

XiangfanGuowang

Composite Insulators Co., LTD.

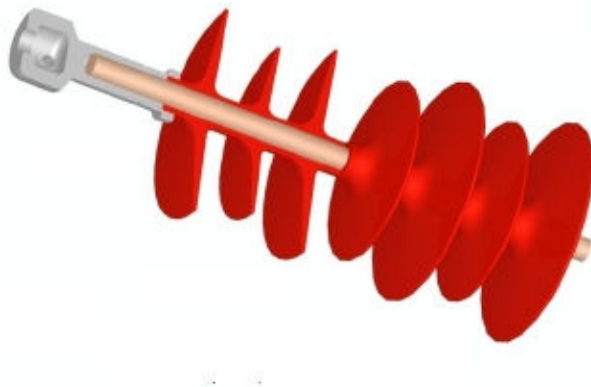
# COMPOSITE INSULATORS



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## Composite Insulators



The core is fiberglass reinforced epoxy resin rod which produced from the highest quality materials. It is the component to bear mechanical load and has minimum tension strength at 1000Mpa.

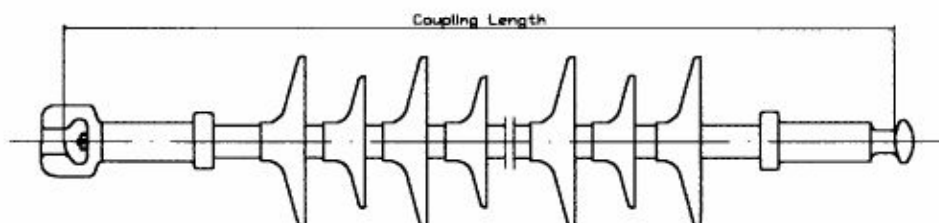
End fittings are made of steel with hot- dip galvanized. They are compressed directly to the rod by a special process.

Sheath & Weathersheds are produced with high temperature vulcanized silicone rubber compound which exhibit high, long- term hydrophobicity, high aging resistance and low permeability to moisture.

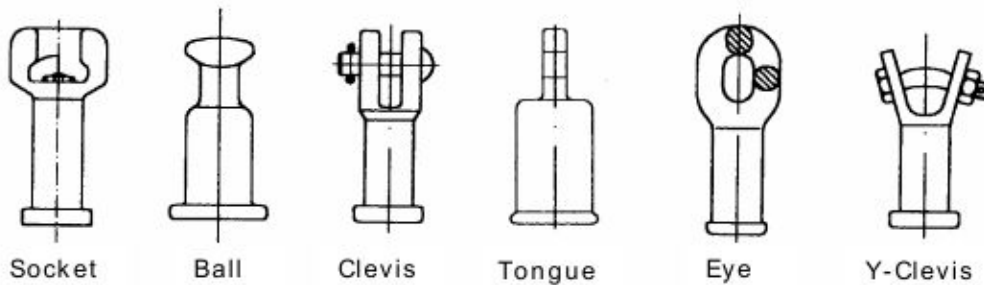
Corona Ring is made of aluminum. The corona ring is necessary at 220kV system and above. For application at 220 kV and 230 kV, one corona ring should be assembled at the line end of the suspension insulator. For application at 345 kV and greater, two corona rings should be assembled at both ends of the insulators.

INTERFACES between the fiberglass rod, rubber sheath, and rubber sheds are laid on a special adhesive which compound on the basis of silicone rubber and then vulcanized. This firmly bond the rubber to the rod and bonds the rubber sheds to the rubber sheath so that the joint between sheds and sheath is stronger than the rubber.

For suspension insulator with SML on or above 120kN, the interface between the metal fittings and the sheath is fitted on an additional o-ring seal beside of the special sealant



#### Configuration of end – fittings



The designations of the above end-fittings are in accordance with IEC61466-1 (Composite string insulators units for overhead lines with a nominal voltage greater than 1000 V- Part 1: Standard strength classes and fittings)

#### Types of composite insulators

- Distribution Dead-end Insulators
- Composite Pin insulators
- Suspension insulators

Xiangfan's insulators have been subjected to the test below :

- Test of core material
- Flammability test
- Accelerated electric – environmental ageing test ( 5000 hours)
- Power arc test
- Verification of sanity withstand voltage with salt fog method
- Test for the control of the slope of the curve " tensile failure load – time" for the core and its end fittings
- Long duration tensile test for verification of the specified mechanical load (SML) and of tightness of the interface between metal end fitting and housing
- Fatigue mechanical tensile test



Chamber for  
ageing test

**TEST REPORT**

Report no. 98470318.000-HVL 99-1277  
Client China Power Grid Development Co. Ltd.  
No. 4 South Xue Yuan Road  
Haidian  
District Beijing, 100088  
P.R. China

Concerning ageing test under operating voltage  
simulating weather conditions

Date 3 March till 27 October 1999

Place KEMA High-Voltage Laboratory, Arnhem,  
the Netherlands

Object two types of non ceramic insulators

Type 300 kN SML and 210 kN SML

Manufacturer TONLY Xiangfan Guowang Composite  
Insulators Co. Ltd, Hubei, China

**REQUIREMENTS**

The requirements as specified in the standard IEC 61109, 1992-03, annex C.

**TEST PROGRAMME**

The programme was specified by the client and was as follows:

- 1 ageing test under operating voltage simulating weather conditions.

**SUMMARY AND CONCLUSION**

The results obtained relate only to the work ordered and to the material tested.  
The insulators withstood the 5000 h test without any flashover. After the test no marks of tracking could be observed and only slight erosion of the surface was visible.  
The tests were passed.

Author L. Scheltinga

This B-report consists of:  
39 pages  
2 appendices

KEMA Nederland B.V.

*P/O G.P.T. Rbelors*

G.P.T. Rbelors  
KEMA High-Voltage Laboratory

Arnhem, 17 November 1999

**MATERIAL DATA**

|                    |   |
|--------------------|---|
| Manufacturer       | TONLY Xiang Guowang Composite Insulators Co. Ltd,<br>Hubei, China |
| Type A             | 300 kN SML ( A series )   |
| Technology A       | HTV after the sheath is extruded onto the fiber glass rod         |
| Type B             | 210 kN SML ( B series )   |
| Technology B       | injection moulding  |
| Number             | A1 to A4 and B1 to B4   |
| Sampling procedure | by the manufacturer   |
| Drawing            | appendix A and B  |

**PERSONS ATTENDING THE TEST**

Neither representatives of the client nor the manufacturer were present during the tests.

**THE TEST WAS CARRIED OUT BY**

|                  |                     |
|------------------|---------------------|
| Mr L. Scheltinga | KEMA Nederland B.V. |
| Mr H.J. Arnoldus | KEMA Nederland B.V. |

**PURPOSE OF THE TEST**

Purpose of the test was to verify whether the material complies with the specified requirements.





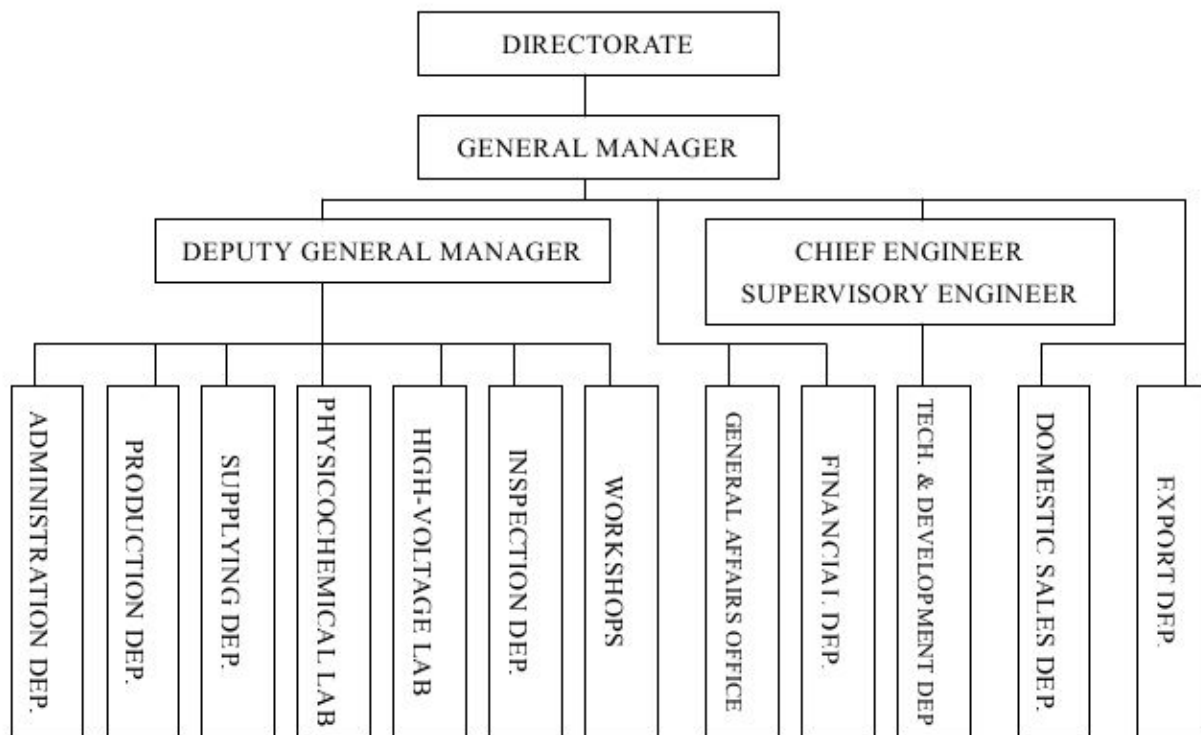
## BRIEF INTRODUCTION OF MANUFACTURER

**Xiangfan Guowang Composite Insulators Co., Ltd.** was located in the Industrial Zone of Xiangfan City. She was established and re-registered in 1997, which on the basis of **Xiangfan Composite Insulators Plant of Xiangfan Tonly Power Equipment Group Co., Ltd.** by joining capitals with six corporations: (1) **Xiangfan Tonly Power Equipment Group Co., Ltd.**, (2) **China Power Grid Construction Co.**, (3) **Central-China Electric Power Industry Development Co.**, (4) **Longyuan Co. of China Northeast Electric Power Group Co.**, (5) **Hubei Electric Industry General Co.**, and (6) **Transmission & Substation New Technological Co. of South-China Electric Power Design Institute.**

In the early 1980's (while the company was in the name of Xiangfan Composite Insulators Plant), the company has taken the lead in researching and developing composite insulators in China, and introduced her series products of 10~500kV **TONLY™** composite insulators to utilities. All its products for various voltage applications were firstly passing tests and accredited with national level in China, and its 500kV AC and DC composite insulators were firstly served in the power grid of China.

Due to the service experiences gained, **TONLY™** composite insulators have been regarded as very reliable components for HV transmission lines, and have become the first batch of recommended equipment for use in the National Power Grid Reconstruction Engineering For Town and Countryside. Up to now, there have been more than 800,000 units of varied **TONLY™** composite insulators served in HV and EHV transmission lines with safety and reliability, they have covered 30 provinces, municipalities and autonomous regions of China, and have been exported to many countries such as Italy, The Netherlands, Chile, Turkey, Jordan and Iran.

### The configuration of the Organization





## Manufacturer's Qualification Statement

(1) Name and Other Information:

- (a) Name of Manufacturer Xiangfan Guowang Composite Insulators Co., Ltd.
- (b) Address of Head Office No.4 Chunyuan West Road, Xiangfan, Hubei, P. R. China  
Telex/Fax/Telephone No. Fax: +86 710 3242099 / 3250621, Tel: +86 710 3262531
- (c) Date Established and/ or Registered Oct. 15<sup>th</sup>, 1997 (The Company was established in 1989, the previous name was Xiangfan Power Equipment Plant.)
- (d) Paid-up Capital USD2,421,307.51
- (e) Latest Balance Sheet (as of) Dec. 31, 2003
- (i.) Fixed Assets USD2,231,734.53
- (ii.) Current Assets USD4,751,364.50
- (iii.) Long Term Liabilities 0
- (iv.) Current Liabilities USD3,211,886.43
- (v.) Net Worth USD4,248,522.97
- (f) Name of Principal Officer (Optional) \_\_\_\_\_
- (g) Name and Address of the Manufacturer's representatives in the PRC, if Any None

(2) Facilities and other information for the manufacturer of the Goods Proposed:

- (a) Facilities and other information for the manufacturer of the Goods of the proposal

| Name and Location<br>of Factory   | Items being<br>Produced                  | Annual Production<br>Capacity                               | Number of<br>Employees |
|---|--|---|------------------------|
| <u>Xiangfan Guowang Composite<br/>Insulators Co., Ltd.<br/>No.4 Chunyuan West Rd.,<br/>Xiangfan, Hubei, P. R. China</u> | <u>10~500kV Composite<br/>insulators</u> | <u>200,000 pc.s<br/>(converted into 110kv<br/>products)</u> | <u>206</u>             |



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**XIANGFAN GUOWANG COMPOSITE INSULATORS CO., LTD.**

- (b) Component parts which shall not be made by the principal manufacturer but shall be secured from other manufacturers

| Name and Address of Manufacturer                    | Items  |
|---|--|
| <u>Cheng-Guang Second Factory Chengdu Branch,</u>   |  |
| <u>Chengdu - China</u>                              | <u>Silicone Rubber</u>                       |
| Wacker – Chemie GmbH, Germany                       | <u>Amorphous fumed silica</u>                |
| Guizhou Aluminum Plant, Guizhou, China              | <u>Riopone</u>                               |
| Zhejiang Shangyu Golden Phenix Power Equipment Ltd. | <u>Epoxy resin reinforced fiberglass rod</u> |
| Rugao Dasheng Line Material Ltd., Rugao, Jiangsu    | <u>End Fittings</u>                          |

- (c) Manufacturing Capacity ( /month) 6,000pc.s of 220kV composite suspension insulators/month

- (3) Experience (number of years) of the Manufacturer in the Production of the Goods Proposed (including project Purchaser, rated capacity, dated of initial commercial operation, etc.)

The Manufacturer have 15 years experience for manufacturing and supplying the composite suspension insulators. As to 500kV composite suspension insulators, they were initially served in Gezhuo Dam- Shanghai Transmission line on June 7<sup>th</sup>, 1991. From then on, there have been large quantities of 500kV composite insulators produced by the Manufacturer were served in the power grid of China.  
In the year of 1999, The Manufacturer have ever been awarded the international tender for Northeast Power Transmission Project for supplying 500kV composite insulators (Contract No.: 99CN01M63I8546507).

- (4) Name and Address of Domestic and Foreign Firms to Whom the Goods Have Been Mainly Sold in the Last Three Years.

- (a) Export Sales

Shown in the reference list

- (b) Domestic Sales

Shown in the reference list

- (5) Yearly Total Volume of Business for the Last Four Years:

| Year        | Domestic (currency)    | Export (currency)      | Total (currency)       |
|-------------|------------------------|------------------------|------------------------|
| <u>2000</u> | <u>USD3,809,072.64</u> | <u>0</u>               | <u>USD3,809,072.64</u> |
| <u>2001</u> | <u>USD5,076,273.85</u> | <u>USD116,949.15</u>   | <u>USD5,193,223.00</u> |
| <u>2002</u> | <u>USD4,033,440.01</u> | <u>USD618,644.07</u>   | <u>USD4,652,084.08</u> |
| <u>2003</u> | <u>USD5,023,455.23</u> | <u>USD1,054,939.48</u> | <u>USD6,078,394.71</u> |





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**XIANGFAN GUOWANG COMPOSITE INSULATORS CO., LTD.**

**SUPPLY RECORDS FOR EXPORT**

| YEAR | DESCRIPTION  | MODEL OR<br>CAT.NO.                             | QUANTITIES<br>(SET) | COMPANY   | COUNTRY            |
|------|--|---|---------------------|---|--------------------|
| 2000 | 132KV/70KN<br>COMPOSITE<br>SUSPENSION<br>INSULATOR                     | FXB-132/70SB                                    | 2300                | Enel Distribuzion                                   | ITATY              |
| 2001 | 20KV/70KN<br>COMPOSITE<br>SUSPENSION<br>INSULATOR                      | FXB1-20/70T<br>FXB2-20/70T                      | 20,000<br>50,000    | Enel Distribuzion                                   | ITATY              |
| 2002 | 145KV/120KN<br>COMPOSITE<br>SUSPENSION<br>INSULATOR                    | FXB-161/120SB                                   | 1,520               | NUON TRANSPORT                                      | THE<br>NETHERLANDS |
| 2002 | 145KV/120KN,<br>145KV/210KN,<br>230KV/210KN<br>COMPOSITE<br>INSULATORS | FXB-110/120SB<br>FXB-110/210SB<br>FXB-230/210SB | 36<br>36<br>7       | ENERSIS<br>VALPARAISO                               | CHILE              |
| 2002 | 24KV/70KN<br>COMPOSITE<br>INSULATOR                                    | FXB1-20/70SB                                    | 288                 |   | TURKEY             |
| 2002 | 69kV/80kN<br>69kV/120kN<br>COMPOSITE<br>INSULATORS                     | FXB4-69/80SB<br>FXB4-69/120SB                   | 4,000<br>1,000      | Hormozgan Regional<br>Electric Company<br>(H.R.E.C) | IRAN               |
| 2003 | 69kV/80kN<br>69kV/120kN<br>COMPOSITE<br>INSULATORS                     | FXB4-69/80YB<br>FXB4-69/120YB                   | 2000<br>1000        | Hormozgan Regional<br>Electric Company<br>(H.R.E.C) | IRAN               |
| 2003 | 132kV/80kN<br>132kV/120kN<br>COMPOSITE<br>INSULATORS                   | FXB3-161/80YB<br>FXB3-161/120YB                 | 250<br>450          | Hormozgan Regional<br>Electric Company<br>(H.R.E.C) | IRAN               |
| 2003 | 132kV/80kN<br>COMPOSITE<br>INSULATORS                                  | FXB-132/80CB<br>FXB-132/80YB                    | 660<br>200          | Yazd Regional Electric<br>Company (Y. R.E.C)        | IRAN               |
| 2003 | 33KV/80KN<br>COMPOSITE<br>INSULATOR                                    | FXB1-33/80SB                                    | 10,000              | IDECO   | JORDAN             |



SUPPLY RECORDS FOR EXPORT

| YEAR | ITEM  | QTY.  | COMPANY            | COUNTRY         |
|------|---|-------|--------------------|-----------------|
| 2000 | COMPOSITE TRANSMISSION LINE INSULATORS FOR HV             | 1,150 | EPOCH IMP & EXP CO | ITALIA          |
| 2001 | 132 KV/ 120 KN COMPOSITE SUSPENSION INSULATOR             | 2,300 | EPOCH IMP & EXP CO | THE NETHERLANDS |
| 2002 | 145 KV / 120 KN COMPOSITE SUSPENSION INSULATORS           | 36    | CAM CHILE          | CHILE           |
| 2002 | 145 KV / 210 KN. COMPOSITE INSULATORS 145 KV. 210 KN.     | 36    | CAM CHILE          | CHILE           |
| 2002 | 245 KV. 210 KN COMPOSITE SUSPENSION INSULATORS            | 7     | CAM CHILE          | CHILE           |
| 2004 | 110 KV / 120 KN COMPOSITE TRACTION INSULATORS             | 204   | CAM CHILE          | CHILE           |
| 2004 | COMPOSITE SUSPENSION INSULATORS 110 KV. 120 KN.           | 231   | CAM CHILE          | CHILE           |
| 2004 | 132 KV / 120 KN COMPOSITE SUSPENSION INSULATORS           | 1,106 | CAM CHILE          | CHILE           |
| 2004 | 132 KN / 210 KN COMPOSITE SUSPENSION INSULATORS           | 140   | CAM CHILE          | CHILE           |
| 2004 | 132 KN / 210 KN COMPOSITE SUSPENSION/ TENSION INSULATORS  | 568   | CAM CHILE          | CHILE           |
| 2005 | 132 KV / 210 KN COMPOSITE SUSPENSION INSULATORS           | 600   | CAM CHILE          | CHILE           |
| 2005 | 132 KV / 210 KN COMPOSITE SUSPENSION INSULATORS.          | 130   | CAM CHILE          | CHILE           |
| 2005 | 132 KV / 210 KN COMPOSITE SUSPENSION / TENSION INSULATORS | 360   | CAM CHILE          | CHILE           |