Escaid™ PathFrac™ fluids

ExxonMobil

Taking unconventional extraction further

Energy lives here™

Achieve results in the toughest operations

Hydraulic fracturing requires fluids that perform effectively under stringent down-hole conditions. The composition of fracturing fluids can vary widely depending on geology. The vast majority of wells are fractured with water-based fluids, composed of over 99.5% water and proppant (often sand or ceramic beads) and less than 0.5% additives.

The additives, while present in very low concentration, provide vital performance enhancements.
Purified by an advanced hydrogenation process, **Escaid™ PathFrac™ fluid** effectively facilitates the delivery of key additives which drive the performance of fracturing fluid formulations.

Formulate fracturing fluids that are reliable and environmentally responsible

Escaid PathFrac fluid enables reliable hydraulic fracturing operations in multiple applications:

- Often used as a carrier fluid for guar slurry viscosifier formulations, or as a carrier fluid for polyacrylamide friction reducers.
- Well suited for use as a carrier fluid for crosslinkers and gel breakers.
- For geologies such as limestone that are not suitable for fracturing with water-based fluids, Escaid PathFrac can also be used as a barrier fluid in emulsified acid fracturing formulations.
- In formations that can be sensitive to water (clay), Escaid PathFrac can be directly used as a replacement for diesel in oil-based fracturing fluid formulations.

With vapor pressures lower than those of traditional diesel products, Escaid PathFrac fluid can help you optimize your formulations with:

- Lower volatility, higher flash point, and improved safety in high temperature conditions.
- Lower potential for exposure by inhalation versus diesel.

In addition, Escaid PathFrac fluid provides:

- Very low total typical aromatic contents < 0.02 wt%.[0]
- Non-detectable levels of benzene, toluene, ethyl benzene and xylenes (BTEX).[1,2,3]
- Polycyclic aromatic hydrocarbon (PAH) level < 0.001 wt%.[4]

Escaid PathFrac fluid enhances the properties of fracturing fluids while supporting your commitment to protect the environment and the health of workers.

For applications requiring a higher density fluid to improve stability of formulations, **Escaid PathFrac HV fluid** has been designed for our customers to meet this specific need. With a typical viscosity of about 2.6 cSt at 40°C, it can provide additional stability for holding guar in suspensions. It has a typical pour point of -20°C, and a minimum flash point specification of 101°C. It also exhibits similar safety, health and environment properties compared to Escaid PathFrac.

Both Escaid PathFrac fluids exhibit virtually zero BTEX and reduce health risks

BTEX[1] mg/kg	Escaid PathFrac and Escaid PathFrac HV	Diesel	
Reference	GC/MS[2] and US EPA 8260B[3]	EPA[5, 6]	US EPA 8260B[7]
Benzene	ND	26-1000	43
Toluene	ND	69-7000	980
Ethylbenzene	ND	70-2000	890
Meta-plus para-Xylene	ND		2300
Ortho-Xylene	ND		1200
Total Xylenes		190-6000	3500
Total BTEX		355-16000	5413

Notes

[0] Does not apply to Escaid PathFrac HV

[1] As manufactured, Escaid PathFrac and PathFrac HV have non-detectable (ND) levels of each of the BTEX species, as analyzed by GC/MS

[2] Practical quantitation limits: Benzene = 0.2 mg/kg, Toluene = 0.3 mg/kg, Ethylbenzene = 0.1 mg/kg, o-Xylene = 0.1 mg/kg, m-xylene plus p-xylene = 0.1 mg/kg; test method Baytown Refinery Laboratory, Analysis AROM_MS_L

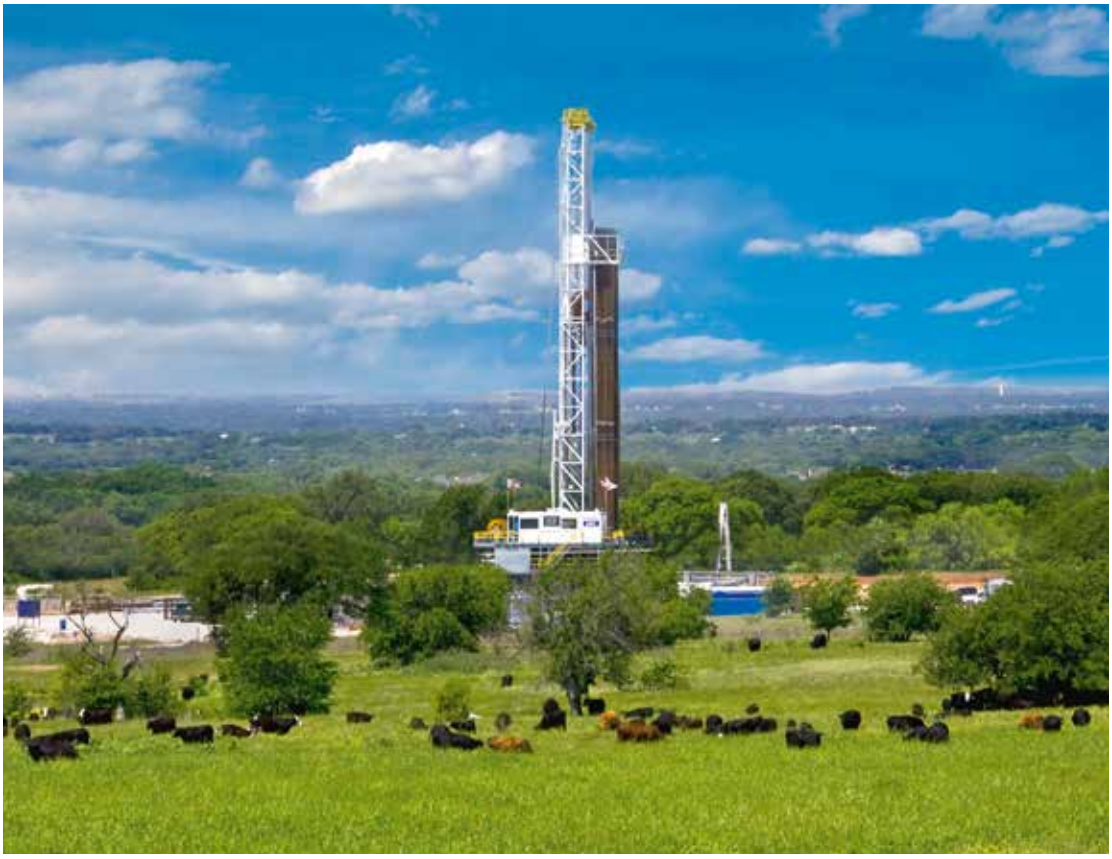
[3] Spot analysis, sample reporting limits: Benzene = 0.05 mg/kg, Toluene = 0.1 mg/kg, Ethylbenzene = 0.05 mg/kg, o-Xylene = 0.1 mg/kg, m-xylene plus p-xylene = 0.15 mg/kg; test method US EPA 8260B

[4] Spot analysis, TSR15-014, PAH content by EPA 1654A

[5] Evaluation of Impacts to Underground Sources of Drinking Water by Hydraulic Fracturing of Coalbed Methane Reservoirs; National Study Final, EPA study 816-R-04-003, Chapter 4, Table 4.2 Report

[6] Potter, T.L. and Simmons, K.E., 1998. Total Petroleum Hydrocarbon Criteria Working Group Series, Volume 2. Composition of Petroleum Mixtures. The Association for Environmental Health and Science

[7] Spot analysis, TSR10-043, test method US EPA 8260B



Performance you need and nothing you don't

Both Escaid PathFrac fluids offer:

Potential for high efficiency with a smaller environmental footprint versus traditional diesel

- Low environmental toxicity
- Very low acute toxicity effects on marine or fresh water species
- Readily biodegradable (per OECD 301F test methodology)
- No environmental hazard classification under EU CLP[8] regulation and under GHS[9]

Potential for improved safety and health versus traditional diesel

- Lower risk of worker exposure to vapors
- Lower skin irritation
- Lower flammability risk due to higher flash points
- Low sub-chronic toxicity; non-mutagenic
- Not classified by US Department of Transportation

Potential benefits for operations in cold weather conditions

- Low typical pour points (-39°C and -20°C respectively for Escaid PathFrac and Escaid PathFrac HV)

Key sales specifications

Properties	Escaid PathFrac	Escaid PathFrac HV	Test Method
Aromatic Content	0.02 wt% max.	0.50 wt% max.	AMS 140.31
Flash Point	70°C min.	101°C min.	ASTM D93
Pour Point	-35°C max.	Reported on CoA	ASTM D97
Viscosity at 40C	1.50 cSt min. - 1.75 cSt max.	Reported on CoA	ASTM D445
Distillation			**ASTM D86**
Distillation Temp., IBP	192°C min.	230°C min.	
Distillation Temp., DP	250°C max.	277°C max.	

Please contact your sales representative for additional product property information

Notes

[8] CLP: Classification, Labeling and Packaging regulations of the European Union

[9] GHS: United Nations Globally Harmonized System of Classification and Labelling of Chemicals

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Contact us for more information:

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