

# MAX-R™ LOW FRICTION CENTRALIZERS

GO FURTHER FASTER WITH MAX-R™ CENTRALIZERS



LIGHTER • STRONGER • SMARTER





Max-R™ low friction polymer centralizers by Matrix are designed specifically for today and tomorrow's extended reach and highly deviated casing installation operations. Utilising propriety blends of premium engineering polymers combined with the expertise of Matrix's thermoplastic engineers, material scientists and decades deep industry experience, the Max-R low friction centralizer continues to deliver solutions to well construction challenges.

# PERFORMANCE AND FEATURES

## LOW AND ULTRALOW FRICTION

Up to 67% less coefficient of friction than thermoset polymer centralizers and 85% less than steel centralizers.

## LOW WEAR

Up to 79% less volume loss than other thermoset polymer centralizers and 98% less than aluminium centralizers.

## SHOCK RINGS™

Patented SHOCK RINGS™ manufactured using a high-impact, low friction polymer material providing:

- Axial shock protection to the leading edge of the centralizer
- Low friction bearing face during pipe rotation
- Eliminates centralizer 'rock' as centralizer supported at both ends
- Mechanically locked in place not glued or interference fitted
- Polymer ring does not pose threat to centralizer body under compressive loads unlike centralizers fitted with metal rings.

## POSI-DRIFT™

Patented castellations allow for a tighter tolerance fit onto the pipe to maximise standoff whilst providing a fluid pathway through the ID.

## HIGH TEMPERATURE RATING

Up to 225°C (437°F) continuous operating temperature for the Max-R™ Pioneer and Extreme centralizers.

## ENGINEERING GRADE POLYMERS

100% metal free, proprietary blend of premium engineering polymers.

## BODY DESIGN

Various width blades available in a complete range of sizes.

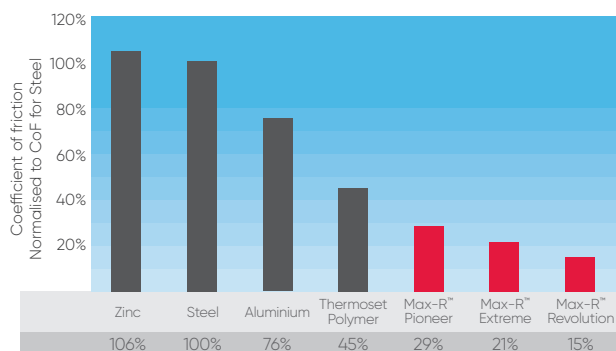
## CUSTOMIZABLE

Easily customisable ODs.

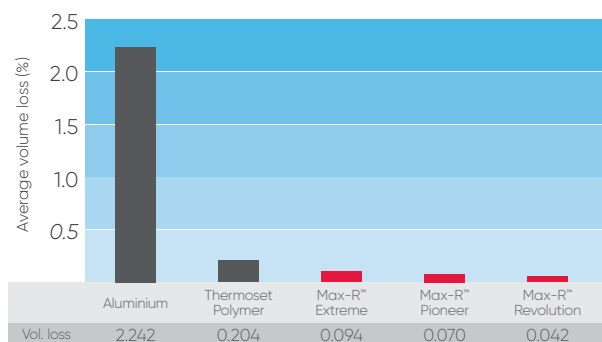
## TRACEABILITY

Production batch numbers integrated onto body.

Static coefficient of friction (Dry)



Volume loss per ASTM G99

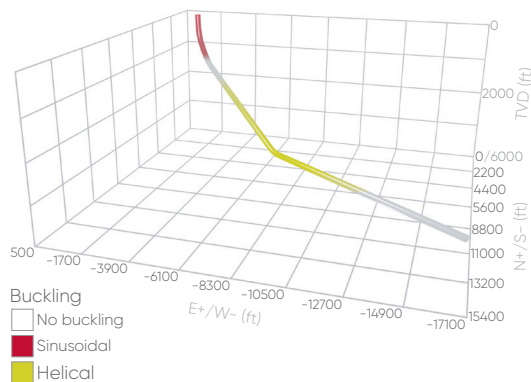


# CUSTOMISED TORQUE, DRAG & PLACEMENT MODELLING

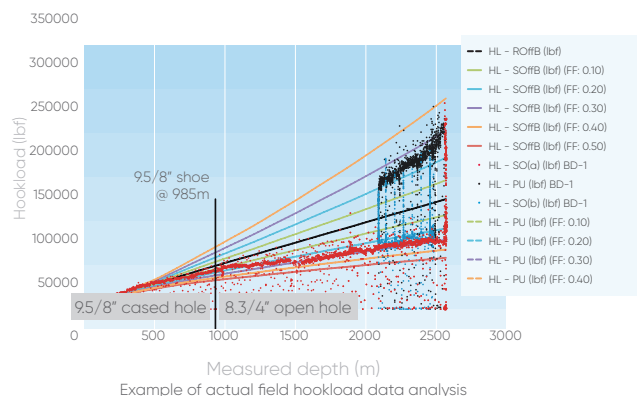
Utilising industry recognized and respected torque, drag and centralizer placement modelling software from Pegasus Vertex Inc, Matrix offers much more than the typical centralizer analysis service.

Matrix's engineers will work with you on your particular area of interest or concern and customize the analysis to meet your requirements. Whether this is a simple stand-off analysis or more involved post operation evaluation to determine actual casing drag, Matrix can supply the data that enables you to make informed decisions and reach precise conclusions.

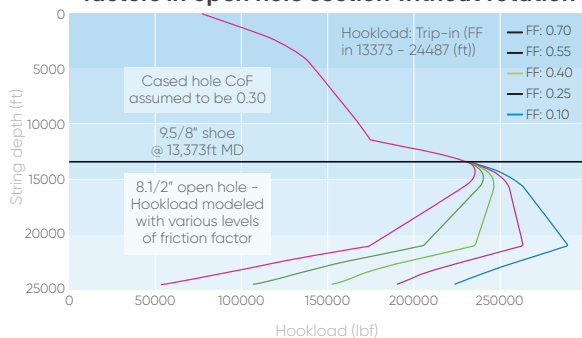
**Buckling effect at Total Depth**



**Hookload (SO and PU) field data analysis**

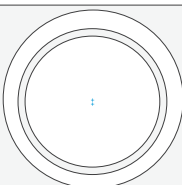
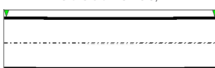


**Run-in hookload analysis with variable friction factors in open hole section without rotation**



Example of pre-installation hookload analysis

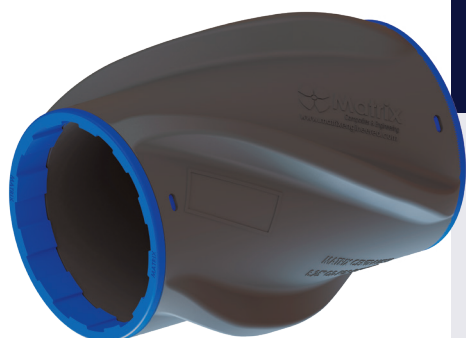
**Standoff analysis at mid-span between centralizers for 7" liner**

INPUT DATA			OUTPUT DATA			
Wellbore	Hole ID	8.500"	Annular clearance @ cent.	0.625 in	Standoff @ cent.	83.3%
	Inclination @ top	90 deg	Max pipe deflection(YMax)	0.039 in	Wellbore clearance	0.750 in
	Inclination @ bottom	90 deg	Annular clearance @ mid-span	0.586 in	Standoff @ mid-span	78.2%
	Azi @ top	0 deg	Axial force @ bottom	0 lbf	Axial force @ top	0 lbf
	Azi @ bottom	0 deg	Side force on span	596 lbf	Side force per cent.	298 lbf
	Mud inside pipe	12.5 ppg				
	Mud in annulus	11.7 ppg				
Casing	Weight	26 lb/ft				
	OD	7.000"				
	ID	6.276"				
	Density	490 lb/ft3				
Centralizer	Type	Matrix Rigid	<p>Axial &amp; longitudinal cross-section of 7" pipe inside 8 1/2" hole over 8 m span (8 1/4" OD Max R Centralizers at both ends)</p> 			
	OD	8.250"				
	Spacing	8 m				

Axial & longitudinal cross-section of 7" pipe inside 8 1/2" hole over 8 m span (8 1/4" OD Max R Centralizers at both ends)



# RANGE AND APPLICATION



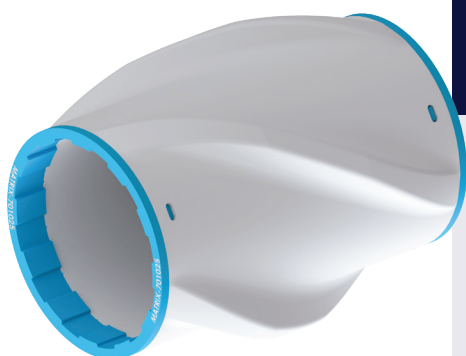
## MAX R™ PIONEER

- High strength, low friction centralizer
- Cemented casing and liners
- Well screens, slotted liners, run with swell packers
- Max operating temp: 437°F/225°C
- Sizes: 4.1/2" to 7" (Various ODs)



## MAX R™ EXTREME

- Extremely high Impact strength, low friction centralizer
- Designed for high impact and Arctic operations
- Ideally suited for large Intermediate Casing Strings where impact from surface operations are a concern
- Max operating temp: 437°F/225°C
- Sizes: 4.1/2" to 10.3/4" (Various ODs)
- 5.1/2" also available in heavy duty passive (5°) and spiral blade design



## MAX R™ REVOLUTION

- Highest step-out ratio completion. Step out ratio of 5.84:1, length of 3,710m, TVD of 636.6m
- Self-lubricating, ultralow friction – the lowest friction, solid centralizer in the industry
- ERD and very high step-out ratio horizontal wells
- Complex, high value, multilateral completions
- Max operating temp: 271°F/133°C
- Sizes: 4.1/2" to 9.5/8" (Various ODs)

# REAL WORLD RESULTS

## MAX-R™ PIONEER CENTRALIZERS – 26% REDUCTION IN WELL COSTS

After experiencing continual high levels of drag preventing the casing from reaching targeted depths together with equipment breakage resulting in significant non-productive time, a southeast Asian operator switched from semirigid steel centralizers to Max-R™ Pioneer centralizers. The switch resulted in 100% success in reaching total depth, elimination of an entire casing string, 30% reduction in time, 26% reduction in well costs, increased production rates and less environmental impact.

## MAX-R™ REVOLUTION – ACHIEVING A FIRST

When a Canadian operator working in Australian waters planned to set a new world record with the highest step-out ratio installation of well screens, they came to Matrix. Utilising Matrix Revolution ultralow friction polymer centralizers, the screens were run to a measured depth of 3,710 m (12,172 ft) in a shallow 636.6 m (2,090 ft) true vertical depth well, resulting in a step-out ratio of 5.84:1. The screens were installed without the aid of a rotational device thus saving time, cost and maintaining operational simplicity.

## MAX-R PACKER PROTECT™ – TAMES AGGRESSIVE SHALE FORMATION

A leading North American multi-stage completion company required a high wear resistant polymer centralizer that would protect the packer elements of their horizontal frac completion systems during installation in very aggressive shale formations.

To add to the challenge the equipment was often assembled in the shop and freighted by road to the field in sub-zero temperatures. Thus the centralizers had to be able to withstand high-energy impact forces at temperatures as low as -50°C (-58°F) whilst retaining the material wear properties to protect the packers when running in the hole.

After significant research, development and testing, the Max-R Packer Protect™ system was developed which combines hybrid Max-R™ Extreme polymer blend materials with a wide blade design. The result is a polymer centralizer that is ready to work in the most extreme environments, both at surface and in the hole.





# 20,000 M<sup>2</sup> OF STATE-OF-THE-ART

Located in Western Australia, the Matrix manufacturing facility houses automated, high pressure injection moulding machines used to produce the Max-R™ range of low friction centralizers.

It is also home to a team of multidisciplinary engineers and material scientists. Research and development is part of the Matrix DNA and by remaining focused on advanced polymer and composite material technologies, ongoing development programs are dedicated to continually enhance product performance, improve operational technical limits and create more value for their customers.



# **MATRIX** **DELIVERING** **TO THE WORLD**

