

# Marcus Oxidized Polyethylene Wax for Water Based Emulsions

## Atmospheric Emulsification of Marcus 3400 and 3500 Polyethylene

**Both Marcus M3500 and M3400 can be used to make high quality atmospheric anionic emulsions. M3500- with an acid value of 24mgKOH/g may be preferable when emulsification is more difficult due to equipment limitations and or formulation needs or where a slightly softer wax is desirable.**

**Oleic acid is included in this starting formulation but there are a number of tall oil fatty acids that can be substituted.**

**The amine in the formulation forms a fatty acid salt with the oleic acid. Various amines can be used in the formulation. Selection can be dictated by volatility and color requirements. Morpholine can also be used to neutralize both the oleic acid and the functional groups on the polyethylene**

## Wax to Water Anionic Emulsion Preparation

<u>Anionic Formulation (25% solids)</u>	<u>Percent</u>
Marcus M3500 or M3400	21.25
Oleic Acid	3.75
Amine	3.75
Water	71.25

### Comments:

DEAE (Diethylamino ethanol) and AMP (2-amino 2 methyl 1- propanol) are common amines used in these formulas.

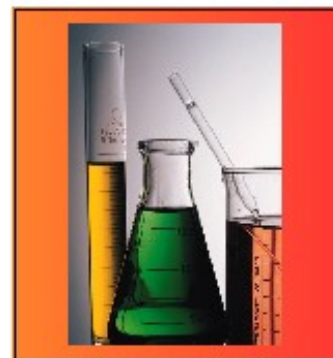
### Procedure:

Mix oxidized Marcus Wax and Oleic acid and melt to a temperature of 125-135 °C. Stir in the amine and mix well to allow the amine to react with the fatty acid and oxidized polyethylene. Allowing the mix to cool somewhat during this time will reduce volatilization of the amine.

After the amine has reacted - increase the melt temperature to 125-130 °C and slowly add the wax melt to an agitated vessel where demineralized water has been preheated to 95-98°C.

After all the wax melt has been added to the vessel the emulsion should be cooled rapidly while continuing to agitate. Improper agitation and/or slow cooling may result in crusting or creaming of the emulsion. Cooling can be facilitated by a double jacketed vessel or an external heat exchanger.

Following cooling to room temperature a bactericide can be added to aid shelf life of the emulsion. The emulsion should then be discharged and filtered



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