Group 1

7000 lb/hr of aniline is to be heated from 100 to 150^0F by cooling 10,000 lb/hr of toluene with an initial temperature of 185^oF in 2” by 1” IPS double pipe hairpin heat exchangers 15ft long. Pressure drop of 10 psi are allowable and a dirt factor of 0.005 is required.

- How many hairpin required?
- How shall they be arranged?
- Wat is the dirt factor?
- Complete the design data sheet
- Draw the design diagram with specifications

Group 2

10,000 lb/hr of 57^0API gasoline is cooled from 150 to 130^0F by heating 42^0API kerosene from 70 to 100^0F. Pressure drop of 10psi are allowed with a minimum dirt factor of 0.004.

- How many 2.5” by 1.25” IPS hairpin 20ft long are required?
- How shall they be arranged?
- Wat is the dirt factor?
- Draw the design diagram with specifications
- Complete the design data sheet

Group 3

24,000 lb/hr of 35^0API distillate is cooled from 400 to 300^0F by 50,000 lb/hr of 34^0API crude oil heated from an inlet temperature of 250^0F. Pressure drops of 10 psi are allowed. A dirt factor of 0.006 is required. 20-ft haipin of 4” by 3” IPS are availbel.

- How many hairpin required?
- How shall they be arranged?
- Wat is the dirt factor?
- Complete the design data sheet
- Draw the design diagram with specifications

Group 4

O-xylene coming from storage at 100^0F is to be heated to 150^0F by cooling 18,000 lb/hr of butyl alcohol from 170 to 140^0F. 3” by 2” IPS double pipe hairpin heat exchangers of 25ft long are available. Pressure drops of 10 psi are allowed. A dirt factor of 0.006 is required.

- How many hairpins required?
- How shall they be arranged?
- Wat is the dirt factor?
- Complete the design data sheet
- Draw the design diagram with specifications

Group 5

5000 lb/hr of aniline is to be heated from 100 to 150^0F by cooling 8,000 lb/hr of toluene with an initial temperature of 185^oF in 2” by 1” IPS double pipe hairpin heat exchangers 15ft long. Pressure drop of 10 psi are allowable and a dirt factor of 0.005 is required.

- How many hairpin required?
- How shall they be arranged?
- Wat is the dirt factor?
- Complete the design data sheet
- Draw the design diagram with specifications

Group 6

8,000 lb/hr of 57^0API gasoline is cooled from 150 to 130^0F by heating 42^0API kerosene from 70 to 100^0F. Pressure drop of 10psi are allowed with a minimum dirt factor of 0.004.

- How many 2.5” by 1.25” IPS hairpin 20ft long are required?
- How shall they be arranged?
- Wat is the dirt factor?
- Complete the design data sheet
- Draw the design diagram with specifications

Group 7

20,000 lb/hr of 35^0API distillate is cooled from 400 to 300^0F by 45,000 lb/hr of 34^0API crude oil heated from an inlet temperature of 250^0F. Pressure drops of 10 psi are allowed. A dirt factor of 0.006 is required. 20-ft haipin of 4” by 3” IPS are available.

a. How many hairpin required?
b. How shall they be arranged?
c. Wat is the dirt factor?
d. Complete the design data sheet
e. Draw the design diagram with specifications

Group 8

O-xylene coming from storage at 100^0F is to be heated to 150^0F by cooling 14,000 lb/hr of butyl alcohol from 170 to 140^0F. 3” by 2” IPS double pipe hairpin heat exchangers of 25ft long are available. Pressure drops of 10 psi are allowed. A dirt factor of 0.006 is required.

- How many hairpins required?
- How shall they be arranged?
- Wat is the dirt factor?
- Complete the design data sheet
- Draw the design diagram with specifications

Group 9

9000 lb/hr of aniline is to be heated from 100 to 150^0F by cooling 12,000 lb/hr of toluene with an initial temperature of 185^oF in 2” by 1” IPS double pipe hairpin heat exchangers 15ft long. Pressure drop of 10 psi are allowable and a dirt factor of 0.005 is required.

- How many hairpin required?
- How shall they be arranged?
- Wat is the dirt factor?
- Complete the design data sheet
- Draw the design diagram with specifications

Group 10

- 10,000 lb/hr of 57^0API gasoline is cooled from 140 to 110^0F by heating 42^0API kerosene from 70 to 100^0F. Pressure drop of 10psi are allowed with a minimum dirt factor of 0.004.
- How many 2.5” by 1.25” IPS hairpin 20ft long are required?
- How shall they be arranged?
- Wat is the dirt factor?
- Complete the design data sheet
- Draw the design diagram with specifications

Group 11

- 24,000 lb/hr of 35^0API distillate is cooled from 380 to 270^0F by 50,000 lb/hr of 34^0API crude oil heated from an inlet temperature of 250^0F. Pressure drops of 10 psi are allowed. A dirt factor of 0.006 is required. 20-ft haipin of 4” by 3” IPS are availbel.
  - How many hairpin required?
  - How shall they be arranged?
  - Wat is the dirt factor?
  - Complete the design data sheet
  - Draw the design diagram with specifications

Group 12

O-xylene coming from storage at 120^0F is to be heated to 160^0F by cooling 16,000 lb/hr of butyl alcohol from 170 to 140^0F. 3” by 2” IPS double pipe hairpin heat exchangers of 25ft long are available. Pressure drops of 10 psi are allowed. A dirt factor of 0.006 is required.

- How many hairpins required?
- How shall they be arranged?
- Wat is the dirt factor?
- Complete the design data sheet
- Draw the design diagram with specifications

Group 13

- 9000 lb/hr of aniline is to be heated from 80 to 120^0F by cooling 12,000 lb/hr of toluene with an initial temperature of 185^oF in 2” by 1” IPS double pipe hairpin heat exchangers 15ft long. Pressure drop of 10 psi are allowable and a dirt factor of 0.005 is required.
- How many hairpin required?
- How shall they be arranged?
- Wat is the dirt factor?
- Complete the design data sheet
- Draw the design diagram with specifications

Group 14

- 12,000 lb/hr of 57^0API gasoline is cooled from 150 to 130^0F by heating 42^0API kerosene from 70 to 100^0F. Pressure drop of 10psi are allowed with a minimum dirt factor of 0.004.
- How many 2.5” by 1.25” IPS hairpin 20ft long are required?
- How shall they be arranged?
- Wat is the dirt factor?
- Complete the design data sheet
- Draw the design diagram with specifications

Group 15

- 22,000 lb/hr of 30^0API distillate is cooled from 400 to 300^0F by 48,000 lb/hr of 28^0API crude oil heated from an inlet temperature of 250^0F. Pressure drops of 10 psi are allowed. A dirt factor of 0.006 is required. 20-ft haipin of 4” by 3” IPS are availbel.
  - How many hairpin required?
  - How shall they be arranged?
  - Wat is the dirt factor?
  - Complete the design data sheet
  - Draw the design diagram with specifications

Group 16

O-xylene coming from storage at 100^0F is to be heated to 150^0F by cooling 14,000 lb/hr of butyl alcohol from 180 to 140^0F. 3” by 2” IPS double pipe hairpin heat exchangers of 25ft long are available. Pressure drops of 10 psi are allowed. A dirt factor of 0.006 is required.

- How many hairpins required?
- How shall they be arranged?
- Wat is the dirt factor?
- Complete the design data sheet
- Draw the design diagram with specifications

Group 17

7400 lb/hr of aniline is to be heated from 110 to 160^0F by cooling 10,000 lb/hr of toluene with an initial temperature of 185^oF in 2” by 1” IPS double pipe hairpin heat exchangers 15ft long. Pressure drop of 10 psi are allowable and a dirt factor of 0.005 is required.

- How many hairpin required?
- How shall they be arranged?
- Wat is the dirt factor?
- Complete the design data sheet
- Draw the design diagram with specifications

Group 18

11,000 lb/hr of 60^0API gasoline is cooled from 160 to 130^0F by heating 42^0API kerosene from 70 to 100^0F. Pressure drop of 10psi are allowed with a minimum dirt factor of 0.004.

- How many 2.5” by 1.25” IPS hairpin 20ft long are required?
- How shall they be arranged?
- Wat is the dirt factor?
- Complete the design data sheet
- Draw the design diagram with specifications

Group 19

24,000 lb/hr of 35^0API distillate is cooled from 400 to 300^0F by 50,000 lb/hr of 34^0API crude oil heated from an inlet temperature of 250^0F. Pressure drops of 10 psi are allowed. A dirt factor of 0.006 is required. 20-ft haipin of 4” by 3” IPS are available.

- How many hairpin required?
- How shall they be arranged?
- Wat is the dirt factor?
- Complete the design data sheet
- Draw the design diagram with specifications

Group 20

O-xylene coming from storage at 120^0F is to be heated to 160^0F by cooling 19,000 lb/hr of butyl alcohol from 170 to 140^0F. 3” by 2” IPS double pipe hairpin heat exchangers of 25ft long are available. Pressure drops of 10 psi are allowed. A dirt factor of 0.006 is required.

- How many hairpins required?
- How shall they be arranged?
- Wat is the dirt factor?
- Complete the design data sheet
- Draw the design diagram with specifications

Group 21

5000 lb/hr of aniline is to be heated from 100 to 150^0F by cooling 8,000 lb/hr of toluene with an initial temperature of 185^oF in 2” by 1” IPS double pipe hairpin heat exchangers 15ft long. Pressure drop of 10 psi are allowable and a dirt factor of 0.005 is required.

- How many hairpin required?
- How shall they be arranged?
- Wat is the dirt factor?
- Complete the design data sheet
- Draw the design diagram with specifications