

INITIAL VAPOR DISTRIBUTION IN SULFURIC ACID TOWERS

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GOALS FOR TOWERS

- REDUCE PRESSURE DROP
- MINIMIZE BED DEPTH
- MAXIMIZE THROUGHPUT

NEED FOR GOOD INITIAL VAPOR DISTRIBUTION

- EFFICIENT USE OF PACKING REQUIRED TO MEET GOALS
- EFFICIENCY DEPENDS ON EVEN DISTRIBUTION OF VAPOR
- UPPER LIMIT OF EFFICIENCY IS EVEN INITIAL DISTRIBUTION

TYPICAL TOWER

- INSUFFICIENT INLET DIAMETER
- INSUFFICIENT SPACE BETWEEN INLET AND PACKING SUPPORT

POOR INITIAL DISTRIBUTION

DEVICES WHICH PROVIDE EVEN VAPOR DISTRIBUTION

- PRESSURE DROP
 - ORIFICE PLATE
 - PACKING

DEVICES WHICH PROVIDE EVEN VAPOR DISTRIBUTION

- STRUCTURED PACKING

DEVICES WHICH PROVIDE EVEN VAPOR DISTRIBUTION

■ FLOW REDIRECTION

- VAPOR HORN
- V-BAFFLE
- GUIDE VANES

KOCH-GLITSCH, INC.

- VAPOR DISTRIBUTION TECHNOLOGY
2 U.S. PATENTS
COMMERCIAL EXPERIENCE

- PILOT SCALE VAPOR DISTRIBUTION

- COMPUTATIONAL FLUID DYNAMICS

COMPUTATIONAL FLUID DYNAMICS

- FINITE ELEMENT ANALYSIS TECHNIQUE
- SOLUTION OF MATERIAL AND ENERGY BALANCE FOR EACH ELEMENT
- COMPLEX GEOMETRIES

KOCH-GLITSCH, INC.
KNIGHT DIVISION

- CERAMIC RANDOM (FLEXISADDLE™) AND STRUCTURED (FLEXERAMIC®) PACKING
- SELF-SUPPORTING DOME AND BAR-TYPE PACKING SUPPORTS

KOCH-GLITSCH, INC. KNIGHT DIVISION

- SULFURIC ACID TOWERS
 - CARGILL - RIVERVIEW, FL
 - MARSULEX - OREGON, OH
 - GENERAL CHEMICAL - CLAYMONT, DE
 - SHERRITT - SASKATCHEWAN, ALBERTA
 - SAVAGE ZINC - CLARKSVILLE, TN
 - EI DuPONT - RICHMOND, VA
 - KOCH SULFUR - RIVERTON, WY
 - EI DuPONT - BURNSIDE, LA

KOCH-GLITSCH, INC.

- CHEMICAL TECHNOLOGY GROUP
 - LIQUID DISTRIBUTORS
- MIST ELIMINATOR GROUP
OTTO YORK DIVISION
 - FLEXIFIBER®
 - DEMISTER®

TOWERS STUDIED

- ARCH WALLS AND BAR-TYPE PACKING SUPPORT
- SELF-SUPPORTING DOME-TYPE PACKING SUPPORT

VAPOR DISTRIBUTOR

- ARCH WALLS AND BAR-TYPE PACKING SUPPORT
 - BRICK GUIDE VANES

VAPOR DISTRIBUTOR

- SELF-SUPPORTING DOME-TYPE PACKING SUPPORT
 - V-BAFFLE

CONCLUSION

- ENHANCED PERFORMANCE OF TOWERS DEPENDS ON GOOD INITIAL VAPOR DISTRIBUTION
- INITIAL VAPOR DISTRIBUTION CAN BE IMPROVED WITHOUT PRESSURE DROP INCREASE AND WITH MINIMAL MODIFICATION TO TOWER