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 5 – Combustion and Fuel Rating

Topic : Additive, mechanism and its requirements, Petrol & Diesel fuel additive

ADDITIVES

- Additives are a chemical component or blend used at a specific treat rate, generally from < 1 to 35 percent, to provide one or more functions in the fluid.
- Ideally, additive components are multifunctional.
- They are soluble in mineral oil, water or sometimes both.
- Second, additives offer or help with a wide variety of functions, such as:
  - boundary lubricity
  - extreme pressure (EP)
  - inhibiting corrosion
  - emulsification
  - antimisting
  - antimicrobial pesticide
  - antifoam additives and defoamers

REQUIREMENT OF ADDITIVES

- It must be affective in desired reaction that is knock resistance or surface ignition or both.
- It should be soluble in fuel under all conditions.
- It should be stable in storage and have no adverse effect on fuel stability.
- It should be in the liquid phase at normal temperature, and volatile to give rapid vaporization in the manifold.
- It must not produce harmful deposits.
- Its water solubility must be minimum to minimize handling loses.

ROLES OF ADDITIVES

Enhance Existing Base Oil Properties	Suppress Undesirable Base Oil Properties	Impart New Properties to Base Oils
Antioxidants Corrosion Inhibitors Anti-foam Agents Demulsifying Agents	Pour Point Depressants VI Improvers	EP Additives Detergents Metal Deactivators Tackiness Agents

ADDITIVES


Performance Modifiers
Pour point depressants
VI Improvers
Seal Swell Agents
Lubricant Protectors
Oxidation Inhibitors
Metal Deactivators
Foam Inhibitors
Surface Protectors
Rust & Corrosion Inhibitors
Detergents & Dispersants
Antiwear Agents
Friction Modifiers

PETROL FUEL ADDITIVES

Additives	Type	Function
Oxidation inhibitors	Aromatic amines and phenols	Inhibit gum formation and oxidation
Corrosion inhibitors	Carboxylic acids and carboxylates	Inhibit corrosion of ferrous metals
Metal deactivators	Chelating agent	Inhibit gum formation Catalyzed by certain metals
Anti-icing additives	Surfactants and glycols	Prevent icing in carburetor and fuel system
Detergents	Amines and amine carboxylates	Prevent deposits in carburetor throttle body
Deposit control additives	Polybutene amines Polyether amines	Remove and prevent deposits throughout carburetor intake ports and valves
Blending agents	Ethanol, methanol, tertiary butyl alcohol, methyl tertiary ether	Extend gasoline supply, increase apparent octane quality with some loss in mileage
Antiknock compounds	Lead alkykl, organo-manganese compounds	Increase octane quality

DIESEL FUEL ADDITIVES

Additive	Type	Function
Detergents	Polyglycols, basic nitrogen-containing surfactants	Prevent injector deposits, increase injector life
Dispersants	Nitrogen-containing surfactants	Peptize soot and products of fuel oxidant; increase filter life
Metal deactivators	Chelating agents	Inhibit gum formation
Rust and corrosion inhibitors	Amines, amine carboxylates, and carboxylic acids	Prevent rust and corrosion in pipelines and fuel systems
Cetane improvers	Nitrate esters	Increase cetane number
Flow improvers	Polymers, wax crystal	Reduce pour point modifiers
Antismoke additions or smoke suppressants	Organic barium compounds	Reduce exhaust smoke
Oxidation inhibitors	Low–molecular weight amines	Minimize deposits in filters and injectors
Biocides	Boron compounds	Inhibit growth of bacteria and microorganisms

FUEL SPECIFICATION

Properties	Diesel	B10	B20	B50
Heat Value (MJ/kg)	45.28	44.72	44.17	42.39
Cloud Point (^{0}C)	18	17	17	15
Density @ 15^{0}C (kg/m^3)	853.8	855	855.4	876.8
Total Sulphur (wt %)	0.28	0.25	0.21	0.11
Viscosity @ 40^{0}C (cSt)	3.6	4.16	4.524	4.595
Flash Point (^{0}C)	93.0	96	98	110
Pour Point (^{0}C)	12	9.0	6	6
Cetane Number	54.6	54.4	57.8	59
Carbon (wt %)	84.1	82.3	82	78.5
Hydrogen (wt %)	12.8	12.5	12.5	12.2
Oxygen (wt %)	3.9	4.3	5.5	7.7

THANK YOU !!!