

Zymol Revive

Environmentally friendly biosurfactant additive designed to stimulate production in oil and gas wells and improve reservoir recovery

Zymol Revive, part of Tendeka's range of environmentally friendly biosurfactants is a highly effective, economical well stimulation treatment.

Designed to be pumped into the formation to improve productivity indices and increase overall recovery, Zymol Revive offers an effective means of altering rapid production declines, especially when associated with loss of oil mobility in tight formations.

In addition to its environmental credentials of low toxicity & biodegradability, Zymol Revive harnesses the chemistry of three key attributes to stand out from other contemporary technologies.

1. True "nano-scale" micelles, allow not only extensive formation penetration but also effective recovery of oil in the tightest of rocks. Zymol Revive is an order of magnitude smaller than traditional nano surfactants.
2. Critical Micelle Concentration (CMC) is vastly lower than alternative surfactants, resulting increased efficiency with less product.
3. Unique adsorption/desorption characteristics allow Zymol revive to bind to formation much more effectively and release in controlled manner. Prolonging the effectiveness of the treatment beyond the capabilities of other technologies.

Like any other surfactant technology Zymol Revive is designed to increase oil and gas production by reducing interfacial tension and leaving the formation near the wellbore in its natural water-wet state. It stands apart by doing this much more effectively, to a greater penetration & for a longer duration than its competitors.

Treatments with Zymol Revive have been proven to increase production by more than 400%, and even removes scale and organic deposits.

Features

- Extremely low critical micelle concentration (CMC) <50 ppm
- Very small micelle (1-2 nm)
- Low interfacial tension
- Unique adsorption-desorption characteristics
- Bio-static (no bacteria growth)

Benefits

- Effective at low concentration
- Small micelles penetrate even the smallest of nano-networks
- Changes wettability to water wet
- Long-lasting treatment
- No corrosion caused by bio-film build-up

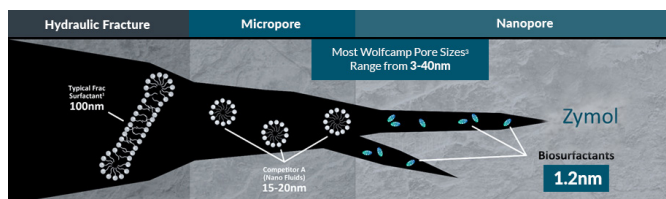

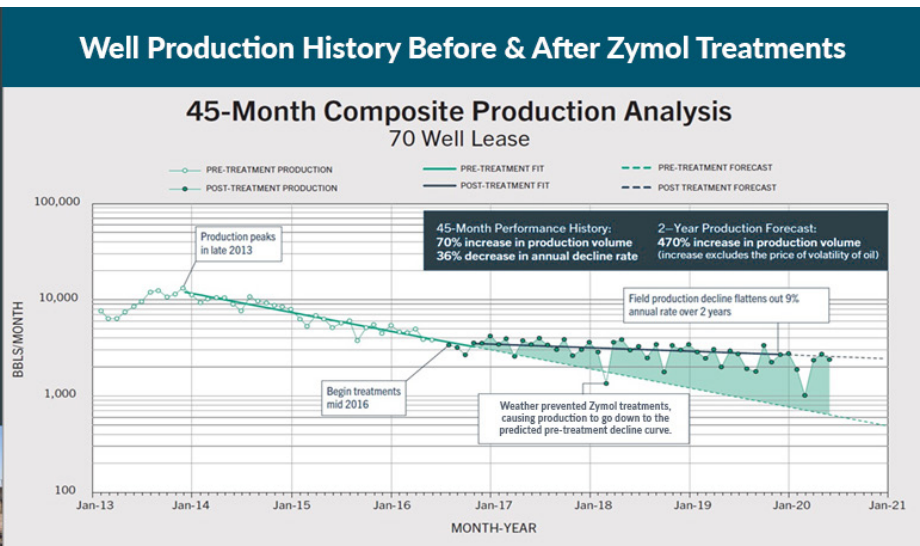


Figure 1: Zymol Revive nano scale can penetrate and recover from deeper in the formation

- **70%** increase in projected oil production rates from a 70-well Appalachian lease
- **45 month** sustained rate with Biosurfactant treatments
- **45%** decline rate pre-treatment
- **9%** decline rate post-treatment
- **58,000** incremental bbls recovered using biosurfactants

**Technical Specification**

pH	5.5 - 7.5	Mild to Neutral
Viscosity	1 - 2 cP (at 20°C)	Easy pumping
Static Surface Tension	28.0 - 35.0 mN/m	Reducing capillary pressure
Critical Micelle Concentration (CMC)	<50 ppm	Active even at low dosage
Interfacial Tension	<1 mN/m	Highly mobilizing oil
Contact Angle	5 - 40°	Highly water wetting
Thermal & Hydraulic Stability	Stable to 300°F	Longevity and sustained performance
Fluid Compatibility	Compatible with Oils and Brines	Non-emulsifying
HSE	Non-Hazardous	Sustainable & Biodegradable