ANNUAL REPORT 2025

NSAI CONSULTATIVE COMMITTEE NSAI/TC 49 – MANUFACTURING & MACHINERY

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1 Chair

In 2020 NSAI offered the position of Chairman to Dr Matt Cotterell, who accepted the role and Chaired the first meeting of NSAI/TC 49/SC 03 on the 17th November, 2021.

Dr Matt Cotterell is Head of the Munster Technological University (MTU) School of Mechanical, Process & Electrical Engineering. Dr Cotterell is involved in the development and management of programmes and research within the constituent Departments in the School: Mechanical, Biomedical & Manufacturing Engineering; Process, Energy & Transport Engineering; Electrical & Electronic Engineering and the Centre of Craft Studies.

2 Introduction

Standards contribute greatly to urgently addressing global safety

The Manufacturing and Machinery Standards Consultative Committee has been established by the board of NSAI to facilitate and manage this sector of Industry. This Consultative Committee can propose the establishment of a Technical Committee or Sub-Committee where it deems it necessary to track the standardisation activities in a specific area. It will provide a strategic direction on new opportunities and challenges arising from Industry 4.0 for standardisation, including priority areas for NSAI national mirror committees to focus on for maximum national impact. In 2019, Future Jobs Ireland acknowledged these challenges and opportunities, by publishing Ireland's Industry 4.0 Strategy 2020-2025, the Government's economic pathway to ensure that Ireland is well placed to prosper in a rapidly changing global economy. This Consultative Committee will advise and provide guidance on the key strategics actions assigned to NSAI in this National Strategy.

Industry 5.0 will be critical to developing Ireland's manufacturing sector while helping to maintain it competitiveness. Standards are a key enabler for the digitisation of the manufacturing industry. Ensuring that Ireland is at the forefront of emerging technologies, they will help provide indigenous companies and academia with a voice on the European and International Standardisation Platforms. As manufacturing processes are now being digitised there is a significant opportunity for Ireland and NSAI to help shape the future of the sector which is heavily dependent on standards.

According to the Central Statistics Office (CSO), manufacturing production in Ireland fell by 5.7% in the three months from June to August 2025 compared with the previous quarter, but was 14.4% higher year-on-year. Monthly production rose 9.6% between July and August. Turnover declined 27.6% quarter-on-quarter and was down 0.2% compared with the same period in 2024. The highly globalised Modern sector—including chemicals, pharmaceuticals, and electronics—recorded an annual production increase of 18.4%, while the Traditional sector saw a 2.2% decline. These figures reflect significant volatility linked to contract manufacturing and outsourcing, underscoring the CSO's recommendation to focus on longer-term trends.[1].

[1] Central Statistics Office, "Industrial Production and Turnover August 2025," CSO, 2025. [Online]. Available: https://www.cso.ie/en/releasesandpublications/ep/p-ipt/industrialproductionandturnoveraugust2025/. [Accessed: 09th -Jan-2025]

3 Scope of SCC

This Manufacturing & Machinery Standards Consultative Committee will focus on supporting Irish business through optimising a standards vision to provide the Irish manufacturing community with relevant standards related information and information on current and future standardisation activities.

The Manufacturing & Machinery Standards Consultative Committee is dedicated in providing NSAI with expert advice on general strategy, Industry trends relating to Manufacturing and Industry 5.0 and how standards can support the Irish manufacturing industry. This will create a strategic framework for prioritising standards development work and resource deployment.

The Manufacturing & Machinery Standards Consultative Committee will not produce indigenous Irish Standards. This Consultative Committee will give guidance on the development of a coherent NSAI standards development strategy in Advanced Manufacturing and Industry 5.0 by advising on alignment and linkages with other relevant national policy initiatives and academic and enterprise developments.

The Consultative Committee is tasked with the following:

The Consultative Committee will monitor and provide overview of International and European standardisation in 'Advanced Manufacturing', including Smart / Digital Manufacturing (aka 'Industry 5.0'), IIoT, Robotics, Additive Manufacturing and enabling technologies such as Cloud Computing and Distributed Platforms and Artificial Intelligence;

- ✓ Consider European and international advanced manufacturing technology standardisation programmes and national participation in such programmes;
- ✓ Advice and support NSAI on matters, relevant to Manufacturing and Industry 5.0 standardisation;
- ✓ Aid NSAI on its dissemination of information of significant value to the Irish manufacturing industry and relevant stakeholders;
- ✓ Assist NSAI in matters of strategic importance by providing guidance of tactical relevance on operational matters, European Regulations and National Positioning ballots;
- ✓ Contribute to the development of national policies and strategies, by providing recommendations linked to current standardisation activities, during the public consultation phase.

The Consultative Committee will monitor the activities of NSAI Standards Committees within the Manufacturing Sector. Recommendations can be made to NSAI highlighting specific areas of standardisation that may be strategical beneficial for the Irish Manufacturing Sector.

The Consultative Committee will advise NSAI in implementing the strategic actions from applicable Irish Government Strategies and Ireland's Industry 4.0 Strategy 2020-2025, see Annex A.

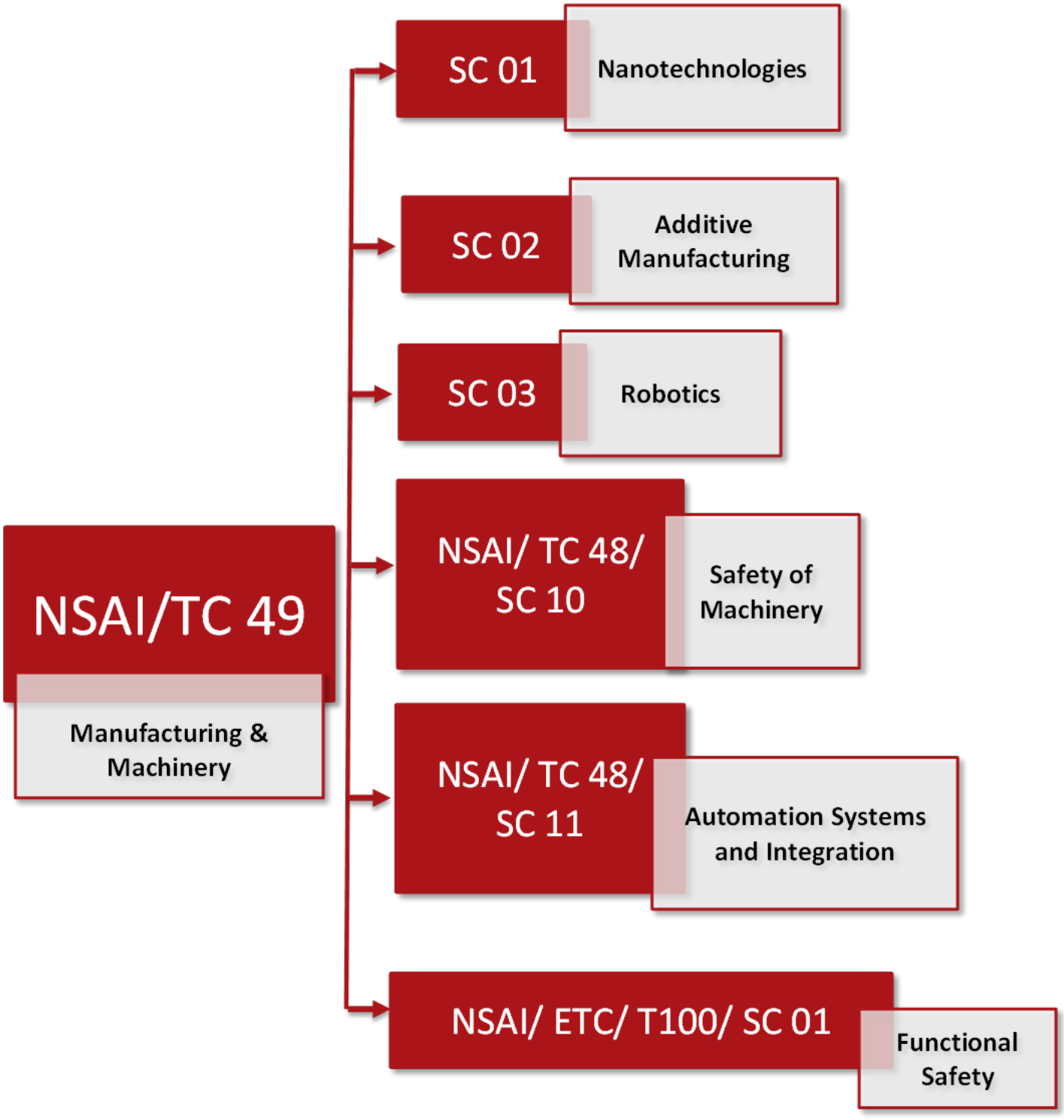
The Consultative Committee will produce an annual report. The annual report will report on the activities of the NSAI Standards Committees within the Manufacturing Sector.

The Consultative Committee will play an advisory role to NSAI providing standards related information that will increase Irish manufacturing companies and SME readiness for future production, while seeking to take full advantage of the evolving transformation opportunities for Industry5.0 and adopting new manufacturing advancements.

4 Structure and Membership

4.1 Structure

The Figure below Illustrates the structure of the National Committee:



4.2 Members

The list below are the members for the year 2025:

Organisation	Role
NSAI	Secretary
MTU	Chairman
Advanced Manufacturing Training Centre	
Analog Devices	Committee member
Digital Manufacturing Ireland	Committee member
Dromone Engineering Limited	Committee member
Enterprise Ireland	Committee member
IBEC	Committee member
IDA	Committee member
IMR	Committee member
Johnson & Johnson	Committee member
University of Galway	Committee member
PEM Technology Gateway	Committee member
Pilz	Committee member
Smarter factory Tech Gateway	Committee member
West Pharma	Committee member

5 Summary of 2025 Activities

5.1 National

5.1.1 Meetings

The meetings were conducted via web-conferencing to reduce the burden and environmental impact of travel for members. Committee members attended the following national meetings:

Meeting No.	Date	Minutes Reference ** optional**
1	16th January 2025	N 318
2	13th November 2025	N 411

The Secretary developed a repository of informative technology reports, research projects, emerging EU Legislation, draft standardisation requests, policy documents, presentations, and trend reports. With the intention of boosting the knowledge valorisation of the committee, thus enabling the Irish Manufacturing base to create a compelling and distinctive reputation. This knowledge valorisation process organically grew the membership of the committee and strengthened its reputation, through providing key stakeholders with the information they need when they need it.

Throughout 2025, the Chair and Secretary held meetings to identify key stakeholders and support significant Industry 4.0 events. Committee members actively participated in events associated with the Irish Manufacturing Council, I-Form Research Centre, IBEC's Engineering Industries Ireland, and various universities to promote standards and standardisation.

Lectures were provided to undergraduates on current standardisation activities, emerging legislation and how to engage in the standardisation process. All of which is of tactical importance to supporting the manufacturing Industry by preparing students for critical roles.

These presentations also promoted European priorities such as the code of practice on standardization for researchers, that has the potential to generate scalable value from standardisation for Irish manufacturers through involvement in innovative projects with researchers.

In 2025, NSAI presented at the National Manufacturing & Supply Chain Conference & Exhibition 2025. NSAI's Standards Officer, Barry Cox, delivered presentations alongside Mr Declan Staunton (Chair of NSAI/TC 49/SC 03 – Robots, Cobots & Robotics). The presentations provided strategic examples of how standards and standardisation contribute to great change in the world, through their achievements in cutting-edge research in Ireland.

The Consultative Committee wishes to acknowledge the invaluable contributions of the committee members above in disseminating critical information to the Irish manufacturing industry and relevant stakeholders. Their efforts significantly enhance the understanding and implementation of knowledge valorisation through standardization. This work not only drives innovation but also ensures that best practices are widely adopted, benefiting the entire sector.

5.1.2 National Work

The Standards Committee will not draft any National Standards. The Manufacturing & Machinery Standards Consultative Committee is dedicated to providing NSAI with expert advice on general strategy, industry trends relating to Manufacturing and Industry 5.0 and how standards can support the Irish manufacturing industry. This will create a strategic framework for prioritising standards development work and resource deployment.

5.2 International/Regional

5.2.1 Meetings

The Standards Committee is not a National Mirror Committee for any ISO, CEN or IEC Committee. This Committee is a Standards Consultative Committee and is dedicated in providing NSAI with expert advice on general strategy, Industry trends relating to Manufacturing and Industry 5.0 and how standards can support the Irish manufacturing industry.

5.2.2 International/Regional Work

The Secretary produced a Sectoral Study of Standards in Manufacturing to assist the Consultative Committee that provides an overview of the Industry 5.0 from a standards perspective, following the structure of fifteen areas of focus.

It starts with a summary on what the "fourth industrial revolution" is, followed by an overview of the manufacturing sector in Ireland in 2019 and information on Ireland's digital transformation. It highlights European Policies and National Strategies and their potential impact on the industry as well as enabling changes to the current landscape.

The report highlights the importance of standards by emphasizing the links and benefits achievable through standards and innovation, that can positively affect standardisation. It also mentions some of the current funding mechanism that are available to support this action. The German Standardisation Roadmap is referred to for its overview of standards and specifications

relevant to Industry 4.0 with some strategic recommendations to address gaps and normative inconsistencies.

The current standards and standardisation process is then comprehensively examined and eleven enabling technologies are listed. The current and future applications of these technologies are investigated and linked to standards committees. The key relationships between emerging technologies and standardisation are addressed and links are provided to published standards and current standardisation activities.

Finally, this document maps the standardisation activities of the European standards setting organisations, the International Organization for Standardization, and the International Electrotechnical Commission with respect to NSAI's National Mirror Committees.

This document is publicly available from NSAI's website at the following link Sectoral Study of Standards in Manufacturing.

5.2.3 International/Regional Standards Reviewed

The Standards Committee is not a National Mirror Committee for any ISO, CEN or IEC Committee. This Committee is a Standards Consultative Committee and is dedicated in providing NSAI with expert advice on general strategy, Industry trends relating to Manufacturing and Industry 5.0 and how standards can support the Irish manufacturing industry.

5.2.4 International/Regional Voting Results

The Committee is an advisory Committee and does not vote on international standards.

However, it does advise NSAI with regards CEN Technical Board Ballots and requests from NSAI's parent department The Department of Enterprise Trade and Employment with regards Standardization requests in this Sector.

5.3 Regulatory Development/Update

On 21st April 2021, the European Commission presented its proposal for a new Regulation on machinery products. The main legal changes are the transformation of the legislation into a Regulation, with alignment to the New Legislative Framework. The regulation will facilitate the homogenous application throughout the EU, and an alignment with the horizontal rules on the responsibilities of economic operators, market surveillance, accreditation, as well as the role of notified bodies and conformity assessment procedure.

On 29th June 2023 the Machinery Regulation (Regulation (EU) 2023/1230) was published.

This text replaces Machinery Directive 2006/42/EC. The Machinery Regulation intends to better cover new technologies such as autonomous mobile machinery (robots), internet of things with connected equipment, or artificial intelligence (AI), where specific modules of AI using learning techniques ensure safety functions.

The new text will enter into force 42 months after its publication, which means 20 January 2027. Exceptions pertain some rules applying to Member States, such as the notification of conformity assessment bodies, definitions of penalties from each EU, etc. There are no transitional provisions between the Machinery Directive and the Machinery Regulation. This means that manufacturers will have to comply with the Machinery Directive until 19 January 2027 and with the new Machinery Regulation as of the following day.

Main changes:

The Machinery Regulation introduces relevant changes, among which:

• Legal status: as a Regulation, the Machinery Regulation provides more harmonisation as well as direct application throughout the EU. Manufacturers will not need to wait for each country's transposition in national law, which may introduce stronger national requirements.

• New Legislative Framework: the Machinery Regulation follows the principles of the New Legislative Framework, which sets out the main rules for the accreditation of conformity assessment bodies and for the market surveillance framework.

• Paperless: manufacturers can provide product instructions in digital format. If the machine is intended for non-professional users, a paper document containing the main safety information needs to be provided

- Paperless: manufacturers can provide product instructions in digital format. If the machine is intended for non-professional users, a paper document containing the main safety information needs to be provided.
- Common specifications: the Machinery Regulation gives rules for the development of common specifications, in case there are issues to develop a harmonised standard for a specific machine.
- Substantial modification: the notion of 'substantial modification' is introduced, targeting evolutions/modifications brought out by the final user, and which generate a change of the significant hazards associated with the modified machine.
- Conformity Assessment: the general principle for the conformity assessment of the machinery is self-compliance. Machinery indicated in a list included in the Regulation must undergo validation through notified bodies (external accredited centres). Under the Machinery Directive there was the possibility to apply for self-compliance when an existing harmonised standard covers all its relevant hazards; under the Machinery Regulation this possibility was revoked for some specific machinery or components. In particular, power take-off (PTO) drive shafts and their guards or simply guards to PTOs, when they are placed alone on the market, will need to be validated by a notified body.
- Machine learning: systems containing 'fully or partially self-evolving behaviour containing machine learning approaches' are now in the list of machinery requiring the validation by a notified body. The upcoming AI Regulation, when published, will consider these systems as high-risk Artificial Intelligence and impose additional requirements.
- Partly completed machinery will need to comply with the requirements of the Machinery Regulation before they are incorporated in the whole machinery.

Technical Requirements:

The technical requirements are gathered in a specific annex to the Machinery Regulation. Compared to the Machinery Directive, the numbering remains unchanged. Here below is an overview of the main changes.

Protection against corruption/Safety and reliability of control systems: The Machinery Regulation extends the protection against external influences, when they would result in a dangerous behaviour of the machine. This impacts both the protection of the machinery and the behaviour of control systems (cybersecurity). The manufacturer is required to identify key data or key software, the versions of the software installed, the proof of interventions. The upcoming publication of the Cyber-Resilience Act should cover this in detail. On remote controls, a communication or a connection failure must not lead to a dangerous situation either.

Manufacturers of **mobile machinery** will need to:

- Provide a filtered cab for machines with ride-on driver, when the main use of the machine is the application of hazardous substances. This is typically the case for self-propelled sprayers.
- Provide an audible and visual warning when the seat belt is not fastened on machines presenting a risk of overturning. Additionally, where there is a significant risk of roll or tip over and its restraint system is not used it shall not be possible for the machinery to move.
- Take into account the possibility of contact with overhead power lines. Manufacturers will need to do this firstly with measures to avoid the contact or the creation of an electric arc, and secondly through solutions to prevent electrical hazards in case the contact occurs.

For **autonomous mobile machinery**, a set of new requirements was introduced:

- The possibility to have a supervisor and a related supervisory function. This role intends to monitor the actions of the robot when it is in autonomous mode. The robot must send information and alerts to the supervisor who has the possibility to stop, re-start the machine in autonomous mode, or to bring it to a safe position.
- The robot must travel safely in a defined working area (also for the automatic charging of the batteries), using either a physical borders or obstacle detection.

Finally, for **machines fitted with fully or partially self-evolving logic or behaviour**, the risk assessment will need to take into account the behaviour of the machine after it is placed on the market. This measure targets in particular the movement space and the tasks it will perform. The manufacturer will need to ensure good connection between the operator and the machinery, when it comes to communication and to forces used to carry out a task. Finally, the data related to a software of a safety function taking decision will have to be stored each time a decision is taken.

Next steps:

Now that the text of the Machinery Regulation has been published there are two important steps that will follow:

- Development of the Application Guide of the Machinery Regulation, in order to avoid diverging interpretations of the text
- Update of the harmonised standards. Each standard will need at least the addition of an annex making the link between the requirements of the Regulation and the requirements of the standards. The European Commission is working with standardisation instances on a Standardisation Request to officially allow this work.

The full text of the Machinery Regulation can be read in all the official languages of the EU at this link:

EUR-Lex - 32023R1230 - EN - EUR-Lex (europa.eu)

Products designed and manufactured in accordance with the Machinery Directive 2006/42/EC can circulate freely throughout the internal market and Member States may not introduce

additional and/or diverging requirements regarding the manufacturing and placement on the market of such products[2].

Moreover, the Cyber Resilience Act is a first ever EU-wide legislation of its kind: it introduces common cybersecurity rules for manufacturers and developers of products with digital elements, covering both hardware and software. It will ensure that wired and wireless products that are connected to the internet and software placed on the EU market are more secure and that manufacturers remain responsible for cybersecurity throughout a product's life cycle. It will also allow the customers of these products to be properly informed about the cybersecurity of the products they buy and use.

Harmonised Standards

Currently, over 800 harmonised standards are listed in the Official Journal of the European Union under the Machinery Directive. CEN/CENELEC Technical Committees are reviewing these standards to identify those that do not meet the new requirements of the Machinery Regulation. Any “gaps” identified by the committees could then be noted as restrictions in the Official Journal before January 20, 2027.

Additionally, on July 4, 2024, the European Commission published a draft standardisation request to the European Committee for Standardization (CEN) and the European Committee for Electrotechnical Standardization (CENELEC) regarding machinery and related products. This request supports Regulation (EU) 2023/1230 of the European Parliament and of the Council, aiming to draft new harmonised standards and European standardisation deliverables. Furthermore, it specifies requirements for revising existing harmonised standards and European standardisation deliverables. The Draft Standardisation request can be view at the following LINK.

As of April 2025, the CEN/CENELEC Machinery Coordination Group reported significant progress and challenges related to the implementation of the new Machinery Regulation and harmonised standards. Key updates include:

- **926 harmonised standards cited** under the Machinery Directive.
- **299 active revision projects** addressing both the existing directive and the new regulation framework.
- **91 projects** specifically focused on updates required by the new Machinery Regulation.
- A draft of a new type-B standard for EHSR 1.1.9 (“protection against corruption”) progressing through the enquiry stage.

Additionally, under Regulation 1025/2012, Article 10(5), harmonised standards must undergo a HAS (Harmonised Standards) review before publication in the Official Journal. Between March 2024 and March 2025, 243 HAS requests were processed, with the following outcomes:

1. 31 compliant
2. 14 conditional
3. 198 non-compliant, resulting in delays to standardisation updates

[2] European Commission, "Conformity assessment procedures for 3D printing and 3D printed products to be used in a medical context for COVID-19?", 2020. [Online]. Available on: https:// https://health.ec.europa.eu/system/files/2020-09/md_mdcg_qa_3d_ppp_covid-19_en_0.pdf [Accessed on: 05th January,2023]

6 Irish Publications/Reviews

6.1 Publications

National Standards will not be produced by this Committee as the International Standards will be published as European Standards adopted as Irish Standards.

6.2 Reviews

The Committee will review the standardization activities of each of the Technical Committees as outlined in the reporting structure of the Committee in 4.1.

7 Work programme for 2026 onwards

The Consultative Committee will understand the overview of International and European standardization in 'Advanced Manufacturing', including Smart / Digital Manufacturing (aka 'Industry 5.0'), Safety of Machinery, Robotics, and Additive Manufacturing.

Strategic Actions for the Committee in 2026

1. **Expand Strategic Partnerships:** Foster growth of the Committee by engaging key stakeholders from industry, academia, and government to enhance collaborative efforts and drive innovation.
2. **Enhance Information Dissemination:** Support NSAI in effectively disseminating information on standardization requests, national policies, European regulations, and impactful standards open for public comment to ensure broad awareness and engagement.
3. **Develop Strategic Content:** Provide NSAI with high-quality content for the Communication team, including articles for the NSAI webpage, to keep the industry informed about regulatory developments and standards, and to highlight current research leveraging standards.
4. **Influence Standardisation Requests:** Actively contribute to standardisation requests, particularly concerning the Machinery Regulation, to ensure that industry needs and advancements are well-represented.
5. **Showcase Cutting-Edge Research:** Create platforms to highlight Ireland's leading research that builds upon and utilizes standards, maximizing its impact and visibility.
6. **Promote Strategic Significance:** Co-present at key industry events, such as the Manufacturing and Supply Chain Conference, to emphasise the strategic importance of the Committee's work and the role of standards in advancing the manufacturing sector.

8 Additional Information

As manufacturing processes are now being digitised there is a significant opportunity for Ireland and NSAI to help shape the future of the sector which is heavily dependent on standards. NSAI's Board has approved the establishment of a Sectoral Consultative Committee which is tasked with serving the needs of the Manufacturing Sector through the use of standards for the firm adoption of Industry 5.0 Technologies.