CIVIL ENGINEERING MATERIAL

BITUMEN

MELTED BITUMEN

- **A black or dark brown viscous material, composed principally of high molecular weight hydrocarbons, having adhesive properties, derived from petroleum either by natural or refinery processes and substantially soluble in carbon disulphide.**

ORIGIN

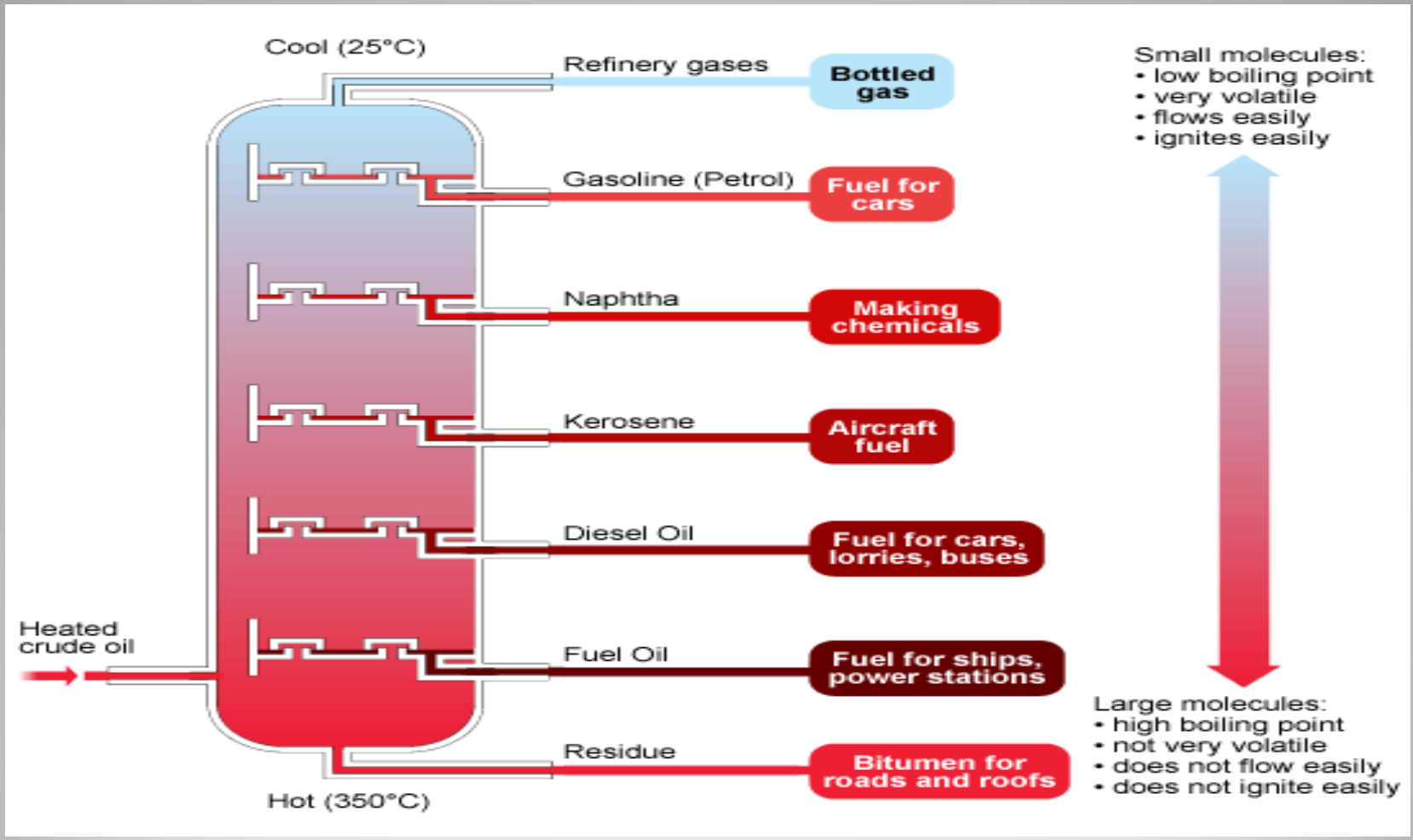
- Asphalt materials have been utilized since 3500 B.C. In building and road construction. Their main uses have been as adhesives, waterproofing agents.
- These early asphalt materials were native asphalt. These native asphalts were found in pools and asphalt lakes. For example Trinidad and Bermudez lake deposits (asphalt lake).

Trinidad Lake Asphalt

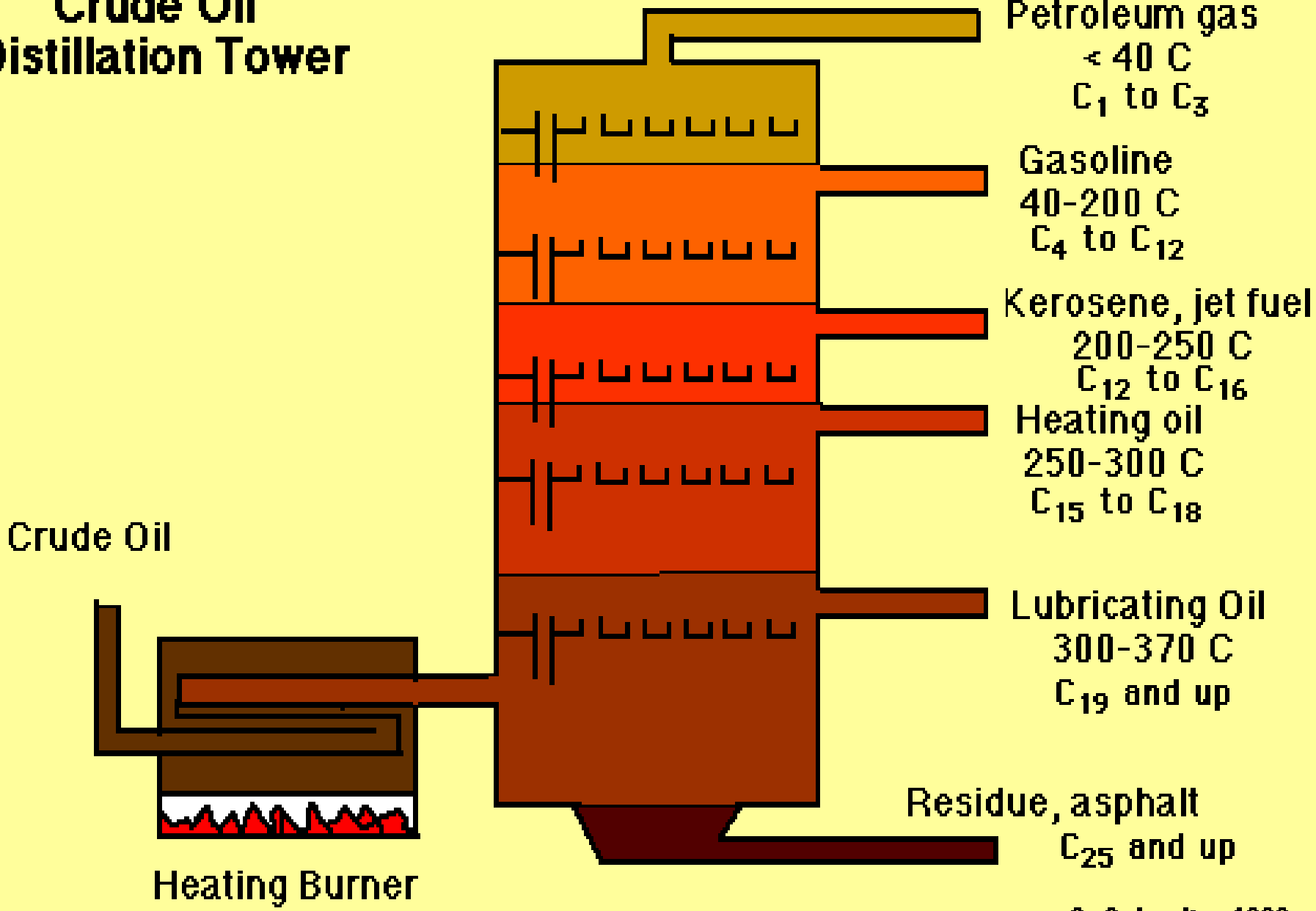
- Demand for paved roads/ construction exceeded the supply of lake asphalts in late 1800, lead to use of petroleum asphalts

Basic Refining Process

- Asphalt is simply the residue left over from petroleum refining.
- Crude oil is heated in a large furnace to about 340° C (650° F) and partially vaporized. It is then fed into a distillation tower where the lighter components vaporize and are drawn off for further processing.
- The residue from this process (the asphalt) is usually fed into a vacuum distillation unit where heavier gas oils are drawn off.


Cool (25°C)
Refinery gases
Bottled gas
Gasoline (Petrol)
Fuel for cars
Naphtha
Making chemicals
Kerosene
Aircraft fuel
Diesel Oil
Fuel for cars, lorries, buses
Heated crude oil
Fuel Oil
Fuel for ships, power stations
Residue
Bitumen for roads and roofs
Hot (350°C)
Small molecules:
• low boiling point
• very volatile
• flows easily
• ignites easily
Large molecules:
• high boiling point
• not very volatile
• does not flow easily
• does not ignite easily

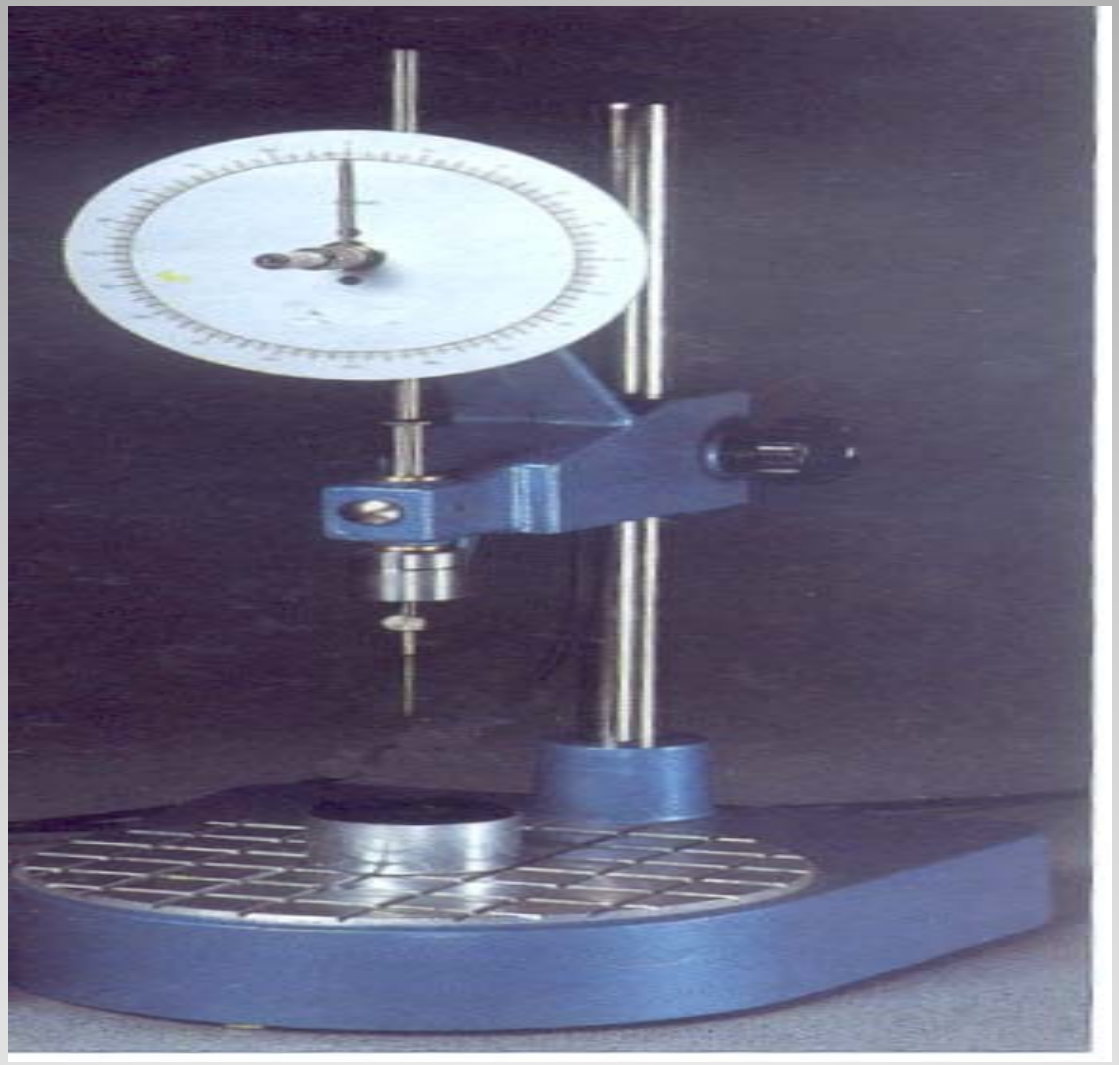
Crude Oil Distillation Tower



PRIMING OVER WMM SURFACE IN PROGRESS

ENGINEERING PROPERTIES

- Penetration Value
- Softening Point
- Flash and Fire Point.
- Ductility.
- Viscosity.
- Bitumen content in a mix.



Penetration Grades Available in India

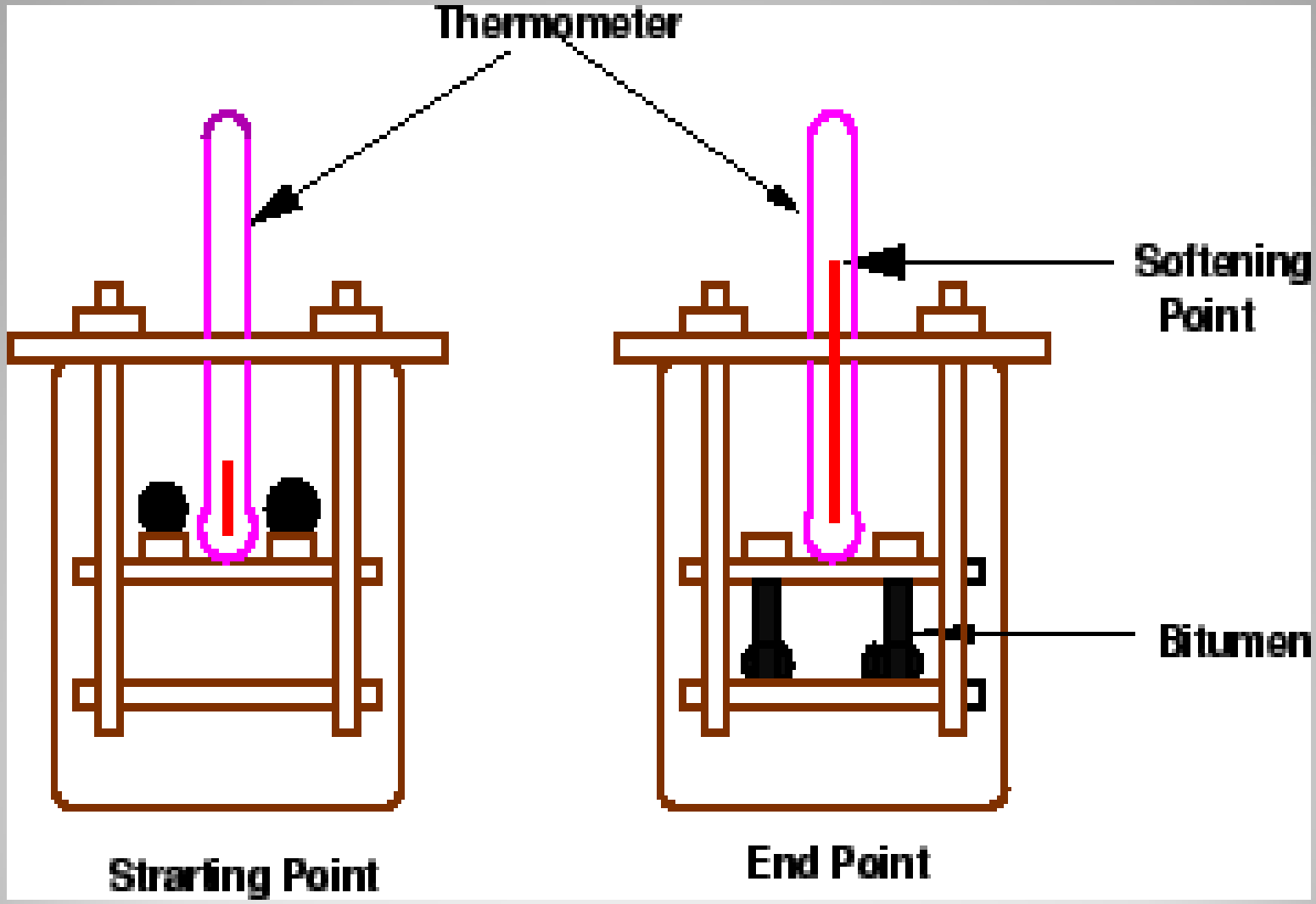
- S 35 = Penetration value at 25 deg C, 100g, 5 sec, 1/10 mm = 30 to 40
- S 45 = 40 to 50
- S 55 = 50 to 60
- S 65 = 60 to 70
- S 90 = 80 to 100
- S200 = 175 to 225

Assam Source Grades having higher wax content.

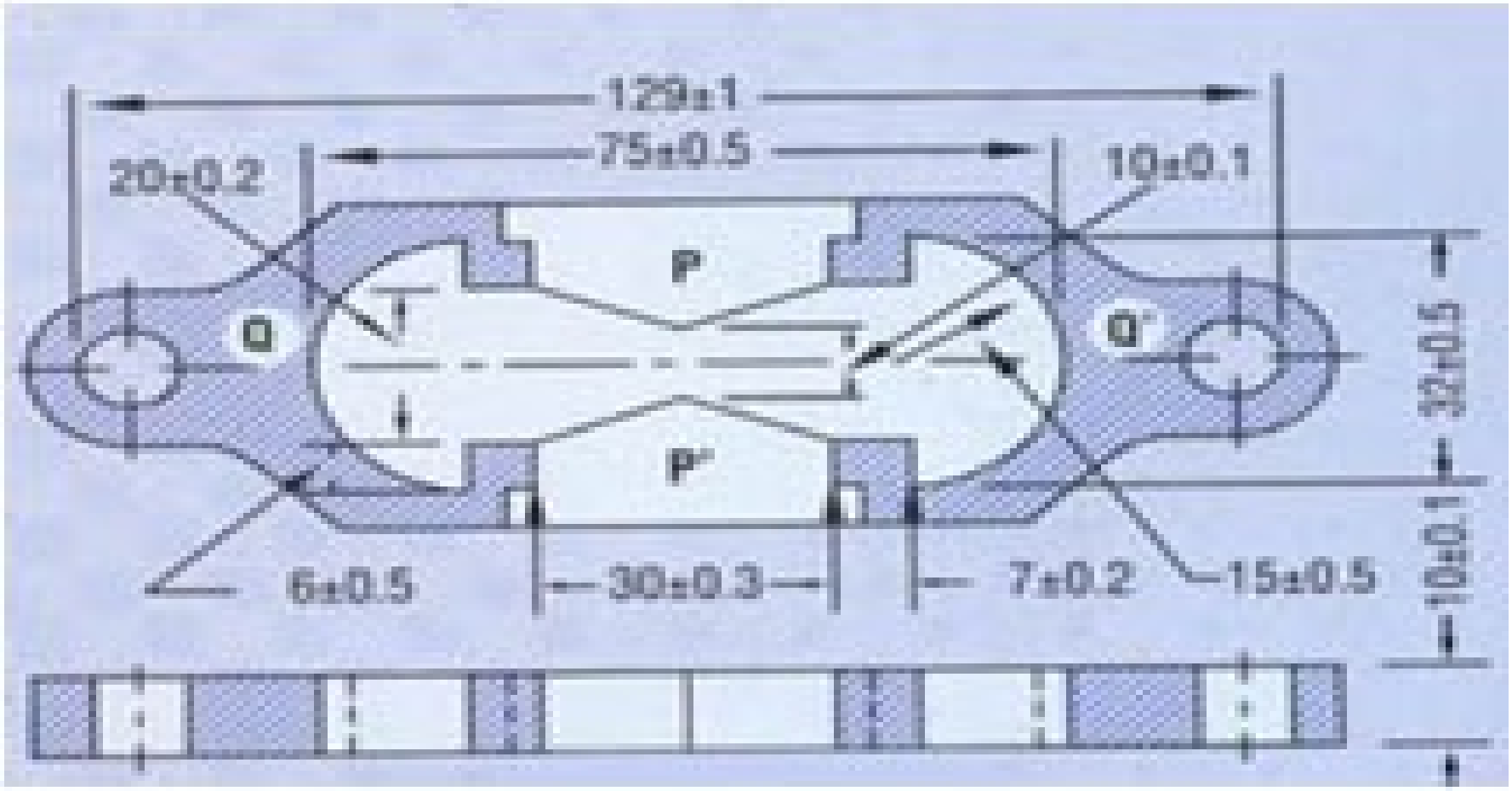
- A 35
- A 55
- A 65
- A 90

Centrifugal Extractor

Softening Point


Thermometer
Softening Point
Bitumen
Strarting Point
End Point


DUCTILITY TEST
CES/DTM/01


129±1
75±0.5
20±0.2
10±0.1
P
Q
Q'
P'
32±0.5
10±0.1
6±0.5
30±0.3
7±0.2
15±0.5