



Tru-Tec Division

■ KOCH ENGINEERING COMPANY INC

DOW CHEMICAL COMPANY

Plaquemine, Louisiana

TRU-SCAN®

of

C-29 Cracked Gas Water Wash Column

April 2, 1991

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C-29 WATER WASH LHC III

DOW PLAQUEMINE

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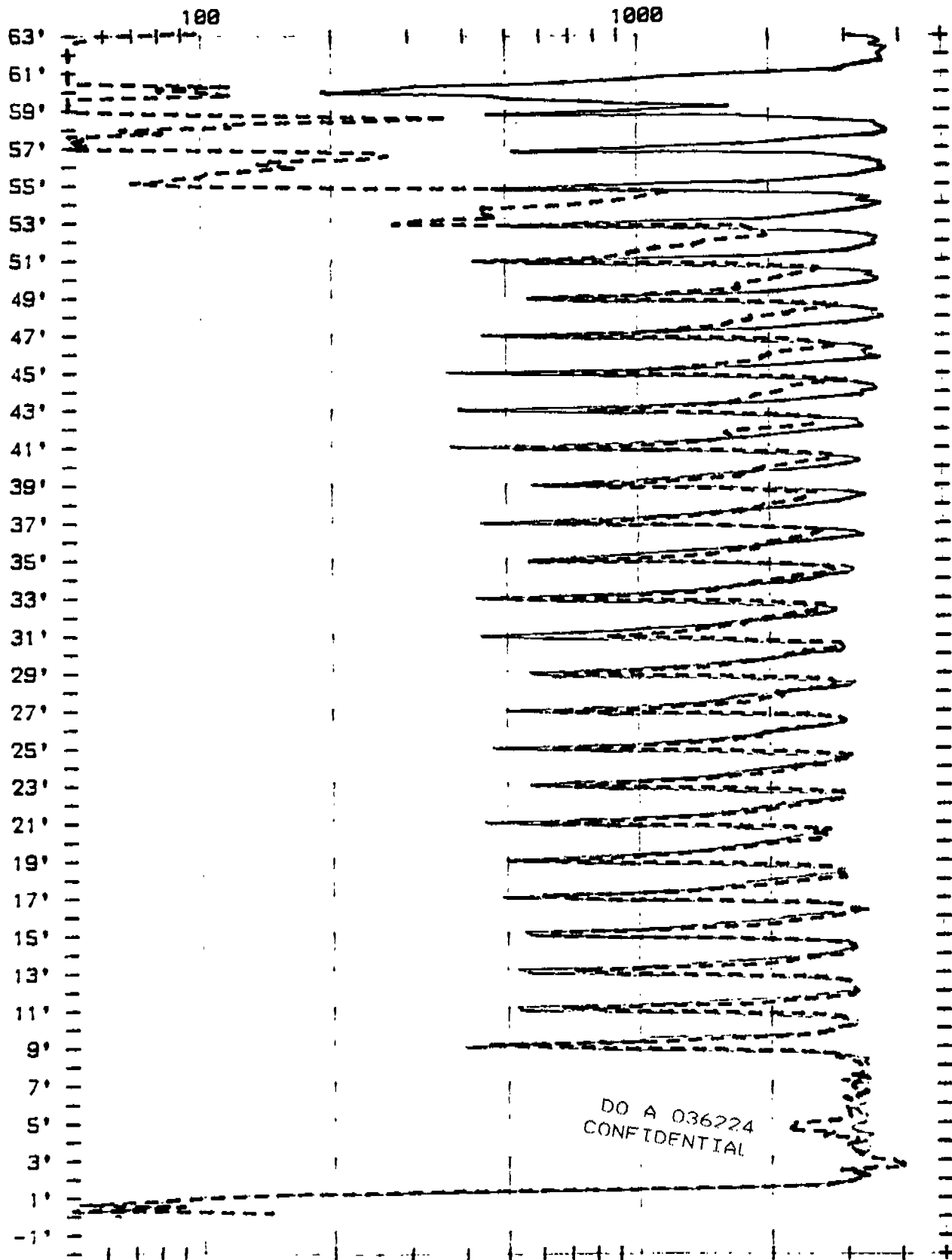
SCALES: 50 - 5000

FIGURE 1A

TRU-TEC, INC.

PROCESS DIAGNOSTICS

1-800-288-8970



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ASPEN MODEL APPLICATIONS

A. LHC3

1. K-71 cracked gas compressor studies
2. Furnace load study
3. K-120 propylene compressor study
4. Quench section rigorous model & evaluation study
5. Revision of models to fit plant modification
6. Plant start-up compressor false-load study
7. Revision of furnace models to fit new coils
8. Program for easy insertion of model parameters

B. LHC2

1. K-71 cracked gas compressor studies
2. K-71 intercooler replacement evaluation
3. TK-71 steam turbine upgrade evaluation
4. LHC2 expansion study
5. Distillation column profiles for control system improvement
6. Updating of model to fit plant modifications

C. LHC8 BENZENE PLANT

1. Model of entire benzene plant
2. Plant evaluation under several design cases
3. Column profiles for control system development

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EFPS APPLICATIONS

Ethylene Furnace Program System (EFPS)

A complete cracking furnace model system
licensed from Pyrotec Institute

A. LHC3

Naphtha furnace cracking study

B. LHC2

2F25 Study

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CFD APPLICATIONS

Computational Fluid Dynamics (CFD)

Using PHOENICS system

A. LHC3

Flow study of split-coil furnace venturis

Flow patterns in Benzene Plant HDA Reactor

B. LHC2

2F25 Convection Section Flow Study

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LINEAR PROGRAMMING APPLICATIONS

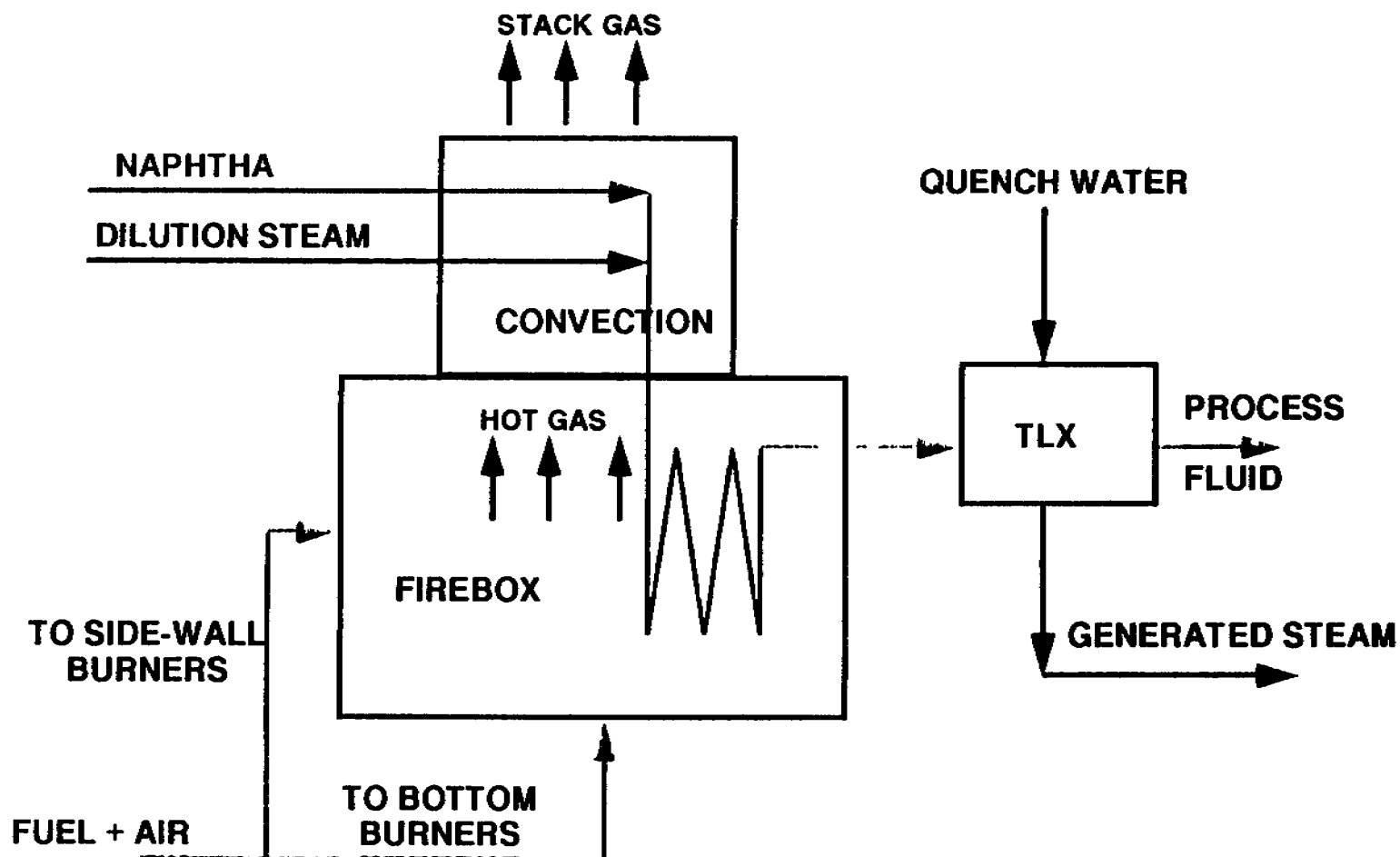
Gulf Coast Hydrocarbons Economic Model

LP optimization including LHC3, LHC2,
& Texas LHC plants

Used for feedstock purchases &
other economic decisions

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EFPS MODEL OF NAPHTHA FURNACE

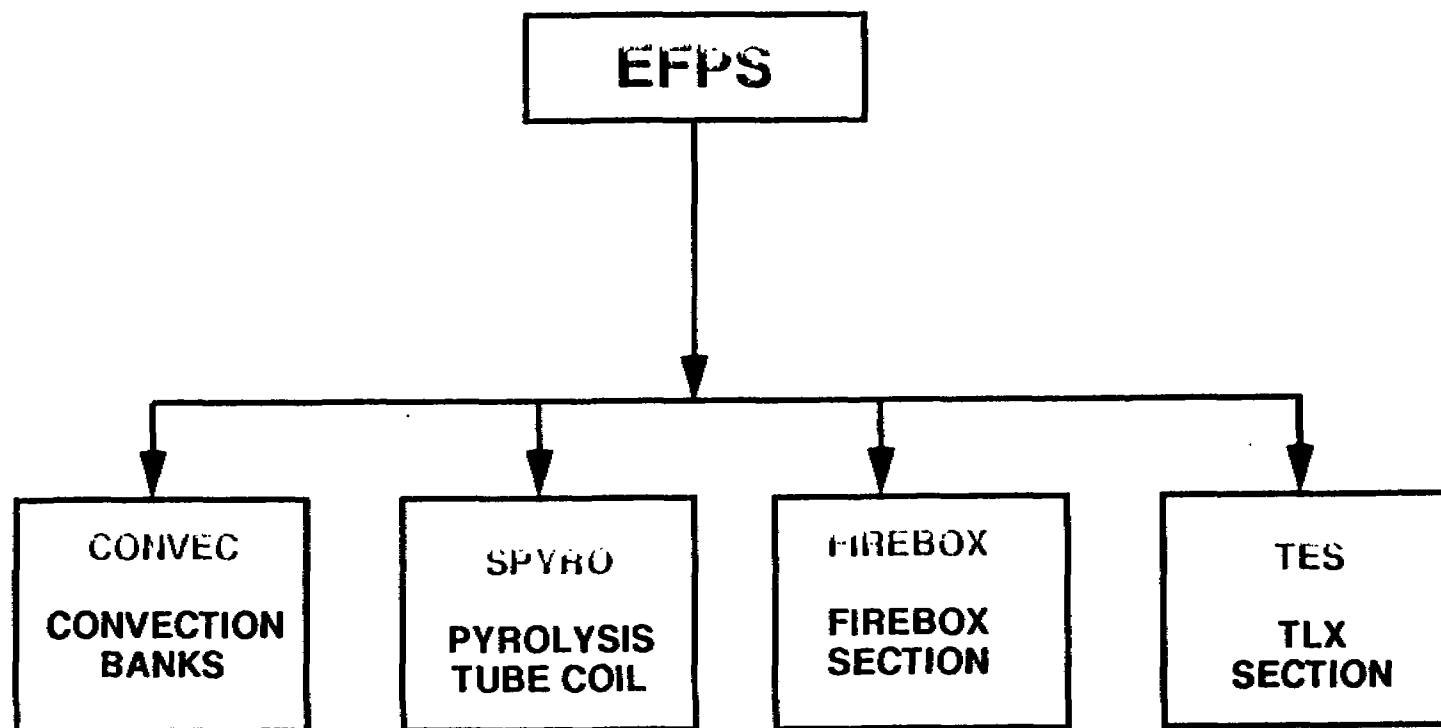


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EFPS MODELING SOFTWARE

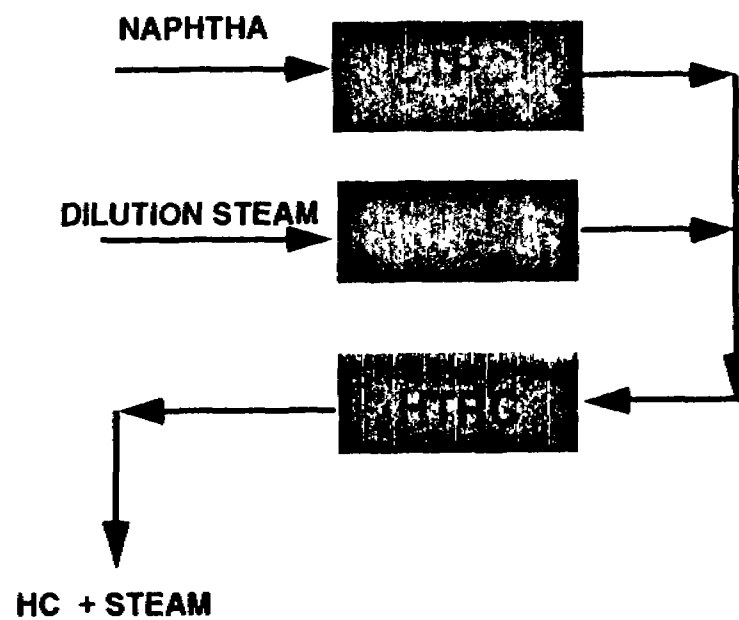


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NAPHTHA FURNACE CONVEC SECTION

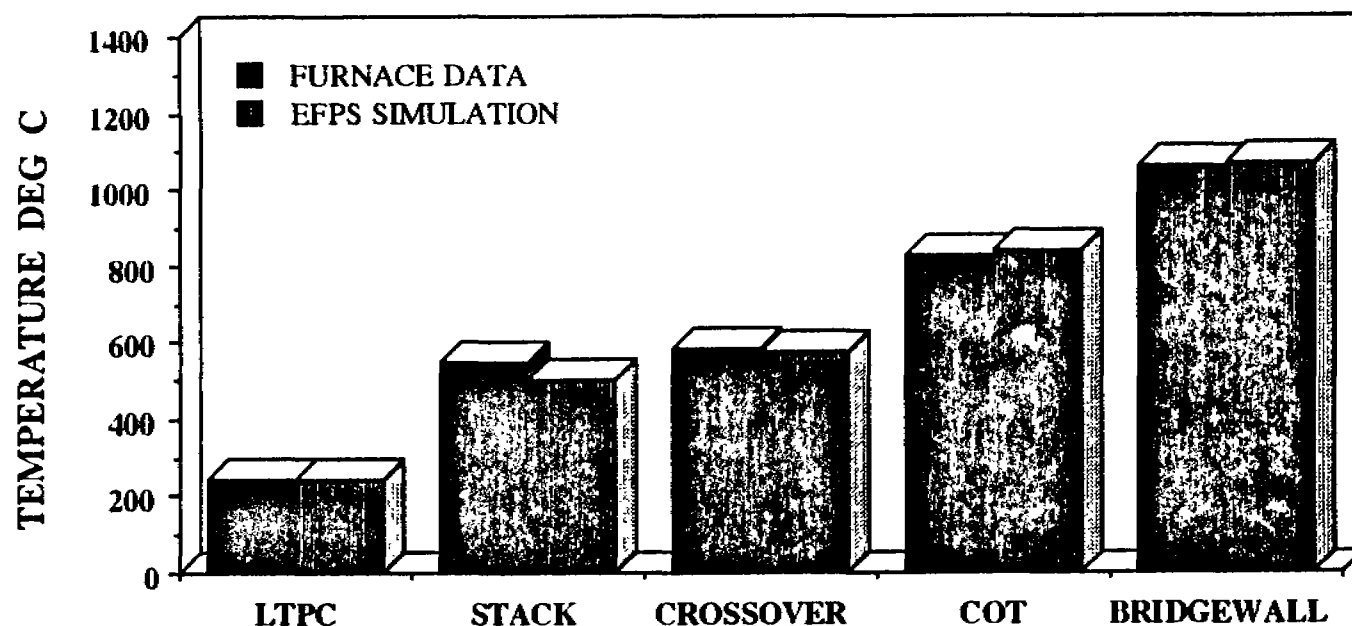


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COMPARISON OF SIMULATION & FURNACE DATA



MPR = METHANE / PROPYLENE ≈ 1.04

FUEL REQUIREMENT = 2700 KG/H (65 % CH₄, 35 % H₂)

STEAM GENERATED = 31000 KG/H

EFFICIENCY = 74.8 % (RAD = 44.2 %, CONVEC = 30.6 %)

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FURNACE REGRESSION MODEL

- MANY CASE STUDIES USING TUNED EFPS FURNACE MODEL
- STATISTICAL REGRESSION OF RESULTS USING SAS

Characteristics = f{Naphtha, Steam ratio, Excess Air, Conv, P_{cin} , P_{cout} }

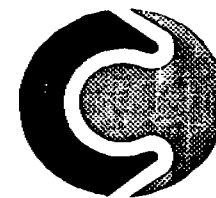
E.g.

$$T_{over} = 440.2 + (Naphtha/1000)[3.5475MPR + 2.0625SR] + 93.6 P_{cin}X_{Air}$$

USEFUL FOR FURNACE OPERATION AND CONTROL

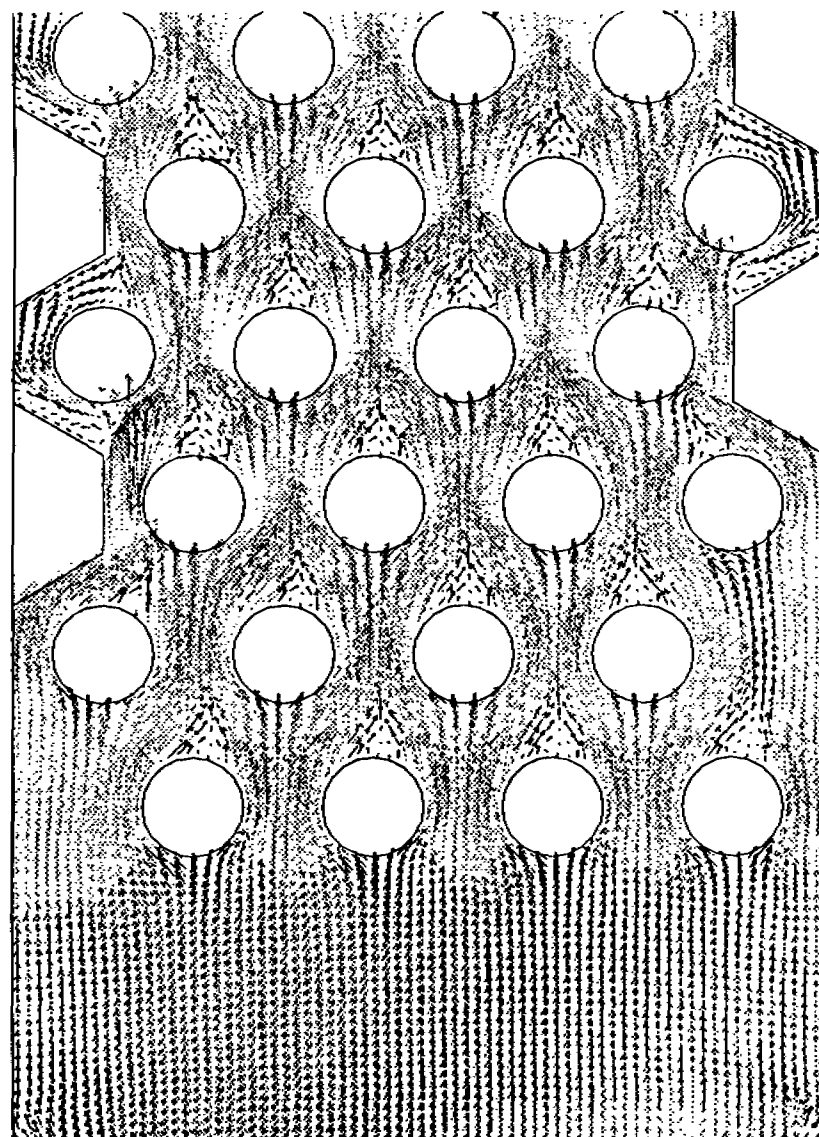
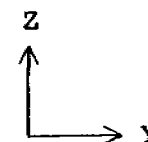
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High Pressure Steam
Steam Superheat Coil

High Temperature
Process Coil



→ : 12.50 m/s.

Min : 2.1707E-02

Max : 1.0716E+01

2F-25 Convection Section

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PHOENICS

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