



BUSINESS PLAN

ISO/TC 227 Springs

EXECUTIVE SUMMARY

The main activity of ISO/TC 227 is to establish the new International Standards to facilitate the worldwide exchange of products and to disseminate the technology and services of springs through eliminating the technical barriers to trade.

Since 1990s, manufacturing of the products using a spring as an essential element such as industrial machines, rail way cars, automobiles, and electric appliances etc. has been expanded into emerging countries and the manufacturing of springs is consequently being shifted from industrialized countries such as Japan, the USA, and European countries to developing countries. The global standardization of basic technical infrastructures of springs is at most necessary in the field of spring industries.

Springs are widely used in various industries and they are worth approximately 7,900 million dollars in the market scale. ISO/TC 227 deals with metallic springs and is going to standardize the tolerance, terminology and test methods as well as processing technology of springs. ISO/TC 227 shall exclude assembled products, module parts, springs for particular use, and items already covered by existing TC.

The following benefits are expected through ISO/TC 227 activities:

-By standardizing basic technology domain like spring terminology and spring classification;

- Prevention of overkilled quality
- Reduction of defects
- Cost reduction

-By standardizing inspection/test method;

- Avoidance of redundant investment of testing equipment
- Establishment of common ground for quality assurance

-By standardizing process technology which is characteristics of springs (example; shot peening);

- Promotion of advanced technology transfer
- Development of light weight springs
- Improvement of fuel consumption for automobiles and the reduction of CO₂ release

In order to achieve these objects, ISO/TC 227 will play active roles in the areas of tolerances, inspection/test methods as well as processing methods. The committee has promoted standardization of spring terminology, spring classification, spring symbol, tolerance, and processing methods. Currently, we are proceeding on the development of standards for coil spring test methods.

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 program with expressed business 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 such as the National Standards Bodies (NSBs) of 174 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 offers also 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

2.1 Description of the Business Environment

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:

A spring may be defined as a machine element which utilizes accumulated energy produced by the elastic deformation of an object. Its primary function is to deflect or distort under load (or to absorb energy) and recovers its original shape when released after being distorted. Although most material bodies are elastic and will distort under load, the spring defined here are the machine elements that are designed to deflect relatively large amount when loaded. And this is the different point from general structure components, which should not deflect largely.

With these characteristics, springs have broad applicable fields. For example, washers and clips (tightening by elasticity), switches and computer keyboards (recovering to original position), power springs (memory effect of elastic body), vehicle suspension springs (vibration and shock absorption), balance and sensor spring (proportionality of load and displacement) etc.

With these functions, there are the variety of spring applications in various fields. For example, railroad vehicles, automobiles, boats, airplanes, furniture, housing apparatus, electrical appliances as well as medical apparatus.

Springs are usually delivered to the manufacturer of final products to be assembled there. However, springs like paper clips and washers may be brought directly to users. When used in an assembled products, the spring design tends to be completed at the last stage with the variety of shapes and dimensions. That is why springs are different from standardized products like screws.

Technological fields related to springs are material engineering, processing (forming, heat treatment, surface treatment), and inspection/test technology, and so forth. Consequently, the associated areas for spring manufacturers are fairly broad. For example, steel and metal industry, spring machine industry, as well as the manufacturers of transportation vehicles, electrical appliances, testing and inspection equipment, etc.

The necessity of resource saving and energy saving (i.e. improved fuel consumption for automobiles) urges the industrial sector toward the manufacturing of downsized and light weight products, and spring manufacturers have to comply with this requirement by supplying down sized and light weight springs. They imply the necessity of the advanced material engineering, heat treatment technology, the improvement of surface strengthening technology, the optimization of spring shapes, and high precision manufacturing processes.

Under the globalized trade environment, the manufacturing site of springs tends to shift from one country to another. In order to prevent troubles in trading and to promote spring technology transfer, the development of international standards in spring sector is essential.

ISO/TC 227 will standardize the common infrastructural technical elements such as tolerances, terminology, inspection/test methods and processing technology. It excludes assembled products, module parts, and springs manufactured for particular use.

2.2 Quantitative Indicators of the Business Environment

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

Table 1 shows a trend of spring sales and market share ratio together with 2019 presumption. The transition of market is falling compared to a decade ago, though, the market volume will continue to rise as needs in emerging countries expand.

Table 2 shows spring industry in major countries in the year of 2021.

It is remarkable that the sales volume is quite large in the countries of advanced motorization like in China, the USA, Japan, and Germany.

Table 2 - Spring industry in major countries (2021)

	Austria	France	Germany	Italy	U.K	China	Japan	USA
Number of springs manufacturers	-	-	-	-	-	-	505	400
Number of employees	-	-	-	-	-	9,368	22,000	16,524
Sales amount	22 million Euro	213 million Euro	2,111 million Euro	528 million Euro	66 million GBP	8,128 million RMB	314,578 million JPY	4.7 billion USD
Weight, ton	1,282	52,094	342,142	272,518	16,282	459,850	384,082	-

3 BENEFITS EXPECTED FROM THE WORK OF THE ISO/TC

Springs are machine element parts for which there is no standardized dimension list. They are usually designed and produced each time for its need. Most of them are custom made products. Therefore, the spring manufactures have been doing their business complying with national standards and /or individual standards set by their customers.

However, in recent years, by the promotion of the world optimal production for spring business dueto the globalization of economy, differences in national standards or standards applying in specificttrade zone have been causing problems, and the development of international standards has become an outstanding problem.

Recognizing those circumstances, there is a growing tendency to develop international standards through ISO/TC 227 activities. Expected benefits are to obtain common quality level, to prevent confusion when contracting trade, and to offer a designer accordable references like terminology, tolerances, test methods amongst countries and regions. Effect of technology transfer in emerging countries is also expected.

Followings are specific examples of benefits.

(1) Avoidance of troubles between interested parties through international standardization of common infrastructure;

- Prevention of dispute an intellectual property right by the establishment of spring terminology in international society.
- Rational quality agreement between customers and suppliers by the establishment of international standards for tolerances.

(2)Promotion of technology transfer and its synergy effect through the standard development of process engineering and the evaluation technology of the process; Taking shot peening for example,

- The improvement of shot peening technology in emerging countries.
- Lightweight springs ---resource saving, energy saving.
- Fuel consumption improvement for automobile vehicles---reduction of CO₂ release into atmosphere.

(3) Prevention of overlapping investment of testing equipment and avoidance of troubles over quality issue by sharing the test result complying with international standards of test method and evaluation criteria.

4 REPRESENTATION AND PARTICIPATION IN THE ISO/TC

4.1 [Countries/ISO members bodies that are P and O members of the ISO committee](#)

4.2 Analysis of the participation

Currently, ISO/TC 227 members are consisting of 25 member bodies whereby 12 of them are P-members and another 13 are O-members.

The state of participation is illustrated in Table 3.

Table 3 - TC 227 members: participating state and regional distribution

Region	P-member	O-member
Asia	China, India, Japan, Malaysia,	Indonesia, Iran, Korea, Philippines, Viet Nam, Thailand, Uzbekistan
Europe	France, Germany, Italy, United Kingdom, Finland, Poland	Austria, Bulgaria, Czech Republic, Serbia, Slovakia, Hungary
America	United States	
Africa	Nigeria	

It seems well balanced when studying areal distribution (11 Asian countries, 12 from Europe, 1 from America and 1 from Africa).

It is important to have other emerging countries coming into spring business as the TC member when considering worldwide deployment of spring related goods, yet, their participation is still limited. One reason for the fact is that the lack of resources, such as traveling cost, the number of experts, information and so on. Another is that while the launching of standardization started in Europe, United States and Japan, emerging countries could not follow the movement. In the future, it is expected for them to deepen the recognition of international standardization activities through ISO/TC 227, and their further participation is anticipated.

5 OBJECTIVES OF THE ISO/TC AND STRATEGIES FOR THEIR ACHIEVEMENT

5.1 Defined objectives of the ISO/TC

The object of ISO/TC 227 is to develop international standards which are expected to be accepted widely among stakeholders in the field of spring business.

ISO/TC 227 completed series of international standards relating to the spring terminology and the systematic classification of springs in 2009. Then the standards of tolerances, inspection/testing methods, and process technologies were followed.

Going forward, we will continue to systematically develop standards for each technical area while

observing market trends.

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

In order to achieve the objectives, ISO/TC 227 will establish the category of technical domain that needs to be worked out. Specific project examples in each domain are shown in Table 4. The first step will be starting with terminology and systematic classification. Then the succeeding standards would follow depending on a situation among participating member countries taking priority and technology status into account.

Table 4 - Technical domains and projects

Category	Technical domain	Project (examples)
I	Terminology and classification	Terminology
		Systematic classification
II	Tolerance	Tolerance (compression springs)
		Tolerance (extension springs)
		Tolerance (torsion springs)
III	Inspection/test method	Spring characteristic test
		Fatigue test
IV	Processing	Shot peening
		Stress relief annealing

Metallic springs are basic machine element parts and their applicable fields are fairly broad. However, ISO/TC 227 takes charge in the standardization of fundamental common needs excluding those specific requirements of the springs in particular machines, or spring material requirements. TC 227 will establish liaison with those TC/SCs which have the scope of particular machines or spring materials when the need arises. In relation to springs, fastener industry, transportation machine industry (automobiles, railroad cars, boats, airplanes, space vehicles, etc.), electronic goods industry, and hardware industry are in being. As for spring materials, steel industry and nonferrous metal industry are in main existence.

6 FACTORS AFFECTING COMPLETION AND IMPLEMENTATION OF THE ISO/TC WORK PROGRAMME

There are currently no factors impacting the TC business program.

7 STRUCTURE, CURRENT PROJECTS AND PUBLICATIONS OF THE ISO/TC

This section gives an overview of the ISO/TC's structure, scopes of the ISO/TCs and any existing subcommittees and information on existing and planned standardization projects, publication of the ISO/TC and its subcommittees.

7.1 [Structure of the ISO committee](#)

7.2 [Current projects of the ISO technical committee and its subcommittees](#)

7.3 [Publications of the ISO technical committee and its subcommittees](#)

Reference information