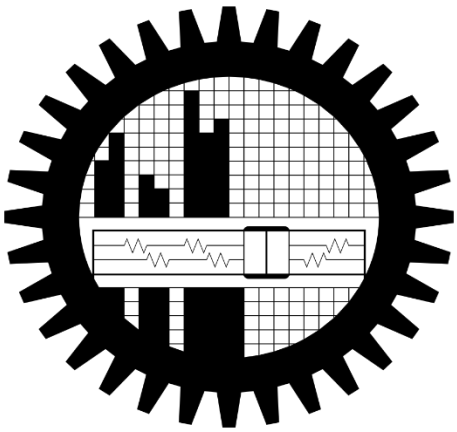
BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY



Project:

Double Pipe Heat Exchanger

Submitted By :

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Department : ME

Section : C1

ABSTRACT:

To make ourselves acquainted with design of heat equipments, our teachers assigned us to a double tube heat exchanger. Our heat exchangers (Double pipe configuration) consisted of Mild steel for outer pipes and Galvanized iron for inner pipes of different diameters. We undertook calculations of various configurations of double pipe heat exchangers- from single pass to multi pass and we chose the best configuration based on both the cost and heat transfer qualities. The project gave us hands on experience of engineering design, construction, team work, problem solving and most importantly- decision making.

OBJECTIVES:

- To get a brief idea of design a heat exchanger
- To get a Hands-on experience of building a double pipe heat exchanger
- To increase the ability of finding the outcome of teamwork

SOFTWARE:

- Solidworks
- Microsoft Excel
- Microsoft Word
- SF Pressure Drop

THERMAL DESIGN:

Inner Pipe Diameter	2 in
Outer Pipe Diameter	4 in
Length Per Turn	7 meter
Number of Turns	11

MECHANICAL DESIGN:

Gasket:

Internal Diameter of Gasket(mm)	114.25
External Diameter of Gasket(mm)	162.3917
Mean Gasket Diameter(mm)	138.32085
Mean Gasket Width(mm)	24.070849
Basic Gasket Seating Width(mm)	12.035424
Effective Gasket Seating Width(mm)	1.7346055

Bolt:

The Bolt Root Diameter Chosen(mm)(A-325 Type)	14
Bolt Numbers	4
Bolt Circle Diameter(mm)	142.5

Nozzle:

Nozzle Diameter(mm)	60.325
Nozzle Minimum Thickness(mm)	1.0512554

DESIGN MATERIAL:

Inside Pipe	Stainless Steel
Outside Pipe	Bronze

WORK-OUT MODEL(PROTOTYPE):

THERMAL:

Inner Pipe Diameter	3/4 in
Outer Pipe Diameter	1.5 in
Length Per Turn	1 feet
Number of Turns	1

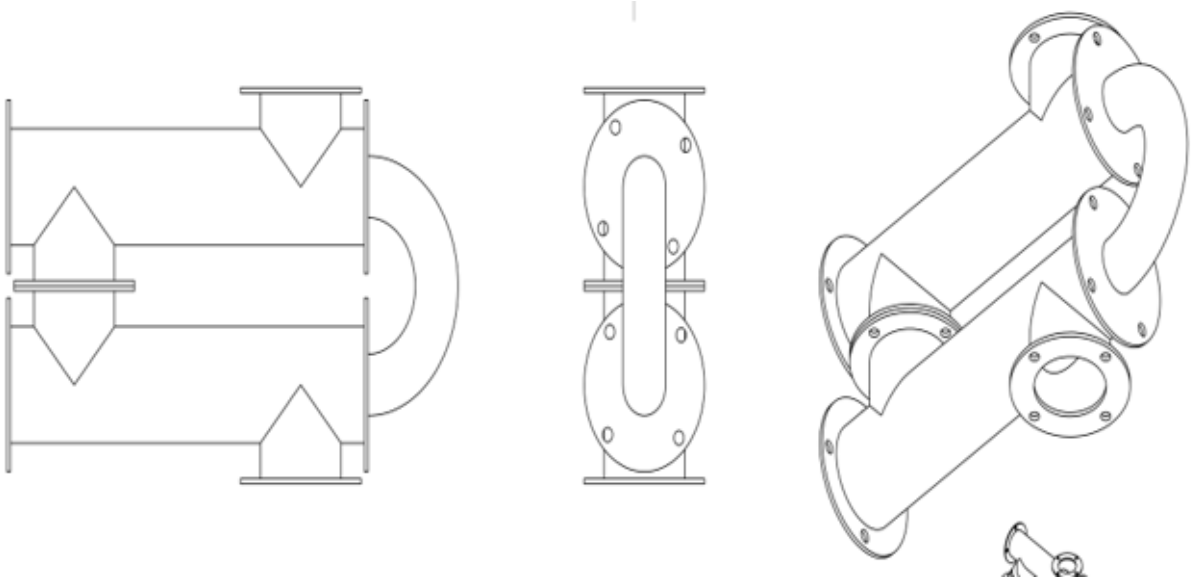
MATERIAL:

Inside Pipe	Galvanized Iron Pipe
Outside Pipe	Mild Steel

OTHER:

- In place of bolt we used ***Arc Welding*** to joint parts
- We used ***elbow pipes*** instead of bend pipes

3D DESIGN:



PRACTICAL IMAGE:


KSB
KSB
TOP
TOP

COST:

Galvanized Iron	92 tk/feet
Mild Steel	32 tk/feet
Elbow Pipe	40 tk/piece
Elbow Joint	120 tk

DRAWBACKS:

- Our practical model was not leak proof
- We couldn't do the pressure test for operation due to leak
- We were unable to use exact material given in the problem due to scarcity in the market
- Welding was not up-to the mark

CONCLUSIONS:

The introduction of a hands-on, problem based approach to process engineering teaching has proven to be a popular innovation with engineering students. Their appreciation of both the science and art of engineering has been enhanced and the general level of social interaction between students as a consequence of the need for a genuinely group-based approach, has been significantly improved.

REFERENCES:

- ***Heat Transfer in Process Engineering*** – Eduardo Cao
- ***Design of Fluid Thermal Systems*** – William S. Janna
- ***Heat & Mass Transfer Fundamental & Approach*** – Cengel & Boles
- ***Heat Transfer A Basic Approach*** – M. Necati Ozisik
- ***Heat Transfer*** – J.P. Holman

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