

# TIRATHAI *transformers*



TIRATHAI PUBLIC COMPANY LIMITED

[www.tirathai-transformer.com](http://www.tirathai-transformer.com)



ISO 9001  
Certificate Number  
QMS02070/515



ระบบบริหารคุณภาพ  
Q 002



DNV Certification Pty Ltd  
Quality Assured ISO9001:2000  
Certificate No.  
2175-2002-AQ-SIN-JA-S-ANZ



ISO 14001  
Certificate Number  
EMS06034/253



TESTING  
No. 0140



# Content

- ☀ Key Milestone
- ☀ Technology Development
- ☀ Production Standard
- ☀ Design
- ☀ Production Line
- ☀ Variety of Products
- ☀ Testing
- ☀ Services
- ☀ Exports

02



# Key Milestone



- 1987** : **Tirathai Company Limited** was established by a group of engineers and specialists in the manufacturing of electric transformers with several years of expertise derived from **Siriwat (1972) Co., Ltd.**, the first standard transformer manufacturer in Thailand.
- 1988** : certified **TIS 385-2525** from **Thai Industrial Standards Institute (TISI)**
- 1992** : joint venture with **HTT AG/Germany** to produce for Dry Type Cast Resin
- 1994** : License agreement with **EBG/AUSTRIA** for manufacturing of power transformer
- 1996** : License agreement with **FUJI ELECTRIC/JAPAN** for distribution and power transformers
- 1997** : achieved the quality assurance system **ISO 9001** certificate from **Bureau Veritas Quality International (BVQI)** and **Thai Industrial Standards Institute (TISI)**
- 1999** : achieved for the **PRIME MINISTER'S EXPORT AWARD** and approved products for **Thailand Brand**
- 2000** : certified laboratory in accordance with **TIS1300 ( ISO/IEC Guided 25 )**
- 2001** : achieved a certificate from **SABS** (South African Bureau of Standards).
- 2003** : achieved a short circuit certificate from **KEMA**, Netherlands for **50MVA 115/23.1kV**.
- 2004** : achieved a certificate of Laboratory Accreditation **TIS 17025-2543 (2000) : ISO/IEC 17025 : 1999**.
- 2005** : supply 2 units of 200 MVA, 230-121-22 kV transformer for **Electricity Generating Authority of THAILAND (EGAT)**.
- 2006** : transformed to **Tirathai Public Company Limited** and listed in the Stock Exchange of Thailand (SET).
  - : achieved a certificate of **TIS 14001 - 2548 ( ISO 14001 - 2004 )**
  - : achieved a certificate of acceptance for manufacturing **300 MVA, 230 kV** from **EGAT**.
- 2008** : supply **2 units of 300 MVA,230/69kV** to Metropolitan Electricity Authority (MEA).

# Technology Development

Apart from the Company's own development, evidenced with various certifications, it has deemed necessary to co-operate with several foreign company's to complete at international level. So, it has developed and improved its technology consistently as follows.



■ License agreement between VA TECH EBG Transformatoren GmbH from Austria and Tirathai Public Co.,Ltd. To manufacture Power Transformer up to 300 MVA 230 kV



■ License agreement between FUJI ELECTRIC CO., LTD. from Japan and Tirathai Public Co.,Ltd. for the production of Distribution transformer, Furnace transformer and Rectifier transformer



■ 120/160/200 MVA 230 - 121-22 kV  
Electricity Generating Authority of Thailand



■ 4921/2 x 3480 kVA 22000 - 200 VAC  
Padaeng Industries Public Company Limited

04

# Production Standard

Tirathai has been certified TIS 385-2525 from Thai Industrial Standards Institute since 1988 and also standard certification for Automatic voltage regulator transformer on 1995


- ★ TIS 384 THAILAND
- ★ IEC 60076 INTERNATIONAL
- ★ VDE 0532 GERMANY
- ★ ANSI C57.12 U.S.A.
- ★ JEC 2200 JAPAN
- ★ BS 171 BRITISH
- ★ OTHERS STANDARD



**TIS/ISO 9001 CERTIFICATE**



**TIS/ISO 14001 CERTIFICATE**



**SHORT CIRCUIT CERTIFICATE**



**TIS/ISO 17025 CERTIFICATE**

Tirathai is well aware on the significance of product quality as it can be competitive in the country and abroad. Tirathai has implemented the quality assurance system of ISO Standard, and was awarded the ISO 9001 certificate from BVQI (Bureau Veritas Quality International) a well known international body on 11 April 1997. In addition,

Tirathai received the Certification of Quality System on TIS/ISO 9001 from TISI, Ministry of Industry on 11 Sep. 1997 and TIS/ISO 14001 on 10 Nov. 2006

# Design

Advance computer design technology with our skilled and experienced staffs enabling to pursue the steady development of both design and production and guarantees a high degree of precision and ensures that Tirathai Transformers are able to meet the most demanding requirements and international standards.

For design proof of short circuit withstand, Tirathai has produced and sent its products to test the ability to withstand short circuit at KEMA, Netherlands which is an independent institute accredited as the first electrical high-voltage laboratory in the world.

The results show that Tirathai's products are successfully passed the type test certificate of short-circuit performance in accordance with IEC and ANSI standard.



## Magnetic Cores



06 The magnetic cores of transformer's are made of grain oriented silicon steel sheets.They are cut to length by CNC Controlled cutting machines and handled in a manner that ensures the lowest possible distortions in the material. Giving transformer cores with low FE losses.



The core laying is performed by our skilled and experienced staffs from many routine tasks and in conjunction with frequently checking in process ensure that the laminations are formed into the correct size according to transformer design as well as precision and quality control.



# Windings

Our winding department can produce any kind of winding used in transformers. We employ several semi-automatic winding machines to produce good and sustainable quality coils. Frequency quality checks ensure the precise dimensions of the winding including in process of turn ratio measurement for the windings are routine testing for production control according to the design. The finished windings shall be pressed with high pressure by hydraulic machine for short circuit strength of the windings and they shall be processed through a drying oven for cleaning and drying for their better insulation quality by reduced residual moisture.



# Products Range

## Power Transformer

Under Licensed of  
**FUJI ELECTRIC / JAPAN**  
Under Licensed of  
**VA TECH EBG Transformer GmbH / Austria**  
Capacity 5 - 300 MVA Rated  
Voltage 230 kV

## Distribution Transformer

Under Licensed of  
**FUJI ELECTRIC / JAPAN**  
Capacity 1 - 100 MVA Rated  
Voltage 36 kV

## Rectifier & Induction Furnace Transformer

Under Licensed of  
**FUJI ELECTRIC / JAPAN**  
Capacity 1 - 10 MVA Rated  
Voltage 36 kV

## Dry Type Cast Resin Transformer

Capacity 50 - 5000 MVA Rated  
Voltage 36 kV



Open type with conservator



Completely Self Protected (CSP Type)



Radial feed Pad mounted



Induction furnace



Automatic Voltage Tegulator



Pad mounted with Load break



Air sealed tank type



Power Unit Load Center



Power Transformer



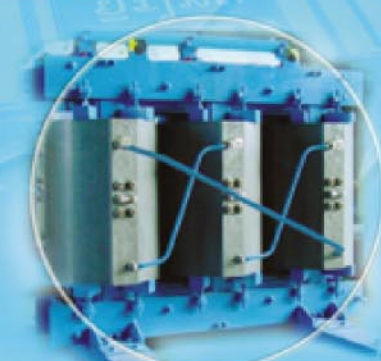
Silicone Oil



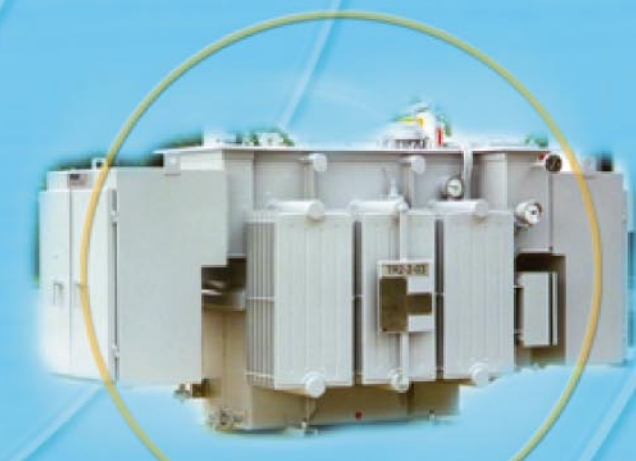
Mobile Substation



Rectifier



Dry type cast resin



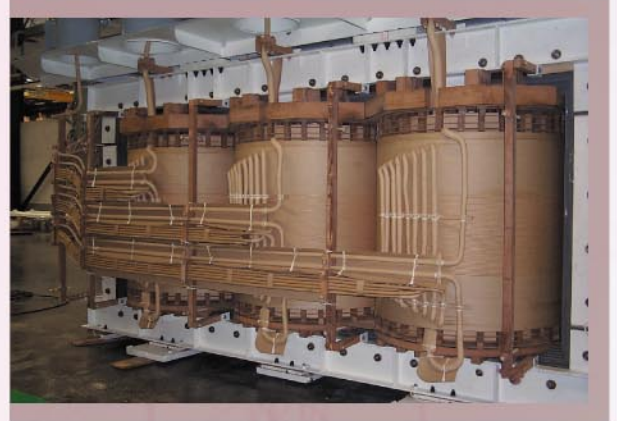
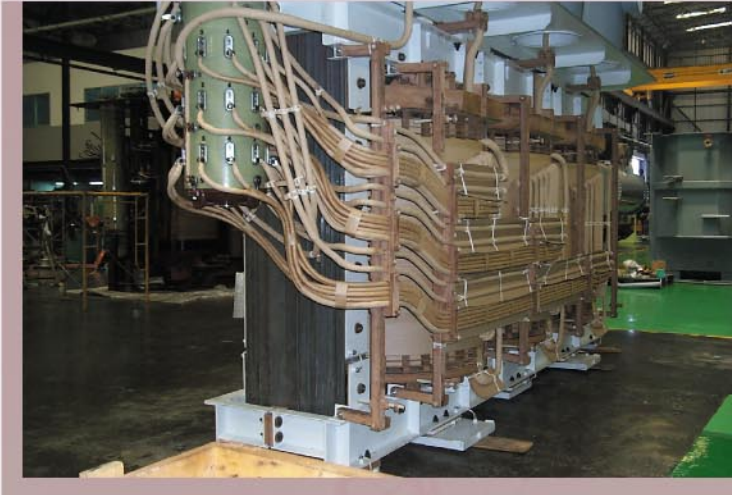
Hermetically sealed Nitrogen gas filled



Fully sealed tank (Corrugate fins)



## **A**ctive parts



The windings are then put onto the core assembly and completed assembly with yoke clamp, press support including Tank Cover and leads wiring connection from the windings to Tap Changer and Bushings.

10

## **D**rying



The final drying process for the active parts of transformers are performed either at a conventional drying oven or in our MICAFIL microprocessor controlled vapor phase which is suitable for the large size of active parts and high efficiency for drying and cleaning not only reducing the insulation particle contamination (Liquid flushing or wash out) but also reaching its better insulation quality by reduced residual moisture.



## Tanking and Oil Filling



As soon as vapor phase process for the active parts is finished, it shall be immediately put into its tank and assembled with radiators, conservator, bushings and other associated accessories then processed for vacuum and oil filling.

## Final Assembly



By our overhead cranes the lifting capacity of 132 tons and 160 tons, we can utilize them for entire manufacturing, final assembly and inspection through testing for each transformers.

The Test bay and Calibration division of Tirathai was awarded standard ISO/IEC 17025 TIRATHAI TEST BAY DIVISION Tirathai has two testing laboratories,

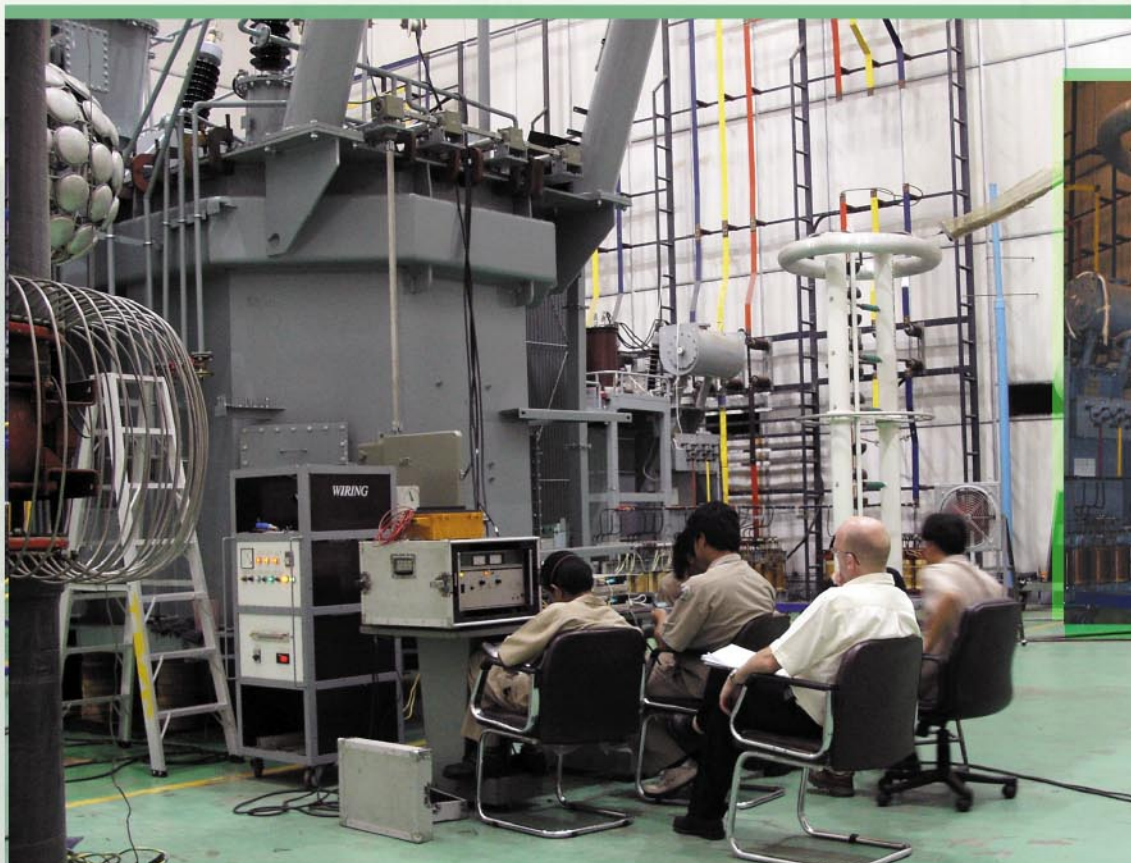
Lab. I can test transformer up to 1 – 5000 kVA

Lab. II can test transformer up to 300 MVA

The testing is done in reference to design standard or the requirement of the client, IEC76, ANSI C57.12, DIN, TISI etc. Tirathai test bay division employ's persons, engineers and technicians that have knowledge and experience in using measuring equipment both HV and LV Measurement Equipment's will be calibrated and registered. They are traceable to The National Lab.

The Testing hall is design as Faraday's cage, it has an Impulse generator set max. voltage 1400 kV max. energy 70 kJ, Chopping Gap 1200 kV, HV Testing transformer 0-250 kV, Auxiliary transformer 4000 kVA, PD detector set and measuring equipment.

The Testing Hass (Test field) contains all special equipment that is used testing Electric transformers. We paid more than 50 Million baht to setup this standard laboratory. Some equipment is designed and build at our own facilities, such as HV Testing transformer that is used in Applied potential test to step-up AC voltage from 0-400 V (input) to 0-250 kV (output) and can cascade up to 375 kV. We have a reactor used to compensate the power factor in case of testing big transformers that have high capacitance.



# Services



- ◆ Transportation and Unloading
- ◆ Installation, Oil filling and Field Test
- ◆ Supervisor for Installation, Commissioning
- ◆ Training for Operation and Maintenance
- ◆ Preventive Maintenance
- ◆ Modify and Repairing at site
- ◆ Modify and Repairing at factory
- ◆ Test and Inspection on the transformer at site
- ◆ Test and Inspection and Overhaul the transformer at Tirathai's factory
- ◆ Equipment for Rent
  - ◆ **Oil Storage Tank**
  - ◆ **Oil Treatment Plant**
  - ◆ **Testing equipment**



**1996**

7000/7000/1500 kVA 3 Ø 33000 - 6600/190V  
Induction Furnace Transformer  
Nippon Denkoh / JAPAN



**2006**

40/56/75 MVA 3 Ø 132 - 34.5 kV  
HI-TECH SYSTEMS & SERVICES LIMITED  
CESC Project, Kolkata / INDIA



**1999**

37.5 MVA 3 Ø 132 - 10 kV  
FUJI ELECTRIC TECHNOLOGY CO.,LTD.  
Asahi Glass Project / ARGENTINA



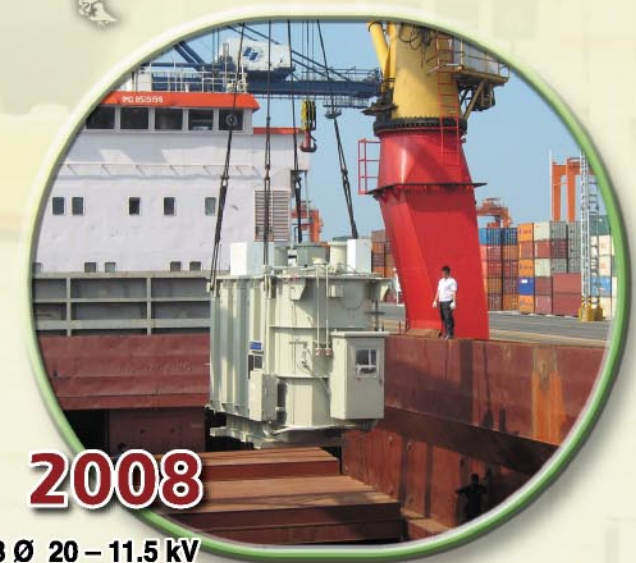
**2006**

45 MVA 3 Ø 132 - 33 kV  
PESTECH SDN. BHD.  
MNI Project / MALAYSIA



**2002**

30/40 MVA 3 Ø 115 - 23 kV  
Dai Hoang Ha Electrical Ltd.  
DHH Substation, Hanoi / VIETNAM



**2008**

32/40 MVA 3 Ø 20 - 11.5 kV  
MEHR PETROCHEMICAL COMPANY  
Mobin Petrochemical, Tehran / IRAN



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