Product Certification of Heat Soaked Tempered Glass

Ir. C K Cheung

Hong Kong Accreditation Service

1.   What is Product Certification ?

In the manufacturing sector, the ISO 9000 series quality management system (QMS) assured the product consistently meeting prescribed requirements. However, it focuses mainly on the quality system but not much on the product itself. Prior to its acceptance, the product is still very often required for testing by the purchaser to confirm its compliance with the relevant standard or specification. The two activities, manufacturer's QMS and purchaser testing are not coordinated. In an effort to integrate them into one quality assurance (QA) system, products certification was developed. It promulgates the QMS (similar to ISO 9000 QA series model), the ISO 17020 for inspection and ISO 17025 for testing schemes into one coordinated effort. The product is controlled at source in a manufacturing plant starting from initial prototype testing, technical inspection of the manufacturing process, auditing of the quality system, approval of the product and subsequent surveillance audit testing of products sampled from the factory and/or market, etc. In order to enhance the credibility of the product certification, manufacturers of the product very often have to seek third party certification body to perform the independent certification audit. This third party product certification scheme is featured with a certification mark.

A recent example was that a product certification company named Hong Kong Certification Service Limited was accredited by the Hong Kong Accreditation Service for a tempered glass scheme subject to the heat soaked process to BS EN 14179-1 : 2005. A scheme named Product Conformity Certification Scheme for heat soaked tempered glass is now currently compiled by the Facade Group of the Hong Kong Institute of Steel Construction.

Product Conformity Certification Scheme
for Heat Soaked Tempered Glass

Established in some decades ago, product certification has already been the earliest quality assurance activities operated by many certification bodies all over the world. It has evolved throughout the years to its present form. The International Standard for the product certification is the ISO/IEC Guide 65:1996. This is a top level and generic international standard that the any certification body has to follow. Any manufacturer or company may apply to a third party certification body to have a product certified to the requirements of a recognized standard under the product certification scheme. The product standard may be a British Standard, an International Standard or any national standards.

Although participation in the scheme is in most cases voluntary, over the world many government departments, regulators, public authorities and national agencies require mandatory certifications of their products for reasons of safety, health, environmental protection, fraud prevention and market fairness. The requirements are often stipulated in their works and procurement contracts.

To ensure the quality of the activities of product certification bodies meeting the international and domestic technical requirements, the accreditation of certification bodies by their national accreditation bodies is often necessary.

There are different types of product certification classification according to the international practice. In the ISO publication "Certification and Related Activities - Assessment and Verification of Conformity to Standards and Technical Specifications", eight systems of the product certification are stipulated and they are as follows:

No	System	Detail
1	**Type testing**	Type testing is a method under which a sample of the product is tested according to a prescribed test

			method in order to verify the compliance of a model with a specification. It is the simplest and most limited form of independent certification of a product both from the point of view of the manufacturer and the approval authority.
2		**Type testing followed by subsequent surveillance through audit testing of samples purchased from the open market**	A system based on type testing (see System No. 1) but with some follow-up action to check that subsequent production is in conformity. Open market audit testing means a random audit testing of the type tested model from distributors' or retailers' stock.
3		**Type testing followed by subsequent surveillance through audit testing of factory samples**	A system based on type testing (see System No. 1) but with some follow-up action to check that subsequent production is in conformity. Audit testing of factory samples involves a regular check of samples of the type tested models selected from the manufacturer's production before dispatch.
4		**Type testing followed by subsequent surveillance through audit testing of samples from both open market and the factory**	A system based on type testing (see System No. 1) but with some follow-up action to check that subsequent production is in conformity. Audit testing both of factory samples and open market samples.
5		**Type testing and assessment of factory quality control and its acceptance followed by surveillance that takes into account the audit of factory quality control and the testing of samples from the factory and the open market**	A system based on type testing (System No. 1), with assessment and approval of the manufacturer's quality control arrangements followed by regular surveillance through inspection of factory quality control and audit testing of samples from both the open market and the factory.
6		**Factory quality control assessment and its acceptance only**	Sometimes known as the approved firm or approved manufacturing method of certification. A system under which the manufacturer's capability to produce a product in accordance with the required specification, including the manufacturing methods, quality control organizations and type and routine testing facilities are assessed and approved, in respect

		of a discrete technology.
7	**Batch testing**	Batch testing is a system under which a batch of a product is sample tested and from which a verdict on the conformity with the specification is issued.
8	**100% testing**	100% testing is a system under which each and every item certified is tested to the requirements of the technical specification.

The commonest product certification scheme for construction products is based on the ISO Certification System 5. Some relatively low risk products may be based on System 1. The product manufacturer is awarded a license by a product certification body if the product complies with the standard and the factory has a proper quality control system to ensure consistent and continuous compliance with the standard coupled with a series of scheduled audit testing on products selected from the factory and/or the market. A licensee under this scheme is entitled to use the certification mark of the certification body on the product to denote compliance with the standard. (Note: a quality system certification mark to ISO 9001 is not permitted to appear on the product.)

When this mark of conformity is affixed on a product, the product certification body shall ensure that the traceability of its mark to the relevant product standards is available to the public. In the case when a certified product complies with a part of the standard only, it should be clearly indicated. These marks may be registered under Trade Mark Ordinance and are the property of the product certification body. Unauthorised use or misuse of the marks will be subject to legal action in accordance with applicable laws. In case of misuse of the mark, certification body shall take appropriate corrective actions which could include legal action.

2.   Advantages of Product Certification

Product certification provides the following advantages:

● It is an independent assurance that the product is manufactured under an effective system of testing, supervision and control
● Purchasers of the product may not require to carry out further tests, as the products are already certified to be in compliance with the standards
● Certified products provide the user an assurance for safety and reliability
● Certified products enjoy the benefits of protection against competition from substandard products and misrepresentation

- The product certification mark enhance the reputation of manufacturer and thus, extend its marketing capability
- Improved efficiency in production and reduced wastage and rejects.

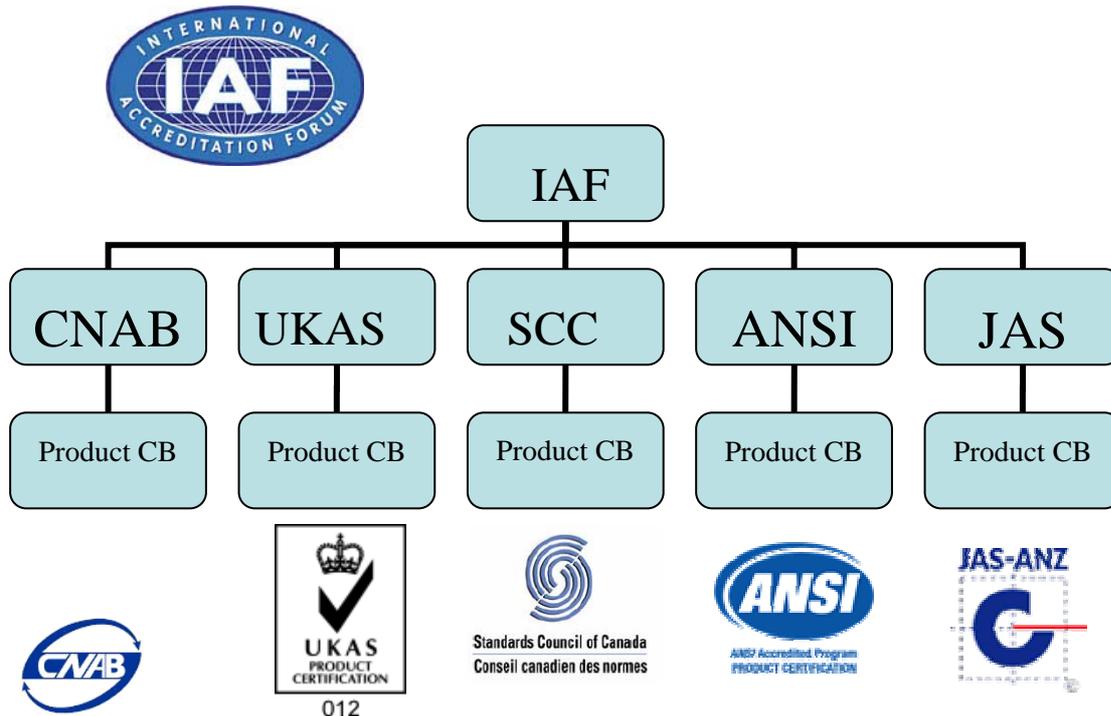## 3. Why Accreditation of Product Certification body is needed ?

Many products certification bodies are commercial organizations and the quality of their certification activities have to be assessed to comply with the ISO/IEC Guide 65, the relevant product standard such as BS EN 14179-1 : 2005 and local accreditation requirements in order to provide confidence to the purchasers or users of the certified products. It is with this task that an accreditation body in a country is emerged. Many countries and economies have accreditation bodies at national level to perform technical assessments to the product certification body. In most cases, accreditation bodies are government departments. Accreditation means credibility. Accreditation is a formal recognition of the competency of an organization to perform conformity assessment activities. Under the International Accreditation Forum (IAF), a multilateral recognition agreement (MLA) among various economies was established. Signatories of the MLA are obliged to promote the acceptance of the conformity assessment results among all MLA members. The objective of which is to facilitate cross border trading and reduce technical barriers to trade (TBT), a mission of the Asian Pacific Economic Cooperation (APEC) and World Trade Organization (WTO).

Examples of some of the national accreditation bodies are as follows and many of which are government bodies:

- ANSI – American National Standards Institute
- UKAS – United Kingdom Accreditation Service
- CNAB – China National Accreditation Board for Certifiers
- JAB – Japan Accreditation Board
- SCC – Standard Council of Canada
- JAS-ANZ – Joint Accreditation System of Australia & New Zealand
- SAC – Singapore Accreditation Council
- DSM – Department of Standards, Malaysia
- NAC – National Accreditation Council of Thailand

- A chart above showing the proposed Multilateral Recognition Agreement (MLA) for product certification schemes among Accreditation Bodies of different economies under the International Accreditation Forum (IAF).

A MLA for laboratory testing and calibration has been operating globally under International Laboratory Accreditation Cooperation (ILAC) for more than a decade. A new global MLA for product certification has been launched in 2004 by IAF. The IAF MLA (for product) signatories as at March 2005 are Australia, Austria, Belgium, Canada, China, Czech, Denmark, Finland, France, Germany, Ireland, Italy, Mexico, Netherlands, New Zealand, Norway, Poland, Romania, Alovakia, South Africa, Spain, Sweden, Switzerland and United Kingdom. (24 member states) ANSI of USA and JAB of Japan are now under application to the MLA signatory. HKAS is a IAF MLA QMS signatory on accredited ISO 9001 certification since 2004 but not yet a MLA signatory on accredited product certification. HKAS intends to seek entry into the IAF MLA signatory a few years later after the accreditation scheme on product certification is sufficiently mature.

When a particular product certified by a certification body accredited by HKAS, the HKCAS mark is permitted to affix on the product along side with the product certification body mark. The two marks together have to be housed in a rectangular box as shown below.

BS EN 14179-1 : 2005

The combined use of the certification and accreditation marks affixed on the product certificate will no doubt further enhance the credibility and confidence to the purchasers and users of the product.

4. Compulsory Registration/Certification of Products by Domestic Law

Apart from voluntary certification systems of products mentioned above, there are two countries in the world, namely, Mainland China and Japan, known to the HKAS that operated compulsory certification of products under their laws. These apply mainly to high risk products such as motorcyclists' protective helmets, fire doors, seat belts, electrical appliance and wiring accessories, etc. These two schemes are called the China Compulsory Certification (China's CCC mark) and Japan Industrial Standard (Japan's JIS mark). The former is directly administered by the General Administration of the Quality Supervision, Inspection and Quarantine under the State Council of the People's Republic of China Government and the latter by the Ministry of Industry and Technology of the Japanese Government.
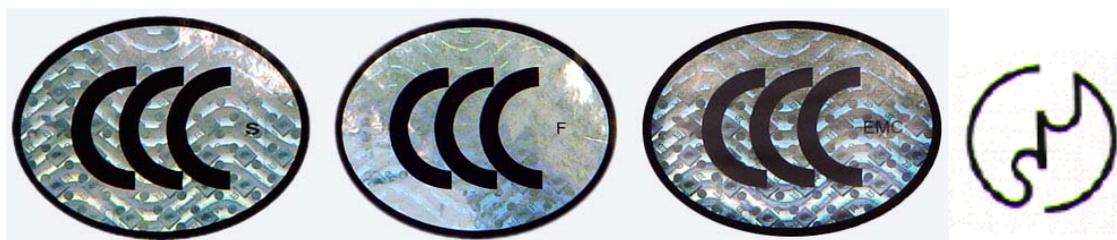
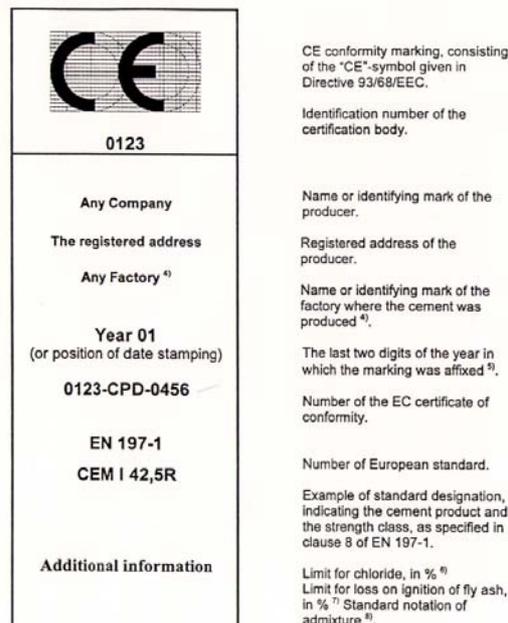CCC Safety Mark   CCC Fire Product Mark   CCC EMC mark   JIS Mark

5.   European practices : Construction Products Directive (CPD) and CE marking

The Construction Products Directive aims to break down technical barriers to trade in construction products between Member States in the European Community. To achieve this, the CPD provides for the following 4 main elements:

- A system of harmonized technical standards, e.g. cement to EN 197-1:2000, aggregate to EN 12620:2002 and concrete to EN206-1:2000

- An agreed system of attestation of conformity for each product family, 6 systems of attestation are stipulated as follows (e.g. CPD required cement to system 1+ and aggregate to system 2+) (Systems 1+ to 3 must be certified by a third party certification body approved by the respective governments but System 4 can be a self declaration by the manufacturer of the product):

  - ✓   System 1+   Product conformity certification with audit testing
  - ✓   System 1   Product conformity certification without audit testing
  - ✓   System 2+   Factory production control certification with cont surveillance
  - ✓   System 2   Factory production control certification without surveillance
  - ✓   System 3   Initial type testing
  - ✓   System 4   Manufacturer's task only

- A framework of notified bodies, e.g. accredited product certification bodies in each Member States approved by their governments and notified to the European Commission are called Notified Body (or Approved Body).

- The CE marking of products, a typical example for cement to EN 197-1:2000 is shown as follows:

CE	CE conformity marking, consisting of the "CE"-symbol given in Directive 93/68/EEC.
0123	Identification number of the certification body.
Any Company	Name or identifying mark of the producer.
The registered address	Registered address of the producer.
Any Factory ⁴⁾	Name or identifying mark of the factory where the cement was produced ⁴⁾.
Year 01 (or position of date stamping)	The last two digits of the year in which the marking was affixed ⁵⁾.
0123-CPD-0456	Number of the EC certificate of conformity.
EN 197-1	Number of European standard.
CEM I 42,5R	Example of standard designation, indicating the cement product and the strength class, as specified in clause 8 of EN 197-1.
Additional information	Limit for chloride, in % ⁶⁾ Limit for loss on ignition of fly ash, in % ⁷⁾ Standard notation of admixture ⁸⁾.

6.   Overview of Hong Kong Accreditation Service

Hong Kong Accreditation Service (HKAS) was originated as an accreditation scheme named HOKLAS in 1985 under the then Industry Department. Since then, it has undergone substantial developments and is now a government accreditation body providing various accreditation schemes within the Innovation and Technology Commission (ITC), Commerce Industry and Technology Bureau (CITB) of the Hong Kong SAR Government. Currently, HKAS offers the following schemes:

- Hong Kong Laboratory Accreditation Scheme **(HOKLAS)**
- Hong Kong Inspection Body Accreditation Scheme **(HKIAS)**
- Hong Kong Certification Body Accreditation Scheme **(HKCAS)**

The accreditation marks for the three schemes are as follows:

HOKLAS provides accreditation of laboratories on various categories which include construction materials, chemical, toys, electrical products, food, environmental and recently medical laboratories. The accreditation standard is ISO/IEC 17025. HKIAS provides accreditation of inspection bodies for construction products, welding and indoor air quality inspection. The accreditation standard is ISO/IEC 17020. HKCAS provides accreditation of certification bodies for quality management scheme (QMS) to ISO 9001 and environmental management system (EMS) to ISO 14001. In August 2003, HKAS has launched a new

accreditation programme under HKCAS scheme on construction products certification.

The construction product certification programme covers product certification of general construction materials, building, highway, waterworks and firefighting products, etc.

General construction material products – ready mix concrete, cement, aggregate, PFA, admixture, grout, repair mortar, bituminous materials, steel reinforcement, structural steel, welding material, glass and aluminum, etc.

Building products – door, gate, window, cladding, glazing, facing stone, tile, brick, block, partition and dry wall, paint, false ceiling, fire shutter, passive fire protection product, drainage and plumbing pipe and duct, precast concrete and steel piles, etc.

Highway products – railing, fencing, manhole cover, drainage and sewerage pipes, bridge bearing, vehicular parapet, fabricated movement joint, street lighting, any street furniture, etc.

Waterworks and firefighting products – water tap, water meter, water pipe and fitting, stopcock, storage cistern, valve, hydrant, hose reel, sprinkler, drencher etc.

A HKCAS Supplementary Criteria No. 2 on the Accreditation of Construction Products Certification is available in the HKAS web www.info.gov.hk/itc/hkas.

10. Conclusion

The world has entered into an era of rapid transformation of information and technology. With the globalization of trade and knowledge and given China's accession to the WTO, a multilaterally recognized accreditation scheme on product certification would no doubt help enhance Hong Kong's ability to keep abreast with its trading partners and facilitate cross border trading. This will also improve the quality of our products used domestically and to strengthen our competitiveness in the global market. Accreditation of fire product certification will no doubt help improve the quality of these products to meet the standard requirements.

11. References

1. ISO/IEC Guide 65 "General requirements for bodies operating product certification systems", 1996.
2. ISO/IEC 17020 "General criteria for the operation of various types of bodies performing

inspection" 1998

3. ISO/IEC 17025 " General requirements for the competence of testing and calibration laboratories", 1999

4. ISO 9001 Quality management system – requirements 2000

A typical heat soaked oven complied with BS EN 14179-1:2005 requirements

PCCS-FaG: TG 001 & 002
BS EN 14179-1:2005
Heat Soaked for 2 hours
Serial No.: S-GDS-008001

A Typical Product Conformity Mark