

MEETING ADDITIONAL PLANT CAPACITY REQUIREMENTS WITHOUT ADDING ADDITIONAL VESSELS

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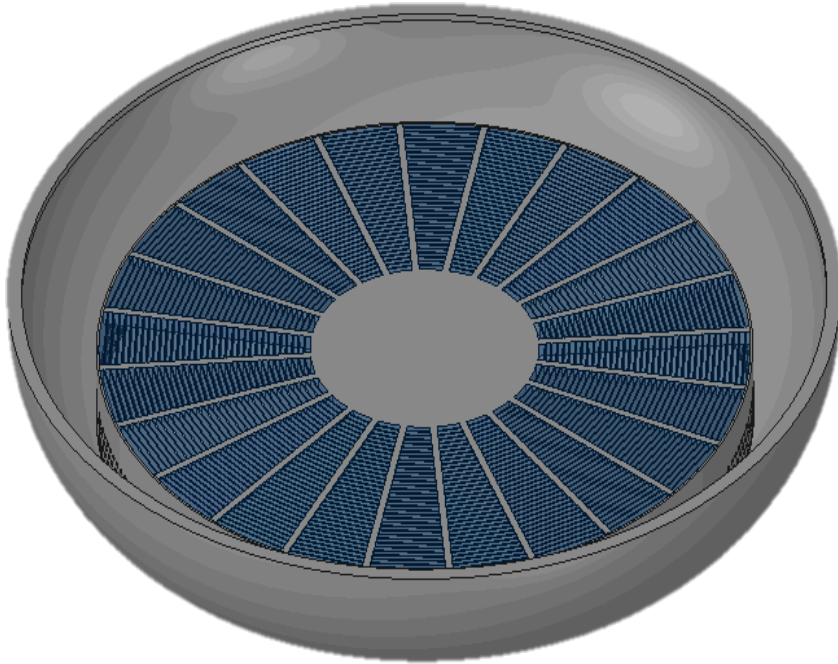
Agenda

- Case Study
- Standard Equipment CFD Review
- Outlet Support Grid CFD Review
- Outlet Support Grid Design Overview
- Outlet Support Grid Benefits
- Q & A



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OUTLET SUPPORT GRID (OSG)



CONFIDENTIAL PRESENTATION
US Patent Protected



CASE STUDY

- Project Located In West Virginia
- Three Mole Sieve Bed System
- Standard Outlet Baskets Installed
- Previous Containment Issues
- Poor Bed Utilization
- Pre-Installation Bed 130 psi
- Plant Conditions Warrant ESD



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CASE STUDY

- Project Success In Areas Of:
 - Safety
 - Project Execution
 - Process Improvement
 - ROI
- Three Outlet Support Grids Installed Within 1.5 Hours For Each Bed – Far Exceeding Maintenance Plan



CASE STUDY

- Post-Installation Bed Reduced To 3 psi
- Significant Reduction In Support Media
- Additional Mole Sieve Volume
- Containment Issues Resolved
- Project Payback Estimated Less Than 12 Months
- Outstanding Project ROI

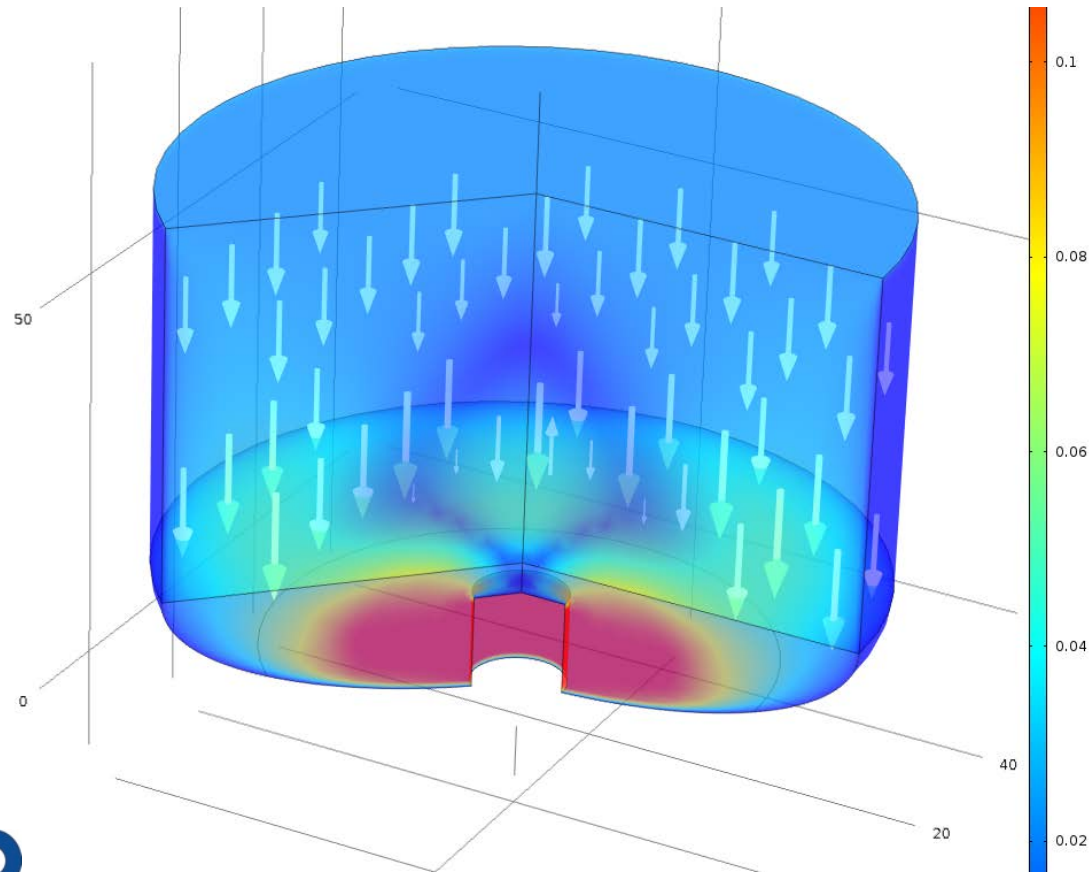


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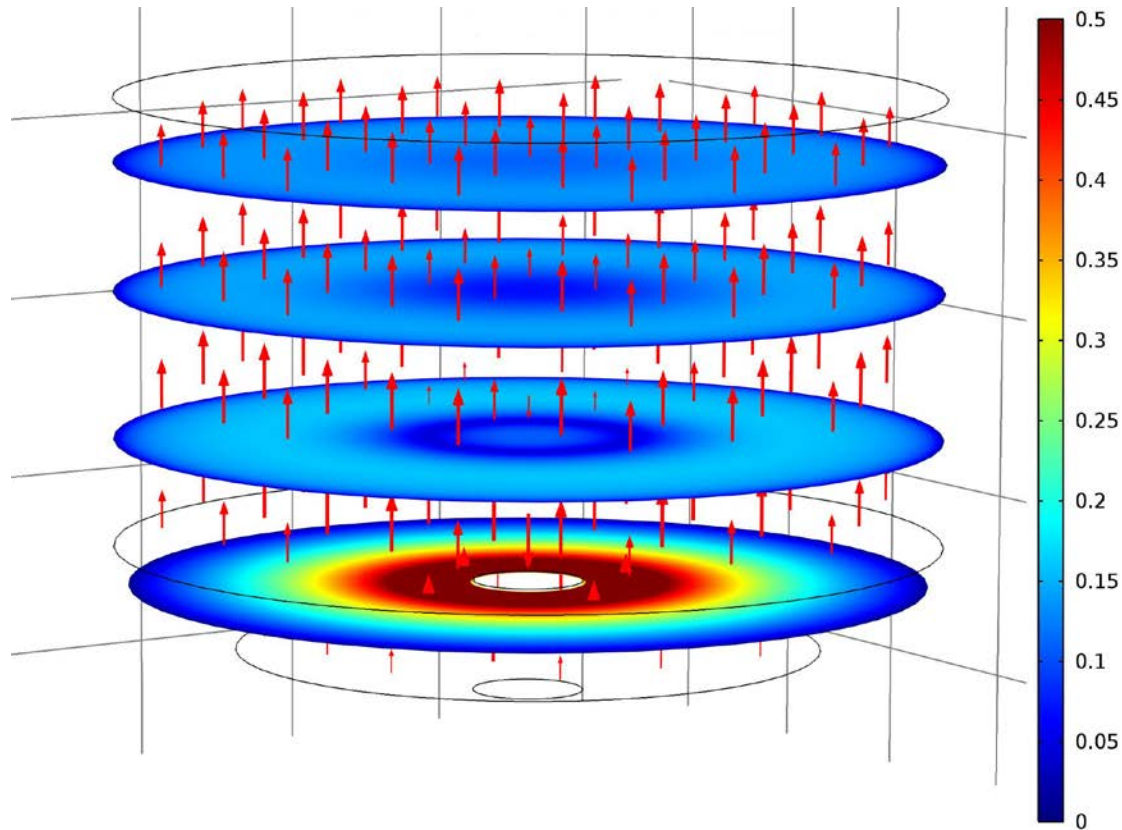


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CFD STUDY



CFD STUDY



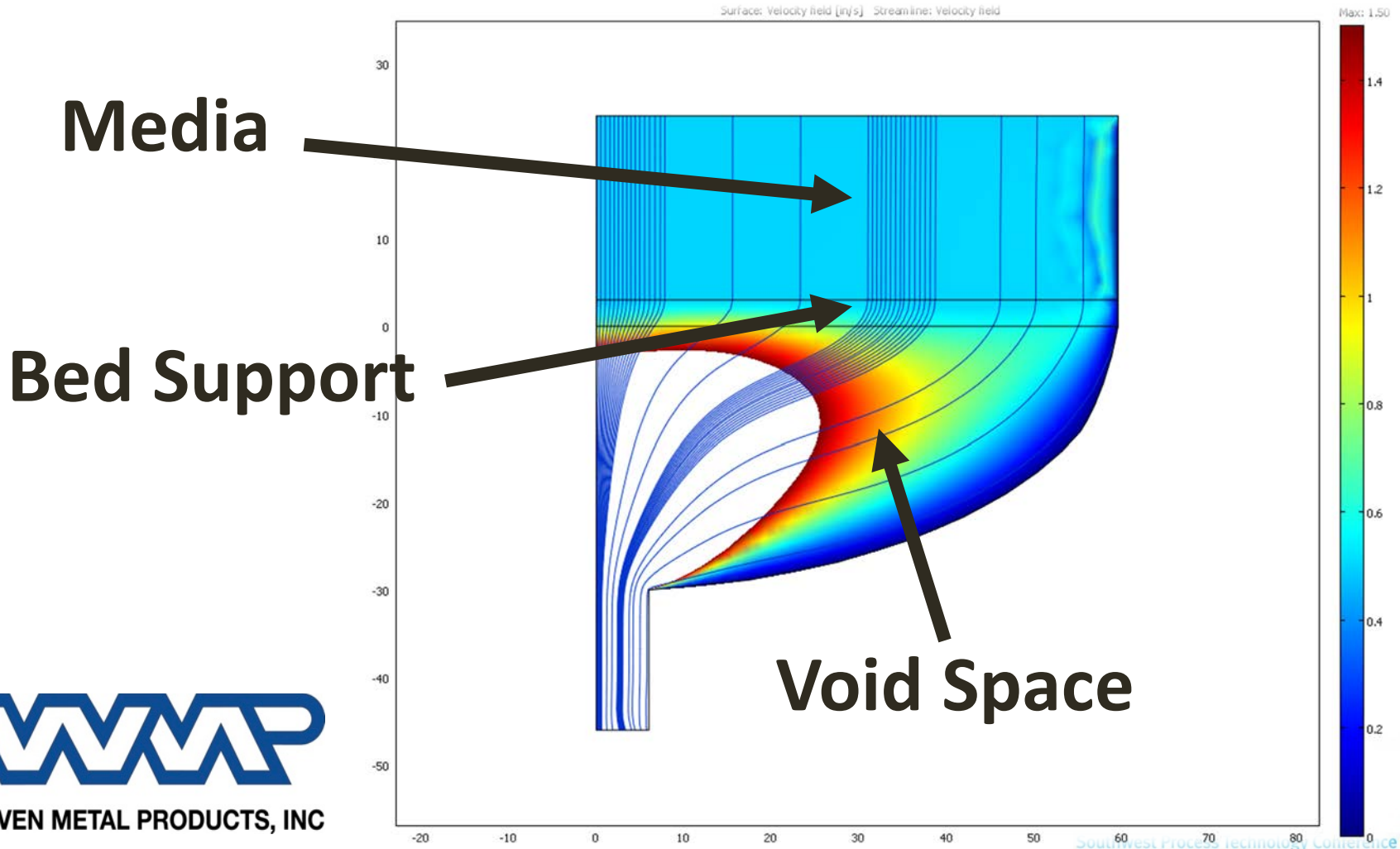
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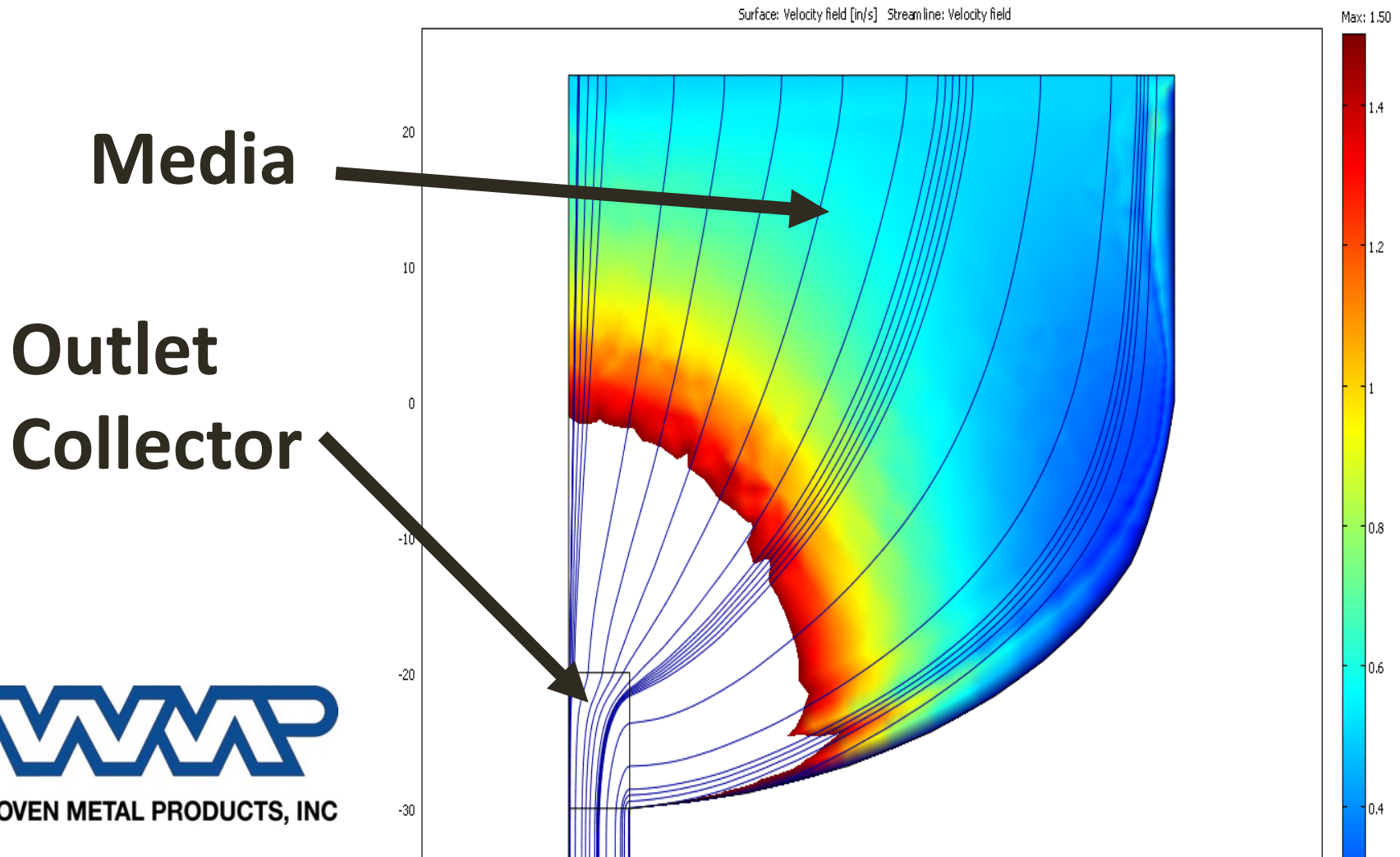
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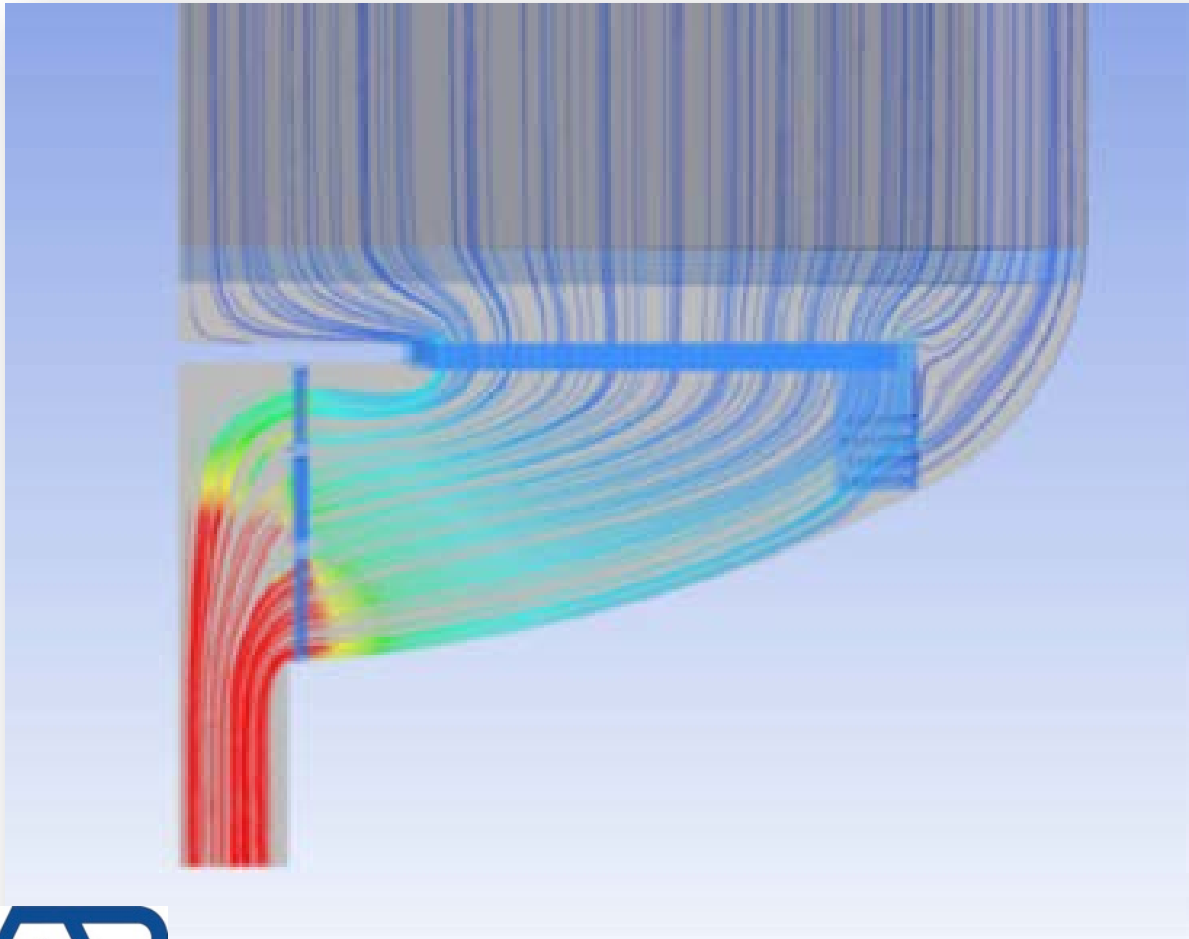
CFD STUDY



CFD STUDY

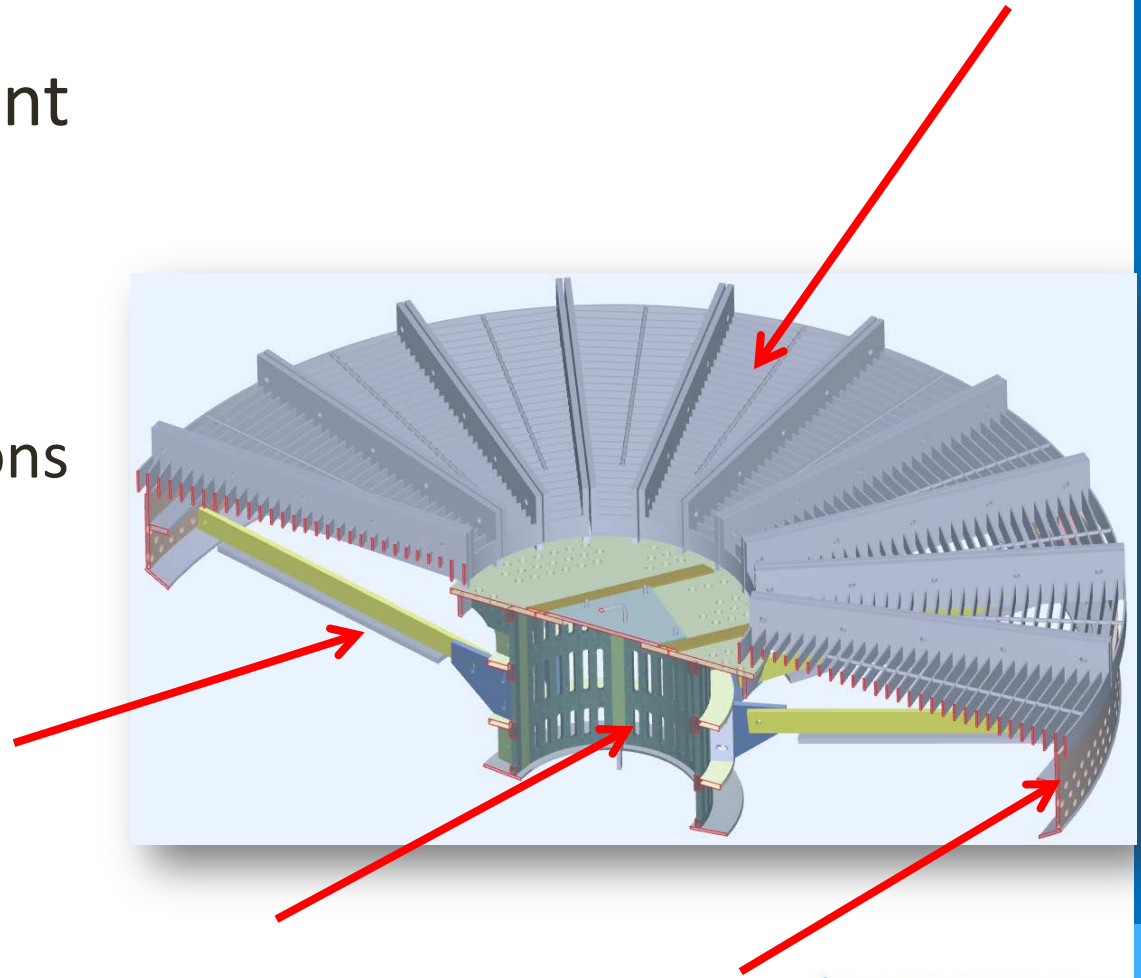


CFD STUDY



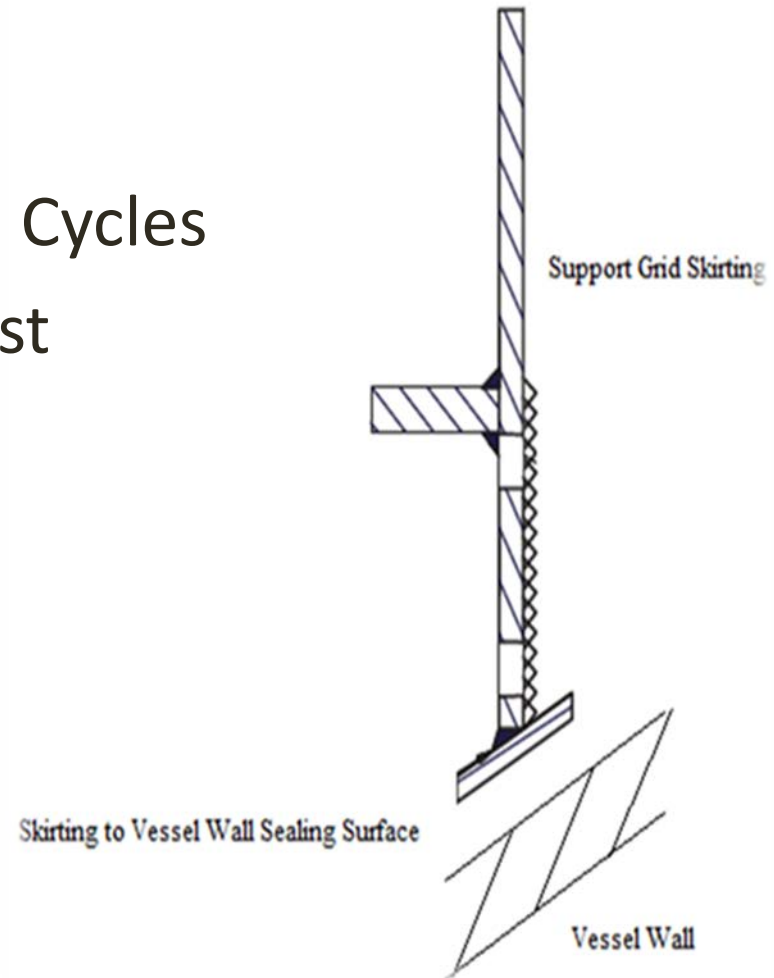
OUTLET SUPPORT GRID (OSG)

- All New Equipment
 - Elephant Stool
 - Outlet Connector Rods
 - Outer Skirt Sections
 - Top Support Grid Screen
 - Hardware



OUTLET SUPPORT GRID (OSG)

- No Rope Packing Required
- Performs Well Over Thermal Cycles
- No Support Media Or Catalyst Migration Issues



INSTALLATION

- All Pieces Manway Installable
- No Welding Required
- Minimal Hardware
- Same Size Bolting Throughout Design
- Minimum Installation Time
- Easily Retrofitted
- Horizontal Limiter Lugs Mitigate Horizontal Movement



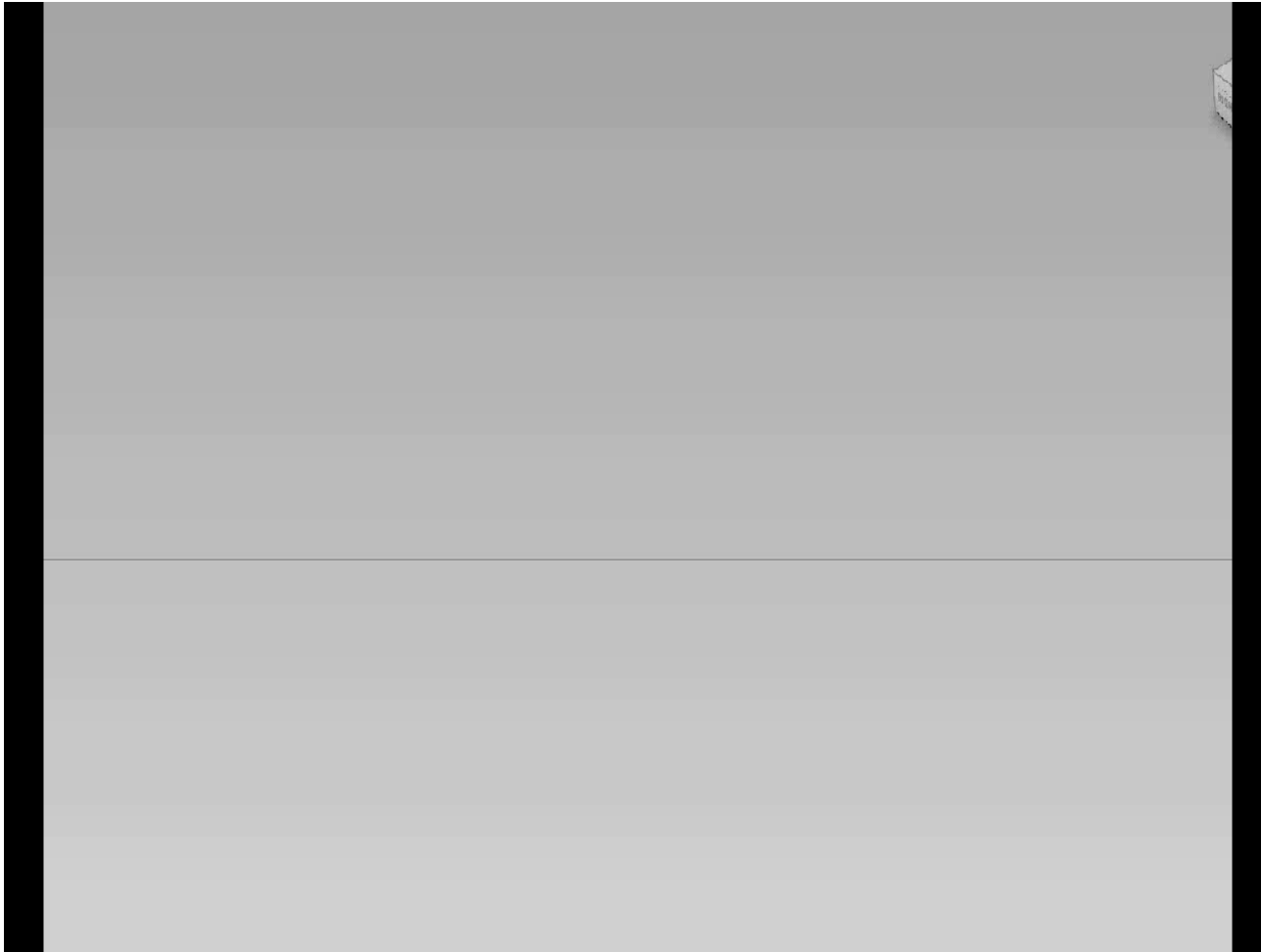
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INSTALLATION



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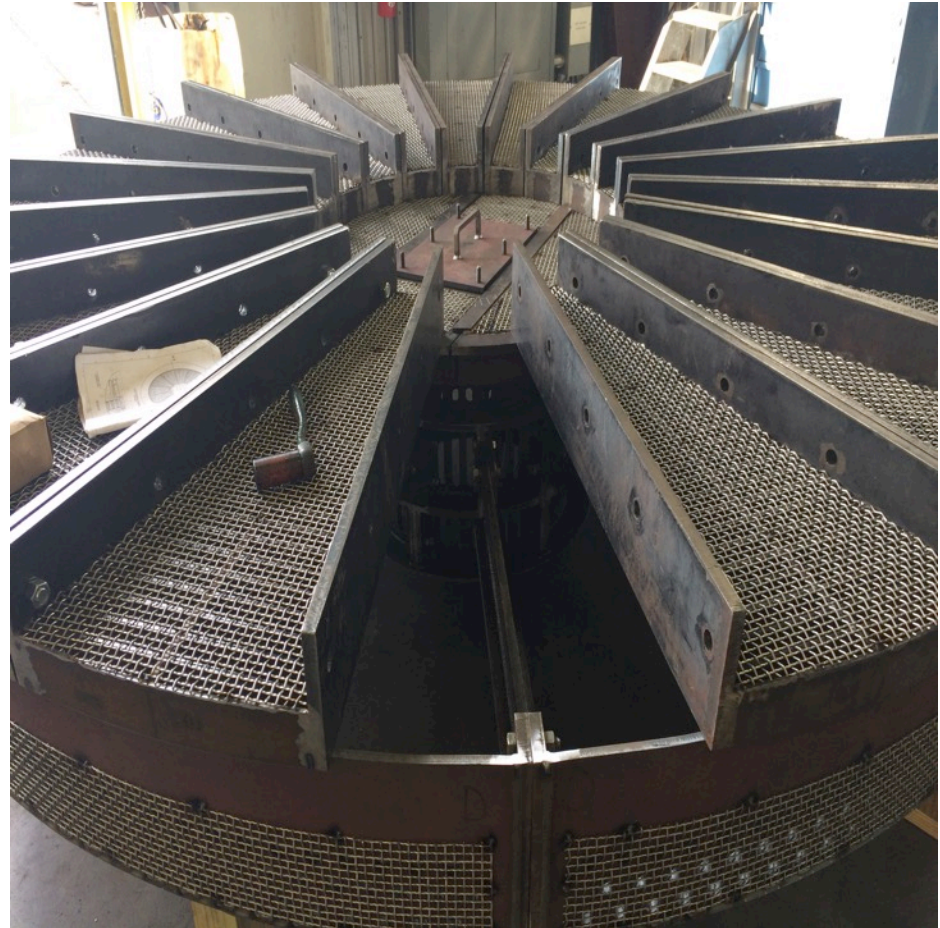


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COST SAVINGS

- Maximum Bed Utilization
- Capture Void Space From Standard Bed Support
- Increase Bed Volume
- Full Bed Containment
- Reduced Pressure Drop



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COST SAVINGS

- Reduced Regenerations
- Longer Run
- Ease Of Maintenance
- Less Valve Cycles
- 50 – 75 % Reduction Of Required Support Media



INSPECTION ACCESS

- Manway Hatch Allows Access To Outlet Piping
- Removable “Pie” Sections Eliminates Need To Remove Entire Support Grid For Inspections





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Q & A



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THANK YOU!

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