions require further treatment to bring them to the desired specification of lubricating oil.

A modern lube oil comlex consisit of following process units :

- High vacuum distillation unit : to obtain various disstilate fractions and vacuum residue.
- Solvent deasphalting unit : to remove asphalt from vacuum residue.
- Solvent extraction unit : to remove undesirable napthenic and aromatic hydrocarbons from the distillate fractions so as to improve the viscosity index of lube oil .

- Solving dewaxing unit : to remove wax content of the soil so as to improve the pour point of the lube oil.
- Hydrofinishing unit : to improve colour , oxidation and colour stability of finished lube oil.

EVALUATION OF CRUDE OIL FOR LUBE OIL BASE STOCKS MANUFACTURE

Evaluation of crude oil for lube oil

- Some crudes are not well suited to the manufacture of lube oil , example : too paraffinic crudes .

- It is likely that an adjustment or a change to present processing schemes may be required to handle new crudes .

- Hydrofining process is one of the best solution to improve quality .

- Another important factor is the yield of lube distillates which must be increased.

- The hydrotreating process is more attractive to improve the yield by rearranging the molecules.

Schematic diagram of modern lube oil complex

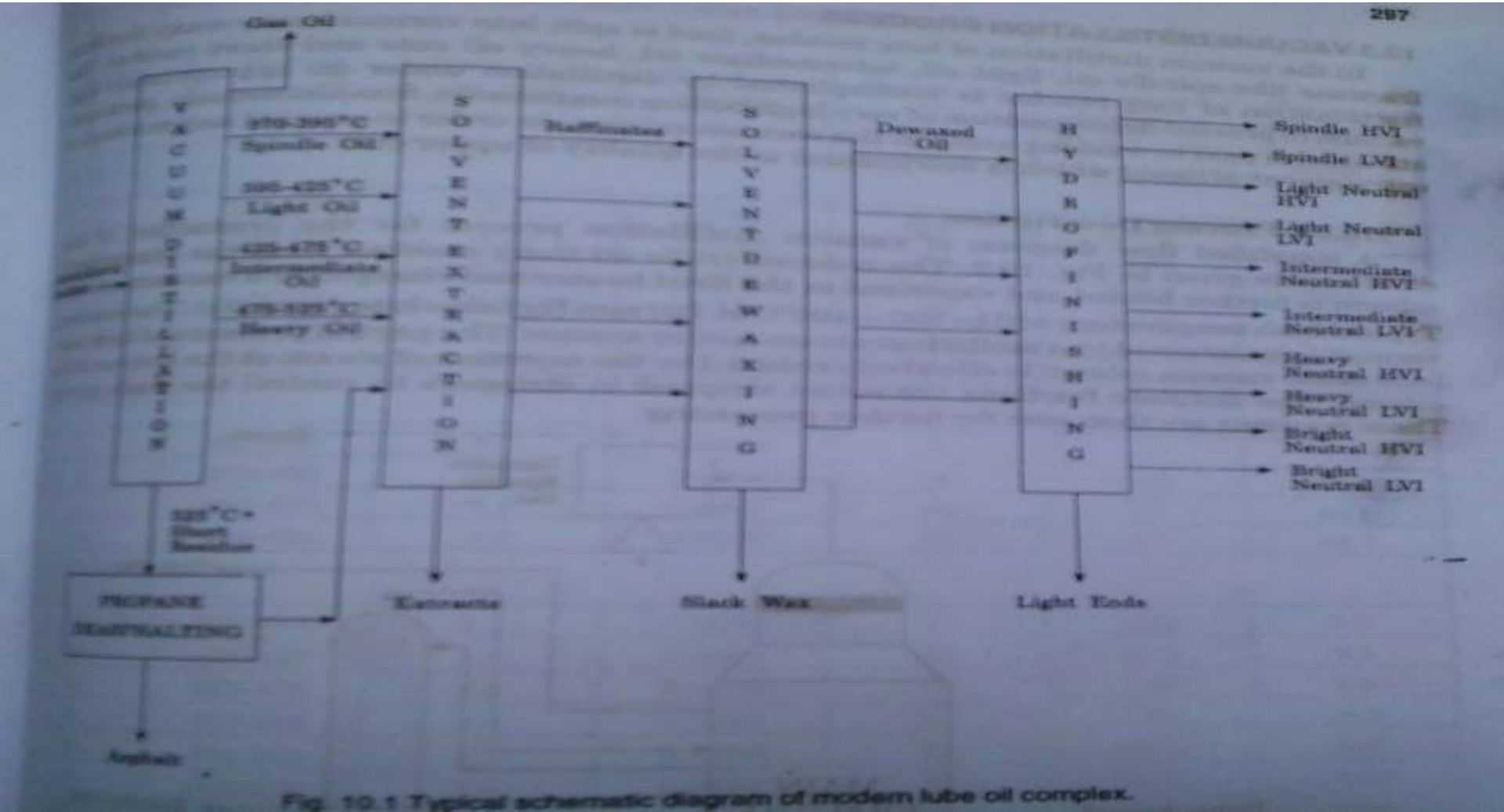

Fig. 10.1 Typical schematic diagram of modern lube oil complex.

Properties of raw lube distillates from three crudes

Table 10.1 Properties of Raw Lube Distillates from Three Crudes

Cut No.	Boiling range, °C	Yield, wt % on crude	Sp. gr. at 15/4°C	Pour point, °C	Kinematic viscosity at 98.9 °C, cSt	Wax content, wt.% on fraction basis
KALOL						
1	360-390	5.2	0.8296	39	2.569	57.8
2	390-415	4.92	0.8532	42	2.993	57.6
3	415-442	5.11	0.8822	45	3.927	52.9
4	442-500	5.61	0.8981	48	5.718	52.9
5	500-524	4.55	0.9102	48	-	40
6	524-538	2.08	0.9118	48	-	39
ANKLESHWAR						
1	320-350	7.7	0.8738	0	-	7.3
2	350-400	8.2	0.9053	23	3.45	29.1
3	400-450	8.4	0.8937	46	5.4	44.1
4	450-490	6.6	0.8950	55	6.7	48.7
BASRAH CRUDE OIL (Iraq)						
1	370-400	4.1	0.8898	21	3.62	9.3
2	400-425	3.6	0.8991	27	4.74	9.7
3	425-450	3.5	0.9089	30	5.86	9.8
4	450-475	3 4	0.9210	36	7.69	8.9
5	475-500	3.1	0.9288	42	10.76	9.0
6	500-525	3.4	0.9340	45	14.85	8.9
7	525-550	3.3	0.9451	48	20.81	13.0

- Kalol crude has little potential for high viscosity lube oil because of low viscosity and high wax content .

- Since viscosity index of distillates from Naharkatia crude is low , it is no not suitable for high viscosity index lube oils.

- Among three crudes NR crude oil has better potential for lube oils .

VACUUM DISTILLATION PROCESS

- Feed is long residue
- Product is spindle oil , light oil , intermediate oil , heavy oil cuts and short residue

Thanks