



Acidize with accuracy

Uniformly acidize the rock matrix to increase production



The uniform effect all along the wellbore



Where the productivity or injectivity of a well is low due to low matrix permeability the well's performance is adversely affected. Uniform acidizing to increase permeability is very difficult or impossible to achieve with conventional acids which react on contact with the carbonate formation forming wormholes rather than uniformly acidizing the whole rock matrix.

Acidizing Fundamentals¹ defines an 'ideal matrix acidizing system' as one that is 'so highly retarded that essentially no reaction takes place while the acid is pumped into the reservoir.'

DEEPA is very close to the ideal matrix acidizing system described by Acidizing Fundamentals where over 95% of the total acid produced is generated down hole after the treatment fluid has been pumped to fill the rock matrix.

DEEPA technology has a number of valuable oilfield applications including:

- ☀ deep matrix acidizing of carbonate formations
- ☀ deep matrix acidizing of sandstone formations containing some carbonate e.g. carbonate cementation or secondary mineralization
- ☀ deep matrix acidizing of formations that have a build-up of carbonate scale
- ☀ stimulation of natural fracture networks in carbonate formations

Significantly increase production by up to **200%***

- ☀ typical production increases obtained range from 20% increase for wells with no near wellbore damage to 200% or more for damaged wells
- ☀ uniform placement of DEEPA treatment fluid into the rock matrix around the wellbore results in excellent uniform acidizing throughout the fluid-filled zone and highly effective matrix stimulation
- ☀ deep matrix acidizing involves uniformly increasing the permeability of the rock matrix to 1-6m radius around the wellbore in a producer or injector well

Reduce pumping costs by up to **40%**

- ☀ mix using standard equipment at the well site using completion brines, town water or produced water
- ☀ compatible with all completion brines
- ☀ does not require high pump rates for effective placement
- ☀ suitable for selective placement techniques
- ☀ placement for wells already on production via workover string, coiled tubing or bullheading

¹Ref: Williams, B.B., Gidley, J.L., and Schechter R.S.: "Acidizing Fundamentals" Soc. Pet. Eng Monograph vol. 8 (1979).

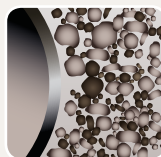
*Production increases vary. To date, the largest increase in production has been 266% sustained for 6 months after DEEPA treatment.

Improve HSE/ environmental compliance

- ☀ DEEPA treatments are simple to use and non-hazardous, thereby removing hazardous materials from inventory, trucking and well site
- ☀ non-aggressive matrix stimulation overcomes the problems associated with placing highly reactive acids such as HCl
- ☀ simple to mix and pump with standard oilfield equipment
- ☀ improve HSE on well site, protecting the asset, company and personnel
- ☀ extremely low environmental impact



REDUCED PERMEABILITY IS A BARRIER TO PRODUCTION

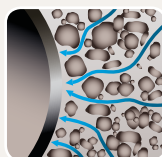


Reduced flow

Low intrinsic rock permeability or production related damage reduces achievable flow rate



FORMATION DAMAGE REMOVAL

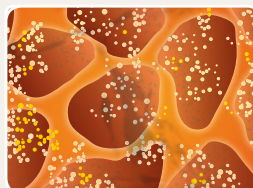


Damage removed

Removal of acid soluble formation damage such as calcium carbonate scale will restore permeability and improve flow to the wellbore



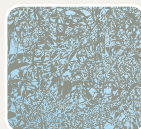
IN-SITU ACIDIZING



Acid is generated in-situ throughout the fluid-filled zone, increasing permeability, including deep into the formation

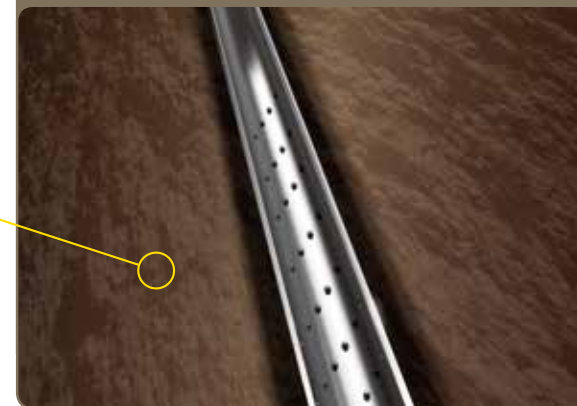


INCREASED PERMEABILITY



Dissolution of the carbonate rock matrix or carbonate cementation and secondary mineralization in sandstones increases matrix permeability

LOW PERMEABILITY FORMATION LIMITS PRODUCTION



DEEPA PLACED IN FORMATION



INCREASED PERMEABILITY OPTIMIZES PRODUCTION

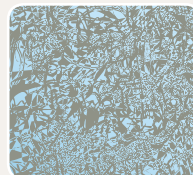


Improve HSE/ environmental compliance

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- ☀ non-aggressive matrix stimulation overcomes the problems associated with placing highly reactive acids such as HCl
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Increase matrix permeability

Where the production rate of the well is limited by the matrix permeability, DEEPA can uniformly increase the permeability of the rock matrix up to several metres radius around the wellbore.



Dissolution of the carbonate rock matrix or carbonate cementation and secondary mineralization in sandstones increases matrix permeability

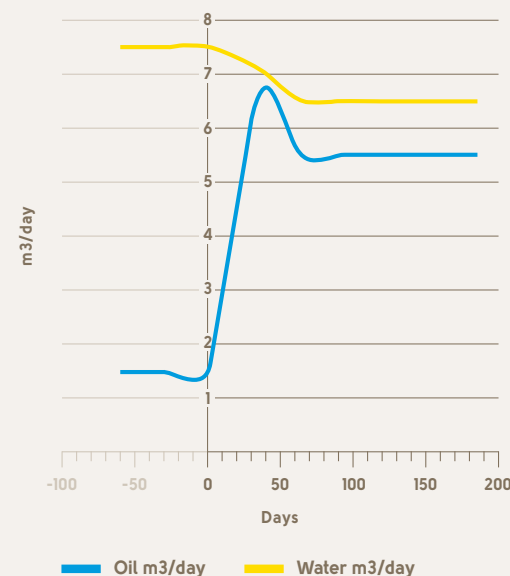


Remove near wellbore damage

In many cases DEEPA can also remove near wellbore damage, resulting in increases in production rates above those that would be expected from increasing the matrix permeability alone.

Even in wells that have produced for many years, if there is residual oil in place DEEPA deep matrix stimulation can deliver excellent financial returns.

Days pre/post DEEPA treatment



Acidize with accuracy



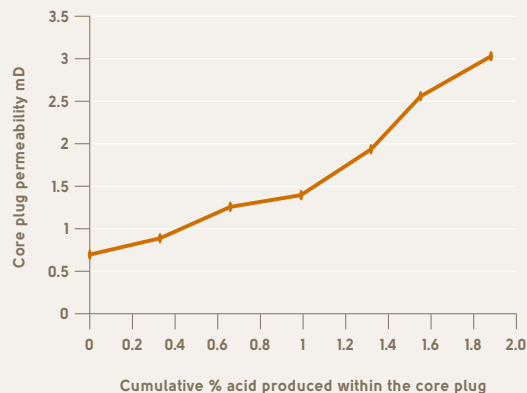
Laboratory validated

Proven and robust technology

DEEPA is proven to increase the permeability and the porosity of carbonate formations or sandstone formations cemented with carbonate or suffering from carbonate scaling.

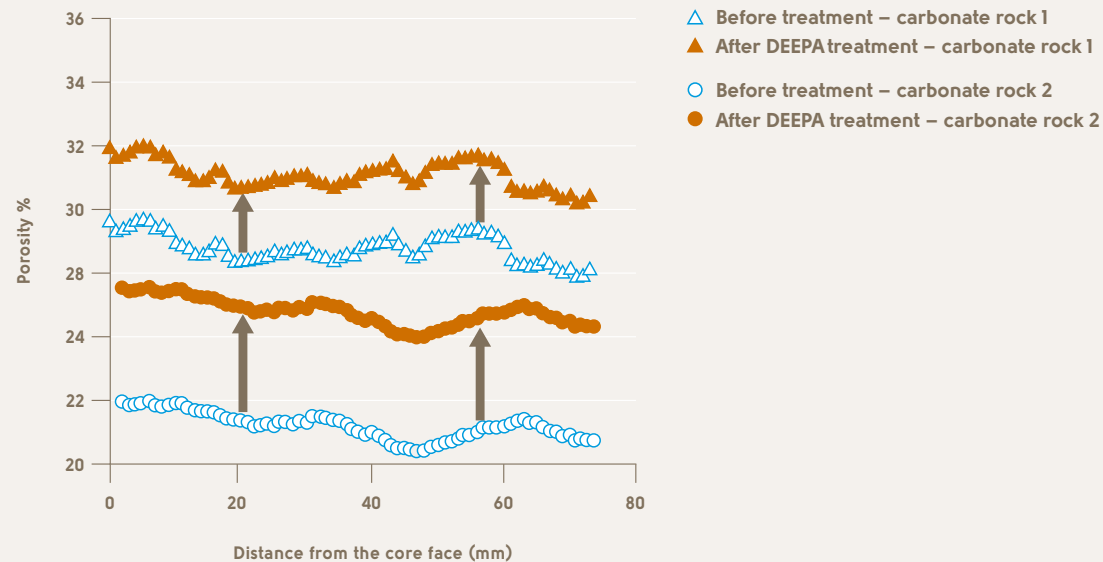
The graph shown below illustrates the effect of sequential, low concentration DEEPA treatment steps on the permeability of a carbonate core. Note that although only a few percent of organic acid has been produced in total within the core, significant increases in permeability have been achieved.

Effect of sequential DEEPA treatments on permeability of San Andres Dolomite



The graph below illustrates the effect of DEEPA treatment fluid on the porosity of carbonate cores, determined by CT scanning. Extremely uniform increases in porosity were observed.

Effect of DEEPA treatments on porosity of carbonate cores



- proprietary technology engineered for specific applications
- compatible with all completion brines

- technically validated
- our field case histories prove the efficacy of the technology and its value to operators

Cleansorb

The innovative reservoir chemistry company

Cleansorb's patented in-situ acid generation technologies achieve uniform radial and longitudinal distribution of cleanup and stimulation fluids in the target zone(s) without risk to the formation, environment or completion equipment.



Get in touch

Cleansorb has a team of DEEPA specialists to advise you on the best strategy for your circumstances. Please email contact@cleansorb.com for more information.

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