EXECUTIVE SUMMARY

Business Environment

The development and implementation of innovative technologies like Thermal spraying on the market is of an eminent importance to maintain competitive advantages of the European Market in a globalised economy. Thermal spraying processes are widely applied for manufacturing industrial products.

Stepping up the productivity and efficiency of production plants and machines inevitably increases the wear on individual or system components. That's why highly stressed vulnerable surfaces must be protected by thermally sprayed coatings or be otherwise modified in order to withstand these high stresses. At the same time, thermal spraying processes also allow surfaces to be modified and imported with tailored characteristics for every requirement. Furthermore, thermal spraying can be used as a process for additive manufacturing.

The overall goal of the committee is to support the innovative technology market by developing standards by means of a consensus basis considering recent research.

Thermal spraying has a signifcant positive impact on global sustainability, e. g. green technology.

Parties involved

In Europe there are more than 3000 companies which supply thermally sprayed coatings. Major industry groups in the market include:

- Aircraft and aerospace
- Building construction
- Domestic appliances
- Engine components
- Electronics
- Agriculture
- Mining
- Oil and gas industry
- Marine
- Medical technology
- Motor vehicle
- Textile
- Paper and printing industry
- Renewable energy
- Power generation

Benefits

Thermal spraying is one of the most leading technologies and has a large potential for further development.
Thermally sprayed coatings provide very special properties which are not achieved by other processes. There are a variety of thermal spraying processes and materials available on the market. Therefore, expert know-how and also guidelines and standards for industrial users are a compelling necessity.

Priorities

Priorities are to make European Standards in this domain available in respect of:
- definitions
- acceptance of tests and quality control for thermal spraying equipment
- specifications for spraying materials and sprayed coatings
- quality and technical requirements
- health and safety aspects
- testing procedures
- requirements for thermal spraying personnel.

1 BUSINESS ENVIRONMENT OF THE CEN/TC 240

1.1 Description of the Business Environment

The following political, economic, technical, environmental, regulatory, legal, societal and/or international dynamics describe the business environment of the industry sectors, products, materials, disciplines or practices related to the scope of this CEN/TC 240, and they may significantly influence how the relevant standards development processes are conducted and the content of the resulting standards:

Thermal spraying processes are widely applied for manufacturing industrial products.
Thermal spraying has gained an increasing importance in many parts of industrial application, production, maintenance and repair. The processes increase the efficency and the lifetime of components and contribute to sustainability. It is applied onto steel constructions for corrosion protection, in automotive industry for achieving sliding properties (e.g. cylinder bores) and electrical insulation as well as special functions (lambda sensor), in aerospace and aviation industry for serving hot gas corrosion requirements and repair of jet engines. It is used in tool and die industry against wear attack and for repair. Printing and textile industries are using ceramic coatings because of their special sliding and wear behaviour. Power plants, food industry, steel and mining industry as well as offshore enterprises are using thermally sprayed coatings for anti corrosion, anti wear, high temperature protection and against chemical attack. Thermal spraying also has the potential to support new applications like electrical mobility. These are only some examples from the wide field of applications.

Thermal spraying is widely used in industry. The total annual turnover is estimated to several billion € world-wide and more than 2 billion in Europe. The 3000 European users can be divided into 30 % of in-house job shops and 70 % of service job shops. The annual turnover increase rate of thermal spraying is approx. 10 % and is driven by technology improvements and new applications.

Midsized enterprises are serving the market all over Europe. Small job shops sell nationally and to the neighbour countries. Equipment and material manufacturers sell world-wide.

1.2 Quantitative Indicators of the Business Environment

The following list of quantitative indicators describes the business environment in order to provide adequate information to support the activities of CEN/TC 240:

The following factors influence the way these activities should be drafted:

- Political factors

The major benefit of standardisation in this field is a continous improvement in the quality of coatings through the development of technically valid standards. These standards help to satisfy the ever increasing demand for excellence. They must be responsive to the needs of the market place and should be developed on a minimum timely basis to ensure optimum industry support. The goal is to maintain the technological leadership of these technologies within Europe.

- Economic factors

Economic benefit shall arise through harmonisation of the market in thermal spraying. For example, the surface enhancement by thermal spraying provides significant savings of material due to the fact that low cost substrate construction materials can be used. Additionally saving of high cost materials is possible, e.g. to avoid corrosion attack in case of high temperature corrosion or thermal overloading. Thus thermal spraying provides a high net benefit.

Consequently, the thermal spraying process has a great influence on the production costs, sustainability and completion of the final product. Therefore, it is important to apply the thermal spray process in an effective way and to carry out quality management and assurance on each point and step of production.

- Technical factors

Continuously rising technical requirements for the coated component demand deeper harmonisation regarding equipment, processes, quality assurance, materials and education. For new and recently developed materials, test work is necessary to establish the validity of test methods before including in the standards.

- Legal factors

Global use (in aviation, automotive, railway, chemical, energy and glass industry) requires standardised technical rules and guidelines for thermal spraying.

On the other hand, standards on thermal spraying are necessary in order to support EU directives (e.g. steel structure, machinery, pressure vessels, and sustainable products. The materials have to be compliant with respective directives, e.g. REACH, ROHS etc.

- Health and environment

Experience over a number of years has shown that thermal spraying results in few serious health or safety problems but like many other industrial processes requires attention to application procedures and equipment to avoid hazards.

In the domain of public health, functional surfaces are a fundamental part of medical technology.

Also the reduction of component weight or intelligent combination of materials can help to save valuable energy and raw material resources in many fields of technology. Thermal sprayed

coatings allow improvements in the efficiency of power generation plants and engines for aircraft and transportation.

2 BENEFITS EXPECTED FROM THE WORK OF THE CEN/TC 240

The aim of standardisation work is to facilitate the exchange of goods and services leading to the elimination of technical barriers to trade. In this regard the major benefit of thermal spraying standardisation work is to spread its know-how world wide in

- developing European and International standards in order to support the uniformity of standards and to establish them on the greatest possible market;
- defining procedures for measuring the properties of thermally sprayed coatings (more precise – less expensive);
- describing inspection and installation of thermal spraying equipment;
- recommendations for proper execution of thermal spraying processes;
- recommendations for quality control, assurance and personnel qualification;
- determining the symbolic representation of thermally sprayed coatings on drawings;
- recommendations for technical supply conditions;
- determining vocabulary for the three main European languages (D,E,F), in the codification of technical terms and definitions in order to facilitate communication and to avoid misunderstanding in any business transaction.

3 PARTICIPATION IN THE CEN/TC 240

All the CEN national members are entitled to nominate delegates to CEN Technical Committees and experts to Working Groups, ensuring a balance of all interested parties. Participation as observers of recognized European or international organisations is also possible under certain conditions. To participate in the activities of this CEN/TC, please contact the national standards organisation in your country.

4 OBJECTIVES OF THE CEN/TC 240 AND STRATEGIES FOR THEIR ACHIEVEMENT

4.1 Defined objectives of the CEN/TC 240

Data exchange and competition between small and midsize companies in thermal spraying should not be restricted by incompatibility of standardisation systems. Standardisation work is required to raise equality of competition and equality of small and midsize enterprises.

Thermal spraying is a special process. Therefore, coating properties cannot be verified entirely by quality controls performed on the final product. Moreover, e.g. inadequacies generated during the whole process often do not occur until the product or component is in use. Thus, the various different process steps such as pre-treatment, spraying and post-treatment as well as other influencing factors must be explicitly defined to ensure the reproducibility of the products.

Therefore, the objective is to establish technical rules which ensure a high reproducibility of high quality coatings.
Another objective is to bring thermal spraying more and more into the focus of design engineers, engineers and students working with standards.

Standards for thermal spraying are basic standards. In other words thermal spray standards are typically referenced in application standards specifying requirements on corrosion protection for steel structures, pressure equipment as well as for engineering which will use them for reference.

New research programmes are ongoing for new compostions, methods and applications.

4.2 Identified strategies to achieve the CEN/TCs defined objectives.

In going ahead by building up a network of standards which build on each other step by step and cover equipment, processes, materials, approval and testing methods as well as education of thermal spray operators and supervisors. Also quality requirements for a technical state of the art technology are to be determined. This state ensures safe application of thermal spraying for the variety of different uses. Due to the fact that thermal spraying requires special know how, a development of standards by thermal spray experts within their own technical committee is fundamental. For drafting standards, concepts of similar technologies, e.g. welding, are used for transparency, consistency but also for synergy effects.

- International trade and standardisation aspects

At a global level international standards fulfill the GATT-agreement in supporting international trade. Therefore CEN/TC 240 adopted the concept to harmonise the European and the International standardisation work by applying the Vienna agreement from the very beginning. Under the leadership of CEN most of the International standards are identical with the corresponding EN standards and at present for most of the standardisation items the parallel procedure with ISO lead is provided.

- Liasons

Liaisons are kept with the following committees CEN/TC 121, CEN/TC 262, ISO/TC 107/WG 1.
Further liasons with CEN/TC 433, ISO/TC 35 and ISO/TC 158 are planned to be established.

4.3 Environmental aspects

The need to reduce the potential impacts on the environment of a product that can occur during all stages of its lifetime is recognised around the world. The potential environmental impacts of products can be reduced by taking into account environmental issues in product standards.

- CEN/TC 240 considers environmental issues when drafting product standards in support of sustainable international trade.

- CEN/TC 240 actively addresses compliance with any applicable national, European or internationally related regulation.

- Furthermore, CEN/TC 240 undertakes to use CEN/GUIDE 4 to determine if it is possible to deal with an environmental issue through a product standard.

- CEN/TC 240 actively works on standards for renewable energy technologies and carbon dioxide reduction, e. g. coating of wind turbines, hydro power parts, electric vehicles and fuel cells.

5 FACTORS AFFECTING COMPLETION AND IMPLEMENTATION OF THE CEN/TC 240 WORK PROGRAMME

The potential risks to the future effectiveness of standardisation work in this domain are:

- Thermal spraying is a very economic but special technology with limited resources of available experts and financial support.

- The continuity and the drafting of standards in an appropriate time schedule by voluntary work of experts is achieved only by sufficient participation of experts from TC member countries and sufficient government and industrial finance.