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# QUALITY CONTROL AND MARKET SUPERVISION OF COMPACT FLUORESCENT LAMPS IN CHINA



April 2010

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**The views expressed in this discussion paper do not necessarily reflect the views of the United States Agency for International Development or the United States Government. International Resources Group (IRG) prepared this report under the ECO-Asia Clean Development and Climate Program. Contract No. EPP-1-100-03-00013-00 Task Order 9.**

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# TABLE OF CONTENTS

ACKNOWLEDGMENTS .....	3
ACRONYMS.....	4
EXECUTIVE SUMMARY .....	5
INTRODUCTION.....	12
<b>SECTION 1: CFLS IN CHINA.....</b>	<b>14</b>
1.1 CFL Production in China.....	14
1.2 CFL Domestic Sales and Export Market .....	15
1.3 CFL Promotion Programs in China.....	17
1.4 Importance of Quality Control of CFLs in China.....	18
<b>SECTION 2: LAWS, REGULATIONS AND STANDARDS RELATED TO QUALITY</b>	
<b>SUPERVISION OF CFLS IN CHINA .....</b>	<b>19</b>
2.1 Laws and Regulations Related to Product Quality Supervision.....	9
2.2 National Standards Related to CFL Performance, Safety and Energy Efficiency.....	20
2.2.1 GB16844-1997, <i>Safety Requirements for Self-Ballasted Fluorescent Lamps for General Lighting Use</i> .....	21
2.2.2 GB/T17263-2002, <i>Performance Requirements for Self-ballasted Fluorescent Lamps for General Lighting Use</i> .....	21
2.2.3 GB17625.1-2003, <i>Electromagnetic Compatibility (EMC) Limits: Limits for Harmonic Current Emissions (equipment input current <math>\leq 16A</math> per phase)</i> .....	24
2.2.4 GB19044-2003, <i>The Limited Value and Grade of Energy Efficiency of Self-ballasted Fluorescent Lamps for General Lighting Use</i> .....	24
2.2.5 Chinese Restrictions on Hazardous Substances (RoHS).....	25
2.3 Development Trends of CFL Regulations and Standards.....	25
2.4 Impacts of Regulations on CFL Quality.....	26
<b>SECTION 3: ORGANIZATIONS AND INSTITUTIONS RELATED TO QUALITY</b>	
<b>SUPERVISION OF CFLS IN CHINA .....</b>	<b>27</b>
3.1 Quality Supervision System in China.....	27
3.2 Responsibilities of Relevant National Organizations and Institutions.....	29
3.2.1 General Administration of Quality Supervision, Inspection and Quarantine (AQSIQ) .....	29
3.2.2 State Administration for Industry and Commerce (SAIC) .....	30
3.2.3 China Consumers' Association (CCA) .....	31

3.2.4 China Association of Lighting Industry (CALI).....	31
3.2.5 China Quality Certification Center (CQC).....	32
3.2.6 China National Institution of Standardization (CNIS).....	32
3.2.7 Technical Support Organizations .....	32
<b>SECTION 4: QUALITY SUPERVISION PRACTICE OF CFLS IN CHINA.....</b>	<b>33</b>
4.1 National Supervision and Inspection (NSI) on Quality.....	33
4.1.1 National Standards for NSI of CFLs.....	33
4.1.2 The Results of NSI on CFLs .....	34
4.2 Inspections of the State Administration for Industry and Commerce (SAIC).....	37
4.3 Supervision of Consumers' Association (CCA) .....	39
4.4 Other Mechanisms for Quality Monitoring of CFLs.....	40
4.4.1 Energy Conservation Certification Program .....	40
4.4.2 Energy Label Program.....	40
4.4.3 Enterprises' Self-Discipline.....	41
4.5 Quality Monitoring of CFLs for Export.....	42
<b>SECTION 5: SUMMARY AND RECOMMENDATIONS.....</b>	<b>43</b>
5.1 Summary.....	43
5.2 Recommendations.....	44
5.2.1 Strengthen Enforcement of Quality Supervision.....	44
5.2.2 Strengthen the Development of CFL Standards.....	44
5.2.3 Facilitate Information Sharing and Exchange.....	45
5.2.4 Strengthen Training and Awareness-raising Programs .....	45
5.2.5 Strengthen Quality Supervision of CFLs for Export.....	45
5.2.6 Develop a Standard Set of Recommendations for Purchasers and Consumers.....	45
<b>REFERENCES.....</b>	<b>46</b>
<b>ANNEX 1: LAWS RELATED TO PRODUCT QUALITY SUPERVISION.....</b>	<b>47</b>
<b>ANNEX 2: GUIDELINES FOR NATIONAL QUALITY SUPERVISION AND SAMPLING EXAMINATION .....</b>	<b>51</b>
<b>ANNEX 3: IMPLEMENTATION SPECIFICATIONS FOR PRODUCT QUALITY SUPERVISION AND SAMPLING INSPECTION FOR SELF-BALLASTED FLUORESCENT LAMPS FOR GENERAL LIGHTING SERVICE.....</b>	<b>53</b>



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# ACRONYMS

<b>AGO</b>	Australian Greenhouse Office	<b>ISO</b>	International Organization for Standardization
<b>AIC</b>	Administration for Industry and Commerce	<b>MEP</b>	Ministry of Environmental Protection of the People's Republic of China
<b>AQSIQ</b>	General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China	<b>MOF</b>	Ministry of Finance of the People's Republic of China
<b>CALI</b>	China Association of Lighting Industry	<b>NDRC</b>	National Development and Reform Commission
<b>CCA</b>	China Consumers' Association	<b>NLTC</b>	National Lighting Test Center
<b>CCC</b>	China Compulsory Certification	<b>NSI</b>	National Supervision and Inspection
<b>CFL</b>	compact fluorescent lamp	<b>NVLAP</b>	National Voluntary Laboratory Accreditation Program
<b>CNAS</b>	China National Accreditation Board for Laboratories	<b>OEM</b>	original equipment manufacturer
<b>CNCA</b>	Certification and Accreditation Administration of the People's Republic of China	<b>QS</b>	quality safety
<b>CNIS</b>	China National Institute of Standardization	<b>RMB</b>	Chinese Renminbi
<b>CQC</b>	China Quality Certification Center	<b>RoHS</b>	Chinese Restrictions of Hazardous Substances Directive
<b>CRI</b>	color rendering index	<b>SAC</b>	Standardization Administration of the People's Republic of China
<b>CSC</b>	China Standard Certification Center	<b>SAIC</b>	State Administration for Industry and Commerce of the People's Republic of China
<b>DERC</b>	Department of Environment and Resource Conservation	<b>SDCM</b>	standard deviation of color matching
<b>ECO-Asia</b>	Environment Cooperation -Asia Clean Development and Climate Program	<b>UK</b>	United Kingdom
<b>EMC</b>	electromagnetic compatibility	<b>UL</b>	Underwriters Laboratories
<b>EPA</b>	Environmental Protection Agency	<b>UNDP</b>	United Nations Development Programme
<b>EST</b>	Energy Saving Trust	<b>USAID/ RDMA</b>	United States Agency for International Development, Regional Development Mission for Asia
<b>GEF</b>	Global Environment Facility		
<b>IEA</b>	International Energy Agency		
<b>IEC</b>	International Electrotechnical Commission		

# EXECUTIVE SUMMARY

## INTRODUCTION

The USAID Environmental Cooperation-Asia Clean Development and Climate Program (ECO-Asia) has been working closely with China's National Lighting Test Center (NLTC) and key Chinese quality supervision agencies to strengthen governance systems for the supervision of quality and compliance of energy-saving compact fluorescent lamps (CFLs). The objective of the project is to review the process for product quality supervision, share this information with Chinese policymakers, and ensure that lessons learned and best practices from China are disseminated to policymakers in Asia.

The report "Quality Control and Market Supervision of CFLs in China" was prepared by NLTC, with input from ECO-Asia. It provides an overview of the existing framework, practices and factors affecting quality control monitoring and compliance of CFLs in China, and identifies opportunities for cooperation and improvement in the governance capacity for quality control of CFLs produced in China, both for domestic sale and for export. As the largest CFL manufacturer in the world, China offers important lessons in how to meet increased worldwide demand. This has positive implications for other countries, particularly developing nations. The report covers the history and current state of the CFL industry in China and provides an overview of Chinese laws, regulations and standards related to quality supervision of CFLs. It describes the institutional framework for quality supervision of CFLs in China and summarizes the practices and measures taken to monitor and to supervise the quality of CFLs made in China, and offers some observations and recommendations for further consideration.

## CURRENT STATE OF CFLs IN CHINA

Compact fluorescent lamps (CFLs) use up to 75 percent less energy and typically last six to 10 times longer than standard incandescent lamps, and thus carry much potential as a highly viable, cost-effective alternative. China's long-term investment in the development and production of CFLs over the past decade has earned it an enviable position amid the escalating global demand for affordable, eco-friendly lighting products. In 12 years (1996-2007), China's CFL output grew 30-fold, catapulting it to first place among manufacturers worldwide in output and exports. In 2007, China's total production of CFLs was about 3 billion, a 25 percent increase from 2006 (see Figure 1).<sup>2</sup> Current and upcoming phase-out programs for incandescent bulbs around the world<sup>3</sup> will, at the very least, maintain current levels of Chinese CFL production.

The rapid increase in the production and marketing of CFLs has led to serious concerns about product quality. New manufacturers with unproven track records and limited experience have entered the market, and existing manufacturers are stretching to expand their production capacities, while government agencies and bulk buyers are seeking ways to justify and ensure their investments in CFLs. Therefore, the need to sustain or further improve CFL quality has become critical. To retain its lead in this competitive market, China's must not only maintain its current quality control regime but also discover, share and apply the lessons learned from its current efforts.

Currently, there are more than 300 CFL manufacturers in China, of which about 100 have considerable production scale.<sup>4</sup> The bulk of CFL manufacturing is concentrated in the provinces of Zhejiang, Fujian, Guangdong, Jiangsu and

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<sup>1</sup> USAID, Confidence in Quality-Harmonization of CFLs to Help Asia Address Climate Change, 2007.

<sup>2</sup> Mr. Hua Shuming (NLTC), 'Current Situation of CFL Product in China', presented at the Asia Clean Energy Forum, Manila, 2008

<sup>3</sup> More than 40 countries have announced plans to phase out standard incandescent lamps and shift to efficient lighting technologies, including CFLs.

<sup>4</sup> Mr. Hua Shuming (NLTC), 'Experiences and Challenges in China on Enhancing Compliance, Monitoring and Evaluation of CFLs', presented at IEA conference, February 2008.

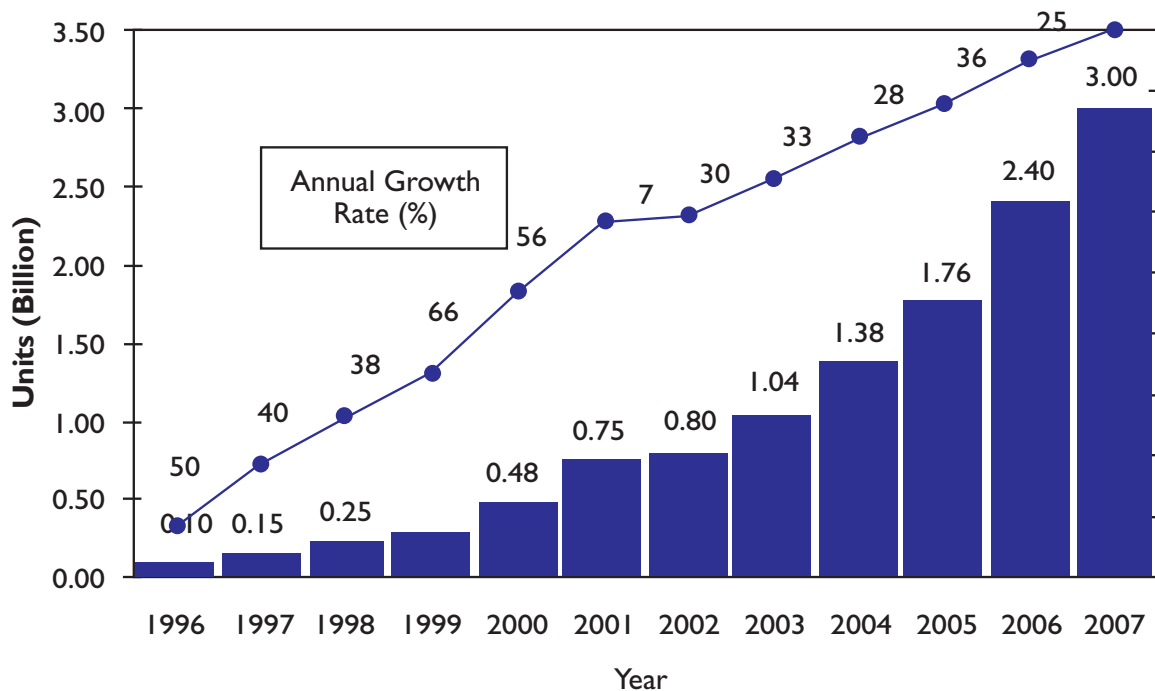
Shanghai.

More than 70 percent of CFLs produced in China are exported, reaching 170 countries around the world. The top five importers of Chinese CFLs are the United States, Indonesia, India, Brazil, and Korea, which together imported about 36 percent of total Chinese production in 2007

That year, 800 million CFLs were sold in the domestic market, which accounts for approximately 27 percent of China's total production. For incandescent bulbs, the total production in 2007 was 4.44 billion bulbs, of which 1.9 billion were sold domestically.<sup>5</sup>

During the rapid growth phase, with the global emphasis on large production volumes and price, and with many smaller

**FIGURE I. Annual CFL Production and Growth Rate in China, 1996-2007**



companies using manual assembly to produce CFLs, the overall quality of the product began to decline. To deal with this problem, the Chinese government adopted a series of measures to regulate CFL production and the CFL market in China. This has helped improve the overall quality of CFLs produced in China.

### LAWS, REGULATIONS AND AGENCIES RESPONSIBLE FOR CFL QUALITY

The Chinese government has developed and enacted a series of laws governing domestic product quality supervision, standards and the protection of con-

sumer rights and interests. These laws provide a legal basis for product quality supervision and inspection. The government has issued safety and performance standards, including regulations on hazardous substances in lighting products. Before the 1980s, China used its own national standards and sometimes Soviet Union standards. However, with the expansion in the variety and manufacturing output of CFLs, China has since the 1980s gradually moved to using standards of the International Electrotechnical Commission (IEC) as its reference for national product standards. Along with the continuous improvement of national standards, China now also actively participates in the formulation and implementation of the IEC's international standards.

<sup>5</sup> 'Progress and Barriers on Phasing out Incandescent Bulbs in China', *China Energy*, 2009.



China has a well-established institutional framework for product quality supervision and inspection to support these regulations. The system can be divided into categories covering administration, social supervision, the certification/

labeling program and industrial self-discipline. Table I summarizes the quality supervision and inspection system for lighting products sold in China.

**TABLE I.** Quality Supervision and Inspection System (Products Sold in China)

<b>Product Supervision and Inspection System</b>	<b>National Institutions or Organizations</b>	<b>Duties</b>
Administrative supervision and inspection	General Administration of Quality Supervision, Inspection and Quarantine (AQSIQ)	Implement National Product Quality Supervision and Inspection
	State Administration for Industry and Commerce (SAIC)	In charge of market supervision and regulation
Social supervision and inspection	China Consumers' Association (CCA)	Participate in supervision and inspection of commodities and services regulated by relevant administrative departments
Certification and labeling programs	China Quality Certification Center (CQC)	Implement Energy Conservation Certification Program
	China National Institute of Standardization (CNIS)	Implement Energy Label program
Industry self-discipline	China Association of Lighting Industry (CALI)	Promote the healthy development of lighting industry
Technical support organizations	National Technical Committee on Lighting of Standardization Administration	Formulate national lighting standards
	National Lighting Test Center (NLTC)	Undertake testing of lighting products for quality supervision

The situation is much different for exported products, for which the above laws and regulations do not apply. Some provinces have instituted their own export regulations, and some local governments have issued regulations covering supervision and inspection of products for export. Zhejiang,

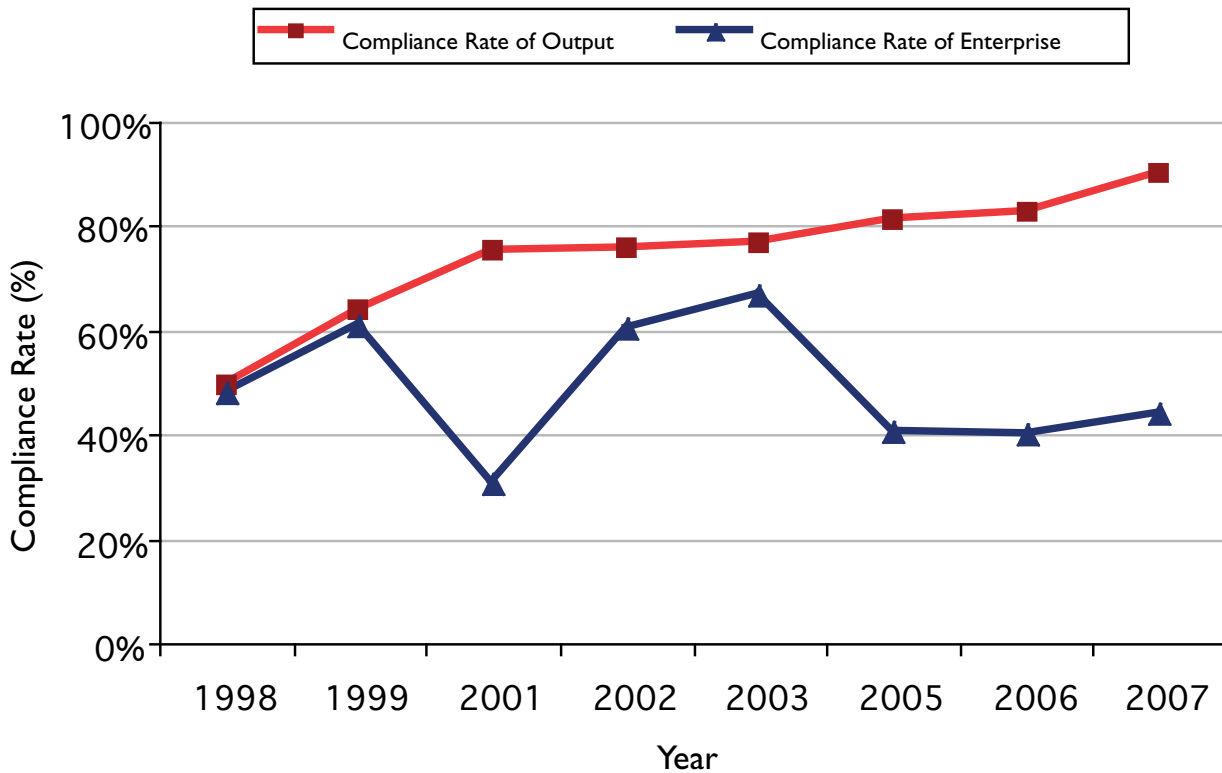
for example, monitors CFL exports, inspects export shipments and oversees manufacturers' quality control. However, in general, the approach taken by China is in line with all major exporting nations: The products supplied are as specified by the purchaser. In other words, it is the purchas-

er's responsibility to ensure that the product specifications comply with the regulations and market needs of the importing country. Unfortunately, one commonly cited issue is the lack of technological expertise among managers of bulk procurements: buyers unschooled in technical product specifications tend to purchase stock with an eye on profit and market share, rather than product quality.

## TRENDS IN COMPLIANCE

Since 1998, China conducted an annual National Supervision and Inspection (NSI) Test on CFLs. The tests are carried out for both CFLs sampled at factories, as well as in the marketplace.

**FIGURE 2.** NSI Compliance Rates of Manufacturers and Output for CFLs<sup>6</sup> (1998-2007)



## CFL QUALITY AT THE MANUFACTURERS

Figure 2 shows NSI-tested compliance rates as a share of manufacturers and as a share of total CFL output. In 1998, the compliance rates were about 50 percent for both, which means that 50 percent of manufacturers met national standards, as did 50 percent of all products tested at

CFL factories. Since then, the compliance rate for total CFL output has increased to nearly 90 percent. At the same time, the compliance rate for manufacturers has varied, but is now slightly more than 40 percent. This means that while 90 percent of CFLs tested at factories around China meet national product standards, only 40 percent of the manufacturing plants sampled produce CFLs that meet the national standards. This divergence occurs because 10 percent of CFL

<sup>6</sup> From NSI data for years given

producers (large- and medium-sized enterprises) make 90 percent of all CFLs in China, so that products from these larger suppliers, which tend to be of better quality, dominate the CFL quality assessments.

## CFL QUALITY IN THE MARKETPLACE

According to the regulation, 'Methods on Inspection of the Quality of Commodities in the Circulation Sector', issued by the State Administration for Industry and Commerce (SAIC) of China in 2005, SAIC is responsible for assigning enforcement officers and testing institutes to sample and test products from the distribution and retail chain and for releasing the inspection results. When the SAIC conducts CFL market supervision, nationally-accredited lighting test laboratories do the testing; when a local administrative department of industry and commerce conducts CFL market supervision, it uses local professional lighting test laboratories.

Figure 3 shows 2006 data that compare the national standards compliance rate for CFLs purchased at different types of stores. CFLs from large-box supermarkets (i.e. hypermar-

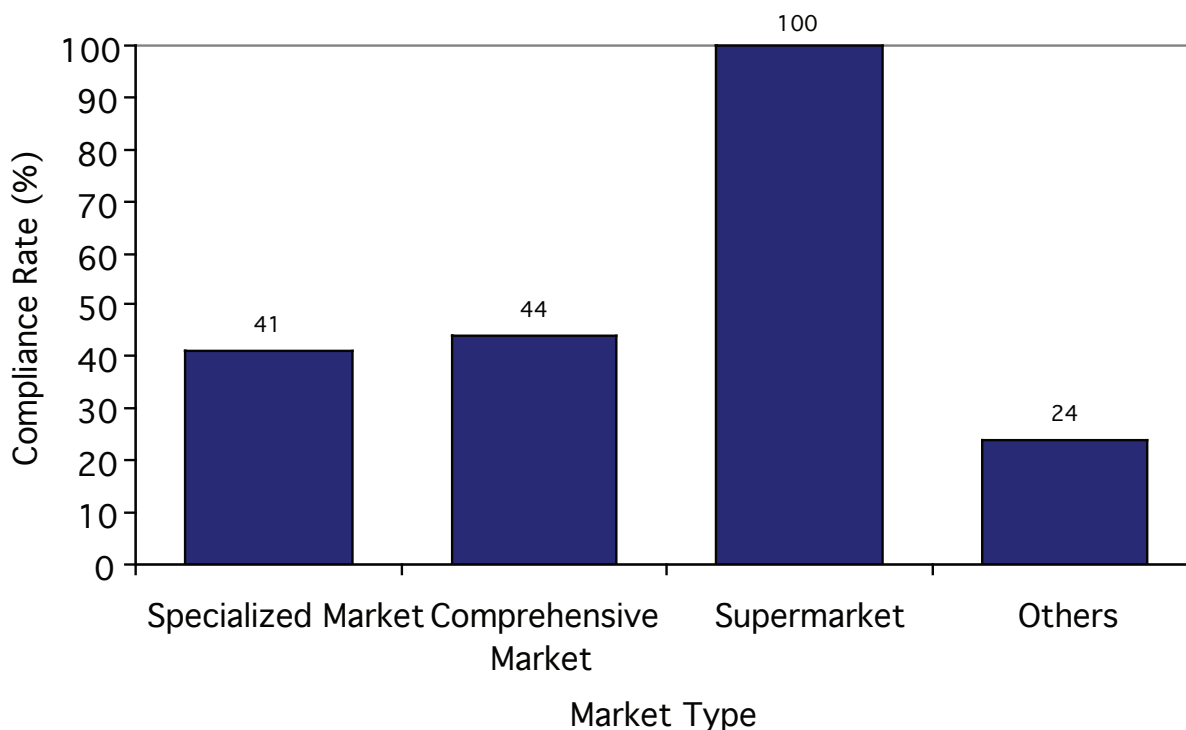
kets like Wal-Mart) are virtually 100 percent compliant, but CFLs from specialized stores (i.e. building supply stores) and department stores are much less compliant, in the range of 40-50 percent, while only one in four CFLs from "other" stores complied with national standards. The inference is that large-box retailers place strong emphasis on their own brand (or franchise) identity, and employ a stricter quality control system for products they sell.

## SUMMARY ANALYSIS AND RECOMMENDATIONS

### Summary

In general, the product quality supervision system in China is well established and functions effectively. To some degree, China has been successful in addressing serious product quality control problems. However, the country's history of quality supervision is relatively short. With rapidly expanding domestic and import/export markets, the current system will need to stay ahead of CFL developments and continuously improve. Key challenges or concerns include:

**FIGURE 3.** Compliance Rate of CFLs Collected from Different Types of Stores



- Product quality supervision is dependent on government administrative supervision. Meeting the demands of a rapidly expanding product market will challenge budgets and personnel.
- Several national organizations are involved in the product quality supervision system. However, information-sharing and exchange mechanisms need to be further improved to increase the effectiveness of product quality supervision.
- Product quality is determined not only by product design, manufacturing, and utilization rates, but also by factors like raw materials, shipping, and distribution and recycling. Besides the product quality supervision on finished-products, government should strengthen the supervision of raw materials, shipping, distribution and recycling.
- Training local administrative departments to improve their professional skills and help them better understand market needs is very important in ensuring the effectiveness of supervision and needs continual improvement.

The inspection and management of production, along with the increased promotion of national standards and requirements within businesses, have helped to steadily improve the quality of CFLs produced in China. Thanks to a decade of effective supervision and management, the compliance rate of output for CFLs reached 90 percent in 2007. However, only 40 percent of manufacturers comply with China's national product quality standards for CFLs. There remain a number of specific challenges:

- The sampling summary indicates that higher compliance rates require more stringent oversight. The quality supervision system needs to be strengthened and further improved, especially in cities and regions with low CFL compliance rates.
- Quality supervision is mainly focused on strategies to control product safety and performance. Recently, mercury content testing has been initiated. However, opportunities exist to consider heightened control of hazardous substances in CFLs at the state and local level to prevent future pollution caused by product manufacturing, use and disposal.
- The overall compliance rate of CFL manufacturers is quite low compared to that of CFL output because of the large

number of smaller, poorer-quality manufacturers. Corporate self-discipline is very important for maintaining the health and sustainable development of the whole CFL industry. However, the current degree of self-discipline among companies is quite weak compared to other measures for quality control, and potential exists for strengthening.

- Poor-quality products have taken advantage of price competition in a number of overseas markets in Asia, and supervision where the consumer purchases CFL products could be improved. Thus, strengthened supervision in the distribution and retail sector is needed.

## Recommendations

The study team recommends that the following measures be taken to improve quality supervision of CFLs in China:

### 1. Strengthen Enforcement of Quality Supervision

- Currently, laws and regulations related to product quality supervision impose insufficient penalties for illegal actions and non-compliant products. Strong penalties are essential to ensure effective quality supervision; otherwise, manufacturers and distributors punished for non-compliant products may become repeat offenders.
- Media should be encouraged to expose enterprises with inferior products as well as praise those with high-quality products. Media outlets are powerful tools that can have an impact on suppliers' reputations.
- Local Bureaus of Quality and Technical Supervision, and local Administrations for Industry and Commerce (AIC), are the main implementing organizations. Training to improve personnel professional skills and capacities for enforcement of supervision at these local administrative departments is recommended.

### 2. Strengthen the Development of CFL Standards

- Chinese policymakers and regulators should actively participate in the formulation of international standards, such as IEC standards, to build a solid foundation for the harmonization of Chinese and international standards.
- Regulators should better understand current levels of national and international raw material and product

performance to allow the formulation of appropriate product performance standards.

- Policymakers should work with regional organizations to foster discussion on a common set of quality standards for CFLs, in order to share relevant Chinese experience and improve the reputation of Chinese CFLs.

### **3. Facilitate Information-Sharing and Exchange**

- Chinese policymakers and regulators could actively participate in international lighting events and programs, to build an international platform from which to share experiences, information and technology, and promote mutual recognition of testing results. This platform could also provide technical consultancy for policymakers of various countries.

### **4. Strengthen Training and Awareness-Raising Programs**

- Accredited testing institutions could organize a series of systematic technical and standardization training programs aimed at technicians and managers of lighting enterprises, to help them better understand the market and standards requirements, and quality assurance procedures. Such

programs could also provide technical support for companies to establish internal laboratories to test product quality and set internal quality control systems and benchmarking.

- Organize training programs for distributors and market management personnel to help them recognize good quality CFLs.

As with most countries, China does not regulate products for export (although the government may wish to examine the successful regulation of exports from Zhejiang Province). In line with other countries, China believes that the country of destination should implement appropriate local regulations and enforcement (as China does for products entering its market). However, this sometimes leads to supervision problems with manufacturers that claim to produce only for export, but that also supply to the local market. Increased harmonization of international standards (including China) will assist in pressuring all manufacturers to begin to build products to similar standards. Foreign purchasers should also be encouraged to review information on CFL product quality information published by the Chinese government, so as to avoid purchasing products manufactured by unqualified businesses.



# INTRODUCTION

## BACKGROUND

Worldwide, grid-based electric lighting consumes 19 percent of total electricity production and is associated with 1.9 billion metric tons of CO<sub>2</sub> emissions a year. The universal need for light makes it one of the most attractive targets for global conservation efforts. Most of the world's general lighting is provided by inefficient incandescent bulbs.<sup>7</sup> Phasing out these low-efficiency lights in favor of high-efficiency replacements would simultaneously realize energy-savings and emission-reduction targets while supporting the sustainable development of global energy resources and prudent environmental protection practices.

On February 20, 2007, Australia announced it would phase out the sale of incandescent light bulbs by 2010, replacing them with CFLs and other efficient alternatives. Since Australia's announcement, more than 40 nations worldwide have committed to phasing out the use of incandescent lamps.<sup>8</sup>

On May 1, 2008, a national project in China to phase out incandescent bulbs and promote energy-saving lamps, jointly initiated by China's National Development and Reform Commission (NDRC) and the United Nations Development Programme (UNDP), was approved by the Global Environment Facility (GEF). The project aims to accelerate the transition from incandescent bulbs, ultimately phasing out their use in China.

China's investment in the development and production of CFLs over the past decade has earned it an enviable position amid the escalating global demand for cost-efficient, environmentally-friendly lighting products. In 12 years (1996-2007),

China's CFL output has multiplied 30 times, catapulting it to first place among manufacturers worldwide in both output and export levels. In 2007, the total production of CFLs in China was about 3 billion, an increase of 25 percent from 2006.<sup>9</sup> The near-term potential for CFL production also remains significant, as China's initiatives to phase out incandescent bulb use and to support the transition of their manufacturers to CFL can combine to increase—or at least maintain—the country's CFL output and export totals.

The increase in CFL use, production, and market viability has led to significant challenges. New manufacturers with unproven track records and limited experience have entered the market, and existing manufacturers are stretching to expand their production capacities while government agencies and buyers seek ways to justify and insure their investments in CFLs. Therefore, the need to sustain or further improve CFL quality worldwide has become extremely important.

To retain its lead in this competitive market, China will not only have to maintain its current quality control regime but must also discover, share and apply the lessons learned from its current efforts. Thus, it is imperative that China strengthen its governance capacity for quality monitoring of CFLs produced in China, both for domestic sale and, where practical, for export.<sup>10</sup>

## PURPOSE OF THE REPORT

This report provides an overview of the existing framework and practices on quality monitoring of CFLs in China. It assesses factors affecting quality

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<sup>7</sup> GEF, 'Global Market Transformation for Efficient Lighting', a GEF project document released on the GEF website, <http://www.gefonline.org/projectDetailsSQL.cfm?projID=3457>.

<sup>8</sup> USAID, 'Confidence in Quality-Harmonization of CFLs to Help Asia Address Climate Change', Appendix C - International Actions on CFLs, 2007.

<sup>9</sup> Mr. Hua Shuming (NLTC), 'Current Situation of CFL Product in China', presented at Asia Clean Energy Forum, Manila, 2008

<sup>10</sup> As an added benefit, the improvements in CFL quality can also significantly reduce waste from both burned out incandescent and CFL lamps, as well as mercury emissions from CFL production lines and prematurely failed CFLs.

control and compliance, and identifies opportunities for cooperation and improvement in the governance capacity for quality control of CFLs produced in China. As the largest CFL manufacturing base in the world, China offers important lessons in how to meet increased worldwide demand. This has positive implications for other countries, particularly developing nations. Since most of the world's CFLs come from China, ensuring high-quality CFL production would serve to increase efficiency and reduce greenhouse gas emissions not only in China but around the world.

The report covers the history and current state of the CFL industry in China and provides an overview of Chinese laws, regulations and standards related to quality supervision of CFLs. It examines the institutional framework for quality supervision of CFLs in China and summarizes the practices and measures taken for quality supervision of CFLs and the monitoring of results. Finally, it offers observations and recommendations for moving forward.

## METHODOLOGY

A project team made up of lighting specialists from the National Lighting Test Center (NLTC), carried out the research for this report from June 2008 to March 2009. A Roundtable on CFL Monitoring and Quality Control in China, jointly organized by NLTC and USAID's ECO-Asia Clean Development and Climate Program (ECO-Asia), was held in Beijing on July 22, 2008. The aim of the workshop was to launch this study, develop a work plan, and establish relevant partnerships with lighting research institutes, certification bodies, manufacturers and lighting associations. Data used for analysis of this report came mainly from published data; all the analysis was made by NLTC. Initial findings by the team were presented and discussed at a follow-up workshop at NLTC in Beijing on September 21, 2009, and finalized in this report. International lighting specialists also reviewed and contributed their international experiences and lessons learned.

## SECTION I:

# CFLS IN CHINA

## I.1 CFL PRODUCTION IN CHINA

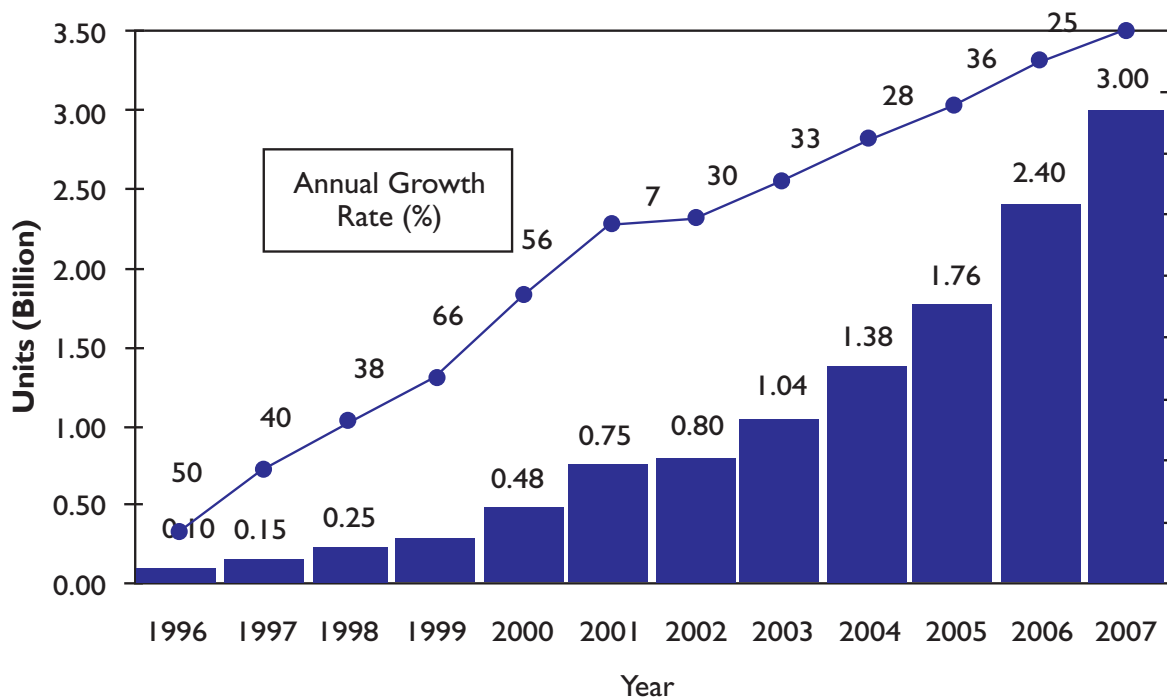
When first introduced, CFLs represented a relatively new lighting technology, and were not easily adopted by consumers initially. However, as the technology matured and their performance and versatility improved, CFLs are now available in many markets as the leading alternative to incandescent bulbs.

The CFL industry has developed rapidly in the past decades, especially in China. As previously noted, CFL output in China mushroomed 30 times from 1996-2007 (See Figure I-1).<sup>11</sup>

Following the launch of the China Green Lights Project in

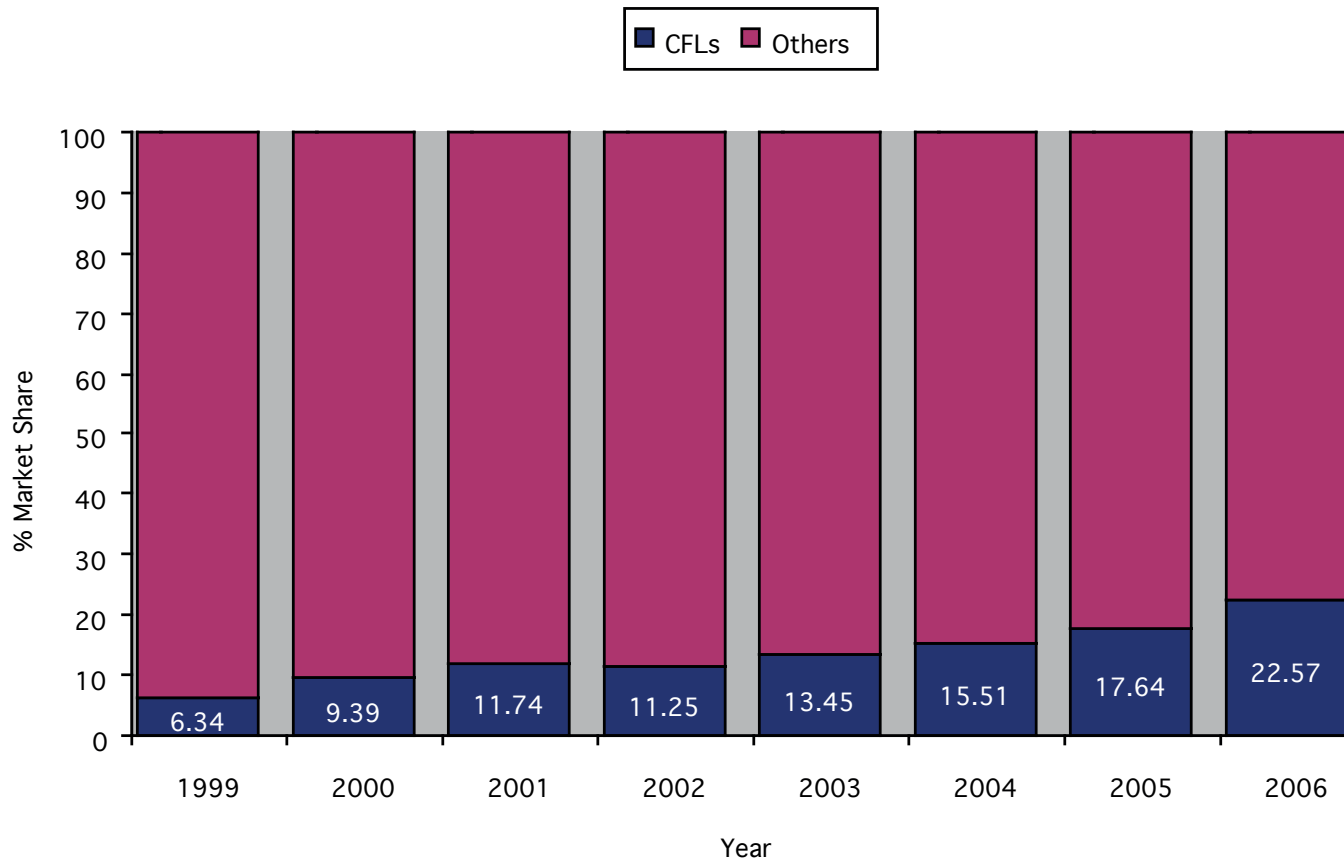
1996,<sup>12</sup> the CFL industry began to develop rapidly: the average annual growth rate of CFL production in China from 1997 to 2007 was 37.1 percent. However, with the emphasis on production volume and price, combined with more and more small-sized businesses and manual workshops producing CFLs, quality began to decline (as measured by the Chinese government's National Supervision and Inspection test). Subsequently, the government adopted a series of measures to regulate CFL production and the market. Some nearly bankrupt, small-sized and state-owned enterprises were integrated and reconstructed. This transition led the lowest annual growth rate of 6.67 percent in 2002, but growth has since recovered.

**FIGURE I-1.** Annual CFL Production and Growth Rate in China, 1996-2007



<sup>11</sup> Mr. Chen Yansheng (CALI), 'CFLs in China', presentation, 2008.

<sup>12</sup> Refer to Section 1.3 for further details.

**FIGURE I-2.** CFL Production As a Proportion of all Lighting Produced in China, 1996-2007

In 2002, significant reform occurred with the readjustment of China's lighting manufacturers' structures and systems. This also had an impact on CFL production. Since 2002, there has been a gradual increase in the number of large-scale lighting businesses. Currently, there are over 300 manufacturers in China, about one third of which have considerable production scale.<sup>13</sup>

CFLs are steadily capturing a large proportion of the total lighting produced in China (see Figure I-2). CFL products rose from 6.34 percent of all lighting sources in 1999 to 22.57 percent in 2006. The bulk of CFL manufacturing is concentrated in Zhejiang, Fujian, Guangdong, Jiangsu and Shanghai, where CFL production in 2007 was 1.062 billion, 621 million, 600 million, 426 million and 128 million units, respectively.<sup>14</sup> The top three companies in terms of CFL

annual production are: Zhejiang Yankon Group, Shanghai Zhenxin Electronic Engineering Co. Ltd, and Xiamen Topstar Lighting Co. Ltd.<sup>15</sup>

## 1.2 CFL DOMESTIC SALES AND EXPORT MARKET

In 2007, 800 million CFLs were sold in the domestic Chinese market, accounting for only 27 percent of total CFL production in China, while 1.9 billion incandescent bulbs were sold domestically in 2007, from annual production of 4.44 billion incandescents.<sup>16</sup> Thus, sales of CFLs in China lag behind incandescent bulbs by more than two to one. The proportion of incandescent bulbs in medium and small cities is above 50 percent, and in rural areas this rate is even higher. Use of CFLs is uncommon to non-existent in

<sup>13</sup> Mr. Hua Shuming (NLTC), 'Experiences and Challenges in China on Enhancing Compliance, Monitoring and Evaluation of CFLs', presented at IEA conference, February 2008.

<sup>14</sup> 'Research Report on Lighting Industry in China in 2007', China Light & Lighting, 2009.

<sup>15</sup> Ibid.

<sup>16</sup> 'Progress and Barriers on Phasing out Incandescent Bulbs in China', China Energy, 2009.

rural areas, because:

- Many rural residents live at subsistence levels and cannot afford to budget for specialty items, particularly lighting that is 10 to 20 times the average price of an incandescent bulb.
- Rural citizens have little knowledge of CFL technology and are used to buying incandescent bulbs.
- Rural residents have low rates of energy-saving awareness and concern.

Power supply is unstable in some of the more remote areas, which could affect the performance and quality of CFLs.

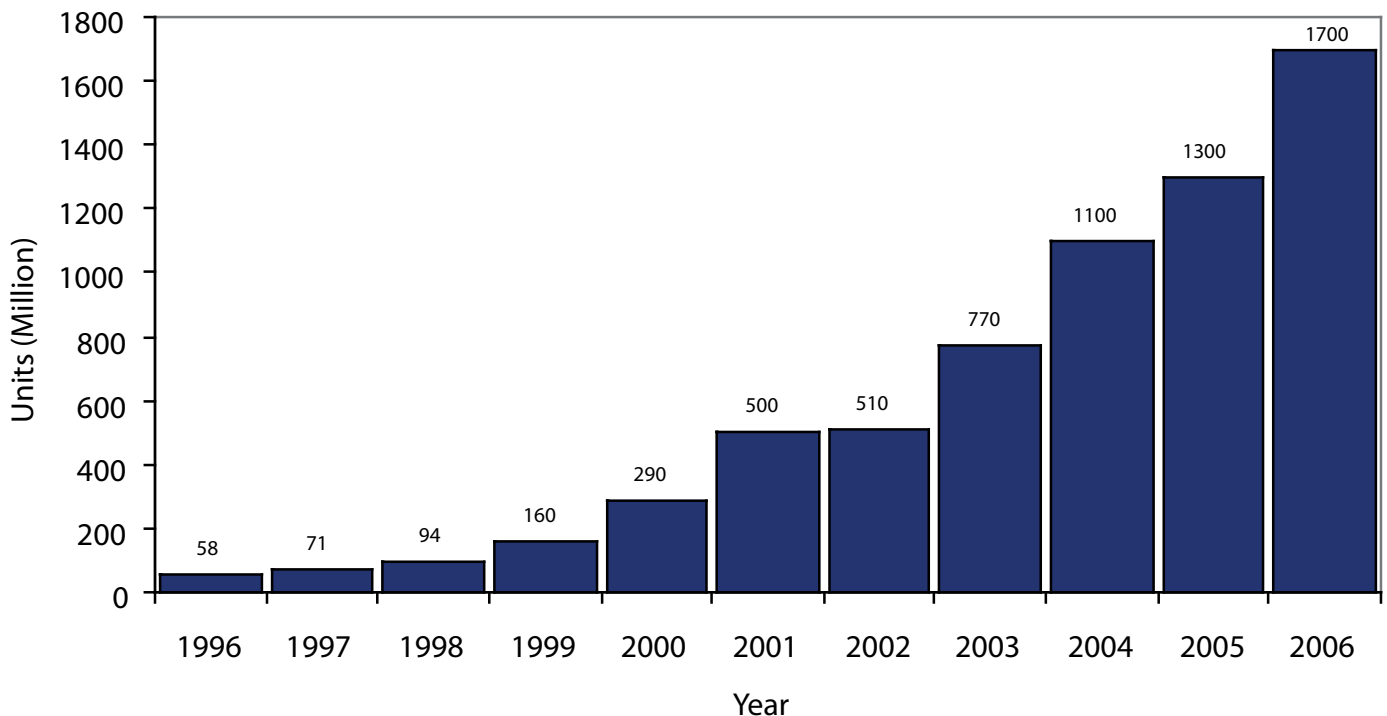
Beijing, Shanghai and other medium-to-large cities comprise the dominant market arena for CFLs. Prices of CFLs sold in the domestic market range from RMB8-30 (US \$1.2-4.3). CFLs from internationally well-known brands, such as Philips, OSRAM and GE, and famous domestic brands such as Yankon, TCP and Topstar, normally sell for RMB20-30 (US \$2.9-4.3). Good quality but less well-known domestic brands

retail for approximately RMB13-20 (US \$1.86-2.86). Some poor-quality unknown brands sell for less than RMB10 (US \$1.43).

More than 70 percent of CFLs produced in China are exported worldwide. Figure I-3 provides a glimpse of China's CFL exports from 1996 to 2006.<sup>17</sup> The top five importers of CFLs from China are listed in Table I-1<sup>18</sup>.

CFLs exported to South America and Asia are generally considered to be in a quality class below those exported to North America and Europe where many products comply with international quality specifications such as US Energy Star or the UK's Energy Saving Trust's requirements. Buyers in South America and Asia are more inclined to accept lower technical standards in exchange for more favorable pricing. Table I-1 shows that the US is China's biggest export market. Due to the economic crisis, however, American procurement of CFLs has declined rapidly, depressing China's CFL industry and forcing some companies to cut production.

**FIGURE I-3.** China's CFL Exports, 1996-2006



<sup>17</sup> Mr. Chen Yansheng (CALI), 'CFLs in China', presentation, 2008.

<sup>18</sup> 'Research Report on Lighting Industry in China in 2007', *China Light & Lighting*, 2009.



**TABLE I-1. Top Five Countries Importing CFLs from China (2007)**

<b>Country</b>	<b>CFLs imported (Million)</b>
<b>U.S.A.</b>	<b>475</b>
<b>Indonesia</b>	<b>190</b>
<b>India</b>	<b>179</b>
<b>Brazil</b>	<b>125</b>
<b>Korea</b>	<b>106</b>

### **I.3 CFL PROMOTION PROGRAMS IN CHINA**

Given its high energy consumption and low energy-efficiency rates, China's government has devoted a great deal of attention to energy saving and energy security.

In 1997, the Global Environment Facility (GEF) funded the first phase of the China Green Lights Project. Only 150 million CFLs were produced in China at that time. When the project's second phase began in 2002, CFL output had reached 800 million. Currently, the government is planning to implement the project's third phase, which aims to accelerate the transition of lighting companies in China from incandescent to CFL.

Apart from green lighting projects, the Chinese government also established an efficiency procurement mechanism to promote energy-efficient products. In 2004, the Ministry of Finance (MOF) and the National Development and Reform Commission (NDRC) jointly issued the government's procurement list of energy conservation products, including CFLs. In August 2007, the Office of State Council issued directive requiring government institutions at all levels using Finance Ministry funds to give priority to energy-saving products if their technologies and services are satisfactory. It also called for compulsory procurement of specific products if those products complied with relevant energy efficiency and performances standards. CFLs were among the products

listed in the government's initial list.

In order to meet the target set in the eleventh National Five-year Plan, an incentive campaign was unveiled by the NDRC and the MOF in January 2008 to subsidize and promote 150 million energy-saving lamps<sup>19</sup>. This program requires that qualified manufacturers submit to a public bidding process and, if awarded a contract, agree to promote their energy-saving products. This key provision ensures that the subsidies provided directly correlate to the quantity of products sold. Manufacturers are funded indirectly: Their products are sold at a price determined by subtracting the subsidized price from the price quoted in the bid agreement. Additional measures seek to guarantee quality control by soliciting companies with established reputations within the industry; products promoted must be high quality and affordable.

The program also awards consumers: bulk users are awarded rebates at 30 percent of the cost mentioned in the bid contracts, while urban and rural residents can save as much as 50 percent. The NDRC estimates that the switch to 150 million energy-efficient lamps could save 29 billion kilowatt-hours of electricity each year and reduce carbon dioxide emission by 29 million metric tons and sulfur dioxide by 290,000 metric tons annually<sup>20</sup>. In three years, 587.08 million RMB (US \$86 million) will be used for this subsidy program. In 2008, 50 million energy saving lamps were produced, among which 29 million were CFLs and 21 million were T8 and T5 fluorescent lamps<sup>21</sup>.

<sup>19</sup> Here, "energy-saving lamps" refers not only to CFLs but also includes other energy-efficient lighting products, such as T8 and T5 fluorescent lamps.

<sup>20</sup> <http://www.ccchina.gov.cn/cn/NewsInfo.asp?NewsId=12522>.

<sup>21</sup> Mr. Hua Shuming (NLTC), 'Current Situation of CFL Product in China', presented at the Asia Clean Energy Forum, Manila, 2008.

## I.4 IMPORTANCE OF QUALITY CONTROL OF CFLS IN CHINA

### QUALITY CONTROL OF CFLS FOR DOMESTIC SALE

China's efforts to promote CFLs in recent years are beginning to pay dividends. CFLs are gradually being embraced by Chinese consumers due to their mature technology, reasonable price and good performance. Despite recent market growth, however, CFL household saturation is still very low throughout China. Overcoming the early market challenges faced by CFLs, specifically issues of performance and quality that led to consumer dissatisfaction, is an important factor.

Secondly, with more than 300 CFL manufacturers in China, continuous growth of the CFL industry is inevitable. So, how to regulate the market and avoid unfair competition is crucial to the industry's health and sustainable development. Market supervision and inspection is the most necessary and

effective measure. In addition, China is facing great pressures in its energy-saving and environmental protection efforts. China's energy demands have roughly doubled over the past 20 years, resulting, on average, in the opening of two new coal-power plants per week. China is now the world's largest greenhouse gas (GHG) emitter.

The fact that CFLs can deliver large savings in both energy and money for a small price is a major incentive for China to consider CFL technology. However, if CFLs do not meet performance requirements, they may not meet energy-saving and greenhouse gas-reduction targets.

Further, both good- and bad-quality CFLs are produced using the same raw materials: phosphors, electronic components and glass. Since sub-standard CFLs burn out sooner, strengthening product quality control and supervision would help China's lighting industry reduce production line waste of rare earth resources and cut mercury pollution.

## SECTION 2:

# LAWS, REGULATIONS AND STANDARDS RELATED TO QUALITY SUPERVISION OF CFLS IN CHINA

## 2.1 LAWS AND REGULATIONS RELATED TO PRODUCT QUALITY SUPERVISION

To improve product quality and protect the legal rights and interest of consumers, China has formulated and enacted a series of laws to strengthen product quality supervision and inspection. For the detailed Articles specified in these Laws, see Annex I.

### **Product Quality Law of the People's Republic of China**

The Product Quality Law of the People's Republic of China, initially adopted in 1993, was amended at the Ninth National People's Congress in July 2000 and enacted on September 1, 2000. The law applies to all production and marketing activities within Chinese territory. Products covered by the law are those that have been processed and manufactured for purpose of marketing. The law covers supervision and control of product quality, the responsibilities and obligations of producers and sellers, and compensation for damages and penalties. Under the law, random checking is the principal tool used for the State's product quality supervision and inspection system. Random samples are taken from the market or from warehouses storing finished products for sale, with or without the producer's or seller's consent. Supervision and inspection is conducted by the product quality supervision administrations of the State Council. Local administration for product

quality supervision, at or above the county level, may also organize supervision and random checks within their respective administrative regions. Expenses for supervision and random inspection are covered in accordance with State Council provisions.

### **Standardization Law of the People's Republic of China**

The Standardization Law of the People's Republic of China was adopted at the Seventh National People's Congress in December 1988 and enacted on April 1, 1989. Its purpose was to develop the socialist commodity economy, promote technical progress, improve product quality and harmonize standardization with socialist modernization. The law covers the formulation of standards and their implementation, and the legal responsibilities of product producers, sellers and importers. Whoever produces, sells or imports products that do not conform to compulsory standards is dealt with by the appropriate administrative authorities as prescribed by the law. In the absence of such prescriptions, inferior products and unlawful proceeds are confiscated and the producer is fined by the administrative authorities for industry and commerce. Where serious consequences are caused and crimes are constituted, the person directly responsible is investigated for criminal responsibility in accordance with the law.

### **Law of the People's Republic of China on Protection of the Rights and Interests of Consumers**

The Law of the People's Republic of China on Protection of

the Rights and Interests of Consumers was adopted at the Eighth National People's Congress on October 31, 1993 and enacted on January 1, 1994. This law is aimed at protecting the legitimate rights and interests of consumers, maintaining the socio-economic order and promoting the healthy development of the socialist market economy. The law covers the rights of consumers, obligations of the operators, state protection of consumers' rights and interests, and the settlement of disputes. Industrial and commercial administration departments of the people's governments at various levels and other relevant administrative departments are empowered to adopt measures to protect consumer rights and interests while specifying the responsibilities of consumer associations.

#### **REGULATIONS RELATED TO PRODUCT QUALITY SUPERVISION INCLUDE:**

- General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China Announcement No.13 on Measures for Administration of National Product Quality Surveillance Sampling (February 29, 2001);
- Decision of the State Council Concerning Several Issues on Further Strengthening Supervision of Product Quality;
- Guidelines for National Quality Supervision and Sampling Examination<sup>22</sup> (see Annex 2);
- Regulations of the People's Republic of China on the Administration of Production Licensing for Industrial Products;
- Administrative Measures on Product Quality Arbitration and Product Quality Management

## **2.2 NATIONAL STANDARDS RELATED TO CFL PERFORMANCE, SAFETY AND ENERGY EFFICIENCY**

In order to regulate the lighting industry and guarantee product quality to promote rapid development of lighting technology and sustainable development of the lighting industry, China has published various GB safety and performance standards for lighting products. Before the 1980s, national and Soviet Union standards were widely used in China. However, with increased variety and expanded output, many products were exported or entered in international competitions. To reach the international advanced level, China since the 1980s gradually adopted International Electrotechnical Commission (IEC) Standards for technical content and compilation formats. Since IEC

### **Box 2-1. Development History of CFL Standards in China**

- In 1997, the first CFL standards, GB16844-1997 *Safety Requirements for Self-ballasted Fluorescent Lamps for General Lighting Use*, were published by AQSIQ, signifying China's growing interest in the quality and production of CFLs.
- In 1998, GB/T17263-1998 *Performance Requirements for Self-ballasted Fluorescent Lamps for General Lighting Use* specified CFL performance requirements for the first time, with. In the same year, guidelines for the National Supervision and Inspection on CFLs were published.
- In 2002, due to increased product variety and a surge in market demand, AQSIQ called for a cooperative effort between various agencies to revise, improve and supplement the original performance standards. GB/T17263-1998 was replaced by the GB/T17263-2002 (neq IEC 60969:2000), which is effective to this date.
- In 2003, GB19044-2003 *Limited Value and Grade of Energy Efficiency of Self-ballasted Fluorescent Lamps for General Lighting Use* was issued, marking the initial effort to grade the energy efficiency of CFLs. Also in 2003, China established GB17625.1-2003 *Electromagnetic Compatibility (EMC)-Limits-Limits for Harmonic Current Emissions (equipment input current  $\leq 16A$  per phase)*, which is IDT IEC 61000-3-2:2001.
- In 2008, work began on revising GB/T17263-2002. However, the revision process has yet to be completed.

<sup>22</sup> AQSIQ website, <http://english.aqsic.gov.cn/>;<sup>22</sup>

### Box 2-2. Key Test Items Specified in GB 16844-1997, Safety Requirements for Self-Ballasted Fluorescent Lamps for General Lighting Use

- **Marking:** Lamps shall be clearly and indelibly marked with the following mandatory elements: Mark of Origin, Basic Optical and Electrical Characteristics (Power, Initial Luminous Flux, Lifetime, Color Characteristics, Harmonics Content, Power Factor), Instruction (Applicable Voltage and its scope, Burning Time), Security Warnings (burning positions if restricted, unusable in dimming circuits).
- **Interchangeability:** An indicator used to test whether the cap and bulb holder are matched well. Varying bulb cap sizes create obvious dangers in installation and disassembly, as well as potential dangers if the bulb is not firmly affixed to the lamp structure.
- **Protection against Electric Shock:** An indicator used to test whether it is safe to install and disassemble the product, and whether unexpected electric shock will occur.
- **Mechanical Strength (Torsion Resistance):** An item used to test whether the insulation shell is firmly attached to the cap. If the plastic shell and the cap become loose, internal short circuit or electric shock could occur during installation or disassembly.
- **Resistance to Heat, Flame and Ignition:** A measurement determining the ability of the shell to withstand melting, deformation and ignition when lamps operate under faulty conditions.

Standards do not regulate specific requirements for some key technical indexes, the Chinese used GB standards to specify numerical requirements for each item. So far, China has established more than 100 national standards for various lighting products, including standards for safety, performance, energy efficiency, and others for special purpose lamps.

#### 2.2.1 GB 16844-1997, Safety Requirements For Self-ballasted Fluorescent Lamps For General Lighting Use

**G**B 16844-1997, the first CFL standard issued by AQSIQ, is a National Mandatory Standard: All CFL products produced and sold in China have to meet

this standard. Safety requirements specified in the standard include: Marking, Interchangeability, Protection against Electric Shock, Mechanical Strength, and Resistance to Heat, Flame and Ignition.

#### 2.2.2 GB/T 17263-2002, Performance Requirements for Self-ballasted Fluorescent Lamps for General Lighting Use

GB/T 17263-2002 is a recommended national standard. It specifies the following items: Power, Initial Luminous Flux/Efficacy, Starting and Run-up time, Power Factors, Stabilization time, Color, Lumen maintenance and Life.

**TABLE 2-1. Requirements for Initial Efficacy**

No.	Rated voltage (range) (W)	Color: F6500/5000	Color: F4000/3500/2700
1	5-8	36	40
2	9-14	44	48
3	15-24	51	55
4	≥25	57	60



**TABLE 2-2.** Requirements for Electrical Parameters and Starting Characteristics

Rated Voltage (V)	Rated Frequency (Hz)	Starting Voltage (V)	Starting Time (s)		Stabilization Time (Min)	Run-up Time (Min)
			Magnetic	Electronic		
220	50	≤198	≤10	≤4	≤40	≤3

**TABLE 2-3.** Requirements for Photometric Parameters

Color	Lumen Flux Maintenance at 2000h	Life Time	Color Rendering Index	Chromaticity	
				X	Y
F6500 (Daylight)	80%	6000h	80	0.313	0.337
F5000 (Neutral White)				0.346	0.359
F4000 (Cold White)			82	0.380	0.380
F3500 (White)				0.409	0.394
F3000 (Warm White)			84	0.440	0.403
F2700 (Incandescence)				0.463	0.420

**TABLE 2-4.** Performance Differences between GB/T17263-1998 and GB/T17263-2002

Criteria		GB/T17263-1998	GB/T17263-2002
CRI	F6500/F5000	76	80
	F4000/F3500	78	82
	F3200/F2700	80	84
SDCM		6	≤5
Average Life of Bulb		5000h	6000h
Lumen Maintenance at 2000h		78%	80%
Deviation (Actual Wattage from Rated Wattage)		Actual wattage shall not exceed 105% of the rated wattage.	Deviation of actual wattage from the rated wattage shall not exceed 15%

### **Box 2-3. Explanation of Key Items Specified in GB/T17263-2002, Performance Requirements for Self-ballasted Fluorescent Lamps for General Lighting Use**

- **Power** refers to the measured power when a lamp is operated at the rated voltage and rated frequency. The GB standards, unlike international standards, not only limit the maximum value but also restrict the minimum value. The GB standard requires that the tested power of CFLs shall be within 15 percent of the rated value.
- **Initial Luminous Flux** defines the lumen measured after the lamps reach 100 hours of use.
- **Efficacy:** The value of Initial Luminous Flux divided by Power. While an important baseline in measuring energy-saving properties, efficacy is variable and depends on product design, color and power. China's national standards (GB Standards) specify the requirements for the efficacy of fluorescent lamps, including single-capped fluorescent bulbs, double-capped fluorescent bulbs and CFLs. The lamps' efficacy and GB standard compliance would be greatly enhanced if manufacturers substituted old halogen phosphor with tricolor phosphor.
- **Power Factor:** GB/T17263-2002 does not have quantitative requirements for the power factor; it only requires that the tested value shall not be 0.05 lower than the one claimed by manufacturers. The power factor's value is highly dependent on other parameters and is mainly derived from the design of the ballast within the lamp, which directly correlates to the harmonics, life, power and other parameters.
- **Color Appearance** includes two parameters: Color Rendering Index (CRI) and Standard Deviation of Color Matching (SDCM), both of which measure the light sources' spectrum. CRI is the capability of man-made light sources to reflect the original color of objects as they would appear in natural light. Light sources with high CRI values have more capacity to reflect the accurate color of objects, creating a feeling of comfort when looking at them. Inferior color appearance masks the true color of objects, rendering them unnatural in color and creating a feeling of unease. The color appearance of CFLs is related to the phosphor used inside the lamp. One SDCM, which is formulated by the CIE, is defined as the minimum change that can be distinguished by the human eye.
- **2000h Lumen Maintenance** evaluates the quantity of lumen output of a light source after 2,000 hours. This parameter represents the lifetime of a bulb, or in plainer economic terms, its energy efficiency and cost effectiveness. As a result, it is a statistic highly scrutinized by the public and the government. GB Standards require the 2000h Lumen Maintenance of CFLs to be at least 80 percent.
- **Life** refers to the time duration from the initial use of the bulb to its burn out (or when the lumen maintenance is lower than the permitted value). GB/T17263-2002 requires average CFL bulb life to be 6,000 hours.

### 2.2.3 GB 17625.1-2003, *Electromagnetic Compatibility (EMC) Limits: Limits for Harmonic Current Emissions (equipment input current $\leq 16A$ per phase)*

The key testing item specified in the GB17625.1-2003 is the limited values of harmonic current. This is an Electromagnetic Compatibility (EMC) test to measure the content of harmonic current produced by the electrical ballast integrated in a CFL in order to determine whether the content interferes with other electrical appliances when operated. This item requires that the burning of the lamp shall not disturb the grid when it operates under normal conditions. This is an issue of concern in the design of electrical circuits. If this requirement cannot be met, the use of CFLs will weaken the load

capacity of the grid and bring some potential dangers. This requirement seems to be more important when large quantities of CFLs are used. Developed countries have strict guidelines for this standard.

Testing samples should meet one of two requirements in order to pass, the first of which is illustrated below:

The second criterion requires that the third harmonic current, expressed as a percentage of the fundamental current, shall not exceed 86 percent and the fifth shall not exceed 61 percent. Moreover, the waveform of the input current shall be such that it begins to flow before or at 60 degrees and has its last peak (if there are several peaks per half period) before or at 65 degrees and does not stop flowing before 90 degrees, where the zero crossing of the fundamental supply voltage is assumed to be at 0 degree.

**TABLE 2-5.** Harmonics Requirement for Energy-saving Lamps with Power of Less Than 25w

Harmonic order	Maximum permissible harmonic current per watt mA/W
3	3.4
5	1.9
7	1.0
9	0.5
11	0.35
$13 \leq n \leq 39$ (Odd harmonics only)	3.85/n

### 2.2.4 GB 19044-2003, *The Limited Value and Grade of Energy Efficiency of Self-ballasted Fluorescent Lamps for General Lighting Use*

This standard establishes a rating system for energy efficiency: the Limited Values of Energy Efficiency, the Evaluating Values of Energy Conservation, Testing Methods, and establishing rules for CFLs.

**Limited Values of Energy Efficiency** is a mandatory requirement, and a basic criterion for CFLs to pass if they are to be sold on the market in China. It is specified as the

values of Grade 3 in Table 2.6 above.

**Evaluating Values of Energy Efficiency** is a voluntary standard and is stricter in comparison to the Limited Values. It is specified as the values of Grade 2 in Table 2.6 above. If a CFL meets the requirement, and passes the relevant audits, it can be certified by the China Energy Conservation Certification.

**Target Values of Energy Efficiency**, the energy efficiency requirement for CFLs to meet in the future, is the highest such requirement for CFLs and is shown as Grade 1 in Table 2.6 above.

**TABLE 2-6.** Energy Efficiency Grades of CFLs

Range of rated wattage (W)	Initial luminous efficacy (lm/W)					
	Energy efficiency grades (Color temperature: RR, RZ)			Energy efficiency grades (Color temperature: RL, RB, RN, RD) <sup>23</sup>		
	1	2	3	1	2	3
5 ~ 8	54	46	36	58	50	40
9 ~ 14	62	54	44	66	58	48
15 ~ 24	69	61	51	73	65	55
25 ~ 60	75	67	57	78	70	60

### 2.2.5 Chinese Restrictions on Hazardous Substances (RoHS)

In 2003, the European Parliament and the Council of the European Union issued stringent new guidelines banning hazardous substances in consumer products made, imported or sold in member states. The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment—in short, Directive RoHS—restricted the use of six substances: lead (Pb), mercury (Hg), Cadmium (Cd), Hexavalent Chromium, Polybrominated Biphenyl and Polybrominated Diphenyl Ethers. This directive, formally implemented on July 1, 2006, created a technical barrier to China's burgeoning export market.

On February 28, 2006, China's Ministry of Information Industry introduced Regulations Concerning Control and Management of Pollution from Electronic and Information Products (otherwise known as Management Regulations) in tandem with seven other ministries: the National Development and Reform Commission (NDRC), the Ministry of Commerce, China Customs, the State Administration for Industry and Commerce (SAIC), the General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China (AQSIQ), and the Ministry of Environmental Protection (MEP) of the People's Republic of China. In an effort to promote consumer health and safety as well as minimize environmentally damaging waste disposal, Management Regulations were aimed at controlling the contents of hazardous substances in electronic and

information products via design and production. In a parallel directive to the early EU legislation, China also curbed the use of lead (Pb), mercury (Hg), and four other hazardous substances in electronic and information products. The introduction of this law, Directive RoHS in China, serves not only to improve the quality of electronic and information products but also to promote environmental protection efforts. Furthermore, it can supervise and foster Chinese exports to improve the products' international competitiveness and increase China's international prestige. This directive will be improved, supplemented and revised continuously in the future to establish a professional test standard which can be adapted to China's domestic circumstances while complying with international requirements.

### 2.3 DEVELOPMENT TRENDS OF CFL REGULATIONS AND STANDARDS

With broader adoption of CFLs in recent years, mercury content has become an issue to which the Chinese government has attached great importance. Relevant standards for mercury content in lamps, and mercury test procedures, are under development. The 11th Five-year Plan on Lighting Industry developed by CALI calls for increased environmental protection awareness, implementation of a sustainable development strategy, and promotion of cleaner production in the lighting industry. Two standards, one on mercury pollution emissions and the other for recycling and disposal of waste gas-discharge

<sup>23</sup> RR, RZ, RL, RB, RN, and RD represent 6500K, 5000K, 4000K, 3500K, 3000K and 2700K respectively.

lamps, should be formulated and implemented during the 11th five-year period. Use of lead-free glass, lead-free soldering tin as well as the amalgam and other solid mercury technology are encouraged for the production of fluorescent lamps.

The NRDC is currently in the process of developing the Policies and Measurements on Recycling of Waste Lighting Products in China.

Along with the continuous internal improvement of national standards, China also actively tracks the formulation and implementation of international standards (like Energy Star) to enable the updating of national regulations where appropriate to local conditions. Further, China also directly participates in the development of international standards. For example, at the International CFL Harmonization Initiative organized by the Australian government, China's NLTC was the primary drafting organization for a new testing method that was subsequently submitted to the International Electrotechnical Commission (IEC) for review.

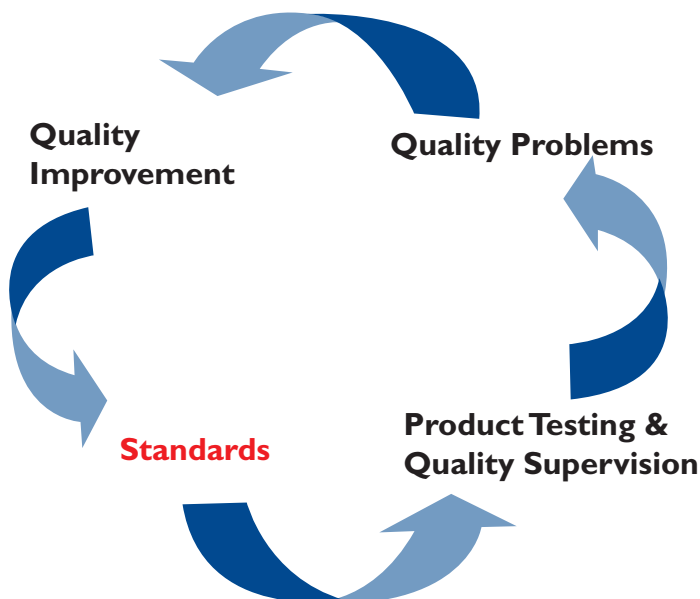
## 2.4 IMPACTS OF REGULATIONS ON CFL QUALITY

Standards are the technical basis for implementation of product quality supervision, such as NSI and certification programs. In the early stage of NSI on CFLs,

AQSIQ only tested the parameters of Safety, Lifetime, Luminous Flux and Lumen Maintenance based on GB16844-1997 and GB/T17263-1998. However, the NSI test results showed that some companies claimed false power for their product. Consequently, AQSIQ revised the GB16844-1997 and specified that deviation of actual wattage from the rated wattage shall not exceed 15 percent. Figure 2-1 explains the relationship between product standards and product quality control.

From the standardization process for CFLs, it can be found that quality standards for CFLs have become stricter and that CFL quality has improved significantly. However, as most CFLs in the world are from China, technical barriers to trade (TBT) have become a big issue for the CFL industry in China. An effective way to remove the barriers is to continue participating in the development of international standards and to make efforts to harmonize national CFL standards with international ones. China began a third-round revision of CFL performance standards in 2008; this is a good opportunity for China to make these standards apply in the broader international market.

FIGURE 2-1. Relationship between Product Standards and Product Quality Control



SECTION 3:

# ORGANIZATIONS AND INSTITUTIONS RELATED TO QUALITY SUPERVISION OF CFLS IN CHINA

## 3.1 QUALITY SUPERVISION SYSTEM IN CHINA

China has a well-established institutional framework for product quality supervision and inspection. The supervision system can be divided into four

categories: administrative, social supervision, the certification/labeling program and industrial self-discipline. Table 3-1 shows the quality supervision system for lighting products in China, Figures 3.1 and 3.2 show the relationships among these institutions.

**TABLE 3-1. Quality Supervision and Inspection System for Lighting Products**

Product Supervision and Inspection System	National Institutions or Organizations	Duties
Administrative Supervision and Inspection	General Administration of Quality Supervision, Inspection and Quarantine (AQSIQ)	Implement the National Product Quality Supervision and Inspection
	State Administration for Industry and Commerce (SAIC)	In charge of market supervision and regulation
Social Supervision and Inspection	China Consumers' Association (CCA)	Participate in supervision over or inspection of commodities and services conducted by relevant administrative departments
Certification and Labeling Programs	China Quality Certification Center (CQC)	Implement Energy Conservation Certification program
	China National Institute of Standardization (CNIS)	Implement the Energy Label program
Industry self-discipline	China Association of Lighting Industry (CALI)	Promote the healthy development of lighting industry
Technical Support Organizations	National Technical Committee on Lighting of Standardization Administration	Formulate national lighting standards
	National Lighting Test Center (NLTC)	Undertake testing

FIGURE 3.1 Institutional Framework for Market Inspection in China

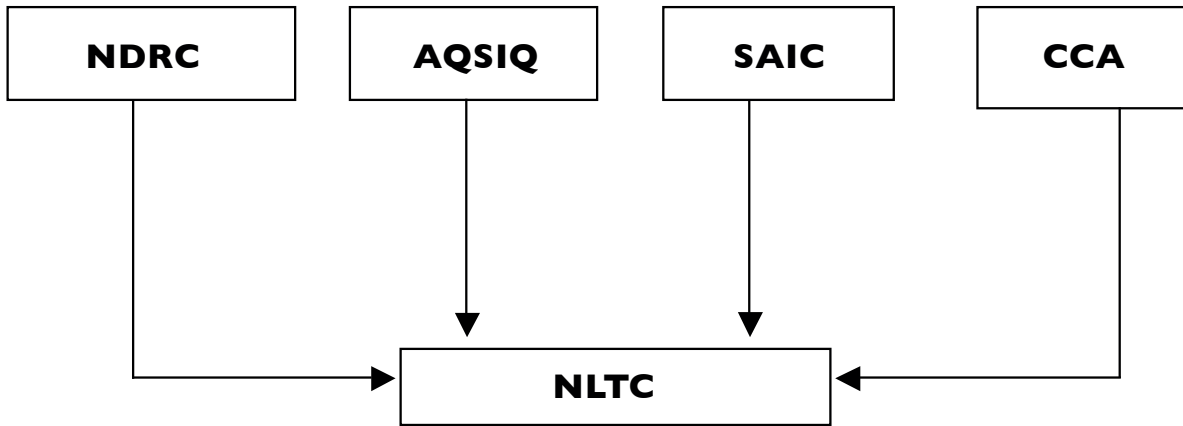
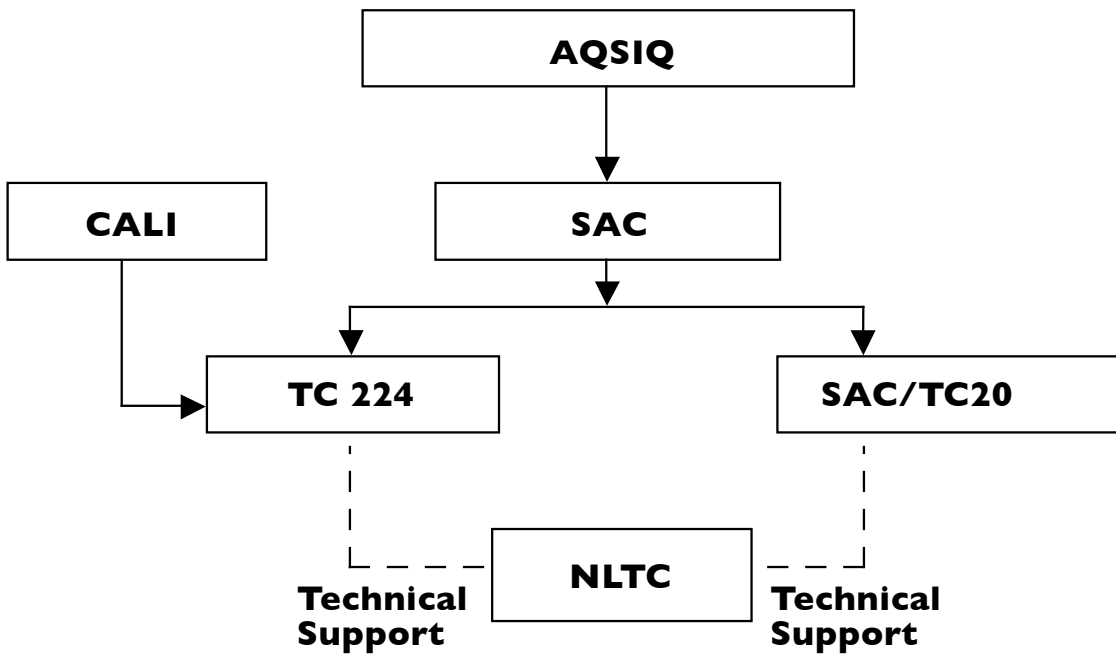


FIGURE 3.2 Institutional Structure for Standard Marking and Administration





### 3.2 RESPONSIBILITIES OF RELEVANT NATIONAL ORGANIZATIONS AND INSTITUTIONS

#### 3.2.1 General Administration Of Quality Supervision, Inspection And Quarantine (AQSIQ)

The General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China (AQSIQ) is a ministerial organ directly under the State Council of the People's Republic of China. AQSIQ is the centralized department charged with supervising and ensuring product quality in China, including national quality, metrology, entry-exit commodity inspection, health quaran-

tine and animal and plant quarantine, import/export food safety, certification and accreditation, standardization, and administrative law-enforcement.

AQSIQ's role is to administer the Certification and Accreditation Administration of the People's Republic of China (CNCA) and the Standardization Administration of the People's Republic of China (SAC), both authorized by the State Council. CNCA is a vice-ministerial-level department that administers unified management, supervision and overall coordination of certification and accreditation activities across the country. SAC, also a vice-ministerial-level department, performs nationwide administrative responsibilities and carries out unified management for standardization across the country.

FIGURE 3-3. AQSIQ Institutional Structure



The function of quality and technical supervision is performed through 31 provincial-level Bureaus of Quality and Technical Supervision. As the working departments of the respective provincial governments (and of autonomous regions and municipalities), these offices exercise vertical management of all Bureaus of Quality and Technical Supervision below the provincial level. The total number of working staff engaged in quality and technical supervision is more than 180,000 across the country<sup>24</sup>. AQSIQ provides provincial-level (and, for autonomous regions, municipal) Bureaus of Quality and Technical Supervision with technical guidance.

### 3.2.2 State Administration For Industry And Commerce (SAIC)

The State Administration for Industry and Commerce (SAIC) of the People's Republic of China is the presiding authority at the ministerial level, directly under the State Council, in charge of market supervision, regulation and related law enforcement through administrative means.

While creating a regulated and harmonized market environment, SAIC's function is to maintain market order and protect the legitimate rights and interests of businesses and consumers by carrying out regulations in the fields of enterprise registration, competition, consumer protection, trademark protection and combating economic illegalities. SAIC also heads the operation of local Administrations for Industry and Commerce (AIC) at or below the provincial level nationwide.

SAIC's main responsibility is to regulate product quality in the circulation sector; protect consumer rights and interests in the service sector; investigate and punish irregularities such as counterfeiting, fraud and inferior quality; monitor consumer inquiries, appeals and complaints, and facilitate the development of related networks thereof; and protect the legal rights and interests of business operators and consumers.

#### Box 3-1. Responsibilities of the Certification and Accreditation Administration of the People's Republic of China (CNCA)

- Develop and implement state laws, regulations and rules concerning certification and accreditation, safety licensing, hygiene registration and conformity assessments, coordinate and guide certification and accreditation works across the nation, and oversee accreditation and personnel registration bodies;
- Draft the catalogue of products subject to compulsory certification and the Safety License System, develop certification marks and conformity assessment procedures and technical requirements, and organize the implementation of compulsory certification and the Safety License System;
- Supervise and standardize the certification business, oversee the qualification screening of and supervision over certification bodies, and accept, investigate and handle complaints related to certification and accreditation; and
- Administer the assessment and qualification approval of the technical competence of relevant calibration, testing and inspection laboratories, organize the implementation of the assessment, metrological auditing, registration and qualification approval of laboratories; and oversee the approval of certification bodies, inspection bodies and laboratories.

<sup>24</sup> AQSIQ website

### **Box 3-2. Responsibilities of Standardization Administration of the People's Republic of China (SAC):**

- Draft and revise state laws and regulations on standardization, develop policies and national administrative rules on standardization and create relevant systems, and implement all relevant laws, rules and systems;
- Develop programs on standardization in China, create programs for the development and revision of national standards, and approve the examination, numbering and publication of national standards;
- Approve the coordination and administration of the relevant national technical committees of standardization, coordinate and guide regional and local standardization work, and preside over the registration of regional and local standards;
- Participate in activities of the International Organization for Standardization (ISO), International Electrotechnical Commission (IEC) and other international and regional standardization organizations; organize activities of the Chinese National Committee for ISO and IEC; manage the participation of domestic sectors and local regions in the activities of international and regional standardization organizations; and sign and enact international cooperation agreements.

### **3.2.3 China Consumers' Association (CCA)**

The CCA is a citizen's consumer rights organization responsible for the oversight and quality control of products in the market as well as the protection of consumers' legal rights. According to the Law of the People's Republic of China on Protecting Consumers' Rights and Interests, the CCA's responsibilities include:

- Providing consumer information and consultation services;
- Assisting relevant administrative departments in supervising and checking commodities and services;
- Consulting with relevant administrative departments regarding the violation of consumers' legitimate rights and interests, and seeking solutions with those departments;
- Accepting consumer complaints and conducting investigations and mediation with regard to those complaints;
- If the complaints involve the quality of commodities and services, a verification department, when asked to verify the quality, shall provide the verification conclusion;
- Supporting victimized consumers by taking legal action against violations of consumers' legitimate rights and interests;
- Exposing and criticizing, through mass media, violations

of consumers' legitimate rights and interests.

### **3.2.4 China Association of Lighting Industry (CALI)**

CALI is a social group sponsored by and comprised of members of the lighting industry and state institutions. Officially registered with the Chinese Ministry of Civil Affairs in 1989, it is in charge of developing industrial and national standards. Its chairman is the director of National Technical Committee 224 on Lighting of the Standardization Administration of China (SAC); currently, most key enterprises within the industry and most CFL manufacturers are CALI members. The association is comprised of seven professional committees—for Lighting, Luminaries, Cap and Lamp Holders, Electrical Accessories, Special Materials, Neon Light and Semiconductor Lighting—as well as two working committees.

The 8th, 9th, 10th, and 11th Five-year Development Plans of the Lighting Industry, as well as the authoritative statistics, were all developed by CALI. Through its comprehensive work and its influence in the formulation of standards, CALI has developed a better understanding of companies' production, operations, product standards, certification, quality, technology, equipment, the supply of the raw materials, and sales, all of which allow CALI to provide the companies with reliable information and valuable assistance.

### 3.2.5 China Quality Certification Center (CQC)

CQC is a specialized certification body authorized by AQSIQ and CNCA. Affiliated with the China Certification and Inspection Group, CQC's business mainly includes the China Compulsory Certification (CCC), voluntary certification (covering products and quality management systems) and training service for certification. CQC is the only institution accredited by the Chinese government to issue certification of energy conservation products. In addition to CFLs, CQC runs energy conservation certification programs on other lighting products such as electronic ballasts, magnetic ballasts, and double-capped and single-capped fluorescent lamps.

### 3.2.6 China National Institution of Standardization (CNIS)

The China National Institute of Standardization (CNIS) is a non-profit national organization dedicated to standardization research. Established in 1990 and affiliated with the AQSIQ, CNIS provides all-round support in standardization for technical progress, industrial upgrading, and product quality improvement, as well as scientific evidence for government policy on standardization. CNIS is also the secretariat for the National Technical Committee on Environmental Protection and Product Standardization Administration of China. This committee, chiefly responsible for all standardization research in energy administration, also develops, publicizes and enacts national standards.

### 3.2.7 Technical Support Organizations

National Technical Committee 224 on Lighting of the SAC: This committee is mainly in charge of standardization research for the content, performance, operation and security of lighting sources, as well as accesso-

ries and luminary products. In addition to managing more than 300 national standards, it is also responsible for the formulation, publicity and implementation of relevant national and industrial standards. Currently, with Beijing Lighting Research Institute as the secretariat, it directs sub-committees for Lighting, Luminaries, Illumination Basis and Test Methods. All national standards related to safety and performance requirements of CFLs were drafted by the Lighting Committee.

### National Lighting Test Centre (NLTC)

With over 30 years' testing experience, the NLTC specializes in lighting appliances nationwide. As the quality supervision and inspection institute authorized by the Chinese government and the lighting industry, the NLTC accepts annual assignments from the government and provides technical support for developing standards and industrial policies. The NLTC is also a state-level testing lab approved by the China National Accreditation Board for Laboratories (CNAS), as well as an appointed testing lab for Energy Conservation Certification, ELI certification and the China Compulsory Certification (CCC). The NLTC is also a national testing centre for lighting appliances authorized by the AQSIQ. Internationally, NLTC is an accredited laboratory by US National Voluntary Laboratory Accreditation Program (NVLAP), and authorized by the U.S. Environmental Protection Agency (EPA), Energy Saving Trust (EST), Australian Greenhouse Office (AGO), Swedish SEA, New Zealand and Cuba to undertake their testing tasks.

In addition, NLTC has been helping both domestic and overseas enterprises and organizations to set up laboratories to enable them to control product quality on their own. So far, NLTC has helped three Chinese lighting enterprises to build up their laboratories with another four under way. NLTC also helped the Cuban government to set up its first testing laboratory for lighting products, and assisted Cuba to purchase CFLs from China in 2006.

## SECTION 4:

# QUALITY SUPERVISION PRACTICE OF CFLS IN CHINA

## 4.1 NATIONAL SUPERVISION AND INSPECTION (NSI) ON QUALITY

National Supervision and Inspection (NSI) is the main agency in China for product quality control and monitoring. According to the Law on Product Quality, AQSIQ is responsible for the organization and implementation of NSI, as well as the release of the NSI Bulletin.

The local bureaus of Quality and Technical Supervision and the accredited product testing laboratories established by the Law on Product Quality are responsible for model sampling for NSI, while the accredited product testing laboratories are responsible for NSI model testing. The bureau of Quality and Technical Supervision for each province, autonomous region or municipality should conduct the appropriate NSI work in their own administration areas in accordance with AQSIQ's requirements. (See Annex 2, Guidelines for National Quality Supervision and Sampling Examination.)

NSI results are announced and handled through:

- News conferences, with results presented by AQSIQ;
- Dissemination of data to the provincial supervision departments, so as to urge them to deal with the relative matters;
- Publication in the *Economic Daily*.

Enterprises with good NSI inspection results are praised openly for encouragement. Moreover, if the enterprises get good inspection results continuously, their products will be titled as National Inspection-free Products and will be exempted from the supervision and inspection conducted by the local government for the next year. Enterprises with

unqualified products, on the other hand, are ordered to reform within a time limit, after which they are re-supervised and re-inspected. Publicizing repeatedly through various media the enterprises with unqualified products reminds consumers not to purchase the products from these enterprises. Moreover, large shopping malls, professional markets and other sales markets could also be blocked to these enterprises with unqualified products.

The Chinese government has placed a high premium on national supervision and inspection in assuring improved quality of CFLs. They are the only lighting product to have been covered by the NSI every year since 1998. The "Implementation Specifications for Product Quality Supervision and Sampling Inspection for Self-ballasted Fluorescent Lamps for General Lighting Service" (see Annex 3) issued by AQSIQ in 2008 specifies the principles for sampling, testing, assessment and re-testing by NSI of CFLs. According to these specifications, the responsible departments or institutes formulate the corresponding measurements to conduct supervision and inspection.

### 4.1.1 National Standards for NSI of CFLs

Mandatory NSI standards for CFLs are:

- GB16844-1997, Security Requirements for Self-ballasted Fluorescent Lamps for General Lighting Use. The inspection items include marking, interchangeability, protection against electric shock, mechanical strength, and resistance to heat, flame and ignition.
- GB17625.1-2003, Electromagnetic Compatibility (EMC) Limits: Limits for Harmonic Current Emissions (equipment input current  $\leq 16A$  per phase). The inspection item covers limited values of harmonic current.



- GB19044-2003, The Limited Value and Grade of Energy Efficiency of Self-ballasted Fluorescent Lamps for General Lighting Use. The inspection items include limited values of energy efficiency, evaluating values of energy efficiency and 2000h lumen maintenance.

Voluntary standards for product supervision and inspection are:

- GB/T17263-2002, Performance Requirements for Self-ballasted Fluorescent Lamps for General Lighting Use. The inspection items include power, Initial Luminous Flux/Efficacy, Start Voltage, Start Time, Power Factors, Stabilization Time, Color, Lumen Maintenance and Life.
- GB/T17743-1999, Limits and Methods of Measurement of Radio Disturbance Characteristics of Electrical Lighting and Similar Equipment.
- Relative industrial standards and corporate standards or quality commitment.

#### 4.1.2 The Results of NSI on CFLs Overview of NSI on CFLs

Between 1998 and 2008, China conducted NSI trials on CFLs 11 times.

The first NSI on CFLs, conducted in 1998, only measured the basic safety and performance items (including 2000h lumen maintenance). Since GB16844-1998 had not yet been enacted, manufacturers did not have much knowledge of this standard, and the compliance rate was relatively low.

After the first NSI in 1998, the government and the companies undertook efforts at reform. In the second testing round in 1999, all safety and performance items were included. The results showed a marked increase in compliance rates and a significant improvement of the products overall.

The third NSI in 2000 was processed in the market with

the aim of obtaining basic market information which had not been available previously.

In the fourth NSI in 2001, samples were taken from both the market and the manufacturers. Because some samples were from the market, the compliance rate for product batch was lower, while the compliance rate for product output was higher.

The fifth NSI in 2002 was conducted on market products and manufacturing samples simultaneously. The compliance rate of products from the market was 64.7 percent, a little higher than in 2001.

The sixth NSI in 2003, the first since the revised standards, was also conducted on market products and manufacturing samples simultaneously. The compliance rates of products from the market area and from the manufacturing area were 55.6 percent and 68.9 percent, respectively.

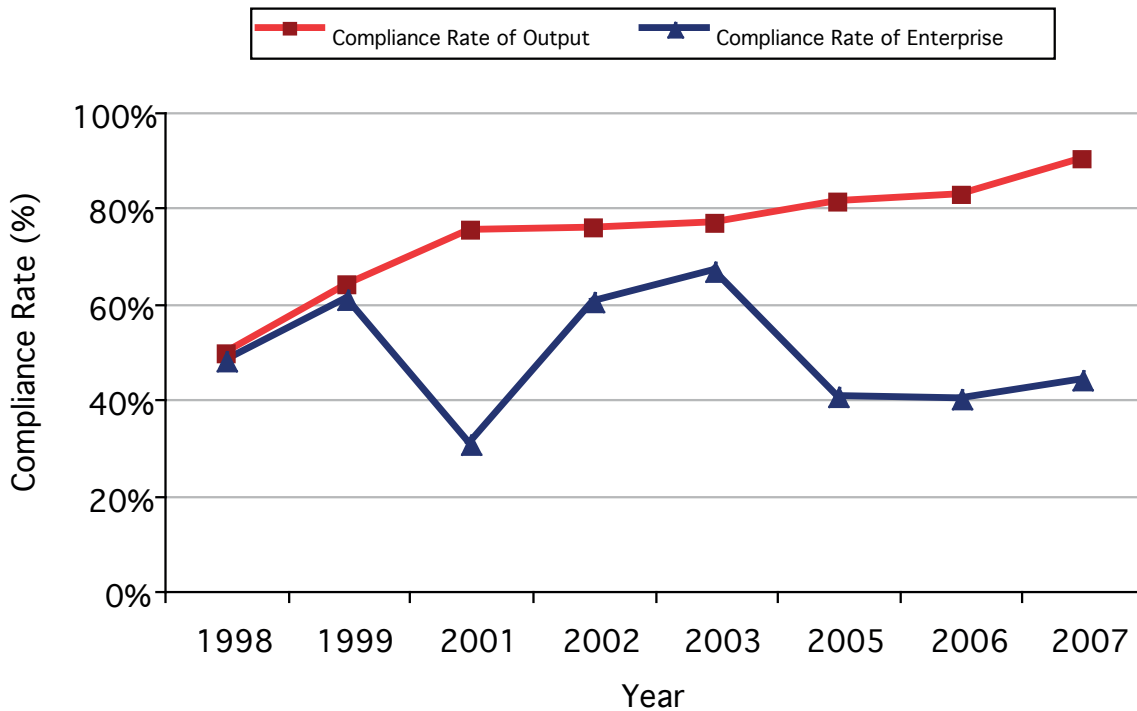
In 2004, the samples were obtained from the market. Unlike in 2003, the testing items covered the 2000h lumen maintenance and the limited values of energy efficiency.

In 2005, for the eighth NSI, samples were taken from the market and manufacturing. This time, energy efficiency grade was added as a testing item. The sampling involved 8 provinces.

In 2006, with the addition of evaluating values of energy efficiency, the ninth national supervision and inspection was conducted only with market samples.

The tenth national supervision and inspection in 2007 added the test for Harmonics. The compliance rate of CFLs quality was 90 percent, and each item had improved significantly, thanks to ten years of effective supervision and management.

For the 11th NSI, an additional testing criterion has been added with radio disturbance characteristics, but supervision results have not been released yet.

**FIGURE 4-1.** 1998-2007 NSI Compliance Rates of Manufacturers and Output for CFLs<sup>25</sup>

As noted in Figure 4-1, compliance rates of output for CFLs have increased steadily since the initial NSI conducted in 1998, due to better inspection and management in production as well as increased promotion of national standards and requirements within businesses. In the past, manufacturing was dominated by medium- and small-sized factories with low quality. Gradually, owing to their large production scale, the high degree of automation, superior quality control and high investment in technology research, larger and medium-sized enterprises have begun to dominate the market. In fact, the daily output of a larger company might equal the total annual output of a smaller factory. After 2005, around 10 percent of companies (large and medium-sized enterprises) manufactured 90 percent of CFLs in China, causing their products to dominate quality assessments of CFLs in China, resulting in a continuous rise in compliance rates of output for CFLs. From 2005, the compliance rate reached 80 percent or better.

However, many small-sized CFL companies still exist.

Although their output and sales are not high, their large number as a proportion of manufacturers has lowered the compliance rate among manufacturers. As seen in Figure 4-1, the compliance rate of manufacturers has fluctuated and is fraught with uncertainty, with the lowest rate in 2001. Since the 1996 implementation of the China Green Lights Project, the CFL industry has mushroomed. In 1998, the government embarked on a campaign to regulate the market and improve production technology and quality through concerted national supervision and inspections. This yielded results in terms of compliance; however, as an influx of smaller companies flooded the lighting industry, product quality was compromised and thus the compliance rate of manufacturers decreased in 2001.

Furthermore, the low compliance result in 2001 was also caused by sampling changes. For the NSI in 2001, about half of the samples came from the circulation sector; whereas for the previous NSIs all the samples came from manufacturers. Recognizing that inspection results based only on

<sup>25</sup> From NSI data for years given



samples from manufacturers could not accurately reflect product quality levels, the NSI added products in circulation allowing the 2001 NSI results to faithfully reflect the practical CFL's quality level. Clearly, selecting samples from different sectors and inspecting samples on various aspects could better regulate the industry and better protect consumers' rights and interests.

### Efficacy

Efficacy is the most important factor in evaluating a bulb's energy efficiency level. Figure 4-2 illustrates the change of CFL efficacy levels in a three-year NSI snapshot.

With a gradually increased compliance rate of output, the general performance parameters of CFLs have maintained a relatively high level. Data from the NSI indicates that CFL efficacy has sustained acceptable levels that could match or even surpass the values regulated by national standards. Figure 4-2 shows the efficacy level of CFLs with different

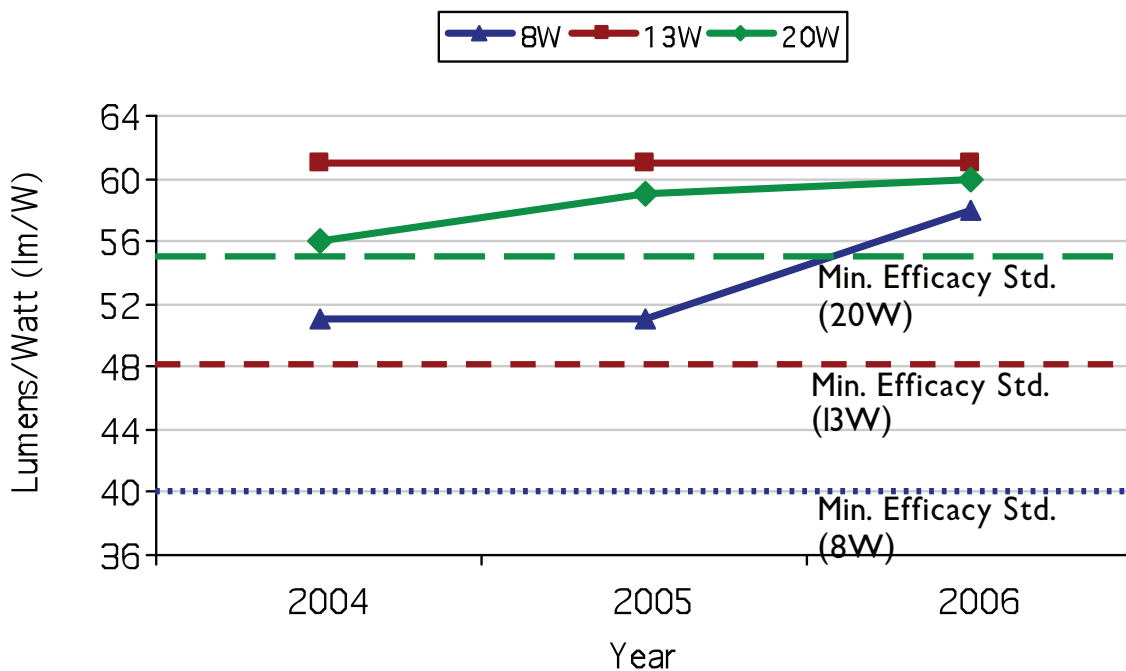
powers of 8W, 13W and 20W. The lamps with lowest power (8W) have a relatively rapid increase in efficacy, while the lamps with the highest power (20W) have a slow but steady rise. The values of 55, 48, 40 lm/W are the minimal energy efficacy values required by the national standard for lamps with 20W, 13W and 8W. Figure 4-2, shows that CFLs with different powers perform above the required minimal energy efficiency values.

### 2000h Lumen Maintenance

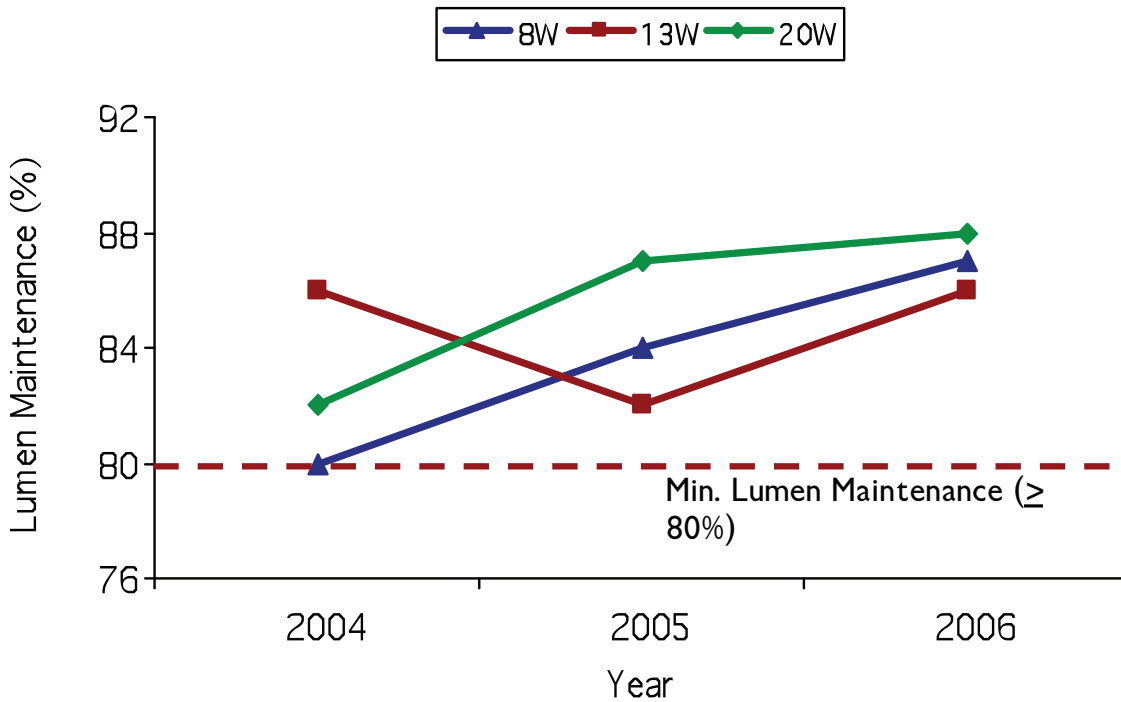
2000h Lumen Maintenance is the primary factor in evaluating a bulb's light output over time.

Analysis of 2000h lumen maintenance of CFLs over the same three-year period shows an upward trend with average values higher than 80 percent. The values indicate a fairly stable trend overall for lumen maintenance of CFLs in China.

**FIGURE 4-2.** NSA Efficacy Levels of CFLs with Different Powers<sup>26</sup>



<sup>26</sup> From NSI data for the years given

**FIGURE 4-3.** 2000h Lumen Maintenance of CFLs with Different Powers<sup>27</sup>

## 4.2 INSPECTIONS OF THE STATE ADMINISTRATION FOR INDUSTRY AND COMMERCE (SAIC)

According to the Methods on Inspection of the Quality of Commodities in the Circulation Sector, issued by the State Administration for Industry and Commerce (SAIC) of China in 2005, the administrative department for industry and commerce is responsible for assigning enforcement officers and testing institutes to sample and test products from the circulation sector and release the inspection results. For CFL market supervision

conducted by the SAIC, the national accredited lighting test laboratories are entrusted to do the testing; for CFL market supervision conducted by the local administrative department of industry and commerce, this is done by local professional lighting test laboratories.

As with AQSIQ's initial evaluation process, samples are tested for their adherence to guidelines directing security, efficacy, and lumen maintenance. Product testing results are reported to the media. Non-compliant manufacturers are punished.

<sup>27</sup> From NSI data for the years given.

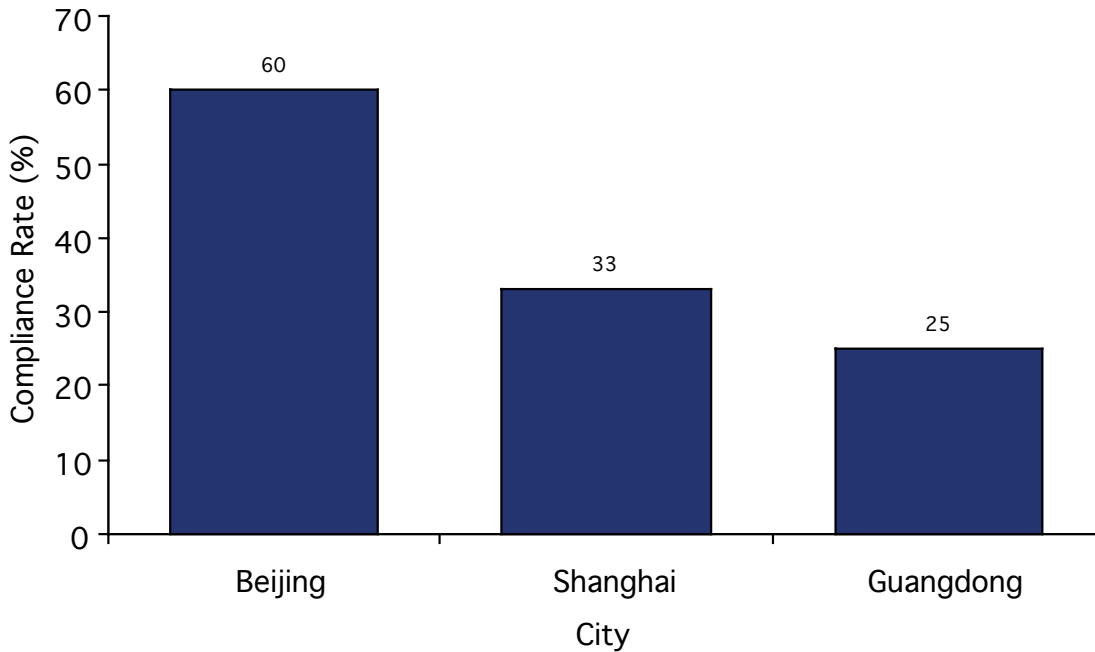
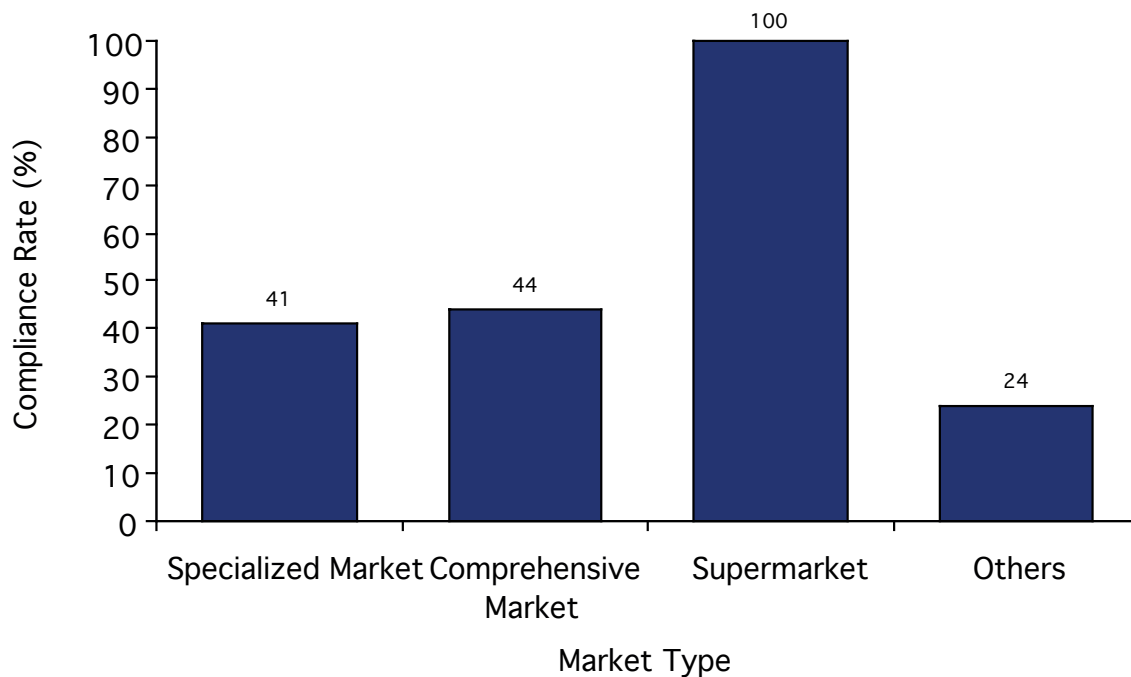
**FIGURE 4-4.** Compliance Rate of CFLs for Different Cities (2006)

Figure 4-4 shows inspection results conducted by the SAIC in 2006 for CFLs sampled from the circulation sector in Beijing, Shanghai and Guangdong. Beijing had the highest compliance rate of the three, and Guangdong the lowest. Compliance variation between regions can be attributed to several factors. Beijing Shilihe Lighting City, for example, adopted a license distribution system in which distributors are authorized by the manufacturers. Additionally, lighting stores are required to select a point person to inspect product quality and send random samples to an inspection department for regular testing. Through these steps,

product quality has improved consistently in Beijing. The other two reasons that Beijing recorded the highest compliance rate are that high-quality, famous brand products and are sold in the capital and the NLTC, the national lighting test center, is located in Beijing.

Guangdong's poor compliance rates can be traced to slipshod sales and distribution practices. Dominated primarily by small-sized businesses, Guangdong's distribution units typically place their shops in front and the factories behind, an arrangement that makes product quality difficult to control.

**FIGURE 4-5.** Compliance Rate of CFLs Collected from Different Sources

Additional sample data from 2006 reveals that larger stores or markets tend to have products with higher compliance rates. The compliance rate of supermarkets, for example, reached 100 percent. The inference is that supermarkets, because they place stronger emphasis on their own brand (or franchise) identity than on other brands, employ a stricter quality control system for products they sell. Moreover, the challenge of penetrating supermarkets makes manufacturers focus more on product quality.

### 4.3 Supervision of Consumers' Association (CCA)

The China Consumers' Association (CCA) was established to conduct social supervision of commodities and services and to protect the rights and interests of consumers. In order to regulate CFL market development and improve CFL quality, the CCA has entrusted the national professional lighting test institutes to undertake random inspections of CFL samples for sale in markets. The CCA also provides objective and practical

information about CFL quality, performance and price to encourage consumers to choose CFLs.

In 2007, the CCA partnered with local consumer organizations in Beijing, Shanghai and Guangdong to conduct benchmark tests on 23 types of CFLs sold in the market. NLTC undertook the testing task in accordance with GB/T17263-2002. Values evaluated in the tests included Power, Standard Deviation of Color Matching (SDCM), Initial Energy Efficacy and 2000h Lumen Maintenance. Results, later posted on the CCA's website, included claimed trademark, claimed manufacturer, claimed model, purchase site, claimed power, measured results on power, SDCM, initial efficacy and 2000h lumen maintenance. However, the measured results were displayed with a star symbol (★) instead of values that could be easily understood by consumers. For each test item, a greater number of ★ indicated better performance. The analyses showed that while the 23 types of CFLs tested complied with national safety standards, a discrepancy existed between individual performance and purchase prices.

## 4.4 OTHER MECHANISMS FOR QUALITY MONITORING OF CFLS

### 4.4.1 Energy Conservation Certification Program

By raising consumer consciousness, the China Quality Certification Center (CQC) seeks to promote the sale and use of green alternatives, as well as improve existing technology and innovation. After a stringent technical evaluation and market analysis, the CQC established an energy conservation certification program. As the initial third-party institute conducting certifications on energy conservation products, the China Standard Certification Center (CSC) was folded into the CQC where it will continue its work on energy conservation certification.

The energy conservation certification program covers 35 categories, including electric appliances, lighting products, electrical products, office equipment, and construction products. According to recent statistics, 26 CFL companies have been granted the energy conservation certification. In the future, this along with CFLs greater energy efficiency should give CFLs a competitive advantage in the market. It could also promote technology innovation and quality improvement, and phase out unqualified products from the market, thus contributing to energy conservation and reduction of greenhouse gas emissions. According to the CQC energy conservation certification model, CQC will

conduct annual supervision of certified products after issuing the certificates.

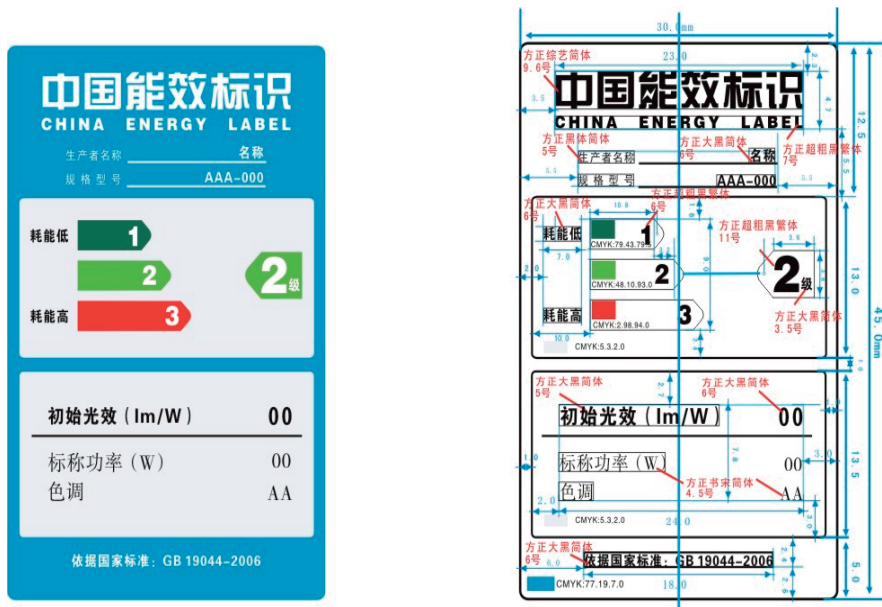
In addition, the state continues to encourage and support related policies on prices and taxation, which can have a positive and profound impact on the still nascent energy conservation industry.

### 4.4.2 Energy Label Program

The energy efficiency label attached to energy-consuming products on their packaging indicates the product's energy efficiency grade and energy performance (generally in terms of either consumption or efficiency), so that consumers can get the necessary information when they purchase the product. The China Energy Label Scheme is compulsory. Products covered by the scheme have to display the energy label with the claimed energy efficiency rating for consumers' reference. The implementation model for the energy label is: manufacturers' statement + supporting documents + supervision. The energy label management unit is established within the China National Institute of Standardization (CNIS).

The Energy Label Scheme for CFLs was launched jointly by NDRC, AQSIQ and CNCA, and formally executed on June 1, 2008. There are three levels of ratings in the CFL energy label: Level 3 is the bare minimum energy efficiency value (all CFLs have to meet the Level 3 requirement), while Level 1 refers to the most energy-efficient product.

FIGURE 4-6. Energy Labels for CFLs in China



The energy label management unit is responsible for verifying the label used by manufacturers or importers. Manufacturers of CFLs sold in the market have to paste the energy label on the CFL and submit to check-testing or supervision by the energy label management unit. Such scrutiny should significantly improve CFL market regulation and accelerate the development of energy- efficiency technology in China.

#### 4.4.3 Enterprises' Self-Discipline

As part of an industry-wide commitment to foster consumer confidence, under the guidance of CALI, a consortium of CFL manufacturers based in Guzhen, Guangdong, the production base for CFLs in China, sponsored a regulatory guideline titled Quality Self-discipline Norms for Energy Conservation Lamps Industry. Through such self-discipline, it is hoped that CFL

companies can conduct their business honestly, ensure the scientific and reasonable utilization of non-renewable resources, protect the environment, save energy, stop the spread of fraudulent or unqualified CFLs, and provide good before- and after-sale service. Manufacturers, distributors and professional markets not in compliance with these guidelines will face exposure by CALI to the media, as well as punitive sanctions meted out by the relevant oversight agencies.

In addition, many companies are actively devoted to building national accredited laboratories for their own products' quality control. Through the management platform of the laboratories, the production techniques and technologies could be controlled more effectively, and product quality guaranteed and improved. Currently, several companies have shown interest in establishing such laboratories.

#### Box 4-1. Quality Self-discipline Norms for the Energy Conservation Lamps Industry

- Quality guarantees specified in the regulations include:
- Security requirements for CFLs to comply with national standards;
- Manufacturing to adopt high-efficiency tricolor luminescent power, with a color rendering index above 80;
- SDCM  $\leq 5$ ;
- Average rated Lifetime  $\geq 6000$ h;
- Efficacy of CFLs with 10W shall be five times higher than general lamps, so as to ensure that the energy conservation index is above 80 percent;
- 2000h lumen maintenance  $\geq 80$  percent
- 2000h failure rate  $\leq 5\%$ .

## 4.5 QUALITY MONITORING OF CFLs FOR EXPORT

One commonly cited issue contributing to the low quality of CFLs available in the market is the lack of technological expertise among managers of bulk procurement. Buyers unschooled in technical product specifications tend to purchase stock with an eye on profit and market share, buying product that may be of questionable quality. This makes it imperative that technical support based on the industry's quality control mechanisms be in place before products go out the door.

In accordance with the Chinese law, Inspection of Import and Export Commodities, some provinces have instituted their own export regulations. Zhejiang, for example, monitors CFL exports, including inspection of export shipments and oversight covering the manufacturer's quality control. The Zhejiang Provincial Entry-Exit Inspection and Quarantine Bureau is responsible for the unified management of CFL supervision for export in Zhejiang and the coordination of extended stations work. The extended stations are responsible for recording the CFL export companies within their administrative areas, supervising the products, and determining the companies' ability to guarantee quality.

According to the Specification for Inspection and Supervision of CFLs for Export, issued by the Zhejiang Provincial Entry-Exit Inspection and Quarantine Bureau, the inspection departments conduct risk assessments and select representative samples for type testing in accordance with the company's level of quality management, the degree of export products' quality and the importers' requirements. The samples are tested according to the importers' standards. If there are no importer's standards, the tests are conducted according to IEC or national standards. If the tests are successful, the test report is provided in triplicate to the company, inspection department and laboratory, and posted on the laboratory's website. If the samples fail the test, companies are allowed to make adjustments, following which new samples are selected by the inspection department for retesting.

Although some governments have issued regulations covering the supervision and inspection of export products, a single model cannot manage all products exported to different markets. This is especially as some buyers ignore quality issues and are more concerned with product prices.

Thanks to state supervision and publicity about quality, several companies have raised their awareness of quality control of export products using improved technology and strengthened management and technical control.



## SECTION 5:

# SUMMARY AND RECOMMENDATIONS

## 5.1 SUMMARY

In general, the product quality supervision system in China is well-established and functioning. To some degree, China has been successful in addressing serious product quality control problems, leading in some cases to a virtuous circle. For example, in 2001, when national supervision and inspections were first conducted, some wholesalers, owners and managers in the lighting malls had no idea what to do. However, after this activity, managers and owners began to pay great attention to quality. Moreover, lighting malls in some big cities began to require that manufacturers provide the test report from authorized institutes before allowing the products into the market, thereby rejecting inferior products. This indicates that the market has begun to take quality seriously.

However, with rapidly expanding domestic and import/export markets, the current system will need to stay ahead of CFL developments, and continuously improve. Key challenges or concerns include:

- Product quality supervision depends mainly on government administrative supervision. Budgets and personnel will be challenged to meet the demands of a rapidly expanding product market. Manufacturers, distributors, consumers, research institutes and media must be mobilized to participate in the product quality supervision system.
- As shown in table 3-1, several national organizations are involved in the product quality supervision system. However, information sharing and exchange mechanisms need to be further improved to increase the effectiveness of product quality supervision and minimize duplication.

- Product quality is determined not only by product design, manufacturing, and utilization rates, but also by factors such as raw materials, shipping, distribution, and recycling. Government, therefore, should consider strengthening the supervision of these factors, along with quality supervision of finished products.
- Local Bureaus of Quality and Technical Supervision, and local AICs at or below the provincial level are the main implementation organizations for administrative supervision. Strengthening training for local administrative departments — to improve their professional skills and help them better understand the market requirements — is a very important factor in ensuring the effectiveness of supervision.

Inspection and production management, and increased promotion of national standards and requirements within business, have helped to steadily improve quality. Thanks to a decade of effective supervision and management, the compliance rate of output for CFLs reached 90 percent in 2007. With each additional standard and criterion, such as lumen maintenance, efficacy was improved significantly. However, there are still challenges that need to be addressed:

The compliance rate of CFLs in Beijing is almost twice as high as that in Shanghai, and the 100 percent compliance rate of CFLs in supermarkets far exceeds compliance rates for other markets. The sampling summary indicates that higher compliance rates result from submission to more stringent oversight. The whole quality supervision system needs to be strengthened and further improved, especially in areas with low CFL compliance rates.

- Currently, quality supervision is mainly focused on strategies to control product safety and performance but control of hazardous substances in CFLs is increasingly important. The Chinese government began to include a mercury content test in the NSI in 2009. Opportunities exist for the state and local administrative departments to consider controlling the content of hazardous substances in CFLs to prevent future pollution from product manufacturing, use and disposal.
- The compliance rate of CFL manufacturers is quite low compared to those for CFL output. From 2005 through 2007, the compliance rate of CFL output was above 80 percent while the compliance rate of CFL manufacturers was barely above 40 percent, mainly due to the large number of smaller, poorer-quality manufacturers. Activities like the CALI regulatory guidelines Quality Self-discipline Norms for Energy Conservation Lighting Industry are already underway to improve manufacturers' self-discipline. Failure to comply with these guidelines can lead to exposure of the organization in the media, as well as potential punitive sanctions by oversight agencies. However, there is still potential for strengthening and widening activities to promote such corporate self-discipline. .
- The open market is the only place for consumers to buy CFLs. However, analysis suggests that the compliance rate of CFLs in the circulation sector is quite low. For example, the compliance rate of CFLs in Shanghai was only 33 percent and around 40 percent in specialized lighting markets. The main reason is that high-quality products with high prices are no match for more affordable poor-quality products. Strengthening supervision in the distribution and retail sectors may improve compliance and create a more fair and more competitive market for quality suppliers.

## 5.2 RECOMMENDATIONS

The Study recommends that the following measures be taken to advance quality supervision in China:

### 5.2.1 Strengthen Enforcement of Quality Supervision

(1) Currently, laws and regulations related to product quality supervision impose insufficient penalties for illegal

actions and non-compliant products. Due to this inadequate discipline, and given the motivation to achieve high profits, some manufacturers and distributors prefer to produce and sell inferior CFLs. Therefore strong penalties are essential to ensure effective quality supervision. Further, if the supervision is not sustainable, manufacturers and distributors that have been punished for non-compliant products may not believe they will be caught again and revert to making poor products. Therefore, high levels of ongoing market sampling and testing are required.

(2) Strengthen the role of media in the process of product quality supervision. For manufactures and distributors, media scrutiny is a powerful tool that can have a direct impact on their reputations. Media should be encouraged to expose enterprises with inferior products and praise those with high quality products.

(3) Local Bureaus of Quality and Technical Supervision, and local AICs, are the main implementation organizations. Training for these local administrative departments, to improve the personnel's professional skills and capacities on enforcement of supervision, is crucial. This training can be provided by higher level administrative departments, such as AQSIQ and SAIC, and can also be provided by professional institutions in the lighting industry, such as NLTC and CALI.

### 5.2.2 Strengthen the Development of CFL Standards

Standards are the technical basis for implementation of product quality supervision. With the rapid development of the CFL industry, relevant standards should be modified accordingly. This report proposes the following recommendations to strengthen the development of CFL standards:

(1) Actively participate in the formulation of international standards, such as IEC standards, to build a solid foundation for the integration of Chinese and international standards. Currently, IEC is processing the development of CFL performance standards, a vital component in the revision of Chinese CFL performance standards.

(2) Better understand current levels and potential effects of national and international raw material and product performance to allow the formulation of increasingly appropriate product performance standards.

(3) Work with regional organizations to foster discussion on a common set of CFL quality standards, to share the Chinese experience and improve the reputation of CFLs made in China.

### **5.2.3 Facilitate Information Sharing and Exchange**

(1) Actively participate in the international lighting affairs and programs.

(2) Build an international platform from which to share experiences, information and technology, and promote mutual recognition of testing results. This platform could also provide technical consultancy for policy makers of various countries.

### **5.2.4 Strengthen Training and Awareness-raising Programs**

(1) Accredited testing institutions could organize a series of systematic technical and standardization training programs aimed at technicians and managers of lighting enterprises to help them better understand the market and standards requirements, and quality assurance procedures. Such programs could also provide technical support to companies to establish internal laboratories so they could test product quality and set controls themselves.

(2) Organize training programs for distributors and market management personnel to help them recognize good quality CFLs.

### **5.2.5 Strengthen Quality Supervision of CFLs for Export**

(1) As with almost all nations internationally, China does not regulate the products for export (although the government may wish to examine the successful regulation of exports from Zhejiang Province). Like other countries, China believes that the country of destination should implement appropriate local regulations and enforcement (as China does for products entering its market). However, this sometimes leads to supervision problems with manufacturers that claim to produce only for export, but in fact also supply the local market. Increased harmonization of international standards (including China) will assist in pressuring all

manufacturers to begin to build products to similar standards.

(2) Encourage foreign purchasers to pay attention to product quality information published by the Chinese government, to avoid purchasing products manufactured by unqualified businesses.

### **5.2.6 Develop a Standard Set of Recommendations for Purchasers and Consumers**

A standard set of recommendations for purchasers and consumers should be developed and used by all agencies concerned. This would facilitate consumer feedback about CFLs while encouraging manufacturers to compete on the basis of product performance and quality. The message can contain the following elements:

(1) Brand and quality awareness. Encourage consumers to pay attention to the announced results of the supervision and inspection, and select qualified brands.

(2) Price and quality awareness. Attention should be paid to both price and quality. Normally, enterprises manufacture products with different quality levels according to different costs. The blind pursuit of low prices only leads consumers to purchase trashy lamps.

(3) Proper handling. Consumers should be aware of proper handling when using CFLs, such as holding the plastic part of the lamp without grasping the tube directly, and then checking the appearance. Consumers should also be aware of the information available on the plastic part: the producer of the lamp (it could be the trade mark or the name of the manufacturer), rated voltage and its range, rated power, and rated frequency. The bulb's appearance is also important: it should be clean and without bubbles. The fluorescent layer within the tube should be thin, white and without granules. The cap and the tube should be in an upright position and not slanted. The tube and the plastic part should be firmly fixed. No sound is permitted when the bulb is screwed in.

(4) Proper application: Finally, since the CFL contains a ballast circuit, it is best not to use it in places where the lamp needs to be switched on and off quite frequently.

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## ANNEX I:

# LAWS RELATED TO PRODUCT QUALITY

## SUPERVISION

### ***Product Quality Law of the People's Republic of China***

The law specifies that:

**Article 3** The manufacturers and sellers must perfect their internal management of product quality, strictly implement quality criteria for various posts, specify quality liabilities, and make checks accordingly.

**Article 7** The people's governments at all levels shall incorporate the task of improving product quality into their plans for national economy and social development. They shall strengthen the coordination, planning and administration of product quality, encourage and supervise the manufacturers and sellers to strengthen the management of product quality and improve the quality of their products. The governments shall also coordinate relevant departments to take legal measures to stop the activities in the production and sale in violation of this Law to safeguard the implementation of this Law.

**Article 8** The department under the State Council in charge of supervision over product quality shall be responsible for nationwide supervision over product quality. The relevant departments under the State Council shall be responsible for supervision over product quality within the scope of their respective functions and responsibilities.

**Article 15** The State shall implement a product quality supervision and inspection system with random checks as its main form. Products constituting possible threats to the health or safety of human life and property, industrial products bearing important influence on the national economy and the people's livelihood, and products with

quality problems reported by consumers or relevant organizations shall be subject to random checks. The samples shall be picked out from the market or from the warehouse storing finished products for sale. Such supervision and random checks shall be planned and conducted by the department in charge of supervision over product quality under the State Council. The administrative departments responsible for supervision over product quality of the local people's governments, at or above the county level, may also organize supervision and random checks within their respective administrative regions. Where a law provides otherwise on supervision and checks over product quality, such law shall apply.

The relevant department at the local level shall not randomly check the product that the State has already randomly checked. The department at lower levels shall not randomly check the product that the department at a higher level has randomly checked. Products may be inspected if supervision and random checks of such products so require. The number of samples picked out for inspection shall not exceed a reasonable amount, and the inspection fee shall not be imposed upon the inspected. Expenses incurred shall be disbursed in accordance with relevant regulations of the State Council. Where the manufacturer or seller has disputes regarding the inspection result, they may, within fifteen days of receipt of the inspection result, apply to the inspection organ, or its higher level, for re-inspection. The organ undertaking re-inspection shall deliver the result of re-inspection.

**Article 17** Where the product quality fails to pass the supervision and random checks conducted in accordance with this Law, the organ conducting the supervision and random checks shall order the manufacturer or seller to rectify the matter within a prescribed period. Where the

manufacturer or seller fails to do so, the department at the provincial level in charge of supervision of product quality shall publicize the matter. Where the manufacturer or seller fails the re-inspection after the publicity, the said department shall order it to suspend the business for internal rectification within a prescribed period. Where the product is still found to be unqualified after the internal rectification, the business license thereof shall be revoked. Where serious product quality problem is found during supervision and random checks, the manufacturer or seller shall be punished according to the provisions of Chapter Five of this Law.

**Article 21** The institutions for testing and authentication of product quality must issue the test results or authentication certificates objectively and fairly according to related standards. After issuing the authentication certificate, the institution on authentication of product quality must, in accordance with related rules of the State, follow up with inspections on the product on which the authentication mark is used. Where the product on which the authentication mark is used is found unqualified, said institution shall require the user of the mark to improve its product to meet the standard. Where the case is serious, said institution shall cancel the manufacturer or seller's qualification to use the authentication mark.

## ***Standardization Law of the People's Republic of China***

The law specifies that:

**Article 3** The tasks of standardization shall include the formulation of standards and organization of and supervision over the implementation of the standards.

Standardization shall be incorporated in the plan for national economic and social development.

**Article 4** The state shall encourage the active adoption of international standards.

**Article 5** The department of standardization administration under the State Council shall be in charge of the unified administration of standardization throughout the country. Competent administrative authorities under the State Council shall, in line with their respective functions, be in charge of standardization in their respective departments and trades.

The departments of standardization administration of provinces, autonomous regions and municipalities directly under the Central government shall be in charge of the unified administration of standardization within their respective administrative areas. Competent administrative authorities under the governments of provinces, autonomous regions and municipalities directly under the Central government shall, in line with their respective functions, be in charge of standardization in their respective departments and trades within their respective administrative areas.

The standardization administration departments and the competent administrative authorities of cities and counties shall, in line with their respective functions as assigned by the governments of provinces, autonomous regions and municipalities directly under the Central government, be in charge of standardization within their respective administrative areas.

**Article 6** National standards shall be formulated for the technical requirements that need to be unified nationwide. National standards shall be formulated by the department of standardization administration under the State Council. Where, in the absence of national standards, technical requirements for a certain trade need to be unified, trade standards may be formulated. Trade standards shall be formulated by competent administrative authorities under the State Council and reported to the department of standardization administration under the State Council for the record, and shall be annulled on publication of the national standards. Where, in the absence of both national and trade standards, safety and sanitary requirements for industrial products need to be unified within a province, an autonomous region or a municipality directly under the Central government, local standards may be formulated. Local standards shall be formulated by departments of standardization administration of provinces, autonomous regions and municipalities directly under the Central government and reported to the department of standardization administration and the competent administrative authorities under the State Council for the record, and shall be annulled on publication of the national or trade standards.

Where, in the absence of both national and trade standards for products manufactured by an enterprise, standards for the enterprise shall be formulated to serve as the criteria for the organization of production, an enterprise's stan-



dards for its products shall be reported to the standardization administration department and the competent administrative authorities under the local government for the record. Where national or trade standards have been formulated, the state shall encourage enterprises to formulate their enterprise standards, which are more stringent than the national or trade standards, to be used in these enterprises. Where the formulation of standards is otherwise provided for by law, such legal provisions shall be complied with.

**Article 7** National and trade standards shall be classified into compulsory and voluntary standards. Those for safeguarding human health and ensuring the safety of the person and of property and those for compulsory execution as prescribed by the laws and administrative rules and regulations shall be compulsory standards, while the others shall be voluntary standards. The local standards formulated by standardization administration departments of provinces, autonomous regions and municipalities directly under the Central government for the safety and sanitary requirements of industrial products shall be compulsory standards within their respective administrative areas.

**Article 12** The roles of trade associations, scientific research institutions and academic organizations shall be brought into play in the formulation of standards.

A department engaged in the formulation of standards shall organize a committee on standardization technology composed of specialists, which shall be responsible for the drafting of the standards and shall participate in the examination of the draft standards.

**Article 14** Compulsory standards must be complied with. It shall be prohibited to produce, sell or import products that are not up to the compulsory standards. With regard to voluntary standards, the state shall encourage their adoption by enterprises on an optional basis.

**Article 16** Technical requirements for export products shall comply with contractual provisions.

**Article 20** Whoever produces, sells or imports products that do not conform to the compulsory standards shall be dealt with according to law by the competent administrative authorities as prescribed by the laws and administrative rules and regulations. In the absence of such prescriptions, his products and unlawful proceeds shall be confiscated and

he shall be concurrently fined by the administrative authorities for industry and commerce; where serious consequences are caused and crimes are constituted, the person directly responsible shall be investigated for criminal responsibility in accordance with the law.

## ***Law of the People's Republic of China on Protection of the Rights and Interests of Consumers***

The law specifies that:

**Article 6** It is the common responsibility of the whole society to protect the legitimate rights and interests of consumers.

The State shall encourage and support all organizations and individuals to exercise social supervision over acts infringing upon consumer rights and interests.

Mass media shall conduct propaganda defending the legitimate rights and interests of consumers and, through public opinion, exercise supervision over acts infringing upon the legitimate rights and interests of consumers.

**Article 15** Consumers shall have the right to exercise supervision over commodities, services as well as the work of protection of consumer rights and interests.

Consumers shall have the right to inform and charge against the infringement upon consumer rights and interests and the breach of law or neglect of duty on the part of State organs and their functionaries in the work of protection of consumer rights and interests, and have the right to raise criticism of or proposals for the work of protection of consumer rights and interests.

**Article 27** People's governments at various levels shall strengthen their leadership, and organize, coordinate and supervise the administrative departments concerned to do their work well in the protection of the legitimate rights and interests of consumers.

People's governments at various levels shall strengthen supervision to prevent occurrence of acts damaging to the personal or property safety of consumers and promptly check any such acts.

**Article 28** Departments for industry and commerce of people's governments at various levels and other adminis-



trative departments concerned shall adopt measures to protect the legitimate rights and interests of consumers within the scope of their respective functions and duties in accordance with the provisions of the laws and regulations.

Administrative departments concerned shall listen to the complaints of consumers and their public organizations as to the transactions of business operators and the quality of their commodities and services, and carry out timely investigation and disposition.

**Article 50** If business operators are under any of the following circumstances and the Law of the People's Republic of China on Product Quality and other laws and regulations have provided for punitive organs and forms therefore, the provisions of the laws or regulations shall be applied; in the absence of such provisions in the laws or regulations, administrative departments for industry and commerce shall order them to make corrections, and may, in light of the circumstances, punish the offenders exclusively or concurrently with warning, confiscation of unlawful earnings, or imposition of a fine no less than one time but not more than five times the value of the unlawful earnings; in case there involves no unlawful earnings, the offenders shall be punished with a fine of 10,000 Yuan or less, and if the circumstances are serious, they shall be ordered to suspend business for rectification, and their business licenses shall be revoked. Such conditions include:

1) producing or selling commodities that fail to meet the requirements for the protection of personal and property safety;

(2) mixing adulterations into their commodities, or passing fake commodities off as genuine ones, or passing defective commodities off as good ones, or passing substandard commodities off as standard ones;

(3) producing commodities that have been formally declared by the State to be obsolete, or selling commodities no longer effective or deteriorated;

(4) forging the origin of commodities, forging or counterfeiting the names and addresses of other factories, and forging or counterfeiting the authentication marks or famous-and-excellent-product marks;

(5) selling commodities not inspected or quarantined against the requirement therefore, or forging the result of inspection or quarantine;

(6) making false or misleading propaganda about their commodities or services;

(7) deliberately delaying or unreasonably refusing consumers' demand for repair, remanufacture, replacement, return of goods, make-up for short commodity, refund of payment for goods or services, or compensations for losses;

(8) violating human dignity or personal freedom of consumers;

(9) other circumstances wherein punishment shall be given for the infringement of consumer rights and interests as stipulated by laws or regulations.

## ANNEX 2:

# GUIDELINES FOR NATIONAL QUALITY SUPERVISION AND SAMPLING EXAMINATION

## **I. Assigning the mission of national quality supervision and sampling examination**

1. The Department of Supervision on Inspection of AQSIQ, in accordance with the national quality supervision and sampling examination catalog, is responsible for developing the Surveillance Sampling program and assigning the supervision mission for products that have serious quality problems, that endanger life and property safety, or that raise social issues such as important production materials related to the national economy and people's livelihoods.

2. The Quality Inspection Center is responsible for national quality supervision, sampling examination, and the preparation of sampling programs. The QIC takes part in national quality supervision and arranges sampling examination conferences. On request, the QIC can obtain Letters of Attorney on National Quality Supervision and Sampling Examination, Notices on National Quality Supervision and Sampling Examination, and Feedback on National Quality Supervision and Sampling Examination .

## **II. Quality inspection bodies organize sampling and inspection**

1. Quality inspection bodies organize sampling according to the approved sampling program and list of enterprises.

2. After arriving at the random inspected enterprise, the sampling personnel present the Notice on National Quality Supervision and Sampling Examination. They carry out sampling and sealing samples according to sampling procedures, and have the enterprise principal(s) add a signature on the sampling document after finishing the sampling.

3. After the samples are received by the inspection authorities, the quality inspection bodies first check the condition of the sealed samples and the sampling documents and then conduct the acceptance formalities and organize inspection.

4. After the inspection, the quality inspection bodies shall judge the inspection results according to appropriate regulations and then issue the inspection report. The inspection report shall be sent to the inspected enterprise by EMS immediately after being verified and approved.

5. An inspected company that dissents from the inspection results after receiving the inspection report is entitled to raise written objections within 15 days. The quality inspection center shall give a written response within 10 days of receiving the written opinion, make a copy and send it to the Department of Supervision on Inspection of AQSIQ.

## **III. Reporting the sampling examination results**

After the sampling and inspection work is complete, the sampling data must be classified, and authorities must fill out the database of national supervision and sampling examination, generate summary tables and statistics, fill out the expenditure table and report all materials to the Department of Supervision on Inspection of AQSIQ.

## **IV. Summarizing the sampling examination results**

The inspecting and examining authorities are responsible for reporting the data to the Department of Supervision on Inspection of AQSIQ. The Department of Supervision on

Inspection shall collect, summarize and analyze the reported data from the quality inspection centers and generate notification of national quality supervision and sampling examination of classified products, and issue a news release.

## V. Releasing the results

1. Announcements. AQSIQ is responsible for releasing the sampling examination results.

2. Distributing the data and notifications. Authorities are required to distribute the sampling examination notifications and data to the Bureaus of Quality and Technology Supervision in provinces and municipalities nationwide and urge the Provincial-level Quality and Technology Supervision authorities to punish companies producing unqualified products.

## VI. Treatment of enterprises producing unqualified products

The Bureaus of Quality and Technology Supervision in various regions are responsible for determining the treatment of enterprises producing unqualified products and report the results of the treatment to AQSIQ within six months. AQSIQ is responsible for releasing the results of treatment of businesses found to have produced unqualified products.

Source: AQSIQ website

[http://english.aqsiq.gov.cn/SpecialTopics/SupervisiononProductQuality/ApplicationGuides/200907/t20090708\\_121174.htm](http://english.aqsiq.gov.cn/SpecialTopics/SupervisiononProductQuality/ApplicationGuides/200907/t20090708_121174.htm)

## ANNEX 3:

# IMPLEMENTATION SPECIFICATIONS FOR PRODUCT QUALITY SUPERVISION AND SAMPLING INSPECTION FOR SELF-BALLASTED FLUORESCENT LAMPS FOR GENERAL LIGHTING SERVICE

## I. SCOPE

This specification applies to quality supervision and sampling inspections for self-ballasted fluorescent lamps for general lighting service, as organized by National or Provincial Quality and Technical Supervision Departments. Supervision and sampling inspections organized by other Quality and Technical Supervision departments, or organized for special cases, could also be conducted by referring to this specification. The specification denotes the product classification, company scales, inspection references and requirements, sampling, assessment and

re-inspection for non-compliance.

The specification is applicable to self-ballasted fluorescent lamps for general lighting service as having:

- a rated wattage of up to 60W;
- a rated voltage of 100V to 250V;
- Edison screw or bayonet caps.

## 2. PRODUCT CLASSIFICATIONS

### 2.1 Product classifications and codes

Product Classification	One-stage classification	Two-stage classification	Three-stage classification
Classification Code	2	210	210.4
Classification Name	Daily necessities	Lighting sources and luminaries	Self-ballasted fluorescent lamps for general lighting service

### 2.2 Product Categories

Self-ballasted fluorescent lamps for general lighting service are called self-ballasted lamps, or energy saving lamps. This refers to a unit that cannot be dismantled without being permanently damaged. Such units are provided with a lamp cap and incorporate a light source and any additional elements necessary for starting and for stable operation of the lighting source.

For classification by lamp cap, self-ballasted fluorescent

lamps can be divided into screw lamps and bayonet lamps. For classification by ballast, self-ballasted fluorescent lamps can be divided into electronic ballast lamps and magnetic ballast lamps.

## 3. ENTERPRISES SCALES

According to the actual annual sales volume of self-ballasted fluorescent lamps for general lighting service, companies can be divided into three scales as indicated in the table below:

Company scale	Large scale companies	Medium scale companies	Small scale companies
Sales volume (RMB 10,000s)	≥ 10,000	≥2,000 and < 10,000	<2,000

#### 4. INSPECTION REFERENCES

The following normative documents contain provisions which, through reference in the text, constitute provisions of this Specification. For dated reference, subsequent amendments or revisions of these publications do not apply to this Specification. For undated references, the last edition of the normative documents referred to applies to this Specification.

GB16844 *Self-ballasted Lamps for General Lighting Service-Safety requirements*

GB17625.1 *Electromagnetic Compatibility-Limits-Limits for Harmonic Current Emissions (equipment input current ≤ 16 A per phase)*

GB19044 *Limited Values of Energy Efficiency and Rating Criteria of Self-ballasted Fluorescent Lamps for General Lighting Service*

GB/T17263 *Self-ballasted Lamps for General Lighting Service-Performance Requirements*

No.13 *Order of General Administration of Quality Supervision, Inspection and Quarantine: Management Measures of National Supervision and Inspection on Product Quality*

*Recorded and Valid Enterprises' Standards and Requirements on Product Quality Statement*

#### 5. SAMPLING

##### 5.1 Sampling Models

Draw one representative sample from each company.

##### 5.2 Sampling methods/quantity

Samples should be randomly drawn from a company's finished-product warehouse or retail market, from the qualified products which have passed the enterprise's inspection, or from the products claimed as qualified in any manner. When drawing samples from a company's finished-product warehouse, the sample cardinal number should be more than 200 units, and the sample size should be 25 units—among which 15 units are used for testing and 10 units are sealed and stored in the laboratory that undertakes the testing task. When drawing samples from the retail market, the sample cardinal number should be equal to or more than the sample size, while sampling methods and sampling quantity requirements are the same as those for sampling in the company's finished-product warehouse.

##### 5.3 Samples treatment

Samples should be packaged according to shipping requirements and the "Product Quality and Inspection Seal" should be pasted on all possible openings of the packaging.

Samples should be transported and kept from stress, moisture, and heavy sunning and should not be stored with corrosive substances such as oil, acid or alkali.

##### 5.4 Sampling form

The sampling form should be filled out according to relevant requirements. Information about sampled models, companies and their sales volumes (in unit CNY10,000) of self-ballasted fluorescent lamps in the preceding year should be recorded. In case the enterprise did not produce self-ballasted fluorescent lamps in the preceding year, sales volumes for this kind of product in this year should be recorded.

No.	Inspection Item	Standards	Mandatory or Voluntary	Testing Methods	Sample size for testing	Judgment array		Sample Serial Number	Importance Degree		
						Ac	Re		A	B	C
1	Mark (Safety)	GB 16844-1997 4.1	Mandatory	4.1	3	0	1	13-15	<input type="checkbox"/>		
2	Interchangeability	GB 16844-1997 5	Mandatory	5	3	0	1	13-15	<input type="checkbox"/>		
3	Protection against electric shock	GB 16844-1997 6	Mandatory	6	3	0	1	13-15	<input type="checkbox"/>		
4	Insulation resistance and dielectric strength	GB 16844-1997 7	Mandatory	7	3	0	1	13-15	<input type="checkbox"/>		
5	Mechanical Strength	GB 16844-1997 8	Mandatory	8	3	0	1	13-15	<input type="checkbox"/>		
6	cap temperature rising	GB 16844-1997 8	Mandatory	9	3	0	1	13-15	<input type="checkbox"/>		
7	Heat-resisting	GB 16844-1997 10	Mandatory	10	3	0	1	13-15	<input type="checkbox"/>		
8	Fire proofing and burn proofing	GB 16844-1997 11	Mandatory	11	3	0	1	13-15	<input type="checkbox"/>		
9	Abnormal condition	GB 16844-1997 12	Mandatory	12	3	0	1	13-15	<input type="checkbox"/>		
10	Lamp Power	GB/T17263-2002 5.4	Voluntary	6.4	12	2	3	1-12		<input type="checkbox"/>	
11	Initial efficacy /lumen output	GB/T17263-2002 5.6	Voluntary	6.4	12	2	3	1-12		<input type="checkbox"/>	
9	Color rendering index	GB/T17263-2002 5.7	Voluntary	6.4	12	2	3	1-12		<input type="checkbox"/>	
10	Lumen maintenance at 2000 h	GB/T17263-2002 5.9	Voluntary	6.5	10	2	3	1-10		<input type="checkbox"/>	
11	Mark (Performance)	GB/T17263-2002 8.1	Voluntary	8.1	12	2	3	1-12		<input type="checkbox"/>	
12	Start characteristics	GB/T17263-2002 5.3	Voluntary	6.3	12	2	3	1-12			<input type="checkbox"/>
13	Color tolerance	GB/T17263-2002 5.7	Voluntary	6.4	12	2	3	1-12			<input type="checkbox"/>
14	Power factor *	GB/T17263-2002 5.5	Voluntary	6.4	12	2	3	1-12			<input type="checkbox"/>
15	Harmonic	GB/T17263-2002 5.10	Voluntary	6.6	12	2	3	1-12		<input type="checkbox"/>	
16	Limited value of energy efficiency	GB 19044-2003 4.3	Mandatory	5.2	12	2	3	1-12	<input type="checkbox"/>		

Note 1: If there is no claimed power factor, measured data should be provided.

Note 2: Mark (Safety) is the item specified in GB 16844.

Note 3: Mark (Performance) is the item specified in GB/T17263.

## 6. INSPECTION REQUIREMENTS

### 6.1 Inspection Items and Importance Degree

Note: In the Importance Degree line, the “A” category means very important; the “B” category means important; and the “C” category means slightly important.

### 6.2 Product Actual Quality Inspection Items and Label Quality Inspection Items

In the above table, only Mark belongs to the Label Quality inspection item; others belong to the Product Actual Quality inspection items.

### 6.3 Issues to be considered

In case some important inspection items are not covered by company standards, Product Quality Statement Standards, or mandatory standards, these items should be inspected according to voluntary standards.

## 7. ASSESSMENT PRINCIPLES

### 7.1 Assessment principles for product actual quality

When all actual quality inspection items pass or only one item of the “C” category fails, the product’s actual quality is in compliance. Otherwise, the product’s actual quality is in non-compliance. When two or more than two items in the “A” category fail, or three or more than three items in the “B” category fail, or one item in the “A” category plus two items in the “B” category fail, the product’s actual quality is in serious non-compliance. When one item in the “A” category fails, or two items in the “B” category fail, or one item in the “A” category plus one item in the “B” category fail, the product is in relatively serious non-compliance. When one item in the “B” category fails, or two or more than two items in the “C” category fail, or one item in the “B” category plus one item in the “C” category fail, the product is in slight non-compliance.

### 7.2 Assessment principles for product labels

When one or more than one sub-item in Mark (Safety) item fails (refer to Section 4), the product label is in non-compliance. Otherwise, the product label is in compliance.

Besides the above conditions, the Mark (Performance) item should be inspected according to relevant requirements without assessment. Non-compliance conditions can be recorded in attached pages of the inspection report with this note: “Inspection has been conducted and corrections have been proposed, however, the Mark (Performance) item inspection result has not been included in the integrated assessment.”

### 7.3 Integrated assessment principles for product inspection results

If the product’s actual quality and label quality are all in compliance, the product should be assessed as a qualified product. Otherwise, the product should be assessed as disqualified. When the product’s actual quality is in serious non-compliance or the product’s actual quality is in relatively serious non-compliance and the label quality is in non-compliance, the product is seriously disqualified. When only the product’s actual quality is in relatively serious non-compliance, or the product’s actual quality is in slight non-compliance and the label quality is in non-compliance, the product is relatively seriously disqualified. When only the product’s actual quality is in slight non-compliance, or only the label quality is in non-compliance, the product is slightly disqualified.

## 8. RE-INSPECTION FOR NON-COMPLIANT PRODUCTS

8.1 If the non-compliant items can be verified by relevant evidence, such as records (including paper, electronic or video records), defective characteristics or other quality data related to a non-compliant quality item, and the verification can be accepted by the re-inspection applicants, the original inspection conclusion will be kept.

8.2 For re-testing of non-compliant items, if the testing can be conducted on the original test samples, the original samples should be used. Otherwise, the samples sealed up for storage should be used. If the re-testing results show that the items are still in non-compliance, the original testing results should be kept. If the re-testing results show that the items are in compliance, then the re-testing results should be used for assessment.



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