



QUICK AND ACCURATE METHOD TO STUDY DEMULSIFICATION

Comparison of different demulsifiers

oil

INTRODUCTION

The effectiveness of a demulsifier depends on many parameters including the amount of water produced, the quality of the oil/water interface, the quality of the water produced and the separation kinetics. The usual technique used to evaluate the effectiveness of a demulsifier is the Bottle Test. In this Application Note, we propose a faster and more accurate technique to assess the quality of a demulsification and to compare the efficiency of different demulsifiers.

METHOD

The effectiveness of 5 different demulsifiers is assessed with a quick and simple protocol: 100 ppm of demulsifier (dosed from a stock solution using an appropriate solvent) is added to the crude oil emulsion and handshaked 50 times. The crude oil emulsion evaluated was from a UK onshore source with an API of 11° and a [BS&W](#) of 60%. All testing was carried out by Croda using demulsifiers from their Kemelix™ product range.

Demulsifier 1	Polysorbate polyester
Demulsifier 2	Resin alkoxyate
Demulsifier 3	Resin alkoxyate
Demulsifier 4	Polyol alkoxyate
Demulsifier 5	Polyimine derivative

Then, Turbiscan® measurements are performed at 60°C for 60 minutes with 1 scan per minute. The following graph displays a typical Turbiscan profile obtained.

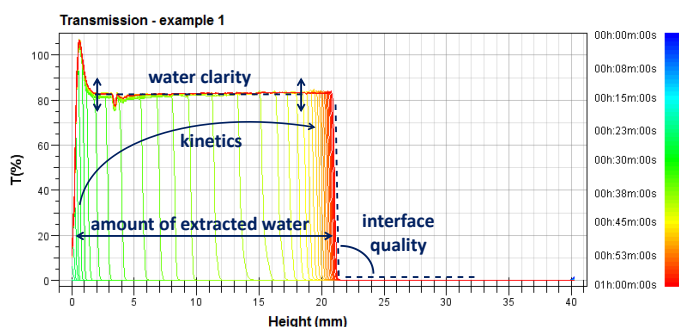


Figure 1: Evolution of the transmission signal for Demulsifier 1

RESULTS

The graph displayed in Figure 1 shows information regarding the **amount of produced water**, the **clarity** of produced water, the **quality of water/oil interface** and the **demulsification kinetics**.

Volume of water produced

The volume of produced water is directly linked to the thickness of the transmission peak obtained. The following graph displays the transmission peak thickness obtained for the 5 demulsifiers evaluated:

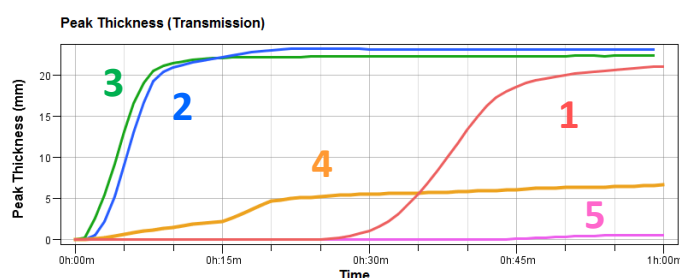


Figure 2: Peak thickness for the 5 demulsifiers evaluated

This graph allows us to classify these demulsifiers in terms of amount of produced water (initial volume of sample is 20 ml):

Sample	Final peak thickness (mm)	Amount of water produced (ml)	Amount of water produced (% of BS&W)	WATER VOLUME
Demulsifier 5	0.6	0.3	<1	-
Demulsifier 4	6.6	3.2	27	
Demulsifier 1	21.0	10.3	86	
Demulsifier 3	22.3	10.9	91	
Demulsifier 2	23.1	11.3	94	+

This table shows that Demulsifiers 4 and 5 give relatively low amounts of produced water. On the other hand, Demulsifiers 1, 2 and 3 give comparable and significant amount of water produced.

Separation kinetics

Another important parameter in the demulsification process is the time required to complete demulsification. If we look again at Figure 2, Demulsifiers 1, 2 and 3 can be compared in terms of