



# Maximizing Global Opportunities

How international standards can help  
your business grow overseas

**bsi.**

...making excellence a habit.™



## Foreword

**“ BSI is dedicated to promoting excellence. Working with organizations of all sizes in 182 countries worldwide, we improve performance, reduce risk and increase resilience right the way through the supply chain. ”**

Howard Kerr, Chief Executive, BSI





## Introduction

**T**he United States has the world's second largest export economy. In 2014 it delivered \$1.45 trillion worth of products and raw materials across the globe. Trading on such a scale means it is essential to understand the diversity inherent in localized markets. In order to distribute this report to our US customers, for example, it needs to be designed to American standard paper sizes.

It is tempting to dismiss such differences as just quirks in the system. After all, in an increasingly homogenized world, it's always nice to have a few little details to remind you that you are in a new culture that has a different history to your own.

It is these little quirks that are the most important reminders of the value of the standardization process. As our article on the history of standards points out on page 6, "Before the twentieth century, there were no standards". Innovation and technological developments happened on a local level and companies needed to redesign and retool to deliver the same products for different markets.

These days, we tend to take it for granted that new technologies will operate globally, but it is more important than ever to understand that this does not happen by accident. Industries work together through local and international standard bodies like BSI, ASTM and ISO to develop a consensus – both of process and specification.

And it is this consensus that will go on to form the standard – a published document that works not just as a minimum requirement, but as a guarantee of quality and guidelines to achieve best practice.

The BSOL (Standards Online) library is a database with over 95,000 International, American, British and European standards covering everything from product and material specifications to quality management systems and supply chain resilience.

In this report, we will be looking at emerging trends in America's key export markets and how standards and standardization are central to their development.

Karen Jacobs  
Territory Manager, North America  
BSI Group

**“ These days, we tend to take it for granted that new technologies will operate globally, but it is more important than ever to understand that this does not happen by accident. ”**

## Contents

- 6** A history of BSI  
How standards have become an integral component in running a successful and accountable business.
- 8** Manufacturing: Sector trends  
How the Internet of Things is changing the relationship between a company and its products.
- 12** Aerospace: Sector trends  
As new technologies start to influence the aerospace sector, internationally recognized standards have never been more important.
- 16** Automotive: Sector trends  
Why public reassurance is essential in the age of the autonomous vehicle.
- 20** Oil and gas: Sector trends  
How maximizing operational efficiencies will be crucial for the industry's future profitability.
- 24** Why choose BSOL?  
A faster, easier way to work with standards.
- 26** BSI training and certification  
BSI provides the widest range of standards-related training available.

**bsi.** BSOL  
Standards Online

**BSOL** is the online standards database that makes using standards easier and more cost effective. You can access a comprehensive library of over 95,000 internationally recognized standards.

[@BSI\\_America](#) [in BSI BSOL](#)

# A History of BSI

“ Before the twentieth century there were no standards. ”

This may seem like a counter-intuitive statement. After all, society has always been awash with morals and ethics – rules on how to behave and what to do. However, we only need to think of passengers and goods having to be transferred between trains running on different gauges, to be reminded that there was often little consensus in the industrial process.

A growing recognition soon developed, that producing materials and components to a standard specification would lead to efficiencies that could both increase competition and open up new markets. This resulted in the very first meeting of the Engineering Standards Committee in 1901.

Convened by Sir John Wolfe-Barry, designer of London’s Tower Bridge, the committee published the first British Standard (BS1) in 1903. BS 1 tabulated the standard dimensions of steel angle sections, essential for structural engineers sourcing from different manufacturers.

This was soon followed by standards for the specification of sections and gauges of tramways, copper conductors, telegraph materials and cement. By 1931 the Engineering Standards Committee had been granted a Royal Charter and finally changed its name to The British Standards Institution (BSI).

After the end of World War II there was renewed focus on the need for global standards and in 1946 the first Commonwealth Standards Conference took place. This led to the International Organization for Standardization (ISO) of which BSI is a founding member.

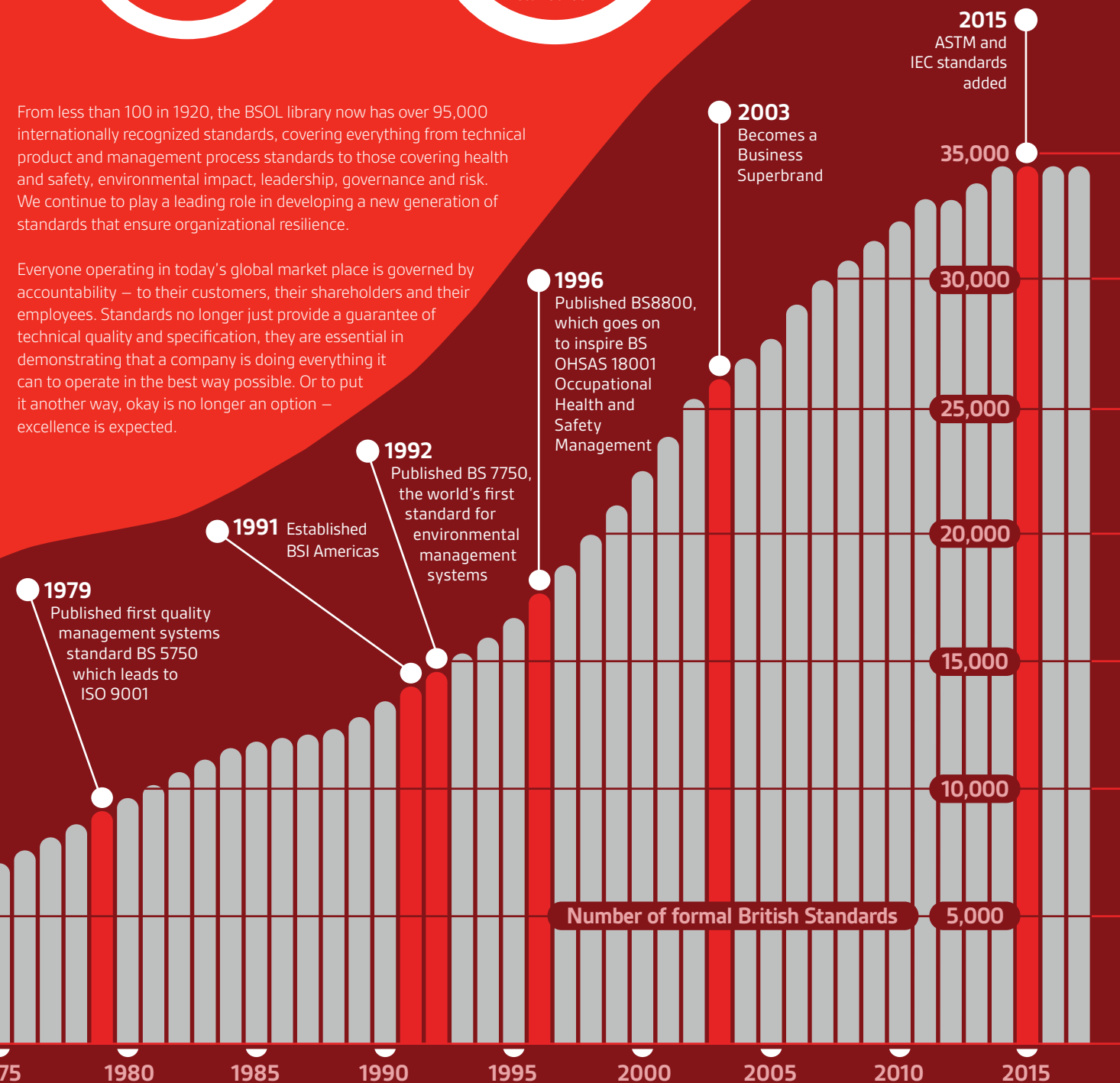
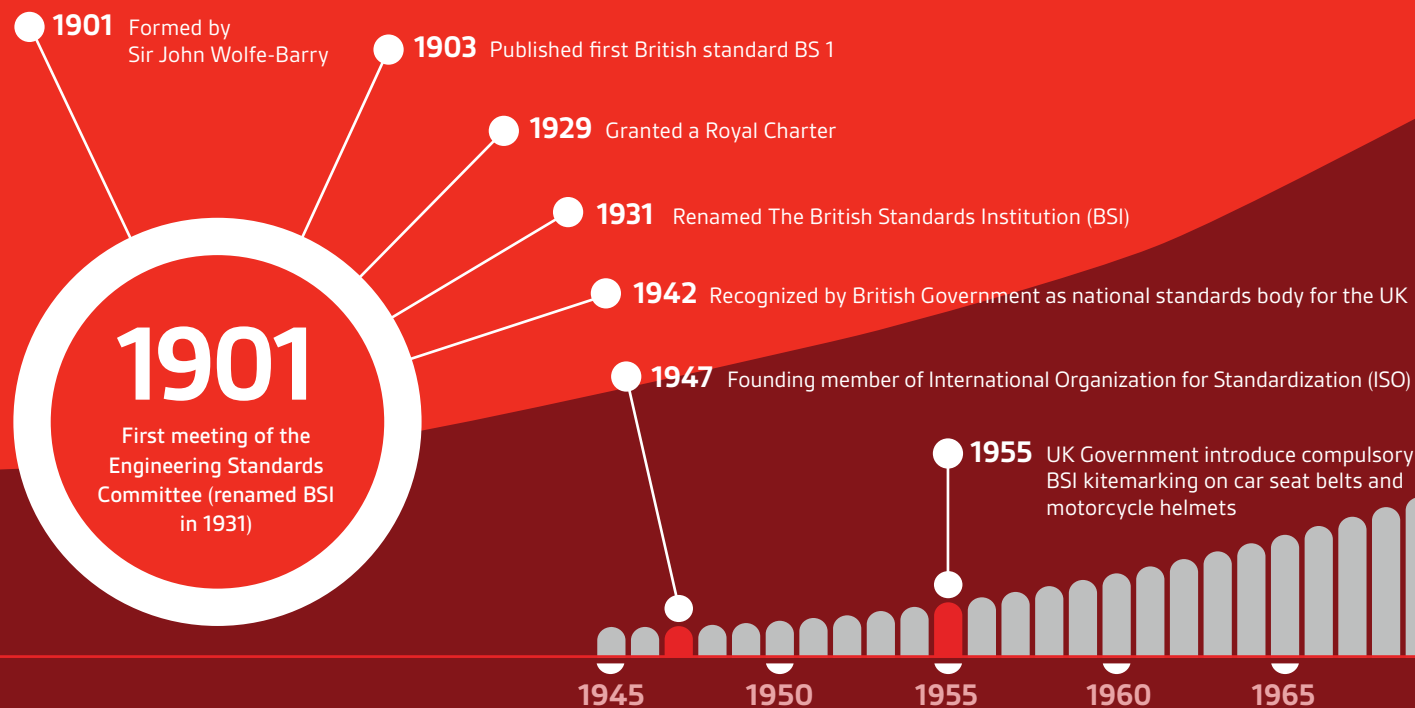
The latter half of the twentieth century saw the emergence of business process standards, as it became increasingly apparent that the quality of a product was directly related to the quality of the process that made it. Many of the world’s most widely used ISO standards, such as the Quality and Environmental Management series (ISO 9001 and ISO 14001), started out life as original British Standards developed by BSI.

**2016**  
5199 additional standards added to BSOL database.

**2017**  
BSOL now features over 95,000 recognized standards.

From less than 100 in 1920, the BSOL library now has over 95,000 internationally recognized standards, covering everything from technical product and management process standards to those covering health and safety, environmental impact, leadership, governance and risk. We continue to play a leading role in developing a new generation of standards that ensure organizational resilience.

Everyone operating in today’s global market place is governed by accountability – to their customers, their shareholders and their employees. Standards no longer just provide a guarantee of technical quality and specification, they are essential in demonstrating that a company is doing everything it can to operate in the best way possible. Or to put it another way, okay is no longer an option – excellence is expected.



# Manufacturing: Sector trends

With the Internet of Things changing the relationship between a company and its products, businesses need to be imaginative, efficient and resilient to survive.

In 2015, industrial manufacturing in the United States returned to near record levels with a gross output of \$6.2 trillion, almost twice as much as any other sector in the economy<sup>1</sup>. This strength is reflected in the Deloitte Global Manufacturing Competitive Index for 2016, which places the US as the world's second most competitive manufacturing economy, expecting it to overtake China and become the most competitive by 2020<sup>2</sup>.

Post recession recovery has been achieved with the sector supporting five million fewer US jobs than it did in 2006<sup>1</sup>. But reducing labor costs to deliver efficiencies can no longer be the driving force behind increasing output. Continued growth in manufacturing will only be guaranteed through companies embracing recent technological innovations, and embedding systems and cultures that maximize efficiencies throughout the supply chain.

There have been many significant developments in recent years. Particularly suited to small-batch production, additive manufacturing (also known as 3D printing), is allowing for the localized production of replacement parts, thus reducing some distribution costs. Additive manufacturing is also helping to extend the operative lifespan of some products and machinery by enabling the 'printing' of obsolete replacement components.

Technological innovations are also providing companies with connective tools to deal with their diverse global networks of customers and suppliers. By giving deeper visibility into the supply chain, with insight into factors such as inventory levels, capacity, quality and order status, these connective tools increase reliance, allowing businesses to predict trends and anticipate problems before they happen.

However, it is the emergence of the Internet of Things, where products talk directly to one another, that is set to fundamentally revolutionize the relationships that companies have with their customers.

**7,538**  
standards projects  
at BSI.

Industrial manufacturers can now be actively engaged in the overall life of their products. Sensors can continually collect and send back performance-related data for analysis and action. This is likely to see a move from pay-for-product to pay-for-performance, where suppliers will be paid more if equipment downtime is reduced or component upgrades are identified that can improve productivity.

But, the biggest barrier to the future health and success of manufacturing businesses is likely to be in their ability to change and adapt their strategic culture. A recent PWC study<sup>3</sup> suggested that only 30% of US based manufacturers were planning to invest in information technology in 2016. Successful companies will be those that can see outside of traditional product development models of investment, and utilize new technologies throughout their business, visualizing and building systems to continually maximize efficiency for themselves and their customers.

Many of the rules on which the manufacturing industry has been built no longer apply. In fact, the only certainty for today's business leaders is that the future is uncertain. Embedding competence and capability throughout an organization's operations is crucial. Products, services, people, processes, vision, values and behaviors are all vital elements in a company's ongoing success.

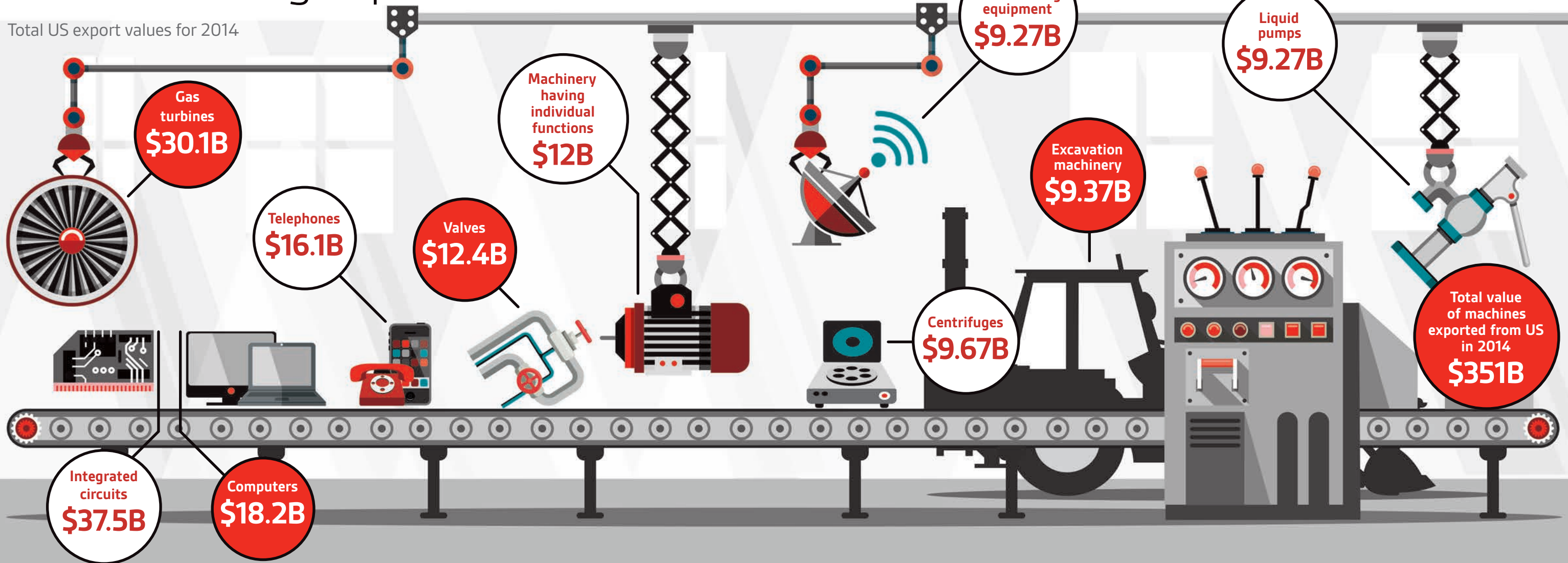
Using standards for quality assurance and compliance is no longer enough. Thriving companies will use standards to achieve organizational resilience, ensuring that their operational cultures are not only maximizing efficiencies, but are forward thinking, anticipating the bumps on the road whilst being ready to embrace new opportunities for success ●

“...it is the emergence of the Internet of Things, where products talk directly to one another, that is set to fundamentally revolutionize the relationships that companies have with their customers.”



# Manufacturing export data

Total US export values for 2014



## 10 vital standards for the manufacturing industry

1	BS EN ISO 4063:2010	Welding and allied processes. Nomenclature of processes and reference numbers.
2	BS EN 61508-1:2010	Functional safety of electrical/electronic/programmable electronic safety-related systems. General requirements.
3	BS 499-1:2009	Welding terms and symbols. Glossary for welding, brazing and thermal cutting.
4	BS EN 61784-3:2016	Industrial communications networks. Profiles. Functional safety fieldbuses. General rules and profile definitions.
5	ISO 22745-1:2010	Industrial automation systems and integration. Open technical dictionaries and their application to master data. Identification of concepts and terminology.

6	ASTM F1503-02:2007	Standard practice for machine/process capability study procedure.
7	BS 8887-1:2006	Design for manufacture, assembly, disassembly and end-of-life processing (MADE). Terms and definitions.
8	BS 8888:2017	Technical product documentation and specification.
9	BS EN 71-1:2014	Safety of toys. Mechanical and physical properties.
10	BS EN 62430:2009	Environmentally conscious design for electrical and electronic products.

# Aerospace: Sector trends

As new technologies start to influence the aerospace sector, internationally recognized standards have never been more important in ensuring quality and safety in an increasingly complex and diversified supply chain.

According to data from the OEC, in 2014 the United States exported \$53.2 billion worth of aircraft to the rest of the world. 88% were destined for either Asia or Europe, with China accounting for over a quarter (28%) of all exports alone.

Some forecasts suggest a need for over 33,000 new aircraft globally by 2035 and much of this growth is expected in the Asia-Pacific region, where fleets are set to triple by 2034<sup>1</sup>. Such a rapidly expanding market is bringing some particularly unique pressures.

When it comes to maintenance, there is a pressing need to upskill local workers to populate ground crews. Boeing predicts that the industry will need 600,000 new technicians in the next 20 years and, with a fully qualified maintenance worker currently spending eight years in training, there is a significant skills gap starting to develop<sup>1</sup>.

One solution has seen companies increasingly looking towards the potential of augmented reality to provide on-site training solutions. Japan Airlines, for example, has reportedly ran a trial of the use of Google Glass to allow operators on the ground to supply images to remote maintenance specialists for assessment<sup>2</sup>.

New technologies are also allowing airlines to reduce the chance of aircraft being grounded. Aircraft Health Monitoring Systems are enabling faults to be detected before they become a problem. Intelligent sensors on a new Boeing 787 can detect 45,000<sup>1</sup> faults and the potential for this kind of big data to drive efficiencies will only increase as aircraft begin to talk directly to one and other, identifying and heading off potential issues that may affect the entire fleet.

However, it is not only in the diagnosis of impending problems that new technologies are playing a role. In 2013, civil aviation accounted for 12% of the global revenue from Additive Manufacturing, more commonly known as 3D printing<sup>3</sup>.

This technology has the capacity to rapidly increase the availability of replacement parts at the point of use. The cost savings that could be made by utilizing such technologies are not hard to imagine, but neither are the problems, such as reducing the potential for counterfeiting and ensuring quality control.

With airlines and manufacturers embracing so many new technologies, it has never been more important for the industry to operate to a unifying set of standards. The AS 9100 (BS/EN 9100) series of quality management standards are used by leading aerospace companies to guarantee quality and resilience in their supply chains and achieving compliance can be essential to trading in the sector.

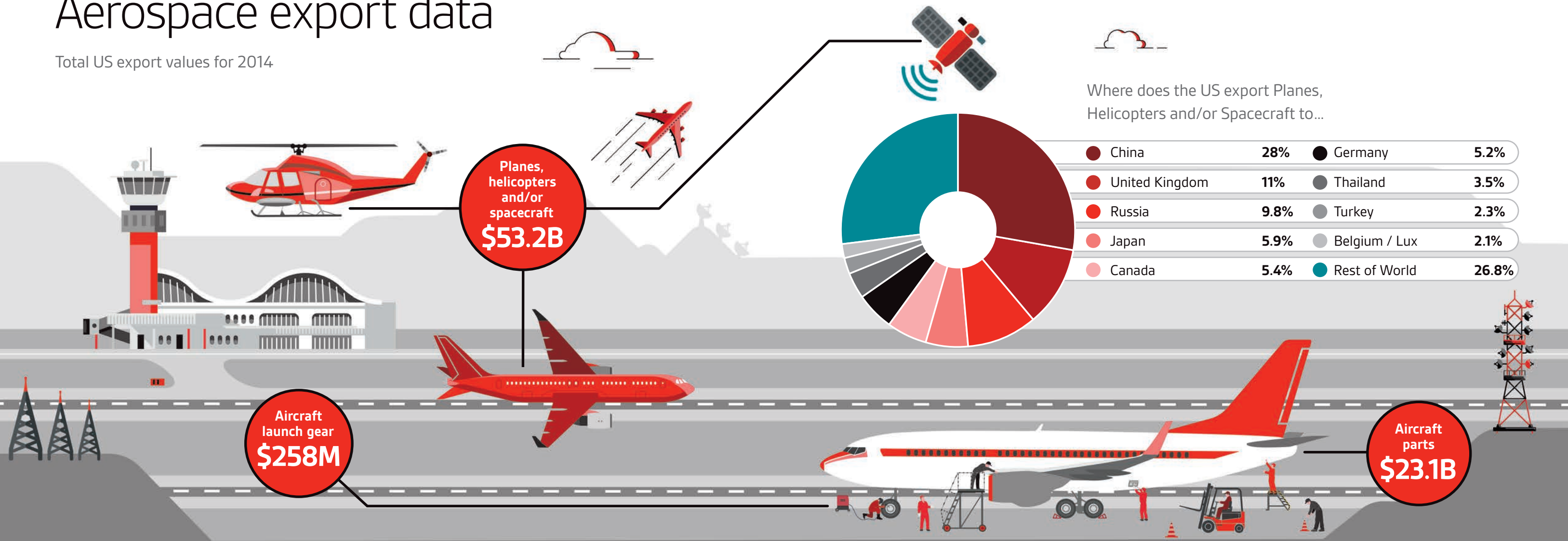
“With airlines and manufacturers embracing so many new technologies, it has never been more important for the industry to operate to a unifying set of standards.”

But perhaps the biggest trend affecting the industry, and one that is leading us to question how we use and manage our skies, is the surge in the development and use of unmanned aircraft systems, more commonly referred to as 'drones'. Initially driven by its suitability for use in global security, drone technology is now finding myriad applications, both industrial and recreational. Standards such as ASTM F2849-10 and ASTM F3201-16 are essential in ensuring that drones are developed and used safely without putting the public or other aerospace users at risk.

Ultimately, safety is, and always will be, the absolute overriding concern of the aerospace industry. Although standards are essential in ensuring quality, efficiency and resilience in the sector, it is in the guaranteeing of the highest possible levels of safety that they perhaps play their most significant role – reassuring customers, governments and the public alike ●

# Aerospace export data

Total US export values for 2014



## 10 vital standards for the aerospace industry

1	BS EN 3908:2017	Aerospace series. Nipples, lubricating, axial type, in corrosion resisting steel, passivated.
2	BS EN 4644-002:2016	Aerospace series. Connector, electrical and optical, rectangular, modular, rectangular inserts, operating temperature 175°C (or 125°C) continuous. Specification of performance and contact arrangements.
3	BS ISO 7718-1:2016	Aircraft. Passenger doors interface requirements for connection of passenger boarding bridge or passenger transfer vehicle. Main deck doors.
4	ISO 10046:1997	Aircraft Methodology of calculating cargo compartment volumes.
5	BS EN 2087:2005	Aerospace series. Aluminium alloy AL-P2014A. T6 or T62 Clad sheet and strip 0,4 mm ≤ a ≤ 6 mm.

6	BS ISO 24394:2008+A1:2012	Welding for aerospace applications. Qualification test for welders and welding operators. Fusion welding of metallic components.
7	BS EN 4300:2008	Aerospace series. Identification marking of engine items. Design standard.
8	BS ISO 6966-2:2005	Aircraft ground equipment. Basic requirements. Safety requirements.
9	BS ISO 17763	Space systems. Human-life activity support systems and equipment integration in space flight.
10	BS ISO 18441:2016	Space data and information transfer systems. Space link extension. Application program interface for transfer services. Core specification.



# Automotive: Sector trends

Autonomous vehicles are fundamentally changing our relationship with cars and driving, and reassurance will be the essential component in making sure that the public embraces the industry's imagination.

**“ The pressure to produce weight savings will no doubt spread throughout the supply chain and meeting specification standards will be vital in ensuring quality (and safety) is maintained. ”**

**E**ver since Henry Ford started his assembly line production of the Model T in 1908, the United States has been at the heart of the global automotive industry. The world's leading producer of vehicles for much of the last century, in 2014 nearly one in ten (8.7%) cars exported globally originated from the US

The industry is now about to enter its most significant period of transformation in over 100 years. A combination of new autonomous technologies, along with global efforts to tackle emissions, is resulting in rapid and exciting developments whose only limit may be in the imagination of the market itself.

The intelligent vehicle is not new. Self-braking and self-parking cars, that can decide when to switch on their windshield wipers and headlights, are already with us. However, it is more recent technological advances in interconnectivity and vehicle-to-vehicle communication that have rapidly turned the truly autonomous car into a reality.

It is in this context that automakers are increasingly looking outside the industry to the technology sector to develop solutions. Ensuring the adoption of industry-wide quality management standards, such as IATF 16949:2016, throughout the supply chain will be essential when integrating the industry's traditional five-year product development cycles with the 'fail and fix' techniques used by software companies to ensure rapid product development.

But perhaps the biggest challenge, when it comes to Connected and Autonomous Vehicles (CAV), will be in persuading governments and the public alike that it is safe to let go of the steering wheel. Rigorously designed standards will be an essential part of this reassurance process and since 2016 BSI has been working with trade bodies to identify the factors that will enable the safe deployment of CAVs onto domestic road networks.

The other major trend currently shaping the sector is a worldwide drive to lower emissions. Although recent low fuel prices have meant there is less pressure from the end users for more efficient vehicles, many governments from Europe to China now have ambitious and pressing targets

relating to carbon and particulate pollutant reduction. In EU countries, for example, the average carbon emissions of all new cars sold in 2021 must be 40% less than 2007 levels<sup>1</sup>.

One way of meeting these targets is through the adoption of electric vehicles (EV) and countries such as Norway and the Netherlands are considering legislation to phase out all fossil fuel-powered automobiles by 2025. Rapid advances in EV technology are making electric cars more affordable and some of the latest models boast ranges of over 200 miles before recharge.

Maybe the biggest barrier to the success of EVs lies in the infrastructure investment needed. There are still only 15,510 electric stations and 40,841 charging outlets in the US<sup>2</sup>. And looking at the whole of Europe, there are just over 100,000<sup>3</sup> charging spots, with all but a few thousand of these being 'slow', and taking around eight hours to recharge a vehicle<sup>4</sup>.

Despite the rapid pace of all these developments, public uptake remains slow. There is a growing consensus within the industry that meeting emissions targets will need to be achieved by maximizing efficiencies in petroleum based internal combustion engines. Experts believe that utilizing breakthroughs such as exhaust after-treatment technologies could increase fuel economy by as much as 75%<sup>4</sup>.

Fuel economies can be further enhanced through weight reduction and car makers are looking for alternative lighter materials. In 2014, for example, Ford decided to replace steel with aluminum in its F-series truck<sup>4</sup>. The pressure to produce weight savings will no doubt spread throughout the supply chain and meeting specification standards will be vital in ensuring quality (and safety) is maintained.

In fact, as the recent diesel scandal has shown, companies who try and cheat the system will be held to account by governments and the public alike. It is through openly using standards that the industry can regain trust, demonstrating it is not only complying, but going above and beyond regulatory requirements and that it has everyone's safety, health and best interests at heart •

**3,500**  
members of  
staff at BSI

# Automotive export data

Total US export values for 2014

Cars  
**\$60.8B**

Vehicle parts  
**\$38.4B**

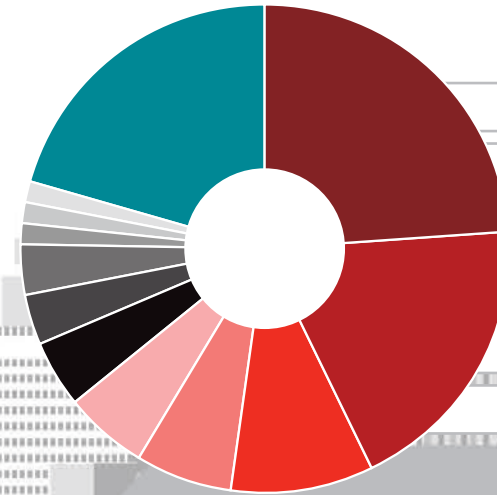
Specialized vehicles  
**\$2.06B**

Delivery trucks  
**\$14.3B**

Trailers  
**\$3.92B**

Tractors  
**\$5.95B**

Motorcycles  
**\$1.71B**



Where the US exported cars to in 2014

Canada	24%	China	19%
Germany	9.3%	Saudi Arabia	6.5%
Mexico	5.5%	UAE	4.5%
Australia	3.3%	Russia	3.2%
South Korea	1.5%	Nigeria	1.4%
Japan	1.3%	Rest of the World	20.5%

## 10 vital standards for the automotive industry

1	BS 10125:2014+A1:2016	Automotive series. Specifications for vehicle damage repair processes.
2	BS ISO 13296:2016	Diesel engines. High-pressure fuel injection pipe assemblies. General requirements and dimensions.
3	BS ISO 18300:2016	Electrically propelled vehicles. Test specifications for lithium-ion battery systems combined with lead acid battery or capacitor.
4	BS ISO 22840:2010	Intelligent transport systems. Devices to aid reverse manoeuvres. Extended-range backing aid systems (ERBA).
5	BS ISO 23828:2013	Industrial automation systems and integration. Open technical dictionaries and their application to master data. Identification of concepts and terminology.

6	BS ISO 15622:2010	Intelligent transport systems. Adaptive cruise control systems. Performance requirements and test procedures.
7	BS SIO 15829:2013	Road vehicles. Side impact test procedures for the evaluation of occupant interactions with side airbags by pole impact simulation.
8	BS ISO 3779:2009	Road vehicles. Vehicle identification number. (VIN). Content and structure.
9	BS EN ISO 15008:2009	Road vehicles. Ergonomic aspects of transport information and control systems. Specifications and test procedures for in-vehicle visual presentation.
10	BS ISO 14513:2016	Road vehicles. Pedestrian protection. Head impact test method.

# Oil and Gas: Sector trends

With oil being extracted in ever more challenging environments, maximizing operational efficiencies will be a priority in maintaining profitability.

Since 2013, the US has led the global export tables for refined petroleum. It exported 3.83 million barrels-per-day (bbl/d) in 2014, which accounted for 7.1% (or \$103 billion) of that year's total export revenues. And with the International Energy Agency (IEA) predicting in its 2016 World Energy Outlook, that demand for oil and gas is growing over the long term, the outlook for the sector is good<sup>1</sup>.

However, underneath these headline predictions, the industry is a volatile mix of challenges and opportunities. Understanding and negotiating these challenges, whilst seizing the opportunities, will be crucial to individual companies' health and success.

One of the most significant changes on the horizon for the industry in the US will be the projected completion of the Dakota Access/Bakken pipeline. Set to run from the Bakken shale oil fields in North Dakota and terminate almost 1,200 miles away at Patoka, Illinois, the pipeline is designed to deliver a reliable feed of crude oil to refineries.

Compared with traditionally more expensive and time-consuming production from Canadian tar sands, and offshore fields in the Arctic and the Gulf of Mexico, shale oil is relatively quick and cheap to produce. It has been big news in the US energy market since 2011, as related production capacity has rocketed.

Two recent technological advances have helped drive this development. Firstly the ability to drill efficiently and accurately, on a horizontal plane, through shale rock formations. And secondly, improvements to modern hydraulic fracturing or 'fracking' techniques used to break apart the rocks and help the oil and gases flow. By 2015, there was so much shale oil flooding the market that the US voted to repeal a ban on exporting crude oil, originally enacted during the oil crisis in the 1970s.

Standardization has been essential to this rapid expansion, removing the need for re-engineered technical interfaces. Technologies developed in Europe under ISO standards could be readily exported and incorporated in the US shale boom. In return, clear European standards (BS and ISO) enabled US refiners to produce products against a stable set of internationally recognized requirements. Without standards, international trade would be significantly slower, as the formulation for each shipment would need to be independently negotiated and blended.

ISO 29001 was developed during the shale oil growth period in the US in partnership between ISO and an international oil and gas industry group, led by the American Petroleum Institute. It defines the quality management system requirements for the design, development, production, installation and service of products for the petroleum, petrochemical and natural gas industries.

“Without standards, international trade would be significantly slower, as the formulation for each shipment would need to be independently negotiated and blended.”

Quality management and specification standards play an important role in the overall drive towards ever-greater operational efficiency. Keeping only the most efficient rigs and teams running has been critical for oil companies trying to keep pace with declining global prices.

For example, in certain areas of Texas, the amount of crude produced per foot of pipe in the ground rose by between 70 and 120% from 2012 to 2016, as companies focused on technologies and techniques designed to maximize returns<sup>2</sup>.

Although there are now fewer rigs drilling for oil and gas around the world than when oil prices were higher (the number of rigs peaked in late 2014), the remaining rigs are, on average, much more productive. Efficiencies have been found, making it cheaper and easier to extract the most from each existing well than to explore and drill new ones.

Looking ahead, if higher prices return and take hold in the longer-term, then it is likely that new, more productive rigs will be deployed in more difficult environments, and operating efficiencies that have been achieved in recent years will be retained •

Over  
**8,500**  
registered BSOL  
users in North  
America

# Oil and Gas export data

Total US export values for 2014



## 10 vital standards for the oil and gas industries

1	PD 5500:2015	Specification for unfired fusion welded pressure vessels.
2	BS EN ISO 17776:2016	Petroleum and natural gas industries. Offshore production installations. Major accident hazard management during the design of new installations.
3	BS EN ISO 16440:2016	Petroleum and natural gas industries. Pipeline transportation systems. Design, construction and maintenance of steel cased pipelines.
4	BS EN ISO 15156-1:2015	Petroleum and natural gas industries. Materials for use in H2S-containing environments in oil and gas production. General principles for selection of cracking-resistant materials.
5	BS EN ISO 17349:2016	Petroleum and natural gas industries. Offshore platforms handling streams with high content of CO2 at high pressures.

6	BS EN ISO 13702:2015	Petroleum and natural gas industries. Control and mitigation of fires and explosions on offshore production installations. Requirements and guidelines.
7	BS EN ISO 16961:2015	Petroleum, petrochemical and natural gas industries. Internal coating and lining of steel storage tanks.
8	BS EN ISO 24817:2015	Petroleum, petrochemical and natural gas industries. Composite repairs for pipework. Qualification and design, installation, testing and inspection.
9	BS EN ISO 13623:2009	Petroleum and natural gas industries. Pipeline transportation systems.
10	BS EN ISO 21809 (series)	Petroleum and natural gas industries. External coatings for buried or submerged pipelines used in pipeline transportation systems.

# Why choose BSOL?

- ✓ A faster, easier way to work with standards.
- ✓ Available 24/7 and revised every single day, BSOL keeps customers/subscribers completely up to date.
- ✓ Using an out of date document could mean product recall or a project failure. BSOL brings peace of mind, because it guarantees everyone has access to the right documents, wherever they are in the world.

BSOL is a comprehensive online standards library giving access to over 95,000 internationally recognized standards including ISO, EN, BS, CEN, CENELEC, ASTM and IEC standards in one easily searchable and cost effective solution.

## Download standards anywhere in the world

Registered users can find what they are looking for in seconds – searching by number, keyword or phrase, standards can be viewed through the BSOL online viewer or downloaded as PDF.

## Automatic update alerts

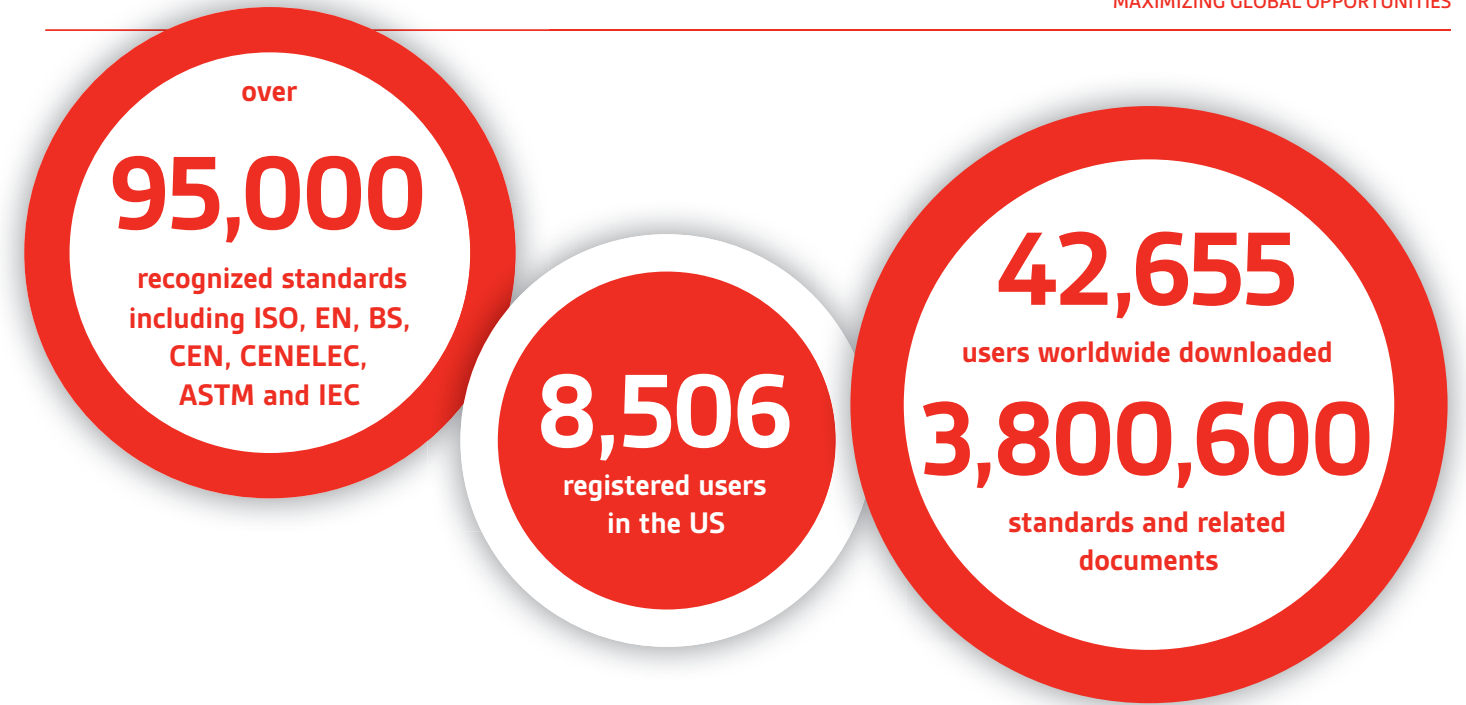
Group email alerts send notifications around key standards to all registered users letting them know what's changed and when.

## Flexible, cost-effective access

Subscribers can choose from 53 subject-related modules or build a custom collection with the standards crucial to their business.

“BSI is a valuable resource with real depth and I regularly dip into it for the latest training, white papers and webinars. BSI provides more than just access to standards – it is a real holistic solution.”

Fortune 500 Company



## Stay ahead with exclusive content

BSOL is the only way to subscribe to PAS documents, BSI books and draft standards, connecting customers to the latest innovations and trends and leaving them best placed to anticipate and influence the future of their industry.

## Unrivalled depth

Businesses with older equipment or buildings can search a complete archive of historical standards – as far back as 1919.

## Dedicated support

The BSOL Knowledge Centre provides free access to experts via the phone, or email.

## Reduced costs

Tracking and maintaining a library of documents costs precious time. A BSOL subscription means customers will never purchase another duplicate document.

## Reduced risk

Having guaranteed access to the latest standards helps reduce liability and risk of using out of date documents. It also makes compliance with contracts or audit requirements simple.

## Three ways to work with BSOL

### 1 Subscribe to the full collection

The full collection contains over 95,000 internationally recognized standards including ISO, EN, BS, CEN, CENELEC, ASTM and IEC standards.

### 2 Subscribe to subject based modules

The BSOL database is broken down into 53 standards based modules and 3 book modules. Each module contains all the standards related to a specific subject, and many contain thousands of individual standards.

### 3 Create a custom collection

Choose from the complete BSOL library to build an easily accessible collection of the standards.

# Training and certification

## Why train with BSI?

BSI is one of the world's leading providers of training, information and knowledge on standards.

Expert teams tailor top quality training to organizations of all sizes and for every type of activity - ranging from leading multinationals and innovative start-ups to educational institutions, governments and charities.

BSI tutors work across the world to transfer the knowledge, skills and tools needed to promote excellence and embed change. These trainers will:

- ✓ Determine how standards can help your organization
- ✓ Help teams plan and implement
- ✓ Embed monitoring, auditing and compliance

For more information go to [www.bsigroup.com/en-US/](http://www.bsigroup.com/en-US/)

## Certification

For over a century, BSI has led the way in standards. Certifying with BSI sends a clear message to customers, competitors, suppliers, staff and investors that a business is committed to being the best it can be.

With more than 80,000 certified clients and more full-time assessors than any other certification body worldwide, BSI is one of the largest and most experienced certification providers. Driven to ensure the long-term health of your company, after certification, BSI will provide regular visits to assess and ensure compliance, carefully matching their industry experience to customer need and giving free analysis, benchmarking performance against other organizations in the same sector.

For more information go to: [www.bsigroup.com/en-US/](http://www.bsigroup.com/en-US/)



## Disclaimer

Whilst every effort has been made to ensure the accuracy of the material in this document, BSI and the report's authors will not be liable for any loss or damages incurred through the use of the report. @BSI

The British Standards Institution (BSI, a company incorporated by Royal Charter), performs the National Standards Body activity (NSB) in the UK.

BSI, together with other BSI Group Companies, also offers a broad portfolio of business solutions other than the NSB activity that help businesses worldwide to improve results through Standards-based best practice (such as certification, self-assessment tools, software, product testing, information products and training).

## References

All data in this report has been taken from OEC (Observatory of Economic Complexity) visualization engine for international trade data [atlas.media.mit.edu](http://atlas.media.mit.edu), or the Cebr (Centre for Economics and Business Research) Centre Ltd report: [The Economic Contribution of Standards to the UK Economy, June 2015](#), unless noted below (figures quoted from data in February 2017):

### Manufacturing: Sector trends

1 Nutting, R. (2016). Think nothing is made in America? Output has doubled in three decades. MarketWatch.

Available at: [www.marketwatch.com/story/us-manufacturing-dead-output-has-doubled-in-three-decades-2016-03-28](http://www.marketwatch.com/story/us-manufacturing-dead-output-has-doubled-in-three-decades-2016-03-28)

2 Deloitte. (2016). 2016 Global Manufacturing Competitive Index. deloitte.com.

Available at: [www2.deloitte.com/global/en/pages/manufacturing/articles/global-manufacturing-competitiveness-index.html](http://www2.deloitte.com/global/en/pages/manufacturing/articles/global-manufacturing-competitiveness-index.html)

3 PwC. (2016). Manufacturing Barometer, Business Outlook Report, July 2016. pwc.com.

Available at: [www.pwc.com/us/en/industrial-manufacturing/assets/pwc-manufacturing-barometer-q2-2016.pdf](http://www.pwc.com/us/en/industrial-manufacturing/assets/pwc-manufacturing-barometer-q2-2016.pdf)

### Aerospace: Sector trends

1 mro-network.com, (2017). Three Trends Taking Off in Civil Aviation MRO in 2017.

Available at: [www.mro-network.com/maintenance-repair-overhaul/three-trends-taking-civil-aviation-mro-2017](http://www.mro-network.com/maintenance-repair-overhaul/three-trends-taking-civil-aviation-mro-2017)

2 mro-network.com, (2016). The Aviation Trends of Tomorrow.

Available at: [www.mro-network.com/maintenance-repair-overhaul/opinion-aviation-trends-tomorrow](http://www.mro-network.com/maintenance-repair-overhaul/opinion-aviation-trends-tomorrow)

### Automotive: Sector trends

1 ec.europa.eu. Reducing CO2 emissions from passenger cars. Available at: [ec.europa.eu/clima/policies/transport/vehicles/cars\\_en](http://ec.europa.eu/clima/policies/transport/vehicles/cars_en)

2 afdc.energy.gov. Electric Vehicle Charging Station Locations. Available at: [www.afdc.energy.gov/fuels/electricity\\_locations.html](http://www.afdc.energy.gov/fuels/electricity_locations.html)

3 eafo.eu, (2017). Electric Vehicle Charging Infrastructure. Available at: [www.eafo.eu/electric-vehicle-charging-infrastructure](http://www.eafo.eu/electric-vehicle-charging-infrastructure)

4 strategyand.pwc.com. 2016 Auto Industry Trends. Available at: [www.strategyand.pwc.com/trends/2016-auto-industry-trends](http://www.strategyand.pwc.com/trends/2016-auto-industry-trends)

### Oil and Gas: Sector trends

1 IEA. (2016). World Energy Outlook 2016 Executive Summary. Paris: IEA Publications, p.6.

Available at: [www.iea.org/publications/freepublications/publication/WorldEnergyOutlook2016ExecutiveSummaryEnglish.pdf](http://www.iea.org/publications/freepublications/publication/WorldEnergyOutlook2016ExecutiveSummaryEnglish.pdf)

2 Meyer, G. (2017). US Shale Oil Output Remains Resilient Despite Rig Count Fall. Financial Times.

Available at: [www.ft.com/content/73c5297e-d813-11e6-944b-e7eb37a6aa8e](http://www.ft.com/content/73c5297e-d813-11e6-944b-e7eb37a6aa8e)



If you would like to find out more about  
creating your own digital standards collection  
via BSOL please get in touch:

**BSI Group**  
12950 Worldgate Drive  
Suite 800 Herndon  
VA 20170  
Tel 1 703 437 9001  
[www.bsigroup.com/en-US](http://www.bsigroup.com/en-US)  
© BSI 2017

 @BSI\_America  BSI BSOL

**bsi.**

...making excellence a habit.™