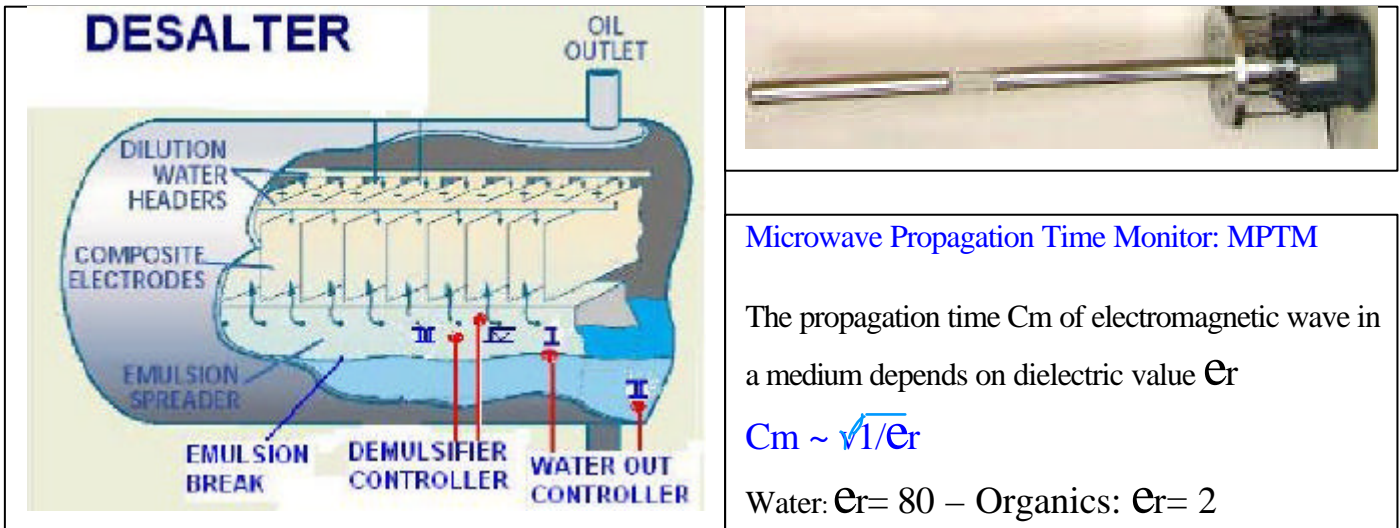


DESALTER UNDER CARRY BARRIER



Microwave Propagation Time Monitor: MPTM

The propagation time C_m of electromagnetic wave in a medium depends on dielectric value ϵ_r

$$C_m \sim \sqrt{1/\epsilon_r}$$

Water: $\epsilon_r = 80$ – Organics: $\epsilon_r = 2$

I. FUNCTION :

Desalting operation can be very challenging due to changing process variables and crude assay.

The desalter will be the predominant source of wastewater in a refinery and upset in desalter will not only increase sewers loading but also increase valuable crude losses.

In other way, after the crude has been washed and mixed as an emulsion of oil and water, demulsifying chemicals are injected and electrostatic fields are used to break the emulsion and concentrate suspended water globules in the bottom of the setting tank . A dedicated balance must be maintained while controlling chemical desemulsifier feed and other parameters for the specified quality of the crude at outlet and the minimum under carry at bottom discharge.

Depending on crude assay (from high potential yield to opportunity crudes) and process variables , the Desalter Under Carry Barrier guarantees less than 50 to 300 PPM crude contamination at the waste water discharge valve .

II. OPERATION:

The valve controller system uses the In Tank Microwave Propagation Time (MPT) monitor :

This is an absolute fail-safe measuring method working even under hard conditions such as emulsion deposits and foam . MPT monitor is not dependent on the media and can be carried out even in sticky coating and fouling conditions.

Referring to the DESALTER internal view the MPT monitor item I actuates the discharge valve in order to control a level of 10 to 20% residual hydrocarbons in emulsion at sensing point; this is a guaranty that emulsion will be completely broken at water discharge valve point (approx. 1.5 metres under of control sensing point) .

The MPT monitor item II is monitoring the solid hydrocarbons accumulated at 30 cm from the bottom of desalter vessel and periodically removed by the “mud washing system”.

As addition to Under Carry Barrier an Emulsion Phase Profiler constituted by the MPT monitors III and IV can be supplied as option .

Purpose of the Emulsion Phase Profiler is to monitor the water concentration in the electrostatic field area in order to optimise the demulsifying chemicals feed flow .The target is to concentrate emulsion within electrostatic field core in order to boost efficiency and to decrease the desulfurifier rate.

Our propriatory model determines per application the range and location of the two MPT monitors .

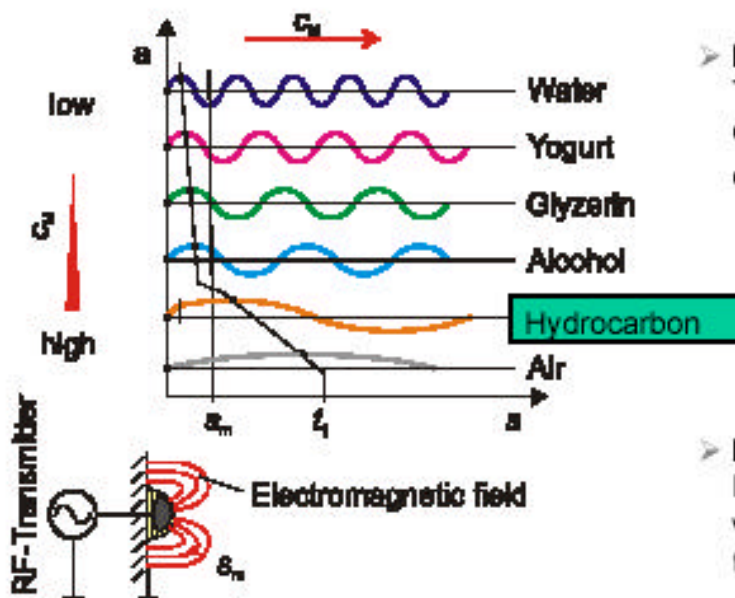
III.BENEFITS:

The oily waste content of wastewater is depending of the crude assay number ; low assay will be more difficult to process due to higher levels of contaminants and water and typical concentration can be 1.5 to 2% and up to concentrate of 15% .This can exceed the system's deshydration abilities , turn the effluent water quality off spec. with new legislative demands and even foul up downstream wastewater treatment .

An other aspect is that reduction of oil to under carry recovers valuable crude oil that would otherwise be recovered for reprocessing . Based on refinery figures , reprocessing cost is about 6 to 8 €/per bbl and for an application where 6% wash water is metered in ahead the desalter with a 6% oily average in waste water a refinery processing 150,000 bbl/day would have a return of 1.4 M€/year.

Benefits of the Emulsion Phase Profiler are dependant of the demulsifying chemicals saving : for a refinery processing of 150,000 bbl/day the annual consumption of desulfurifier is about 30 m3 at approx. 5,000 €/m3 and the Emulsion Phase Profiler proved a saving of 30% chemicals consumption leading to a profit of 45,000 €/ year.

More about the [Microwave Propagation Time Monitor: MTPM](#)



- **Runtime measurement:**
The propagation time c_M of an electromagnetic wave in a medium depends on the dielectricity value ϵ_r

$$c_M \sim \sqrt{\frac{1}{\epsilon_r}}$$

- **Marginal point assignation:**
How long does an electromagnetic wave take from the cap of the device to the vessel wall?



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