

## **BUSINESS PLAN**

### **CEN/TC 299**

#### **GAS-FIRED SORPTION APPLIANCES, INDIRECT FIRED SORPTION APPLIANCES, GAS-FIRED AND ENDOTHERMIC ENGINE DRIVEN HEAT PUMPS**

#### **EXECUTIVE SUMMARY**

##### **Business environment**

The “202020” program impose to Europe important objectives in terms of increased energy efficiency and larger use of renewable energies. Heating buildings represents 40% of total demand for final energy use.

Sorption technology (GAHP) has been ranked by European commission preparatory study (Ecoboiler) as one of the prominent technologies in term of reduction of energy consumption and CO<sub>2</sub> emission. Similarly preparatory study for Ecolabel2 highlights that sorption heatpumps can deliver heat in the cleanest possible way when all pollution elements are taken into account (NO<sub>x</sub>, PM, CO<sub>2</sub>, F-Gases). Europe has therefore the most favorable conditions to take advantage by the deployment of sorption technologies. Europe has also at this point in time a group of universities, research centers and industries on the leading edge in terms of sorption technology development.

Gas-fired endothermic engine driven heat pumps (GEHP) is a very high efficient technology in both cooling and heating mode, as it makes possible to recover the thermal energy from the engine. As GAHP technology, GEHP reduces energy consumption and CO<sub>2</sub> emission and uses the renewable energy according to the European directives and regulations. Europe has therefore the most favorable conditions to take advantage of the deployment of GEHP technology.

The main scope of CEN/TC 299 is the standardization of the requirements for the construction, safety, rational use of energy, marking, installation and testing of gas-fired sorption appliances and gas-fired endothermic engine driven heat pumps both with capacity not higher than 70 kW.

As new developments for the future it will extend the scope to include the following connected technologies:

- indirect fired sorption appliances;
- gas-fired sorption appliances with capacity higher than 70 kW;
- gas-fired endothermic engine driven heat pumps with capacity higher than 70 kW.

The parties involved are all industries at national and international level, public authorities, institutes, laboratories, consumer representatives, gas distribution companies, etc.

##### **Benefits**

Within the scope of CEN/TC 299, since 1999 nine standards have been published, taking into account user confidence.

The benefits intend to address the harmonization of test methods, requirements and terminology to be applied to gas-fired and indirect fired sorption appliances and gas-fired endothermic engine driven heat pumps.

## **Priorities**

The priorities of CEN/TC 299 are the following:

- facilitate understanding between the parties and eliminating trade barriers.
- harmonize at European level the requirements for the construction, safety, rational use of energy, marking, installation and testing of gas-fired sorption appliances, indirect fired sorption appliances and gas-fired endothermic engine driven heat pumps.
- give support to essential requirements of Directive 2009/142/EEC on the approximation of the laws of the Member states relating to appliances burning gaseous fuels and other applicable Directives to gas appliances or to renewable energy sources (RES) and energy related products (ErP).

## 1 BUSINESS ENVIRONMENT OF THE CEN/TC

### 1.1 Description of the Business Environment

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

- **Gas-fired sorption appliances - Indirect fired sorption appliances and Gas-fired endothermic engine driven heat pumps**

#### 1) State of the art

##### **a) Parties interested in the standardization process**

- appliance manufacturers;
- gas distribution companies;
- consumers;
- public authorities involved in energy and environment management.

##### **b) Market**

Products within the scope of the standards under the responsibility of CEN/TC 299 are used for heating, domestic hot water preparation, cooling and refrigeration. Most of the appliances currently available are produced in Europe or imported from the Far East (Japan, China, Korea, India) and USA. The performance in heating mode of sorption appliances is moving the interest of the industry from the air-conditioning to the heating application. While the air-conditioning market in the European southern countries is about three times larger than in the north (main countries, classified by their market are Italy, Spain, France, Greece, and Germany), the heating market is focused primarily in the north and central European countries (France, UK, Germany, Netherland, Belgium). On the other hand, gas-fired endothermic engine driven heat pums performance is quite high in both modes, heating and cooling.

#### 2) Market Environment

##### **a) Political factors**

Most of these appliances use electrical energy and compression technology with refrigerant fluids that are going to be replaced in the medium term due to environmental problems. This has boosted the development of other technologies as absorption and adsorption as well as those based in gas-fired engine driven compressors, for these applications. To that end it has proved necessary to develop new products in the low-power sphere for which no equipment exists in the market. Introduction of these gas-fired appliances into the market will permit a reduction of energy consumption, a reduction in CO<sub>2</sub> emission, in NO<sub>x</sub> and in PM. In addition it will prevent peaks of demand for electricity both in winter and in summer, thereby avoiding investments in new electricity-generating power stations to meet that demand, while at the same time achieving a flatter gas-demand curve would allow better design and management of gas supply facilities.

**b) Economical factors**

European projects are currently being implemented for these appliances types. The regulations will provide criteria for design, rational use of energy and test methods useful for manufacturers and test laboratories and will encourage the emergence of new European manufacturers.

**c) Social factors**

There is growing social expectation for heating and DWH production in winter and for air conditioning in summer to be achieved in a sustainable and cost effective way. The regulations will facilitate the market entry of safer appliances with lower primary energy consumption and lower emissions.

Indeed the recent economic crisis, the frequent power shortages, the ever increasing “environmental awareness” and the sensitivity towards the use of renewable resources has paid the attention on the development of appliances able to use primary energy in the most efficient way.

The use of gas or other indirect thermic sources allows the achievement of this target without weighing on electric burden of single countries.

**d) Technical factors**

There are new available applications of absorption and adsorption as well as gas-fired engine driven technologies to low-power situations. Their development and implementation might interest the European economy.

**e) Legal factors**

The objective of the regulations is to provide the criteria needed by the test laboratories in order to verify compliance with the essential requirements of the Gas Appliance Directive (GAD) Renewable Energy Sources (RES), Energy related products (ErP) Directives, Ecolabel Directive and Green Public Procurement Directive.

**f) International trade**

The regulations drawn up are compatible with United States regulations, thereby permitting exports to that market.

**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 actions of CEN/TC 299:

The total market for all space heating heat pumps including reversible units (air to air and air to water), exceeded 600,000 units in 2014. All primary market research expect a continuous growth for heat pump market in Europe. (Reference: European Heat Pump Association (European heat pump statistics – Outlook -2015)).

- **Gas-fired sorption appliances - Indirect fired sorption appliances and Gas-fired endothermic engine driven heat pumps**

Sorption appliances have only been available so far in the professional market (light commercial and industry applications only). Recently one major boiler manufacturer has announced market availability of a product for residential applications based on sorption technology. Four other manufacturers have announced similar plans in the near future. The total residential market for heating appliance in Europe exceeds 6.5 Million units. The largest majority of them rely on fuel gases as their energy source.

Sorption technology might represent a natural technological evolution for the traditional boiler industry that has reached maximum efficiency with regular condensing boiler technology and needs to identify alternative ways to improve the efficiency of heating appliances.

GEHP technology is available in the professional market (light commercial and industry applications) and its market in Europe is around 800 units per year. From 2005 there are installed more than 8000 units in Europe.

In Japan the market is around 30.000 units per year, so there is a huge potential market in Europe for this kind of high efficient technology to grow up.(source japan refrigerant & Air conditioning association).

## **2 BENEFITS EXPECTED FROM THE WORK OF THE CEN/TC**

The benefits obtained have been the harmonization of test methods, requirements and terminology to be applied to gas-fired and indirect fired sorption appliances and gas-fired endothermic engine driven heat pumps. In particular, standards elaborated within CEN/TC 299 intend to:

- harmonize the terms of reference in the sector, facilitating understanding between the parties and eliminating trade barriers;
- harmonize at European level the requirements for the construction, safety, rational use of energy, marking, installation and testing of gas-fired sorption appliances, indirect fired sorption appliances and gas-fired endothermic engine driven heat pumps;
- give support to essential requirements of Directive 2009/142/EEC on the approximation of the laws of the Member states relating to appliances burning gaseous fuels and other applicable Directives to gas appliances or to Renewable Energy Sources (RES), Energy related Products (ErP), Ecolabel requirements and Green Public Procurement.

## **3 PARTICIPATION IN THE CEN/TC**

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 organizations is also possible under certain conditions. To participate in the activities of this CEN/TC, please contact the national standards organization in your country.

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

### **4.1 Defined objectives of the CEN/TC**

The objectives of CEN/TC 299 are:

- a) to elaborate standards covering requirements for the construction, safety, rational use of energy, marking, installation and testing of gas-fired sorption appliances and gas-fired endothermic engine driven heat pumps both with capacity not higher than 70 kW;
- b) to review and adjust the work programme as necessary in order to ensure that prevailing and long term market needs are met.

In particular, as a new development for the next few years, the scope was further extended to include the following connected technologies:

- indirect fired sorption appliances;
- gas-fired sorption appliances with capacity higher than 70 kW;
- gas-fired endothermic engine driven heat pumps with capacity higher than 70 kW;
- c) to ensure, through a regular programme of review, that the standards already published and available for use are kept up to date and accurately reflect the state of the art at the time of review;
- d) to take into account political, economic, technical, regulatory, legal, societal and/or international dynamics as elements insisting on the gas-fired sorption appliances, indirect fired sorption appliances and gas-fired endothermic engine driven heat pumps, industry sector that may significantly influence how the relevant standards development processes are carried out and on the content of the resulting standards;
- e) to provide European standards to enable the implementation of the Ecodesign Directive 2009/125/EC and its implementing measures, responding to Mandate M/495.

#### **4.2 Identified strategies to achieve the CEN/TCs defined objectives**

In order to achieve the defined objectives of CEN/TC 299, the following strategies have been applied, through prioritisation of projects as follows:

- seeking standards and reference documents (national standards, standards drawn up by other TCs (liaisons, electrical appliances, etc.);
- firstly drawing up construction, operational and safety requirements, followed by the pertinent tests.

#### **Liaisons**

Possible future liaisons may be established with CEN/TC 48 "Domestic gas-fired water heaters", CEN/TC 180 "Domestic and non-domestic gas-fired air heaters and non-domestic gas-fired overhead radiant heaters" and CEN/TC 109 "Central heating boilers using gaseous fuels" and CEN/CLC/JWG FCGA "Fuel cell gas appliances".

#### **4.3 Environmental aspects**

The Ecodesign Directive (2009/125/EC) is an integral part of European product policy addressing the important issue of sustainable environmental and economic development targeting climate changes and resources depletion. In 2009 the Directive, which initially focused on Energy-using-Products (EuP), such as TVs, ovens or heating equipment, has been extended to Energy-related-Product (ErP) such as windows, taps and insulation materials. A list of preparatory studies has been launched by the European Commission between 2006 and 2009, either for DG Transport and Energy (TREN) or DG Enterprise and Industry (ENTR).

Within this list the EU Commission issued standardization Mandate (M/534 (Ecodesign Water Heaters) and M/535 (Ecodesign Space Heaters)) to CEN/TC 299 for the following items:

- Boilers and combi-boilers (gas and oil fired boilers, heat pumps and mCHP)

Standardization needs are: measurement of space heating energy efficiency of fossil fuel boilers, mCHP and heat pumps. Tasks include:

- Classification of controls
- Energy performance of solar thermal parts
- Emissions of nitrogen oxides and carbon monoxide
- Methods for calculating the seasonal room heating energy efficiency of fossil fuel boilers, mCHP and heat pumps, their combinations, and their combinations with controls, solar thermal parts, pumps and storage tanks
- Measurement of water heating energy efficiency of combiboilers
- Methods for calculating the water heating energy efficiency of combi-boilers, and their combinations with solar thermal parts, pumps and storage tanks

Available standards include EN 50465 for mCHP and EN 303 for gas boilers.

Moreover, the following environmental aspects shall be broadened:

- systems energy efficiency improvement and consequent primary energy consume reduction;
- renewable energy use;
- CO<sub>2</sub> emissions reduction;
- better use of gas grid at European level, using gas as primary source for high efficient heating and air-conditioning;
- avoiding transfer of burden on electric system from gas grid for heating application and alleviation of electric burden on the single national grids for air-conditioning.

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

No penalizing factors were identified.