

# AcTivator

Guidelines for ValuBond 40/70

## Fayetteville Shale

### Description

In order to optimize Hexion's AcTivator™ consolidation aide loadings for ValuBond™ 40/70 proppants in the Fayetteville Shale, Hexion has established the following recommended procedures. These guidelines are the result of a comprehensive study designed to outline AcTivator concentrations at specific temperatures and shut-in times to generate a minimum of 40 psi bond strength (at 2,000 psi closure stress). This level of bond strength has shown to prevent proppant flowback in the Fayetteville Shale from numerous fracturing treatments.

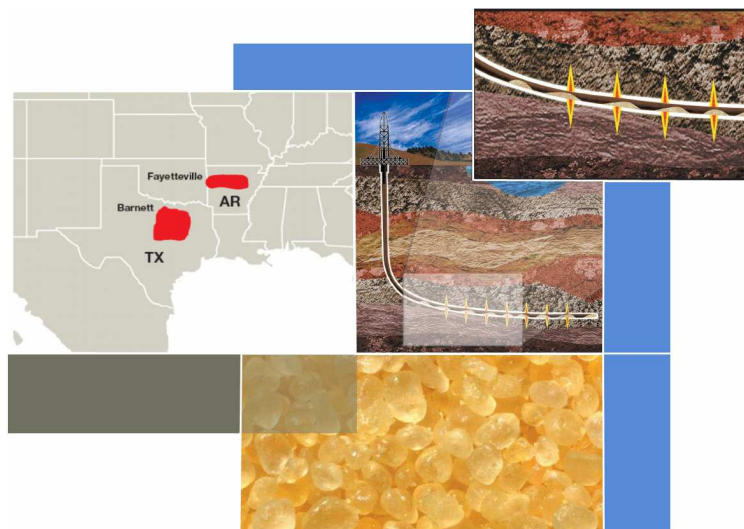
### Application

Typical applications for AcTivator with ValuBond 40/70 proppants are:

- Preventing proppant flowback in the Fayetteville Shale
- At bottom-hole static temperatures of 90-170°F [32-77°C]
- In high-rate waterfrac treatments
- Up to 7,500 psi closure stress
- In horizontal or vertical wells

### Technical Considerations:

- Hexion's AcTivator is required to achieve optimal treatment results and meet published performance data
- Required at temperatures below 180°F [82°C]
- Must be mixed in proppant-laden stages for efficient contact with proppant coating
- Refer to tables below for recommended AcTivator concentration and minimum shut-in times at specified temperatures



### Testing Procedures Utilized

The measurement of unconfined compressive strength of curable resin coated proppants used the following parameters:

- 2% KCl water
- Temperature range of 90-70°F [32-77°C]
- Closure stress of 2,000 psi
- Shut-in time of 2-72 hrs
- AcTivator concentration of 0-2 gal/1,000 gal

### Chemical Properties

<b>Chemical Type</b>	surfactant in alcohol
<b>Ionic Character</b>	nonionic
<b>Color</b>	colorless to pale yellow
<b>Odor</b>	alcoholic
<b>Solubility, weight%</b>	
In water, & light brine	miscible (all proportions)
In heavy brine & acid	soluble to dispersible
In oil	insoluble to dispersible
<b>Shelf-life, months</b>	24

### Physical Properties

<b>Physical State, 68°F [20°C]</b>	liquid
<b>Specific Gravity, 68°F [20°C]</b>	0.92
<b>Density</b>	
g/cm <sup>3</sup> [lb <sub>m</sub> /gal] at 68°F [20°C]	0.92 [7.65]
<b>Pour Point, °F [°C]</b>	-12 [24]
<b>Freezing Point, °F [°C]</b>	<-12 [24]
<b>Flash Point, °F [°C]</b>	54 [12]
<b>Viscosity, cP at 77°F [25°C]</b>	<1
<b>Refractive index, nD at 77°F [25°C]</b>	1.41

# AcTivator

Guidelines for ValuBond 40/70

Fayetteville Shale

## AcTivator Concentration for Listed Minimum Shut-in Time at Specified Temperature

Temperature (°F) [Celsius]	AcTivator Concentration (gal/1,000 gal)	Minimum Shut-in Time (hrs)	Temperature (°F) [Celsius]	AcTivator Concentration (gal/1,000 gal)	Minimum Shut-in Time (hrs)	Temperature (°F) [Celsius]	AcTivator Concentration (gal/1,000 gal)	Minimum Shut-in Time (hrs)		
	90°F [32°C]	12		8	100°F [38°C]		12	2	110°F [43°C]	11
	8	16		8	8		9	8		
	6	24		6	16		7	16		
	4	N/A		4	24		5	24		
	3	N/A		3	N/A		3	N/A		
120°F [49°C]	9	2	130°F [54°C]	8	2	140°F [60°C]	8	2		
	8	4			7		4		7	4
	7	8			6		8		6	8
	6	16			5		8		5	8
	5	24			4		16		4	16
				3	24		3	16		
150°F [66°C]	7	2	160°F [71°C]	3	8	170°F [77°C]	3	4		
	6	4			2		16		2	8
	5	8			1.5		24		1.5	8
	4	12			1		72		1	24
	3	16							0.75	48
	2	24							0.50	72

## Minimum AcTivator Concentration for Listed Shut-in Time at Specified Temperature

Temperature (°F) [Celsius]	Shut-in Time (hrs)	Minimum AcTivator Concentration (gal/1,000 gal)	Temperature (°F) [Celsius]	Shut-in Time (hrs)	Minimum AcTivator Concentration (gal/1,000 gal)	Temperature (°F) [Celsius]	Shut-in Time (hrs)	Minimum AcTivator Concentration (gal/1,000 gal)
	140°F [60°C]	24		2.75	150°F [66°C]		24	2
	48	2.50		48	1.75		48	1.25
	72	2.25		72	1.5		72	1

Temperature (°F) [Celsius]	Shut-in Time (hrs)	Minimum AcTivator Concentration (gal/1,000 gal)
	170°F [77°C]	24
	48	0.75
	72	0.5

© and ™ Licensed trademarks of Hexion Specialty Chemicals, Inc.

© 2009 Hexion Specialty Chemicals, Inc. 10/09 Printed in U.S.A.

The information provided herein was believed by Hexion Specialty Chemicals ("Hexion") to be accurate at the time of preparation or prepared from sources believed to be reliable, but it is the responsibility of the user to investigate and understand other pertinent sources of information, to comply with all laws and procedures applicable to the safe handling and use of the product and to determine the suitability of the product for its intended use. All products supplied by Hexion are subject to Hexion's terms and conditions of sale. HEXION MAKES NO WARRANTY, EXPRESS OR IMPLIED, CONCERNING THE PRODUCT OR THE MERCHANTABILITY OR FITNESS THEREOF FOR ANY PURPOSE OR CONCERNING THE ACCURACY OF ANY INFORMATION PROVIDED BY HEXION, except that the product shall conform to Hexion's specifications. Nothing contained herein constitutes an offer for the sale of any product.



### Oilfield Technology Group

15366 Park Row • Houston, Texas • 77084 USA

Phone: +281 646 2800 [hexion.com/oilfield](http://hexion.com/oilfield)