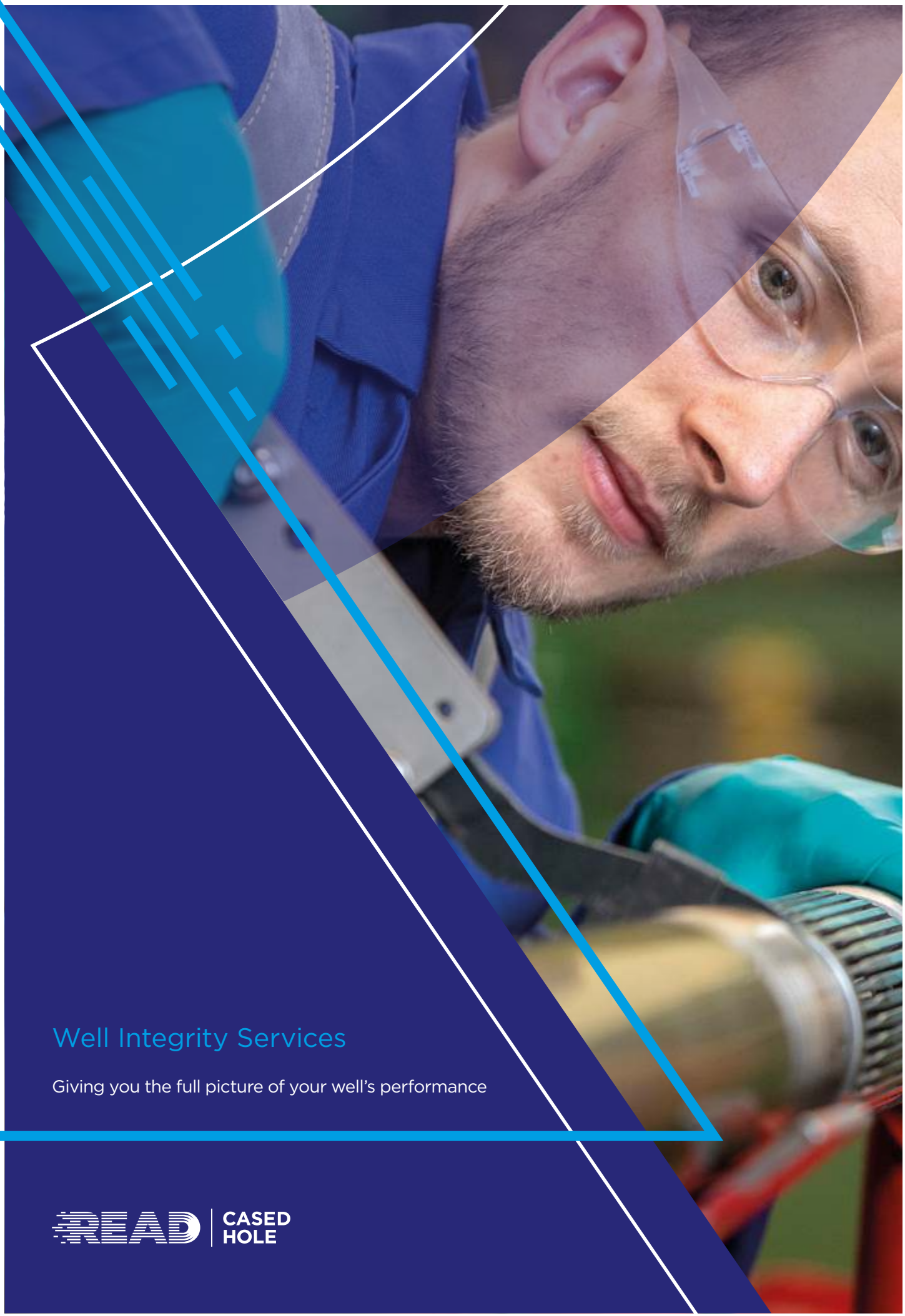


Well Integrity Services

Giving you the full picture of your well's performance

READ | CASED HOLE

We are experts in well integrity evaluation. For 30 years we have been delivering solutions that help operators overcome their well challenges all over the world.

Well integrity evaluation means getting the full picture of your well's barrier performance. It's about understanding the structural integrity of your tubing, casing, liners and cement to ultimately help you manage risk, extend operating life and optimise the management of your wells across their lifecycle.

Our cutting-edge technologies

READ's suite of dedicated well integrity technologies can accurately identify and quantify damage and deformation, holes, leaks, corrosion and scale build-up, and are deployable on electric wireline, slickline or coiled tubing in memory and real-time.

Our portfolio of specialist well integrity technologies includes multifinger calipers, magnetic thickness, acoustic borehole imaging, cement evaluation and leak detection technologies. Our calipers range from 24-arms up to our unique 80-arm caliper which is capable of measuring casings as wide as 20" in diameter.

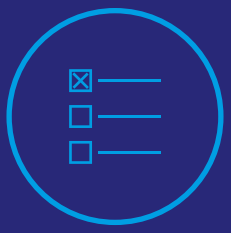
Data analysis for well integrity evaluation

We offer independent and reliable data analysis services from READ ANSA for all of your well integrity evaluation needs. You'll receive fast, flexible data analytics solutions from highly experienced and qualified analysts that maximise the value of your assets.

Find out more at **www.read-ansa.com**

We tailor solutions to your individual equipment and operations and our know-how and expertise provide the answers to help with:

Identifying defects early



Prioritising remediation

Minimising remedial costs

Extending operating life

Managing risk

Protecting your reputation

Avoiding environmental consequences

Complying with legislation

Addressing vulnerable areas

Our Well Integrity Services

Casing and tubing integrity evaluation

By applying best-in-class radial geometry and wall thickness sensor technologies, we document every detail of every completion element. We help you understand the evolution of your well's integrity, identifying issues in advance of failure and knowing exactly where and when to intervene.

3D well access evaluation

When well access becomes a challenge, we'll help you navigate your way safely. Whether you are re-perforating, working over or abandoning a well, we provide simple, ironclad answers to help you resolve complex well access issues.

Complete component condition evaluation

Utilising our range of multifinger calipers, from 24-arms up to our unique 80-arm caliper, we provide close inspection of every component from BOP to TD. This includes safety valves, injection valves, gas lift valves, polished bore receptacles, seal bore expansion joints and landing profiles.

Deposition evaluation

When deposits threaten to choke production or compromise critical safety systems, we can supply the data you need to perform targeted and effective remediation quickly. We scrutinise well geometries to give you a quantitative map of deposits, revealing their impact and severity so you can respond in the right way.

Drilling wear evaluation

Whether you're looking for a green light on drilling the next section, or optimising designs for future wells, we work with you every step of the way. We provide fast, straightforward answers that detail the integrity of your wells during drilling operations, and help you deliver them safely and more efficiently.

Plug and packer setting assurance

We deliver near-instant answers that reveal the optimal location for plug and packer installation. Whether landing a hangar, straddle or retrievable bridge plug, we give you a detailed examination of inner diameter, ovality, metal loss, deformation and deposits.

Leak detection

When a leak occurs in one of your wells, we can provide the expertise to help you understand more about it. We offer a suite of solutions for identifying leaks that may be compromising well integrity. These include multifinger calipers, noise tools, sensors that measure changes in production characteristics and downhole imaging.

Pipe integrity

There are many reasons why downhole tubulars can lose their integrity, ranging from holes, leaks and pressure changes to corrosion, scale and defects anywhere in the completion. We can help you identify the issues and advise you on appropriate remedial action.

Cement evaluation

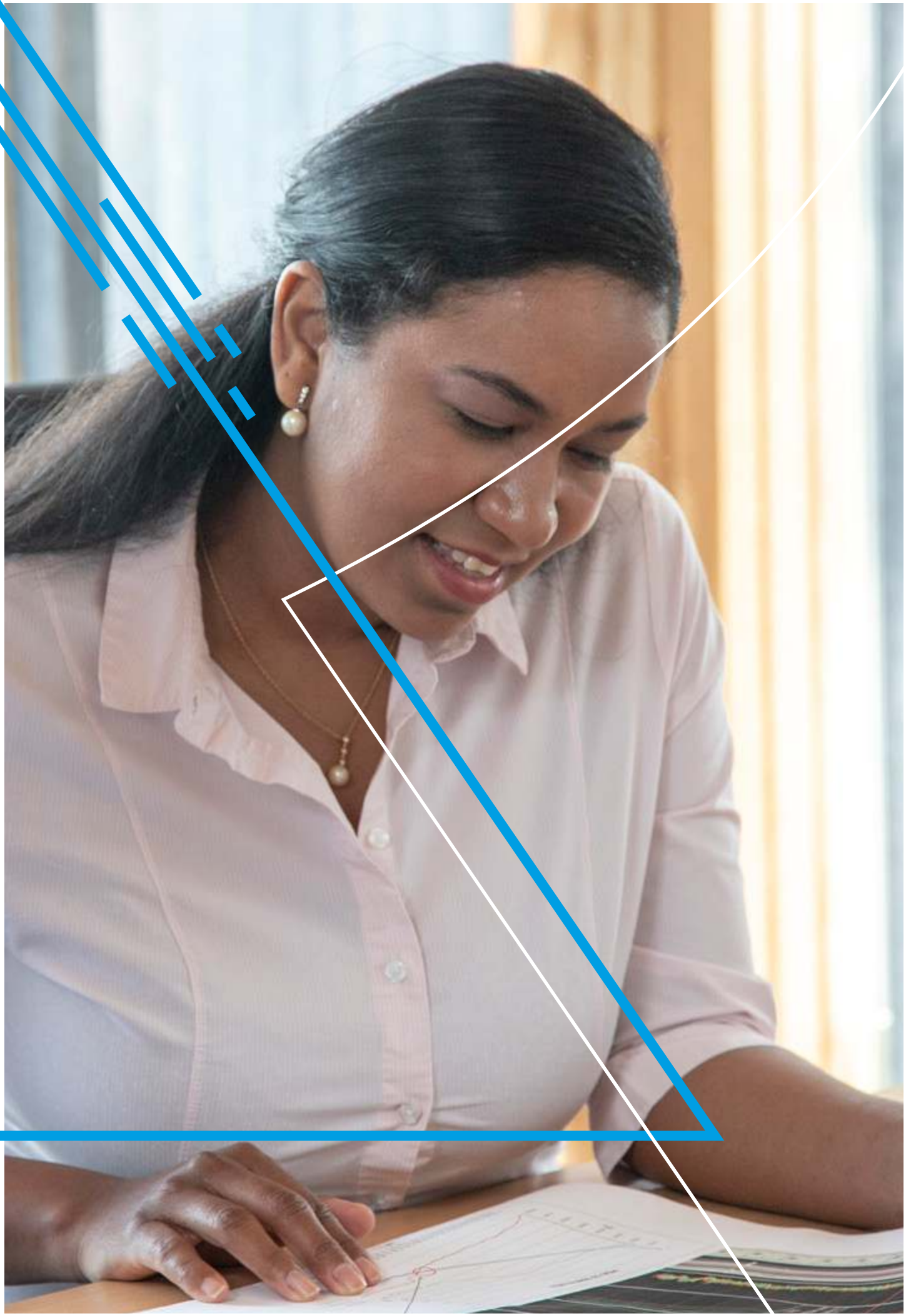
We deliver detailed information about cement to casing, and cement to formation adhesion. Whether you are running a first casing, working over or abandoning a well, we help you make qualified decisions about your cemented annuli.

Dimensional compliance

In downhole environments, there is often the need for close tolerance on casing ID, thickness and ovality at critical locations in the well. We help operators pre-select the best casing joints for these critical zones. We log the pipe in the yard before deployment downhole to verify the dimensional properties of individual joints, then once the casing is run in the well, we help you identify any potential drilling damage on the joints of known dimensions.

ZeroWear™

Cased holes vary in depth, deviations, temperatures and downhole conditions, and we have pioneered our unique and revolutionary ZeroWear™ solution for acquiring accurate downhole data even in the harshest of conditions, including H2S/CO2. Designed and engineered in-house, ZeroWear™ multifinger caliper sensors offer a far greater level of durability and precision than standard tugsten carbide coated sensors.



It’s easy to see why operators choose READ as their well integrity partner.

We have three decades of oil and gas experience and expertise and we can support you from our dedicated facilities across the globe. Our highly skilled field engineers can mobilise to any worldwide location at the shortest of notice and our expert analysts deliver comprehensive and high-precision data interpretation. We have an impeccable safety track record and robust QHSE management systems.

In short, we deliver the ultimate all-encompassing well integrity service across the life-of-field. We offer the high-value well intelligence you need to make qualified decisions, quickly.

Get in touch and find out how our well integrity services can help you improve the efficiency and reliability of your hydrocarbon recovery around the world.

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Well Integrity Technical Specification

Calipers							
Tool	**XY Caliper**	**MFC24**	**MFC40**	**MFC60**	**MFC80**	**HPHT MFC40**	**ZeroWear™**
Tool OD	1 11/16 in (43 mm)	1 11/16 in (43 mm)	2 3/4 in (70 mm)	3.9 or 4.4 in (99 or 112 mm)	8 or 9.5 in (203 or 241 mm)	2 7/8 in (73 mm)	Compatible with MFC24, 40, 60, 80
Tool length	37 ½ in (0.95 m)	64.6 in (1.64 m)	66 in (1.68 m)	61 in (1.55 m)	48.6 in (1.23 m)	87.8 in (2.23 m)	Compatible with MFC24, 40, 60, 80
Tool weight	14 ½ lb (6.6 kg)	20.7 lb (9.38 kg)	70 lb (31.75 kg)	95.7 lb (43.5 kg)	98.1 lb (44.5 kg)	122.9 lb (55.8 kg)	Compatible with MFC24, 40, 60, 80
Temperature rating	350°F (177°C)	350°F (177°C)	350°F (177°C)	350°F (177°C)	350°F (177°C)	430°F (220°C)	430°F (220°C)
Pressure rating	15,000 psi	15,000 psi	20,000 psi	20,000 psi	15,000 psi	20,000 psi	20,000 psi
Casing range	2 – 9 in	2 3/8 – 7 3/4 in	3 ½ - 10 3/4 in	5 – 13 5/8 in	9 5/8 - 20 in	3 ½ - 9 5/8 in	2 3/8 – 20 in
Logging speed	Recommended 30 ft/min (10 m/min); maximum 60 ft/min (20 m/min)					Recommended 30 ft/min (10 m/min)	Recommended 30 ft/min (10 m/min); maximum 60 ft/min (20 m/min)
Primary curves							
Resolution	0.015 in (0.381 mm)	0.002 or 0.003 in (0.051 or 0.076 mm)	0.0015 or 0.0022 in (0.038 or 0.056 mm)	0.003 or 0.005 in (0.076 or 0.127 mm)	0.014 or 0.03 in (0.356 or 0.762 mm)	0.0015 or 0.0022 in (0.038 or 0.056 mm)	±0.005 in (0.127 mm)
Materials	Corrosion resistant throughout						

Detailed technical datasheets are available for each tool at READCASEDHOLE.COM/Knowledge-Hub

Cement Evaluation		Magnetic Thickness		Leak Detection	
RBT*	**ABI-43***	**MTT**	**MTD**	**NTO**	**S100**
1 11/16 in or 3 1/8 in (43 or 79 mm)	1 11/16 in (43 mm)	1 11/16 in (43 mm)	1 11/16 in (43 mm)	1 11/16 in (43 mm)	1 11/16 in (43 mm)
10.27 or 9 ½ ft (3.13 or 2.89 m)	248 in (6.3m) full toolstring	82.3 in (2.09 m)	44.3 in (1.125 m)	27.2 in (0.691 m)	23.6 in (0.6 m)
40 or 140 lb (18.1 or 63.5 kg)	65 lb (29.5 kg) full toolstring	30 lb (13.6 kg)	12 lb (5 kg)	9.92 lb (4.75 kg)	9.1 lb (4.1 kg)
350°F (177°C)	300°F (150°C) With Gamma Ray 257°F (125°C)	300°F (150°C)	350°F (177°C)	350°F (177°C)	350°F (177°C)
15,000 psi or 20,000 psi	10,000 psi	15,000 psi	15,000 psi	20,000 psi	15,000 psi
2 7/8 – 13 3/8 in	2 7/8 - 15 in	2 3/8 - 9 5/8 in	2.36 – 18 5/8 in (60 – 473.1 mm)		
Recommended 30 ft/min (10 m/min); maximum 60 ft/min (20 m/min)	Variable; recommended 10 ft/min (3 m/min)	Recommended 10 ft/min (3 m/min); maximum 30 ft/min (10 m/min)	3 measurements at 30 ft/min (10 m/min), 8 ft/min (2.5 m/min) and 6 ft/min (1.8 m/min)	Recommended stationary measurements; maximum 30 ft/min (10 m/min)	30 ft/min (10 m/min)
Amplitude (3 ft) - radial 1 to 6 or 8, Amplitude map travel time (3 ft), VDL (5 ft)					
		Corrosion resistant throughout			

*RBT and ABI-43 do not work in gas; fluid conditions should be queried.

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