

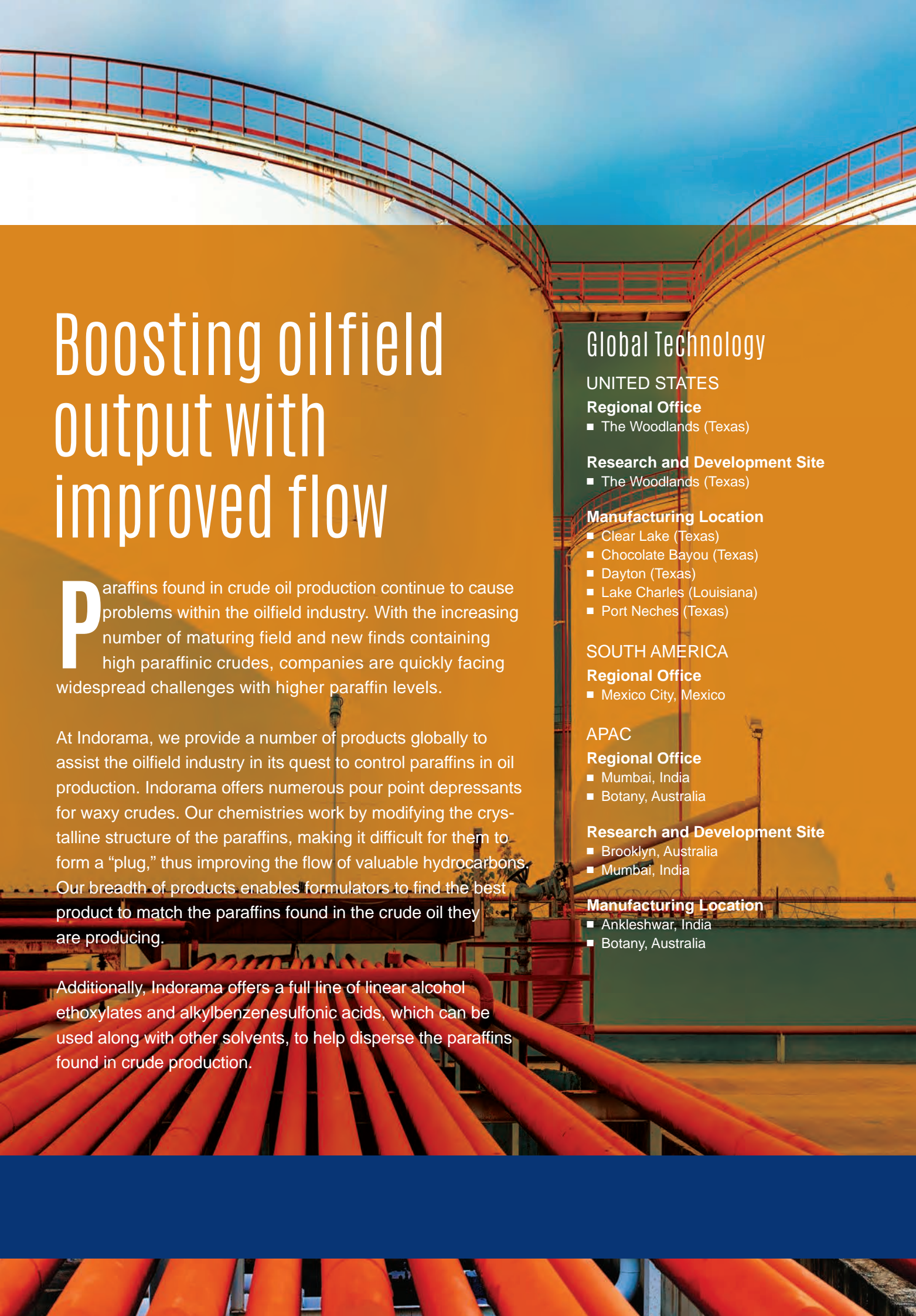


Paraffin Control

We offer an outstanding range of surfactant technologies, world-scale manufacturing and a global distribution network

INDORAMA
VENTURES
Integrated Oxides & Derivatives

> Empowering potential.



Boosting oilfield output with improved flow

Paraffins found in crude oil production continue to cause problems within the oilfield industry. With the increasing number of maturing field and new finds containing high paraffinic crudes, companies are quickly facing widespread challenges with higher paraffin levels.

At Indorama, we provide a number of products globally to assist the oilfield industry in its quest to control paraffins in oil production. Indorama offers numerous pour point depressants for waxy crudes. Our chemistries work by modifying the crystalline structure of the paraffins, making it difficult for them to form a “plug,” thus improving the flow of valuable hydrocarbons. Our breadth of products enables formulators to find the best product to match the paraffins found in the crude oil they are producing.

Additionally, Indorama offers a full line of linear alcohol ethoxylates and alkylbenzenesulfonic acids, which can be used along with other solvents, to help disperse the paraffins found in crude production.

Global Technology

UNITED STATES

Regional Office

- The Woodlands (Texas)

Research and Development Site

- The Woodlands (Texas)

Manufacturing Location

- Clear Lake (Texas)
- Chocolate Bayou (Texas)
- Dayton (Texas)
- Lake Charles (Louisiana)
- Port Neches (Texas)

SOUTH AMERICA

Regional Office

- Mexico City, Mexico

APAC

Regional Office

- Mumbai, India
- Botany, Australia

Research and Development Site

- Brooklyn, Australia
- Mumbai, India

Manufacturing Location

- Ankleshwar, India
- Botany, Australia

PARAFFIN CONTROL Product Offering Overview

			Oil & Gas Well / Flowlines	Pipelines	Surface Equipment
Pour Point Depressants	Polymers	SURFONIC® OFP 359	■	■	■
		SURFONIC® OFP 961	■	■	■
		SURFONIC® OFP 962	■	■	■
		SURFONIC® OFP 963	■	■	■
		SURFONIC® OFP 964	■	■	■
		SURFONIC® OFP 965	■	■	■
Building Blocks / Components	Alkylbenzene Sulfonic Acids	XOF-22A	■	■	
		XOF-23A	■	■	
		XOF-26A	■	■	
		XOF-30A	■	■	
	Nonylphenol Ethoxylates	SURFONIC® N Series	■	■	■
		TERIC® N Series	■	■	■
	Linear Alcohol Ethoxylates	SURFONIC® DA Series	■	■	■
		SURFONIC® L24-2	■	■	■
		SURFONIC® L24-7	■	■	■
		SURFONIC® L24-9	■	■	■
	Ethanolamines	Monoethanolamine (MEA)	■	■	■
Formulated Materials	Alkylaryl Sulfonate Amine Salt (In aromatic solvent)	SURFONIC® OFP 303	■	■	■
		SURFONIC® OFP 309	■	■	■
		SURFONIC® OFP 322	■	■	■
		SURFONIC® OFP 326	■	■	■

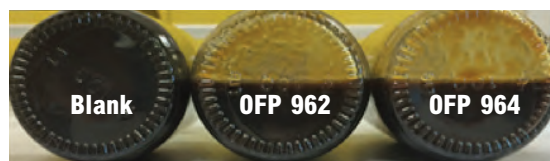
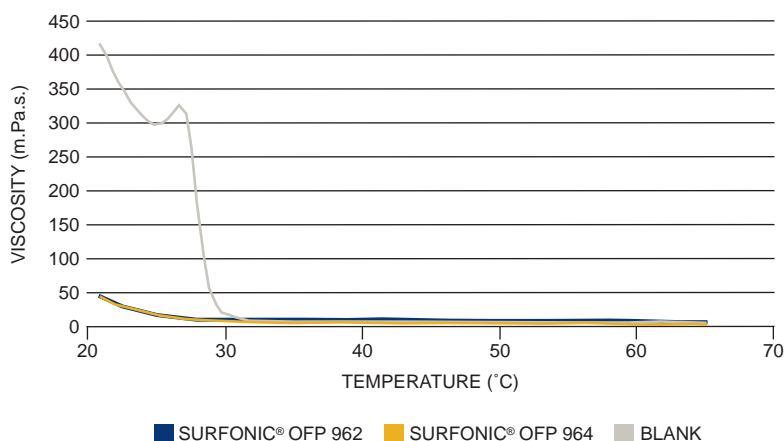
CASE 1 | SCENARIO 1

SURFONIC® OFP 962 & OFP 964: Viscosity of Paraffinic Crude Oil

In this case study, SURFONIC® products tested at 500ppm dose rate.
This data is in reference to the South East Asian crude with a blank pour point of 30°C.

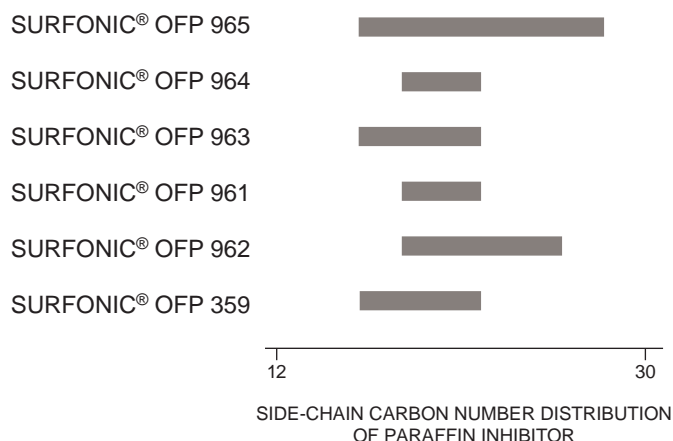
Rheological Studies

Rheology studies with the same samples revealed a significant improvement in the flowability of the crude oil containing either SURFONIC® OFP 962 or SURFONIC® OFP 964 Paraffin Inhibitors. These products offer not only a reduction in pour point of the crude, but also a reduction in its viscosity, even as the temperature is decreased.



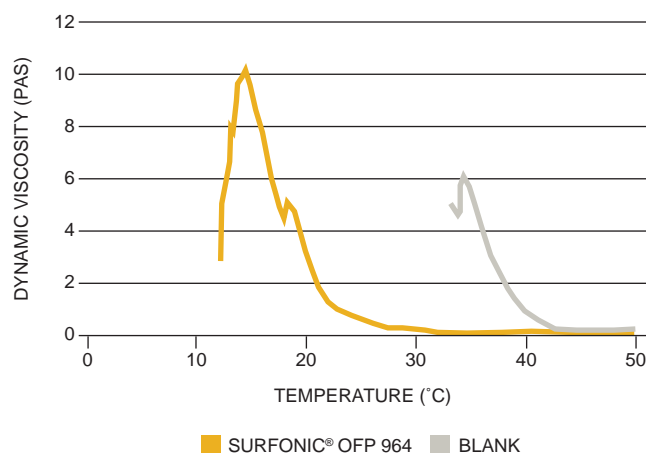
Pour points: +30°C +21°C +21°C

SURFONIC® Paraffin Inhibitors



Dynamic Viscosity vs Temperature

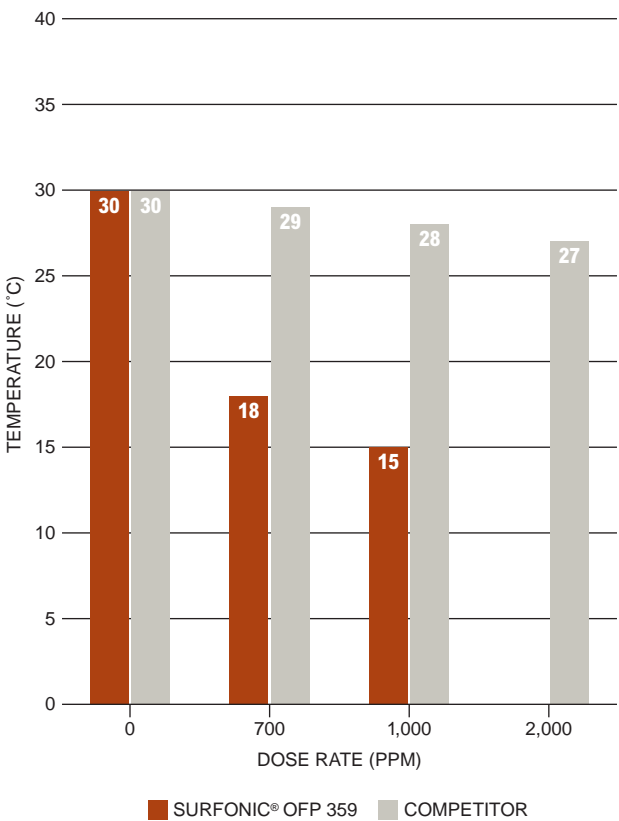
Cone & plate rheometry of Southeast Asian crude (grey line) and crude dosed with 2000 ppm SURFONIC® OFP 964 Paraffin Inhibitor (goldline). A pour point depression of 20°C is observed. Crude containing the pour point depressant also builds to a higher viscosity prior to slippage, enabling more effective re-start after shut-in events.



CASE 1 | SCENARIO 2

SURFONIC® OFP 359:
Cold Filter Plugging Point Analysis

In this case study, SURFONIC® OFP 359 Paraffin Inhibitor was diluted with aromatic solvent



Crude Type: South East Asian Crude

Blank Pour Point30°C

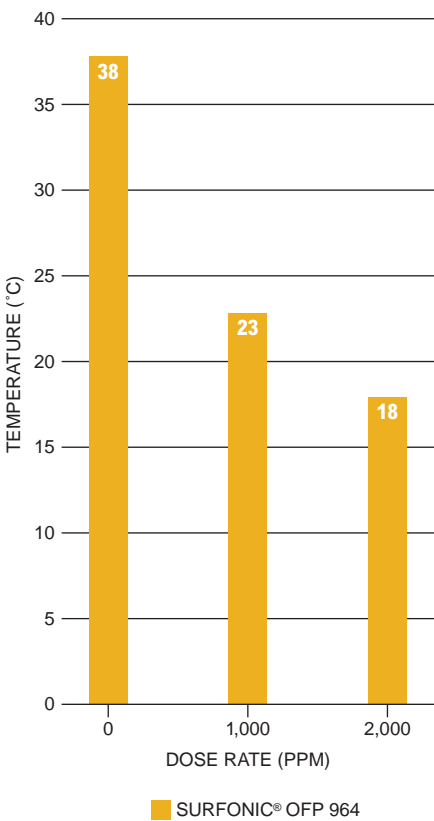
SARA Analysis

Asphaltenes0.70%
Resins11%
Aromatics6.3%
Saturates72%
Wax Content16%

CASE 2

SURFONIC® OFP 964:
Cold Filter Plugging Point Analysis

In this case study, SURFONIC® OFP 964 was diluted with aromatic solvent



Crude Type: South East Asian Crude

Blank Pour Point38°C

WAT.....58°C

Wax Content18% - 22%

About Indorama

Indorama Ventures is a world-class chemical company and a global integrated leader in PET and fibers serving major customers in diversified end-use markets. Following our core strategies, we develop innovative products for customer needs and to make great products for society. Headquartered in Bangkok, Thailand, Indorama Ventures has operating sites in 31 countries on five continents – in Africa, Americas, Asia, Europe & Eurasia.

Integrated Oxides & Derivatives

Indorama Ventures Oxides & Derivatives is a leading chemical intermediates and surfactants producer with a diverse range of products in growth markets such as home & personal care, agrochemicals, oilfield technologies, fuel & lube additives and more.

In January 2020, Indorama Ventures Public Company Limited completed its acquisition of Huntsman's world-class integrated oxides and derivatives business, including:

- **Surfactants:** Integrated producer of a wide range of products for home and personal care, oilfield technologies, agriculture and process industries.
- **Ethylene and Derivatives:** Highly integrated manufacturer of ethylene, ethylene oxide, ethylene glycol, ethanolamines and other derivatives.
- **Propylene Oxide & Derivatives:** Highly competitive technology offerings in propylene glycol, methyl tertiary butyl ether (MTBE) and other derivatives.

Our operating sites include a large flagship site on the US Gulf Coast (USGC) at Port Neches, as well as Chocolate Bayou, Dayton and Clear Lake in Texas, Lake Charles, Louisiana, Ankleshwar, India and Botany, Australia.

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