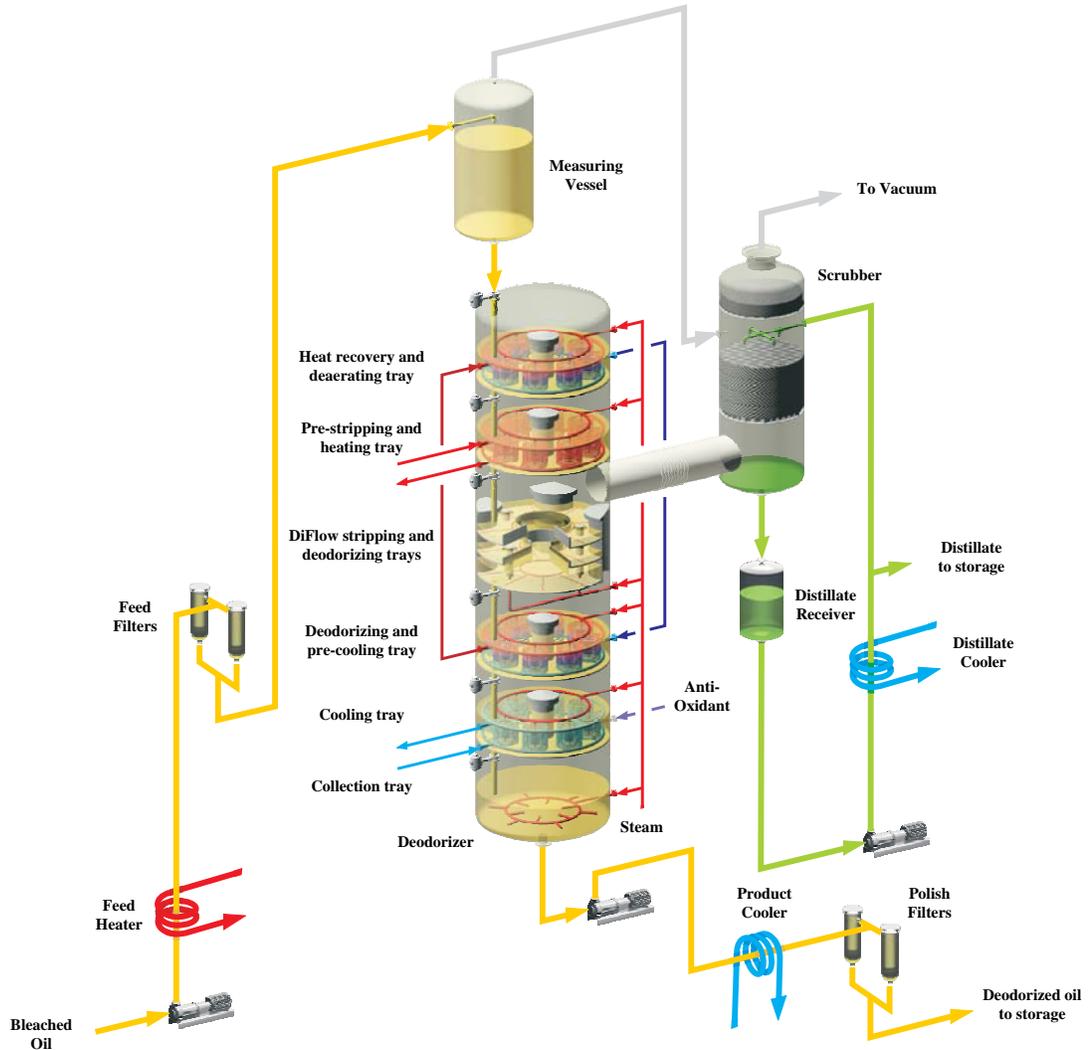




# DiFlow Semi-Continuous Deodorizing System

## DiFlow Semi-Continuous Deodorizing System



### PROCESS BASICS

**Designed for minimum product co-mingling.**

**Highest deodorizing efficiency with shallow-layer stripping in DiFlow cascading film tray.**

**Optional double thermo siphon loops for optimum heat recovery.**

**Optional hot water heat recovery system.**

**Zero air leaks with steam sealed man-ways.**

**Easy access for service and maintenance.**

Batches of pre-heated oil are charged to the Measuring Vessel where the oil is partially deaerated and dried. The batch is dropped into the Deodorizer at 15-20 minute intervals. There the oil is progressively deaerated, stripped, deodorized, heat bleached and cooled.

The oil is pre-heated in the heat recovery tray with steam generated by hot deodorized oil in the pre-cooling tray. The coils of the trays are connected in a closed system partially filled with water. This creates a thermo-siphon effect that naturally circulates the fluid in the coils as it alternates between the liquid and vapor phases.

The DiFlow stripping and deodorizing tray has three steam agitated sub-compartments. Steam is also injected in multiple lift tubes rising from the bottom compartment to the middle and top compartments. The oil collecting in the bottom is thereby rapidly recycled to the overlying compartments from where it cascades back to the bottom. This produces a falling curtain of oil between the compartments which, combined with the shallow layers, substantially increases the surface area of oil exposed to full vacuum and thereby improves the efficiency.

Fatty acids and other materials, evaporated from the oil, are condensed by contact with recycled and cooled distillate in the Scrubber.

The heating steam for the heating tray is supplied by a self-contained high pressure steam generating system.

The entire system operates under deep vacuum (1-3 mbar) generated by either a traditional vacuum system or an ice condensation system.



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# DiFlow Semi-Continuous Deodorizing System

## FEATURES AND ADVANTAGES

- Minimum product co-mingling with trays, internal structures and external equipment designed for maximum drainage.
- Minimum steam requirements due to shallow layer stripping in DiFlow cascading film trays.
- Highest heat recovery with double thermo siphon (TS) loops.
- Up to 200,000 kJ per metric ton of additional heat recovery possible by using spent cooling water to heat boiler feed water etc.
- Seamless and X-rayed coils for high durability.
- Coil bundles removable through man-ways.
- Zero air leakage into the deodorizer ensured by steam sealed man-ways and sight glasses.
- Easy access for service through strategically placed man-ways.
- Plant sizes from 50 to 650 TPD (metric tons per 24 hours).

## UTILITY CONSUMPTION

Typical figures per metric ton of oil entering at 60 °C:

Electric Power: 1,5 - 2,5 kWh depending on plant size  
Add about 4,2 kWh for ice condensation

Steam (10 barg): 120 kg (with surface condensers)  
25 kg with ice condensation

Heating Energy: 317,000 kJ + 3,500 kJ/% FFA (single TS)  
223,000 kJ + 3,500 kJ/% FFA (double TS)

Cooling Water (30 °C): 15 m<sup>3</sup> at ΔT 6 °C  
4 m<sup>3</sup> at ΔT 6 °C with ice condensation

Citric Acid: 0,05 kg (optional as anti-oxidant)

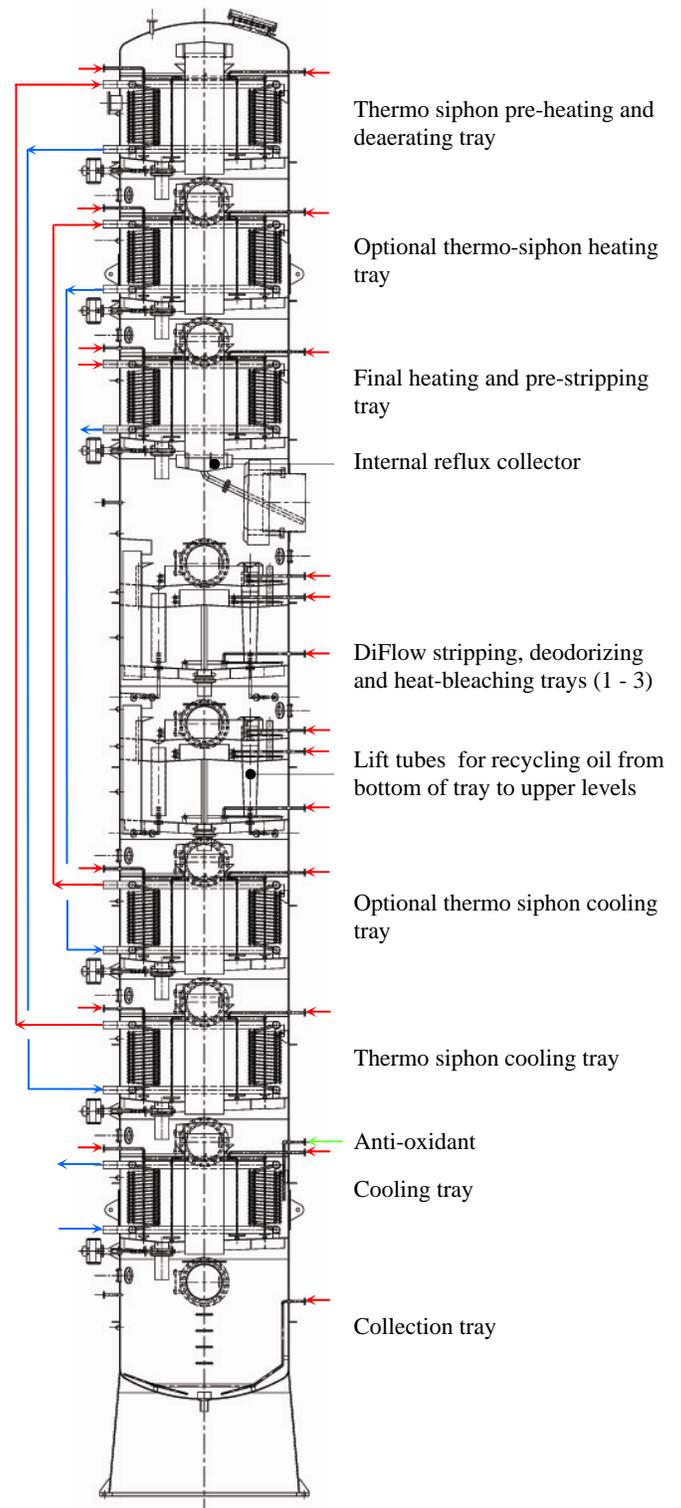
Note: Cooling water is amount circulated per metric ton of oil.

## EQUIPMENT SPACE REQUIREMENTS

50 - 300 TPD: Four levels, each 55 m<sup>2</sup> with 6 m elevation  
300 - 650 TPD: Four levels, each 70 m<sup>2</sup> with 6 m elevation

The deodorizer will require a total elevation of 24 - 34 m.

Note: Control room, MCC, HP steam generator and refrigeration system (for ice condensation) are not included.



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