

The 5th Thailand International Chemical Engineering and Chemical
Technology Asia (TNChE Asia 2026)

**Optimizing Column Performance and
Reliability with Integrated Mass
Transfer Technology**

**PROFLUX® SEVERE
SERVICE GRID**

Ashraf Lakha /9th June 2026

Optimum Column Performance with Reliability

Coking / fouling in refinery towers is an everyday challenge

More challenging feedstocks and severe operating conditions exacerbate the problem especially when operating with opportunity crudes

Is it possible to do the following without sacrificing tower performance?

- Increase capacity and or yields
- Reduce pressure drop
- Extend run lengths

VACUUM TOWER WASH BED COKING

A wash bed should not look like this!



SEVERE COKING OF GRID PACKING



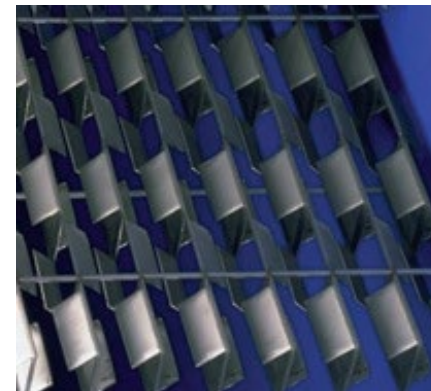
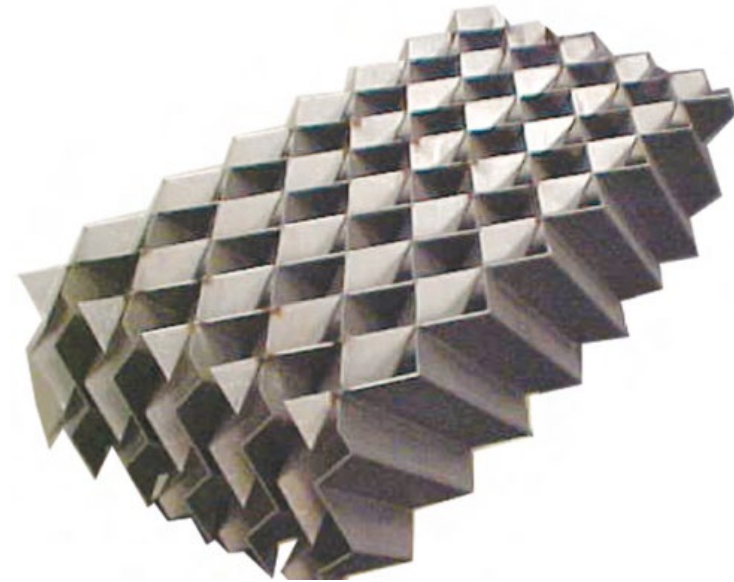
STRUCTURED PACKING

VACUUM TOWER, Wash Bed Design

Existing Technology

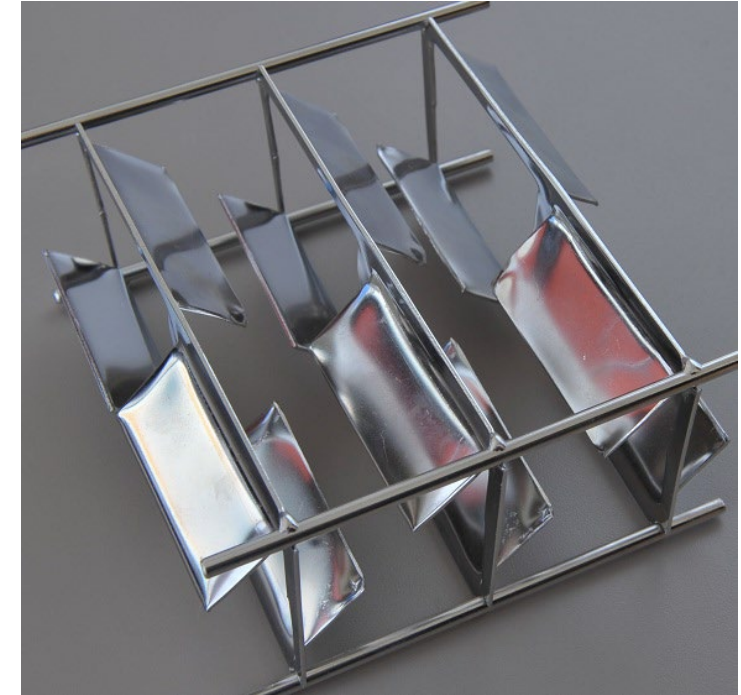
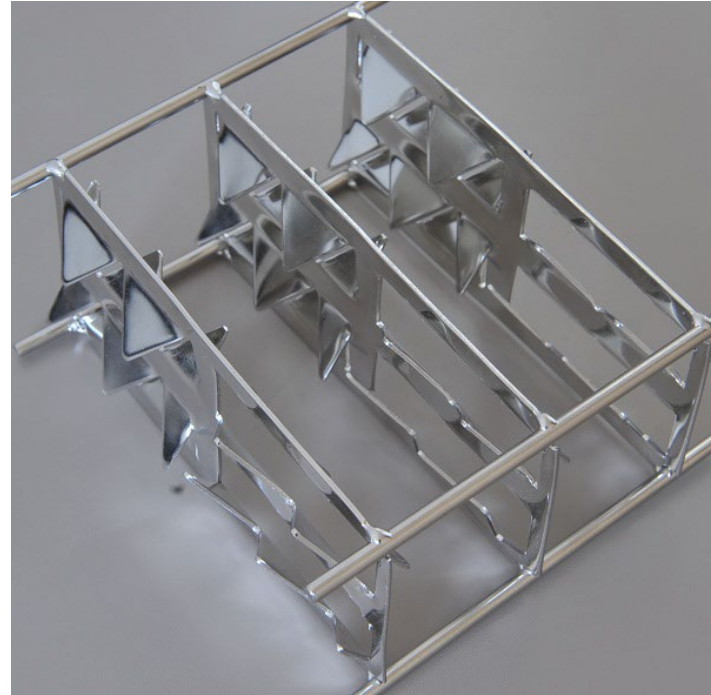
Equipment, Combination bed of..

- Service grid packing® Severe service grid packing
- Large crimp structured packing
- Combination of both packings



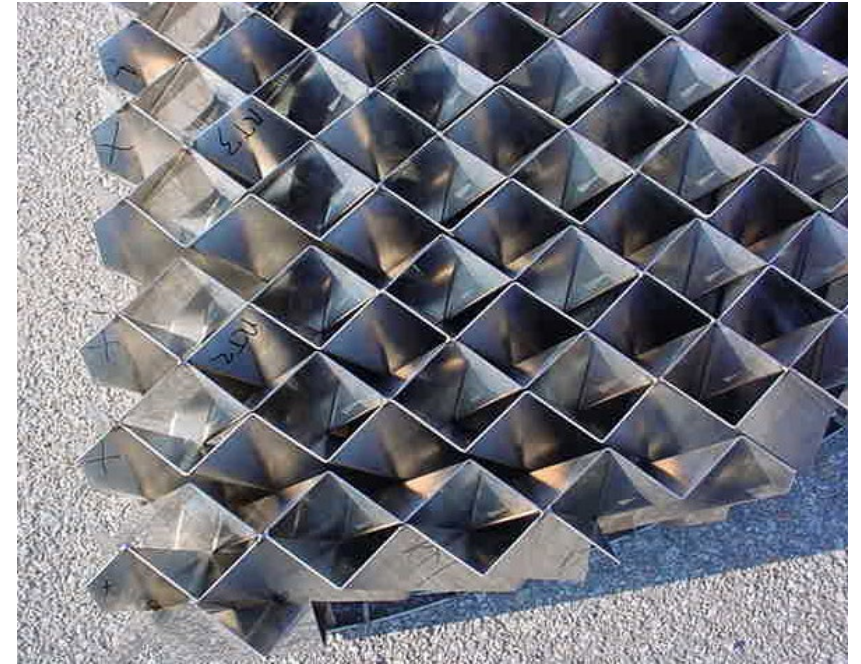
FLEXIGRID® SEVERE SERVICE GRID PACKING

- Good de-entrainment capacity at lower rates
- Very fouling resistant
- Durable construction – resistant to upsets



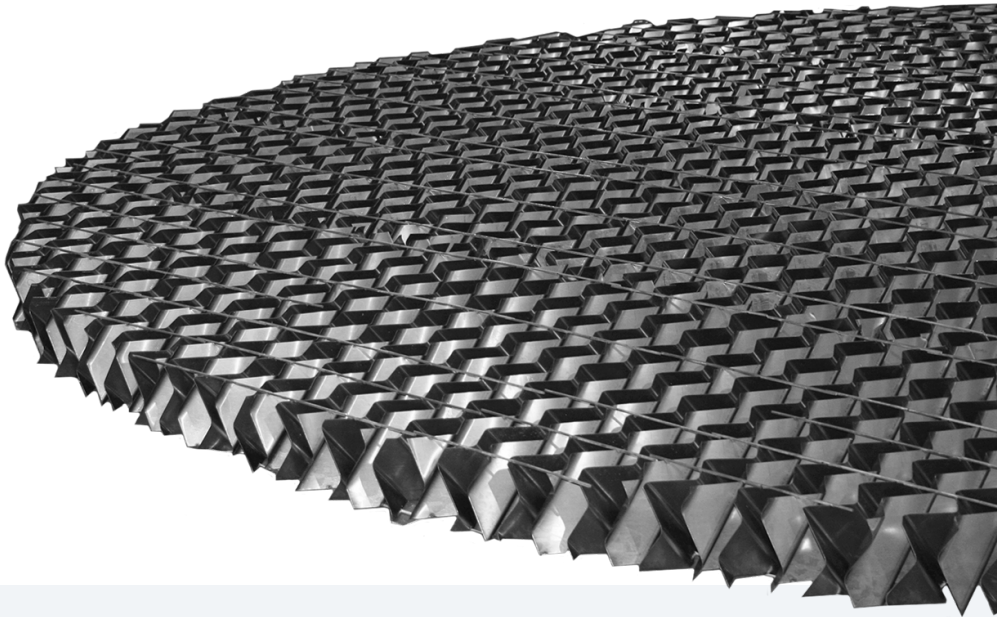
FLEXIPAC® STRUCTURED PACKING

- Better de-entrainment
- Higher efficiency with standard surface treatment
- Somewhat improved fouling resistance with no surface treatment
- Not as rugged



PROFLUX® SEVERE SERVICE GRID PACKING

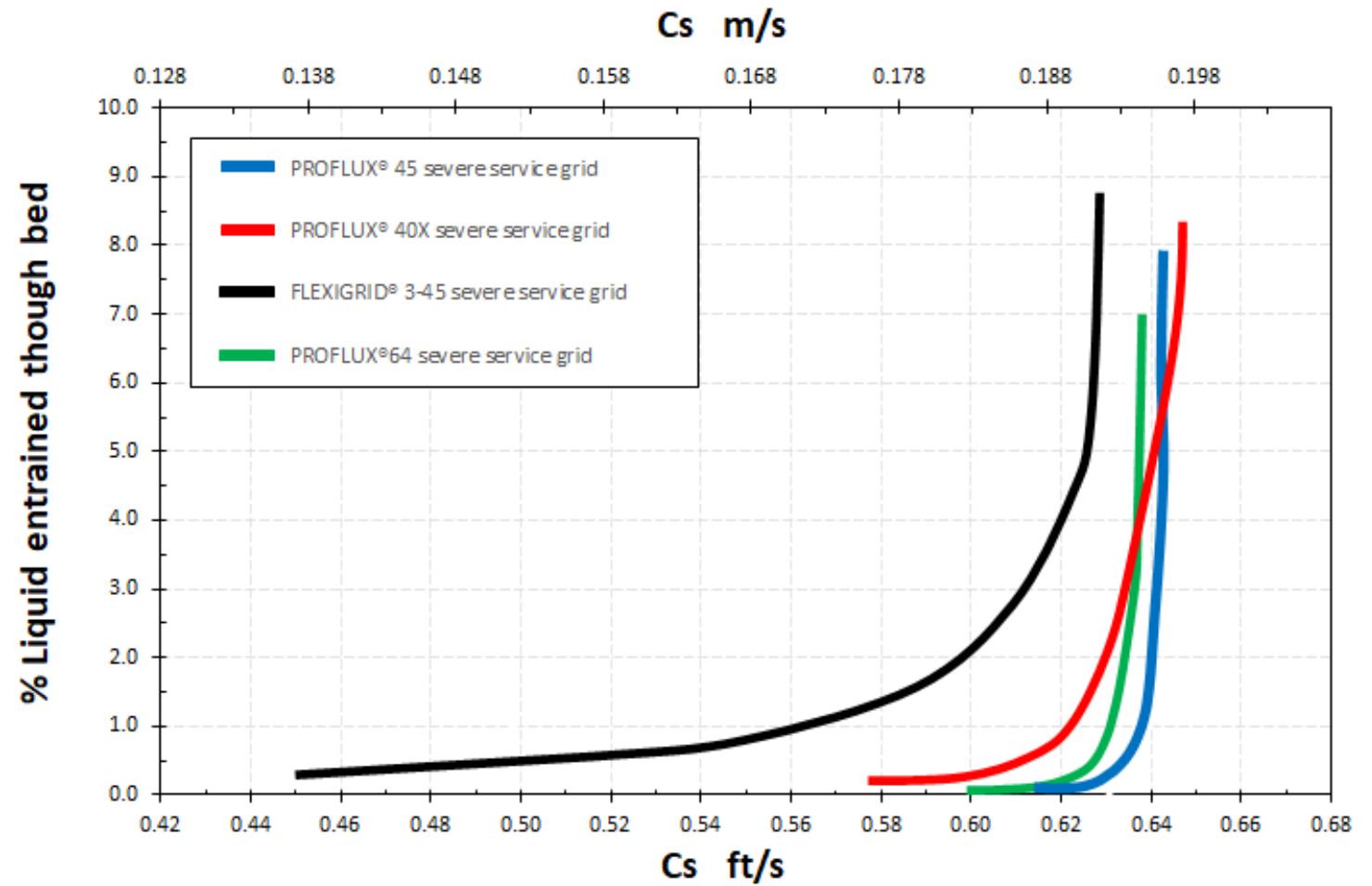
- Integrate and surpasses the best performance characteristics of both grid and structured packing, giving reliably superior performance across capacity, pressure drop, separation and maintainability



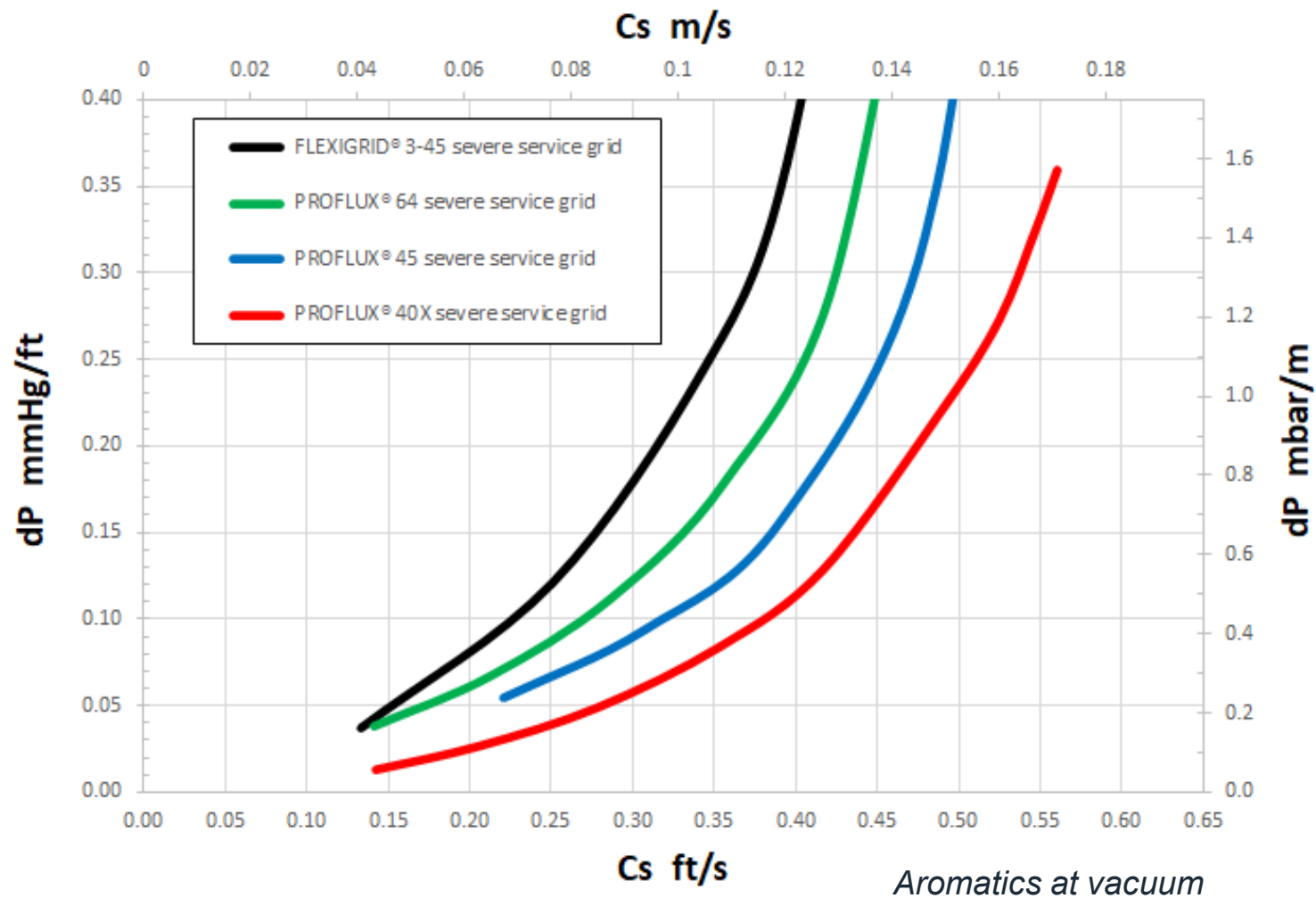
PROFLUX® Severe Service Grid

BETTER DE-ENTRAINMENT

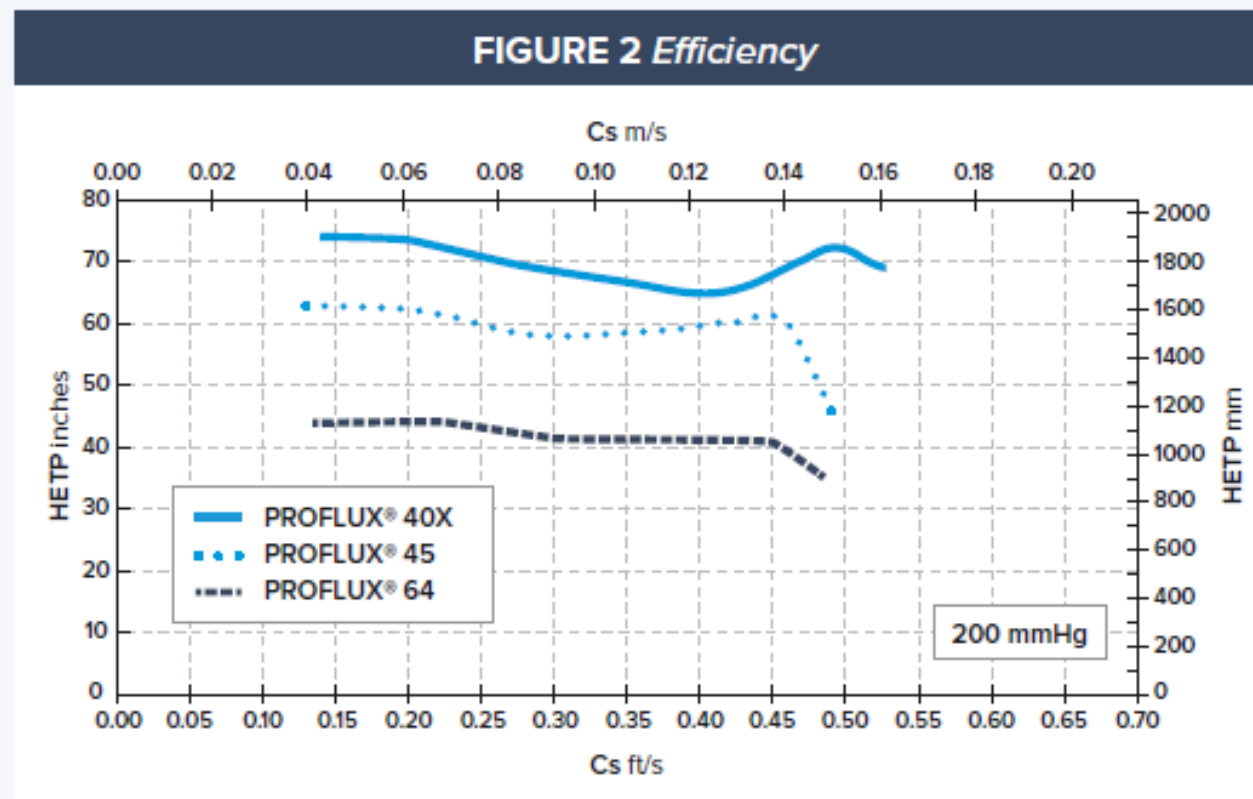
- Non-volatile tracer injected below bed
- Xylene isomers
- 65 mmHg
- 1 gpm/ft²
- 5 ft bed dept



LOWER PRESSURE DROP

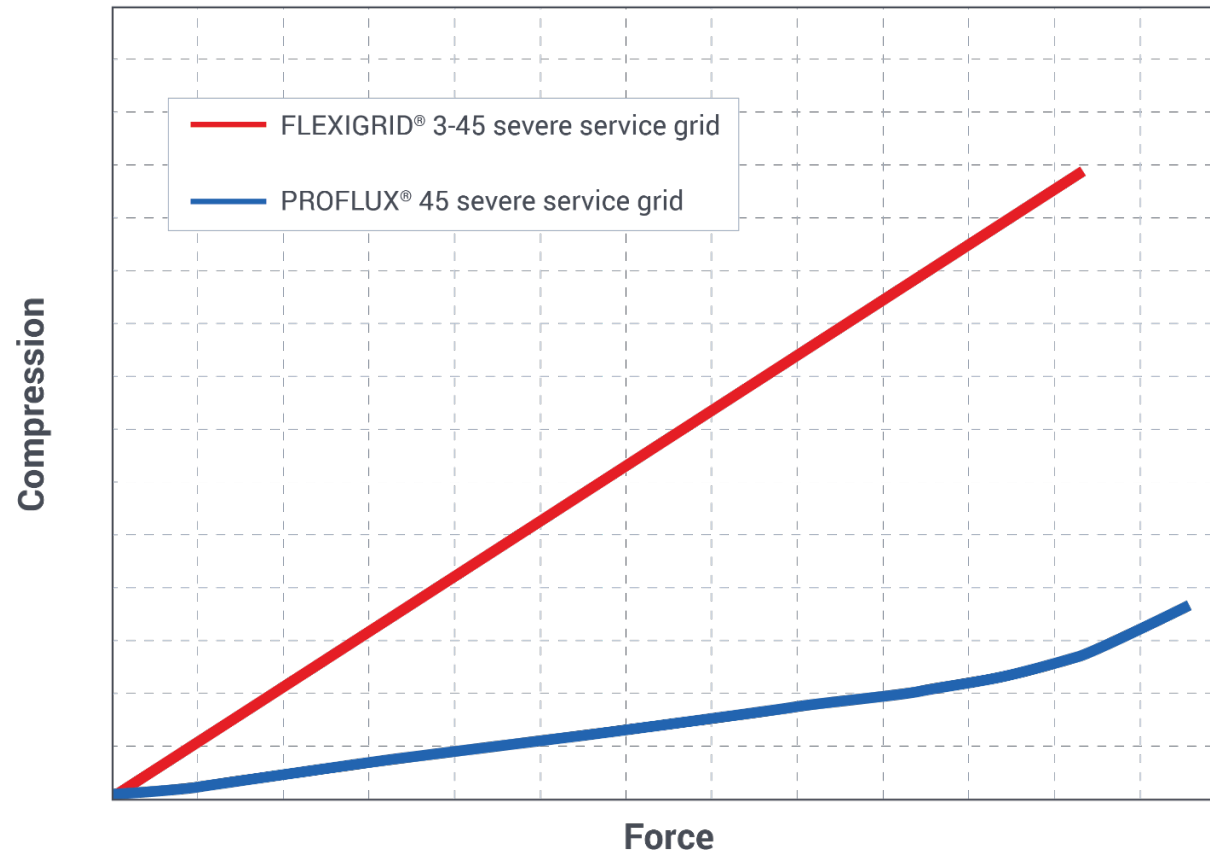


EFFICIENCY



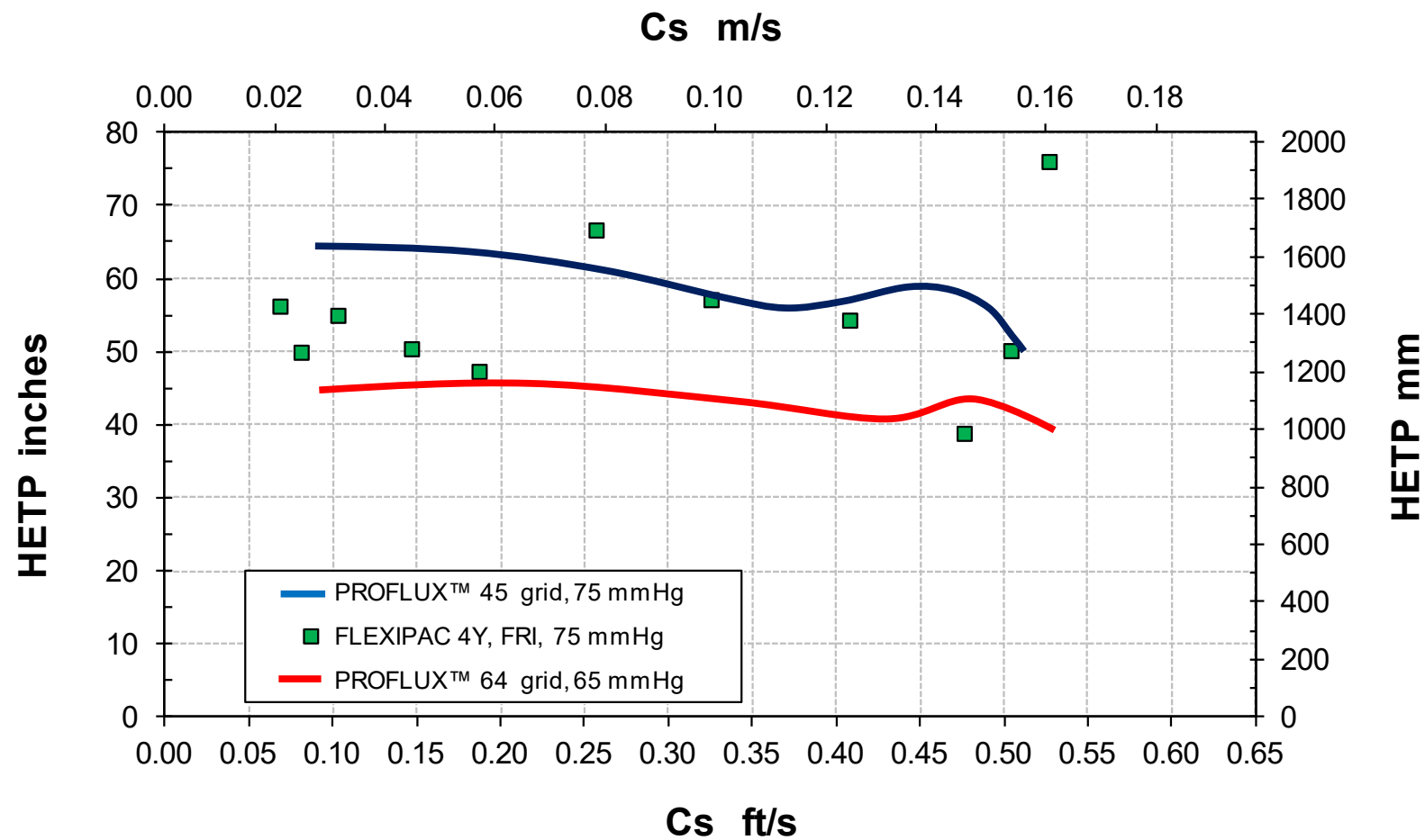
Aromatics at vacuum

GREATER CRUSH STRENGTH



2 bricks in rotated arrangement, standard material thickness

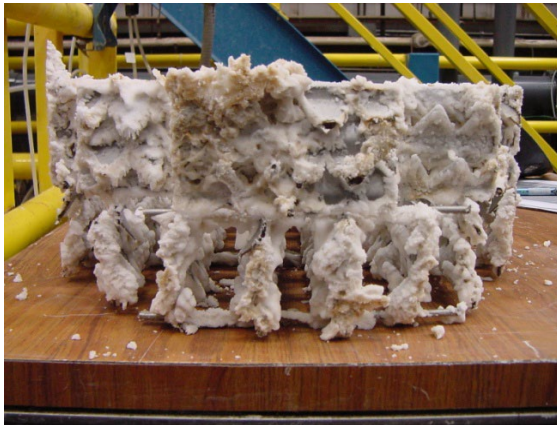
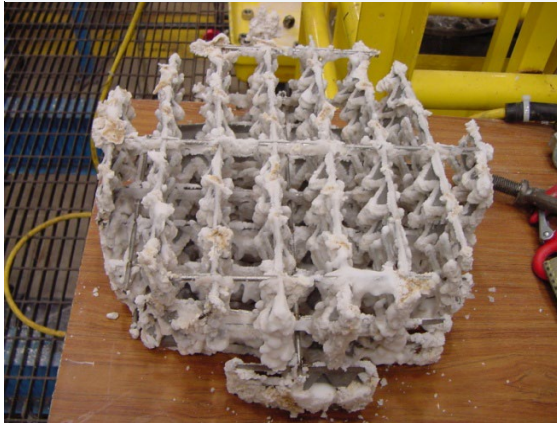
SEPARATION EFFICIENCY



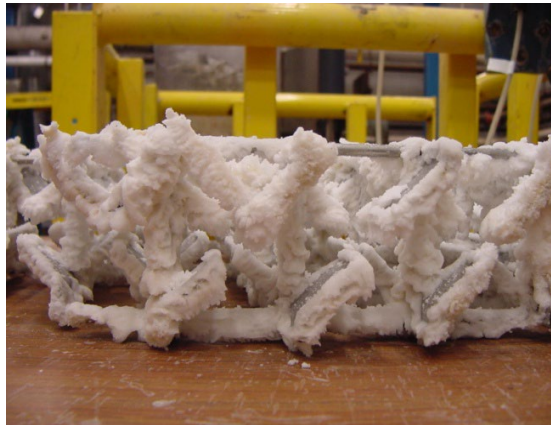
Xylene isomers at total reflux

BETTER FOULING RESISTANCE

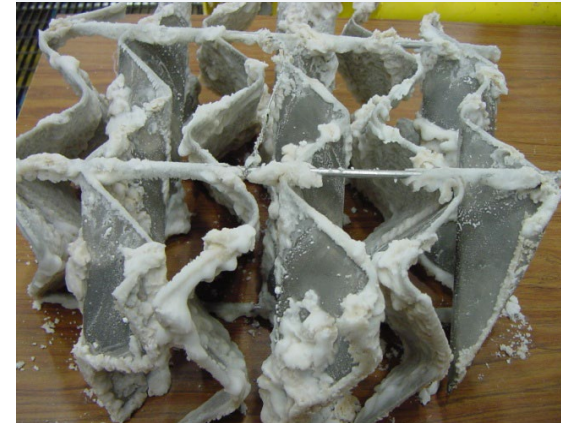
FLEXIGRID® 2-45 GRID



FLEXIGRID® 3-45 GRID



PROFLUX® 45 GRID



All grid products exposed to identical operating conditions.

ADVANTAGES

PROFLUX® severe service grid

- Sheets are spaced apart to prevent any fouling build-up
- Welded construction ensures rigidity
- Can be cleaned
- Smooth surface to prevent material from sticking
- Flow channels are shaped to reduce build-up
- Surface area chosen based on mass-transfer requirements
- Low pressure drop
- Reduced installation time
- Optional through rods increase uplift resistance

Other similar grid packing

- Sheets touch allowing stagnant liquid and foulant buildup
- Bolted construction
- Difficult to clean

Patented

APPLICATIONS

Ethylene plant primary fractionator and water quench tower

- Better fouling resistance compared to conventional grid
- Good heat transfer efficiency
- Lower pressure drop
 - Energy savings by minimizing the compression ratio between hot and cold end of plant
 - Reduction of furnace temperature requirements
 - Improved selectivity for more desirable cracked gas composition

Crude vacuum tower wash bed

- Greater de-entrainment efficiency compared to conventional grid
- Lower pressure drop and higher capacity based on de-entrainment
- Can replace a grid/packing combo bed where fouling is a concern
- Higher separation with similar bed heights

APPLICATIONS

FCC Main Fractionator

- Slurry pumparound zone
 - Size 40X
 - Steeper crimp angle promotes liquid flushing and better fouling resistance
 - Very high hydraulic capacity
- HCO wash bed
 - Size 64
 - More fouling resistant and reliable compared to structured packing
 - Excellent de-entrainment efficiency

MORE THAN 400 INSTALLATIONS GLOBALLY

Petroleum refining

- Vacuum Crude Towers (mostly wash beds)
- Atmospheric Crude Towers
- FCC Main Fractionators (slurry pumparounds)
- Deasphalting
- Visbreaker
- Coker Fractionator
- Hydrocracking
- Lube oil

Petrochemical

- Ethylene Primary/Gasoline Fractionators
- Ethylene Water Quench Towers
- Adiponitrile

Diameters up to 50.5 ft [15,400 mm]

REVAMP Case Study - 1

Existing Configuration

- 9500 mm diameter wash section
- FLEXIPAC® structured packing + FLEXIGRID® severe service grid
- Total bed height: 2352 mm
- **Operational limitations at higher throughput**
 - Unacceptable entrainment when rates are pushed
 - Compromised HVGO product quality

Revamp Solution

FLEXIPAC® HC structured packing + PROFLUX® severe service grid

- **Key Benefits / Value Delivery (Highlight Section)**
- **Significantly lower pressure drop** → Enables higher throughput potential
- **Improved VGO yield** → Direct margin uplift
- **Superior de-entrainment performance** → Maintains product quality even at elevated rates
- **Enhanced fouling resistance** → Sustains performance over longer run lengths
- **Higher mechanical strength** → Improved uplift resistance and operational reliability

REVAMP Case Study -1

	Before Revamp	After Revamp
Packing	FLEXIPAC® + FLEXIGRID® 3-45 grid	FLEXIPAC® HC® + PROFLUX® 45 grid
Diameter, mm (wash bed)	9500	9500
Bed depth, mm	2352	1941
Feed Device (reused)	Vane Inlet Device	Vane Inlet Device
Feed Capacity [MTPD]	9,885	12,393 (+25%)
Cv [ft/s]	0.35	0.43
Pressure Drop, ΔP	Base	- 50%
VGO Cut Point, °C	566	574
VGO Yield Improvement	Base	2.2%
Run Length	Less than 4 years	4 years + (no ΔP increase observed even after 4 years)

Additional US\$ 5.5 Million/year of revenue

REVAMP CASE-2, Integrated solution to maximize performance

BACKGROUND

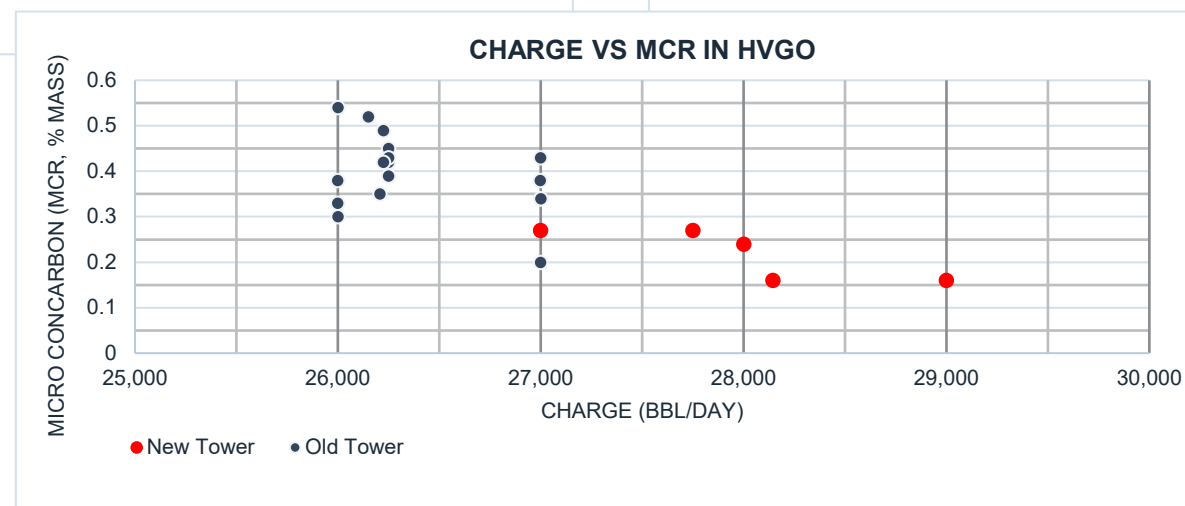
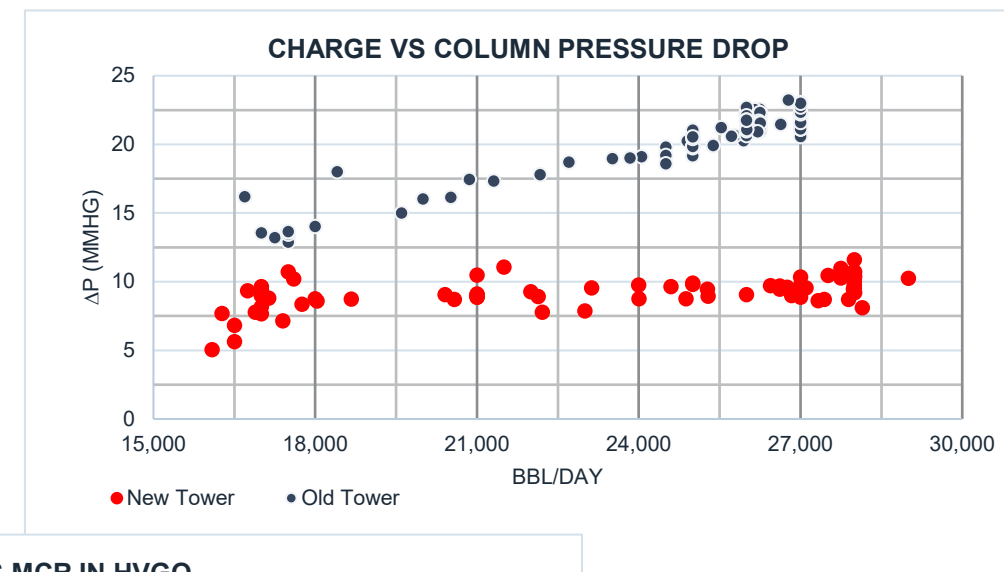
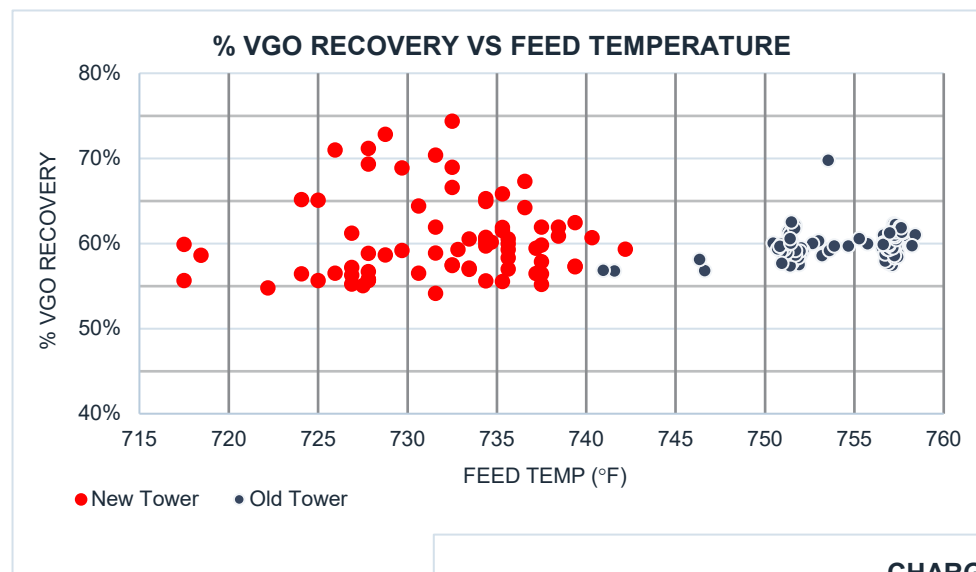
- Consumers Co-Op Refinery - Saskatchewan, Canada
- 17'-0" ID Crude Unit Vacuum Tower
- Replacement of existing packing and internals with upto date high performance technology
- Project originated due to the vessel reaching end of life and needing replacement
- Operator expressed a desire to increase throughput by 10% while minimizing additional capital expenditure keeping diameter and TL to TL same
- A solution was proposed to supply a Koch-Glitsch enhanced vapour horn along with PROFLUX® severe service grid in the wash bed as an upgrade over the existing vapour horn and grid packing
- Wash oil rate maintained

RESULTS

- Throughput increased from 27,000 BPD to 30,000 BPD
- HVGO quality substantially improved due to superior performance characteristics of the new equipment
 - PROFLUX® provides better de-entrainment than traditional grid
 - Enhanced vapour horn provides more uniform vapour flow exiting the flash zone
- Pressure drop reduction leads to operating cost savings
 - Refinery moved from utilizing 6 ejectors to 4; resulted in a cost saving of \$20,000 CAD/month
 - Feed temperature was reduced by ~25F without impacting VGO recovery; energy consumption saving of \$15,000 CAD/month
- Packing has been in use for 7+ years and is on its 3rd run without replacement



PERFORMANCE COMPARISON



SUMMARY

Parameter	Old Tower	New Tower
Max Feed Rate	27,000 - 28,000 BPD	30,000 – 31,000 BPD
Pressure Drop	20.0 – 23.0 mmHg	10.0 - 11.5 mmHg
Feed Temperature	750 – 760 °F	725 – 740 °F
HVGO Quality (MCR)	0.5 – 0.55 wt%	0.25 – 0.27 wt%
Wash Oil Rate	Unchanged	Unchanged
# of Runs	1 (4 years)	2 and going (7+ years)

CUSTOMER ASSESSMENT

“Since installing the PROFLUX severe service grid in our wash bed we have seen a marked improvement in our Vacuum Gas Oil product quality and have been able to push the tower much harder than before. With multiple runs using the same grid packing – we consider the performance of the PROFLUX exceptional!”

LEAD PROCESS ENGINEER,

Process Technology at Consumers Co-operative Refining Limited (CCRL) with over 40 years of process design and operational experience



Optimizing Column Performance and Reliability with Integrated Mass Transfer Technology

Conclusions

PROFLUX® severe service grid provides:

- Unique structure that reduces fouling
- Efficiency of structured packing
- Robustness of grid
- Low pressure drop
- Good fouling resistance
- Good de-entrainment
- Reduced installation time

PROFLUX® severe service grid is ideal for:

- Refinery tower (i.e. atmospheric and vacuum towers wash sections)
- Ethylene quench towers & primary fractionators
- FCC Mian Fractionators Slurry PA bed.
- TGTU unit quench column (bottom bed)

Liquid and vapor distribution is important!: Integrating Koch-Glitsch Vapour horn technology with our PROFLUX® severe service grid® maximize wash bed performance will providing reliable extended run length

QUESTIONS?



THANK YOU!

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