



## Dual Shear Gun

### High Pressure Shearing and Mixing unit

To make and obtain a good oil-based drilling fluid, a stable water-in-oil emulsion must be produced. Creation of a stable emulsion require exposure to a sufficiently high mixing energy. This mixing energy is usually provided by pumping through the drill bit or a shear unit. Most of today's shear units do not provide sufficient shear to make this stable emulsion and circulation through the drill bit is necessary.

Shearing through the drill bit increases the drilling rate of the wells and increase wear on topside and downhole equipment. The most important property used to monitor Oil-based or Synthetic-based Invert-Emulsion Drilling Fluids is the electrical stability (ES). ES measure the needed electric potential to transmit a specified current through the ideally non-conduction fluid. Thus, ES relates to the stability of the emulsion and capabilities to wet additives.

There are many factors that can affect the degree of emulsification, such as suspended solids, viscosity profile, temperature, and pressure. In many cases large volumes of oil-based drilling fluids are mixed without proper and adequate shearing, causing the oil to separate and weight material settling (sagging). High mixing energy is also needed to produce applicable water-based drilling fluids. High mixing energy

reduces appearance of undissolved polymer agglomerations (fisheyes). By removal of fisheyes the waterbased fluids become stable, and all drilling fluid properties can be optimized.

The Jagtech™ Dual Shear Gun is a combined shearing and mixing device for oil, water or synthetic based fluids. The unit will assure maximum Electrical Stability and obtain a stable emulsion with reduced sagging in addition to jet mixing in the area that the opposite jets from the nozzles are colliding. When the drilling fluid passes through the opposing high-pressure nozzles and collapse in the mixing chamber due to the sudden reduction in pressure, the droplets implode, generating dynamic shear and fine particle dispersion. For water-based drilling fluids the same processes will disperse chemicals and remove fisheyes.

### VALUE:

#### QHSE

- Easy maintenance
- Easy installation
- Low noise and vibration
- Low pressure body and outlet

#### FUNCTIONALITY

- Customized outlets and inlets
- High pressure shearing
- Injection ports for additives
- Dual inlets / opposite inline jets
- Jet chaos mixing
- Changeable nozzle sizes
- WC lined or ceramic inner liner

#### EFFICIENCY

- Generating dynamic shear and fine particle dispersion
- High Energy Fluid Shearing and impact jet mixing
- Get homogenized MUD, from different qualities
- Obtain a stable emulsion with reduced sagging
- Proven to increase ES value between 50 to over 100%
- Improved Rheology
- Shear and Mix at the same time
- More stable mud instantly

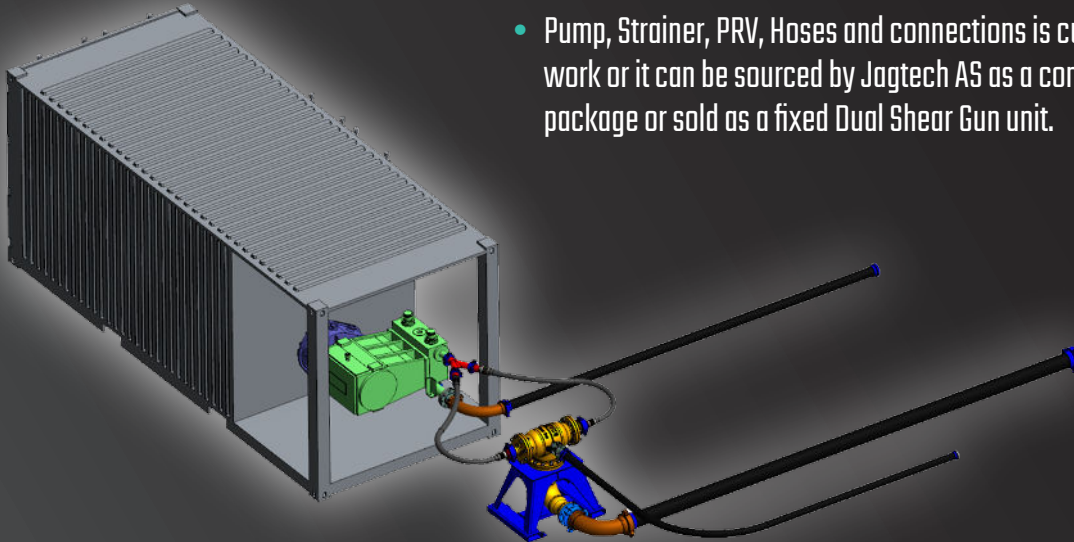
**D.S.G**  
DUAL SHEAR GUN

**PATENT:**  
NO 346707

We deliver innovative and customer specified technologies for the oil and gas industry.



## TYPICALLY SET UP:



- Dual Shear Gun is rented or sold as loose item
- Use existing mud pump or source external mud pump unit to operate.
- Pump, Strainer, PRV, Hoses and connections is customer scope of work or it can be sourced by Jagtech AS as a complete rental package or sold as a fixed Dual Shear Gun unit.

## PRODUCT SPECIFICATION:

Size (l x h x w)	950 mm x 450 x 410
Weight (kg)	Appr. 200
Max. Inlet pressure (bar)	750
Max. Flowrate (l/min)	1500
Outlet pressure (bar)	Atm.
Nozzle type	Smith/SLB N50 series
Exchangable nozzle sizes	7/32 in – 16/32 in
Inner liner material	WC clad st. / Ceramic
Material	Steel
Inlet	3 inch Hammer Union 15000 PSI
Outlet	Flanged 8 inch RF, #150 ANSI B16.5
Operating Conditions HP	1000/1500 l/min @ 100/150 bar
Operating Conditions LP	Please contact us for details

## WARNINGS AND HAZARDS



### JAGTECH AS

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## Dual Shear Gun

JAGTECH presents a new standard for mud and fluid conditioning. This solution performs mixing and high pressure shearing in one, highly efficient, low noise unit. Simple installation with adaptive or customized fluid inlets and outlets. Low pressure and velocity in outlet flow.

### PREFACE:

Appropriate drilling fluid properties for optimal drilling progress with immediate stable viscous parameters during drilling operations. Freshly sheared drilling fluid can be applied directly into the well operation when this shear gun is implemented on the rig. Expected reduction in wellbore construction time due to avoiding fluid circulation in the well only to condition the drilling fluid.

### BENEFITS:

- Double set of shear nozzles
- Easy changeable nozzles
- Standard drill bit shear nozzles
- High pressure inlets
- Low pressure and velocity outlet
- For oil and water-based mud
- Low noise
- Low wear
- Additive inlet nozzles
- Fluid impact mixing
- Changeable inner tube
- For use in ATEX environment

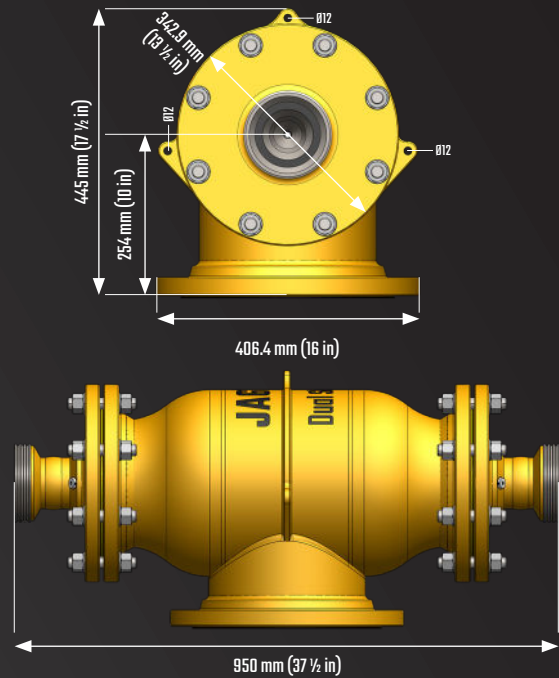
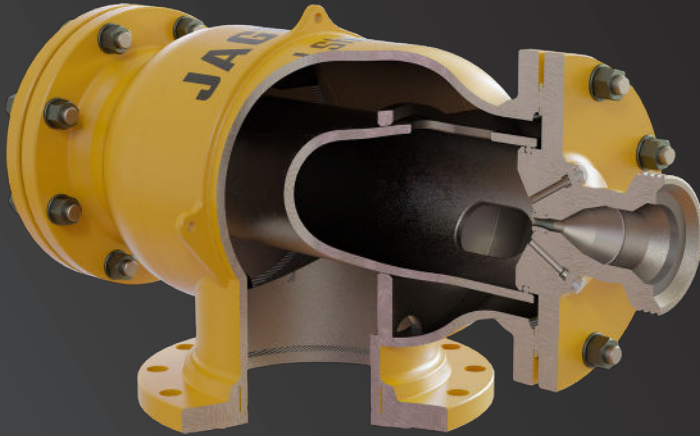
### OPTION:

- Multiple shear nozzle sizes
- Standard or customized high pressure inlet connections
- Standard or customized high pressure outlet connection
- Wolfram carbide lined or ceramic inner tube
- Wolfram carbide or ceramic nozzles

**D.S.G**  
DUAL SHEAR GUN

**PATENT:**  
NO 20190161

We deliver innovative  
and customer specified technologies  
for the oil and gas industry.



## TECHNICAL SPECIFICATION

Max inlet pressure:	750 bar
Max outlet pressure:	10 bar
Max pressure drop in nozzles:	200 bar
Material housing:	S355 carbon steel
Shear nozzle type:	Smith bit N50 Series
Inner tube material:	Wolfram carbide lined carbon steel / Ceramic
Weight:	200 kg
Size:	950 x 406 x 445mm (37 1/2 x 16 x 17 1/2 in)

## WARNINGS AND HAZARDS



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## DualMAPS MAGNETIC ROD SYSTEM:

JAGTECH presents a new standard for removing ferritic material from drilling fluids by using a grid of strong neodymium magnet rods in a defined pattern with integrated spoilers for disrupting laminar flow around the magnet rods.

### PREFACE:

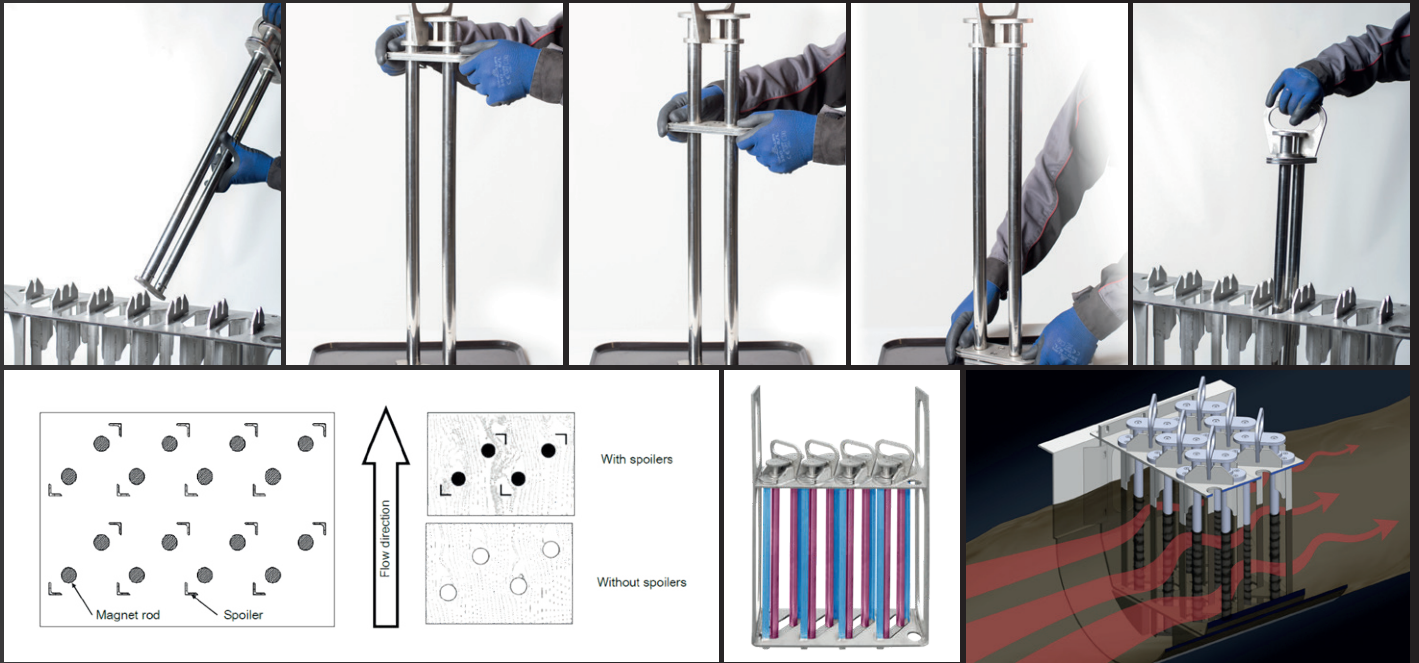
DualMAPS magnetic rod system are developed for an effective, safe and easy installed customized system for removing ferritic and paramagnetic contaminations in a flow of liquids. The DualMAPS magnetic rod system can be manufactured in any length and configuration to meet the custom demands, suitable for any system setups and placements.

### BENEFITS:

- Installation frame designed and calculated to maximize the magnetic field within the flow section.
- Light weight. Easy installation without hot work within a half shift.
- Internal scrapers for easy removal of waste.
- 12000 Gauss peak on clean rod surface
- Custom made frame for various applications
- Removes significantly more magnetic debris than the conventional systems
- Successfully applied in field applications.

### OPTIONS:

- Brass or PTFE scraper.
- Produced according to NORSOK standards.
- On site survey to determine optimal placement with regards to efficiency and HSE.
- Full traceability and recyclable.
- For purchase or lease.
- Full documentation package according to NORSOK.
- Cover and lids.
- Semi automatic cleaning station.
- Turnkey delivery.



## TECHNICAL SPECIFICATION:

Magnetic material	Neodymium magnet segments	
Tubing material	Titanium	
Other metallic materials	AISI 316L / A4.80 / Brass / PTFE / 6082-T6	
Magnetic performance (peek strength)	Gs (T)	Minimum 12000 (1.2)
Performance reading		On magnetic rod surface
Max. working temperature	°C (°F)	80 (176)
Min. working temperature	°C (°F)	-20 (-4)



## WARNINGS AND HAZARDS:



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## JAG-MAG Inline DualMAPS MAGNETIC ROD SYSTEM:

JAGTECH presents a new standard for removing ferritic material from drilling fluids by using a grid of strong neodymium magnet rods in a defined pattern with integrated spoilers for disrupting laminar flow around the magnet rods.

### PREFACE:

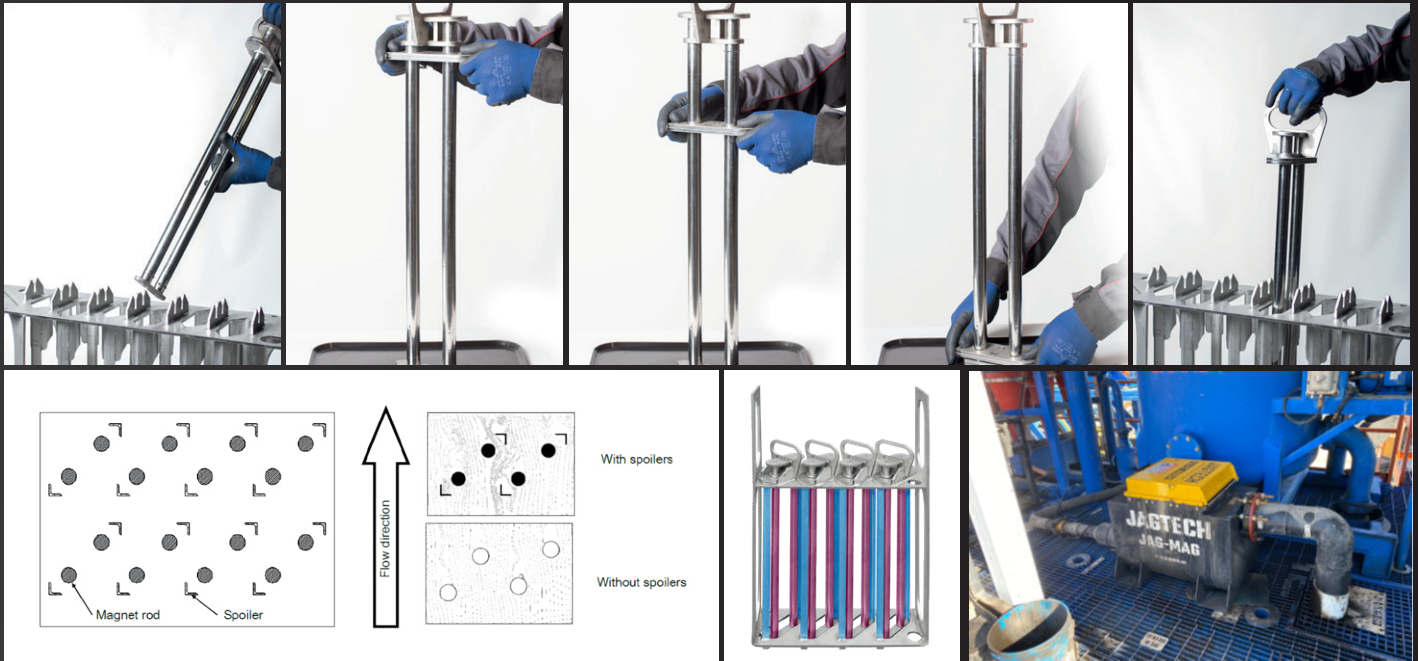
JAG-MAG is our In-Line version of our efficient Dual MAPS magnetic rod system, developed for an effective, safe and easy installed customized system for removing ferritic and paramagnetic contaminations in a flow of liquids. The JAG-MAG magnetic rod system comes standard with 9 off Dual MAPS Magnetic Rods, Frames, Box and Lid, but can be custom manufactured and configured to meet customer demands, suitable for any system setups and placements.

### BENEFITS:

- Easy Installation In-Line designed and calculated to maximize the magnetic field within the flow section.
- Easy handling and operation
- Internal scrapers for easy removal of waste.
- 12000 Gauss peak on clean rod surface
- Removes significantly more magnetic debris than the conventional systems
- Successfully applied in field applications.

### OPTIONS:

- Brass or PTFE scraper.
- Produced according to NORSOK standards.
- On site survey to determine optimal placement with regards to efficiency and HSE.
- Full traceability and recyclable.
- For purchase or lease.
- Full documentation package
- Cover and lids.
- Semi automatic cleaning station.



## TECHNICAL SPECIFICATION:

Magnetic material	Neodymium magnet segments	
Tubing material	Titanium	
Other metallic materials	AISI 316L / A4.80 / Brass / PTFE / 6082-T6	
Magnetic performance (peek strength)	Gs (T)	Minimum 12000 (1.2)
Performance reading		On magnetic rod surface
Max. working temperature	°C (°F)	80 (176)
Min. working temperature	°C (°F)	-20 (-4)



## WARNINGS AND HAZARDS:



**CAUTION**

Interaction with metallic objects may produce Pinch Hazards  
Persons with Medical Implants KEEP BACK 12 inches.

**Strong Magnetic Field**



**DANGER**

No pacemakers, implanted defibrillators, metal implants, loose metal objects, hearing aids, cell phones og pagers allowed. Authorized personnel only.

**Strong Magnetic Field**



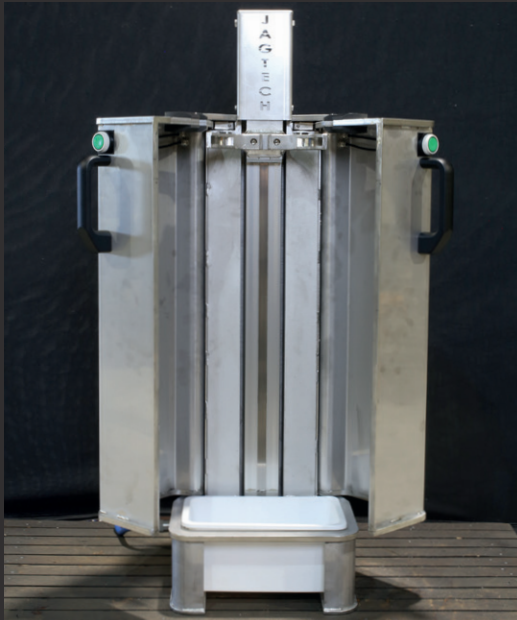
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## DualMAPS CLEANING CABINET:

JAGTECH™ DualMAPS cleaning cabinet for cleaning dual magnet rods in a controlled HSE environment, reducing cleaning time and handling.

### PREFACE:

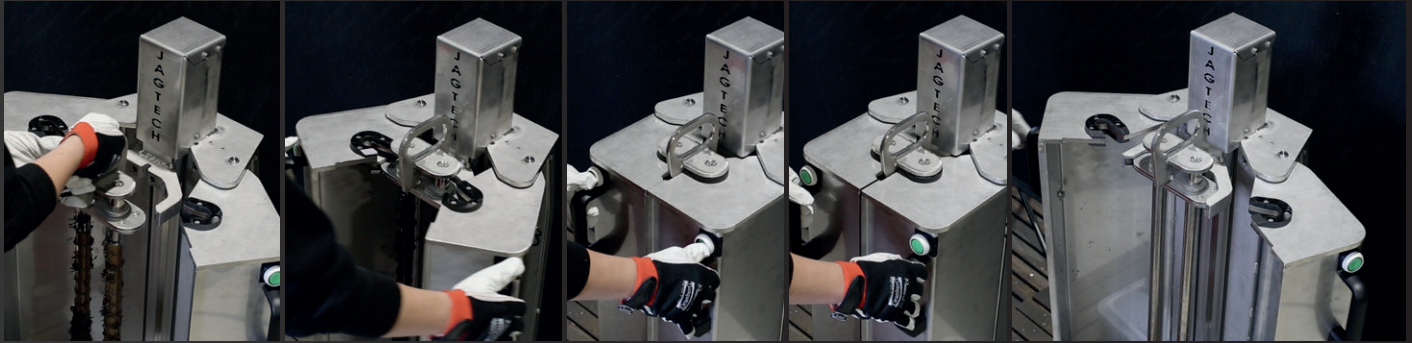
DualMAPS cleaning cabinet are developed for an effective, safe and easy cleaning of our DualMAPS magnetic rods. Fully semiautomatic pneumatic operated without exposing personnel for fumes and hazardous operation during cleaning of our DualMAPS magnetic rods. The unit is delivered with collecting bucket for easy handling, removing and weighing of removed material.

### BENEFITS:

- Pneumatic operated.
- Safe and time reducing cleaning sequence.
- Easy installation.
- High efficiency.
- Easy Use.
- Usable for most magnetic rod lengths.
- Approx. 30 seconds cycle time.
- Less spill on floor / deck.
- With bucket for collection waste.

### OPTIONS:

- For purchase or lease.
- Full documentation package according to NORSOK.
- Turnkey delivery.



## TECHNICAL SPECIFICATION:

### Air supply:

Connection	R3/8" female	
Pressure	bar (psi)	6,0 (87)
Air consumption	L (ft <sup>3</sup> ) / cycle	10,5 (0,37)

### Performance data:

Theoretically actuator force @ 6 bar	N (lbf)	754 (169)
Allowable operating load	N (lbf)	392 (88)
Max. working temperature	°C (°F)	60 (140)
Min. working temperature	°C (°F)	5 (41)

### Dimensions and weights:

Weight (empty)	Kg (lb)	63 (138)
Max. capacity bucket	L (ft <sup>3</sup> )	5 (0,18)
Length x width x height (closed)	mm (in)	391 x 320 x 1010 (15,4 x 12,6 x 39,8)
Length x width x height (open)	mm (in)	380x569x 1010 (15 x 22,2 x 39,8)



## WARNINGS AND HAZARDS:

	<p><b>CAUTION</b></p> <p><b>Pressurized Device</b> System might have stored energy causing unexpected movements. <b>Release Air Pressure Before Servicing</b></p>
	<p><b>CAUTION</b></p> <p><b>Automatic movements</b> Automatic retraction movement of actuator.</p>
	<p><b>CAUTION</b></p> <p>Interaction with metallic objects may produce Pinch Hazards Persons with Medical Implants KEEP BACK 12 inches.</p> <p><b>Strong Magnetic Field</b></p>



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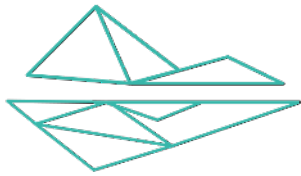
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# JAGTECH

Preferred Technology Partner

**AutoMAPS Introduction**

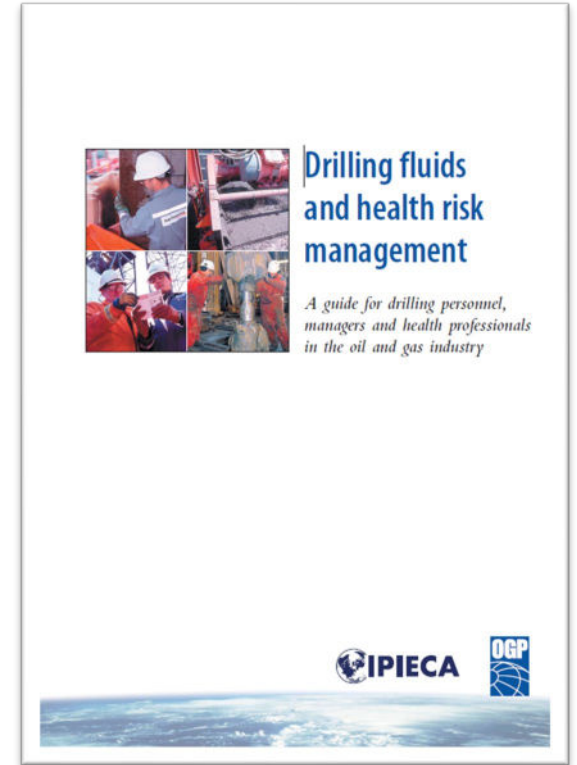


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# Ditch Magnet Challenges Today

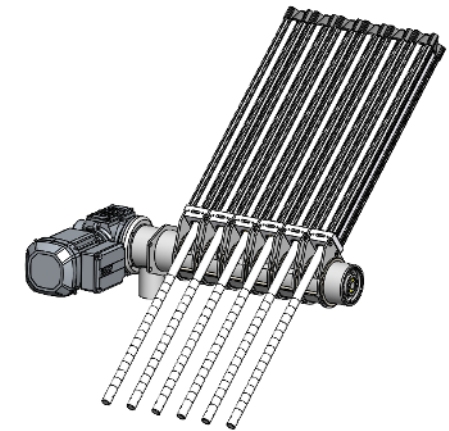
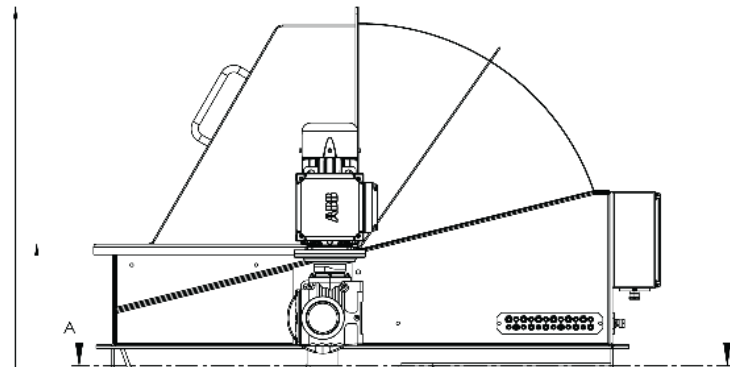
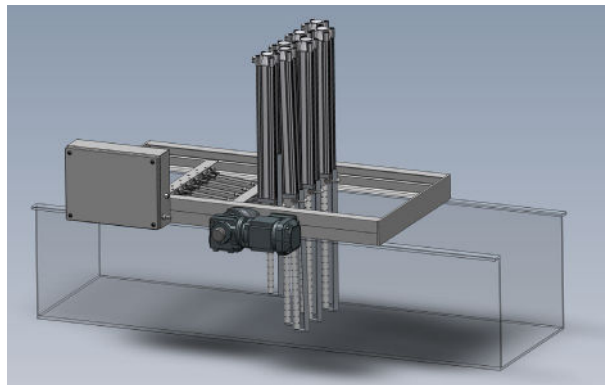
- Manual work
- Time consuming
- Heavy lifting
- HSE hazards
  - Exposed to fumes from the mud
  - Exposed to chemicals
  - Noize
  - Skin cut on sharp swarf
  - Accessibility
  - Magnetic field
  - Pinches and crushing



# AutoMAPS Solution

**PATENTED**

- Fully automatic dich magnet system
- Pre Engineered, Custom Built to flowline, Inline or application specific
- Remotely Air operated
- Integrated to rig process system
- Automatic logging of removed weight (option)
- Flexible installation

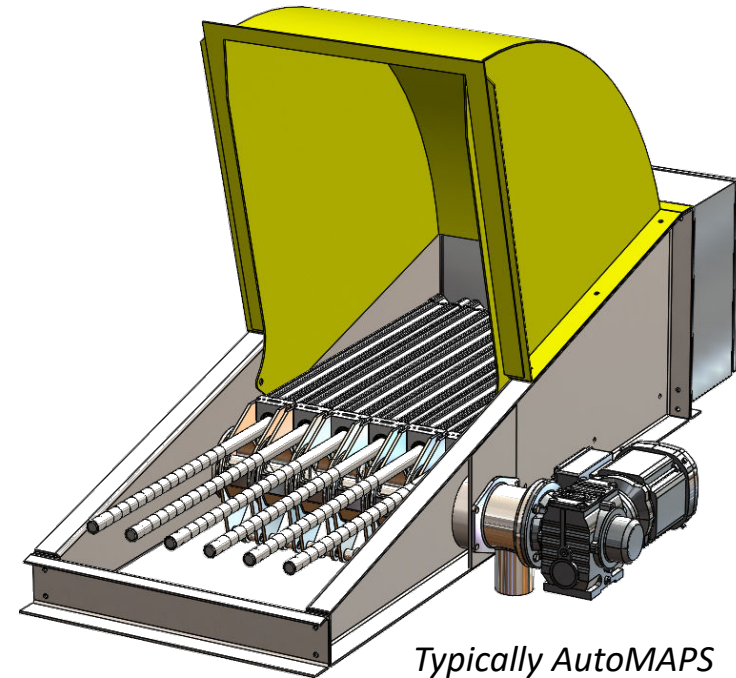


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# AutoMAPS

**PATENTED**

- ✓ Automatic operated
- ✓ Regular cleaning
- ✓ No Exposure of fumes or chemicals
- ✓ No magnet manhandling
- ✓ Easy accessibility
- ✓ No mud spills and dirt
- ✓ Automatic weighting (option)
- ✓ Automatic reporting
- ✓ Improved HSE Environment
- ✓ +++

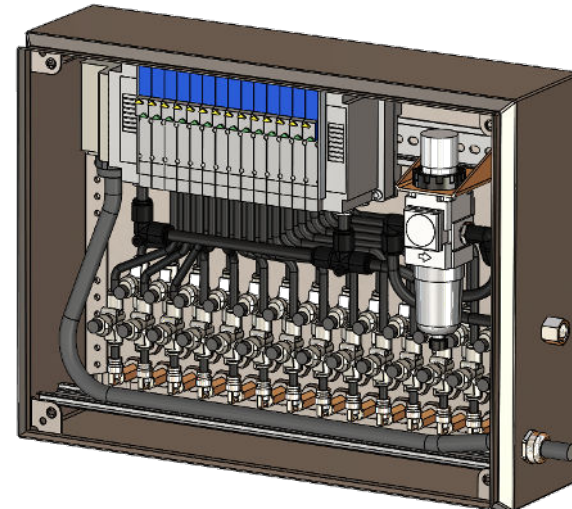
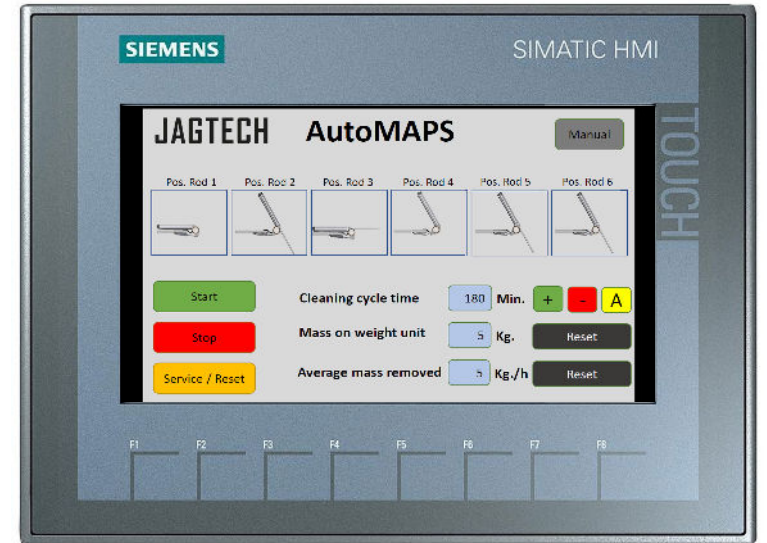


*AutoMAPS is based on the Jagtech MAPS magnets (12000 Gauss) with proven long track record  
The automatic control system is proven technology and traditionally PLC programming*

**JAGTECH**

# Design input

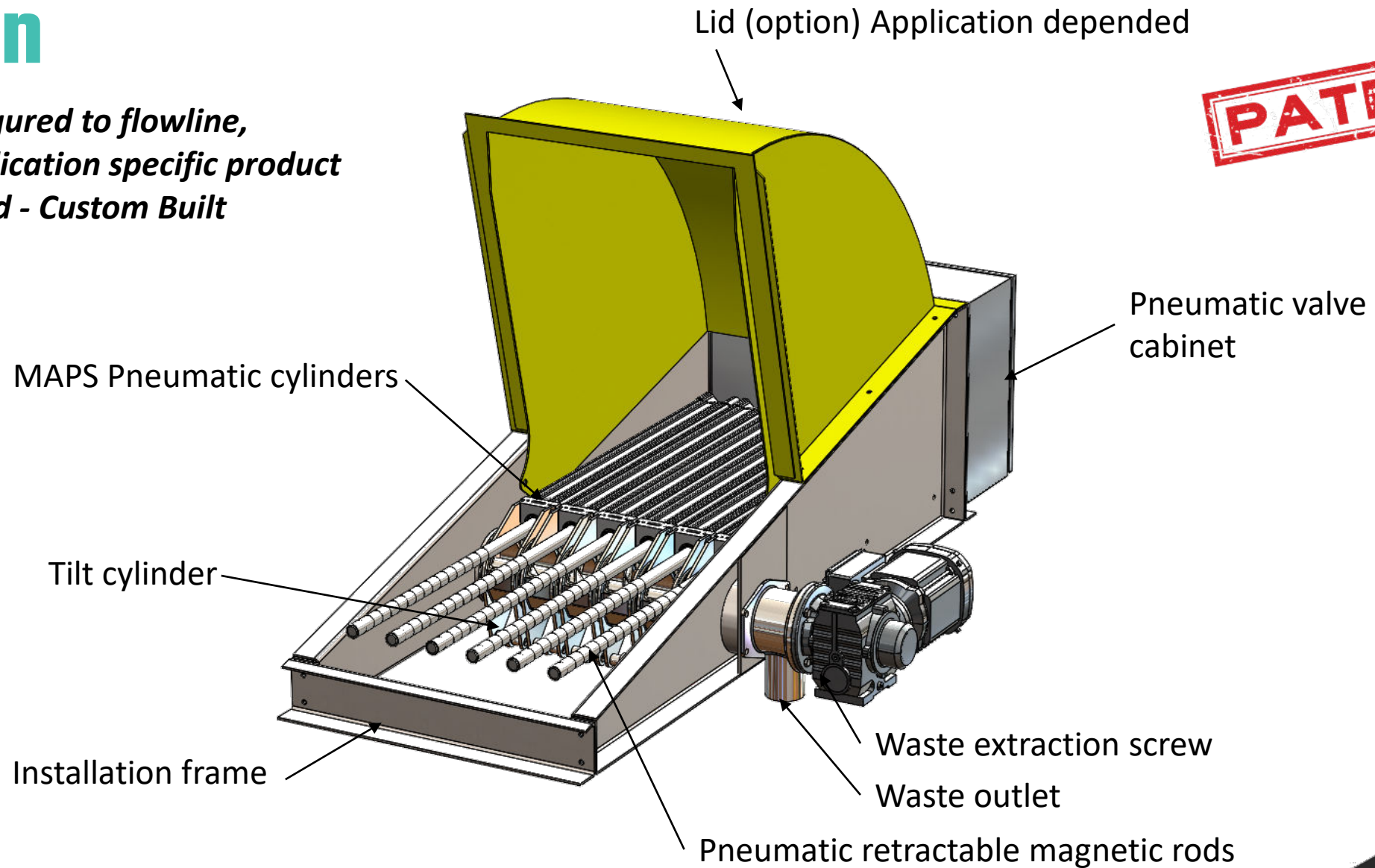
- Fully automatic system
- ATEX Zone 1, category IIB, Temperature class T3
- IP 65
- No need for personnel during operation
- Easy installation.
- Retrofit to existing launder system.
- Adaptive and scalable for various installations.
- Pneumatic operated.
- Adjustable cycle time.
- Default 2 min. cleaning cycle time pr. magnetic rod.
- Self adjusting cleaning cycle time based on weight of removed waste
- Adaptive to rig control system via bus communication
- Fully retractable from flowline
- Titanium high effective magnetic rods (peek strength of 1.2 T)



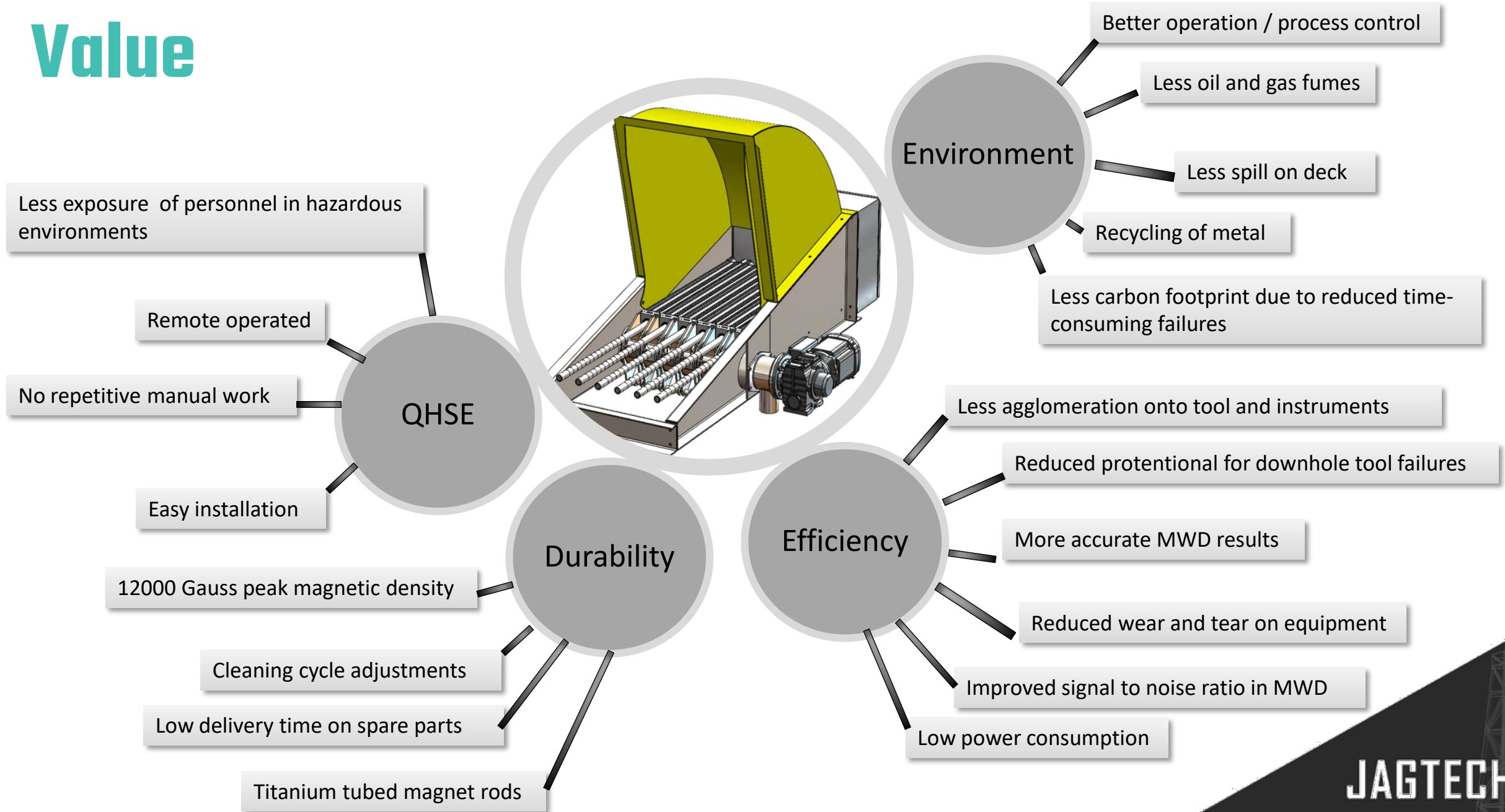
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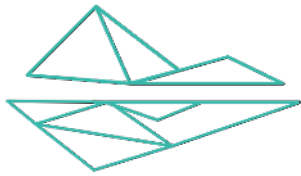
# Design

*Can be configured to flowline,  
Inline or application specific product  
Pre Engineerd - Custom Built*



# Value



















































- **Next Step**
- **Installation site**
- **Scope of work/Inquiry**




































## CUSTOMER REFERENCE LIST MAPS System






	Site	Setup	Rig owner	Customer	Operator
	Peregrino (Brazil)	Single rack 4 x DMR			
	Transocean Arctic	Single rack (spiderbox) 5 x DMR			
	Rowan Viking (Valaris Viking)	2 x Single rack 6 x DMR			
	Island Innovator	1 x double rack 11 x DMR			
	Maersk Intrepid	Single rack 4 x DMR			

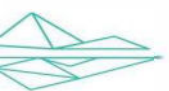
All Maersk rigs are now part of NOBLE Drilling

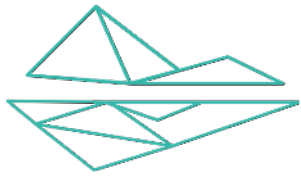
	Site	Setup	Rig owner	Customer	Operator
 	Maersk Interceptor	Dual rack 8 x DMR			
 	Maersk Intrepid	Dual rack 8 x DMR MAPS DMR cleaning cabinet			
	Brage	1 x Single rack 3 x DMR			
 	West Bollsta	2 x double rack 12 x DMR			
	Transocean Endurance	1 x double rack 2 x single rack 16 x DMR			
	Deepsea Nordkapp	2 x double rack 12 x single rack			

	Site	Setup	Rig owner	Customer	Operator
	Statfjord Alpha	2x Single rack 6 x DMR	 equinor	<b>Archer</b>	 equinor
	Gullfaks Charlie	4 x Single rack 12 x DMR	 equinor	<b>Archer</b>	 equinor
	Gullfaks Bravo	4 x Single rack 12 x DMR	 equinor	<b>Archer</b>	 equinor
	Snorre A	2 x Single rack 6 x DMR	 equinor	<b>Archer</b>	 equinor
	Scarabeo 8	5 x Single rack 15 x DMR	 SAIPEM	 SAIPEM	 AkerBP

















	Site	Setup	Rig owner	Customer	Operator
	COSL Promoter	1 x Single rack frame with 8 x DMR Cleaning Station			
	Statfjord B	2x Single rack frames with lid and 3 x DMR 1 x Cleaning station			
	Statfjord C	Between shakers: 2 x Single rack frames with lid and 6 x DMR 1 x cleaning station Pump rom: 2 x Single rack frames with lid and 8 x DMR 1 x Cleaning Station			
	Transocean Endurance	Flowdivider: 5 x Single rack frames and 10 x DMR 1 x cleaning station After Shaker: Single rack frames with 16 x DMR 1 x Cleaning Station 3 spare DMR		 	

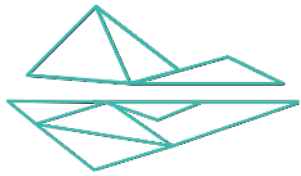
	Site	Setup	Rig owner	Customer	Operator
	Multiple Land Rigs USA	12 off JAG-MAG Inline Dual MAPS			
	Installed on 2 landrigs US	2 off JAG-MAG inline Dual MAPS		ConocoPhillips	ConocoPhillips





# Referense List Dual Shear Gun

	Site	Set Up	Rig owner	Customer	Operator
	Ringhorne Well 1 and 2	Dual Shear Gun with External Pump Unit Offshore instalation Temporary			
	Ringhorne Well 3 and 4	Dual Shear Gun with External Pump Unit. Offshore instalation Temporary			
	Port Fourchon USA	Field trial Dual Shear Gun set up to MUD plant			
	St Johns Canada	Field Trial Dual Shear Gun setup MUD plant			



**JAGTECH**  
Preferred Technology Partner

# Referense List Dual Shear Gun

	Site	Set Up	Rig owner	Customer	Operator

**JAGTECH**

