



# Boiler Operator Training and Boiler, Heat Exchanger Energy-saving Technology Product Testing and Evaluation Work Project Summary of Boiler Operator Training

Project Name: Boiler Operator Training and Boiler, Heat  
Exchanger Energy Saving

Technology Product Testing and Evaluation  
Work



National Industrial Boiler Quality Inspection and Testing Center (Guangdong)

Project Number: ZRGY-CCGP-23060113

Implementing Unit: Shunde Testing Institute of  
Guangdong Special Equipment Testing Research Institute

National Industrial Boiler Quality Inspection  
and Testing Center (Guangdong)

Implementation Period: September 2023 to December  
2023

December 2023



## Summary of Boiler Operator Training

Project Name	Boiler Operator Training and Boiler, Heat Exchanger Energy Saving Technology Product Testing and Evaluation Work	
Project Number	ZRGY-CCGP-23060113	
Implementing Unit	Shunde Testing Institute of Guangdong Special Equipment Testing Research Institute	
Project Overview	<p>In order to strengthen the energy-saving work of high-energy-consuming special equipment such as boilers and heat exchangers, commissioned by the Global Environment Fund's "Industrial Heating System and High-Energy Equipment Energy Efficiency Improvement" project management office, the Shunde Testing Institute of Guangdong Special Equipment Testing Research Institute carried out the Boiler Operator Training and Boiler, Heat Exchanger Energy Saving Technology Product Testing and Evaluation Work Project across the province. This project mainly includes two aspects: (1) Boiler operator energy-saving training; (2) Boiler, heat exchanger energy-saving technology product testing and evaluation. To promote the progress of the first part of the project, the Shunde Testing Institute of Guangdong Special Equipment Testing Research Institute carried out the Boiler Operator Training and Boiler, Heat Exchanger Energy Saving Technology Product Testing and Evaluation Work Project across the province.</p>	
Implementation Status	<p>This project has been successfully carried out with efforts and cooperation from multiple parties, and has achieved some results:</p> <p>(1) The operational skills and business level of boiler operators have been enhanced, including routine operations such as boiler start-up and shutdown, operation adjustment, inspection and maintenance, as well as emergency response methods for abnormal situations, optimizing and improving the operation and maintenance level of boilers.</p> <p>(2) Enterprise management personnel have enhanced their understanding and knowledge of the boiler industry, especially in energy conservation and environmental protection management, and have gained a deeper understanding of the structural principles, working processes, performance parameters of boilers, as well as knowledge related to energy management and energy efficiency evaluation, which helps enterprises enhance energy-saving awareness, optimize energy management levels for boilers and industrial heating systems, promote energy conservation and emission reduction, and achieve green and low-carbon development.</p>	
Report Compilation	Lin Yizhan 林毅湛	(Special seal or official seal of the evaluation agency)  December 29, 2023
Report Proofreading	Wu Zihao 吴梓皓	
Report Review	Yu Mengquan 俞梦权	

Commented [MOU1]: The table cuts off key information provided



National Industrial Boiler Quality Inspection and Testing Center (Guangdong)

Report Approval	Wen Qingshan 文青山	
--------------------	------------------	--



## Table of contents

<b>Summary of Boiler Operator Training.....</b>	<b>1</b>
<b>1. Project introduction.....</b>	<b>1</b>
1.1 Background.....	1
1.2 Project Overview .....	1
<b>2. Training planning .....</b>	<b>3</b>
2.1 Training objectives.....	3
2.2 Training objects .....	4
2.3 Training content.....	4
2.4 Introduction to training units .....	6
<b>3. Overview of training implementation .....</b>	<b>8</b>
3.1 Preparation .....	8
3.2 Training format .....	8
3.3 Training methods .....	9
3.4 Class opening guidelines.....	10
3.5 Course Arrangement .....	10
3.6 Problems and solutions .....	25
3.7 Summary and suggestions.....	26
<b>4. Accessories .....</b>	<b>29</b>
4.1 Notice of opening of some training sessions .....	29
4.2 List of trainees.....	32
4.3 Feedback form from some training students.....	42
4.4 Some on-site photos .....	44



# 1. Project introduction

## 1.1 background

The Global Environment Facility (GEF) is an experimental project created by the World Bank in 1990 to support environmentally friendly projects. It is an international cooperation organization composed of 183 countries and regions. Its purpose is to cooperate with international institutions, social groups and Private sector collaboration to solve environmental problems.

Since 1991, GEF has provided \$12.5 billion in grants and \$58 billion in co-financing for 3,690 projects in 165 developing countries. Over the past 23 years, developed and developing countries have used these funds to support environmental protection activities and implement related projects and plans in areas such as biodiversity, climate change, international waters, land degradation, chemicals and waste.

## 1.2 Project Overview

In order to strengthen the energy-saving work of high-energy-consuming special equipment such as boilers and heat exchangers, entrusted by the Global Environment Fund's "Industrial Heating Systems and High-energy-Consuming Equipment Energy Efficiency Improvement" Project Management Office, the Guangdong Provincial Special Equipment Inspection Institute Shunde Inspection Institute (National The Industrial Boiler Quality Inspection and Testing Center (Guangdong)) carries out boiler operator training and boiler and heat exchanger energy-saving technology product testing and evaluation projects across the province.

This project mainly includes two aspects:

- (1) Energy saving training for boiler operators
- (2) Two parts of testing and evaluation of energy-saving technology products for boilers and heat exchangers

In order to promote the progress of the first part of the project, the Shunde Inspection Institute of Guangdong Special Equipment Inspection Institute (National



Industrial Boiler Quality Inspection and Inspection Center (Guangdong)) will monitor the management and operation personnel of boilers and heat exchanger users, and special equipment during the project period. Supervisory and management personnel and other personnel should be trained to effectively improve the technical level and energy-saving awareness of boiler operators and managers, improve equipment management and operation levels, and promote the green, low-carbon and high-quality development of the high-energy-consuming special equipment industry.

As of December 31, 2023, the National Industrial Boiler Quality Inspection and Testing Center (Guangdong) has conducted a total of 16 training sessions across the province, with a total of 1,324 trainees.



## 2. Training planning

### 2.1 Training objectives

To promote the implementation of the "Industrial Heating System and High-Energy Equipment Energy Efficiency Promotion" project of the Global Environment Fund, effectively enhance the technical level and energy-saving awareness of boiler operators and management personnel in key areas, optimize boiler energy management through energy-saving training for boiler operators, reduce boiler energy consumption and emissions, improve boiler safety and economy, promote the transformation and upgrading of the boiler industry, and achieve green and low-carbon development. Specific objectives are as follows:

1. Disseminate laws, policies, and standard regulations related to boiler safety, energy efficiency, and environmental protection to boiler management and operation personnel, and enhance their legal awareness.
2. Conduct training on basic knowledge of boilers, including their structure, working principles, operating parameters, performance indicators, etc., to enhance the technical knowledge of boiler management and operation personnel.
3. Address common issues in boiler operation, present typical boiler accident cases, and conduct training on daily inspection, maintenance, cleaning, and operation maintenance knowledge of boilers to effectively improve the operational maintenance level of boiler management and operation personnel, ensure boiler safety and normal operation, and reduce accidents.
4. Provide detailed information to boiler management and operation personnel on common boiler energy-saving measures and technologies, including improving combustion methods, optimizing control systems, installing energy-saving devices, recovering waste heat, descaling, using new fuels, etc. Additionally, analyze in-depth the effects of boiler energy-saving transformations based on typical cases, strengthen the understanding of energy-saving transformations by boiler users, and enhance their ability to implement energy-saving transformations.





5. Promote policies, technical guidance, and financial subsidies for boiler energy-saving transformations to enhance the enthusiasm and initiative of boiler users in carrying out energy-saving transformations.

6. Disseminate knowledge on boiler energy efficiency testing and evaluation methods and standards, including testing instruments, testing procedures, data processing, etc., to enhance the ability to evaluate the energy-saving effects of boilers.

## **2.2 Training Targets**

The main training targets of this training are divided into the following categories:

1. Boiler user management personnel who need to understand and update the legal requirements for boiler energy conservation and environmental protection, need to address or optimize operational issues of boilers, and have insufficient technical capabilities and management experience related to energy efficiency in boiler system operations.

2. Personnel from boiler user units who need to learn about boiler energy efficiency testing and the detection and emission of atmospheric pollutants from boilers.

3. Boiler attendants who need to address or optimize operational issues of boilers, and improve their technical skills in ensuring the safe operation and maintenance of boiler systems.

4. Market supervision and law enforcement personnel who need to update their professional skills in boiler energy conservation and emission reduction monitoring and enhance their energy conservation monitoring level.

5. Individuals from industrial enterprises, boiler companies, research institutions, inspection agencies, industry associations, and others who have an interest in understanding energy conservation and emission reduction work for high-energy special equipment.

## **2.3 Training Content**



The training content of this training is as follows:

1. Basic knowledge of boilers, including definitions, classifications, structural components, working principles, operating parameters, safety accessories, and other basic contents.

2. Safety operation requirements for boilers, combined with the relevant requirements of boiler operation and maintenance procedures, introduce the basic requirements and precautions for safe operation of boilers, including safety operation procedures such as startup, shutdown, operation adjustment, safety monitoring, daily inspections, etc.

3. Emergency handling for boilers, detailed introduction of dangerous factors in boiler operation, accident handling, emergency response, and other safety knowledge, combined with typical boiler accident cases.

Maintenance of boilers. Introduce the daily maintenance, regular inspections, fault troubleshooting, and other maintenance contents of boilers.

Introduction to common boiler energy-saving measures and energy-saving technologies, such as energy-saving devices, condensing heat recovery, scale removal, fuel additives, oxygen-enriched combustion, and new types of fuels.

Case studies of boiler energy-saving transformations. Select some typical cases of boiler energy-saving transformations, analyze the energy consumption before and after the transformation in depth, quantify the energy-saving cost, energy consumption reduction, and evaluate the feasibility and economic viability of boiler energy-saving transformations.

Introduction to common boiler environmental protection processes and technologies, such as desulfurization, denitrification, dust removal, mist elimination, and low nitrogen emissions.

Analysis of boiler energy-saving and environmental protection cases. Select some typical cases of boiler energy-saving and environmental protection transformations, and conduct in-depth analysis of the practicality and economic viability of their energy-saving measures.



Relevant laws, regulations, rules, and policies related to the safety, energy efficiency, and environmental protection of boilers. Analyze and interpret the relevant provisions, and disseminate and explain the relevant legal knowledge.

Methods and standards for energy efficiency testing and evaluation of boilers, including the preparation conditions, operating requirements, determination of test boundaries, on-site testing items, testing instruments and equipment, sample collection and chemical analysis, report preparation, and boiler energy efficiency evaluation.

Boiler energy-saving and environmental protection management system, including the requirements for the management system in TSG 91-2021 "Technical Regulations for Boiler Energy Saving and Environmental Protection," the data included in the energy-saving and environmental protection technical files, and the energy-saving analysis and evaluation system.

## **2.4 Introduction of the training unit.**

The National Industrial Boiler Quality Inspection and Testing Center (Guangdong), undertaken by the Shunde Testing Institute of the Guangdong Special Equipment Testing and Research Institute, is the only national inspection center in China that is built with a focus on energy saving, environmental protection, and low carbon. It has established 18 professional testing laboratories/service platforms, covering comprehensive testing areas such as boiler energy-saving and environmental protection, heat exchanger product testing, fuel analysis, water quality testing, oil quality analysis, environmental testing, mechanical performance testing, material testing, and carbon emission monitoring, with a total experimental area of approximately 15,000 square meters.

The National Inspection Center mainly engages in industrial boiler safety, energy efficiency, environmental protection testing, conducts research on industrial boiler energy-saving and environmental protection technologies, carbon emission verification technologies, and promotes the application of new products and processes.



Its testing capabilities cover 27 products (objects) in the industrial field, including water tube boilers, shell boilers, organic heat carrier boilers, electric heating boilers, and small atmospheric hot water boilers, with a total of 283 inspection items (parameters) and 320 standards (methods).



### **3. Overview of training implementation**

#### **3.1 Preparations before the training.**

In order to ensure the smooth implementation of this training project, the training unit carried out a series of preparatory measures before the official start of the project:

(1) According to the total number of participants required for the project, a training plan was formulated in advance, and discussions were held with the enterprise or unit where the training will take place to plan the training sessions and the number of participants for each session.

(2) Early communication with the enterprise or unit where the training will take place, investigation of the main subjects of the training participants, understanding the learning needs of the participants, and planning the training format and content based on the actual situation and learning needs of the participants.

(3) Modification of training materials in advance to meet the needs of different enterprises, units, and participants.

Before the formal training begins, the Shunde Testing Institute of Guangdong Special Equipment Testing Research Institute (National Industrial Boiler Quality Inspection and Testing Center (Guangdong)) first conducts internal training for multiple training lecturers in advance to understand the different training styles of each lecturer, and arranges the lecturers for each training session according to the training plan and the training objects.

#### **3.2 Training Format**

This training adopts a primarily offline training mode supplemented by online training. The number of trainees per batch is determined based on actual circumstances. Depending on the training format and the region to which the trainees belong, different training locations are arranged.

Offline training is organized by the training organizer based on the main concentration locations of the trainees in each batch, determining convenient offline training locations for the majority of the trainees to participate, and issuing training



meeting notices in advance to inform prospective trainees of the training time, content, location, etc. Offline training mainly involves practical teaching through organizing training, field visits, on-site demonstrations, simulated operations, and utilizes social media such as WeChat groups, QQ groups for interactive communication, and timely answering of students' questions and confusion.

Online training is primarily conducted through the Tencent Meeting app for teaching. The training organizer sets up meeting rooms on the Tencent Meeting app, issues training meeting notices in advance, and informs prospective trainees of the training time, content, online meeting room access path, etc. The meeting provides services such as course videos, material downloads, and online Q&A.

### **3.3 Training Methods**

This training adopts a combination of various training methods, specific methods include:

Theoretical teaching. Professionals use PPT or video teaching to provide systematic lectures to students, covering basic knowledge of boilers, policies and regulations, standard requirements, energy-saving technologies, etc.

Case studies. Selecting some typical boiler accident cases for detailed discussion, analyzing the causes of accidents, interpreting process clauses based on the requirements for safe boiler operation in the regulations, drawing lessons from accidents, learning safety experiences. For boiler energy-saving measures and technologies, typical cases of boiler energy-saving transformations are also selected for in-depth analysis of the effects of energy-saving transformations, conducting comprehensive analysis of the feasibility, effectiveness, and economic viability of different boiler energy-saving technologies.

Group discussions. Addressing issues in the daily operation management of boilers, blind spots in legal requirements for boilers, misconceptions in boiler energy efficiency testing and energy evaluation, through group discussions among trainees to share and exchange experiences.



Question and answer sessions. Trainees ask professional staff questions about difficult points and doubts they have, and professionals provide answers and explanations one by one.

### 3.4 Class Opening Criteria

This training is conducted in batches from October 2023 to December 2023. Each batch requires a minimum of 30 and a maximum of 200 trainees to ensure training quality and efficiency. Each boiler operator must attend all training content without absence or leaving early to ensure training effectiveness and fairness. Each boiler operator must adhere to training discipline, actively participate in training activities, and diligently complete training tasks to maintain training order.

### 3.5 Course Schedule

As of December 31, 2023, a total of 16 training sessions have been conducted province-wide, with the training course schedule as shown in the table below:

Session	Start Time	Location	Lecturer	Number of Trainees
1	2023-10-27	Guangzhou Nansha District Comprehensive Administrative Law Enforcement Bureau	Yu Mengquan	105 people
2	2023-11-03	Guangdong Jingxin Electric Power Group Co., Ltd.	Lin Yizhan	80 people
3	2023-11-05	Jieyang Puning Special Equipment Industry Association	Li Minfeng	65 people
4	2023-11-07	Foshan Quality and Safety Vocational Qualification Training Center	Lin Yizhan	43 people
5	2023-11-09	Guangzhou Special Equipment Industry Association	Song Zhenyu	99 people



National Industrial Boiler Quality Inspection and Testing Center (Guangdong)

6	2023-11-15	Zhanjiang Special Equipment Industry Association	Yu Mengquan	104 people
7	2023-11-17	National Industrial Boiler Quality Inspection and Testing Center (Guangdong)	Song Zhenyu	95 people
8	2023-11-20	Shantou Special Equipment Industry Association	Lin Yizhan	107 people
9	2023-11-21	National Industrial Boiler Quality Inspection and Testing Center (Guangdong)	Song Zhenyu	42 people
10	2023-11-29	Guangdong Shunkong Environmental Investment Co., Ltd.	Lin Yizhan	103 people
11	2023-12-01	Foshan Shunde Wusha Thermal Power Co., Ltd.	Lin Yizhan	67 people
12	2023-12-07	Jiantao (Qingyuan) Circular Economy Industrial Park	Lin Yizhan	46 people
13	2023-12-13	Huadian Foshan Energy Co., Ltd.	Lin Yizhan	102 people
14	2023-12-19	Shaoguan Dongyang Guangfu Co., Ltd.	Lin Yizhan	100 people
15	2023-12-21	Foshan Shunde Jinfang Group Co., Ltd.	Lin Yizhan	82 people
16	2023-12-26	Zhaoqing Zhixin Vocational Training School	Lu Zhitong	84 people

This training is conducted in various sessions throughout the province. Based on the different needs of the trainees, the training content has been modified accordingly.



The focus of each training session varies. Below is a summary analysis of selected training sessions.

### 3.2.1 Boiler Safety Operation and Energy Saving Technology Training held at Guangzhou Nansha District Comprehensive Administrative Law Enforcement Bureau on October 27, 2023



The training on boiler safety operation and energy-saving technology was conducted at Guangzhou Nansha District Comprehensive Administrative Law Enforcement Bureau on October 27, 2023. The main trainees of this session are the operators and managers of boiler-using units, as well as market supervision and law enforcement personnel who need to update their professional skills in boiler energy-saving and emission reduction and enhance their energy-saving supervision level. According to the needs of the trainees, this session focuses on explaining the relevant laws and regulations related to boiler safety, energy efficiency, and environmental protection, including the following five parts:

#### (1) Boiler Basics

- Definition of a boiler
- Boiler system components



- Typical industrial boiler structures
- Three main processes of a boiler

## (2) Boiler Safety Operation Requirements

- Requirements for boiler safety operation in regulations such as "Boiler Safety Technical Regulations" and "Special Equipment Operator Assessment Rules"
- Boiler hazards
- Boiler accident handling

## (3) Boiler Energy Saving and Environmental Protection Laws and Regulations System

This part is the focus of this training, providing detailed information to students on China's current legal and regulatory system regarding boiler management.

- "Special Equipment Safety Law of the People's Republic of China"
- "Energy Conservation Law of the People's Republic of China"
- "Air Pollution Prevention and Control Law of the People's Republic of China"
- Special Equipment Safety Supervision Regulations
- Measures for Energy Conservation Supervision of High-Energy-Consumption Special Equipment
- TSG 91-2021 "Boiler Energy Saving and Environmental Protection Technical Regulations"

## Boiler Atmospheric Pollutant Emission Supervision and Testing

- GB13223-2011 "Emission Standards for Atmospheric Pollutants from Thermal Power Plants"
- GB13271-2014 "Emission Standards for Atmospheric Pollutants from Boilers"
- Case Analysis of Boiler Atmospheric Pollutant Emission Monitoring

## Boiler Energy Saving Technology Introduction

- Current Situation of Energy Saving in Industrial Boilers
- Boiler Energy Saving Technology Route



- Boiler Energy Saving Technology Products



**3.2.2 Training on Safe Operation and Energy Saving Technology of Power Plant Boilers conducted at Guangdong Jingxin Power Group Co., Ltd. on November 3, 2023**





Training on Safe Operation and Energy Saving Technology of Power Plant Boilers conducted at Guangdong Jingxin Power Group Co., Ltd. in Nanhai District, Foshan City on November 3, 2023. The main trainees for this session were newly certified G2 boiler operators. The focus of this training session was on basic boiler knowledge and safe operation training, including the following five main contents:

(1) Basic Knowledge of Power Plant Boilers

- Definition of a boiler
- Composition of Power Plant Boiler Systems
- Common Types of Power Plant Boilers
- Three Major Processes of Power Plant Boilers

(2) Safety Operation Requirements of Power Plant Boilers

This part is the key content of this training session, introducing operational knowledge of power plant boilers to trainees to solidify theoretical foundations for future certification and job placement.

- Requirements for boiler safety operation in regulations such as "Boiler Safety Technical Regulations" and "Special Equipment Operator Assessment Rules"
- Key Points for Operation and Safety of Power Plant Boilers
- Boiler hazards
- Handling of Power Plant Boiler Accidents
- Analysis of Typical Accident Cases

(3) Daily Maintenance of Power Plant Boilers

- Boiler Safety Attachments and Instruments
- Operation and Maintenance of Power Plant Boilers
- Shutdown Maintenance of Power Plant Boilers

(4) Introduction of Energy Saving Technologies for Power Plant Boilers

- Energy Saving Technologies for Combustion Systems
- Energy Saving Technologies for Steam-Water Systems
- Energy Saving Technologies for Flue Gas Systems

(5) Performance Testing of Power Plant Boilers



Due to the recent intention of Guangdong Jingxin Power Group Co., Ltd. to conduct performance testing of boilers, this training session provided detailed information to trainees on the performance testing of coal-fired power plant boilers.

- GB/T 10184-2015 "Performance Testing of Power Plant Boilers"
- Boiler Heat Balance Calculation
- Test Conditions and Operating Requirements for Performance Testing
- Testing and Inspection Items
- Instruments and Equipment for Testing
- Sharing of Performance Testing Cases of Power Plant Boilers

### **3.2.3 Training on Safe Operation and Energy Saving Technology of Industrial Boilers conducted at the National Industrial Boiler Quality Inspection and Testing Center (Guangdong) on November 17, 2023**

Training on Safe Operation and Energy Saving Technology of Industrial Boilers conducted at the National Industrial Boiler Quality Inspection and Testing Center (Guangdong) on November 17, 2023. The majority of trainees for this session were operational and managerial staff from boiler-using units in Shunde District, Foshan City. Trainees showed great interest in the energy efficiency and testing of boilers, hence the training content focused on energy efficiency testing and status of industrial boilers, including the following four main contents:

#### **(1) Boiler Basics**

- Definition of a boiler
- Boiler system components
- Typical industrial boiler structures
- Three main processes of a boiler

#### **(2) Boiler Safety Operation Requirements**

- Requirements for boiler safety operation in regulations such as "Boiler Safety Technical Regulations" and "Special Equipment Operator Assessment Rules"
- Boiler hazards
- Boiler accident handling



### Introduction to Boiler Energy Saving Technology

- Current Situation of Energy Saving in Industrial Boilers
- Boiler Energy Saving Technology Route
- Boiler Energy Saving Technology Products

### Industrial Boiler Energy Efficiency Testing

TSG 91-2021 "Boiler Energy Saving and Environmental Protection Technical Regulations" stipulates that boiler users should conduct regular energy efficiency testing on their own (or entrust capable testing agencies), generally once every two years, and the testing work can be combined with external boiler inspections. Some students have doubts about this provision in the regulations, such as whether boiler energy efficiency testing is mandatory, and if the test results do not meet the requirements, whether the boiler can still be used normally. This training session specifically addressed these issues, providing detailed explanations on the relevant provisions of boiler energy efficiency testing, testing methods, and precautions.

- GB/T 10180-2017 "Industrial Boiler Thermal Performance Test Code"
- Preparation work for Boiler Energy Efficiency Testing
- Definition of the scope of Boiler Energy Efficiency Testing
- Boiler Energy Efficiency Testing Inspection Items
- Selection of detection equipment and measurement points for Boiler Energy Efficiency Testing
- Selection of sampling points and sampling requirements for Boiler Energy Efficiency Testing
- Data organization for Boiler Energy Efficiency Testing
- Preparation of Boiler Energy Efficiency Testing Report
- Relevant provisions on boiler energy efficiency testing in TSG 91-2021 "Boiler Energy Saving and Environmental Protection Technical Regulations"



#### 3.2.4 Training on the safe operation and energy conservation and environmental protection regulations of power plant boilers conducted on November 29, 2023, at Guangdong Shunkong Environmental Investment Co., Ltd.

Training on the safe operation and energy conservation and environmental protection regulations of power plant boilers conducted on November 29, 2023, at Guangdong Shunkong Environmental Investment Co., Ltd. In this training session, the trainees have a certain understanding of the daily operation and maintenance of boilers, but they lack relative knowledge of the energy conservation and environmental protection laws and regulations related to boilers. Therefore, the focus of this training session is on the promotion and interpretation of relevant laws, regulations, and policies on boiler energy conservation and environmental protection. It mainly includes the following six parts:

##### (1) Basic Knowledge of Power Plant Boilers

- Definition of a boiler



- Composition of Power Plant Boiler Systems
- Common Types of Power Plant Boilers
- Three Major Processes of Power Plant Boilers

(2) Safety Operation Requirements of Power Plant Boilers

- Requirements for boiler safety operation in regulations such as "Boiler Safety Technical Regulations" and "Special Equipment Operator Assessment Rules"
- Key Points for Operation and Safety of Power Plant Boilers
- Boiler hazards
- Handling of Power Plant Boiler Accidents
- Analysis of Typical Accident Cases

(3) Boiler Energy Saving and Environmental Protection Laws and Regulations System

This part is the focus of this training, providing detailed information to students on China's current legal and regulatory system regarding boiler management.

- "Special Equipment Safety Law of the People's Republic of China"
- "Energy Conservation Law of the People's Republic of China"
- "Air Pollution Prevention and Control Law of the People's Republic of China"
- Special Equipment Safety Supervision Regulations
- Measures for Energy Conservation Supervision of High-Energy-Consumption Special Equipment
- TSG 91-2021 "Boiler Energy Saving and Environmental Protection Technical Regulations"

Boiler Atmospheric Pollutant Emission Supervision and Testing

Sharing with trainees the "three-in-one" management system of boiler safety, energy conservation, and environmental protection, and analyzing case studies of atmospheric pollutant emissions monitoring for boilers.

- GB13223-2011 "Emission Standards for Atmospheric Pollutants from Thermal Power Plants"





- GB13271-2014 "Emission Standards for Atmospheric Pollutants from Boilers"
- Case Analysis of Boiler Atmospheric Pollutant Emission Monitoring

#### Introduction to Power Plant Boiler Energy Saving Technology

- Energy Saving Technologies for Combustion Systems
- Energy Saving Technologies for Steam-Water Systems
- Energy Saving Technologies for Flue Gas Systems

#### Regulations on Energy Saving and Environmental Protection for Waste Incineration Boilers

The boilers used by Guangdong Shunkong Environmental Investment Co., Ltd. are waste incineration boilers. In the current regulatory system in China regarding boiler energy conservation and environmental protection, there are specific regulations for waste incineration boilers that differ from general power plant boilers. This training session not only introduces the general regulations on energy conservation and environmental protection for power plant boilers but also highlights the special regulations for waste incineration boilers in the legal system, sharing and discussing with the trainees; at the same time, exploring energy-saving technologies for waste incineration boilers.

- Legal and Regulatory Requirements for Energy Saving and Environmental Protection of Waste Incineration Boilers
- Analysis of typical cases of energy-saving transformation of waste incineration boilers



### 3.2.5 Training on the safe operation of power plant boilers and energy analysis and evaluation for high-energy-consuming enterprises conducted on December 19, 2023, at Shaoguan Dongyang Guangfu Co., Ltd.

On December 19, 2023, a training session on the safe operation of power plant boilers and energy-saving analysis and evaluation for high-energy-consuming enterprises was conducted at Shaoguan Dongyang Fluorine Co., Ltd. The main participants of this training session were the boiler operation and management personnel of Shaoguan Dongyang. The training content of this session not only focused on energy-saving measures for boilers but also extended to the entire industrial plant area, collectively examining and discussing energy-saving transformations and optimizations for high-energy-consuming equipment throughout the plant area.

#### (1) Basic Knowledge of Power Plant Boilers

- Definition of a boiler
- Composition of Power Plant Boiler Systems
- Common Types of Power Plant Boilers
- Three Major Processes of Power Plant Boilers



(2) Safety Operation Requirements of Power Plant Boilers

- Requirements for boiler safety operation in regulations such as "Boiler Safety Technical Regulations" and "Special Equipment Operator Assessment Rules"
- Key Points for Operation and Safety of Power Plant Boilers
- Boiler hazards
- Handling of Power Plant Boiler Accidents
- Analysis of Typical Accident Cases

(3) Introduction to energy-saving technologies for power plant boilers

- Energy Saving Technologies for Combustion Systems
- Energy Saving Technologies for Steam-Water Systems
- Energy Saving Technologies for Flue Gas Systems

(4) Performance testing of power plant boilers

- GB/T 10184-2015 "Performance Testing of Power Plant Boilers"
- Boiler Heat Balance Calculation
- Test Conditions and Operating Requirements for Performance Testing
- Testing and Inspection Items
- Instruments and Equipment for Testing
- Sharing of Performance Testing Cases of Power Plant Boilers

(5) Energy-saving analysis and evaluation for high-energy-consuming enterprises

In response to the needs of the trainees, this section highlights the characteristics of this training session, mainly introducing the energy-saving evaluation system for industrial enterprises. Based on relevant energy-saving regulations and standards, a simple analysis and evaluation of all energy-consuming links directly related to the enterprise, such as production processes, equipment, site selection, overall layout, architectural, HVAC, electrical, and water supply and drainage specialties, are conducted.

- The basis for energy-saving analysis and evaluation for high-energy-consuming enterprises includes laws and regulations, industry standards, industrial policies, etc.

- Energy-saving measures that can be considered for all energy-consuming links of the enterprise
- Calculation and evaluation of enterprise energy consumption
- Analysis of energy-saving evaluation cases for some enterprises



### 3.2.6 On December 21, 2023, a training session on the safe operation of power plant boilers and the improvement of industrial heating system efficiency was conducted at Foshan Shunde Golden Textile Group Co., Ltd.

On December 21, 2023, a training session on the safe operation of power plant boilers and the improvement of industrial heating system efficiency was conducted at Foshan Shunde Golden Textile Group Co., Ltd. There are a large number of industrial heating pipelines within the factory area of Foshan Shunde Golden Textile Group Co., Ltd. During this training session, the participants showed great interest in the content related to improving the efficiency of industrial heating systems. Therefore, detailed introductions were provided on the efficiency improvement and energy-saving optimization of industrial heating systems in this training session.

#### (1) Basic Knowledge of Power Plant Boilers



- Definition of a boiler
- Composition of Power Plant Boiler Systems
- Common Types of Power Plant Boilers
- Three Major Processes of Power Plant Boilers

(2) Safety Operation Requirements of Power Plant Boilers

- Requirements for boiler safety operation in regulations such as "Boiler Safety Technical Regulations" and "Special Equipment Operator Assessment Rules"
- Key Points for Operation and Safety of Power Plant Boilers
- Boiler hazards
- Handling of Power Plant Boiler Accidents
- Analysis of Typical Accident Cases

(3) Introduction to energy-saving technologies for power plant boilers

- Energy Saving Technologies for Combustion Systems
- Energy Saving Technologies for Steam-Water Systems
- Energy Saving Technologies for Flue Gas Systems

(4) Measures and technologies for improving the efficiency of industrial heating systems

In response to the trainees' requirements, this training session provided detailed introductions on the content related to the efficiency of industrial heating systems, offering more ideas for energy-saving transformations of heating systems for enterprises.

- Factors affecting heat loss in industrial heating systems
- Comprehensive energy efficiency indicators for heating systems
- Main methods and measures to improve the efficiency of industrial heating systems



### 3.6 Existing problems and solutions

During the implementation of the training project, the training unit strives to assess the learning needs of the trainees as much as possible, while enriching the training format and optimizing the training methods to improve the training effectiveness. However, there are still some issues and shortcomings in the implementation of the training project:

(1) The trainees have varying levels of basic knowledge. Some are familiar with the basic knowledge and operational skills of boilers, while others are less familiar and have insufficient understanding of boilers. In response to such situations, the training unit conducts a needs assessment before the training begins to understand the trainees' expectations and confusions regarding energy-saving and environmental protection content related to boilers. Based on the survey results, training objectives are designed with a focus on modifying the training content and courseware to meet the actual needs of the trainees.

(2) The participation and interactivity of some training personnel are not high, the training atmosphere is not active, and the training communication is not sufficient.



To address this, the training unit, during the training process, tries to stimulate the learning interest of the trainees as much as possible by using contextualized and case-based methods. Additionally, during the teaching process, they incorporate questioning and inserting short stories to enrich the training process, aiming to ensure that all students can actively participate in the learning process and enhance the training effectiveness.

(3) Some training students have reflected that the relevance of the training course is insufficient, as the trained content is not closely related to the work they engage in daily, providing limited practical assistance to the students. The reason for this lies in the large number of trainees, not all of whom are directly involved in or engaged in boiler operation management work, making it difficult for the training content to meet the needs of all trainees. To address this issue, the training unit selects specific content for detailed explanation based on the students' needs in each training session. Additionally, in each training session, they explain the basic knowledge of boilers to provide students who are not directly involved in or engaged in boiler operation management work with a preliminary understanding and balance the trainees' basic knowledge level.

(4) In the question-and-answer session, some students ask questions that are highly targeted and professional, which the teaching professionals cannot immediately respond to in the classroom. In such cases, the teaching instructor generally engages in collaborative discussions with experts and other personnel and establishes a teaching WeChat group after class to respond to the questions later.

### **3.7 Summary and Recommendations**

This training project was successfully carried out with the efforts of many parties and the cooperation of numerous companies and students. Although there are still some shortcomings during the implementation process, the training project has achieved some results:



(1) The operational skills and business level of boiler operators have been enhanced, including routine operations such as boiler start-up and shutdown, operation adjustment, inspection and maintenance, as well as emergency response methods for abnormal situations, optimizing and improving the operation and maintenance level of boilers.

(2) Enterprise management personnel have enhanced their understanding and knowledge of the boiler industry, especially in energy conservation and environmental protection management, and have gained a deeper understanding of the structural principles, working processes, performance parameters of boilers, as well as knowledge related to energy management and energy efficiency evaluation, which helps enterprises enhance energy-saving awareness, optimize energy management levels for boilers and industrial heating systems, promote energy conservation and emission reduction, and achieve green and low-carbon development.

(3) Market supervision and law enforcement personnel responsible for boiler safety, energy conservation, and environmental protection management have gained a deeper understanding of relevant laws and regulations related to boiler safety, energy conservation, and environmental protection, and their professional skills in boiler energy conservation and monitoring have been improved.

(4) This training has provided a platform for user units, inspection and testing units, regulatory units, and other units to exchange and learn from each other, which is of great significance for optimizing the manufacturing, energy management, and safety supervision of boilers, and helps promote the sustainable and high-quality development of the boiler industry.

Through this training exchange, some students have also provided their suggestions for energy-saving training:

(1) When conducting case analysis, the efficiency optimization of boiler energy-saving renovation should have detailed data and systematic quantitative analysis to provide students with a clear efficiency improvement effect.





(2) There are relatively few cases of boiler energy-saving renovation, and more renovation cases can be added.

(3) Due to time and space constraints, training activities cannot be held frequently. The training unit can establish a teaching discussion group after the training ends and collect suggestions from different regions and industries to discuss topics of general interest and concern to students in the WeChat group for further research.



4. Accessories

4.1 Partial training session opening notices

广州市南沙区综合行政执法局

穗南综行执法〔2023〕245号

关于举办2023年度特种设备执法抽查总结会暨安全生产进企业宣贯会的通知

各执法大队，广州特种机电设备检测研究院，广州特种承压设备检测研究院，各特种设备生产、特种设备使用单位：

为了提高特种设备相关单位安全管理意识，进一步落实企业主体责任，提高管理水平，防范特种设备事故，我局决定举办2023年度特种设备执法抽查总结会暨安全生产进企业宣贯会，会议共两期，现将有关事项通知如下：

一、会议时间

第一期：2023年10月27日15:00至17:00

第二期：2023年10月30日15:00至17:00

二、会议地点

广州市南沙区综合行政执法局（广州市南沙区进港大道585

号）B栋2楼203会议室。

三、参加人员

各执法大队，各特种设备生产单位、特种设备使用单位安全管理负责人，广州特种机电设备检测研究院，广州特种承压设备检测研究院。

四、会议内容

时间		内容	授课人
第一期 10月27日	15:00-15:15	开班动员	刘志敏
	15:15-16:05	机电类特种设备监督抽查情况总结汇报	李柏
	16:05-16:35	领导讲话	曹裕新
	16:35-17:00	现场交流和答疑	全体人员

时间		内容	授课人
第二期 10月30日	15:00-15:15	开班动员	刘志敏
	15:15-16:05	承压类特种设备监督抽查情况总结汇报	杜伟权
	16:05-16:35	领导讲话	曹裕新
	16:35-17:00	现场交流和答疑	全体人员

五、其他事项

1. 交通安排：自行前往，导航：广州市南沙区进港大道585号；请于14:15前到达会议地点。所有汽车需自费到时代维港

- 1 -

- 2 -

停车场（南沙区进港大道581号）停车，请各参会单位尽量乘坐公共交通工具前往。

2. 各单位请于10月24日前将参会人员回执报至联系人处（邮箱：2012843167@qq.com）。

附件：2023年度特种设备执法抽查总结会暨安全生产进企业宣贯会参加人员回执



（联系人：刘志敏、冯茵妍，联系电话：39006507）



Training Opening Notice of Comprehensive Administrative Law Enforcement Bureau of Nansha

District, Guangzhou on October 27, 2023

### 关于举办锅炉节能技术培训班的通知

为推进全球环境基金“工业供热系统和高耗能设备能效提升”项目执行，提高锅炉行业管理人员与企业多领域的节能知识，提升高耗能设备管理能力，助力我国锅炉行业实现低碳转型，我中心将于近期举办锅炉节能技术培训班，请各有关单位自愿安排人员参加。现将有关事项通知如下：

#### 一、培训对象

锅炉使用企业

#### 二、授课老师

国家工业锅炉质量检验检测中心（广东）（顺德特检院）林毅湛

#### 三、培训内容

1. 锅炉节能法规要求
2. 锅炉节能技术介绍
3. 锅炉能效测试方法

#### 四、培训时间及地点

2023年11月07日（星期五）下午14:30-16:00

#### 五、其他事项

本次培训属于公益培训。

#### 六、联系方式

联系人：伍秋仪 电 话：0757-63285506

佛山市质安职业资格培训中心

2023年11月6日



Training Opening Notice of Foshan Quality and Safety Vocational Qualification Training Center  
on November 7, 2023

## 广东省特检院顺德检测院

### 关于举办锅炉节能技术培训班的通知

各有关单位：

为推进全球环境基金“工业供热系统和高耗能设备能效提升”项目执行，提高锅炉行业管理人员与企业多领域的节能知识，提升高耗能设备管理能力，助力我国锅炉行业实现低碳转型，国家工业锅炉质量检验检测中心（广东）（顺德特检院）将于近期举办锅炉节能技术培训班，请各有关单位自愿安排人员参加，现将有关事项通知如下：

#### 一、培训对象

锅炉制造、安装、改造、维修、使用单位安全管理人员、锅炉操作人员及水质化验人员。

#### 二、培训内容

1. 锅炉节能法规要求
2. 锅炉节能技术介绍
3. 锅炉能效测试方法

#### 三、培训时间及地点

培训时间：2023年11月17日（星期五）下午14:30-16:00

报到、培训地点：顺德特检院 八楼会议室

地址：广东省佛山市顺德区陈村镇永兴社区广隆工业园兴业六路3号之一

（注：使用导航软件搜索“国家工业锅炉质量检验检测中心（广东）”即可按定位前往。）

#### 四、报名方式

1. 报名截止日期为2023年11月16日（星期四）
2. 报名方式：扫描下方二维码报名

#### 五、其他事项

本次培训不收取培训费。

#### 六、联系方式

地址：广东省佛山市顺德区陈村镇永兴社区广隆工业园兴业六路3号之一  
单位：广东省特种设备检测研究院顺德检测院  
邮编：528300  
邮箱：gdsietd@126.com  
联系人：喻孟全 吴梓皓  
电话：0757-22337606  
网址：<https://www.gdsitv.com>  
报名二维码：



锅炉节能技术培训班报名



2023年11月2日

Training Opening Notice of Shunde Testing Institute of Guangdong Special Equipment Testing  
Research Institute (National Industrial Boiler Quality Inspection and Testing Center (Guangdong))  
on November 17, 2023



## 广东省特检院顺德检测院

### 关于举办锅炉节能技术培训班的通知

华电佛山能源有限公司:

为推进全球环境基金“工业供热系统和高耗能设备能效提升”项目执行,提高锅炉行业管理人员与企业多领域的节能知识,提升高耗能设备管理能力,助力我国锅炉行业实现低碳转型,国家工业锅炉质量监督检测中心(广东)(顺德特检院)计划在贵公司举办锅炉节能技术培训班,请安排相关人员参加。现将有关事项通知如下:

#### 一、培训对象

单位安全管理人员、锅炉操作人员及水质化验人员。

#### 二、培训内容

1. 锅炉节能法规要求
2. 锅炉节能技术介绍
3. 锅炉能效测试方法

#### 三、培训时间及地点

培训时间:2023年12月13日(星期三)下午14:30-16:00

报到、培训地点:华电佛山能源有限公司厂内会议室

#### 四、其他事项

本次培训不收取培训费。

#### 五、联系方式

地址:广东省佛山市顺德区陈村镇永兴社区广隆工业园兴业六路3号之一

单位:广东省特种设备检测研究院顺德检测院

邮编:528300

邮箱:gdseisd0126.com

联系人:喻孟全

电话:0757-22337606

网址:https://www.gdsdtjy.com

广东省特种设备检测研究院顺德检测院

2023年12月13日

Training Opening Notice of Huadian Foshan Energy Co., Ltd. on December 13, 2023

## 广东省特检院顺德检测院

### 关于举办锅炉节能技术培训班的通知

乳源东阳光氟有限公司:

为推进全球环境基金“工业供热系统和高耗能设备能效提升”项目执行,提高锅炉行业管理人员与企业多领域的节能知识,提升高耗能设备管理能力,助力我国锅炉行业实现低碳转型,国家工业锅炉质量监督检测中心(广东)(顺德特检院)计划在贵公司举办锅炉节能技术培训班,请安排相关人员参加。现将有关事项通知如下:

#### 一、培训对象

单位安全管理人员、锅炉操作人员及水质化验人员。

#### 二、培训内容

1. 锅炉节能法规要求
2. 锅炉节能技术介绍
3. 锅炉能效测试方法

#### 三、培训时间及地点

培训时间:2023年12月19日(星期二)下午14:00-15:30

报到、培训地点:乳源东阳光氟有限公司厂内会议室

#### 四、其他事项

1. 本次培训不收取培训费。
2. 请贵单位提前准备电脑和投影设备。

#### 五、联系方式

地址:广东省佛山市顺德区陈村镇永兴社区广隆工业园兴业六路3号之一

单位:广东省特种设备检测研究院顺德检测院

邮编:528300

邮箱:gdseisd0126.com

联系人:喻孟全

电话:0757-22337606

网址:https://www.gdsdtjy.com

广东省特种设备检测研究院顺德检测院

2023年12月18日

Training Opening Notice of Shaoguan Ruyuan Dongyang Fluoride Co., Ltd. on December 18,

2023

## 4.2 List of Training Students



全球环境基金 (GEF)		全球环境基金“工业锅炉系统节能减排设备能力建设”项目	
会议签到表			
会议名称	锅炉安全运行及节能技术培训		
会议内容	1) 锅炉安全运行要求; 2) 锅炉节能技术要求; 3) 锅炉节能技术介绍; 4) 锅炉节能案例介绍。		
会议时间	2023年10月27日下午 15:00		
会议地点	广州市南沙区行政服务中心2楼 208会议室		
主讲人	喻金全	参会人数	15
参会人员			
序号	姓名	序号	姓名
1	李树伟	18	黄红一
2	李树伟	19	李树伟
3	李树伟	20	李树伟
4	李树伟	21	李树伟
5	李树伟	22	李树伟
6	李树伟	23	李树伟
7	李树伟	24	李树伟
8	李树伟	25	李树伟
9	李树伟	26	李树伟
10	李树伟	27	李树伟
11	李树伟	28	李树伟
12	李树伟	29	李树伟
13	李树伟	30	李树伟
14	李树伟	31	李树伟
15	李树伟	32	李树伟
16	李树伟	33	李树伟
17	李树伟	34	李树伟

全球环境基金 (GEF)		全球环境基金“工业锅炉系统节能减排设备能力建设”项目	
序号	姓名	序号	姓名
52	李树伟	71	李树伟
53	李树伟	72	李树伟
54	李树伟	73	李树伟
55	李树伟	74	李树伟
56	李树伟	75	李树伟
57	李树伟	76	李树伟
58	李树伟	77	李树伟
59	李树伟	78	李树伟
60	李树伟	79	李树伟
61	李树伟	80	李树伟
62	李树伟	81	李树伟
63	李树伟	82	李树伟
64	李树伟	83	李树伟
65	李树伟	84	李树伟
66	李树伟	85	李树伟
67	李树伟	86	李树伟
68	李树伟	87	李树伟
69	李树伟	88	李树伟
70	李树伟	89	李树伟

Training Attendance Sheet of Comprehensive Administrative Law Enforcement Bureau of Nansha District, Guangzhou on October 27, 2023

全球环境基金 (GEF)		全球环境基金“工业锅炉系统节能减排设备能力建设”项目	
会议签到表			
会议名称	电站锅炉安全运行及节能技术培训		
会议内容	1) 电站锅炉安全运行要求; 2) 电站锅炉节能技术; 3) 电站锅炉节能技术; 4) 电站锅炉节能减排工艺建议。		
会议时间	2023年11月3日		
会议地点	佛山市南海区广东农信电力集团有限公司		
主讲人	林毅强	参会人数	80
参会人员			
序号	姓名	序号	姓名
1	李树伟	18	李树伟
2	李树伟	19	李树伟
3	李树伟	20	李树伟
4	李树伟	21	李树伟
5	李树伟	22	李树伟
6	李树伟	23	李树伟
7	李树伟	24	李树伟
8	李树伟	25	李树伟
9	李树伟	26	李树伟
10	李树伟	27	李树伟
11	李树伟	28	李树伟
12	李树伟	29	李树伟
13	李树伟	30	李树伟
14	李树伟	31	李树伟
15	李树伟	32	李树伟
16	李树伟	33	李树伟
17	李树伟	34	李树伟

全球环境基金 (GEF)		全球环境基金“工业锅炉系统节能减排设备能力建设”项目	
序号	姓名	序号	姓名
52	李树伟	71	李树伟
53	李树伟	72	李树伟
54	李树伟	73	李树伟
55	李树伟	74	李树伟
56	李树伟	75	李树伟
57	李树伟	76	李树伟
58	李树伟	77	李树伟
59	李树伟	78	李树伟
60	李树伟	79	李树伟
61	李树伟	80	李树伟
62	李树伟	81	李树伟
63	李树伟	82	李树伟
64	李树伟	83	李树伟
65	李树伟	84	李树伟
66	李树伟	85	李树伟
67	李树伟	86	李树伟
68	李树伟	87	李树伟
69	李树伟	88	李树伟
70	李树伟	89	李树伟



Training Attendance Sheet of Guangdong Jingxin Electric Power Group Co., Ltd. in Nanhai District, Foshan on November 3, 2023

Global Environment Fund (GEF) Project: "Improving the Safety and Energy Efficiency of Industrial Boilers and Heat Exchangers"

Meeting Sign-in Sheet

Meeting Name: Boiler Safety Operation and Energy Efficiency Training

Meeting Content: 1) Boiler safety operation requirements; 2) Boiler energy efficiency requirements; 3) Boiler energy efficiency inspection introduction.

Meeting Time: 2023.11.03

Meeting Location: Nanhai Special Equipment Industry Association

Lecturer: Chen Jie

Participant Count: 51

Serial Number	Name	Serial Number	Name	Serial Number	Name
1	叶强	18	朱成	35	王德强
2	李永文	19	李永文	36	李永文
3	李永文	20	李永文	37	李永文
4	李永文	21	李永文	38	李永文
5	李永文	22	李永文	39	李永文
6	李永文	23	李永文	40	李永文
7	李永文	24	李永文	41	李永文
8	李永文	25	李永文	42	李永文
9	李永文	26	李永文	43	李永文
10	李永文	27	李永文	44	李永文
11	李永文	28	李永文	45	李永文
12	李永文	29	李永文	46	李永文
13	李永文	30	李永文	47	李永文
14	李永文	31	李永文	48	李永文
15	李永文	32	李永文	49	李永文
16	李永文	33	李永文	50	李永文
17	李永文	34	李永文	51	李永文

2/2

Training Attendance Sheet of Puning Special Equipment Industry Association in Jieyang Puning on November 5, 2023





全球环境基金 (GEF) 全球环境基金“工业炉窑系统和锅炉设备能效提升”项目

会议签到表

会议名称: 电站锅炉安全运行及节能技术培训

会议内容: 1) 电站锅炉安全运行要求; 2) 电站锅炉节能技术; 3) 电站锅炉性能测试; 4) 电站锅炉节能降耗工作建议。

会议时间: 2023年11月7日

会议地点: 佛山市质安职业资格培训中心

主讲人: 林毅湛 参会人数: 43

参会人员

序号	姓名	序号	姓名	序号	姓名
1	陈永祥	18	黄中	35	黄之敏
2	陈永祥	19	黄中	36	黄中
3	陈永祥	20	黄中	37	黄中
4	陈永祥	21	黄中	38	黄中
5	陈永祥	22	黄中	39	黄中
6	陈永祥	23	黄中	40	黄中
7	陈永祥	24	黄中	41	黄中
8	陈永祥	25	黄中	42	黄中
9	陈永祥	26	黄中	43	黄中
10	陈永祥	27	黄中	44	黄中

备注:

1. 会议内容: 1) 电站锅炉安全运行要求; 2) 电站锅炉节能技术; 3) 电站锅炉性能测试; 4) 电站锅炉节能降耗工作建议。可以根据实际情况做相应调整。

2. 拍照: 1) 主讲人讲课 2 张以上; 2) 学员听课 2 张以上。

3. 视频: 现场授课实况 3 分钟以上。

1/1

Training Attendance Sheet of Foshan Quality and Safety Vocational Qualification Training Center  
on November 7, 2023

全球环境基金 (GEF) 全球环境基金“工业炉窑系统和锅炉设备能效提升”项目

会议签到表

会议名称: 锅炉安全运行及节能技术培训

会议内容: 1) 锅炉安全运行要求; 2) 锅炉节能降耗要求; 3) 锅炉节能技术介绍; 4) 锅炉性能测试介绍。

会议时间: 2023年11月9日

会议地点: 广州市特种设备行业协会 8 楼会议室

主讲人: 宋振宇 参会人数: 99

参会人员

序号	姓名	序号	姓名	序号	姓名
1	李永祥	2	李永祥	3	李永祥
4	李永祥	5	李永祥	6	李永祥
7	李永祥	8	李永祥	9	李永祥
10	李永祥	11	李永祥	12	李永祥
13	李永祥	14	李永祥	15	李永祥
16	李永祥	17	李永祥	18	李永祥
19	李永祥	20	李永祥	21	李永祥
22	李永祥	23	李永祥	24	李永祥
25	李永祥	26	李永祥	27	李永祥
28	李永祥	29	李永祥	30	李永祥
31	李永祥	32	李永祥	33	李永祥
34	李永祥	35	李永祥	36	李永祥
37	李永祥	38	李永祥	39	李永祥
40	李永祥	41	李永祥	42	李永祥
43	李永祥	44	李永祥	45	李永祥
46	李永祥	47	李永祥	48	李永祥
49	李永祥	50	李永祥	51	李永祥

1/2

全球环境基金 (GEF) 全球环境基金“工业炉窑系统和锅炉设备能效提升”项目

会议签到表

序号	姓名	序号	姓名	序号	姓名
52	李永祥	53	李永祥	54	李永祥
55	李永祥	56	李永祥	57	李永祥
58	李永祥	59	李永祥	60	李永祥
61	李永祥	62	李永祥	63	李永祥
64	李永祥	65	李永祥	66	李永祥
67	李永祥	68	李永祥	69	李永祥
70	李永祥	71	李永祥	72	李永祥
73	李永祥	74	李永祥	75	李永祥
76	李永祥	77	李永祥	78	李永祥
79	李永祥	80	李永祥	81	李永祥
82	李永祥	83	李永祥	84	李永祥
85	李永祥	86	李永祥	87	李永祥
88	李永祥	89	李永祥	90	李永祥
91	李永祥	92	李永祥	93	李永祥
94	李永祥	95	李永祥	96	李永祥
97	李永祥	98	李永祥	99	李永祥
100		101		102	
103		104		105	
106		107		108	

备注:

1. 会议内容: 1) 锅炉安全运行要求; 2) 锅炉节能降耗要求; 3) 锅炉节能技术介绍; 4) 锅炉性能测试介绍。可以根据实际情况做相应调整。

2. 拍照: 1) 主讲人讲课 2 张以上; 2) 学员听课 2 张以上。

3. 视频: 现场授课实况 3 分钟以上。

2/2





Guangzhou Special Equipment Industry Association training sign-in form on November 9, 2023

全球环境基金 (GEF) 全球环境基金“工业锅炉系统能效提升项目”项目

会议签到表

会议名称: 锅炉安全运行及节能技术培训

会议内容: 1) 锅炉安全运行要求; 2) 锅炉节能法规要求; 3) 锅炉节能技术介绍; 4) 锅炉节能检测介绍。

会议时间: 2023年11月15日

会议地点: 湛江特种设备检测中心

主讲人: 喻志全

参会人数: 104

序号	姓名	序号	姓名	序号	姓名
1	杨平	2	杨平	3	杨平
4	杨平	5	杨平	6	杨平
7	杨平	8	杨平	9	杨平
10	杨平	11	杨平	12	杨平
13	杨平	14	杨平	15	杨平
16	杨平	17	杨平	18	杨平
19	杨平	20	杨平	21	杨平
22	杨平	23	杨平	24	杨平
25	杨平	26	杨平	27	杨平
28	杨平	29	杨平	30	杨平
31	杨平	32	杨平	33	杨平
34	杨平	35	杨平	36	杨平
37	杨平	38	杨平	39	杨平
40	杨平	41	杨平	42	杨平
43	杨平	44	杨平	45	杨平
46	杨平	47	杨平	48	杨平
49	杨平	50	杨平	51	杨平

全球环境基金 (GEF) 全球环境基金“工业锅炉系统能效提升项目”项目

会议签到表

会议名称: 锅炉安全运行及节能技术培训

会议内容: 1) 锅炉安全运行要求; 2) 锅炉节能法规要求; 3) 锅炉节能技术介绍; 4) 锅炉节能检测介绍。

会议时间: 2023年11月15日

会议地点: 湛江特种设备检测中心

主讲人: 喻志全

参会人数: 104

序号	姓名	序号	姓名	序号	姓名
52	杨平	53	杨平	54	杨平
55	杨平	56	杨平	57	杨平
58	杨平	59	杨平	60	杨平
61	杨平	62	杨平	63	杨平
64	杨平	65	杨平	66	杨平
67	杨平	68	杨平	69	杨平
70	杨平	71	杨平	72	杨平
73	杨平	74	杨平	75	杨平
76	杨平	77	杨平	78	杨平
79	杨平	80	杨平	81	杨平
82	杨平	83	杨平	84	杨平
85	杨平	86	杨平	87	杨平
88	杨平	89	杨平	90	杨平
91	杨平	92	杨平	93	杨平
94	杨平	95	杨平	96	杨平
97	杨平	98	杨平	99	杨平
100	杨平	101	杨平	102	杨平
103	杨平	104	杨平	105	杨平
106	杨平	107	杨平	108	杨平

Zhanjiang Special Equipment Industry Association training sign-in form on November 15, 2023

全球环境基金 (GEF) 全球环境基金“工业锅炉系统能效提升项目”项目

会议签到表

会议名称: 锅炉安全运行及节能技术培训

会议内容: 1) 锅炉安全运行要求; 2) 锅炉节能法规要求; 3) 锅炉节能技术介绍; 4) 锅炉节能检测介绍。

会议时间: 2023年11月17日

会议地点: 广东省特种设备检测研究院湛江检测院

主讲人: 宋振宇

参会人数: 95

序号	姓名	序号	姓名	序号	姓名
1	杨平	2	杨平	3	杨平
4	杨平	5	杨平	6	杨平
7	杨平	8	杨平	9	杨平
10	杨平	11	杨平	12	杨平
13	杨平	14	杨平	15	杨平
16	杨平	17	杨平	18	杨平
19	杨平	20	杨平	21	杨平
22	杨平	23	杨平	24	杨平
25	杨平	26	杨平	27	杨平
28	杨平	29	杨平	30	杨平
31	杨平	32	杨平	33	杨平
34	杨平	35	杨平	36	杨平
37	杨平	38	杨平	39	杨平
40	杨平	41	杨平	42	杨平
43	杨平	44	杨平	45	杨平
46	杨平	47	杨平	48	杨平
49	杨平	50	杨平	51	杨平

全球环境基金 (GEF) 全球环境基金“工业锅炉系统能效提升项目”项目

会议签到表

会议名称: 锅炉安全运行及节能技术培训

会议内容: 1) 锅炉安全运行要求; 2) 锅炉节能法规要求; 3) 锅炉节能技术介绍; 4) 锅炉节能检测介绍。

会议时间: 2023年11月17日

会议地点: 广东省特种设备检测研究院湛江检测院

主讲人: 宋振宇

参会人数: 95

序号	姓名	序号	姓名	序号	姓名
52	杨平	53	杨平	54	杨平
55	杨平	56	杨平	57	杨平
58	杨平	59	杨平	60	杨平
61	杨平	62	杨平	63	杨平
64	杨平	65	杨平	66	杨平
67	杨平	68	杨平	69	杨平
70	杨平	71	杨平	72	杨平
73	杨平	74	杨平	75	杨平
76	杨平	77	杨平	78	杨平
79	杨平	80	杨平	81	杨平
82	杨平	83	杨平	84	杨平
85	杨平	86	杨平	87	杨平
88	杨平	89	杨平	90	杨平
91	杨平	92	杨平	93	杨平
94	杨平	95	杨平	96	杨平
97	杨平	98	杨平	99	杨平
100	杨平	101	杨平	102	杨平
103	杨平	104	杨平	105	杨平
106	杨平	107	杨平	108	杨平



Training sign-in form for Shunde Inspection Institute of Guangdong Special Equipment Inspection

Institute on November 17, 2023

全球环境基金 (GEF) 全球环境基金“工业锅炉系统节能减排设备能效提升”项目

会议签到表

会议名称: 锅炉安全运行及节能技术培训

会议内容: 1) 锅炉安全运行要求; 2) 锅炉节能运行要求; 3) 锅炉节能技术介绍; 4) 锅炉节能设备介绍。

会议时间: 2023年11月20日

会议地点: 汕头市韩江路7号汕头市特种设备协会

主讲人: 林毅强

参会人数: 107

序号	姓名	序号	姓名	序号	姓名
1	陈伟林	2	陈伟林	3	陈伟林
4	李强	5	李强	6	李强
7	余强	8	余强	9	余强
10	余强	11	余强	12	余强
13	余强	14	余强	15	余强
16	余强	17	余强	18	余强
19	余强	20	余强	21	余强
22	余强	23	余强	24	余强
25	余强	26	余强	27	余强
28	余强	29	余强	30	余强
31	余强	32	余强	33	余强
34	余强	35	余强	36	余强
37	余强	38	余强	39	余强
40	余强	41	余强	42	余强
43	余强	44	余强	45	余强
46	余强	47	余强	48	余强
49	余强	50	余强	51	余强

1/2

全球环境基金 (GEF) 全球环境基金“工业锅炉系统节能减排设备能效提升”项目

序号	姓名	序号	姓名	序号	姓名
52	余强	53	余强	54	余强
55	余强	56	余强	57	余强
58	余强	59	余强	60	余强
61	余强	62	余强	63	余强
64	余强	65	余强	66	余强
67	余强	68	余强	69	余强
70	余强	71	余强	72	余强
73	余强	74	余强	75	余强
76	余强	77	余强	78	余强
79	余强	80	余强	81	余强
82	余强	83	余强	84	余强
85	余强	86	余强	87	余强
88	余强	89	余强	90	余强
91	余强	92	余强	93	余强
94	余强	95	余强	96	余强
97	余强	98	余强	99	余强
100	余强	101	余强	102	余强
103	余强	104	余强	105	余强
106	余强	107	余强	108	余强

备注:

1. 会议内容: 1) 锅炉安全运行要求; 2) 锅炉节能运行要求; 3) 锅炉节能技术介绍;

4) 锅炉节能设备介绍。可以根据实际情况适当调整。

2. 说明: 1) 主讲人讲课2张以上; 2) 学员听课2张以上。

3. 说明: 现场授课时间3分钟以上。

2/2

Shantou Special Equipment Industry Association training sign-in form on November 20, 2023



全球环境基金 (GEF) 全球环境基金“工业锅炉系统节能减排设备能力提升”项目

会议签到表

会议名称: 锅炉安全运行及节能技术培训

会议内容: 1) 锅炉安全运行要求; 2) 锅炉节能法规要求; 3) 锅炉节能技术介绍; 4) 锅炉节能检测介绍。

会议时间: 2023年11月21日

会议地点: 顺德范州院

主讲人: 宋振宇 参会人数: 42

序号	姓名	序号	姓名	序号	姓名
1	刘永	2	李三	3	谢
4	刘永	5	李三	6	李三
7	李三	8	李三	9	李三
10	李三	11	李三	12	李三
13	李三	14	李三	15	李三
16	李三	17	李三	18	李三
19	李三	20	李三	21	李三
22	李三	23	李三	24	李三
25	李三	26	李三	27	李三
28	李三	29	李三	30	李三
31	李三	32	李三	33	李三
34	李三	35	李三	36	李三
37	李三	38	李三	39	李三
40	李三	41	李三	42	李三

备注: 1. 会议内容: 1) 锅炉安全运行要求; 2) 锅炉节能法规要求; 3) 锅炉节能技术介绍; 4) 锅炉节能检测介绍。可以根据实际情况做相应调整。  
2. 培训: 1) 主讲人讲课2张以上; 2) 学员听课2张以上。  
3. 视频: 现场授课实况3分钟以上。

2023 November 21 Guangdong Province Special Equipment Testing Research Institute Shunde

Testing Institute Training Attendance Form

全球环境基金 (GEF) 全球环境基金“工业锅炉系统节能减排设备能力提升”项目

会议签到表

会议名称: 电站锅炉安全运行及节能技术培训

会议内容: 1) 锅炉安全运行要求; 2) 锅炉节能法规要求; 3) 锅炉节能技术介绍; 4) 锅炉节能检测介绍。

会议时间: 2023年11月29日

会议地点: 广东顺控环境投资有限公司

主讲人: 林毅强 参会人数: 51

序号	姓名	序号	姓名	序号	姓名
1	陈强	2	陈强	3	陈强
4	陈强	5	陈强	6	陈强
7	陈强	8	陈强	9	陈强
10	陈强	11	陈强	12	陈强
13	陈强	14	陈强	15	陈强
16	陈强	17	陈强	18	陈强
19	陈强	20	陈强	21	陈强
22	陈强	23	陈强	24	陈强
25	陈强	26	陈强	27	陈强
28	陈强	29	陈强	30	陈强
31	陈强	32	陈强	33	陈强
34	陈强	35	陈强	36	陈强
37	陈强	38	陈强	39	陈强
40	陈强	41	陈强	42	陈强
43	陈强	44	陈强	45	陈强
46	陈强	47	陈强	48	陈强
49	陈强	50	陈强	51	陈强

1/2

全球环境基金 (GEF) 全球环境基金“工业锅炉系统节能减排设备能力提升”项目

会议签到表

会议名称: 电站锅炉安全运行及节能技术培训

会议内容: 1) 锅炉安全运行要求; 2) 锅炉节能法规要求; 3) 锅炉节能技术介绍; 4) 锅炉节能检测介绍。

会议时间: 2023年11月29日

会议地点: 广东顺控环境投资有限公司

主讲人: 林毅强 参会人数: 51

序号	姓名	序号	姓名	序号	姓名
52	李三	53	李三	54	李三
55	李三	56	李三	57	李三
58	李三	59	李三	60	李三
61	李三	62	李三	63	李三
64	李三	65	李三	66	李三
67	李三	68	李三	69	李三
70	李三	71	李三	72	李三
73	李三	74	李三	75	李三
76	李三	77	李三	78	李三
79	李三	80	李三	81	李三
82	李三	83	李三	84	李三
85	李三	86	李三	87	李三
88	李三	89	李三	90	李三
91	李三	92	李三	93	李三
94	李三	95	李三	96	李三
97	李三	98	李三	99	李三
100	李三	101	李三	102	李三
103	李三	104	李三	105	李三
106	李三	107	李三	108	李三

备注: 1. 会议内容: 1) 锅炉安全运行要求; 2) 锅炉节能法规要求; 3) 锅炉节能技术介绍; 4) 锅炉节能检测介绍。可以根据实际情况做相应调整。  
2. 培训: 1) 主讲人讲课2张以上; 2) 学员听课2张以上。  
3. 视频: 现场授课实况3分钟以上。

2/2



On November 29, 2023, the training attendance sheet of Guangdong Shun Kong Environmental Investment Co., Ltd.

全球环境基金 (GEF) 全球环境基金“工业锅炉系统节能减排设备投资”项目

会议签到表

会议名称: 电站锅炉安全运行及节能技术培训

会议内容: 1) 锅炉安全运行要求; 2) 锅炉节能法规要求; 3) 锅炉节能技术介绍; 4) 锅炉节能检测介绍。

会议时间: 2023年12月1日

会议地点: 佛山市顺德五沙热电有限公司

主讲人: 林毅湛 参会人数: 67

序号	姓名	序号	姓名	序号	姓名
1	梁桂明	2	叶石洞	3	朱世皓
4	孔永坤	5	陈永强	6	周志华
7	李永坤	8	叶永	9	李永发
10	李永发	11	李永发	12	李永发
13	李永发	14	李永发	15	李永发
16	李永发	17	李永发	18	李永发
19	李永发	20	李永发	21	李永发
22	李永发	23	李永发	24	李永发
25	李永发	26	李永发	27	李永发
28	李永发	29	李永发	30	李永发
31	李永发	32	李永发	33	李永发
34	李永发	35	李永发	36	李永发
37	李永发	38	李永发	39	李永发
40	李永发	41	李永发	42	李永发
43	李永发	44	李永发	45	李永发
46	李永发	47	李永发	48	李永发
49	李永发	50	李永发	51	李永发

1/2

全球环境基金 (GEF) 全球环境基金“工业锅炉系统节能减排设备投资”项目

序号	姓名	序号	姓名	序号	姓名
52	李永发	53	李永发	54	李永发
55	李永发	56	李永发	57	李永发
58	李永发	59	李永发	60	李永发
61	李永发	62	李永发	63	李永发
64	李永发	65	李永发	66	李永发
67	李永发	68	李永发	69	李永发
70	李永发	71	李永发	72	李永发
73	李永发	74	李永发	75	李永发
76	李永发	77	李永发	78	李永发
79	李永发	80	李永发	81	李永发
82	李永发	83	李永发	84	李永发
85	李永发	86	李永发	87	李永发
88	李永发	89	李永发	90	李永发
91	李永发	92	李永发	93	李永发
94	李永发	95	李永发	96	李永发
97	李永发	98	李永发	99	李永发
100	李永发	101	李永发	102	李永发
103	李永发	104	李永发	105	李永发
106	李永发	107	李永发	108	李永发

备注:

1. 会议内容: 1) 锅炉安全运行要求; 2) 锅炉节能法规要求; 3) 锅炉节能技术介绍; 4) 锅炉节能检测介绍。可以根据实际情况做相应调整。

2. 签到: 1) 主讲人讲稿2页以上; 2) 学员听课2页以上。

3. 签到: 现场签到表3页以上。

2/2

2023 December 01 Foshan Shunde Wusha Thermal Power Co., Ltd. Training Attendance Sheet



全球环境基金 (GEF) 全球环境基金“工业炉窑系统和热能设备能效提升”项目

会议签到表

会议名称: 锅炉安全运行及节能技术培训

会议内容: 1) 锅炉安全运行要求; 2) 锅炉节能法规要求; 3) 锅炉节能检测介绍。

会议时间: 2023年12月7日

会议地点: 建滔(清远)循环经济工业园

主讲人: 林毅湛 参会人数: 96

序号	姓名	序号	姓名	序号	姓名
1	郑政	2	李伟	3	李伟
4	李伟	5	李伟	6	李伟
7	李伟	8	李伟	9	李伟
10	李伟	11	李伟	12	李伟
13	李伟	14	李伟	15	李伟
16	李伟	17	李伟	18	李伟
19	李伟	20	李伟	21	李伟
22	李伟	23	李伟	24	李伟
25	李伟	26	李伟	27	李伟
28	李伟	29	李伟	30	李伟
31	李伟	32	李伟	33	李伟
34	李伟	35	李伟	36	李伟
37	李伟	38	李伟	39	李伟
40	李伟	41	李伟	42	李伟
43	李伟	44	李伟	45	李伟
46	李伟	47	李伟	48	李伟
49	李伟	50	李伟	51	李伟

1/2

全球环境基金 (GEF) 全球环境基金“工业炉窑系统和热能设备能效提升”项目

序号	姓名	序号	姓名	序号	姓名
52		53		54	
55		56		57	
58		59		60	
61		62		63	
64		65		66	
67		68		69	
70		71		72	
73		74		75	
76		77		78	
79		80		81	
82		83		84	
85		86		87	
88		89		90	
91		92		93	
94		95		96	
97		98		99	
100		101		102	
103		104		105	
106		107		108	

备注: 1. 会议内容: 1) 锅炉安全运行要求; 2) 锅炉节能法规要求; 3) 锅炉节能检测介绍; 4) 锅炉节能检测介绍, 可以根据实际情况酌情调整。  
2. 拍照: 1) 主讲人讲课2张以上; 2) 学员听课2张以上。  
3. 视频: 现场授课实况3分钟以上。

2/2

2023-12-07 Kiantao (Qingyuan) Circular Economy Industrial Park Training Attendance Form

全球环境基金 (GEF) 全球环境基金“工业炉窑系统和热能设备能效提升”项目

会议签到表

会议名称: 锅炉安全运行及节能技术培训

会议内容: 1) 锅炉安全运行要求; 2) 锅炉节能法规要求; 3) 锅炉节能检测介绍。

会议时间: 2023年12月13日

会议地点: 华电佛山能源有限公司

主讲人: 林毅湛 参会人数: 102

序号	姓名	序号	姓名	序号	姓名
1	李伟	2	李伟	3	李伟
4	李伟	5	李伟	6	李伟
7	李伟	8	李伟	9	李伟
10	李伟	11	李伟	12	李伟
13	李伟	14	李伟	15	李伟
16	李伟	17	李伟	18	李伟
19	李伟	20	李伟	21	李伟
22	李伟	23	李伟	24	李伟
25	李伟	26	李伟	27	李伟
28	李伟	29	李伟	30	李伟
31	李伟	32	李伟	33	李伟
34	李伟	35	李伟	36	李伟
37	李伟	38	李伟	39	李伟
40	李伟	41	李伟	42	李伟
43	李伟	44	李伟	45	李伟
46	李伟	47	李伟	48	李伟
49	李伟	50	李伟	51	李伟

1/2

全球环境基金 (GEF) 全球环境基金“工业炉窑系统和热能设备能效提升”项目

序号	姓名	序号	姓名	序号	姓名
52	李伟	53	李伟	54	李伟
55	李伟	56	李伟	57	李伟
58	李伟	59	李伟	60	李伟
61	李伟	62	李伟	63	李伟
64	李伟	65	李伟	66	李伟
67	李伟	68	李伟	69	李伟
70	李伟	71	李伟	72	李伟
73	李伟	74	李伟	75	李伟
76	李伟	77	李伟	78	李伟
79	李伟	80	李伟	81	李伟
82	李伟	83	李伟	84	李伟
85	李伟	86	李伟	87	李伟
88	李伟	89	李伟	90	李伟
91	李伟	92	李伟	93	李伟
94	李伟	95	李伟	96	李伟
97	李伟	98	李伟	99	李伟
100	李伟	101	李伟	102	李伟
103		104		105	
106		107		108	

备注: 1. 会议内容: 1) 锅炉安全运行要求; 2) 锅炉节能法规要求; 3) 锅炉节能检测介绍; 4) 锅炉节能检测介绍, 可以根据实际情况酌情调整。  
2. 拍照: 1) 主讲人讲课2张以上; 2) 学员听课2张以上。  
3. 视频: 现场授课实况3分钟以上。

2/2

2023 December 13 Huadian Foshan Energy Co., Ltd. Training Attendance Form





全球环境基金 (GEF) 全球环境基金“工业炉窑系统和热能设备能效提升”项目

会议签到表

会议名称: 锅炉安全运行及节能技术培训

会议内容: 1) 锅炉安全运行要求; 2) 锅炉节能法规要求; 3) 锅炉节能技术介绍; 4) 锅炉节能检测介绍。

会议时间: 2023年12月19日

会议地点: 韶关乳源东阳光氟有限公司

主讲人: 林毅湛 参会人数: 10

参会人员

序号	姓名	序号	姓名	序号	姓名
1	赵心方	2	陈发	3	陈发
4	陈发	5	陈发	6	陈发
7	陈发	8	陈发	9	陈发
10	陈发	11	陈发	12	陈发
13	陈发	14	陈发	15	陈发
16	陈发	17	陈发	18	陈发
19	陈发	20	陈发	21	陈发
22	陈发	23	陈发	24	陈发
25	陈发	26	陈发	27	陈发
28	陈发	29	陈发	30	陈发
31	陈发	32	陈发	33	陈发
34	陈发	35	陈发	36	陈发
37	陈发	38	陈发	39	陈发
40	陈发	41	陈发	42	陈发
43	陈发	44	陈发	45	陈发
46	陈发	47	陈发	48	陈发
49	陈发	50	陈发	51	陈发

2/2

全球环境基金 (GEF) 全球环境基金“工业炉窑系统和热能设备能效提升”项目

序号	姓名	序号	姓名	序号	姓名
52	陈发	53	陈发	54	陈发
55	陈发	56	陈发	57	陈发
58	陈发	59	陈发	60	陈发
61	陈发	62	陈发	63	陈发
64	陈发	65	陈发	66	陈发
67	陈发	68	陈发	69	陈发
70	陈发	71	陈发	72	陈发
73	陈发	74	陈发	75	陈发
76	陈发	77	陈发	78	陈发
79	陈发	80	陈发	81	陈发
82	陈发	83	陈发	84	陈发
85	陈发	86	陈发	87	陈发
88	陈发	89	陈发	90	陈发
91	陈发	92	陈发	93	陈发
94	陈发	95	陈发	96	陈发
97	陈发	98	陈发	99	陈发
100	陈发	101	陈发	102	陈发
103	陈发	104	陈发	105	陈发
106	陈发	107	陈发	108	陈发

备注:

- 会议内容: 1) 锅炉安全运行要求; 2) 锅炉节能法规要求; 3) 锅炉节能技术介绍; 4) 锅炉节能检测介绍, 可以根据实际情况做相应调整。
- 拍照: 1) 主讲人讲课2张以上; 2) 学员听课2张以上。
- 视频: 现场授课实况3分钟以上。

2/2

On December 19, 2023, the training attendance sheet of Shaoguan Ruyuan Dongyang Guangfu Co., Ltd.

全球环境基金 (GEF) 全球环境基金“工业炉窑系统和热能设备能效提升”项目

会议签到表

会议名称: 锅炉安全运行及节能技术培训

会议内容: 1) 锅炉安全运行要求; 2) 锅炉节能法规要求; 3) 锅炉节能技术介绍; 4) 锅炉节能检测介绍。

会议时间: 2023年12月21日

会议地点: 佛山市顺德区金纺集团有限公司

主讲人: 林毅湛 参会人数: 32

参会人员

序号	姓名	序号	姓名	序号	姓名
1	陈发	2	陈发	3	陈发
4	陈发	5	陈发	6	陈发
7	陈发	8	陈发	9	陈发
10	陈发	11	陈发	12	陈发
13	陈发	14	陈发	15	陈发
16	陈发	17	陈发	18	陈发
19	陈发	20	陈发	21	陈发
22	陈发	23	陈发	24	陈发
25	陈发	26	陈发	27	陈发
28	陈发	29	陈发	30	陈发
31	陈发	32	陈发	33	陈发
34	陈发	35	陈发	36	陈发
37	陈发	38	陈发	39	陈发
40	陈发	41	陈发	42	陈发
43	陈发	44	陈发	45	陈发
46	陈发	47	陈发	48	陈发
49	陈发	50	陈发	51	陈发

2/2

全球环境基金 (GEF) 全球环境基金“工业炉窑系统和热能设备能效提升”项目

序号	姓名	序号	姓名	序号	姓名
52	陈发	53	陈发	54	陈发
55	陈发	56	陈发	57	陈发
58	陈发	59	陈发	60	陈发
61	陈发	62	陈发	63	陈发
64	陈发	65	陈发	66	陈发
67	陈发	68	陈发	69	陈发
70	陈发	71	陈发	72	陈发
73	陈发	74	陈发	75	陈发
76	陈发	77	陈发	78	陈发
79	陈发	80	陈发	81	陈发
82	陈发	83	陈发	84	陈发
85	陈发	86	陈发	87	陈发
88	陈发	89	陈发	90	陈发
91	陈发	92	陈发	93	陈发
94	陈发	95	陈发	96	陈发
97	陈发	98	陈发	99	陈发
100	陈发	101	陈发	102	陈发
103	陈发	104	陈发	105	陈发
106	陈发	107	陈发	108	陈发

备注:

- 会议内容: 1) 锅炉安全运行要求; 2) 锅炉节能法规要求; 3) 锅炉节能技术介绍; 4) 锅炉节能检测介绍, 可以根据实际情况做相应调整。
- 拍照: 1) 主讲人讲课2张以上; 2) 学员听课2张以上。
- 视频: 现场授课实况3分钟以上。

2/2



On December 21, 2023, the training attendance form of Shunde Golden Textile Group Co., Ltd. in Foshan City.

全球环境基金 (GEF) 全球环境基金“工业锅炉系统和商用建筑能效提升”项目

会议签到表

会议名称: 锅炉安全运行及节能技术培训

会议内容: 1) 锅炉安全运行要求; 2) 锅炉节能运行要求; 3) 锅炉节能技术介绍; 4) 锅炉节能检测介绍。

会议时间: 2023 年12月21日

会议地点: 肇庆市职业教育培训中心

主讲人: 陆志雄

参会人员

序号	姓名	序号	姓名	序号	姓名
1	李国栋	2	李国栋	3	李国栋
4	李国栋	5	李国栋	6	李国栋
7	李国栋	8	李国栋	9	李国栋
10	李国栋	11	李国栋	12	李国栋
13	李国栋	14	李国栋	15	李国栋
16	李国栋	17	李国栋	18	李国栋
19	李国栋	20	李国栋	21	李国栋
22	李国栋	23	李国栋	24	李国栋
25	李国栋	26	李国栋	27	李国栋
28	李国栋	29	李国栋	30	李国栋
31	李国栋	32	李国栋	33	李国栋
34	李国栋	35	李国栋	36	李国栋
37	李国栋	38	李国栋	39	李国栋
40	李国栋	41	李国栋	42	李国栋
43	李国栋	44	李国栋	45	李国栋
46	李国栋	47	李国栋	48	李国栋
49	李国栋	50	李国栋	51	李国栋

1/2

全球环境基金 (GEF) 全球环境基金“工业锅炉系统和商用建筑能效提升”项目

序号	姓名	序号	姓名	序号	姓名
52	李国栋	53	李国栋	54	李国栋
55	李国栋	56	李国栋	57	李国栋
58	李国栋	59	李国栋	60	李国栋
61	李国栋	62	李国栋	63	李国栋
64	李国栋	65	李国栋	66	李国栋
67	李国栋	68	李国栋	69	李国栋
70	李国栋	71	李国栋	72	李国栋
73	李国栋	74	李国栋	75	李国栋
76	李国栋	77	李国栋	78	李国栋
79	李国栋	80	李国栋	81	李国栋
82	李国栋	83	李国栋	84	李国栋
85	李国栋	86	李国栋	87	李国栋
88	李国栋	89	李国栋	90	李国栋
91	李国栋	92	李国栋	93	李国栋
94	李国栋	95	李国栋	96	李国栋
97	李国栋	98	李国栋	99	李国栋
100	李国栋	101	李国栋	102	李国栋
103	李国栋	104	李国栋	105	李国栋
106	李国栋	107	李国栋	108	李国栋

备注:

1. 会议内容: 1) 锅炉安全运行要求; 2) 锅炉节能运行要求; 3) 锅炉节能技术介绍;

4) 锅炉节能检测介绍。可以根据实际情况增减培训内容。

2. 拍照: 1) 主讲人讲课2张以上; 2) 学员听课2张以上。

3. 视频: 视频授课实拍3分钟以上。

2/2

On December 25, 2023, the Training Attendance Sheet of Zhaoqing Zhixin Vocational Training School.

## 4.3 Partial Training Trainee Feedback Form



National Industrial Boiler Quality Inspection and Testing Center (Guangdong)

全球环境基金 (GEF) 全球环境基金“工业锅炉系统能效提升设备能力建设”项目

学员意见反馈表

尊敬的各位学员，为了能更好地为您提供培训服务，请根据您的真实想法和建议告诉我们。

填写说明：在最符合您情况的答案序号处打“√”，如无特别说明，每个问题只选择一个答案。

课程名称：锅炉安全运行及节能技术培训  
培训地点：广东顺控环境投资有限公司  
主讲人：林毅湛  
授课日期：2023年11月29日  
学员姓名：[Signature]

	很好	好	一般	较差	很差
1 课程内容清楚，逻辑清晰	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2 课程讲授的知识对我的实际工作有帮助	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3 课程内容丰富、长度适中	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4 主讲人授课思路清晰，表达能力强	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5 主讲人工作经验丰富，且乐于与学员分享	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6 主讲人能有效回答学员提出的问题	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7 主讲人对课堂时间和节奏把握恰当	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8 您对培训组织和现场工作满意	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9 本次培训总体上符合我的期望	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10 其他建议：					

1/1

全球环境基金 (GEF) 全球环境基金“工业锅炉系统能效提升设备能力建设”项目

学员意见反馈表

尊敬的各位学员，为了能更好地为您提供培训服务，请根据您的真实想法和建议告诉我们。

填写说明：在最符合您情况的答案序号处打“√”，如无特别说明，每个问题只选择一个答案。

课程名称：锅炉安全运行及节能技术培训  
培训地点：广东顺控环境投资有限公司  
主讲人：林毅湛  
授课日期：2023年11月29日  
学员姓名：曾繁龙

	很好	好	一般	较差	很差
1 课程内容清楚，逻辑清晰	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2 课程讲授的知识对我的实际工作有帮助	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3 课程内容丰富、长度适中	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4 主讲人授课思路清晰，表达能力强	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5 主讲人工作经验丰富，且乐于与学员分享	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6 主讲人能有效回答学员提出的问题	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7 主讲人对课堂时间和节奏把握恰当	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8 您对培训组织和现场工作满意	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9 本次培训总体上符合我的期望	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10 其他建议：	把案例讲清楚，讲透。				

1/1

Guangdong Shunkong Environmental Investment Co., Ltd. Training Session Feedback Form

全球环境基金 (GEF) 全球环境基金“工业锅炉系统能效提升设备能力建设”项目

学员意见反馈表

尊敬的各位学员，为了能更好地为您提供培训服务，请根据您的真实想法和建议告诉我们。

填写说明：在最符合您情况的答案序号处打“√”，如无特别说明，每个问题只选择一个答案。

课程名称：锅炉安全运行及节能技术培训  
培训地点：广东省特种设备检测研究院顺德检测院  
主讲人：宋国宇  
授课日期：2023年11月17日  
学员姓名：[Signature]

	很好	好	一般	较差	很差
1 课程内容清楚，逻辑清晰	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2 课程讲授的知识对我的实际工作有帮助	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3 课程内容丰富、长度适中	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4 主讲人授课思路清晰，表达能力强	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5 主讲人工作经验丰富，且乐于与学员分享	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6 主讲人能有效回答学员提出的问题	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7 主讲人对课堂时间和节奏把握恰当	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8 您对培训组织和现场工作满意	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9 本次培训总体上符合我的期望	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10 其他建议：	把资料发给我个人。				

1/1

全球环境基金 (GEF) 全球环境基金“工业锅炉系统能效提升设备能力建设”项目

学员意见反馈表

尊敬的各位学员，为了能更好地为您提供培训服务，请根据您的真实想法和建议告诉我们。

填写说明：在最符合您情况的答案序号处打“√”，如无特别说明，每个问题只选择一个答案。

课程名称：锅炉安全运行及节能技术培训  
培训地点：广东省特种设备检测研究院顺德检测院  
主讲人：宋国宇  
授课日期：2023年11月17日  
学员姓名：[Signature]

	很好	好	一般	较差	很差
1 课程内容清楚，逻辑清晰	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2 课程讲授的知识对我的实际工作有帮助	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3 课程内容丰富、长度适中	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4 主讲人授课思路清晰，表达能力强	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5 主讲人工作经验丰富，且乐于与学员分享	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6 主讲人能有效回答学员提出的问题	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7 主讲人对课堂时间和节奏把握恰当	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8 您对培训组织和现场工作满意	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9 本次培训总体上符合我的期望	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10 其他建议：	将授课内容发给我。				

1/1

Guangdong Province Special Equipment Testing Research Institute Shunde Testing Institute

Training Session Partial Feedback Form







On November 5, 2023, a training session was conducted at the Pu'ning City Special Equipment Industry Association in Jieyang.





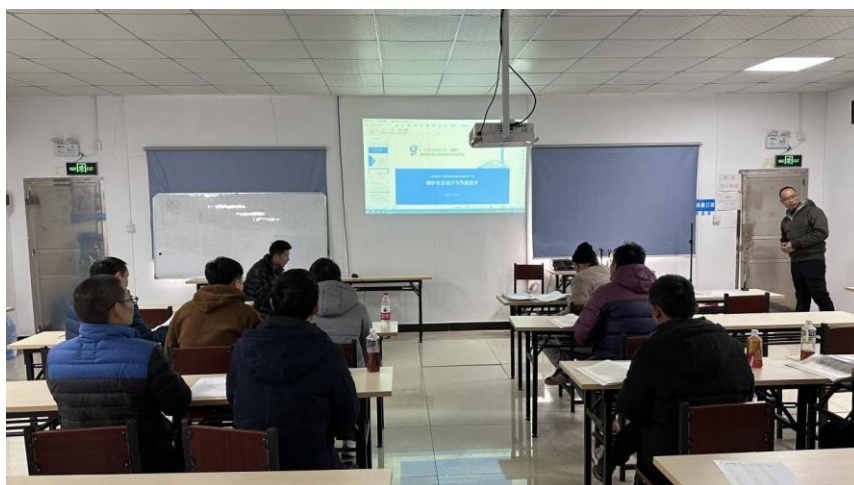
On November 15, 2023, a training session was conducted at the Zhanjiang Special Equipment Industry Association.



On November 20, 2023, a training session was conducted at the Shantou Special Equipment Industry Association.



On December 1, 2023, a training session was conducted at Wusha Thermal Power Co., Ltd. in Shunde, Foshan City.





On December 26, 2023, a training session was conducted at Zhaoqing Zhi Xin Vocational  
Training School.