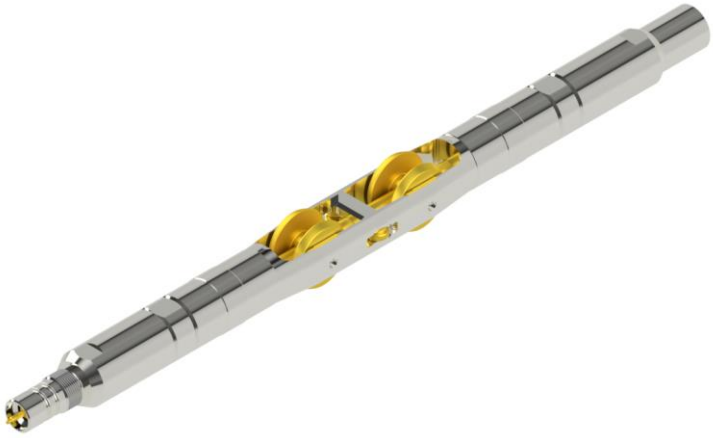
# *U-line*
# Roller Technology

## PORTFOLIO

## THROUGH TUBING – CASED HOLE & OPEN HOLE

## IN-LINE & SLIP-OVER GRAVITY ROLLER

## CONVEYANCE SYSTEMS



GARD

CATALOGUE

# CONTENTS

# GARD U-line

## About us

**Our mission** is driven by a passion to design and deliver highly innovative, proven technologies that address real and existing challenges in the oil and gas industry. We focus on reducing operational costs and risks, improving performance, and lowering environmental impact globally.

By listening to the industry and learning from real-world challenges, we have engineered solutions with a clear focus on our first two priorities: cost-effectiveness and high operational efficiency.

To date GARD has developed a portfolio of novel, patented engineered technologies, ready to transform operational efficiency.

## Efficiency In Operations

**GARD U-line Roller Conveyance System** enhances the efficiency of conventional wireline operations by enabling reliable tool conveyance in highly deviated and complex wellbores by reducing friction and improving distributed stand-off.

**U-line** allows operations that would traditionally require logging while drilling or wireline tractors, to be performed using GARD **U-line** simpler, more cost-effective, lower risk conveyance systems.

# GARD U-line

## Universal Conveyance

- Slickline
- Fibre-optic
- E-line
- Digital Slickline
- Tractor Assist

***Next Generation Well Conveyance***
***U-line Roller Technology***


### *Benefits*

- Faster Intervention
- Light Transportation
- Minimal Maintenance
- Reduced Well Integrity Risk
- Reduced Intervention Risks & Cost
- Extended target depth reach
- Minimizes Operational Footprint

## *GARD U-line Roller Technology*

**GARD's patent-protected U-line Roller Technology** is the industry's **first all-in-one**, multifunctional roller system universally applicable for both slickline and electric wireline conveyance. Its streamlined design and novel "***Fish-Free***" retention mechanism maximise reliability, simplify assembly, and deliver **Formula One–level operational efficiency through intelligent engineering.**

## *- Design Features -*

- Modular
- No fasteners
- Self-balancing
- Simple construction
- Quick and easy re-dress
- Robust mechanical roller
- Universal for all lines and connections

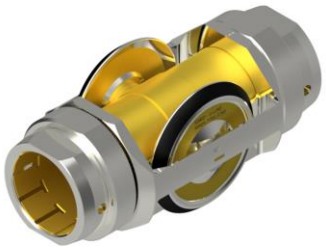
## *Roller Technology Applications*

### THROUGH TUBING & CASED-HOLE

- Camera
- Perforating
- Plug Setting
- Gyro Surveys
- Cement Bond
- Pipe Recovery
- Leak Detection
- Integrity Logging
- Multifinger Caliper
- Ultrasonic Imaging
- Production Logging
- Magnetic Flux Leakage
- Tool Setting & Retrieval
- Radial Cement Evaluation
- Flow Control Manipulation
- Electromagnetic Thickness
- Gas Lift Valve Setting & Recovery

### OPEN-HOLE

- Sonic Log
- Caliper Log
- Porosity Log
- Acoustic Log
- Neutron Density
- Gamma Ray Log
- Permeability Log
- Borehole Imaging
- Resistivity Logging
- Micro-resistivity Logging
- Neutron Porosity Logging
- Formation Pressure Testing
- Nuclear Magnetic Resonance



# GARD U-LINE ROLLER CONVEYANCE SYSTEM

## WR01 & WR02

## THROUGH TUBING & CASED-HOLE OPERATIONS

A **modular intervention conveyance roller** adapted t**o multiple size requirements and configurations** using a cost-effective Conversion Kit, enabling tool reuse and supporting enhanced outcomes.

Built on patented, modern technology, the system is engineered to support deployment in highly deviated well profiles, providing a universal conveyance solution for a wide range of toolstring in **both slickline (S-line) and electric line (E-line) operations.**


**WR01 & WR02 ARE FUNCTIONALLY IDENTICAL**

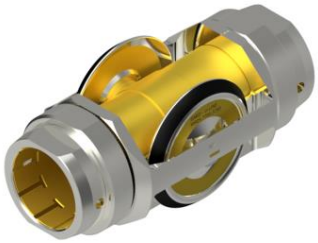
## WR01 & WR02

## APPLICATIONS

- **Gravity Conveyance:** Enables gravity deployment of mechanical, logging and ballistic tools in wells with deviations up to 86° using an in-line connecting design.
- **Tool Orientation:** Maintains accurate orientation of sensors, cores, and pressure tools without stand-off, bow springs, or tool turners.
- **Reliability:** Robust mechanical design with minimal maintenance requirements.
- **Mechanical Stability:** Reduces stick-slip behavior and minimizes cable tension during operations.
- **E-line Operations:** Enables reliable electric-line logging and intervention in highly deviated cased-hole wells where friction limits conventional conveyance.
- **Fiber-optic:** Facilitates efficient fiber-optic installation for distributed sensing by reducing contact forces and improving conveyance reliability in extended-reach wells.
- **Fluid Circulation:** Supports fluid-circulated conveyance by maintaining controlled tool movement and enhancing operational stability.

# GARD U-LINE ROLLER CONVEYANCE SYSTEM

## WR5S & WR6S
## OPEN-HOLE OPERATIONS



An advanced **U-line** **open-hole roller** engineered for **high-performance conveyance** in applications where conventional slip-over rollers are operationally limited.

The system supports **universal open-hole wireline logging, formation testing, pressure measurement, coring, and precision sampling operations** in **highly deviated and complex well profiles.**

It features a **fastener-free interlocking architecture** that enables rapid deployment on standard toolstring and efficient field reconfiguration of wheel geometry without specialized tools or complex assembly.

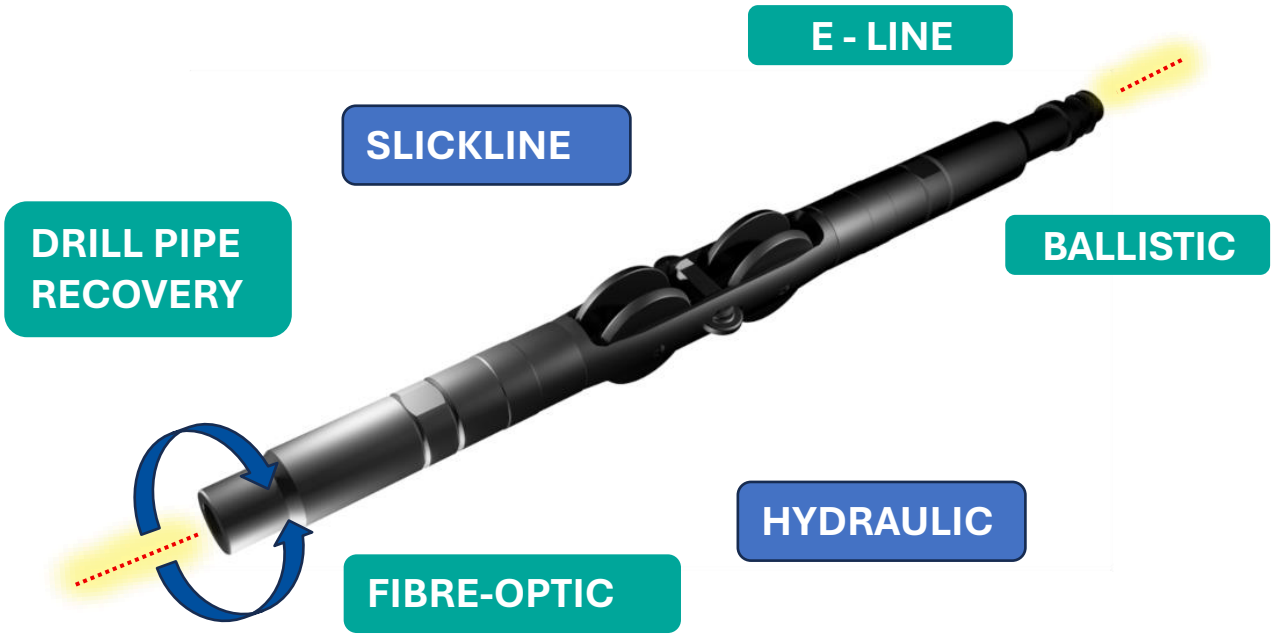
## WR5S & WR6S
## APPLICATIONS

- **Open-Hole Logging:** Enables gravity-assisted deployment of wireline logging tools in deviated open-hole sections.
- **Sampling & Coring Operations:** Supports reliable conveyance of coring and formation sampling tools in open-hole environments.
- **Irregular Wellbores:** Conventional gravity systems are limited by well geometry, friction or wellbore instability.
- **Challenging Open-hole Conditions:** Provides enhanced mechanical conveyance for deep, extended, or complex open-hole operations.
- **Exploration Wells:** Ideal for early-stage well evaluation prior to casing installation.
- **Advanced Formation Testing:** Suitable for running pressure probes, fluid sampling tools, and formation test instruments in open-hole.
- **Geothermal Well Logging:** Enables wireline operations in **HPHT** environment.

***WR5S & WR6S FUNCTIONALLY IDENTICAL***

# GARD U-LINE ROLLER CONVEYANCE SYSTEM

## Technical Specifications – WR01




### PERFORMANCE

**GARD** U-line conveyance systems enable reliable wireline operations in challenging wellbores that would traditionally require heavy conveyance methods such as wireline tractors or coiled tubing.

Proven in the field, U-line technology reliably conveys toolstrings **in highly deviated well profiles up to 86° and at depths of up to 20,000 ft**, delivering consistent performance without added operational complexity.

### SAFE AND RELIABLE CONVEYANCE

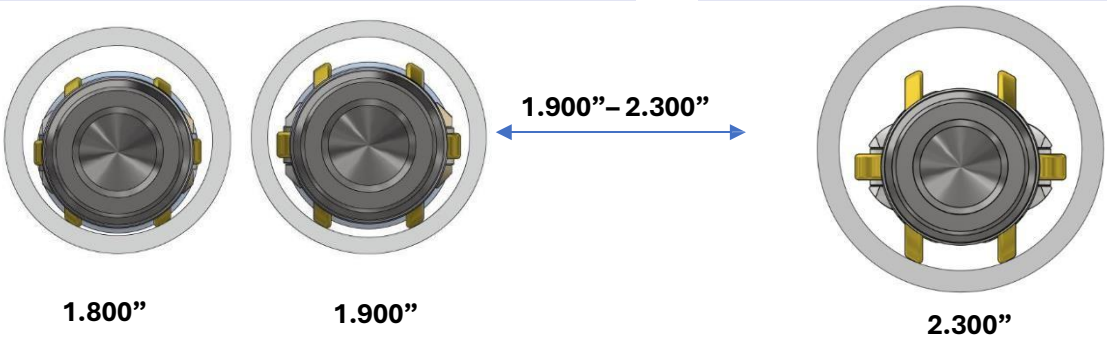
**GARD** U-line **rollers** are engineered with **universal compatibility**, allowing seamless connection to **slickline (S-line) and electric line (E-line) monoconductor systems**, including **fiber-optic lines**. Its exceptionally low rolling friction coefficient minimizes line tension, enabling reliable conveyance across a wide range of applications.

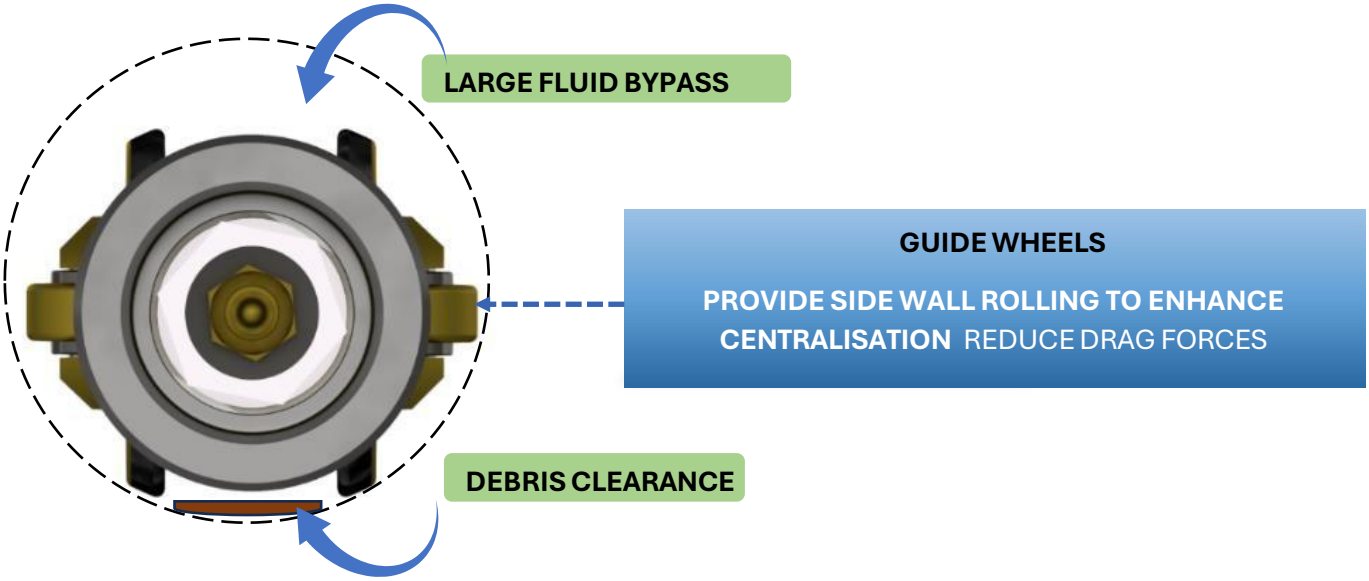
By design, U-line also supports **hydraulically assisted operations**, including **coiled tubing and coiled hose applications**. Recent field deployments have further demonstrated its versatility, including conveyance of E-line cutters through stuck drill pipe for recovery operations.

WR01

CASED-HOLE

# GARD U-LINE ROLLER CONVEYANCE SYSTEM
## Technical Specifications – WR01




| Wheel Diameter | END CONNECTIONS | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | *SLICKLINE* | | | | *ELECTRIC-LINE* | | | | | |
| | 15/16 “SR | | 1-1/2 "QLS | | GO A | | SONDEX | | SLB MONO | |
| | MUL | WEIGHT | MUL | WEIGHT | MUL | WEIGHT | MUL | WEIGHT | MUL | WEIGHT |
| | in | lbs | in | lbs | in | lbs | in | lbs | in | lbs |
| 1.800” | 27.9 | 12.34 | 30.2 | 13.07 | 27.9 | 12.59 | 26.09 | 11.88 | 26.57 | 13.16 |
| 1.900” | | 13.52 | | 14.24 | | 13.77 | | 13.06 | | 14.33 |
| 2.000” | | 13.60 | | 14.32 | | 13.85 | | 13.14 | | 14.41 |
| 2.125” | | 13.73 | | 14.45 | | 13.97 | | 13.26 | | 14.54 |
| 2.300” | | 13.89 | | 14.61 | | 14.13 | | 13.42 | | 14.70 |

***Note:***

1. ***The sizes listed above represent the most commonly used configurations.***
2. ***Alternative wheel diameters can be supplied upon request.***
3. ***Custom end connections and crossovers can be supplied for both Slickline and E-line upon request.***

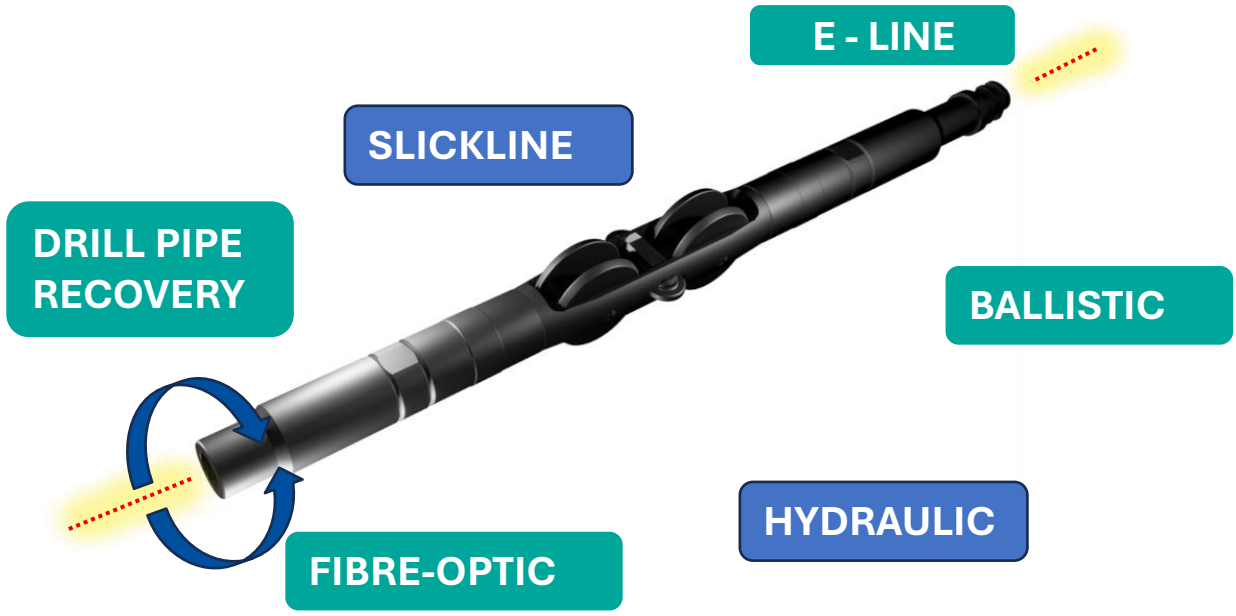
# GARD U-LINE ROLLER CONVEYANCE SYSTEM

## Technical Specifications – WR01

| TECHNICAL SPECIFICATION | |
|---|---|
| **Tubing Size** | **2**-3/8”, **2**-7/8” & **3**-1/2” |
| **Min Well Restriction ID** | **1.875”** |
| **Chassis OD** | **1.600”** |
| **Wheel Diameter Range** | **1.800” – 2.300”** |
| **Rolling Friction co-efficient** | **0.028** |
| **Pressure rating** | **10,000 psi** |
| **Max Operating Temperature (e-line)** | **360˚ F** (182˚ C) |
| **Max Operating Temperature (slick-line)** | **450˚ F** (232˚ C) |
| **E-line Feed Thru Bore** | **7 mm** |

| UNIQUE FEATURES | |
|---|---|
| **NO SCREWS** | **NO** ADDITIONAL E-LINE **CROSSOVERS** |
| **HIGH** WEIGHT **DENSITY** | **UNIVERSAL** TO ALL LINES |
| **VARIABLE** WHEEL DIAMETER | LESS THAN **3%** ROLLING **FRICTION** |
| **HPHT** ENVIRONMENT-READY | OPTION FOR **SWIVEL** AND **LOCKED** POSITION |

# GARD U-LINE ROLLER CONVEYANCE SYSTEM
## Technical Specifications – WR02




### HPHT ENVIRONMENT

**GARD U-line conveyance rollers** are engineered for reliable performance in high-pressure, high-temperature (HPHT) environments. The system supports slickline operations at temperatures up to **360 °F**, with configurations capable of accommodating **slickline runs** at temperatures of up to **450 °F**.

**The wheel bearing design is:**

- Constructed from high-temperature-rated materials, with no Nitrile or Viton elastomers.
- Validated for operating in high-solids and drilling mud environments.
- Self-lubricated, enabling operation at pressures up to **10,000 psi.**

### 360° ORIENTATION

**GARD U-line WR02 technology** features **a 360° swivel orientation system** designed for mechanical, data-acquisition, and ballistic tools that require precise directional control. The system allows for either:

- **Fixed orientation, or**
- **Free self-alignment to maximize operational efficiency.**

This unique capability enhances **data quality and tool performance** by enabling **smooth, low-friction, low-noise deployment**, ensuring controlled conveyance in demanding well environments.

WR02

CASED-HOLE

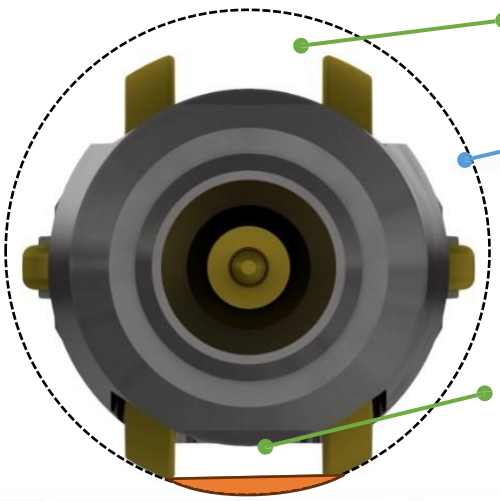
# GARD U-LINE ROLLER CONVEYANCE SYSTEM

## Technical Specifications – WR02

| Wheel Diameter | END CONNECTIONS | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | *SLICK-LINE* | | | | *E-LINE* | | | |
| | 1-1/16 SR | | 1 7/8 QLS | | GO A | | SONDEX | |
| | MUL | WEIGHT | MUL | WEIGHT | MUL | WEIGHT | MUL | WEIGHT |
| | in | Lbs | in | lbs | in | lbs | in | lbs |
| **2.600”** | 31.2 | 28.22 | 34.41 | 29.95 | 31.2 | 27.97 | 29.09 | 26.57 |
| **2.700”** | | 28.59 | | 30.32 | | 28.34 | | 26.94 |
| **2.750”** | | 28.78 | | 30.50 | | 28.53 | | 27.13 |
| **2.900”** | | 29.40 | | 31.12 | | 29.15 | | 27.75 |
| **3.250** | | 29.67 | | 32.52 | | 30.55 | | 29.15 |
| **3.500”** | | 31.99 | | 33.71 | | 31.74 | | 30.34 |
| **3.600”** | | 28.37 | | 34.14 | | 32.16 | | 30.76 |
| **3.650”** | | 32.63 | | 34.35 | | 32.38 | | 30.98 |

| Wheel Diameter | *E-LINE* | | | | | |
|---|---|---|---|---|---|---|
| | A3 | | A2 | | SLB MONO | |
| | MUL | WEIGHT | MUL | WEIGHT | MUL | WEIGHT |
| | in | lbs | in | lbs | in | lbs |
| **2.600”** | 35.95 | 30.01 | 39.21 | 20.34 | 29.61 | 26.92 |
| **2.700”** | | 30.38 | | 20.71 | | 27.29 |
| **2.750”** | | 30.57 | | 20.89 | | 27.48 |
| **2.900”** | | 31.19 | | 21.51 | | 28.10 |
| **3.250** | | 32.59 | | 22.91 | | 29.50 |
| **3.500”** | | 33.78 | | 24.10 | | 30.69 |
| **3.600”** | | 34.20 | | 24.53 | | 31.11 |
| **3.650”** | | 34.42 | | 24.74 | | 31.33 |

***Note:*** *Accommodates any other specific end connections or wheel size to meet customer requirements*



**LARGE FLUID BYPASS**

**GUIDE WHEELS**

PROVIDE SIDE WALL ROLLING TO ENHANCE CENTRALISATION & REDUCE DRAG FORCES

**DEBRIS CLEARANCE**

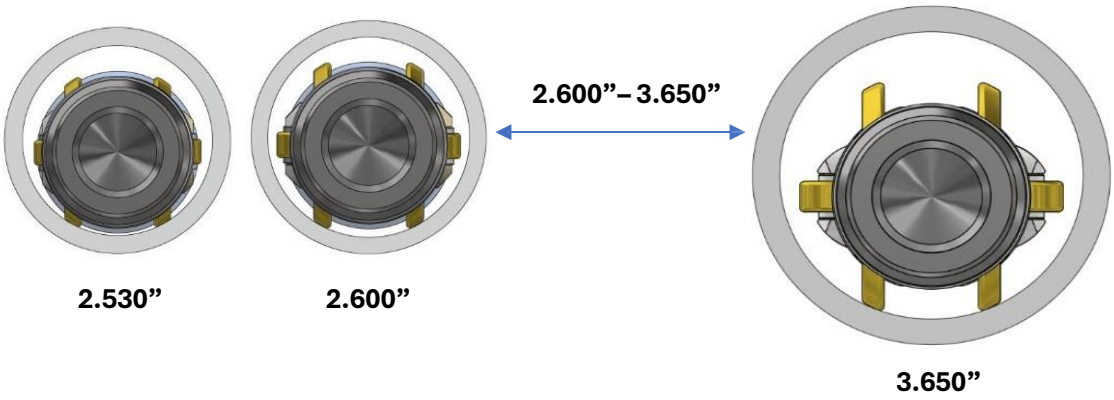
# GARD U-LINE ROLLER CONVEYANCE SYSTEM

## Technical Specifications – WR02

| TECHNICAL SPECIFICATION | |
|---|---|
| **Tubing Size** | **3**-1/2" – **9**-5/8" |
| **Min Well Restriction ID** | **2.600"** |
| **Chassis OD** | **2.425"** |
| **Wheel Diameter Range** | **2.530" – 3.650"** |
| **Rolling Friction co-efficient** | **0.028** |
| **Pressure rating** | **10,000 psi** |
| **Max Operating Temperature (e-line)** | **360° F** (182° C) |
| **Max Operating Temperature (slick-line)** | **450° F** (232° C) |
| **E-line Feed Thru Bore** | **7 mm** |

| UNIQUE FEATURES | |
|---|---|
| **NO** SCREWS | **NO** ADDITIONAL E-LINE **CROSSOVERS** |
| **HIGH** WEIGHT **DENSITY** | **UNIVERSAL TO ALL LINES** |
| **VARIABLE** WHEEL DIAMETER | LESS THAN **3%** ROLLING **FRICTION** |
| **HPHT** ENVIRONMENT-READY | OPTION FOR **SWIVEL** AND **LOCKED** POSITION |

# GARD U-LINE ROLLER CONVEYANCE SYSTEM
## Technical Specifications – WR02




**Electric-line**
(monoconductor)
- GO A
- SONDEX
- SLB-Mono
- BH A2/A3

**Slick-line**
- QLS
- SR

**Fiber-Optic**

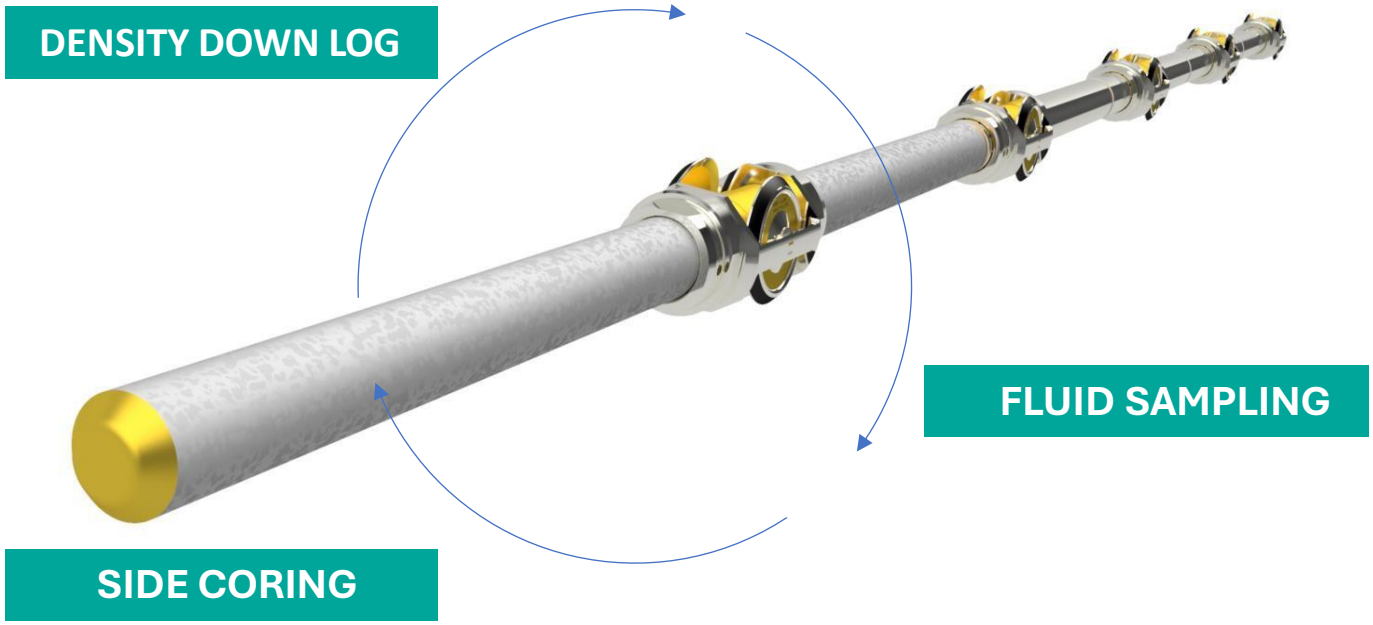
**UNIVERSAL CONNECTIONS**

**VARIABLE SIZE**

**NO SCREWS**

**LOW FRICTION**

# GARD U-LINE ROLLER CONVEYANCE SYSTEM
## Technical Specifications – WR5S




### PERFORMANCE

**GARD U-line WR5S conveyance systems** enable reliable wireline operations in challenging wellbores that would traditionally require heavy conveyance methods, including pipe-conveyed logging and wireline tractors. Field-proven**, WR5S technology** reliably conveys toolstrings in highly deviated well profiles up to **86°** and at depths of up to **20,000 ft**, delivering consistent performance without added operational complexity.

### SAFE AND RELIABLE CONVEYANCE

In wells with washouts and irregular geometries, conventional conveyance methods often struggle to prevent tools from traveling along the low side of the borehole, where solids accumulate and the risk of ledges and obstructions is highest.

**GARD U-line camber wheel design** was developed to actively offset the toolstring away from the low side, significantly **reducing drag, minimizing contact forces, and mitigating the risk of differential sticking;** a long-standing challenge in open-hole sampling operations.

### 360° ORIENTATION

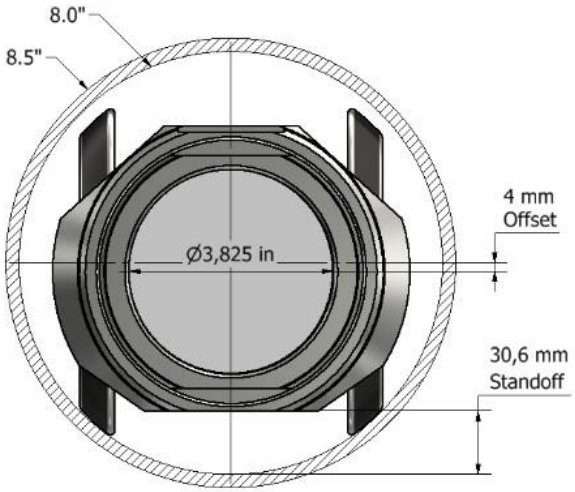
**GARD U-line WR5S conveyance systems** features **a 360° swivel orientation system** for **logging sensors and sampling tools,** enabling precise alignment at any required custom angle.

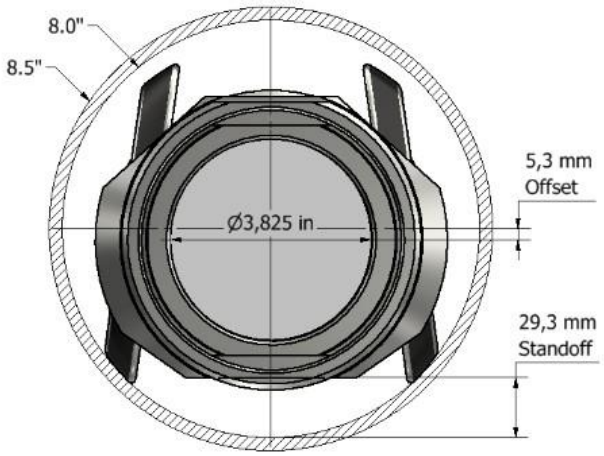
This capability ensures optimal sensor positioning, maximizes data quality, and reduces the risk of misaligned measurements, supporting reliable and repeatable logging results in complex well environments.

**WR5S**

**OPEN-HOLE**

# GARD U-LINE ROLLER CONVEYANCE SYSTEM
## Technical Specifications – WR5S




### MITIGATE DIFFERENTIAL STICKING

The **GARD U-line conveyance system** reduces the risk of differential sticking through four key design features:

- **360° Swivel Orientation:** Self-orienting roller chassis minimizes sustained contact with the borehole wall.
- **Fastener-Free Design:** Collet-based retention allows optimal roller placement along the toolstring, evenly distributing load and reducing contact forces.
- **Low Rolling Friction:** Rolling friction coefficient of 3 – 6% on the wheels delivers up to 40% reduction in POOH cable tension and provides >1" stand-off from the borehole wall.
- **Camber Wheel Technology:** 8° camber angle minimizes mud cake damage during retrieval and prevents rapid wheel embedment when stationary.

| Swivel | Wheel Camber | Offset |
|---|---|---|
| FREE | YES | 5.3 mm |
| FREE | NO | 4.0 mm |
| LOCKED | YES | 5.3 mm |
| LOCKED | NO | 4.0 mm |

### CENTRALISATION

**GARD U-line** features **a simple and unique centralization mechanism** that achieves effective tool positioning with an offset of **4 – 5 mm in an 8" borehole.** This design eliminates stick-slip behavior without the need for additional equipment such as conventional centralizers.

Centralization can be achieved across multiple roller configuration settings, as illustrated in the table (to the right), allowing flexible deployment to **suit specific well conditions and toolstring requirements**.

## GARD U-LINE ROLLER CONVEYANCE SYSTEM
### Technical Specifications – WR5S

| Technical Specification | | |
|---|---|---|
| WR5S – Open-Hole | | |
| Wheel Camber Angle | 0° | 8° |
| Weight | 18.6 kg (41.01 lbs) | |
| Length | 366 mm (1.2 ft) | |
| Min. Hole Size | 8.0” | |
| Max. Hole Size | 12-1/4” | |
| Drag Coefficient Static | 3 | 3.1 |
| Drag Coefficient dynamic | 2.8 | 2.9 |
| Temperature rating | 343° C (650° F) | |
| Pressure rating | 30,000 psi | |
| Wheel Diameter Range | 7-1/4”, 7-1/2” & 7-3/4” | |
| Chassis OD | 6-3/4” | |
| WR5S Bore[1] | 3-3/8” & 3-5/8” | |
| Stand-off in 8.0" wellbore[2] | 31 mm | 30 mm |
| Clear Low Side Angle of Bore Hole | 64° | 78° |

**Notes:**

- Bore with sleeve options to accommodate 3-3/8” & 3-5/8” Logging toolstrings.
- Stand-off drops slightly when camber setting is applied on the wheels for 8” borehole ID (8-1/2” drill bit).

# GARD U-LINE ROLLER CONVEYANCE SYSTEM
## Technical Specifications – WR6S

### CENTRALISATION

**GARD U-line** features a simple and unique centralization system that achieves effective tool positioning with an offset of just 3 mm in an 8" borehole. This design eliminates stick-slip behavior without the need for additional equipment such as conventional centralizers.

### MITIGATES DIFFERENTIAL STICKING

The **GARD U-line conveyance system** significantly reduces the risk of differential sticking through four key design features:

- **360° Swivel Orientation:** The roller chassis can be configured to self-orient and swivel independently, minimizing sustained contact with the borehole wall.
- **Fastener-Free Design:** Collet-based retention allows rollers to be positioned optimally along the toolstring, evenly distributing load across all rollers.
- **Low Rolling Friction:** A rolling friction coefficient of 3-6% on wheels reduces POOH cable tension by up to 40% and provides >1" stand-off from the borehole wall.
- **Camber Wheel Technology:** An 8° camber angle minimizes mud cake damage during retrieval and prevents rapid wheel embedment when stationary.

### HPHT ENVIRONMENT

The GARD U-line conveyance roller system is engineered for operation in extreme high-pressure, high-temperature (HPHT) environments, with temperature capability of up to **650°F (343°C).**

The wheel bearing system is:

- Constructed from high-temperature-rated materials, with no nitrile or Viton elastomers.
- Validated for operating in high-solids and drilling mud environments.
- Self-lubricated, supporting pressures of up to **30,000 psi.**

### GEOTHERMAL WELLS

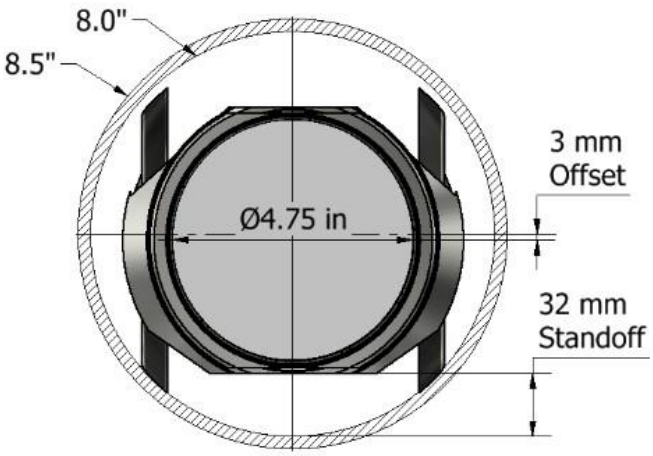
The **U-line open-hole roller** is designed for **HPHT** and geothermal wells, operating reliably in high-temperature and aggressive fluid environments.

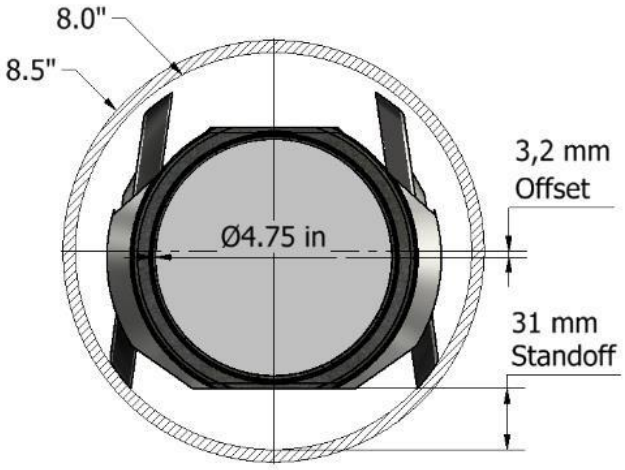
High-temperature collet-retention secures the roller to the toolstring, eliminating grub screws that can loosen or fail under vibration and extreme thermal conditions.

**WR6S**

**OPEN-HOLE**

# GARD U-LINE ROLLER CONVEYANCE SYSTEM
## Technical Specifications – WR6S




## PERFORMANCE

**GARD U-line conveyance systems** enable wireline operations in challenging wellbores that would traditionally require heavy conveyance methods, including pipe-conveyed logging, wireline tractors, or LWD. Field-proven, **U-line** reliably conveys complex toolstrings through highly deviated well profiles up to **86°** and at measured depths of up **to 20,000 ft**.

| Swivel | Wheel Camber | Offset |
|---|---|---|
| FREE | YES | 3.2 mm |
| FREE | NO | 3.0 mm |
| LOCKED | YES | 3.2 mm |
| LOCKED | NO | 3.0 mm |

## SAFE AND RELIABLE CONVEYANCE

To minimize retrieval risk, it is essential to prevent the toolstring from tracking along the low side of the borehole, where solids accumulate and the potential of ledges and washouts increase the likelihood of sticking. Conventional conveyance systems offer limited control to mitigate the effects of these conditions.

The **GARD U-line camber wheel design** repositions the toolstring away from these high-risk zones, **reducing drag forces** and **reducing the risk of differential sticking**, thereby improving operational safety and sampling reliability.

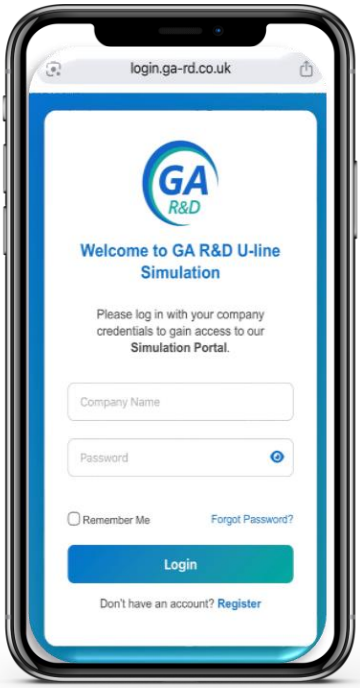
## GARD U-LINE ROLLER CONVEYANCE SYSTEM
### Technical Specifications – WR6S

| Technical Specification | | |
|---|---|---|
| **WR6S – open-hole** | | |
| Wheel Camber Angle | 0° | 8° |
| Weight | 11.4 kg (25.1 lbs) | |
| Length | 365 mm (1.2 ft) | |
| Min. Hole Size | 8.0” | |
| Max. Hole Size | 12-1/4” | |
| Drag Coefficient Static | 3 | 3.1 |
| Drag Coefficient dynamic | 2.8 | 2.9 |
| Temperature rating | 343° C (650° F) | |
| Pressure rating | 30,000 psi | |
| Wheel Diameter Range | 7-1/4” – 7-7/8” | |
| Chassis OD | 6-3/4” | |
| WR6S Bore[1] | 4-1/2” & 4-3/4" | |
| Stand-off in 8.0" wellbore[2] | 32 mm | 31 mm |
| Clear Low Side Angle of Bore Hole | 77° | 86° |

**Notes:**

- 4-3/4” Bore with sleeve options to accommodate 4-1/2” logging toolstrings.
- Stand-off drops slightly when camber setting is applied on the wheels for 8” borehole ID (8-1/2” drill bit).

## GARD U-LINE ANALYSIS SOFTWARE




1

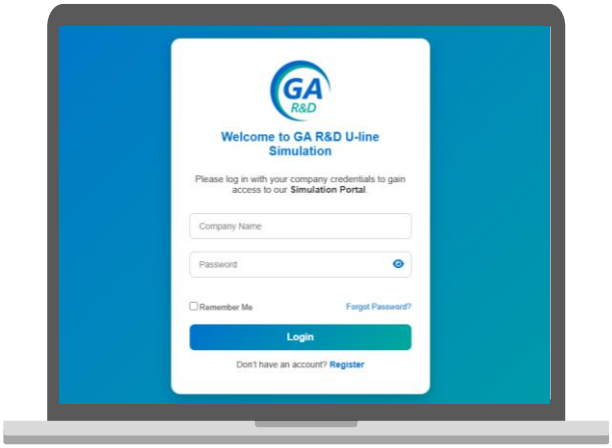
**Field Verification & Risk Mitigation**

Enables engineers to verify tool compatibility, optimal toolstring compatibility, drag forces, and mechanical limits prior to deployment, reducing the risk of stuck tools, equipment failure, and wellbore damage.

2

**Full Reporting & Client Documentation**

Delivers professional engineering reports, plots, and compliance documentation suitable for submission to clients, regulators, and project partners as part of formal approval packages.

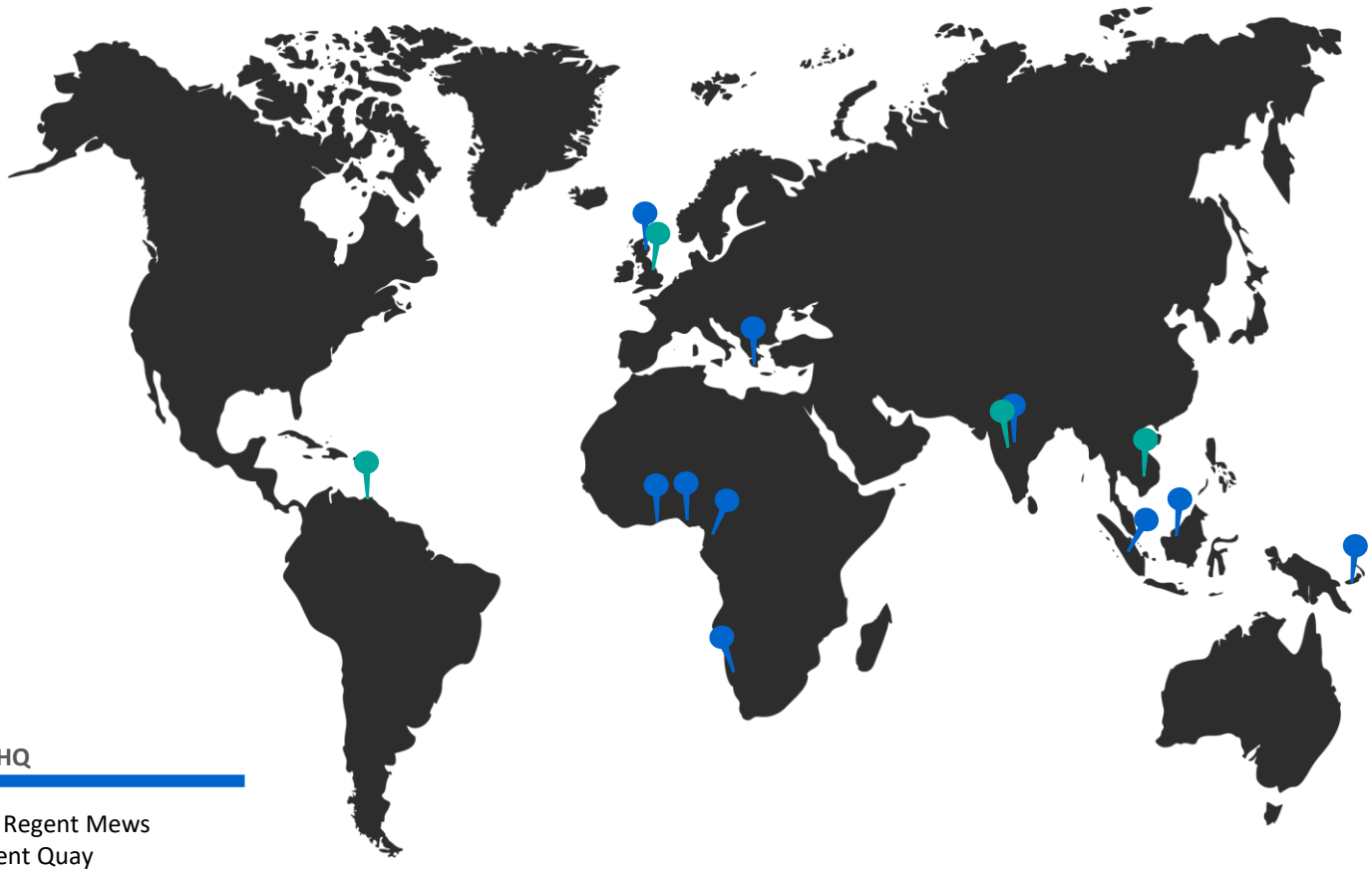



3

**Pre-Job Optimization & Cost Reduction**

Enables multiple design iterations before mobilization, allowing teams to optimize toolstring configuration, select the most efficient conveyance design method, and minimize costly field changes.

# GARD U-line



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