International Organization for Standardization
Organisation internationale de normalisation
Международная организация по стандартизации

STRATEGIC BUSINESS PLAN – ISO/TC 341

Executive summary

The heating and cooling pipeline network is an integral part of the energy system, which realizes the transmission of heat and cold from heat and cold sources to consumers.

Note: In the following, the terms “heat supply” and “heat supply network” are synonymous with “heat and/or cold supply” and “heat and/or cold supply network”.

The scale of heating pipeline networks is substantial and is expanding with the improvement of living standards and the promotion of district heating utilities. In China, by 2020 the total length of heating pipelines in cities and counties reached 507,300 km, which is twice as much as in 2015. In Europe, the length of operating heating pipelines grew from 163,000 km in 2010 to 200,000 km in 2019[1].

ISO/TC 341 addresses standardization in the field of heat supply networks including design, construction, integration, control and regulation based on heating and cooling supply pipeline systems. The ISO/TC 341 work program includes terminology, general requirements of design, construction and operational management, product standards and methods of testing, and control and monitoring systems. The series of international standards and other deliverables prepared by ISO/TC 341 will foster the development, implementation, appraisal and continuous improvement of heat supply networks.

The main target of ISO/TC 341 is to support the development of heat supply networks that are low carbon, energy saving, safe and smart (LESS). With the development of renewable energy and waste heat utilization, complementary multi-energy heat sources will be available, leading to a complex pipeline network, and bringing challenges to operation and adjustment. In this context, the output of ISO/TC 341 will be beneficial to the performance of heating pipeline networks and enable their safe, efficient, and stable operation. Also, ISO/TC 341 will strive to improve the internationalization, versatility, and advancement of heating pipeline networks. From a broader perspective, the work of ISO/TC 341 will promote the decarbonization of district heating sources, reduce the use of fossil energy, and have a role in combating climate change. To achieve the above goals, the priorities of ISO/TC 341 include but are not limited to terminology, design, construction and operational management, procurement, quality control, product standards that will enable the safe and energy-efficient operation of a pipeline network.

[1] IEA (2020), *World Energy Investment 2020*, https://www.iea.org/data-and-statistics/charts/total-operating-district-heat-pipelines-in-europe-2005-2019

1 Introduction

1.1 ISO technical committees and business planning

The extension of formal business planning to ISO Technical Committees (ISO/TCs) is an important measure which forms part of a major review of business. The aim is to align the ISO work programmes with expressed business, social and technical environment needs and trends and to allow ISO/TCs to prioritize among different projects, to identify the benefits expected from the availability of International Standards, and to ensure adequate resources for projects throughout their development.

1.2 International standardization and the role of ISO

The foremost aim of international standardization is to facilitate the exchange of goods and services through the elimination of technical barriers to trade.

Three bodies are responsible for the planning, development and adoption of International Standards: ISO (International Organization for Standardization) is responsible for all sectors excluding Electrotechnical, which is the responsibility of IEC (International Electrotechnical Committee), and most of the Telecommunications Technologies, which are largely the responsibility of ITU (International Telecommunication Union).

ISO is a legal association, the members of which are the National Standards Bodies (NSBs) of some 164 countries (organizations representing social and economic interests at the international level), supported by a Central Secretariat based in Geneva, Switzerland.

The principal deliverable of ISO is the International Standard.

An International Standard embodies the essential principles of global openness and transparency, consensus, and technical coherence. These are safeguarded through its development in an ISO Technical Committee (ISO/TC), representative of all interested parties, supported by a public comment phase (the ISO Technical Enquiry). ISO and its Technical Committees are also able to offer the ISO Technical Specification (ISO/TS), the ISO Public Available Specification (ISO/PAS) and the ISO Technical Report (ISO/TR) as solutions to market needs. These ISO products represent lower levels of consensus and have therefore not the same status as an International Standard.

ISO also offers the International Workshop Agreement (IWA) as a deliverable which aims to bridge the gap between the activities of consortia and the formal process of standardization represented by ISO and its national members. An important distinction is that the IWA is developed by ISO workshops and fora, comprising only participants with direct interest, and so it is not accorded the status of an International Standard.

2 Business Environment of the ISO/TC 341

2.1 Description of the Business Environment

Note: In the following, the terms “heat supply” and “heat supply network” are synonymous with “heat and/or cold supply” and “heat and/or cold supply network”.

The following political, economic, technical, regulatory, legal, and social dynamics describe the business environment of the industry sector, products, materials, disciplines, or practices related to the scope of this ISO/TC, and they may significantly influence how the relevant standards development processes are conducted and the content of the resulting standards:

1. Progress of the heating pipe network

Globally, the district heating field has a broad development prospect and demand. A heating supply network covers four aspects:

I. the pipeline networks, connecting the connections between front-end energy, intermediate heat conversion and downstream consumer side;
II. the front-end energy, such as fossil energy (coal, natural gas, oil, etc.), renewable energy (geothermal, solar, wind, waste incineration, thermal reuse of sewage, etc.), new energy;
III. the intermediate area of heat conversion, such as heat production, cogeneration, various boiler house heat exchange stations, etc.,
IV. the downstream consumer side, such as residential buildings, industrial buildings, commercial buildings, and various industrial processes where use of heat is necessary, etc.

The latest progress in the above-mentioned fields is mainly reflected in:

a. Developing of medium and lower temperature networks, using new developed materials for pipes and/or thermal insulation and facilitating incorporation of low temperature renewable energy sources;
b. developing renewable energy and new energy sources, and reducing the consumption of fossil energy on the supply side;
c. developing various heat production and exchange processes in the intermediate stages to achieve efficient utilization, energy-saving, and emissions reduction;
d. promoting energy conservation on the user side is one of the obligations to improve the overall thermal efficiency. Though it is not part of the scope of this TC, this is important.

Awareness of the need to reduce energy use and curtail emissions on the user side is strengthening, and the district heating field is viewed as a low-carbon, economical, environmentally friendly, and safe energy source.

Increasingly, new heating technologies, materials, equipment, and processes are being promoted and applied. Heat sources have developed from a single coal-fired boiler room to a variety of heat sources such as combined heat and power generation, gas boiler rooms, and cold-hot-electric triple supply. Development and utilization of industrial waste heat, green power, geothermal heat, solar heat and biomass, heat pumps, waste incineration, and other heat sources have been implemented. This has promoted the adjustment of the heating energy infrastructure, resulting in significant environmental and economic benefits. The application of centralized energy storage and cross-season energy storage technology has been widely welcomed. New technologies for district heating systems such as long-distance transmission,

reducing flow and return water temperature and digitization will play an important role in integrating renewable energy sources and realizing zero-carbon heating in the future. They will also enable increased requirements for the efficiency and safety of heat supply networks. In a heating supply network pipelines can be installed by way of direct buried laying, laying in duct and tunnels, and above ground laying. Some ddirect buried pipelines in operation today are known to have reached diameters of up to DN1600. The improvement of thermal metering equipment also boosts the pipe network control and regulation level correspondingly. These developments continue to drive the formation of an increasingly comprehensive, coordinated, and intelligent heating supply network.

The future application of heating supply networks will also generate deep crossover with communication, 5G, Internet, computer, and other technologies to further realize the collaborative and accurate adjustment and control of complex heating supply networks. Taking advantage of automation and computer technologies, the overall operating efficiency and the emergency response efficiency of heating supply networks will improve, operating costs will reduce, and the stable and reliable operation of the system guaranteed.

2. Products, materials, and other technological innovations

Technological changes in heating products drive the district heating industry to pursue higher convenience, reliability, and lower investment. The wide range of solutions for heating pipes provides a variety of choices for the design of heating pipe networks, which can adapt to different laying environments and operation requirements. The market situation of heating products such as valves is much bigger as some products are commonly used globally.

District heating has become a major strategic issue to regulate urban energy infrastructure, resource utilization, construction, and security, and realize sustainable economic development. With the rapid development of information and communication technology today, diversified communication networks and protocols, Internet of Things, big data, digital twin, and other emerging technologies continue to impact and integrate into the district heating sector. These technologies not only improve the functionality of instruments but also give "smart" capabilities to heat monitoring systems. New products and materials such as intelligent secondary network adjustment valves, pipe network safety monitoring systems, heat transfer stations, and resistance reduction technology help the heating supply network achieve safety, energy savings, and ''smart'' capabilities.

The heating supply network technology field involves steel, plastic, and related medium pipe materials. With the development of technology, the demand for digitalization, information technology and management of heating pipe network systems is increasing, therefore this TC also covers related electronic products such as products used in monitoring systems. The materials and products mentioned above may have their own standard systems in other fields, but there is currently a lack of applicable standards in the field of heating supply network systems. Development of technical and management system standards under this TC will break the barriers to international communication and development in this industry and enhance the applicability of common development.

3. Stakeholders

Commoditization, socialization, and marketization are the main future trends of this industry. Therefore, this TC will involve a wide range of stakeholders including, Government, social groups, investors and financial institutions, research & development institutions, product suppliers, heating operation companies, and consumers.

The work of this TC is closely related to some of the priorities that governments consider when formulating energy policy and strategic direction. As an important part of the overall energy infrastructure, district heating requires a large amount of capital for construction. Thus, it is closely related to local economic behaviour such as finance and financial investment. R&D institutions and product suppliers are committed to the research and manufacturing of new technologies and products, which play an important role in promoting the development of heat supply networks. The supply company must apply advanced technology and products to the operation of the heat supply system in accordance with the relevant policies of the government and standards.

With the development of world politics and the global economy, low-carbon and energy saving has become a global focus. The fields covered by this TC are currently receiving attention from all levels of society in many countries, including governments, R&D institutions, financial markets, manufacturers, end users, and media. The work of this TC will help to combine new technologies with energy and environmental protection needs to achieve the optimization of capacity structure, resource allocation and heat use experience, thus supporting the improvement of social benefits in the global district heating field.

The membership of ISO/TC 341 is open to all ISO members, representing different stakeholders in countries.

4. International or regional initiatives

Climate change issues are becoming increasingly serious. Supported by the UNFCCC, international conventions, and documents including the Kyoto Protocol, Bali Roadmap, Copenhagen Accord and Paris Agreement, the global response to climate change has been accelerated. With the improving consciousness of energy-saving and environmental protection, carbon peaking and carbon neutrality are drawing worldwide attention. District heating is one of the key sectors of energy consumption and carbon emissions. In order to achieve carbon emissions reduction, clean energy and waste heat supply are increasingly employed. The path to development of a safe, clean, efficient, low-carbon, and smart heating sector is clear. Advances in heating supply network technology are necessary to achieve this path, and therefore will receive macroeconomic policy support.

2.2 Quantitative Indicators of the Business Environment

The following list of quantitative indicators describes the business environment to provide adequate information to support actions of the ISO/TC:

Because heat supply networks are mainly a country-based market, the overall size of the markets is large but difficult to quantify. The market reputation on heating supply systems depends on a balance between the reliability of the installed systems and the total cost performance in the respective field of application. The following economic, technical, regulatory, legal, and social dynamics describe the business environment of the industry sector, products, materials, disciplines, and practices related to the scope of ISO/TC 341. They may significantly influence how the relevant standards development processes are conducted, as well as the content of the resulting standards.

The economic dynamics are:

- The rate of change for opportunities and challenges,
- Prices of heating raw materials.

The technical dynamics are:

- Monitoring/leakage warning technologies of pipe networks, such as, electric, fiber-optic, and thermographic technologies etc.,
- Diversified communication networks and protocols, Internet of things, big data, digital twin, and other emerging technologies,
- Safety assessment of heating networks,
- Emergency fault response mechanism of heating pipe networks,
- Energy saving and economical operation technology of heating networks,
- Pipe network systems suitable for comprehensive application of renewable energy,
- Pipe network systems suitable for integrated application of energy storage systems,
- Long-distance heating pipe network systems using power plant waste heat and industrial waste heat,
- Pipe and thermal insulation materials and other new material applications,
- Thermal station equipment to achieve low temperature heating.

The legal dynamics are:

- Stricter regulations for waste management (e.g. Environmental Protection Act), emissions and other environmental aspects (e.g. Energy conservation law, renewable energy law),
- Regulatory compliance across legislative domains.

The social dynamics are:

- Sustainability of renewable energy, recyclability of power plant waste heat and industrial waste heat, etc.,
- Lack of formal training and education within the sector, and a need for continual learning and upgrading of skills.
- Raising awareness among society, the media, and individuals on the use of low carbon technologies.

3 Benefits expected from the work of the ISO/TC

1) Key priorities and trends involved
ISO/TC 341 is responsible for standardization in the field of HSN including design, construction, integration, operation and maintenance, manufacturing of products, end of life/service life management, control and regulation based on heating and cooling supply pipeline systems.

—"Design" includes pipeline routes and related investigation, specifications for materials and products, analysis methods and principles for hydraulic calculations, heat loss calculations, pipe force calculations, pipe strength calculations etc.. It also relates to the standards for 'basic design requirements of a heat supply network, such as design pressures and design temperatures, for substations, heat exchange stations and transmission pump stations, including design requirements for pipeline auxiliary structures, operation policy, thermal monitoring & control systems, and energy saving requirements etc.

—"Construction" refers to execution activities including installation, inspection, testing, commissioning and conformity assessment of heating pipeline systems etc.

—"Integration" refers to both the combination of pipes and accessories, and the use of pipes to connect heat sources, heat users, and heat stations, thus constituting a heating network system. Aiming for intensive and intelligent heating, "Integration" also refers to safe and efficient utilization of various energy sources such as industrial waste heat and renewable energy.

—"Manufacturing of products" specifies the quality requirements that the materials and semi-finished products used, and the products manufactured must meet in order to fulfill the expected service life under the specified temperature and pressure conditions and external loads.

—"Operation and maintenance" define measures to ensure the integrity of the heat supply networks for the expected service life. In particular, these measures relate to regular checks of the quality of the circuit water, conformance with the design parameters in network operation, general function checks and monitoring of condition, construction and renewal measures on heat supply networks in operation. Operation also includes safeguarding of the proper process conditions and all measures to ensure continuity of supply to the customer in a safe and sustainable manner.

— "End of life/service life management" deals with the longer-term planning and implementation for the extension/changes of heat supply networks, renewals of network sections and system components, safety and efficiency in network operation, automation/digitalization as well as with the handling/disposal of materials that have reached the end of their service life.

—"Control and regulation" jointly describe actions of adjusting the working state of the water pumps, valves, and other equipment in heating supply networks through manual or automatic systems after monitoring and analyzing the ambient conditions and the operation state, in order to realize the hydraulic and thermal balance, diagnose and highlight faults such as leakage, and achieve on-demand heating, safe operation, energy saving, and carbon emissions reduction.
Priorities are an effective and harmonized terminology (to be developed parallel to the technical standards), design, construction and operational management, procurement, quality control, and product standards that will enable the safe and energy-efficient operation of the pipeline network.

2) Cost savings through standard implementation
   Standards developed by this TC will be based on science, technology, and practical experience, to standardize the performance of various products, engineering design, construction, operation and maintenance, and other aspects of the heat supply network. Thus, mitigating the risk of resource waste, construction accidents, operation accidents, and other unstable factors that lead to an increase in costs.
3) Elimination of trade barriers
   Standards developed by this TC will be applied by various countries as a mature technology paradigm for design, construction, operation, and maintenance of heating supply networks. At the same time, technical reports and other forms are adopted to gradually integrate and promote advanced technologies in the existing technical framework and to eliminate technical barriers to regional trade and open markets.
4) Social, safety, and environmental problem solving
   The social, safety, health and environmental aspects of heating supply networks will be considered in the standards development process. The solutions to these problems are put forward quantitatively and qualitatively by means of calculation, technical requirements, and guidance, so that the users can not only get quantitative solutions and engineering practice requirements but also optimize solutions based on local conditions.
5) Promotion of being consistent with national and regional standards
   Standards are developed on the consensus of experts from ISO/TC 341 members. In addition, ISO/TC 341 will actively communicate with relevant organizations in various countries on the application of technology and standards, to ensure that the developed standards are comprehensive, mature, and have an advanced guiding role in this field. Every country can take the ISO standard as a guide to revise its national or regional standards in time, improving the specification requirements of heating supply network engineering. Through liaisons with other organizations and coordination with related ISO standards, ISO/TC 341 will facilitate the application of relevant international standards and the harmonization with national and regional standards.
6) Standard application and promotion
   Standards developed by TC 341 can be cited or expected to be cited as normative references in other international standards. Experts from countries worldwide interested in the work of ISO/TC 341 increase the knowledge and ability to assemble the technical information and requirements in aspects, such as, design, installation, performance, and test methods, assuring the reliability of heat supply networks to their customers. The working program includes terminology, general requirements for construction and operational management, product standards, methods of testing, instruments and apparatus, and monitoring systems to improve the general quality of heating supply networks. The series of international standards and other deliverables developed by ISO/TC 341 will foster the development, implementation, appraisal, and continuous improvement of heating supply networks. In addition, they will help to disseminate heating supply management best practices internationally, promote energy savings and the business, social and environmental benefits of improved heat supply performance, including but not limited to, increasing distribution efficiency and ease of maintenance, improving environmental protection, and reducing waste. Standards for the reliability of the installed systems and work safety improve the responsibility of heat production enterprises and heat transmission enterprises, adding confidence to the end users.
7) Providing clear quality expectations for procurement and quality control
   Having clear quality expectations is paramount to high quality project execution as is procurement. Standards developed by TC 341 can help with this. What do we need, how do we get it.

4 Representation and participation in the ISO/TC

4.1 Membership

Countries/ISO member bodies that are P and O members of ISO/TC 341

4.2 Analysis of the participation

ISO/TC 341 is currently (as of May 26, 2023) comprised of 40 member countries, including 15 P-members and 25 O-members, as indicated in Table 1. The member countries from Europe, Asia, Africa, Americas, and Oceania account for 55%, 22.5%, 17.5%, 2.5% and 2.5%of the total memberships, respectively. However, if ISO/TC 341 is to accomplish its mission, its membership will have to be expanded to become fully representative.
Out of 40 member countries, 20 are developed countries and 20 are developing countries. 73.3% of P-members are developed countries, among which the vast majority are European. They cover the areas where heat supply technologies are most advanced, and the related markets are well developed with high demands geographically.

Table 1 ISO/TC 341 and its member countries

Note: Developed and developing countries are evaluated and classified using the UN's (United Nations) Human Development Index (HDI), and the criterion is 0.8, i.e., countries with HDI above 0.8 are classified as Developed Country and otherwise as Developing Country.

No.	Continent	P-member			O-member		
		Country/	State of Development		Country/	State of Development	
		Region	Developed	Developing	Region	Developed	Developing
1	Asia (23.1%)	China		√	Iran, Islamic Republic of		√
2		Korea, Republic of	√		Iraq		√
3					Israel	√	
4					Japan	√	
5					Jordan		√
6					Thailand		√
7					Uzbekistan		√
8	Europe (53.8%)	Austria	√		Bulgaria	√	
9		Czech Republic	√		France	√	
10		Denmark	√		North Macedonia		√
11		Finland	√		Norway	√	
12		Germany	√		Romania		√
13		Ireland	√		Slovakia	√	
14		Italy	√		Spain	√	
15		Netherlands	√		Türkiye		√
16		Poland		√	Ukraine		√
17		Russian Federation		√	United Kingdom	√	
18		Sweden	√				
19		Switzerland	√				
20	N. America (0%)						
21	S. America				Colombia		√

	(2.6%)						
22	Africa (17.9%)	Nigeria		√	Gabon		√
23					Mauritius		√
24					Rwanda		√
25					South Africa		√
26					Sudan		√
27					Tunisia		√
28	Oceania (2.6%)				Australia	√	

ISO/TC 341 is to have as many liaisons as needed who would actively participate, including international organizations and representatives from other ISO TCs. These liaisons will communicate the views and needs of a broader stakeholder community, from which ISO/TC 341 will receive the benefit of diversified participation.

5 Objectives of the ISO/TC and strategies for their achievement

5.1 Defined objectives of the ISO/TC

ISO/TC 341 addresses standardization in the field of heat supply networks including design, construction, integration, and control and regulation, based on heating and cooling supply pipeline system.
The series of international standards and other deliverables elaborated by ISO/TC 341 will foster the development, implementation, appraisal, and continuous improvement of heat supply networks.
The defined objectives of ISO/TC 341 are as follows：

- Support the realization of heat supply networks with low carbon, energy saving, safe and smart heating supply networks,
- Provide market relevant test methods and product standards for the global heating supply network industry,
- Provide guidelines for optimizing heat supply network design, construction and operational management
- Improve the performance of heating pipeline networks and enable their safe, efficient, and stable operation,
- Integration and innovation of monitoring and management system to smart network.

To achieve the above goals, TC 341 will develop a series of standards in the field of heat supply networks. A work programme that includes standards for terminology, design, construction and operational management, products standards and methods of testing, instrumentation, and monitoring systems is on an actionable schedule. The priorities for developing standard items are identified as follows：

- To develop market relevant product standards, dealing with manufacturing and test method for pipeline components in heat supply networks, based on existing national/regional standards.
- To harmonize terminology
- To develop standards for media quality
- To develop standards for basic design and operation of heat supply network
- To develop standards for detailed design and construction of heat supply network
- Based on the above works, to develop standards with environmental, ecological, and economic efficiency and smart goals of heat supply networks.

ISO/TC 341 will not engage in standardization of heat sources and space heating systems covered by ISO/TC 11 Boilers and pressure vessels (STANDBY), ISO/TC 86 Refrigeration and air-conditioning, ISO/TC 163 Thermal performance and energy use in the built environment, ISO/TC 205 Building environment design, ISO/TC 267 Facility management, ISO/TC 268 Sustainable cities and communities, ISO/TC 301 Energy management and energy savings, and IEC SyC Smart Cities, IEC SyC Smart Energy. Where appropriate, ISO/TC 341 will work in cooperation with existing committees on subjects that support the heat supply network.

5.2 Identified strategies to achieve the ISO/TC’s defined objectives

The efforts of ISO/TC 341 will focus on developing standards required by the heat supply network industry in a timely fashion. As such, and where applicable, existing national and

regional standards or other standards (such as CEN standards via the Vienna Agreement) may be used as a basis for discussion.

ISO/TC 341 is to make use of joint working groups with other ISO TCs where appropriate to further the standardization work and more effectively utilize experts. This also provides the industry with a unified message rather than competing narratives.

ISO/TC 341 is to hold meetings for the TC and its WGs annually at similar dates whenever possible. A WG or a TF may meet on its own if it wishes. Online meetings will also be held as needed to allow as many members as possible to participate in the development of standards.

6 Factors affecting completion and implementation of the ISO/TC work programme

Factors affecting completion and implementation of the ISO/TC 341 work programme may include:

- Development and successful uptake of international standards require TC members commitment and resources to be sustained over medium-to-long periods. However, during these periods, factors outside of members control, such as national or international policies, or business priorities, may change and significantly affect their level of engagement in, and contribution to, the TC work programme.
- New work items may also challenge the member bodies in providing appropriate resources.
- Participants who have the necessary expertise are commonly busy in their normal work, and thus the time available to work on the development of standards may be limited.
- Participants may have difficulty in sustaining the necessary technical expertise and funding.
- As newly established, ISO/TC 341 may also face the problem in seeking consensus over priorities for forming working groups and developing standards.

7 Structure, current projects and publications of the ISO/TC

Information on ISO online

The link below is to the TC's page on ISO's website:
ISO/TC 341 on ISO Online

Click on the tabs and links on this page to find the following information:

- About (Secretariat, Committee Manager, Chair, Date of creation, Scope, etc.)
- Contact details
- Structure (Subcommittees and working groups)
- Liaisons
- Meetings
- Tools
- Work programme (published standards and standards under development)

The structure of ISO/TC 341 will be updated from time to time based on the needs and demands of the technical committee and standards that are being developed.

The proposed structure of ISO/TC 341 is planned to consist of, but not limited to, the following working groups:

WG	Title
WG1	**Terminology and coordination**
	General terms and definitions
WG 2	**Quality of heat transfer medium**
	Water for heat and cold
	Steam
WG 3	**Design, installation, and operation of factory-made rigid pipe systems** up to 140 °C with steel service pipe, PUR foam thermal insulation and PE casing
WG 4	**Factory made straight** (single and twin) **pipe assemblies** up to 140 °C
Sub WG 4a	**PUR foam thermal insulation**
Sub WG 4b	**PE casing**
WG 5	**Factory made fitting and valve assemblies** up to 140 °C with steel service components, PUR foam thermal insulation and PE casing
WG 6	**Joint casing systems** for factory made assemblies
	Qualification testing of fitter and PE-welder
WG 7	**Factory made flexible** (single and twin) **pipe systems** for plastic and metal service pipes, different thermal insulation materials and PE casing
WG 8	On-site thermal insulated pipe systems for above ground water level
	Factory made thermal insulated steel in steel pipe system
WG 9	**Environmental, Ecological and Economic efficiency / performance**
WG 10	**Planning** for water and steam supply networks
WG 11	**Security of operation**
WG 12	**Smart networks** (including surveillance)
	Surveillance systems for factory made, PUR insulated, rigid pipe, fitting and valve assemblies
WG 13	**Accessories**

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The working groups listed above can be prioritized by TC members based on the importance of the topic, maturity, etc. Additional working groups will be created according to the approved projects.

According to ISO/IEC *Directives*, the establishment of a WG depends on whether there are relevant projects approved, so that WGs would not be created if there are no relevant standards to develop. “Once the decision to set up a working group has been taken, P- members and A- and C-liaison shall be officially informed to appoint Expert(s). Working groups shall be numbered in sequence in the order in which they are established.”(1.12.1, ISO/IEC *Directives*) The current working group numbers are for reference only.

The strategic business plan is a dynamic and living document which will be reviewed and updated periodically.

Reference information

Glossary of terms and abbreviations used in ISO/TC Business Plans

General information on the principles of ISO's technical work