

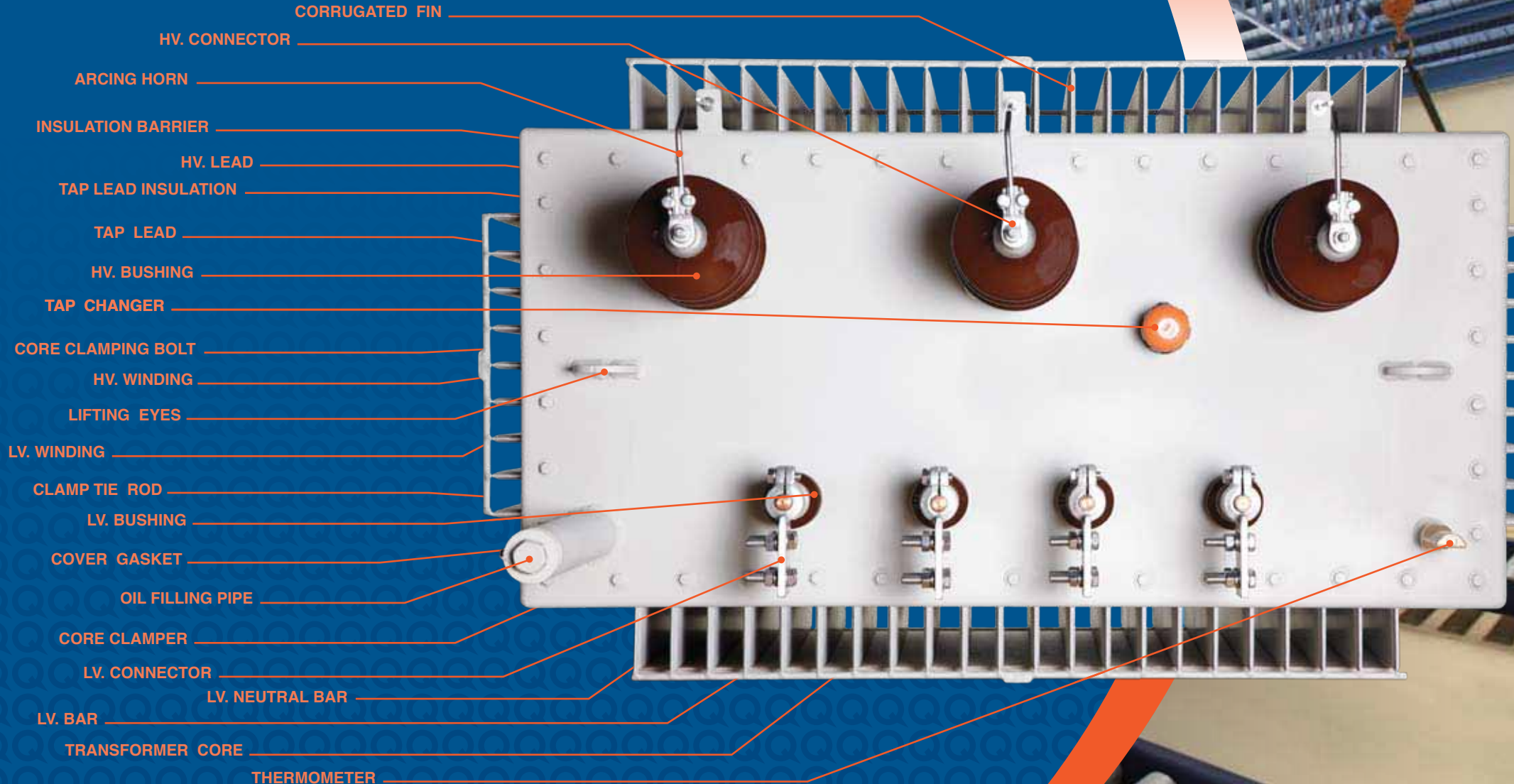


**QTC ENERGY PCL.**

คุณภาพแห่งความประณีต

**QUALITY OF DETAILS >>**

D - DYNAMICS E - ENVIRONMENT  
T - TEAMWORK A - ACHIEVEMENT  
I - INNOVATION L - LEADERSHIP S - SERVICE



## >> COMPANY PROFILE



**QTC Energy Public Company Limited** was established in July, 1996 by a group of professional engineers backed by long experience in this field for more than 30 years. Our mission was to create a transformer manufacturer offering products that were second to none, and to ensure clients of greater benefit and added value.

**QTC** stands alone as Thailand's leader in the local manufacturing of transformers, using the latest technology and machines and other modernized facilities.

Transformers manufactured by **QTC** are superior in quality, reliability and advanced technology. The company is operated and accredited from various independent international standard organizations such as ISO 9001, ISO 14001, OHSAS 18001 and ISO / IEC 17025.

**QTC** has initiated and devoted themselves to consistent and ongoing research and development to ensure the most advanced and superior quality products. **QTC** Transformers have passed stringent Short Circuit Withstand Tests conducted by CESI Italy and KEMA Netherlands. This is why we call the company **QTC** – Quality Transformer Company.



## >> MANUFACTURE & SERVICE EXCELLENCE

Based on our years of engineering experience, our manufacturing facilities have been designed to produce only products of highest quality. Each manufacturing process is closely monitored to reach international safety and operational standards. Experienced and well-trained manufacturing staff works cooperatively with our sales & service teams to guarantee fast and punctual delivery of every order.





## >> DETAILS

## >> MOVE FORWARD WITH COMMITMENT AND VISION

**QTC ...THE QUALITY IS IN THE DETAILS** Attention to DETAILS is at the heart of our principles, and it encompasses every area of **QTC** and covers everything from staff, to way of thinking, way of working, technological advancement, factory operation, products, as well as, consideration for the society and environment.

**>>D-Dynamics** We are dynamic organization, and constant development in every detail is our guiding philosophy. It covers everything from the selection of premium raw materials, to implementing top-quality technology, and to exacting constant control over the standard of production. This has been the secret of our success. Above and beyond that, we are constantly researching and improving our products to meet the demands of world-class standards to satisfy our customers even further.

**>>E-Environment** We all need to be aware of the environment and the importance of reducing the use of energy, so we place a great deal of emphasis on product design and development to ensure safety for both our production workforce and our valued customers. Additionally, the technology we put into our operation saves energy and reduces pollution effectively. We also place great importance on the environmental friendliness of our factory and our office, as well as, the well-being of the community to which we belong, to ensure that everyone lives happily together.

**>>T-Teamwork** We began as a team and we keep alive the team spirit to ensure the quality of work in all units, and we systematically support each other throughout the entire process. We place great importance on human resources at all levels by organizing both national and international workshops regularly. Moreover, we care for the health and the quality of life of all our employees. **>>A-Achievement** As a result of the efficiency of our management, we have been certified with several quality standards and received many awards of success from both inside the country and overseas.

Yet we are still ever committed to improving our performance to achieve even greater successes. **>>I-Innovation** We are innovative. We have even invented our own business software. And we have copyrighted that software because it is very accurate in calculating and processing. It responds to limitations and covers all the requirements of our customers under the world-class standard. **>>L-Leadership** Applying high technology in production and focusing on quality control has earned us considerable recognition as a top-quality transformer manufacturer both nationally and internationally. We also are the leading innovator and developer of much new production know-how in this business. **>>S-Service** A first-rate product deserves first-rate service. And at **QTC** that service excellence has generated for us truly loyal customers who have confidence in our product and the service we provide. Our Engineering Team offers superior electrical system consultancy and our professional Sales Team closely assists customers both before and after sales. More importantly, our Sales Team has been trained to be thoroughly knowledgeable in our products and they are ready to put that knowledge to use in practical and innovative advice. Finally, we are confident in the service provided by our Delivery Team which ensures prompt and efficient delivery.

**>>VISION** We are the World Class manufacturer providing world-class quality in Electric Transformation Equipment and Services.

**>>MISSION** To meet our customers' performance challenges of their electrical system with products and services of international standard.



## >> CERTIFICATE



>> Quality Management System  
ISO 9001



>> Environmental Management System  
ISO 14001



>> Occupational Health and Safety Management System  
OHSAS 18001



>> Q-MARK



>> Short Circuit Performance  
CESI Italy



>> Short Circuit Performance  
KEMA Netherland



>> ISO / IEC 17025



>> ISO 26000



<< THE BEST FACTORY 2002

## >> DESIGN

**QTC** is a leader in the manufacturing of Hermetically Sealed Type Transformers which are fully filled with oil. This particular design defends against the build-up of humidity and gas inside the transformer tank, making silica gel and oil checks unnecessary for many years to come. This design has the advantage of minimizing maintenance expenses for our customers. **QTC** transformers have been designed and tested by our own engineers who have long experience in developing and manufacturing transformers and this has been proven over years of successful operation.

## >> COMPUTERIZED DESIGN

Computer programs are used to calculate all transformer data and all parameters to prevent any electrical, mechanical, and thermal stresses that may arise during operation. **QTC** transformers can guarantee operational safety, reliability, and maintenance-free operation.



# >> MADE FOR YOUR REQUIREMENT



>> Single Phase



>> Hermetically Sealed



>> Freely Breathing (Corrugated)



>> Freely Breathing (Radiator)



>> CSP Type



>> Gas Sealed



>> N<sub>2</sub> Gas Sealed



>> OLTC Transformer





>> Power Transformer  
up to 30 MVA



>> Earthing Transformer



>> Dry-Type Cast Resin



>> Pad Mounted



>> Unit Substation



>> Dry-Type Class F&H



>> Transformer with Cable Box



# >> TRANSFORMER CORE

## >> MULTI-STEP LAP

Multi-Step Lap Core is used in **QTC** transformer to minimize the no-load loss by as much as 15%, exciting current is diminished by 50% and noise level is decreased up to 5 dB to reduce noise pollution.



## >> STACKING TABLE

The core is stacked in the correct layout precisely and accurately on the stacking table. The core limb laminations are mitred at the points with the yoke. The limb and yoke have exactly the same cross-section in which it is spread out step by step, achieving a circular-like shape. An adequate number of core bandages makes a uniform compression of the limbs certain.





# >> TRANSFORMER WINDING

## >> COPPER FOIL

**QTC** uses copper foil to produce low-voltage winding which is an excellent technique to reduce axial short-circuit forces. Copper foil and insulation material are bonded with thermo pox to enhance ability to withstand radial forces.

## >> FOIL WINDING MACHINE

To ensure high quality, safety, and long life warranty, **QTC** employs modernized foil-winding machines to wind the low-voltage coils.

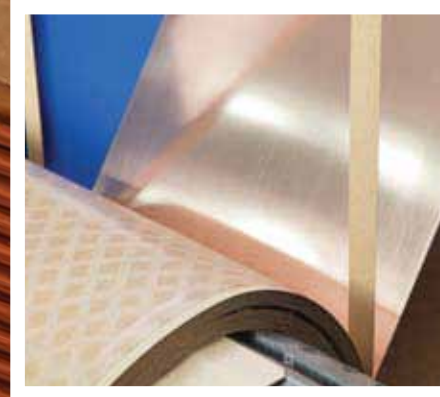
## >> HIGH VOLTAGE WINDING

The latest improvement in the winding technology of **QTC** transformers is the long layer winding design to achieve uniform stress distribution along interlayer insulation. The automatic winding machine is computer-controlled and the winding is more homogenous and less sensitive to high frequency resonance due to lightning impulse overvoltage.

## >> HIGH VOLTAGE WINDING MACHINE

**QTC** computerized winding machine can control tension of copper wire, winding layer insulation and winding sequence to prevent human error and to retain similar quality for every coil.

COPPER FOIL



FOIL WINDING MACHINE



HIGH VOLTAGE  
WINDING



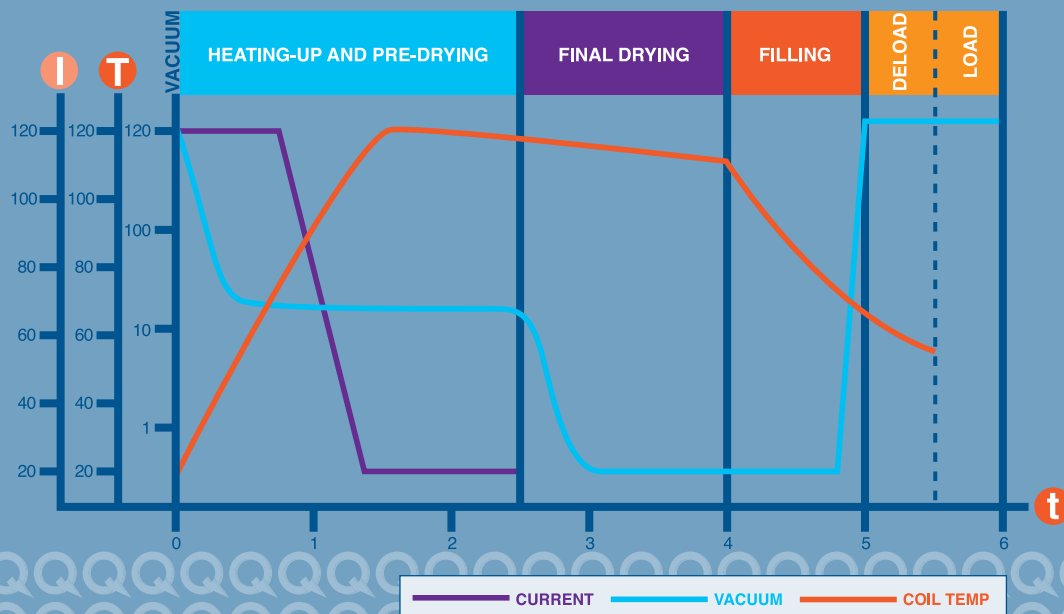
HIGH VOLTAGE  
WINDING MACHINE





# >> VACUUM DRYING AND FILLING PLANT

**QTC** operates Thailand's first and only electric low-frequency heating equipment. The uniform, modern and economical heating and drying process is performed by injection of low-frequency heating current direct to transformer winding under vacuum and then filling with high quality oil. A computerized controller ensures that **QTC** transformer has the highest quality insulation system.





**QTC** transformer can be designed, manufactured and tested according to National and International standards listed below:

- TIS 384-2543
- IEC 60076
- IEEE Std C57.12.00
- AS 2374
- JEC 204
- VDE 0532
- Or any other standard specified by customers



TIS 17025-2543 (2005) Certificate for Electrical Test Laboratory from Thai Industrial Standard Institute (TISI), Ministry of Industry

## >> ROUTINE TESTS

Each and every transformer is subjected to a routine quality test as follows.

- Measurement of winding resistance
- Measurement of voltage ratio and check of phase displacement
- Measurement of short-circuit impedance and load loss
- Measurement of no-load loss and current
- Separate source AC withstand voltage test
- Short-duration induced AC withstand voltage test
- Measurement of insulation resistance
- Oil dielectric test

## >> TYPE TESTS

Type tests will be carried out and conducted based on customer requests and on our own initiative. These have enabled **QTC** to ensure the constant quality and reliability of our transformer products. The details of the type test as follows.

- Temperature-rise test
- Lightning impulse test

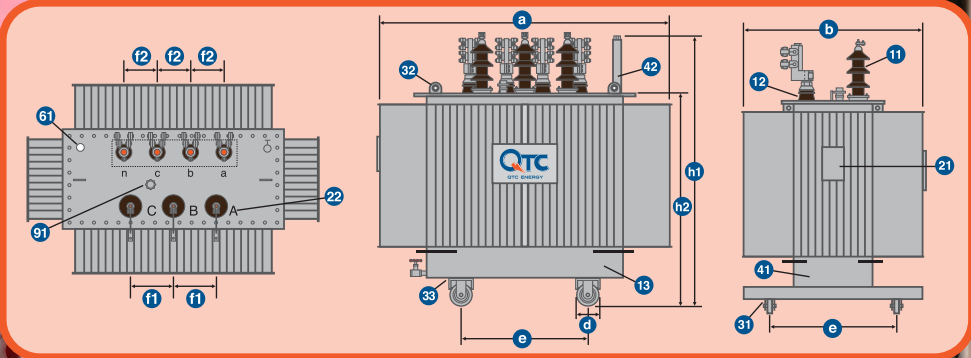
# >> TABLE SELECTION

## >> MARKET STANDARD LOSSES

RATED POWER (KVA)	VOLTAGE SYSTEM 11 KV. 12 KV.									VOLTAGE SYSTEM 22 KV. 24 KV.									VOLTAGE SYSTEM 33 KV.									WATT LOSSES			% IMP AT 75 °C
	WEIGHT		DIMENSION (mm)							WEIGHT		DIMENSION (mm)							WEIGHT		DIMENSION (mm)							NO-LOAD LOSSES		LOAD LOSSES AT 75 °C	
	Total (kg)	Oil (kg)	a	b	h1	h2	e	f1	f2	Total (kg)	Oil (kg)	a	b	h1	h2	e	f1	f2	Total (kg)	Oil (kg)	a	b	h1	h2	e	f1	f2	12-24 kv	33 kv		
50	490	145	960	580	990	695	600	280	150	500	175	1090	630	1230	845	600	280	150	630	215	1180	680	1340	870	700	370	150	160	230	950	4
100	820	215	1135	665	1160	865	680	280	150	800	210	1225	685	1230	865	600	280	150	1055	350	1395	815	1420	950	740	370	150	250	260	1550	4
160	1060	265	1235	715	1210	915	700	280	150	1015	250	1295	735	1280	915	660	280	150	1345	345	1435	805	1425	955	780	370	150	360	370	2100	4
250	1350	315	1305	735	1270	975	780	280	180	1400	345	1365	775	1340	975	820	280	180	1845	480	1485	805	1575	1105	860	370	180	500	520	2950	4
315	1500	350	1365	785	1340	1045	720	280	180	1620	385	1395	795	1430	1065	760	280	180	1830	470	1485	805	1575	1105	860	370	180	700	740	3900	4
400	1620	360	1365	765	1370	1075	740	280	180	1720	400	1415	805	1450	1085	760	280	180	2305	630	1595	865	1655	1185	960	370	180	850	900	4600	4
500	2070	470	1565	835	1350	1055	900	280	200	2140	500	1615	875	1420	1055	940	280	200	2310	610	1715	945	1545	1075	1020	370	200	1000	1050	5500	4
630	2310	470	1545	855	1455	1160	726	280	200	2380	530	1635	925	1545	1180	760	280	200	2780	710	1745	955	1710	1240	900	370	200	1200	1250	6500	4
800	2380	545	1625	905	1505	1210	760	280	230	2630	630	1815	1085	1575	1210	800	280	230	2780	740	1875	1095	1700	1230	900	370	230	1300	1400	10500	6
1000	2940	660	1825	1035	1760	1240	860	280	230	3090	760	1865	1065	1665	1250	900	280	230	3500	900	1975	1115	1800	1280	1020	370	230	1600	1700	13000	6
1250	3610	790	1925	1115	1665	1320	900	280	230	3690	850	2025	1195	1735	1320	940	280	230	3920	1040	2065	1195	1940	1420	1020	370	230	1800	1900	16000	6
1500	3985	890	2065	1215	1805	1505	1050	280	230	4015	960	2095	1235	1905	1525	1070	280	230	4660	1230	2170	1270	2030	1510	1080	370	230	2100	2150	19000	6
2000	4270	1070	2165	1245	1805	1460	720	280	230	4615	1168	2225	1275	1890	1475	780	280	230	4840	1320	2280	1290	2030	1490	860	370	230	2600	2700	22700	6
2500	5250	1250	2285	1295	1900	1560	820	280	250	5460	1350	2315	1305	1975	1560	860	280	250	5900	1590	2425	1375	2125	1585	860	370	250	3200	3300	26800	6



Terminal Arrangement for Cable Conductor					11 HV Bushing acc. to DIN 42531	
Rating Power (kVA)	Applicable to Aluminium and Copper Conductors		Number of Circuits		12 LV Bushing acc. to DIN 42530	
	Diameter Range (mm)	Size (mm) <sup>2</sup>			13 Earth Connection BM 12 DIN 48088	
315	11.4 - 17.6	95 - 185	4		21 Nameplate	
400	12.9 - 20.2	120 - 240	4		22 Terminal Marking Plates	
500	12.9 - 20.2	120 - 240	4		31 Bidirectional Roller	
630	12.9 - 20.2	120 - 240	4		32 Lifting Eye	
800	15.9 - 25.6	185 - 400	4	6	33 Hualing Lugs for Bi Directional Shifting of the Transformer	
1000	15.9 - 25.6	185 - 400	4	6	41 Oil Drain Device	
1250	15.9 - 25.6	185 - 400	4	6	42 Filling Tube	
1600	18.4 - 29.2	240 - 500	6	8	61 Thermometer Pocket	
2000	18.4 - 29.2	240 - 500	6	8	91 Off-Circuit Tap Changer	
2500	18.4 - 29.2	240 - 500	8	10		

[illegible]

● STANDARD ACCESSORIES ● OPTIONAL

# >> OUR EXPERIENCES



>>TESCO LOTUS  
THAILAND



>>CARREFOUR  
THAILAND



>>HOMEPRO



>>JUNGCEYLON  
PHUKET



>>AIRPORT RAIL LINK



>>AMARI ORCHID  
PATTAYA



>>VICHAIYUT HOSPITAL



>>CHULALONGKORN  
UNIVERSITY



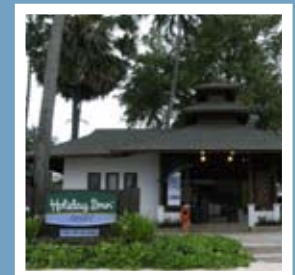
>>CHAROEN POKPHAN  
FOODS PCL



>>BETAGRO GROUP



>>NOVOTEL RAYONG  
RIM PAE



>>HOLIDAY INN KRABI



## >> AFTER-SALES SERVICE

**QTC** offers complete 24/7 Expert After-Sales Service for the life of our transformer. To ensure high efficiency and optimized operation at all times, a **QTC** service team is available round the clock, 24/7. A highly skilled engineer together with an experienced technician will respond promptly to secure and solve your transformer problems. **QTC** has the equipment and instruments calibrated by international institutes to ensure excellent after-sales service you can depend on.

### >> SCOPES OF SERVICES

- Transformer services and maintenances
- Transformer repair
- Transformer oil purification and application analysis
- Transformer testing
- Transformer and electrical system consultancy



คุณภาพแห่งความปรารถนา

**QUALITY OF DETAILS >>**

D - DYNAMICS E - ENVIRONMENT

T - TEAMWORK A - ACHIEVEMENT

I - INNOVATION L - LEADERSHIP S - SERVICE





"We serve you all details you need"

*Poonphat Tantanasin*

**POONPHIPHAT TANTANASIN**  
CHIEF EXECUTIVE OFFICER





## **QTC Energy Public Company Limited**

2/2 SOI KRUNGTHAP KRITHA 8(5) , KRUNGTHAP KRITHA RD. , HUAMARK , BANGKAPI , BANGKOK 10240 THAILAND

Tel : (66)0-2379-3089-92 Fax : (66)0-2379-3097 [www.qtc-energy.com](http://www.qtc-energy.com)