



Testing facilities in Beijing: The National Centre for Quality Supervision and Testing of Solar Heating Systems needs one day for a thermal performance test and around three months for a long term outdoor test.

Photos (3): National Centre for Quality Supervision and Testing of Solar Heating Systems

Quality standards rising in China

The Chinese solar thermal market, which is dominated by open thermosiphon systems, is taking its first steps towards quality standards. The »Golden Sun« label is oriented towards the European Solar Keymark and is being used by well-known home brand-name manufacturers and the first foreign suppliers. Three Chinese institutes are in the starting blocks, to also provide their services to international collector and storage manufacturers.

The country is huge, the solar thermal industry also, and the certification scene is confusing; that's China! There are about 5,000 manufacturers of collectors and storage there – most of these are small and very small businesses. A market concentration is only just beginning. New manufacturers and providers are continually popping up, while others disappear from the market. It is thus difficult for Chinese consumers to orient themselves. This is naturally also true for importers from Europe and the USA who wish to buy collectors in China. The idea of »simply ordering a container-load« after having visited the factory, is one which you should quickly drop again. Without a permanent quality control system and continuous cooperation with the suppliers it is extremely difficult to reliably get high quality products delivered.

At the same time, more and more Chinese manufacturers are pushing into worldwide markets and wish to



National Standards Content	GB/T 18708-2002	Test methods for thermal performance of domestic solar water heating systems
	GB/T 18713-2002	Solar water heating systems - design, installation and engineering acceptance
	GB/T 19141-2003	Specifications for solar water heating systems
	GB/T 18974-2003	Indoor test methods for the thermal performance of solar collectors
	GB/T 6424-2006	Specifications of flat plate collectors
	GB/T 4271-2006	Test methods for the thermal performance of solar collectors
Industry Standards Content	NY/T 513-2002	Technical standards for auxiliary electric heating devices for solar water heaters
	NY/T 514-2002	Technical standards for water tanks for domestic solar water heaters
	NY/T 651-2002	Technical standards for installation and service for domestic solar water heaters

get further certification for their own brands. Reliable and transparent labels are a trust-building measure for them both towards the west and the home market. The most sensible idea is thus to introduce a certification and labelling system which equates to the European system, but which uses existing structures and fulfils Chinese demands for speed and low prices. In the last few years China has moved some important steps forward in this direction.

Voluntary tests at low prices

In 2001 the Chinese State Economic and Trade Commission initiated a standardisation of collectors and systems. The National Development Reform Commission (NDRC) took charge of this standardisation. Together with the international partner organisations United Nations Development Programme (UNDP) and Global En-

So far without »Golden Sun« label: This Himin collectors – sold in a shopping mall – do not possess the label yet. There is still a lot of publicity necessary to make this young label relatively better known.

Photo: Sven Tetzlaff

vironment Facility (GEF), six standards were defined between 2001 and 2006, which are largely aligned to the ISO and EN specifications. These standards were then issued by the Chinese National Institute for Standardisation. There are also a further three industrial standards for product development, service and installation (see table 1).

These standards are binding for the manufacturers of solar heating systems. That these are upheld is checked through tests introduced by the NDRC (see box on page 82). The government has accredited three institutes (see table 2), who are authorised and qualified to carry out these tests. From time to time they are themselves tested by international experts on behalf of the government. As the tests (although not the meeting of standards) are fully voluntary, it is not surprising that only a few companies have them carried out. Alongside the voluntary tests, there are also compulsory tests, however. The government regularly selects product groups, which then undergo testing. Solar water heaters were last chosen in 2004. The three institutes select a series of companies who have to take part in the tests, which the government pays to have carried out. Afterwards the ranking is published on a website. As foreign companies cannot be selected for ranking in this way, these tests are compulsory for them if they wish to sell their products in China (see interview on page 84).

The companies affected by these »forced tests« are keen to use the results for marketing purposes. How-

Table 1: National and industry standards for the solar water heater industry

Source: www.cg.org.cn

Testing facility in Beijing: Only 10% of the Chinese manufacturers use this service.



Institution	Location	Website
Yunnan Provincial Quality Supervision and Testing Centre for Solar Energy Products, Solar Energy Research Institute of Yunnan Normal University	Kunming, Yunnan Province, southern China	www.ynnu.edu.cn/
Hubei Provincial and National Solar Water Heater Supervision and Inspection	Wuhan, Hubei Province, central China	www.hbzj.org.cn/
National Centre for Quality Supervision and Testing of Solar Water Heating Systems, Academy of Building Research	Beijing, northern China	www.cabr.ac.cn www.chinahvac.com.cn

Table 2: National solar water heating testing centres in China

Source: NDRC, UNDP, GEF

The tests for components and systems

Voluntary for Chinese manufacturers, but compulsory for foreign manufacturers: The solar thermal component and system tests introduced by the NDRC in 2001.

System thermal performance testing is performed using a multiple system test bed with eight test stations, capable of being expanded in the future, for carrying out single-day and multiple-day test procedures for system thermal performance and heat loss coefficient of storage tanks. Most testing is currently done using the single-day test methods, but all laboratories are capable of carrying out multiple-day testing.

Solar collector thermal performance testing is performed using a two-axis tracking test bed capable of testing two units at a time for flat plate and glass evacuated tube collectors to determine the steady state efficiency, effective thermal capacity, time constant, incident angle modifier, average heat loss coefficient, and inlet outlet pressure drop of collectors.

System qualification testing for the durability and reliability of solar water heating systems employs a rig to perform tests for freeze resistance, pressure resistance, water contamination, lightning protection, mechanical strength, reverse flow protection, and electrical safety tests for mechanical and environmental stressing.

Collector qualification testing is performed in a two-loop test bed using one loop to test for internal thermal shock and pressure resistance, and the other loop for external shock and rain penetration tests.

All-glass evacuated collector tube thermal and qualification testing is performed to measure the solar exposure parameter, stagnation solar irradiation, and average heat loss coefficient of single tubes, as well as to perform vacuum performance, thermal shock, pressure resistance, and mechanical impact testing of single tubes.

Material testing capabilities include measurement of the optical and thermal properties of solar materials.

Source: NDRC, UNDP, GEF

ever, the likelihood of being among the lucky ones to be tested is relatively low, given that there are 5,000 companies to choose from. In order to give users, importers, architects and planners continuous dependability in their selection of products, efforts have been made to get a labelling system off the ground. This »Golden Sun« label – in some translations also called the »Gold Star« – is issued by the China Jianheng (General) Certification Centre (CGC) in Beijing. This label is similar to the European label Solar Keymark in its structure, and is explicitly orientated towards it. In 2005 the first pilot test was started, resulting in the labelling of 21 companies, encompassing 619 solar water heaters and 11 tube collectors. Well-known companies such as Himin, Tsinghua, Sunshore, Meida, Linuo Paradigma and Linuo Solar are included here. In order to receive the label, three steps must be undertaken:

- checking for adherence to the four national standards
- carrying out of performance tests
- inspecting the company – this to be repeated at regular intervals

These tests are carried out by accredited labs. At the moment the label is still young and relatively unknown. To combat this, the CGC started a massive media campaign in 2006 to make users aware of this label. The label may grow in importance when the first foreign suppliers start applying for it. The German-Chinese joint venture Linuo Paradigma is already taking part, and is the first international company to do so.

Sven Tetzlaff, Zhenhua Weng

Sven Tetzlaff, is a S&WE correspondent in Hangzhou, near Shanghai. Zhenhua Weng is a professor at Zhejiang University of Science and Technology.

Further information:

Air Conditioning Institute: www.chinahvac.com.cn

China Academy of Building Research: www.cabr.ac.cn

China General Certification Centre (CGC), Golden Sun certification: www.cgc.org.cn

General Administration of Quality Supervision Inspection and Quarantine of P.R.C: www.aqsiq.gov.cn

These sources are only available in Chinese.

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Photo: Sven Tetzlaff



»We are able to provide Solar Keymark testing«

Professor Ruicheng Zheng is a professor at the China Academy of Building Research and chief engineer at one of the three solar thermal testing institutes, the National Centre for Quality Supervision and Testing of Solar Heating Systems in Beijing. She is also committee director for Solar Thermal Conversion within the Chinese Solar Energy Society.

S&WE: To what extent is your institute similar to the well-known testing institutes in Europe?

Zheng: The Chinese standards largely match the EN or ISO standards. Using our equipment and suitable tests we are thus also able to check that these standards have been met. We are certainly comparable with the German Institute for Thermodynamics and Thermal Engineering (ITW) or the Swiss Institute for Solar Technologies (SPF). We differ in the closer links to governmental and non-government organisations.

S&WE: Chinese manufacturers have complained to S&WE that processing times are long and costs high when making certification applications in Europe and the USA.

Zheng: We are certainly faster and cheaper. The thermal performance test we carry out takes one day including paperwork and costs RMB* 2,500 (equates to €



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250). In Europe this test takes around four days without the paperwork and costs many times more. In China the long term outdoor test costs approx. RMB* 10,000 (approx. € 1,000) and takes about three months, depending on the weather. We are well aware of this advantage and wish to expressly offer our services to foreign manufacturers. Foreign companies pay the same fees.

S&WE: Can you imagine providing a Solar Keymark test in China?

Zheng: Yes, of course. We are able to do this in terms of both our equipment and the training level of our personnel. It depends solely on the Europeans. We are open to all forms of cooperation with foreign institutes and organisations.

S&WE: How many companies make use of the opportunity to have their products tested by you? After all, such a good price also makes it possible to evaluate prototypes.

Zheng: Unfortunately not very many. Just 10% of manufacturers use this service. As the test is voluntary and there is no public pressure yet either, the small companies often decide to put their products onto the market without having them tested.

S&WE: If I am a foreign company wishing to sell my collectors in China, do I not need a test?

Zheng: In this case the tests are obligatory. Chinese companies may be chosen at random during country-wide tests by the government. The results of these unannounced and compulsory tests are published on a website. The last such test took place in 2004, however. Foreign companies cannot be covered by such random sampling.

S&WE: In what way is your institute different from, say, the one in Wuhan (see table 2)?

Zheng: The Beijing institute is more internationally orientated. This means that it is mainly companies wishing to export which come here. In Wuhan, however, the strengths lie in the home market. But we are the same in terms of the equipment, the qualified staff and the links to the government.

S&WE: What do you wish for your institute in the future?

Zheng: That more Chinese companies know of and use our services. But it is also important for me that manufacturers from Europe and the USA hear about us, and use our services for their product development or their activities in China. *

The interview was conducted by Sven Tetzlaff.

* RMB stands for the Chinese currency Yuan.

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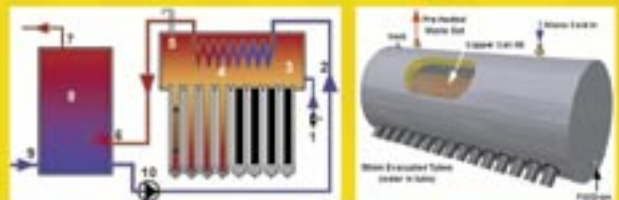
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