Asia-Pacific
Economic Cooperation

Asia-Pacific
Legal Metrology Forum

Report of Training Course on Fuel Dispensers

APEC/APLMF Training Courses in Legal Metrology (CTI 10/2005T)

April 25-May 5, 2005
Pattaya City, Thailand

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Training Course on Fuel Dispensers
April 25-May 5, 2005

Photos taken at the training course in Pattaya City, Thailand

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Foreword

This booklet is one of outcomes of the APEC Seminars and Training Courses in Legal Metrology titled ‘Training Course on Fuel Dispensers - Verification of Non-LPG Dispensers / LPG Dispensers’ held on April 25-May 5, 2005 in Pattaya City, Thailand. This training course was organized by the Asia-Pacific Legal Metrology Forum (APLMF) with a support fund of APEC-TILF (Trade and Investment Liberalization and Facilitation) program, CTI-10/2005T. The training course was also supported by (1) Department of Internal Trade, Ministry of Commerce, Thailand (2) National Measurement Institute, Australia (NMIA), and (3) National Metrology Institute of Japan (NMIJ). Having this result, I would like to extend my sincere gratitude to all the staffs of the Department of Internal Trade and two trainers from Australia. Also, special thanks should be extended to the APEC Secretariat for their voluntary supports.

We have kept making surveys among the APEC member economies concerning seminar and training programs in legal metrology to find their needs and also possible resources which would be available for the region. The survey shows that there is still a strong need for repeating training courses on fuel dispensers that is one of the most important categories of instrument in legal metrology closely connected to daily life of every people. In addition, according to the globalization of international trade in worldwide, the compliance to international recommendations related to fuel dispensers, which is represented by the OIML Recommendation R117, is getting an important issue for the APEC and APLMF member economies.

Main target of this training course was to assist the experts in charge of verification of fuel dispenser in the member economies to learn deeply and to develop common understanding about the verification procedures based on the international standards and OIML recommendations. Thus the target would meet the APEC objective to harmonize metrology legislation with OIML international recommendations. The actual contents of the training course were focused on the understandings of basic principle and construction of fuel dispensers, international or national recommendations related to the fuel dispensers, and learning of actual verification procedures through practices at a facility using fuel dispensers.

In view of these situations, this training course concerning fuel dispensers had been planned and finished successfully so as to settle a sure basis of confidence in legal metrology related to the measurement of volume other than water within the Asia-Pacific region. I would like to say certainly that this is a valuable step to fruitful activities in legal metrology related to fuel dispensers in the Asia-Pacific region.

I am really pleased to have this outcome from the training course and again deeply appreciate invaluable voluntary efforts of the APEC secretariat.

February 17, 2006

Dr. Akira Ooiwa
APLMF President

APEC/APLMF Seminar and Training Courses in Legal Metrology
Training Course on Fuel Dispensers
A. Verification - non LPG Dispensers
B. Verification of LPG Dispensers

The Training Course of Fuel Dispensers on verification and in-service inspection was held from 25 April to 5 May 2005 at the Hotel Garden Sea View Resort, Pattaya City, Thailand. It was organized by APEC and APLMF, and supported by the Central Bureau of Weights and Measures within the Department of Internal Trade Thailand, the National Measurement Institute, Australia (NMIA) and the National Metrology Institute of Japan (NMIJ).

33 trainees attended the course from the following 16 different economies namely Cambodia, PR China, Hong Kong China, Indonesia, DPR Korea, Rep Korea, Lao PDR, Malaysia, Mongolia, Papua New Guinea, Peru, Philippines, Singapore, Chinese Taipei, Thailand and Vietnam. Two trainers from Australia provided the training. The executive secretary of APLMF and nine staffs from the host economy also supported the course. Most of the participants from outside Thailand were supported by APEC or NMIJ. The host economy and APLMF provided the venue, transportation and meals.

Petroleum products play an important economic and commercial role within our economies. In many cases, fuel is used to generate revenue for governments. All types of modern transportation rely on the easy availability of all fuel types. As a result, service stations are situated along all modern transportation routes and also in many outlying areas. The fuel dispensed at these service stations must be measured using an accurate and reliable system to provide confidence to the consumer. As a part of the process of ensuring fuel dispensers are reliable and accurate modern economies implement a national measurement system which includes the pattern approval of fuel dispensers and periodic verification of these instruments while they operate in the marketplace. OIML member economies implement recommendations contained in OIML R 117. This agreed set of internationally accepted test procedures is used for both the pattern approval and the verification of fuel dispensers.

OIML R 117, which was issued in 1997, was used by the NMIA to develop this Train-the-Trainer package. All Trade Measurement inspectors in Australia have been trained, and many licensed certifiers have also attended training. The objectives of the Train-the-Trainer course delivered in Pattaya City are to provide:

- highly competent individuals from member economies with a training package they could use in their own economies to implement OIML R 117;
- opportunities for in-depth discussion to clarify understanding of the test procedures for fuel dispensers; and
- a sound basis for harmonization of verification of fuel dispensers within the region.

By providing regionally consistent training aligned with international best practice and standards, APLMF is assisting with the harmonization of legal metrology within the region. Thus it is providing greater confidence between economies and a strong support network among senior staffs who are implementing OIML R 117 within the region.

This training course has been delivered twice before within the Asia Pacific region. The first time was in Beijing, PR China in 2001, and the second time was in Hanoi, Vietnam in 2003. This training program provides participants with two CD ROMs containing training for two separate training courses. The first CD ROM contains training material for the verification of fuel dispensers other than LPG, and the second CD ROM contains training material for the verification of LPG dispensers using both a volumetric method and a gravimetric method. Each CD ROM contains electronic copies of all the training materials used throughout the course. This will allow

course participants to modify this work to suit their economy and to train others when they return to their own workplace. Read only versions are available for members on the APLMF website.

The CD ROM for Fuel dispensers – other than LPG contains:

- NMI V 2-1 Uniform Test Procedures for the Verification, Certification and In-service Inspection of fuel dispensers – other than LPG
- Trainers Manual – providing step-by-step instructions for the trainer
- Learners Manual – notes on the course including exercises to reinforce learning
- Assessment Manual – some questions to assess how much has been understood
- Assessment Manual Answers
- PowerPoint presentation with embedded video outlining the steps required to test a dispenser

The CD ROM for Fuel dispensers – LPG Dispensers contains:

- NMI V 2-2 Uniform Test Procedures for the Verification, Certification and In-service Inspection of fuel dispensers – LPG
- Trainers Manual – providing step-by-step instructions for the trainer
- Learners Manual – notes on the course including exercises to reinforce learning
- Assessment Manual – some questions to assess how much has been understood
- Assessment Manual Answers
- PowerPoint presentation with embedded video outlining the steps required to test a dispenser

The training course started off with Mr. Veerasak Vissutthatham, Director, Weights and Measures Bureau, Department of Internal Trade who officially welcomed all participants to Thailand and encouraged them to learn as much as possible, and an opening address by the APLMF executive secretary, Dr. Tsuyoshi Matsumoto and Mrs Marian Haire from NMIA. After the opening ceremony, each economy delivered a short outline of how the verification of fuel dispensers is managed within their economy. The information presented by all economies provided a deep understanding of how the procedure of verification varies within the region. Mr. Tapphinyo from Thailand collated this information to provide a simple overview. A copy of this table is included at the end of this report. After each training course, a segment of the course was presented by participants working in groups. This provided an excellent opportunity to clarify understanding and to ensure the procedures were understood by all.

On Monday 25 April, the host in Thailand provided a welcome dinner at the Hotel Garden Sea View Resort. This was attended by Mr. Sakchai Hasamin, Weights and Measures Bureau, Department of Internal Trade.

An important aspect of this training course was the in-field practice. Three days in total were spent at a service station. During this time, each participant worked under the guidance of senior inspectors from Thailand. These experts ensured that each participant had the opportunity to carry out the procedures in the same manner as shown by the trainers.

On Saturday 30 April, we experienced some wonderful sightseeing in and around Pattaya City. First, we visited Yanasangwan where we saw a golden Budda painted onto the side of a rock-face side and some very pleasant gardens surrounding it. The Budda is more than 130 m tall and can be seen glistening in the sunlight from many kilometres away. Our next stop allowed us to visit several temples nearby and refresh ourselves with cool coconut drinks. Later we went to see Mini Thailand, where some of the important architectural features from Thailand are shown in miniature. This was an excellent way to gain an admiration for the amazing history and expertise of the people in Thailand. Our final stop was an elephant village, where we watched a show and had a superb elephant ride.

On Wednesday 4 May, APLMF provided a farewell dinner at the hotel. This was attended by Mr. Vissutthatham and all staffs of the Department of Internal Trade who assisted the training course.

APLMF would like to acknowledge the hard work and dedication of the following individuals who worked cooperatively to ensure the training achieved a successful outcome.

Mr. Siripol Yodmuangcharoen Director-General of the Department of Internal Trade who agreed to host the training.

Mr. Darryl Hines, Senior Inspector for the Queensland State Government who presented the training. Mr. Hines has more than twenty years experience working as an inspector and is an accredited national trainer within Australia. His experience makes him a highly competent trainer.

Mrs. Marian Haire, Manager Training and Technical Transfer, NIMA, coordinated the development of the package and presented the training aspects of the course.

Mr. Jaroonsak Busabon, Ms. Metta Niemprem, Mr. Warapong Pakkut and Peerayuth Chamrak who supported Mr. Hines during the practical training at the service station by ensuring the trainees were carrying out all procedures correctly.

Mr. Sakchai Hasamin who managed all the practical arrangements to ensure the course would run smoothly.

Mr. Tappinyo Koatnon who organized sightseeing for the group during the weekend.

Dr. Tsuyoshi Matsumoto, executive secretary of APLMF who provided support and administration of the training course.

All the participants worked hard and applied themselves to the task of ensuring they got the most from the course. They showed dedication and interest throughout the nine days of training. They participated in the challenge when they were asked to demonstrate what they have learnt, by presenting their knowledge back to the group with good humour and imagination.

The closing ceremony was conducted on Thursday 5 May when Mr. Vissutthatham and Dr. Matsumoto presented certificates to all the participants. All participants returned evaluation forms which provided valuable information for the organizers. They commented on the overall effectiveness of the training course, the new skills acquired and changes they planned to pursue in their home economy. Many responses stated they would be adopting the procedures for use in their own economy. They also commented on the support they would require in order to implement these procedures within their economies. This included: funding to obtain appropriate equipment such as reference standards; access to the trainers by email; opportunities to discuss what they had learnt with regulation people in order to determine the most appropriate path forward; and opportunities to train others. There were many favourable comments about the training course. These included: the importance of including time for practice within the course; the clarity of the presentation; the effectiveness of the CD ROM presentations; the great job done by all the host staffs; and the experience and knowledge of the presenters. The following suggestions were made for changes to the course. Some wished they could have more time for practice, some thought the course was too long, and others wanted to include more information on pattern approval. All the participants found it most valuable to have an opportunity to discuss in depth the issues related to the implementation of OIML R 117 and to have practical ways to implement it in their own economies. All participants went away determined to train others and to discuss how they would implement the procedures in their economies.

Mrs. Marian Haire
Manager
Training and Technology Transfer
National Measurement Institute, Australia

Asia-Pacific
Economic Cooperation

Asia–Pacific
Legal Metrology Forum

APEC/APLMF Seminar and Training Courses in Legal Metrology (CTI 10/2005T)
Training Course on Fuel Dispensers

A. Verification - non LPG Dispensers
B. Verification of LPG Dispensers

April 25-May 5, 2005 in Pattaya City, Thailand

Program

Venue and Accommodation:

Hotel Garden Sea View Resort
282/3 Moo 5 Pattaya - Naklua Rd., Pattaya City, Chonburi 20150, Thailand
Tel: +66-3822-6070, Fax: +66-3822-6069
Email: info@gardenseaviewresort.com
http://www.gardenseaviewresort.com/

- Pattaya City is located 130 km south of Bangkok.
- Accommodations will be prepared in this hotel on a request from the participant at an approximate rate of 1600 Baht (=US$42 x 38.3)/day. Please use the separated registration form to reserve the accommodations.
- Regarding the access to the venue, vans from/to the Bangkok International Airport would be provided on April 24 and May 6 (*details have not been decided*).

Organizers:

1. Asia-Pacific Economic Cooperation (APEC)
2. Asia-Pacific Legal Metrology Forum (APLMF)

Supporting Organizations:

1. Department of Internal Trade (DIT), Ministry of Commerce, Thailand
2. National Measurement Institute, Australia
3. National Metrology Institute of Japan (NMIJ)

Trainers:

1. Mrs. Marian Haire, National Measurement Institute, Australia
2. Mr. Darryl Hines, Queensland Government, Australia

Course A
Verification - non LPG Dispensers

Monday April 25 **Venue: Hotel Garden Sea View Resort**

Time	Details	Presenter
2:00 – 2:15 pm	• Opening ceremony - Opening address by the APLMF - Welcome address by the host	APLMF and Host
2:15 – 3:30 pm	• Overview of the course • The verification of fuel dispensers in each economy. Each economy explains the system used to verify fuel dispensers in their economy.	Mrs. Marian Haire and a trainee from each economy
3:30 – 4:00 pm	***Coffee Break***	
4:00 –5:00 pm	• Economy reports continue	Mrs. Marian Haire and a trainee from each economy
7:00 –9:00 pm	• Welcome dinner hosted by the Department of Internal Trade at the Sea House Restaurant, the Garden Sea View Resort Hotel.	

Tuesday April 26 **Venue: Hotel Garden Sea View Resort**

Time	Details	Presenter
9:00 – 10:30 am	• Working safely with petroleum products • Construction of a fuel dispenser	Mr. Darryl Hines
10:30 – 11:00 am	***Coffee Break***	
11:00 – 12:30 pm	• Preparation for testing • Equipment for testing petrol and diesel	Mr. Darryl Hines
12:30 – 2:00 pm	***Lunch***	
2:00 – 3:30 pm	• Visual Inspection • Functional Tests	Mr. Darryl Hines
3:30 – 4:00 pm	***Coffee Break***	
4:00 – 5:30 pm	• Performance Tests • Question and answer session	Mrs. Marian Haire and Mr. Darryl Hines

Wednesday April 27 **Venue: A Petrol Station**

Time	Details	Presenter
8:30 am	Travel to the training venue	
9:00 – 10:30	• Observe demonstration of individual tests • Discussion in classroom of procedure	Mr. Darryl Hines and Mrs. Marian Haire
10:30 – 11:00 am	***Coffee Break***	
11:00 – 12:30 pm	• Participants work in groups to conduct individual tests according to the test procedures.	Mr. Darryl Hines and Mrs. Marian

	• Discussion in classroom of procedure	Haire
12:30 – 2:00 pm	***Lunch***	
2:00 – 3:30 pm	• Observe demonstration of tests as carried out in the field. • Discussion in classroom of procedure	Mr. Darryl Hines and Mrs. Marian Haire
3:30 – 4:00 pm	***Coffee Break***	
4:00 – 5:00 pm	• Participants work in groups to conduct tests according to the test procedures	Mr. Darryl Hines and Mrs. Marian Haire
5:00 pm	• Return to the hotel	

<u>Thursday April 28</u> **Venue: A Petrol Station and The Eastern Verification Center**

Time	Details	Presenter
8:30 am	Travel to the training venue	
9:00 – 10:30 pm	• Students practice technique and prepare presentations for the following day	Mr. Darryl Hines and Mrs. Marian Haire
10:30 – 11:00 am	***Coffee Break***	
11:00 – 12:30 pm	• Students practice technique and prepare presentations for the following day	Mr. Darryl Hines and Mrs. Marian Haire
12:30 – 2:00 pm	***Lunch***	
2:00 – 4:30 pm	• A Tour to The Eastern Verification Center (Chonburi) in Pattaya City.	Mr. Boonrath Jongsakul and the staffs of the center
5:00 pm	• Return to the hotel	

<u>Friday April 29</u> **Venue: Hotel Garden Sea View Resort**

Time	Details	Presenter
9:00 – 10:30 am	• Group 1 presentations • Discussion and feedback	Participants
10:30 – 11:00 am	***Coffee Break***	
11:00 – 12:30 pm	• Group 2 presentations • Discussion and feedback	Participants
12:30 – 2:00 pm	***Lunch***	
2:00 – 3:30 pm	• Group 3 presentations • Discussion and feedback	Participants
3:30 – 4:00 pm	***Coffee Break***	
4:00 – 5:30 pm	• Group 4 presentations • Discussion and feedback	Participants
5:30 – 5:50 pm	• Closing Ceremony	APLMF and Host

Course B
Verification - LPG Dispensers

Monday May 2 **Venue: Hotel Garden Sea View Resort**

Time	Details	Presenter
9:00 – 10:30 am	• Welcome • Overview of course • Introduction of new participants	Mrs. Marian Haire
10:30 – 11:00 am	***Coffee Break***	
11:00 – 12:30 pm	• Properties of LPG • Working safely with LPG • Construction of an LPG Dispenser.	Mr. Darryl Hines
12:30 – 2:00 pm	***Lunch***	
2:00 – 3:30 pm	• Preparation for testing • Equipment for testing LPG • Visual Inspection	Mr. Darryl Hines
3:30 – 4:00 pm	***Coffee Break***	
4:00 –5:00 pm	• Functional Tests	Mr. Darryl Hines

Tuesday May 3 **Venue: Hotel Garden Sea View Resort**

Time	Details	Presenter
9:00 – 10:30 am	• Performance Testing Using a Master Meter	Mrs. Marian Haire
10:30 – 11:00 am	***Coffee Break***	
11:00 – 12:30 pm	• Question and answer session	Mr. Darryl Hines and Mrs. Marian Haire
12:30 – 2:00 pm	***Lunch***	
2:00 – 3:30 pm	• Performance Testing using the Gravimetric Method	Mr. Darryl Hines
3:30 – 4:00 pm	***Coffee Break***	
4:00 – 5:00 pm	• Question and answer session	Mrs. Marian Haire and Mr. Darryl Hines

Wednesday May 4 **Venue: An LPG Station**

Time	Details	Presenter
8:30 am	Travel to the training venue	
9:00 – 10:30	• Observe demonstration of individual tests • Discussion in classroom of procedure	Mr. Darryl Hines and Mrs. Marian Haire
10:30 – 11:00 am	***Coffee Break***	

11:00 – 12:30 pm	• Participants work in groups to conduct individual tests according to the test procedures. • Discussion in classroom of procedure	Mr. Darryl Hines and Mrs. Marian Haire
12:30 – 2:00 pm	***Lunch***	
2:00 – 3:30 pm	• Observe demonstration of tests as carried out in the field. • Discussion in classroom of procedure	Mr. Darryl Hines and Mrs. Marian Haire
3:30 – 4:00 pm	***Coffee Break***	
4:00 –5:00 pm	• Participants work in groups to conduct tests according to the test procedures	Mr. Darryl Hines and Mrs. Marian Haire
5:00 pm	• Return to the hotel	
6:00 –9:00 pm	• Farewell dinner hosted by APLMF at the Sea House Restaurant, the Garden Sea View Resort Hotel.	

Thursday May 5 Venue: Hotel Garden Sea View Resort

Time	Details	Presenter
9:00 – 10:30 am	• Group 1 presentations • Discussion and feedback	Participants
10:30 – 11:00 am	***Coffee Break***	
11:00 – 12:30 pm	• Group 2 presentations • Discussion and feedback	Participants
12:30 – 2:00 pm	***Lunch***	
2:00 – 3:30 pm	• Group 3 presentations • Discussion and feedback	Participants
3:30 – 4:00 pm	***Coffee Break***	
4:00 – 5:00 pm	• Group 4 presentations • Discussion and feedback	Participants
5:00 – 5:30 pm	• Closing Ceremony - Give certificates to all trainees - Closing address by APLMF - Farewell address by the host	APLMF and Host

Registration:

Fill the attached **"Registration Form"** and send it to the APLMF secretariat by March 24, 2005.

Visa Assistance:

If you need visa to enter Thailand, fill the attached **"Visa Assistance Form"** and send it to the host in Thailand by March 24, 2005.

Contact Persons of the Training Course:

1. APLMF Secretariat (registration and funding)
Dr. Tsuyoshi Matsumoto
APLMF Executive Secretary
NMIJ/AIST Tsukuba Central 3-9, 1-1-1 Umezono, Tsukuba, Ibaraki 305-8563, Japan
Tel: +81-298-61-4362, Fax: +81-298-61-4393
E-mail: e.sec@aplmf.org

2. Working Group on Training Coordination (lecture and training materials)
Mrs. Marian Haire
Training Coordinator, National Measurement Institute, Australia
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E-mail: marian.haire@measurement.gov.au

3. Host in Thailand (visa assistance, accommodation, venue and access information)
Mr. Veerasak Visutthatham <veerasak@cbwmthai.org>
Mr. Sakchai Hasamin <hasakchai@hotmail.com>
Mr. Tapphinyo Koatnon <tapphinyok@dit.go.th>

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Nonthaburi 11000, Thailand
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Participants List of APEC/APLMF Training Courses on Fuel Dispensers

April 25 - May 5, 2005 in Pattaya City, Thailand

No.	Economy	Category	Name	Organization
1	**Australia**	**Trainer**	Mrs. Marian Haire	National Measurement Institute, Australia
2	**Australia**	**Trainer**	Mr. Darryl J. Hines	Racing and Fair Trading Incorporating Liquor Licensing, Queensland Government
3	**Cambodia**	Trainee	Mr. Kim Chandara	Department of Metrology (DOM), Ministry of Industry, Mines and Energy (MIME)
4	**Cambodia**	Trainee	Mr. Sok Narith	Department of Metrology (DOM), Ministry of Industry, Mines and Energy (MIME)
5	**China, PR**	Trainee	Mr. Huang Huimin	Guangdong Institute of Metrology
6	**China, PR**	Trainee	Mr. Li Junliang	Guangdong Institute of Metrology
7	**China, PR**	Trainee	Mr. Xiong Li Min	National Institute of Metrology
8	**Hong Kong, China**	Trainee	Mr. Tsang Chi Kin, Andy	Government Laboratory
9	**Indonesia**	Trainee	Mr. Hikmat Rijadi	Directorate General of Domestic Trade, Ministry of Trade
10	**Japan**	**APLMF**	Dr. Tsuyoshi Matsumoto	Executive Secretary of APLMF / National Metrology Institute of Japan /AIST
11	**DPR. Korea**	Trainee	Mr. Ko Hak Chol	State Administration for Quality Management of the DPR of Korea (SAQM)
12	**DPR. Korea**	Trainee	Mr. Yun Yong Il	State Administration for Quality Management of the DPR of Korea (SAQM)
13	**Republic of Korea**	Trainee	Mr. Ho Young Park	Korea Machinery-Meter and, Metrochemical Testing and, Research Institute (MPI)
14	**Lao PDR**	Trainee	Mr. Kadingthong Singdala	Dept. of Intellectual Property Standardization and Metrology (DISM)
15	**Malaysia**	Trainee	Mr. Mohd Ismail Bin Md Yunus	Ministry of Domestic Trade and Consumer Affairs, Malaysia.
16	**Mongolia**	Trainee	Mr. Boldbaatar Radnaa	Mongolian Agency for Standardization and Metrology
17	**Papua New Guinea**	Trainee	Ms. Debbie Anne Taitarae	Papua New Guinea National Institute of Standards and Industrial Technology (NISIT)
18	**Peru**	Trainee	Mr. Abed Yamil Abdul Morales Quichua	INDECOPI
19	**Philippines**	Trainee	Mr. Jordan Bernardo Damian	Industrial Technology Development Institute, Department of Science and Technology
20	**Singapore**	Trainee	Mr. Adrian Ang Pau Yuen	SPRING Singapore, Weights and Measures Office
21	**Taipei, Chinese**	Trainee	Mr. Ching-Hsien Lin	Bureau of Standards, Metrology and Inspection, Ministry of Economic Affairs.
22	**Thailand**	**Host**	Mr. Peerayuth Chamrak	Eastern Verification Center (Chonburi), Department Of Internal Trade
23	**Thailand**	**Host**	Mr. Sakchai Hasamin	Weights and Measures Bureau, Department of Internal Trade, Ministry of Commerce

24	**Thailand**	**Host**	Mr. Boonrath Jongsakul	Director, Eastern Verification Center (Chonburi)
25	**Thailand**	**Host**	Mr. Tapphinyo Koatnon	Weights and Measures Bureau, Department of Internal Trade, Ministry of Commerce
26	**Thailand**	**Host**	Mr. Charlemsak Panuraj	Weights and Measures Bureau, Department of Internal Trade, Ministry of Commerce
27	**Thailand**	**Host**	Mr. Sommay Pongin	Weights and Measures Bureau, Department of Internal Trade, Ministry of Commerce
28	**Thailand**	**Host**	Miss Khemsai Rahannok	Weights and Measures Bureau, Department of Internal Trade, Ministry of Commerce
29	**Thailand**	**Host**	Ms. Pattaraporn Surasit	Weights and Measures Bureau, Department of Internal Trade, Ministry of Commerce
30	**Thailand**	**Host**	Mr. Veerasak Vissutthatham	Weights and Measures Bureau, Department of Internal Trade, Ministry of Commerce
31	**Thailand**	Trainee	Mr. Jaroonsak Busabon	
32	**Thailand**	Trainee	Ms. Panawan Khamlor	
33	**Thailand**	Trainee	Mr. Chaitoon Lamoon	
34	**Thailand**	Trainee	Ms. Metta Niemprem	
35	**Thailand**	Trainee	Mr. Warapong Pakkut	
36	**Thailand**	Trainee	Mr. Sayomporn Rongnuam	
37	**Thailand**	Trainee	Mr. Pichit Sirintarasophon	
38	**Thailand**	Trainee	Mr. Thanaphat Wongkhiatkhachon	
39	**Viet Nam**	Trainee	Mr. Bui Quang Minh	Vietnam National Petroleum Corporation (Petrolimex)
40	**Viet Nam**	Trainee	Mr. Do Viet Hung	Quality assurance and testing centre 3- Quatest 3
41	**Viet Nam**	Trainee	Mr. Nguyen Doan Tho	B12 Petroleum Company, Vietnam National Petroleum Corporation (Petrolimex)
42	**Viet Nam**	Trainee	Mr. Nguyen Hong Tuan	Hanoi Petroleum Company, Vietnam National Petroleum Corporation (Petrolimex)
43	**Viet Nam**	Trainee	Mr. Nguyen Ngoc Hue	Metrology Department, Directorate for Standard and Quality (STAMEQ)
44	**Viet Nam**	Trainee	Mr. Tra Van Sang	Sai Gon Petroleum Company, Vietnam National Petroleum Corporation (Petrolimex)
45	**Viet Nam**	Trainee	Mr. Truong Dang Canh	Vietnam National Petroleum Corporation (Petrolimex)

*Names are listed in alphabetical order of their economies, categories and last names

COUNTRY REPORT
OF
METROLOGY IN CAMBODIA

Presented
by
Mr. KIM Chandara
Mr. SOK Narith

Department of Metrology
Ministry of Industry Mines and Energy
Kingdom of Cambodia

APEC/APLMF Training Course On
Fuel Dispensers
From April 25 – May 05, 2005
Pattaya City, Kingdom of Thailand

1- Background

- Land area : 181.035 sq. km
- Capital city : Phnom Penh
- Number of provinces : 24
- Population : 12.4 million (in year 2002)
- Official language : Khmer
- Currency : Riel
- Religion : Buddhism
- Average annual temp. : 28.5 ^{o}C
- Season : 6 Months dry season, November to April
  6 Months rainy season, May to October

2- History of Department of Metrology

-1964 Establishment of the National service of Weights and Measures, under the Ministry of Industry.

-1975-79 No activities.

-1995 Re-Establishment of Weights and Measures Unit, under the Ministry of Industry, Mines and Energy (MIME).

-1999 The Weights and Measures Unit upgraded to the Department of Metrology.

-2000 Corresponding member of the International Organization of Legal Metrology (OIML).

-2002 Member of Asia Pacific Legal Metrology Forum (APLMF).

3- Law and Regulation

The legal metrology in Cambodia was operation on:

-Circular No. 3 DT/PMC. It is an Administration on the metrological supervision for weighing and measuring instruments used in business transaction.

-Sub-Degree No. 35 AK/PK. It defines the Organization and Functioning of The MIME and the Role of Dept. of Metrology.

-Law on “Management of Quality and Safety of Products and Services “.

Presently, there is no National Metrology Law giving power to the Department of Metrology to carry out the Legal Metrology Activities.

For the time being, a drafted “National Metrology Law “prepared under UNIDO is under reviewed by the Ministry of Industry, Mines and Energy (MIME). Also, UNIDO expert has been drafted the following regulations:

- Definition of SI Unit
- Pre-Packaged Goods
- Requirements for Domestic Water Measures
- Requirement of Weights and Measures (include: Measurement of Length, Mass, Weighing instruments, and Liquid Fuel measuring instruments).

4- Legal Units of Measurement

The International System of Unit (SI) is the legal system of Cambodia. The use of other units will be permitted by making conversions or equivalence.

5- Type Approval

- There is no Type Approval function in Cambodia.

- This subject has been studied and will be established in the near future.

6- Accreditation and Certification System

- There is no accreditation system for legal metrology in Cambodia.
- This subject has been studied and will be established in the near future.

7- Structure of Metrological Control Authorities

7-1- Department of Metrology

The Department of Metrology operates under the General Direction of Industry of the Ministry of Industry, Mines and Energy (MIME) and is in charge of Registration, Calibration, Verification, Inspection of measuring equipment and issuing licenses to manufacturers, importers repairer and seller of weighing and measuring instruments.

Department of Metrology maintains the National Primary and Secondary Standards of Cambodia and responsible for supervision the high technology and other metrology institutions.

Functions and Duties

- To implement the National Metrology Policy and issue documents concerning manufacture, import, export, and repair manufacturing equipments;
- To assure the conservation of Primary and Secondary Standards;
- To ensure the proper design, verification and use of measuring instruments;
- To review the need, establish the work plan and monitor the implementation;
- To carry out evaluation and supervision of measuring equipment to ensure their effectiveness and efficiency;
- To disseminate and improve the national technology of metrology;
- To organized the training of metrological staff;
- To administer metrological laboratories; and
- To cooperate with international metrology organizations.

7- Structure of Metrological Control Authorities

7-2- Provincial Metrology Office

The Department of Metrology provides technical advice to the provincial metrology office that operate in the 24 provinces and cities of Cambodia. Every province and city has an office of metrology and shares the responsible with Department of Metrology as follow:

- Verification, Re-Verification and Inspection of the weighing and measuring instruments used in business transaction in their local levels.
- Supervision the lower technology of weighing and measuring instruments in their local levels.
- The provincial metrology offices maintain the Working Standards.

8- Verification and Inspection

- All weighing and measuring instruments used in business transaction or any others applications under the Ministerial Regulations must be verified by comparison with the standards of weights and measures.
- The accuracy of weighing and measuring instruments (an initial, periodical and unexpected verifications), shall not be exceeded the maximum permissible errors prescribed in the Ministerial Regulation. The competent officers shall grant the verification and affix or display the verification marks on those instruments.
- An activity related to the Non LPG and LPG in Cambodia:

A- Petrol Companies: (Inspected by compares with Working Standard Vessel)

PTT, SAVIMEX, SOKIMEX, KAMPUCHEA TELA, MITTAPHEAP, CALTEX, SHELL And TOTAL companies.

B- Gas Companies: (Inspected by Weighing)

Oxygen Acetylene Entity, Oxygen Acetylene Chamkardoung, Oxygen Acetylene Bophatip, Super Gas, CAM Gas, Total Gas, Sokimex Gas, and Phnom Penh Oxygen Gas Production companies.

9- Verification of Fuel Dispenser in Cambodia

There are 02 kinds of Fuel Dispensers:

1- Mechanical pump (Verified by the Provincial Metrology Office)

2- Electronic pump (Verified by the Department of Metrology).

A- Visual Inspection

A-1- Required Data:

-To record the date of test, registered trading name, the mark, model, pump number ….

A-2- Assessment of Fuel Dispensers:

- External inspect the Fuel Dispensers

  To check the fuel dispenser is firmly fixed on its foundation, all indications are visible under conditions day and night, nozzle must terminate the delivery ….

- Internal inspect the Fuel Dispenser

  To check the apparent leaks at the pump, hose, meter, gas elimination device, the components are located and fitted in accordance with the certificate, and verification mark and seals are in place ….

B- Functional tests

- Visually inspect the indicator: to check the Eights test, Blank test and Zeros test.
- To check price computing.
- To check nozzle cut-off

C- Performance Tests

- Volume for testing is 05 litre.
- Display of indicator of Fuel Dispenser is compared with Working Standard Vessel
- The MPE is +/- 0.5%.

10- Expectation

- At the end of the training course I will gain an experiences from all Presenters and Participants.
- The training course will build up my capacity and I am able to implement the metrology services in my country in effectiveness.
- This training course will strengthen and harmonize the method of verification among the member of APLMF and in the Regional Metrology Organizations.

Thank you for your kind attention

SOUTH CHINA CENTRE OF METROLOGY &
GUANGDONG INSTITUTE OF METROLOGY

Verification of Fuel Dispensers in China

Li Junliang

Begin

Ladies and Gentlemen, Good afternoon. I am Li Junliang from South China Centre of Metrology. I am very honored to have the opportunity to brief you on the verification of fuel dispensers in our country. My presentation will be divided into 3 parts:

- the general situation of fuel dispensers trade in China
- Metrological management of fuel dispensers in China
- The position and future steps of fuel dispensers in China

1. The general situation of fuel dispensers trade in China

Fuel dispensers are used in gas stations for filling lightweight oil including gasoline, diesel, etc. It have been nearly 50 years since our country imported fuel dispensers from abroad in 1960s, and the development of fuel dispensers have went through 3 stages:

mechanical and manual → mechanical and electronic → electronic and electric

1. The general situation of fuel dispensers trade in China

Till today, we have developed fuel dispensers with revenue function and IC card payment successfully. At present, there are more than forty manufacturers have got manufacturing licenses. Now the annual productivity of fuel dispensers is over 10,000 and the productive value is more than RMB 1 billion in China.

1. The general situation of fuel dispensers trade in China

The components of fuel dispenser made in China mainly include:

flowmeter	such as the measured convertor and the count display device
assistant equipments	such as adjusting to zero component, the total amount display device, the money display device and print device
additional equipments	such as The oil pump, the apparatus of oil separating from air, filter, the watching oil apparatus, nozzles and the soft tube of transmitting oil

2. Metrological management of fuel dispensers in China

Our government has always been attaching importance to metrological management of fuel dispensers. The mode of metrological management includes:

Type approval → initial verification → periodic verification

metrological performance testing
environmental adaptability testing
electromagnetic compatibility testing
function testing

checking appearance
verification of indication value

2. Metrological management of fuel dispensers in China (Verification of fuel dispensers)

At present, our metrology accuracy of fuel dispensers is ±0.3% , better than the accuracy of OIML117(±0.5%). In addition, the verification period of the fuel dispensers is 6 months in our country.

3. The position and future steps in regard to fuel dispensers in our country

Fuel dispenser management of our country is very strict, besides fuel dispensers, there are water meters, gas meters, weighing instruments, watthour meters and taximeters with revenue function, which are six kinds of measuring instruments within the close supervision in China.

With the improvement of fuel dispensers technology, in the future our fuel dispensers will be more and more accurate, energy saving, reliable, multifunctional, environmentally-friendly.

The End

We hope that we can make great contribution to the fuel dispensers trade with all the international fraternities.

Thank You very much.

Legal Metrology (LPG and non-LPG Dispensers)
Hong Kong Special Administrative Region (HKSAR)

Presented by : TSANG Chi Kin –
Chemist of the Government
Laboratory

Weights and Measures Ordinance – Chapter 68

- The whole ordinance is readily available in the internet (www.justice.gov.hk)
- Keyword Search : Chapter 68
- Bilingual (English and Chinese)
- The whole ordinance consists of 38 Sections and 3 Schedules

Enforcement of the Weights and Measures Ordinance

- Under the purview of the Customs and Excise Department;
- Roles of the Government Laboratory :
- Assists in law enforcement by provision of analytical and advisory services :

Roles of the Government Laboratory

- For liquid dispenser such as those used in gas station, provide on-site advisory and analytical services;
- For LPG dispenser, we are currently not equipped to provide such testing service.

Current Situations

- The Customs and Excise Department has the capability of carrying out some of the verification works;
- Some of the tests have been contracted-out e.g. LPG dispenser;
- The request for services is rare.

End of Presentation

- Thank you very much

COUNTRY REPORT

TRAINING COURSE ON FUEL DISPENSER

April 25 ~ May 5, 2005
in Pattaya City, Thailand

Presented by
Hikmat RIJADI

DIRECTORATE OF METROLOGY
DIRECTORATE GENERAL OF DOMESTIC TRADE
THE MINISTRY OF TRADE OF THE REPUBLIC OF INDONESIA

General Overview of Indonesia

- Official Name: Republic of Indonesia
- Population: ± 238.452.952
- Capital City: Jakarta
- Languages: Bahasa Indonesia (official), English, Dutch, local dialects, the most widely spoken of which is Javanese
- National Anthem: Indonesia Raya
- Official Currency: Rupiah
- Location: Southeastern Asia, between Australia & Asia Continents, archipelago between the Indian Ocean and the Pacific Ocean,
- Main Islands: Sumatra, Java, Kalimantan, Sulawesi & Irian
- Provinces: Indonesia has 33 provinces
- Climate: tropical; hot, humid; more moderate in highlands, seasons; dry and wet
- Surface area : 1.900.000 km^2
- Latitude/Longitude 6º 18S, 106º 83E

Overview of Directorate of Metrology and local Metrology offices

Directorate of Metrology is under the Ministry of Trade, Directorate General of Domestic Trade

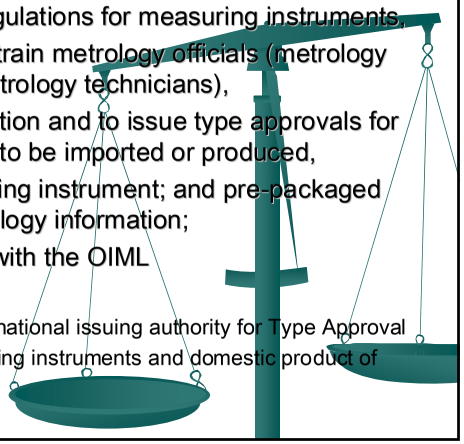
Directorate of Metrology to consist of:

1. Sub Directorate of Metrological Facility and Human Resource
2. Sub Directorate of Metrological Cooperation
3. Sub Directorate of Measurement Standard and Metrological Laboratory
4. Sub Directorate of Metrological Technique
5. Sub Directorate of Supervision and Metrological Information

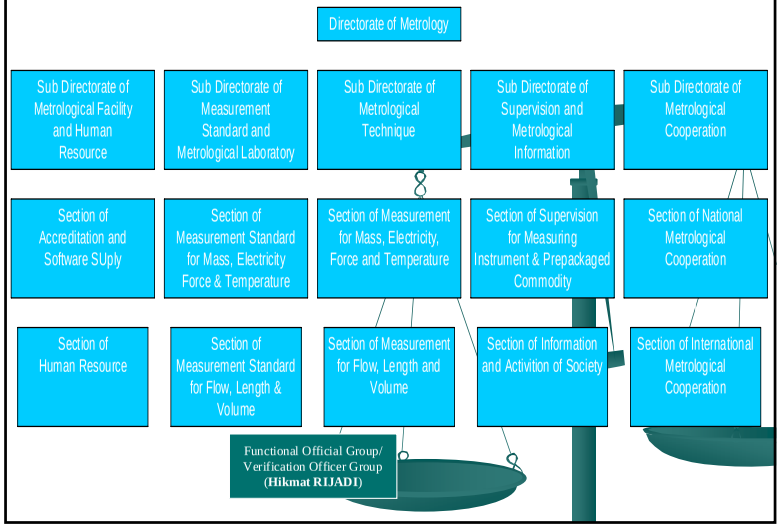
The main tasks of the Directorate of Metrology are:

- to conserve reference standards,
- to draw up technical regulations for measuring instruments,
- to recruit, educate and train metrology officials (metrology engineers and legal metrology technicians),
- to carry out type evaluation and to issue type approvals for measuring instruments to be imported or produced,
- supervise legal measuring instrument; and pre-packaged goods and giving metrology information;
- to implement relations with the OIML

Directorate of Metrology is the national issuing authority for Type Approval Certificate for imported measuring instruments and domestic product of measuring instruments

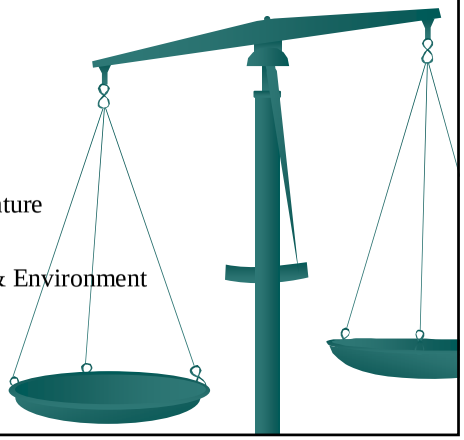


The Organizational Structure of Directorate of Metrology



Laboratory of the Directorate of Metrology

- Laboratory of Mass
- Laboratory of Force
- Laboratory of Pressure
- Laboratory of Length
- Laboratory of Volume
- Laboratory of Temperature
- Laboratory of Electric
- Laboratory of Health & Environment



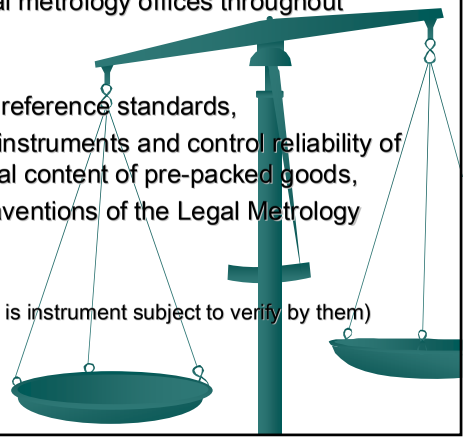
Local Metrology Offices:

There are fifty-five local metrology offices throughout Indonesia.

Their main tasks are:

- to manage physical reference standards,
- to verify measuring instruments and control reliability of mass, volume or total content of pre-packed goods,
- to investigate contraventions of the Legal Metrology Law.

(Including, Fuel dispensers is instrument subject to verify by them)



MEASUREMENT LAW & REGULATIONS

- Measurement Law : No. 2, 1981 Regarding Legal Metrology
- Regulations :

1. No. 2, 1985 concerning Measuring Instrument subject to verification
2. No. 10, 1987 concerning Legal Units of Measurement
3. No. 7, 1989 concerning the National Standardization Council
4. No. 2, 1989 concerning the National Standards for Measurement Units,

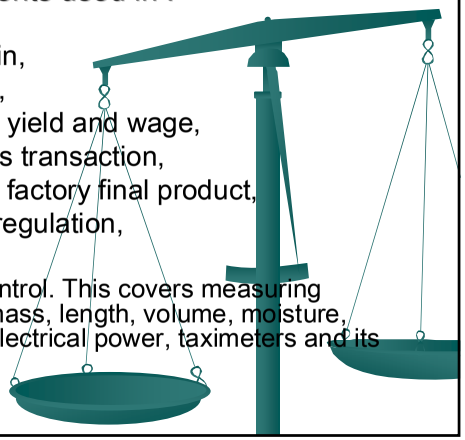
and so on.

Instrument subject to legal control

Measuring instruments used in :

- the public domain,
- custody transfer,
- determination of yield and wage,
- trade or business transaction,
- determination of factory final product,
- enforcement of regulation,

are subject to legal control. This covers measuring instruments for: mass, length, volume, moisture, force, pressure, electrical power, taximeters and its standards.



Number of Verification officer

- Directorate of Metrology:
  51 persons (male: 46 persons, female: 7 person)
- Local Metrology Office:
  900 persons (spread out in 55 offices)

Type Approval and Verification of Fuel Dispensers

- **Type Approval of Fuel Dispenser**
  Directorate of Metrology is the national issuing authority for Type Approval Certificate for imported measuring instruments and domestic product of measuring instruments
- **Verification of Fuel Dispenser**
  Verification of fuel dispensers are carried out by local metrology offices

Type Approval of Fuel Dispensers Procedures:

- Application examination
- Design inspection
- Preparation for testing;
  - general safety requirement, • required equipment
- Visual inspection;
  - required data, • assessment of fuel dispensers
- Functional tests;
  - checking facility, • zero-setting device, • price computing mechanism, • nozzle cut-off device, • interlock for fuel dispenser
- Endurance test
  - 200 hour
- Performance tests.
  - determination of flow rate range, • accuracy, • testing the gas elimination device, • hose dilation, • pre-set test,

Verification of Fuel Dispenser Procedures:

- Preparation for testing;
  - general safety requirement, • required equipment
- Visual inspection;
  - required data, • assessment of fuel dispensers
- Functional tests;
  - checking facility, • zero-setting device, • price computing mechanism, • nozzle cut-off device, • interlock for fuel dispenser
- Performance tests.
  - determination of flow rate range, • accuracy, • testing the gas elimination device, • hose dilation, • pre-set test, • additional tests in the certificate of approval

verification methods

an verification of instrumental error shall be carried out by either:

- a volumetric method, or
- a gravimetric method

Volumetric method is commonly use in Indonesia.

volumetric method

$$E = \frac{M - S}{S} x100\%$$

- E = error
- M = indicated volume of dispenser (L)
- S = indicated *corrected* volume of standard (L)

S = s – e (s = indicated volume of standard
e = error of standard)

mpe: ± 0,5%
repeatability: 0,1%

rate Inspection of flow

An inspection shall be carried out for three flow rate:

- high flow rate
- middle flow rate
- low flow rate

and

- minimum delivery

At the same time, we also inspect for indicated price

Number of Fuel Dispenser

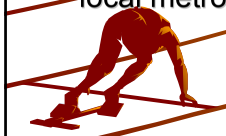
- **Fuel Dispensers: 8000 units**
- **Gasoline Station: 2659**

Reference:

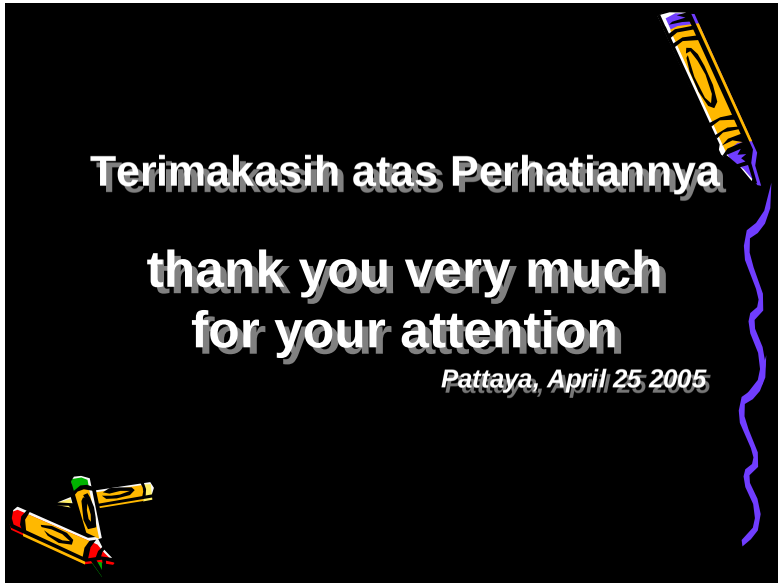
- OIML R 117: Measuring systems for liquids other than water
- OIML R 118: Testing procedures and test report format for pattern evaluation of fuel dispensers for motor vehicles
- Ministerial Decree No. 61/MPP/kep/2/1998 concerning Type Approval of Measuring Instruments
- Director of Metrology Decree concerning Technical Regulation of measuring system for liquids other than water

Future steps:

- fully Implement R117 & R118
- to spread achievement of the training course on fuel dispensers
- to held TOVO (objective: verification officer at local metrology)



Purpose: to make a same language in procedure and method of verification


Terimakasih atas Perhatiannya
thank you very much
for your attention
Pattaya, April 25 2005

Brief Introduction about Legal Metrology on Fuel Dispensers in Japan

by Tsuyoshi Matsumoto, NMIJ

NMIJ (National Metrology Institute of Japan):

Has a long history more than 100 years. It was called as NRLM. Semi-privatized in 2001.

Belongs to AIST (National Institute of Advanced Industrial Science and Technology) which is an research institute independent from the government.

Total 2,500 permanent staffs in AIST and 300 in NMIJ. Two sites in Tsukuba and Osaka.

In charge of all measurement standards including physical, chemical and material standards and related scientific research activities.

Also responsible of legal metrology mainly in type approval and calibration & testing of verification standards.
(Verifications => Local Gov.)

Target Fuel Dispensers in Legal Metrology:

Dispensers used for automobiles, motorcycles and small boats with an diameter less than 50 mm.

Mobile dispensers carried on a truck.

Dispensers installed in an apartment or building to deliver fuel for heating, cooking, etc. to each resident.

Dispensers used for fuels with viscosity more than 0.1 Pa·s, and those used in the temperature range below -20ºC or over 50ºC may be used without a verification mark.

Verification Interval:
7 Years for dispensers used in gas stations.
5 Years for dispensers used in a factory or a plant.

Roles of NMIJ and Other Authorities:
NMIJ is in charge of type approval of all fuel dispensers and the testing and/or calibration of verification standards (standard tanks, etc.).

Local governments and designated verification bodies are in charge of periodical verification and Inspection of all fuel dispensers in service.

Fuel Dispensers for LPG:

Target Dispensers in Legal Metrology:
LPG dispensers used for taxies and chauffeur-driven cars with a diameter less than 40 mm and which has a capability to refill LPG cylinders.

Verification Interval:
4 Years for all target LPG dispensers.

JICA Training course 2003

Evaluation of the performance of a flow meter

- An evaluation examination and practical skill of fuel dispenser
- Proofreading of a master tank

2003 / 7 / 10 Legal flow metrology section

OIML certificate system (Japan)

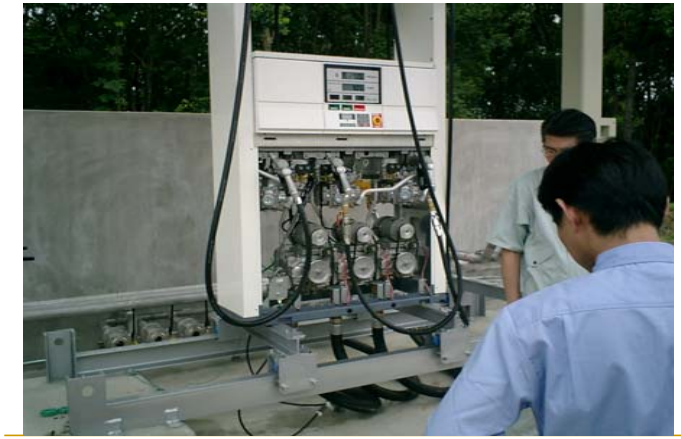
- R 76-1 (1992) & R 76-2 (1993)
  Non automatic weighing instruments

- R 117 (1995) [+ R 118 (1995)]
  Fuel Dispenser For Motor Vehicles

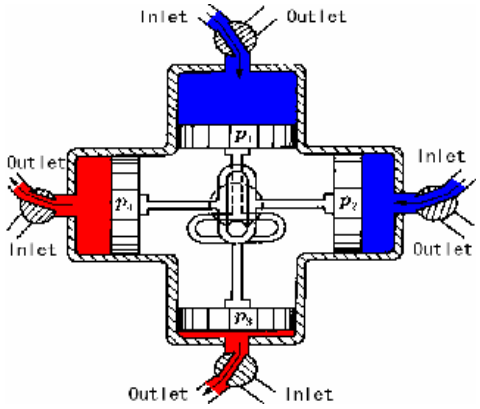
Gas station

Gas station

The inside of a dispenser



Principle of the 4 piston meter



Test items

1. Accuracy
2. Minimum measured quantity
3. Flow interruption
4. Gas elimination device
5. Variation in the internal volume of hose
6. Endurance test
7. Additional testing procedures for electronic dispensers

Test items

1. Accuracy

- **Object of the test:**
  To verify that each measurement result at each flowrate meets the requirements concerning the maximum permissible errors.
- **Test method:**
  $Q=K^{(NF-1)}\ Qmax$
  $K=(Qmin/Qmax)^{1/(NF-1)}$
  The test shall be performed 3times at each flowrate.
  The test volume shall be at least the volume delivered in one minute at Q.

Test items

1. Accuracy

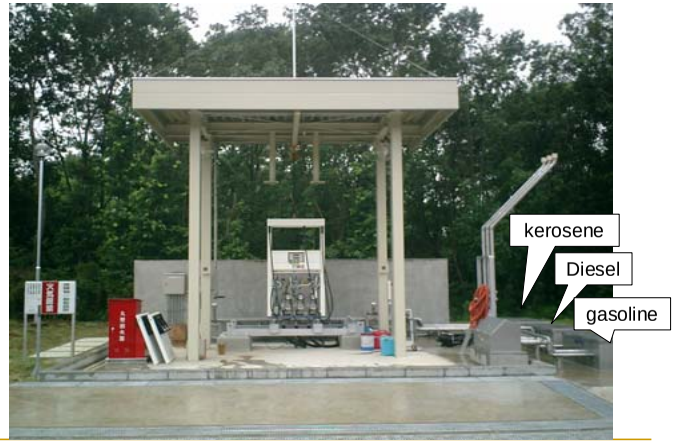
when Qmax / Qmin = 10 ,
Q(1) = 1.00 × Qmax
Q(2) = 0.63 × Qmax
Q(3) = 0.40 × Qmax
Q(4) = 0.25 × Qmax
Q(5) = 0.16 × Qmax
Q(6) = 0.10 × Qmax = Qmin

Master Tank

Equipment

The situation of carrying in

The situation of installation



The situation of inspection (Accuracy)

Test items

1. Accuracy
2. Minimum measured quantity
3. Flow interruption
4. Gas elimination device
5. Variation in the internal volume of hose
6. Endurance test
7. Additional testing procedures for electronic dispensers

Test items

2. Minimum measured quantity

- **Object of the test:**

  To determine the error of volume indication when the dispenser delivers the minimum measured quantity.

- **Test method:**

  Qmin ・・・

  Highest flowrate attainable ・・・ 3 times

The situation of inspection (Minimum measured quantity)

Test items

1. Accuracy
2. Minimum measured quantity
3. Flow interruption
4. Gas elimination device
5. Variation in the internal volume of hose
6. Endurance test
7. Additional testing procedures for electronic dispensers

Test items

3.Flow interruption

- **Object of the test:**
  To determine the effect of sudden pressure variations on the accuracy of the volume and price indications.
- **Test method:**
  Qmax･･･3times
  The liquid flow is started and stopped abruptly 5 times.

The situation of inspection (Flow interruption)

Test items

1. Accuracy
2. Minimum measured quantity
3. Flow interruption
4. Gas elimination device
5. Variation in the internal volume of hose
6. Endurance test
7. Additional testing procedures for electronic dispensers

Test items

4. Gas elimination device

- **Object of the test:**
  To determine the efficiency of the gas elimination device.
- **Test method:**

Viscosity	Entry of air
≦ 1mPa･s	0～20%
＞ 1mPa･s	0～10%

Equipment (Gas elimination device)

Test items

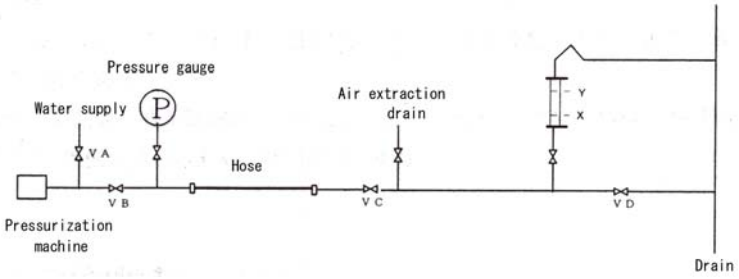
1. Accuracy
2. Minimum measured quantity
3. Flow interruption
4. Gas elimination device
5. Variation in the internal volume of hose
6. Endurance test
7. Additional testing procedures for electronic dispensers

Test items

5. Variation in the internal volume of hose

- **Object of the test:**
  To determine the increase in internal volume of a hose under pressure.
- **Test method:**

Equipment (Variation in the internal volume of hose)



Test items

1. Accuracy
2. Minimum measured quantity
3. Flow interruption
4. Gas elimination device
5. Variation in the internal volume of hose
6. Endurance test
7. Additional testing procedures for electronic dispensers

Test items

6. Endurance test

- **Object of the test:**

  To determine the long term stability of the dispenser.

- **Test method:**

  100 hours

  Qmax × 0.8 ～ Qmax

Equipment (Endurance)

Test items

1. Accuracy
2. Minimum measured quantity
3. Flow interruption
4. Gas elimination device
5. Variation in the internal volume of hose
6. Endurance test
7. Additional testing procedures for electronic dispensers

Additional testing procedures for electronic dispensers

1. Dry heat
2. Cold
3. Damp heat, cyclic (condensing)
4. Power voltage variations
5. Short-time power reductions (Disturbance)
6. Electrical bursts
7. Electrostatic discharges (Disturbance)
8. Electromagnetic susceptibility

Equipment (Dry heat,Cold,Damp heat)

Additional testing procedures for electronic dispensers

1. Dry heat
2. Cold
3. Damp heat, cyclic (condensing)
4. Power voltage variations
5. Short-time power reductions (Disturbance)
6. Electrical bursts
7. Electrostatic discharges (Disturbance)
8. Electromagnetic susceptibility

Equipment (Power voltage variations)

Additional testing procedures for electronic dispensers

1. Dry heat
2. Cold
3. Damp heat, cyclic (condensing)
4. Power voltage variations
5. Short-time power reductions (Disturbance)
6. Electrical bursts
7. Electrostatic discharges (Disturbance)
8. Electromagnetic susceptibility

Equipment (Short-time power reductions)

Additional testing procedures for electronic dispensers

1. Dry heat
2. Cold
3. Damp heat, cyclic (condensing)
4. Power voltage variations
5. Short-time power reductions (Disturbance)
6. Electrical bursts
7. Electrostatic discharges (Disturbance)
8. Electromagnetic susceptibility

Equipment (Electrical bursts)

Additional testing procedures for electronic dispensers

1. Dry heat
2. Cold
3. Damp heat, cyclic (condensing)
4. Power voltage variations
5. Short-time power reductions (Disturbance)
6. Electrical bursts
7. Electrostatic discharges (Disturbance)
8. Electromagnetic susceptibility

Equipment (Electrostatic discharges)

Additional testing procedures for electronic dispensers

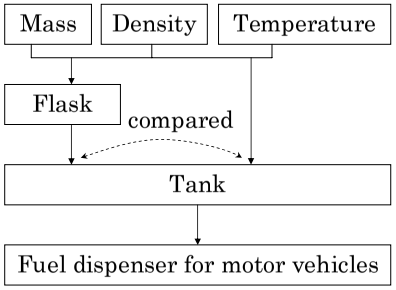
1. Dry heat
2. Cold
3. Damp heat, cyclic (condensing)
4. Power voltage variations
5. Short-time power reductions (Disturbance)
6. Electrical bursts
7. Electrostatic discharges (Disturbance)
8. Electromagnetic susceptibility

Equipment (Electromagnetic susceptibility)

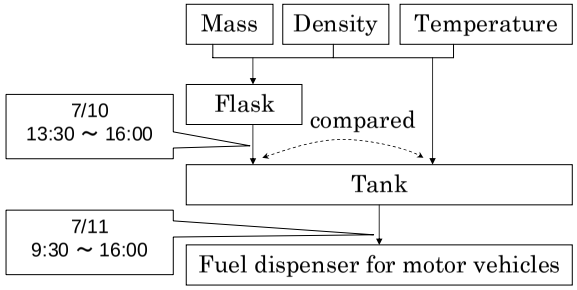
Test items

1. Accuracy
2. Minimum measured quantity
3. Flow interruption
4. Gas elimination device
5. Variation in the internal volume of hose
6. Endurance test
7. Additional testing procedures for electronic dispensers

The proofreading method of fuel dispenser

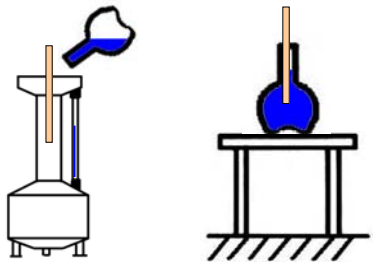


The proofreading method of fuel dispenser



Flask

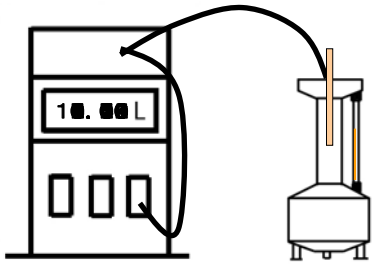
Tank



10 L Tank　　5 L Flask

Tank

Fuel dispenser for motor vehicles



Dispenser　　10 L Tank

Test sheet (Flask – Tank : The comparison method)

VQs	VQs-Es	ts	tm
10.0000	10.0066	22.1	22.2

α (ts-4)/72000	① α (tm-ts)	② β s(ts-T)	③ β m(T-tm)	④ 1+①+②+③	Q (VQs-Es)×④
0.000251	**0.000025**	**0.000178**	**-0.000346**	**0.999857**	**10.0052**

I = _____ L　　E = I – Q = _____ - _____ = _____ L

Accuracy

Test measures used: _____ L　　β : 0.000048　　Reference temperature: 15 ℃

Q(1)	Vi	Vn	T	β (15-T)	Ev	mpe
L/min	L	L	℃	%	%	%
9	10.12	10.084	29.1	-0.07	0.29	± 0.5

The end

(M P I)
Korea Machinery-Meter ,Metrochemical testing and

Reserch institute

Ho young park
Korea Republic

Verification of fuel dispensers in south korea

1.Verification method
2.How to Seal for verification
3.How to measure by volume and mass
4. How to maintain traceability and standard
5. Implemented in accordance with R117

1. Verification method in korea

1)comparing test with more accuracy instrument and standard tank by cubic mass.
2)measuring a hose length from inlet to outlet (because of gravitation or friction resistance from overflow type and underflow type)
3)checking measured quantity with standard tank and than measuring LPG temperature because of volume expansion in respect with weather and season.
4)permissible error is +0.5% and –0.5% and we try to set up Zero point if possible after verification
5)verification for flowrate is twice method
Qmax and Qmin

2.How to Seal for verification

1) All fuel dispensers that pass verification will be lead-sealed with wire
(we think it is possible for lead-sealed to contaminate environment so we will find other way instead of lead-sealed)
Lead-sealed is marked month and year
2)validity period for verification is 2 year

3.How to measure by volume and mass

1)Volume is conversed with mass for fuel dispenser with temperature and humidity correction if it is not accuracy.

2)Density value for oil of fuel dispenser is applied for mass calculation.

3)Mathematical or physical formula is used to mass conversion.

4)Air separation device from fuel dispenser is set up to measure more accuracy.

4.how to maintain a traceability and standard

1) certification for error is given on fuel dispenser and standard measure tank to maintain traceability and standard

2)expansion coefficient for petroleum and gasoline and diesel are applied for fuel dispensers

5.Our step to be implemented in accordance with R117

1)our standard for dispenser is not OIML R117 but KS (korea stand) now

2)we are accessing to OIML R117 regulation and following it

3)our institute will implement pattern approver for R 117

Thank you

“ Training courses on Fuel Dispensers Pumps
in PATTAYA ,Thailand April 25 to May 5 , 2005 ”

Country Report on Fuel Dispensers Activities in Lao PDR

Presented: By Mr. Kadingthong Singdala
Metrology Division
Department of Intellectual Property, Standardization and Metrology(DISM),
Science, Technology and Environment Agency(STEA).

Chairman.
Distinguished Ladies and Gentlemen,

On behalf of Lao PDR, I'm very pleased to be here with you to present some information on the activities for the Metrology Management in Lao PDR

I would like to express my sincere thank to all of the organizers for assisting and providing us the opportunity to participate in the Training Course on Fuel Dispenser in PATTAYA Thailand.

I. Basic Country Data.

The Lao People's Democratic Republic (Lao. PDR) is a land-locked and mountainous country which borders China to the north, Cambodia to the south, Vietnam to the east, Thailand to the west and Myanmar to the northwest.

Lao PDR has a total area of 232,800 square kilometers with a population of 5 million (1998), and its capital is Vientiane. The Lao PDR was established on December 2,1975.

The climate is tropical and dominated by the southwest monsoon which brings high rainfall, high humidity and high temperatures between mid-April and mid October. While over 70% of the rain falls during wet season, the climate is characterized by high inter-annual variability with relatively frequent occurrence of flooding and drought. Average temperatures ranges around $20^{\bullet c}$ in the mountainous areas and on the highland plateaus to $25^{\bullet c}$ - $27^{\bullet c}$ in the plain. Gross Domestic product (GDP) per capita: US$ 380 (1997).

Trade and Current Account Balance Deficits:

While imports have been increasing with growth, exports have been subject to fluctuations caused by variations in world prices (fuel or coffee for example). Export policy is generally given more attention than import policy, although the value of import is two or three times the value of exports. Exports are mainly of garments, electricity, timber, wood products, coffee, cardamom, mining output, and forestry and agriculture products. Imported food have generally declined, but imported factory raw materials, and vehicles, agricultural equipment and machinery have increased. Raw materials make up 63% of all imports. The biggest import drain on hard currency in 1999 was fuel, costing US$ 70 million. Vehicles, machinery, raw materials, garments, construction materials, pharmaceutical products and food followed this.

Up to now, the imported goods except drug and food are not controlled and inspected by any concerned bodies yet.

II. The Present Status And Problems on the activities of Fuel Dispenser in Lao. PDR.

- **Organizational Chart of DISM (see annex1).**
- **Organizational Chart of Metrology Division (MD) (see annex2).**

Department of Intellectual Property, Standardization and Metrology (DISM) under Science Technology and Environment Agency (STEA) are a National Standards Body (NSB) and a Government Body. The DISM was established in 1993 under STEA, which advises and manage the issues of intellectual property, standardization and metrology management for the whole republic.

The main priority task of DISM is to improve standards and quality awareness in all economic sectors as to:

- Prepare plans, law, rules and regulation on QSTM and submit them to the higher authorities for approval;

practices of these matters. Lao PDR likes some others least developed countries in the region lacked of the basics knowledge both in Legal metrology and physical metrology, therefore to implement any requirements, regulations or even in the practice we always meet the constraints such as budget limited, lack of fundamental equipments to run the control and the inspection for testing of measuring instruments and calibrating standards (Mass, Volume,..)

Finally on behalf of myself, I would like to express my sincere thank the government of Japan particularly National Institute Metrology of Japan who has supported me to this meaningful training course and particularly all of organizers who has always contacted and facilitated me before and during the training course. And of courses those who I can not forget it are all of my colleagues participants in this training courses who always assisted and gave me their experiences.

Thank you for your patience attention.

- Organize the supervision and central on the implementation of the approved law, rules and regulations;
- Establish organization system on QSTM and provide methodological guidance for all activities of the above system;
- Organize formulation of national standards and maintain national metrology standards;
- Provide and implement quality system and product certifications, testing and calibration, verification of metrology equipment and laboratory accreditation. Implement the supervision and inspection on quality of goods and products and measuring instrument;
- Conduct studies on QSTM;
- Improve the technical level of employees, training and cooperate with regional and international organizations in the field of QSTM management.

The local management agency (Provincial and Municipal level) has the role in activities regarding QSTM matters as well as central activities but according to the recommendation of the central management agency.

Legislation :

In order to ensure and strengthen administration of QSTM matters, Lao PDR has promulgated some necessary legislation relating to the standardization, quality and testing metrology management are followings:

- Decree on Metrology Management issued by the Prime Minister in October 26,1993.
- Regulation on Registration of Measurement Instruments (No 233/STEA. March 10,1994).
- Guidelines on Registration and Testing of fuel Dispenser(February 07,2001).
- Regulation on Prepackages goods (Drafted)
- Regulation on Fuel Truck Tank registration (Drafted)

However, all legislation mentioned above are relating with some activities of the management only, but still absence of the right inspection and testing system with Legal Metrology conformance.

Fuel Dispensers Activities in Lao .PDR:

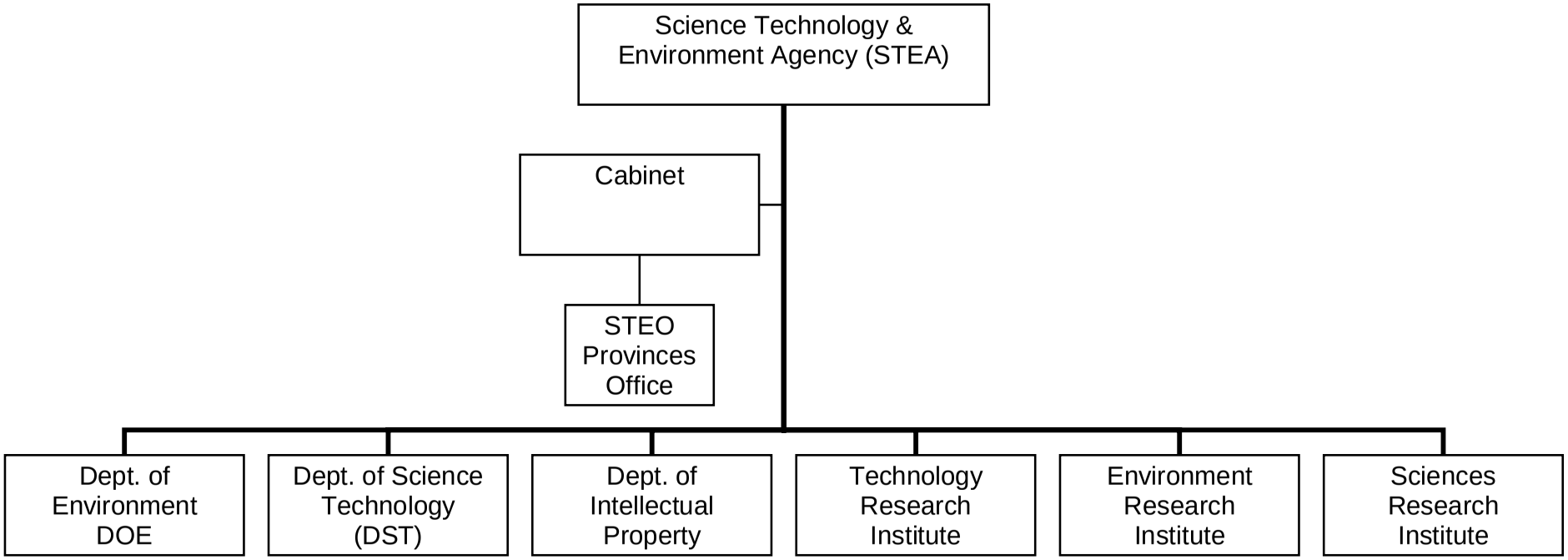
Based to Decree on Metrology Management issued by the Prime Minister in October 26, 1993 and the Regulation on Registration of Measurement Instruments (No 233/STEA. March 10, 1994), all of measuring instruments in the country should be registered in the office of the Science Technology and Environment Agency (STEA) .therefore regarding the fuel dispenser pumps, the individual or the companies who deal with them shall be registered with the department of Intellectual Property Standardization and Metrology(DISM) as well as the Science Technology and Environment Agency Office in the whole country. Currently they have five main Fuel companies which deal with Fuel Dispenser Pumps namely Lao State Fuel Company, Lao Fuel Vientiane, Houa kong Trade, Shell and Caltex. The total numbers of Fuel Gas Station in Lao is around 833 stations which it has 3 to 6 fuel dispenser pumps per station. All of the companies mentioned above have to bring their vessels to STEA Office for the calibration and will serve for testing and checking their fuel dispenser pumps themselves when they needed.

And concerning the method for calibrating the fuel dispenser and due to we lack of an appropriated instrument so we have used the volumetrically method and with the tolerance of 0.5%.

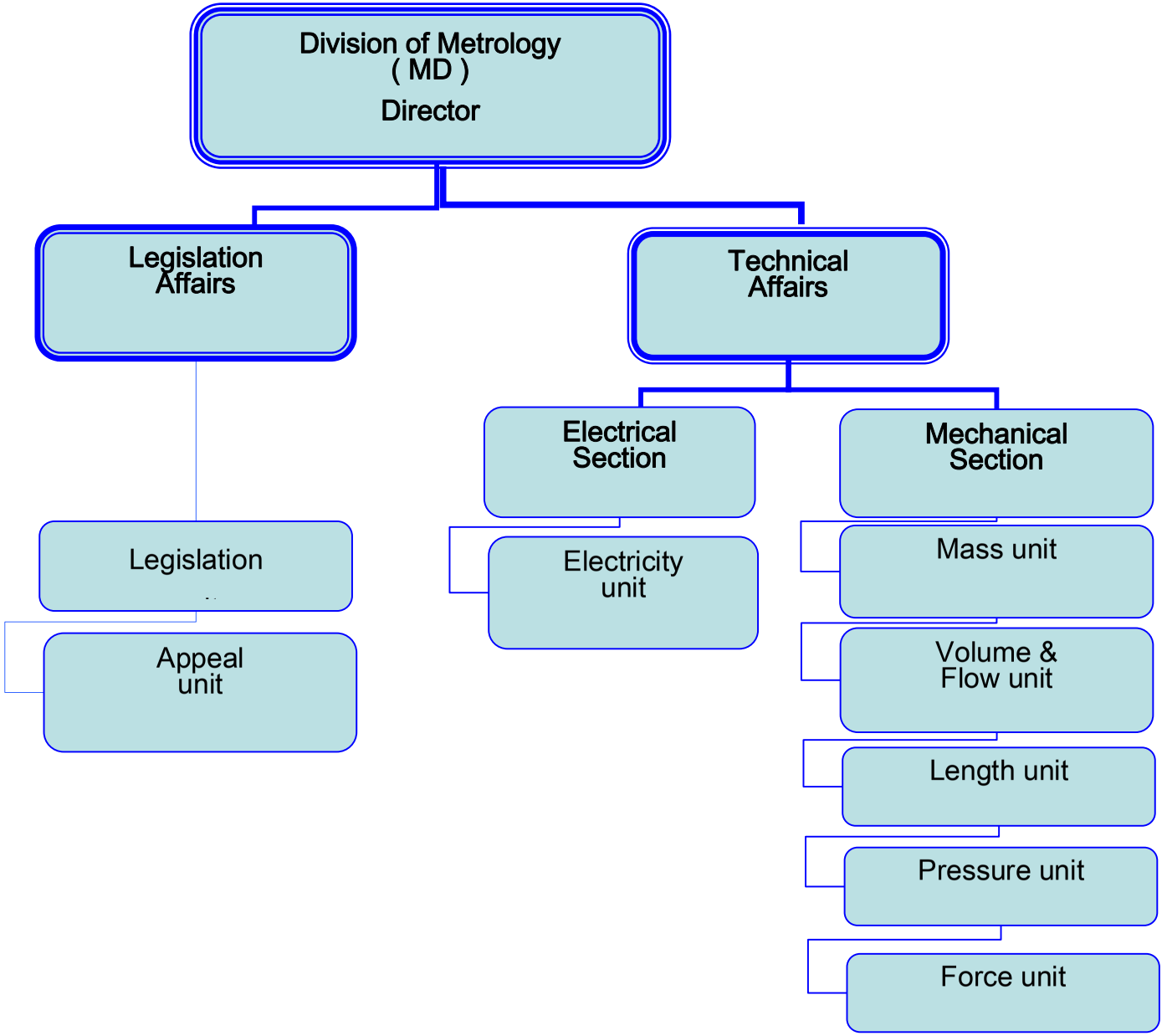
Therefore, the participation to this training course will be very important for me to get and share experiences from participant’s countries particularly from the lecturers and the colleagues participants from the developing countries who got a lot of experiences and

Annex I

Science Technology & Environment Agency Chart



Annex II
Metrology
Division
Chart



VERIFICATION OF FUEL DISPENSERS
IN MALAYSIA

A. PETROL DISPENSERS

B. LPG DISPENSERS

BY

MOHD ISMAIL BIN MD YUNUS
MINISTRY OF DOMESTIC TRADE
AND CONSUMER AFFAIRS, MALAYSIA

PETROL DISPENSERS

1. SECTION 14 OF WEIGHTS AND MEASURES ACT
   (MANDATORY VERIFICATION AND ANNUAL REVERIFICATION)

2. DISPENSERS MUST BE TYPE APPROVED BY NATIONAL METROLOGY LABORATORY (NML)

3. VOLUMETRIC METHOD
   MEASURED VOLUME AGAINST VOLUMETRIC STANDARD MEASURING CAN (FIELD STANDARD TEST MEASURES)
   5L, 10L, 20 L

4. TEST FOR PRICE AGAINST VOLUME DELIVERED

5. 3 RUN FOR EACH VOLUME

6. LIMIT OF ERROR:

   POSITIVE: 5ML PER LITRE

   NEGATIVE: 2.5 ML PER LITRE

7. ISSUE VERIFICATION CERTIFICATE
   SEAL THE PUMP
   STICK SECURITY LABEL AND VERIFICATION PLATE

8. TEST RESULTS MUST BE RECORDED IN VERIFICATION FORM

9. DISPENSER MUST BE REVERIFIED IF SEAL IS BROKEN
   (REPAIR OR RELOCATION) BEFORE ANNUAL REVERIFICATION

LPG DISPENSERS

1. SECTION 14 OF WEIGHTS AND MEASURES ACT
   (MANDATORY VERIFICATION AND ANNUAL REVERIFICATION)

2. DISPENSERS MUST BE TYPE APPROVED BY NATIONAL METROLOGY LABORATORY (NML)

3. VOLUMETRIC METHOD
   MEASURED VOLUME AGAINST STANDARD MASTER METER
   NORMAL VOLUME PURCHASED BY CUSTOMERS

4. TEST FOR PRICE AGAINST VOLUME DELIVERED

5. 5 RUNS AT A CONSTANT FLOWRATE

6. LIMIT OF ERROR: VOLUME INDICATION

   REPEATABILITY : + / - 0.5 %

   LINEARITY : + / - 1 %

7. ISSUE VERIFICATION CERTIFICATE
   SEAL THE PUMP
   STICK SECURITY LABEL AND VERIFICATION PLATE

8. TEST RESULTS MUST BE RECORDED IN VERIFICATION FORM

9. DISPENSER MUST BE REVERIFIED IF SEAL IS BROKEN
   (REPAIR OR RELOCATION) BEFORE ANNUAL REVERIFICATION

TECHNICAL SPECIFICATIONS
VOLUMETRIC STANDARD MEASURING CAN
CAPACITY 5, 10, AND 20 liter

1. It shall be made of stainless steel of thickness 1.5-2 mm and cylindrical in shape. The interior surface shall be corrosion resistant

2. It shall be made of single wall body and provided with reinforced bands Any horizontal cross section shall be circular and the shape of the standard measuring can shall permit complete draining.

3. It shall be provided with a base circumferential rim to prevent damage or denting to the can bottom

4. It shall be provided with a handle at the top neck for easy carrying.

5. The standard measuring can, shall be equipped with a gauge glass mounted on the side of the top neck. The glass shall be defect free and of borosilicate.

5. The standard measuring can, shall be equipped with a gauge glass mounted on the side of the top neck. The glass shall be defect free and of borosilicate.

6. The parallel scale plate shall be provided on the gauge glass assembly. The scale plate shall be made of stainless steel and mounted at a tangent to the front of the gauge glass.

7. The scale plates shall be marked in milliliters (ml). The scale plates shall be graduated in 5 ml interval to :-
   - 7.1 +/- 25 ml from the zero level for 5 liter can
   - 7.2 +/- 50 ml from the zero level for 10 liter can
   - 7.3 +/- 100 ml from the zero level for 20 liter can

8. The graduation lines, number and other inscriptions on the scale plate shall be permanent. Graduation lines shall be of uniform width. The width of the lines shall not be more than 0.4 mm.

   The major lines (numbered) shall be at least 10mm in length. Intermediate lines shall be at least 5 mm in length. The major and intermediate lines shall extend to the edge of the scale plate adjacent to the gauge glass. The zero line shall extend completely across the plate.

9. The scale holders or bracket shall be provided with two adjusting rods one of which shall be provided with means for sealing to prevent movement.

10. Each standard measuring can, shall be packed in suitable protective wooden box. The box shall be provided with handles made of metal or leather and a lock. Each box shall be provided with a pad lock.

11. A certificate of calibration issued by the Custodian of Weights and Measures Malaysia shall be provided for each can and be submitted together at the time of delivery.


7 ProJET
24 4 2005

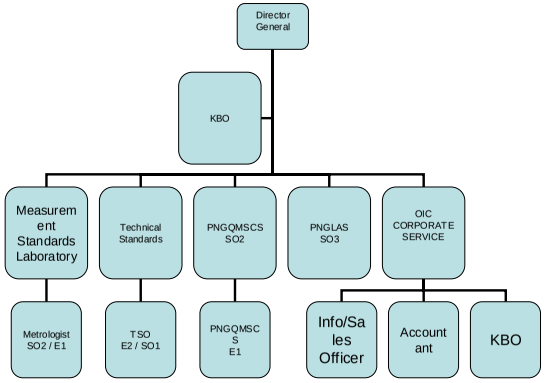

24 4 2005

PAPUA NEW GUINEA NATIONAL INSTITUTE OF STANDARDS & INDUSTRIAL TECHNOLOGY (NISIT)

NISIT in Brief

- An Act Passed By Parliament in 1993 known as the NISIT Act 1993
- Measurement Standards Laboratory (MSL) – department in NISIT
  - Calibration and verification activities
  - Custodian of PNG National Physical Measurement Standards

The NISIT Structure



Trade Measurement Inspector

Independent Consumer & Competition Commission (Regulator)
- Consumer Protection Body

Regulate under:

✓Trade Measurement Act Regulation
✓Packaging Act Regulation
✓Bread Act Regulation

Under the Trade and Measurement Act:

Deals with Weights and Measures for Trade use

Role of Trade Measurement Inspector

- Trade Measurement Inspectors' check and verify all measuring equipment that are used for trade.
- Inspectors are approved by the government to inspect and conduct verification of fuel dispensers.
- A verification check is scheduled every twelve months at service stations and on vehicle tankers.

Verification procedures for fuel dispensers

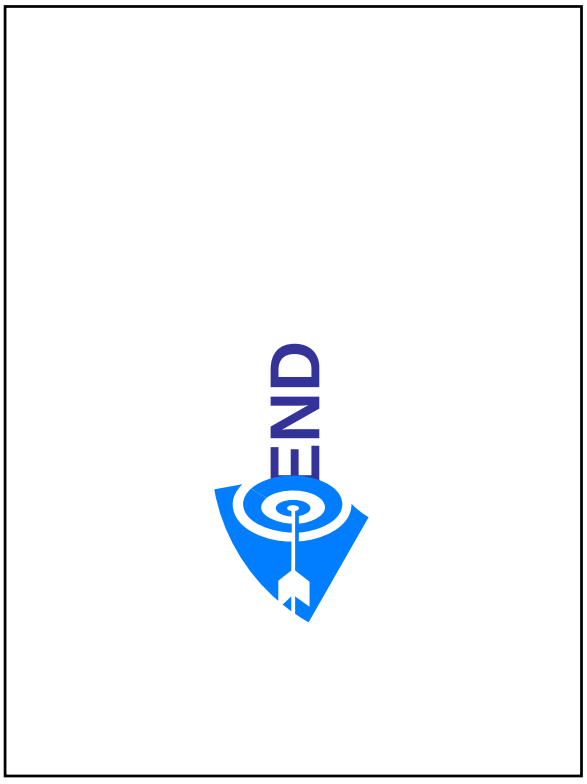
- Preparation for testing
  - General safety requirements
- Visual inspection
  - Externally
  - Internally
- Functional tests
- Performance tests

NISIT & ICCC

- An MOU was signed between NISIT and ICCC on March 21st 2005.
  - Share resources
  - Technical assistance
  - Technical training and advice
  - Empowered to carry out inspectors' task

Way Forward

- NISIT hopes to gain from this training:
  - Update on verification procedures of fuel dispensers
  - Disseminate verification procedures through training programs to regulators (ICCC) and others involved
  - To support ICCC through provision of Fuel Dispenser verification service


END

TRAINING COURSE ON FUEL DISPENSERS
PATTAYA, THAILAND

- COUNTRY: PERU
- ORGANIZATION: INDECOPI - NATIONAL METROLOGY SERVICE
- TRAINEE: Abed Morales.

LOCATION

PERU IS PART OF LATIN AMERICA.

IT IS LOCATED IN THE CENTRAL AND OCCIDENTAL PART OF SOUTH AMERICA

Peru is the land of the famous old INCAS Empire

INFORMATION

- Country (long form) Republic of Peru
- Capital Lima
- Total Area 1 285 220,00 square kilometers
- Population 27 483 864 (July 2001 est.)
- Languages Spanish (official), Quechua (official), Aymara
- Religions Christians (Catholic and anothers) 99 %
- Government Type Constitutional Republic
- Currency 1 Nuevo Sol (S/.) = 0,30 US$
- Industry mining of metals, petroleum, fishing, textiles, clothing, food processing, cement, steel, metal fabrication
- Agriculture coffee, cotton, sugarcane, rice, wheat, potatoes, coca; poultry, beef, dairy products
- Peru has the biggest biodiversity of the world
- Natural Resources copper, silver, gold, petroleum, wood, fish and others

INDECOPI - NATIONAL METROLOGY SERVICE (SNM)

Address:

Calle De la Prosa 138

San Borja. Lima - PERU

Tel. (51-1) 2247800 Ext 1331

Fax. (51-1) 2247800 Ext 1264

http://www.indecopi.gob.pe

Current Situation about Verification of Dispensers in PERU

What organization(s) regulate the measurement of Fuel in Peru?

The Ministry of Energy and Mines through the Hydrocarbons General Direction.

Current Situation about Verification of Dispensers in PERU

What are the legal units of measure for the scale of volume in Peru?

The legal units of measure for the scale of volume in Peru is the cubic meter, and its submultiples like the Liter. The International System of Units is adopted.
However, in petroleum industry, even now the "US Gallon" is used .

Current Situation about Verification of Dispensers in PERU

Is the verification testing of dispenser required? What organization performs this?

Yes. The regulating institution is named OSINERG . They perform the verification of non-LPG dispensers only, using equipments calibrated in the National Metrology Service, INDECOPI.

Current Situation about Verification of Dispensers in PERU

What is the standard measurement instrument and the standard method used for the verification?

A standard volumetric measure of 5 gallons, class 0,1 is used. The method is volumetric in accordance to the National Metrological Standard NMP 008:1999 (based in OIML R117-95) elaborated and published by INDECOPI.

Current Situation about Verification of Dispensers in PERU

Why not the LPG dispensers are verified?

While there are more than 1000 non-LPG stations in the country, there are less than 20 LPG stations recently installed.
We don´t know the method and the equipment requirements for the implementation of the measuring system.

What we hope of this Training Course?

- We hope to learn the methods, equipement requirements (including providers if it´s possible), for a good verification of dispensers. Specialy, the verification of LPG dispensers.
- We want performing the implementation of verification system of LPG dispensers in the next months.

Thank you!

- Abed Morales Q.
- INDECOPI - PERU
- amorales@indecopi.gob.pe

NATIONAL METROLOGY LABORATORY PHILIPPINES

CALIBRATION AND SEALING OF DISPENSING PUMPS

Jordan B. Damian

Calibration and Sealing

- All dispensing pumps in petroleum retail outlets
- Once every 60 days by authorized calibration entity
- Uncalibrated and no sealed pumps should marked by owner or operator "OUT OF ORDER" until it has been sealed and calibrated by the said entity

Authorized Calibrating Entity

- Municipal or city treasurer of an LGU
- * DOST – ITDI
- * other government agency
- * oil company

* In their absence or incapacity of the previous entity/ies

Documentation

- All calibration are signed by the authorized person who carried-out calibration
- Countersigned petroleum retail outlet owner or operator or supervisor.
- Petroleum retail outlets are given a copy of this certificate for filing.

Proof of Calibration

- A duly signed stickers are posted by the authorized calibration person to the face of the pumps he/she calibrated.
- Failure of the petroleum retail outlet to have his/her dispensing pumps calibrated and sealed shall constitute “ILLEGAL TRADING”.

Calibrating Bucket

- Petroleum retail outlets are obliged by law to maintain a DOST-ITDI calibrated and sealed calibrating bucket for their use in a daily checking of all their pumps.
- Calibrating bucket must be calibrated and sealed once every 12 months

Internal Pump Checking

- All dispensing pumps of the petroleum retain outlet are daily tested at a time not later than 9:00 am for accuracy in delivering the correct quantity using the calibrating bucket.
- Any dispensing pump not delivering the correct quantity are marked by the owner or operator as “OUT OF ORDER” and are padlock until it has been recalibrated and resealed by the proper authority.

Internal Pump Checking

- Records of daily testing and checking of all dispensing pumps are properly documented and filed in their outlet
- These records are to be presented to the OIMB inspectors and public upon demand
- Failure to provide these records give rise to the presumption that the dispensing pump is “UNDELIVERING”.

Undelivery

- Volume delivered by the dispensing pump shall not be less than the actual quantity by more than 50 milliliter for every 10 liter calibrating bucket
- The calibrating bucket is filled to the 10 liter mark 3 times at low, medium and fast flowrates and the average quantity delivered by the pump is the quantity to be compared with the test quantity of 10 liters.

Undelivery

- Dispensing pumps delivering less than the minimum quantity allowed are “UNDELIVERING”
- Absence of “OUT OF ORDER” sign or padlock locking are deemed an actual use of the pump for the conduct of retailing
- Dispensing pump with broken or nor seal are also considered “UNDELIVERING”

THANK YOU FOR LISTENING!!!

Weights and Measures Programme

by
Adrian Ang
Weights and Measures Office
SPRING Singapore

Weights and Measures Programme

- Introduction
- Objectives
- Organization Chart
- Standards
- Activities
- Verification of fuel dispensers
- Requirements
- Pre-verification
- Preparation for verification
- Actual verification
- Sealing

Introduction

- Weights and Measures Office(WMO)- authority for legal metrology
- Metric system with the exception of Chinese unit (tahils)- for trading in Chinese herbs/ medicines

Objectives

- To ensure uniform and accurate system of weights and measures used in Singapore
- Protecting consumers and traders

Organization Chart

SPRING

(**S**tandards, **PR**oductivity & **IN**novation Board)

QUALITY & STANDARDS GROUP

CONSUMER PRODUCT SAFETY & WEIGHTS & MEASURES DIVISION

WEIGHTS & MEASURES OFFICE

- 2 MANAGERS
- 3 INSPECTORS
- 1 ADMIN SUPPORT

Standards

- National standards- National Metrology Centre
- Secondary to working standards- WMO

Activities

- Licensing
- Registration of instruments
- Training
- Inspection/ spot-checks
- Investigation
- Education
- Verification of instruments
  - Flowmeters
  - Liquid capacity measures
  - Linear measures
  - Non-automatic weighing instruments
  - Fuel dispensers

Verification of fuel dispensers

Types of fuel

- Petrol
  - Private cars, motorcycles, vans
  - Commercial goods vehicles
- Diesel
  - Commercial goods vehicles, i.e. lorries, vans, etc.
  - Taxis
  - Public transportation, i.e. buses, vans, etc.

Breakdown

- 5 oil companies
- 217 petrol stations

Requirements

- Re-verification period
  - 5 years
  - > mpe
- Maximum Permissible Errors
  - Initial & subsequent verification
    - 0% to +0.6%
  - In-service inspection
    - -0.3% to +1.2%

Pre-verification

- Break seal
- Service/ repairs/ adjustments
- Locking of dispenser
- Ready for actual verification

Preparation for verification

Required equipment

- Reference Standards
  - Seraphin tank
- Measuring cylinder
- Safety equipment
- Evaluation report

Actual verification

Following are carried out during actual verification:

- Pre-delivery requirement
  - Visual inspection
- Accuracy test
  - 3 runs
- Functional tests (concurrently)
  - Nozzle cut off
  - Interlocks
  - Hose dilation
  - Price computing
- Results

Sealing

- **Sealing devices & stamping plate**
  - Sealing carried out by means of wire and lead seals
  - Stamping plate bearing the letter 'RS' with the verification number affixed.

RS A1234567

THANK YOU

WMO Posters & Advertisement

Accuracy Label

Introduced on 1 April 2004

Legal Metrology in Chinese Taipei

Lin,Ching-Hsien

Bureau of Standards, Metrology and Inspection (BSMI)

Ministry of Economic Affairs (MOEA)

NATIONAL AUTHORITY FOR LEGAL METROLOGY

- The BSMI is the regulatory authority for legal metrology in Chinese Taipei.
- To maintain an effective national metrology system and to facilitate trade.

The main governed matter of BSMI in the field of legal metrology

- **Establishment, Maintenance and Dissemination of National Measurement Standards**
- **Type Approval of Legal Measuring Instruments**
- **Verification and Inspection of Legal Measuring Instruments**
- **Management of Measuring Instruments Enterprises**
- **Harmonization of Measurement Units**

Type approval of legal measuring instruments

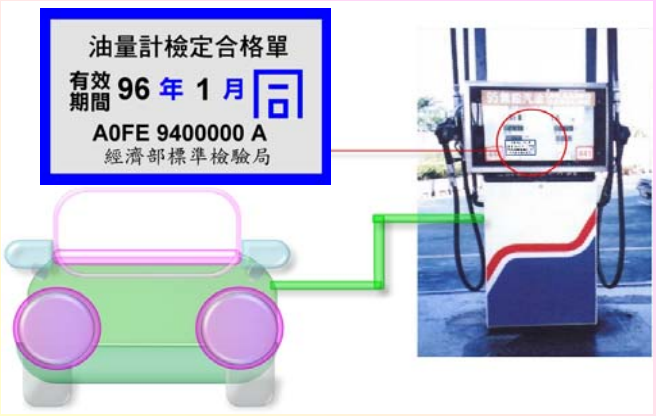
The Ministry of Economic Affairs has currently announced that **taximeters**, **water meters**, **lux meters**, **electronic scales** and **diaphragm gas meters** are subject to type approval.

Verification and inspection of legal measuring instruments

- Taxi Meters
- Weighing instruments
- Liquid column pressure meters (including sphygmomanometers)
- Volumeters(metal measuring pails and measuring tanks , Diaphragm gas meters , Water meters , Fuel dispensers , LPG flow meters)
- Milk hydrometers
- Watthour meters
- Sound level meters
- Concentration meters (including the breath alcohol testers and analyzers, rice moisture meters and vehicle exhausts emissions analyzers)
- Lux meters
- Mercury clinical thermometers
- Radar speedometers

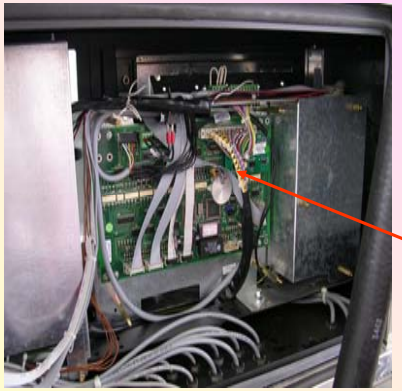
Qualified verification label of fuel dispensers

All fuel dispensers that pass verification will be lead-sealed with the logo “同” and attached with a conformity sticker.



A conformity sticker attached

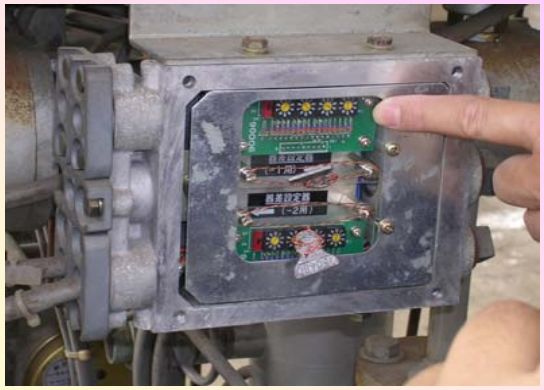
on the front face of fuel dispenser



Lead sealing the regulator of oil meter

A conformity sticker is attached

on the front face of LPG flow meter



Lead sealing the flow regulator of LPG flow meter

The method of verification for fuel dispensers

- Compare method:
  - Standard measure tank
  - Standard measure vessel
  - Standard flow meter (for large diameter oil meter)
- Weighting method:
  - Standard weighing instruments
  - Standard specific gravity meter
  - Thermometer

Compare method: we usually verify by Standard measure tank

We usually verify large diameter oil meter by Standard flow meter

Verification and inspection of fuel dispensers

- All are fuel dispensers verified and inspected by the BSMI and its six branches.
- The validity period of the verification : 2 years
- The amount of verification and inspection:

	Verification	Inspection
– 2003 : 37, 510 pc		22,380 pc
– 2004 : 31,050 pc		21,778 pc

The method of verification for LPG flow meter

- Compare method:
  - Standard volume tube
- Weighing method:
  - Standard weighing instruments
  - LPG standard float density meter (additional thermometer is attached)
  - Standard pressure meter
  - Pressure container

We usually verify LPG flow meter by Weighing method

The method of verification for LPG flow meter

The validity period of the verification : 1 year

The amount of verification	The amount of inspection
2002: 78 pc	2002: 26 pc
2003: 83 pc	2003: 24 pc
2004: 80 pc	2004: 29 pc

Verification Fuel Dispensers In Thailand

By
Mr. Warapong Pakkut
Central Bureau Of Weights and Measures

Test Method

- Quality Test
- Accuracy Test

Quality Test

- Ancillary device ;
  - Zero setting device
  - Price indicator device ,etc.
- Additional device ;
  - Filter
  - Pump, etc.

Accuracy Test

The test is conducted at 3 flowrates.

- Maximum flowrate (Q_{max})
- 0.4 - 0.6 of Maximum flowrate
- Minimum flowrate (Q_{min})

Verification Of Fuel Dispensers In Thailand

The Maximum Permissible Relative Errors Table

Measured Quantity (V)	Maximum permissible error ± (MPE)
≤ 0.1 litre	2 millilitre
> 0.1 – 0.2 litre	0.02V
> 0.2 – 0.4 litre	4 millilitre
> 0.4 – 1 litre	0.01V
> 1 – 2 litre	10 millilitre
≥ 2 litre	0.005V

Verification Of Fuel Dispensers In Thailand

Standard For Testing

- **At minimum,0.5Max,Maximum flow rate : Use 2,5 ,20 ,50 litre tanks calibrated : traceable to CBWM (National Standard or International Standard)**

Verification Of Fuel Dispensers In Thailand

Standard For Testing

Standard For Testing

Standard For Testing

Verification Of Fuel Dispensers In Thailand

THE END

THANK YOU

DIRECTORATE FOR STANDARDS AND QUALITY

STAMEQ – VIET NAM

Presented by : Nguyen Ngoc Hue, Eng.

Vietnam Country

- Area: about 331, 688 sq km
- Location: Vietnam is situated in centre of South - East Asia. It borders China in the North, Lao and Cambodia in the West and looks out the East sea (Pacific) in the east and the south.
- Population: 81 millions
- Capital: Hanoi
- **64 provinces & cities**
- **3 Geo-administrative regions:**
- **-North (24 provinces + 2 city)**
- **-Middle (12 provinces +1 city)**
- **-South (23 provinces +2 city)**

Map of Vietnam

Ministry of science and technology

directorate for standards and quality

1. Administration department
2. Standardization department
3. Metrology department
4. Conformity assessment department
5. Planning & finance department
6. International cooperation department
7. Organization and personnel department
8. Inspection department
9. Department for goods quality management

1. Vietnam center for standards and quality
2. Vietnam metrology institute
3. Quality assurance and testing center 1 (Hanoi)
4. Quality assurance and testing center 2 (Danang)
5. Quality assurance and testing center 3 (Hochiminh City)
6. Vietnam WTO/TBT office

1. Information center
2. Training center
3. Bureau of accreditation
4. Vietnam certification services
5. Vietnam productivity center
6. Small and medium enterprises development support center
7. VIETNAM-GERMAN technology transfer and training center
8. SMQ magazine
9. Vietnam codex contact point

The Directorate for Standard and Quality (STAMEQ)

- STAMEQ is Governmental Body under Ministry of Science and Technology.

- STAMEQ undertakes the function of state management on standardization, metrology and quality of products and goods.

- The *Metrology Department* is one of function Departments belong to STAMEQ, having major duties on metrology as follows:

  * To unify the state management on metrology.

  * To establish and improve national measurement standards.

  * To verify and calibrate the measuring standards & instruments.

  * To train and certify for verifiers.

  * To carry out the activities of scientific research, information and international cooperation in the metrology.

The legal metrology system in Vietnam

STAMEQ

1. Metrology department
2. Vietnam metrology institute
3. Quality assurance and testing center No1 (Hanoi)
4. Quality assurance and testing center No2 (Danang)
5. Quality assurance and testing center No3 (HCM city)

Branches of STAMEQ in 64 provinces

1. North Region: 24 Provinces & 2 Cities
2. Middle Region: 12 Provinces & 1 City
3. South Region: 23 Provinces & 2 Cities

The Verification of Fuel Dispensers in Vietnam

1. General information

- Total of fuel dispensers in use: about 35000 (non LPG)
- Total fuel station in use: about 8000
- Verifiers: about 300 persons
- Total of verification offices : 71
  + 4 offices of STAMEQ
  + 64 offices of province & city (Branches of STAMEQ)
  + 3 offices of Petrolimex
- Regulations: Follow to OIML R117
- DLVN 10-2003 : Methods and means of verification
- DLVN 97-2003 : Methods and means of test
- Re-verification interval :1 year

The Verification of Fuel Dispensers in Vietnam (cont.,)

1. The Standard for measuring Volume
   Volume Rate: 2; 5; 10; 20; 50 ;100 ; 200 L

   Accuracy: 0,1%
   Re-verification Interval :1 year

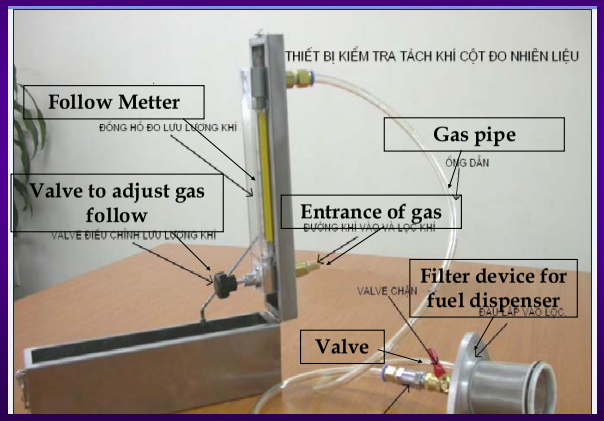
2. Approval of fuel dispensers in Vietnam

   (2 type of fuel dispensers: SKD and IKD)

   A number of approvals until 2004: 44 fuel dispensers

The Verification of Fuel Dispensers in Vietnam (cont.,)

The Gas Elimination Testing Device made in Vietnam



The Verification of Fuel Dispensers in Vietnam (cont.,)

Technical Regulation to verify fuel dispensers

- The first Regulation on fuel dispensers was promulgated in 1986 (after former Soviet Union)
- Then, this Regulation was revised in 1998 and 2003 after OIML R117 on technical requirements for fuel dispensers.

Future Steps

- In 2005: Strengthening capacity for the staffs of STAMEQ and branch of STAMEQ in provinces on verification of fuel dispensers.
- In 2006: Expanding Training Courses for Enterprises manufacturing and business on non-LPG and / or LPG fuel dispensers.
- In 2007: Technical Requirements for fuel dispensers will be implemented in accordance with R117 & R118;

Acknowledgment

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Thank you for your attention !