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BIM: a 'must' for Manufacturers

Why digital transformation in the built environment offers a new world of opportunity for makers of construction products

A BSI Whitepaper

Executive Summary

- Digital technology is transforming the built environment sector

- Specifically, Building Information Modelling (BIM) is enabling collaboration throughout the supply chain

- As a result, construction industry architects and specifiers are increasingly requiring digital versions of building products, whether generic or manufacturer-specific – BIM Objects

- To satisfy the need where specific objects are required, manufacturers must provide digital versions of their own products

- With BIM, manufacturers can access new sales channels – making it a golden opportunity that some are already grasping

- BSI is supporting them with a new BSI Kitemark for BIM Objects

- BSI Kitemark certification provides assurance to specifiers and customers that BIM Objects and associated data are an accurate representation of the physical products they represent

- The BSI Kitemark offers construction manufacturers differentiation and competitive advantage.

Introduction – The drive to digitize

The 'Digital Revolution' continues to affect almost every aspect of human existence – and the built environment is no exception. From building design and construction projects to infrastructure development and ongoing asset management, the built environment industry is being transformed by new and evolving digital solutions.
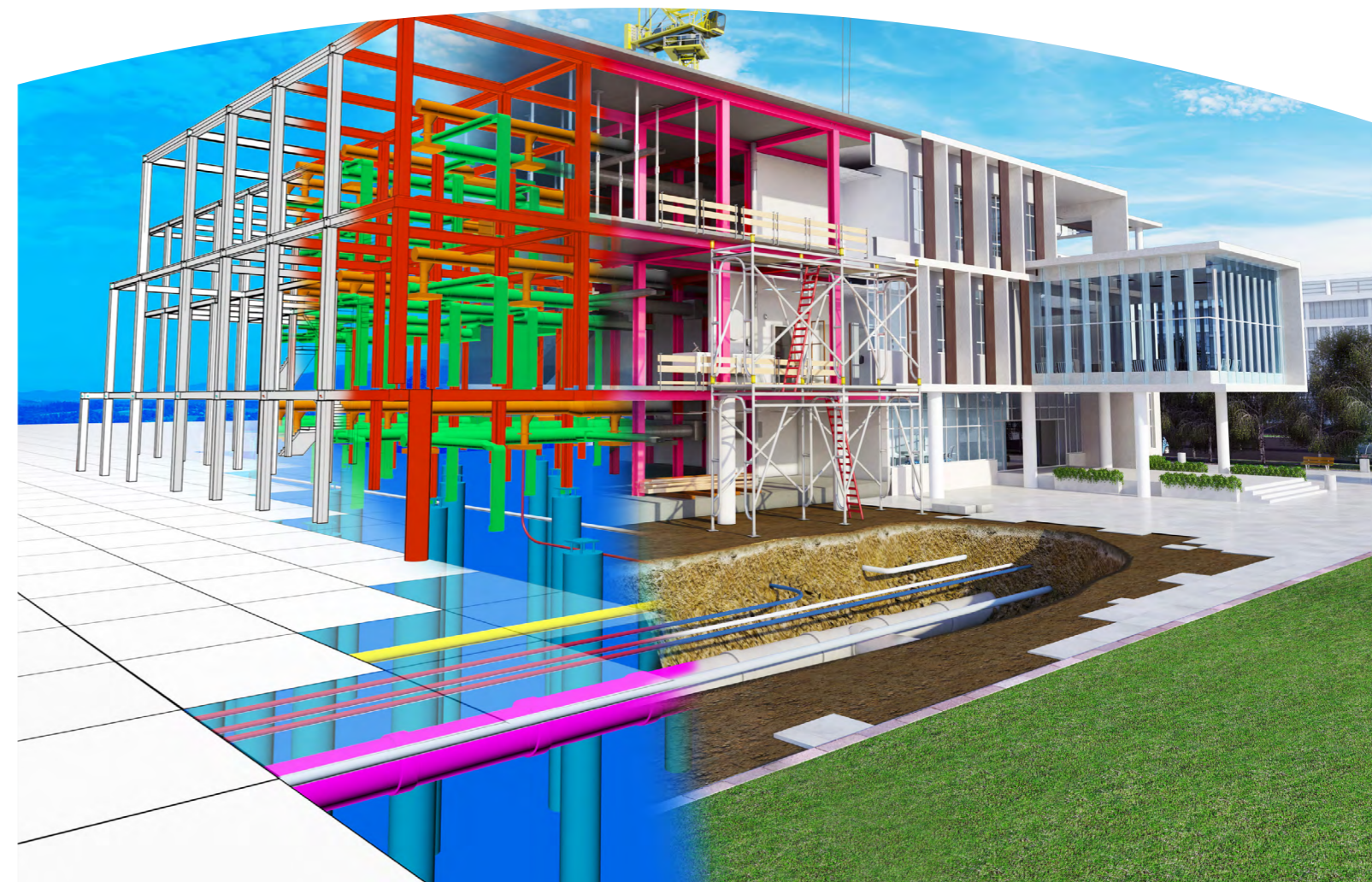
To resist the tide of change is as futile as King Canute attempting to hold back the ocean waves. Technological innovation will continue, indeed hasten, and organizations must embrace it.

In the UK, the government has long recognized as much, publishing a succession of strategy documents in recent years that present a vision of the country's construction sector leading change. The potential rewards of this strategy are enormous. If successful, it will enable the built environment sector to perform more efficiently and sustainably, and win a larger share of the vast global construction market, which experts predict will grow by more than 70% by 2025.

A key element of digital transformation in the built environment is Building Information Modelling (BIM). This BSI Whitepaper explores the nature of BIM and, specifically, why manufacturers supplying the sector should understand BIM Objects – digital versions of products – and welcome the new world of opportunities they offer.

Contents

Understanding BIM

BIM is a process that uses three-dimensional digital modelling and intelligent structured data to improve collaboration between companies throughout the supply chain for building and infrastructure projects. As such, it represents a significant digital step forward in the construction and asset management markets.

BIM brings together all the components that make up a project in the development stage, creating a common language, shared knowledge and increased transparency between all the parties involved, from the main contractor through to sub-contractors, specialists and professionals. It provides the framework to manage costs, timescales and material quantities, and so optimize the efficiency of construction projects.

BIM can be used for a wide range of projects. The process can be adopted for individual buildings (from houses and hospitals to shops and schools), infrastructure (from roads and reservoirs, to ports and pylons), and for complex developments involving many and varied structures in the built environment.

Importantly, the use of BIM extends through the whole lifecycle of a built asset. The process defines a set of procedures for the production, management and exchange of information generated in the design, construction and asset management phases, from initial drawings all the way through to final decommissioning.

Matt Crunden, Training and BIM Manager at Legrand, a global specialist in electrical and digital building infrastructures, explains: "BIM is just one aspect of the overarching strategy towards a more sustainable future. If we consider that just 20% of the total life costs of a building are consumed during its construction, then 80% are its operational costs. This represents massive savings potential and BIM is a great vehicle to help achieve those savings."

Crunden, who has been recognized by the construction industry for his commitment to digital transformation throughout the sector, adds: "From manufacturers to consultants and architects, and everyone in between, it is essential for us to understand how the built environment sector recognizes and exchanges digital information. It is all about being able to work smarter and build more relationships across the industry to encourage collaboration."

Buying in to BIM

While three-dimensional models are the visual representation of BIM, the process is fundamentally about sharing information. It provides a set of processes and standards for managing information through collaboration, underpinned by technology. It allows the entire supply chain to communicate and coordinate effectively.

By collating accurate information, from drawings and specifications to materials and measurements, problems can be avoided throughout the supply chain, driving up the efficiency of the construction and asset management processes. Firms recognize that BIM saves time and costs through fast, streamlined processes, reducing waste and uncertainty, enabling collaborative working and improving productivity and delivery times.

According to a recent Government construction strategy report, BIM can lead to cost savings of 15-20% when fully implemented. Such large potential savings mean BIM adoption is already well underway, albeit to varying degrees.

The UK government has also forced the pace of digital transformation. In April 2016 it introduced a condition of contract requiring the use of BIM on all public projects. More recently, in July 2018, as part of its Industrial Strategy, it published a new deal for construction, a £420m partnership between government and

industry to transform the sector's productivity through innovative technologies and a more highly skilled workforce. The deal commits to using digital technologies, including BIM and offsite construction techniques, across the sector. Of specific relevance to manufacturers is the decision to develop digital building designs for use in procurement for all projects, and to work with the product and manufacturing sector to allow

accurate, repeatable, machine-readable product information to be used across the sector.

Alongside the Government's BIM push, large swathes of the built environment sector have bought into these benefits. BIM is increasingly being used by a wide variety of organizations across the industry, from developers and architects to contractors and consultants.

And BIM adoption has not only been growing in the UK. It has formed part of a modernization drive through digital working taking place in many global markets, including the US, Europe, Middle East, Asia and Australasia.

Applying BIM

Currently, there are four recognized levels of BIM maturity, essentially moving the production of building information from an individual, non-collaborative, two-dimensional approach (Level 0) to a fully digital environment encouraging full collaboration (BIM Level 3). Currently, however, no organization is yet recognized as working beyond Level 2.

The UK Government's condition of contract requires construction companies to demonstrate BIM Level 2 capability. The full suite of BIM Level 2 standards can be found at www.bimlevel2.org. The BS 8541 series of standards is part of the Level 2 suite and was developed to define how library objects (BIM

Objects) should be produced, named and detailed, and what information that they should provide. The series includes:

- **BS 8541-1:2012** – Library objects for architecture, engineering and construction. Identification and classification. Code of practice.

- **BS 8541-3:2012** – Library objects for architecture, engineering and construction. Shape and measurement. Code of practice.

- **BS 8541-4:2012** – Library objects for architecture, engineering and construction. Attributes for specification and assessment. Code of practice.

Manufacturers and BIM Objects

BIM has enormous implications for manufacturers and suppliers of construction products, as architects and designers increasingly use digital versions of products – BIM Objects – in the development and design process.

As a manufacturer you will be a provider of products directly to a developer or contractor, or to another supplier in a supply chain. Through BIM, specifiers are now interacting with their supply chain in a different way, providing new digital routes to market.

Andy Butterfield, Director of Built Environment, Product Certification at BSI, explains that BIM represents a significant opportunity for manufacturers. "They need to provide BIM content for their products because their route

to market has just changed," he says. "In effect, online BIM Object libraries are their new shop window, increasing the visibility of those products to potential customers."

Many manufacturers are now producing 'digital twins' of their products alongside the physical product to enable their products to be incorporated into BIM.

Experts acknowledge that there are some 'rules' that apply for manufacturers, and these can be difficult to interpret. To address the issue, the UK BIM Alliance is creating a report on the state of product data, and this is currently open to industry comment. One call in the marketplace is to separate the object from the data, enabling simpler updating and avoiding the

creation of objects with too much data, or data that is 'locked' inside an object. The report is scheduled for launch at UK Construction Week in October 2018.

Butterfield stresses that, as long BIM content is provided in the right format to specifiers, it can help manufacturers become preferred suppliers. Visibility of manufacturer content within BIM models can also help to raise brand awareness and future engagement with facilities management providers.

"They can become more resilient by embracing the technological change that's transforming the built environment sector, opening up new business development opportunities," he says.

The BSI Kitemark™ for BIM Objects

BSI is supporting digital transformation in the built environment through its traditional strengths – helping to develop and deploy standards that provide consistency and certainty, and through a range of certification solutions that offer the assurance of best practice.

Until recently, manufacturers supplying the sector have had limited BIM certification options available to them. Their challenge has been not only to provide accurate digital product information – but also to be independently verified as doing so. In response, in July 2017, BSI launched a new BSI Kitemark that enables manufacturers to demonstrate they have embedded BIM into their manufacturing processes and are delivering high quality BIM Objects.

The BSI Kitemark was designed in collaboration with key stakeholders from different industry

sectors, including windows and doors, plastic pipes, aggregates, fire, wood, steel and electrical products. The first organizations to achieve it are Legrand Electric Ltd, the global specialist in electrical building structures, and Wavin, a leading supplier of plastic piping systems for drainage and water in Europe (see case studies).

Gary Pattison, Certification Technical Expert for BIM and Digital Construction, explains that designers and specifiers will typically use generic objects as placeholders in their designs – but generic objects do not always produce realistic or dimensionally accurate designs, compared to the use of a manufacturer's BIM Objects. "All too often, they are faced with too much, too little, or inaccurate online BIM content," he says.

The BSI Kitemark for BIM Objects verifies that the digital version of a manufacturer's product is an

accurate, up-to-date representation of the physical object. It demonstrates that the dimensional, performance and specification data related to the product has been validated and that this is presented and structured correctly, using standardized templates. It also proves that the manufacturer's processes meet the requirements of BIM and that the object will function properly when placed within a digital model.

"When specifiers see the BSI Kitemark against a product, they know immediately that it's an accurate digital object that has been independently verified,

reducing the number of checks they will need to undertake throughout the project," says Summerson. "As a result, they're more likely to download it and incorporate it in their digital plans."

He adds that the certification process also helps manufacturers understand what information should be provided about their products: "Creating BIM Objects can seem a big step, but they probably already have the necessary information – it's all about breaking it down and presenting it correctly."

Global opportunity

BSI's Butterfield sums up why independently verified BIM Objects are a 'must' for manufacturers: "The construction industry is highly competitive, so it's really important that construction manufacturers can differentiate their products when tendering for BIM projects, and to gain access to new markets," he says. "This BSI Kitemark has been designed to help them demonstrate their ability to innovate and embed new ways of working within their organizations.

It is the benchmark in best practice for the production of digital products used in BIM models, effectively putting manufacturers back in charge of their shop window."

He concludes, "BIM is here to stay and manufacturers must get on board. We believe this new BSI Kitemark will help them do that, and ultimately exploit the huge global construction market opportunity."

BSI Kitemark benefits

Higher sales – differentiate construction products in a crowded market with validated BIM Objects carrying the BSI Kitemark, the original trust mark since 1903

Customer satisfaction – provide trustworthy information to specifiers, designers and other BIM Object users they can deliver projects quickly and efficiently

Risk reduction – ensure products meet customer specification and performance requirements so they can avoid the costly consequences of rework or replacement

Operational resilience – enhance operational resilience by embedding robust processes to produce reliable BIM Objects
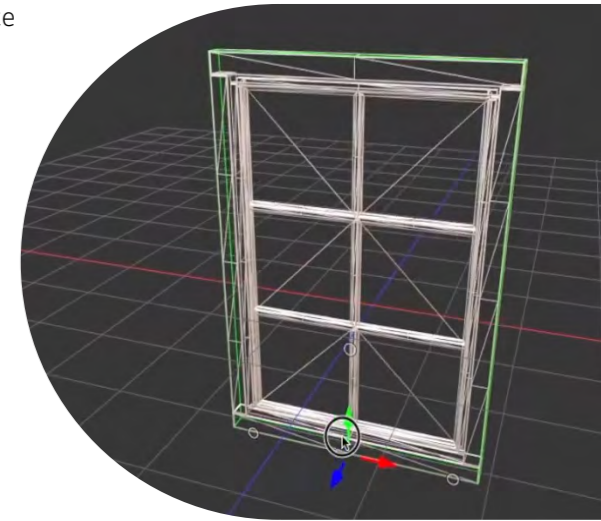
Enhanced reputation – protect brand credentials by embracing best practice processes to provide BIM Objects that meet validated standards.

Seven steps to BIM

1 **Talk to your key specifiers to find out how they are using BIM,** whether they are including your products in their BIM models and any challenges they face, to see what sort of BIM content you could provide to best support them

2 **Once you understand what your clients want,** focus on your biggest ticket items first to have the biggest impact

3 **Consider where you will host your BIM content** and how you will engage with users of it to benefit your business

4 If you don't have the in-house skills to develop BIM content**, engage with a qualified BIM adviser to help you.** BSI offers an Associate Consultancy Programme, which includes a number of BIM consultants

5 **Ensure your BIM content aligns with the BIM Level 2 standards,** using a common language and structure, and that you have processes in place to keep your content accurate and up to date. BSI can help you as part of its BIM Objects Kitemark

6 **Train your internal teams** so they understand the relevance of BIM to your products and how your BIM content can benefit your business and customers

7 **Tell the world** – promote and share your content and offer support with its use. Achieving the BSI BIM Object Kitemark is a great way of doing this.

Get in touch: For more information on the BSI Kitemark for BIM Objects, visit **www.bsigroup.com/BIM-UK**

Case studies

Legrand, the global specialist in electrical and digital building infrastructures, and Wavin, a leading manufacturer of plastic piping systems in Europe, are the first manufacturers in their industry sectors to achieve BSI's Kitemark for BIM Objects.

Legrand: Creating competitive advantage

Legrand achieved BSI certification for BIM Objects in 2017, but its journey began back in 2011, when it first created digital 3D objects for some of its products for the process, power and marine (PPM) sector.

Legrand's initial focus was on making sure information was displayed in the same language and format, so that PPM specifiers could see and assess products easily. Matt Crunden, Training and BIM Manager, explains that the creation of BIM Objects – "3D digital models that can be inputted into a single blueprint or 3D model incorporating structured data" – was the second stage, making the design and construction process integrated and seamless.

"We started sending 3D product families to customers within the PPM sector on CDs," says Crunden. "It was not yet BIM as we now know it, but we could see the way the technology was heading. As the market leader, we took a strategic decision to invest further in digitization."

As a 'first-mover', Legrand stole an early advantage over competitors, and began a steep learning curve. By 2013 it was using extensive 3D object catalogues for the PPM sector "that really were BIM Objects," says Crunden. Success in the PPM market paved the way for further investment in BIM Objects for a wide range of onshore markets.

"By 2017 we had over 2,000 BIM Object downloads, including nearly 500 for one cable tray product alone. By adding download statistics to our CRM system we were able to directly link them to contract wins," continues Crunden. "There's no doubt that BIM Objects have driven up sales by enabling high visibility of our products, early customer engagement and simple collaboration."

Crunden explains that BSI Kitemark certification of the BIM Object reassures customers of its accuracy

before they use it, improving the reliability of the design and installation, and reducing the cost and time associated with returning and replacing products that do not fit the original specification, as well as time spent sourcing and validating data. "The BSI Kitemark encourages project teams to utilize Legrand systems to produce accurate and efficient plans, cable routing and procurement lists as part of fully integrated BIM projects," he says.

To date, BIM Object families for a number of Legrand products have been included within the initial scope of Legrand's BIM Objects BSI Kitemark, including branded cable trays and ladders, power tracks, presence detectors and lighting control systems. Each family has the associated product data templates, ensuring accuracy before publication. More BSI Kitemark-approved BIM Object families are planned for the future.

Crunden sums up, **"A lot of people claim they're BIM-ready, but it's a constantly changing market. It's not about being BIM-ready; it's about being on a journey. BSI Kitemark certification helps us put across a more convincing message — it shows our customers that we recognize the importance of BIM to them and we're committed to meeting their digital requirements."**

Wavin: Maximizing value for the customer

The BSI Kitemark validates that all Wavin's BIM Objects are accurate digital representations of its above-ground drainage pipes and associated products. For specifiers, this helps streamline the process of getting from 'designed' to 'built', increasing efficiency of building projects.

Steve Skeldon, Product Group Manager at Wavin, explains how the company's digital journey began about four years ago. "Like all building products manufacturers, we became aware of the digital transformation taking place in the way buildings were being designed, so we started to do some research," he says. "We could see an opportunity to achieve a new competitive advantage, but were also motivated by the Government's impending BIM condition of contract requirement of April 2016."

Skeldon continues, "Customers were increasingly asking us for more data on our pipe systems, but we faced a massive task because of the complexity of our product range, which runs into the many thousands. We decided to focus initially on products for the new build market."

Wavin developed custom BIM Revit content packages – BIM Objects – with built-in intelligent assistance. Whereas the generic Revit pipe option cannot be used to make an accurate model of a pipe system, Wavin packages allow users to create a fully accurate representation of the way piping systems will actually be installed. They also feature a fully integrated bill of materials.

"We have created Revit families with built-in intelligent assistance so that Wavin pipework can be integrated into the building design with far greater accuracy and in less time, with the net result leading to less waste on site," says Skeldon. "We wanted the system to be really smart and user-friendly to add maximum value for the customer."

Wavin's BIM Revit piping packages provide reliable clash detection, so that errors can be corrected prior to installation, which means, for instance, that Wavin pipework will fit in the duct spaces for which it was intended and will not interfere with other structural elements or building services when it comes to installation.

Other reliability features include: accurate specifications by selecting the right product range, diameters and type of fittings to be installed; reliable drawings, which leads to accurate prefabrication parts; and reliable ordering of the products, which leads to ordering and site logistics optimizations.

Now, BSI Kitemark certification of its BIM Objects means that Wavin's customers can be secure in the knowledge that their files will be accurate, providing correct ordering and clash detections, and consequently generating maximum saving of cost and time.

"With so many providers of BIM services in the market, often giving different advice, the BSI Kitemark brings into play a robust, consistent and objective set of BIM parameters for product data. It represents a real watershed for construction manufacturers and their customers," he concludes.

Find out more about the BSI Kitemark for BIM Objects

Visit: **bsigroup.com/BIM-UK**
or call: **+91 11 4762 9000**
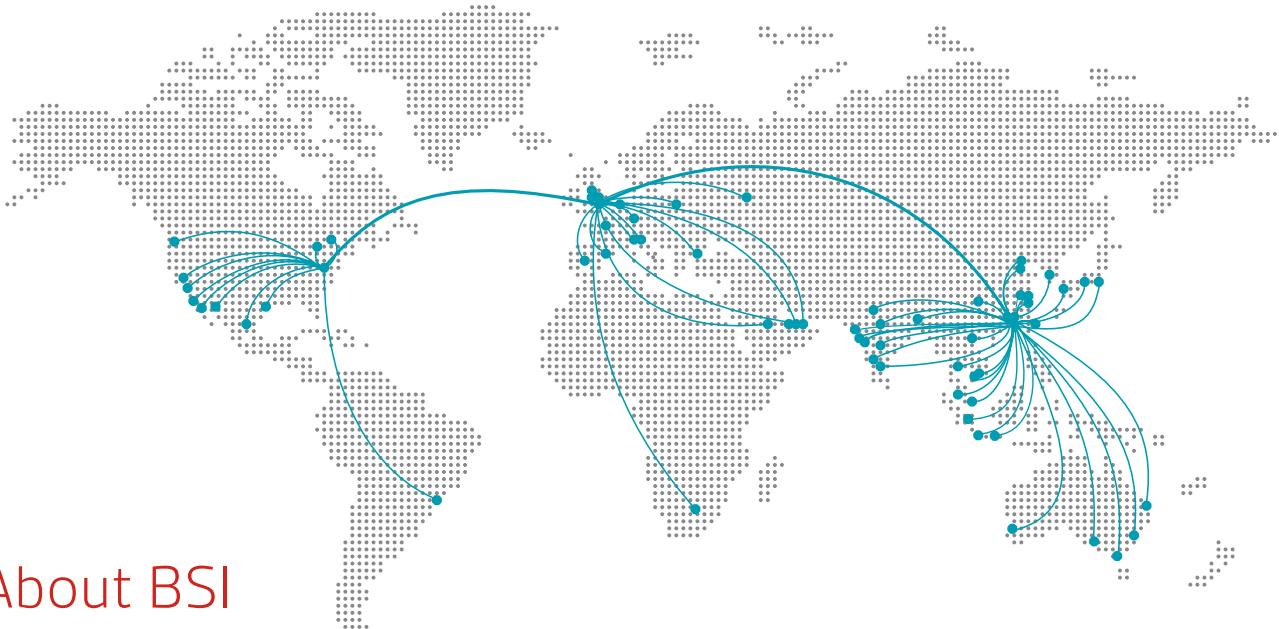
About BSI

We are the business standards company that equips businesses with the right tools and solutions to turn best-practice standards into habits of excellence. With over 4,000 staff worldwide, we help our clients drive performance, manage risk and grow sustainably.

Founded in 1901 we were the world's first National Standards Body. Now over a century later, we're globally recognized as a champion in best practice. We have been and still are responsible for originating many of the world's most commonly used standards and publish nearly 2,700 standards every year. These standards are developed to address the most pressing issues of today. They also cover various industry sectors, including Aerospace, Automotive, Built Environment, Food, Healthcare, IT and Fire.

All our standards are underpinned by a collaborative and rigorous approach perfected over decades. We always work closely with industry experts, government bodies, trade associations, businesses of all sizes and consumers to develop standards that drive excellence.

We currently work with over 86,000 clients in 193 countries worldwide to help them adopt and cultivate continuous habits of best practice. We also train our clients and provide them with practical implementation guidance, as well as a comprehensive suite of compliance tools. And to ensure our clients get the very best service, we're also independently assessed and accredited globally by ANAB (ANSI-ASQ National Accreditation Board) and 26 other accreditation bodies throughout the world, including UKAS (United Kingdom Accreditation Service).

Our reach is global and we play a key role within the International Organization for Standardization (ISO). As one of the founding members, we help make sure international standards developed address today and tomorrow's business and social needs, while delivering real benefits to an organization and all its stakeholders.

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Get in touch

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