Brownsville Reactors

An assembly drawing of the Brownsville Reactors (Combustion Engineering Drg. No. E-152-572-7) is included in the appendix for ready reference. These reactors, of which there are two alike, are 16'-6" I.D. and 21'-9" high from bend line to bend line with hemispherical heads. Each reactor is filled with steam tubes which are arranged in bundles as shown in plan on the following Sketch A.

There are 1420 - 1 7/8" O.D. tubes in all, arranged in 31 bundles. All but 12 of the bundles have 61 tubes each with 24" melons at top and bottom. The other 12 bundles have 21 or 22 tubes with 19" melons. The height of the bundles from ctr. line of bottom melons to ctr. line of top melons is 16'-6" for most bundles and 18'-6" for a few to stagger the top melons. The bottom melons are all on the same plane with their center line 21 1/4" above the grid.

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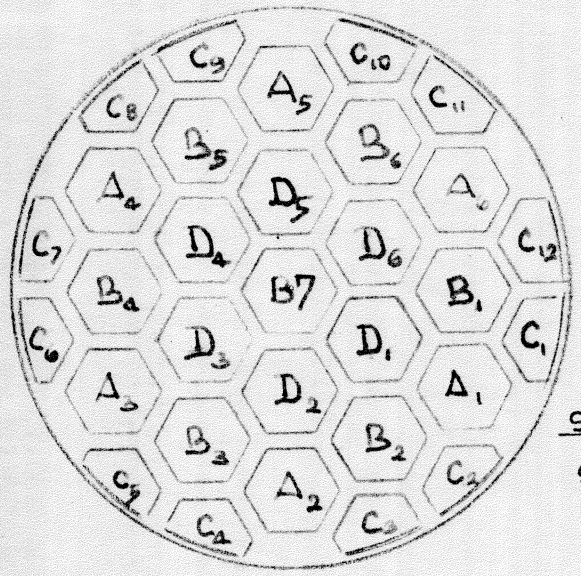
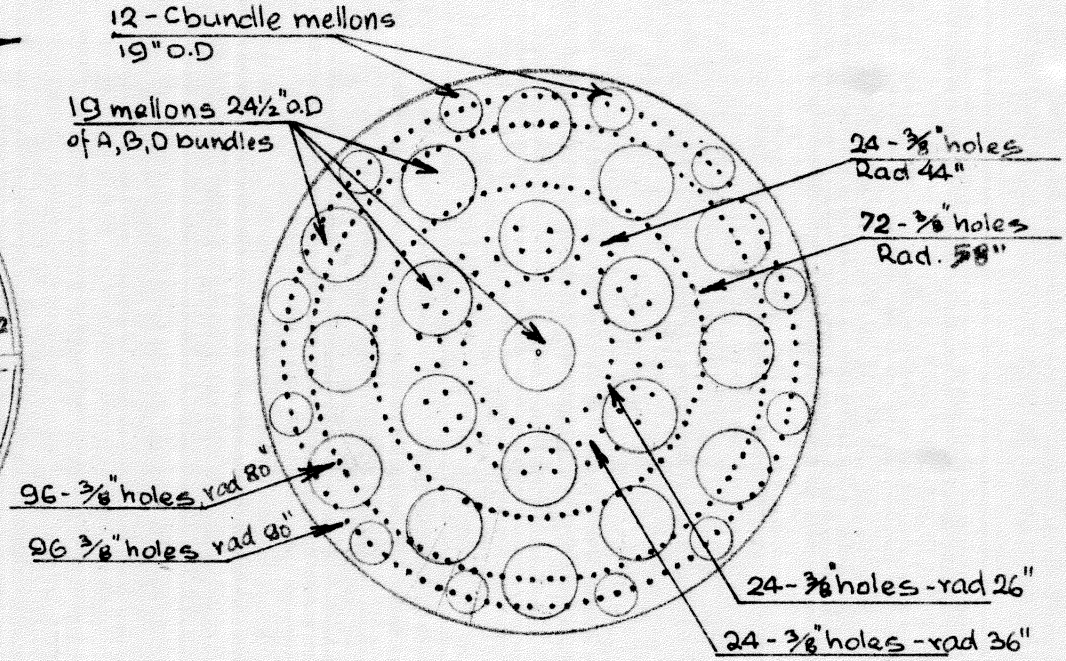
SKETCH A

Arrangement of water tube bundles in reactor K 351 B

16'6" Diameter



Arrangement of reactor grid holes and location of mellons.



Total of 1 7/8" O.D water tubes - 1420
in 19 bundles A_1 - A_6, B_1 to B_7, D_1 to D_6, each 61 tubes
and 12 bundles C_1 to C_{12} each 21/22 tubes.
Mellons installed 24" above grid (to center)
Distance between mellon centers vertically:
Bundles A, B_1 - 16½ ft, Bundles C & D - 18½ ft

Total number of 3/8" I.D holes — 336
Grid consist of 24 pie sections, center plate and 48 sectors at periphery, each with 4 holes

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The free area between tubes is 187 sq. ft. and the distance from the grid to the center line of the lower row of top melons is 18'-6". This is probably the maximum height of catalyst bed that can be used and still have enough submerged cooling surface to take away the exothermic heat of reaction.

The grid is made up of pie shaped castings and contains 336 openings as shown in the plan on the above Sketch A. These openings were originally 3/4" diameter but in May 1951, after Run #8, these were reduced to 3/8" diameter by means of sleeve inserts. This was done on both reactors.

In the original reactors there were three horizontal rows of louvre type baffles installed between the cooling tubes near the tops of the bundles. These caused localized erosion of some of the tubes and were removed from both reactors in Feb. 1951 after Run #5.