

Rayotek Scientific, Inc: The Clear Leader in Transparent Solutions

Rayotek is a multi-faceted design, engineering and manufacturing company with experience in all aspects of high tech custom glass and optics. We caught up with Jarrett King, O&G Products Development Lead, to debunk the misconceptions of industrial glass.

 Established in 1992 by a group of physicists and engineers, Rayotek was initially founded as a glass R&D firm. Over time, the company has evolved into a full-service corporation with clients at the highest levels of science, technology and research throughout the world. In this article, Jarrett King outlines how the firm creates innovative solutions to meet the ever-evolving needs of its diverse client base.

King comments that "Because Rayotek has a deep understanding of the physics and engineering of glass, fused silica, sapphire and other clear materials, our clients receive the best possible engineering for both our standard lines and custom solutions. What also sets Rayotek apart is our ability to

do all engineering, manufacture and testing in-house; so, we are truly a 'one-stop shop'. Our energy clients represent the most diverse cross-section of our customer base, making them our most challenging sectors to serve. Our energy clients process in some of the harshest, most abusive environments on the planet. Contrary to popular belief, this is where glass and sapphire thrive while most other materials, including metals and plastics, corrode, melt, or wear down.

Educating customers about transparent materials is where we usually need to start the design process. Many people don't stop to think about how glass, sapphire, fused silica and many other transparent materials are used in virtually every aspect of our lives, both at home and throughout industry. These materials are in use from

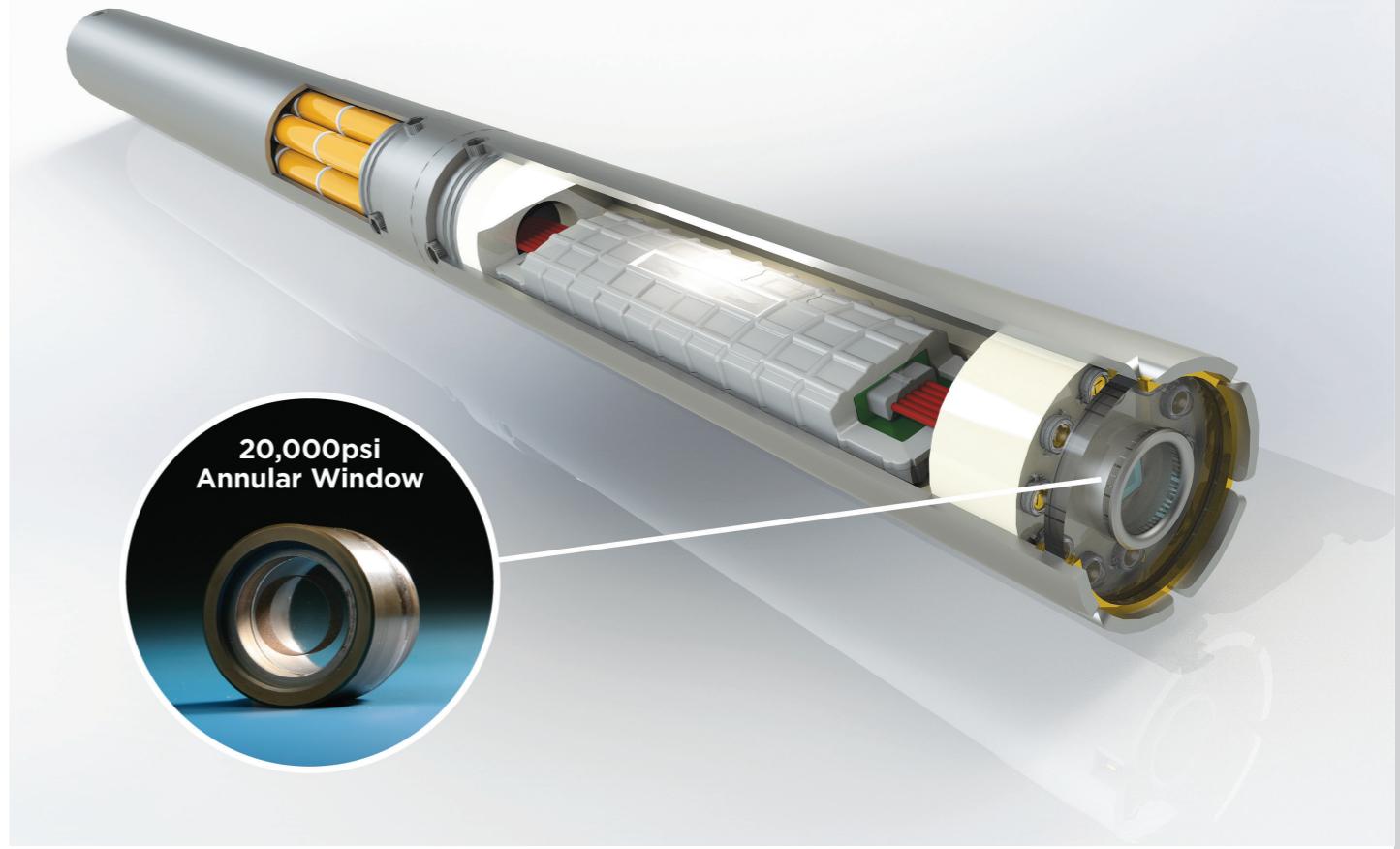
the bottom of the sea, to the gas pump, in industrial and military machinery all the way out to space, the "final frontier". In spite of the wide use of transparent materials, many misconceptions about industrial glass products still exist with engineers, designers and manufacturers.

What are the common misconceptions? Glass is fragile, glass is prone to catastrophic failure, it's susceptible to thermal shock, its maintenance intensive. Mr. King notes that, "Ironically, in most cases the metal housing of a sight window assembly reaches its designed point of failure long before the glass or sapphire component."

In fact, transparent materials like sapphire, borosilicate and fused quartz have a long history of operating in environments at the extreme limits of pressure,

temperature and chemical exposure. Rayotek's team is known for asking potential clients: "if you had the opportunity to look into any process, no matter how extreme, what would it be?". The answer is consistently to use a Rayotek engineered sight window with the end result of improved processes, technical breakthroughs and safer systems.

One doesn't have to look far into Rayotek's repertoire to see just how true that statement is. With one of the world's largest databases of custom industrial sight window projects, Jarrett can describe a host of high profile vessel and O&G processing projects set to revolutionize energy sector, processing technologies and debunk misconceptions:





1. Specialized HPHT Sight Window System

– The customer needed to observe and measure a process at 2000psi at over 900 F and had avoided using windows for fear of catastrophic failure. Rayotek completed design, engineering and proof test of an ASME flange assembly that allowed clients a 4" clear aperture view of their hydrocarbon process system at over 2000 psi and 900 degrees Fahrenheit. Rayotek works with a variety of research institutes, government agencies and universities to allow for safe viewing into highly specialized research equipment. Rayotek sight windows are required for sensitive scientific experiments in potentially dangerous process vessel systems.

2. Wellhead Window System

System - Rayotek is currently validating the design of Window Systems used directly on the wellhead. For years customers have been asking for a window that would allow for direct observation of the wellhead internals during installation and operation to confirm operational function. The window system is being vetted by clients according to all appropriate API testing protocols to attain approval for use in 10,000psi operational service (15kpsi test). Full pressure, temperature and stress cycling tests have recently proven the technology to be suitable.

3. Dual Aperture High Pressure Optical Annular Fused (Pre-Stressed) Window

– Imaging many miles down in a well has always been a huge challenge with extreme pressures, temperatures and abrasive, chemically abusive fluids. The industry had given up

on finding a robust window system that could handle these extreme conditions. In response, Rayotek created a one-of-a-kind technology that combines state-of-the-art fused glass sight window technology and an ultra-hard sapphire shield with a proprietary annular isolation shield to separate the incoming images from the outgoing illumination. The Rayotek annular fused window virtually eliminates light backscatter in downhole camera systems. This greatly improves imaging in dark, dirty environments at pressures up to 20kpsi and temperatures over 250C.

Jarrett summarizes that Rayotek has the ability to take customer's needs from the conceptual stage, through engineering-design, to final manufacture. "At Rayotek, our focused, highly specialized staff allows us to focus on some of the most vexing industry-wide challenges; and come up with 'impossible solutions'".

Rayotek's recent growth has included the addition of several key infrastructure improvements such as the recent purchase of a full-service CNC machining facility and significant additions to technical staff. One of the key directives of the organization in the near future is to leverage thousands of custom product solutions and an extensive database of IP into commercialized products, along with providing the capability to bring these to market.



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