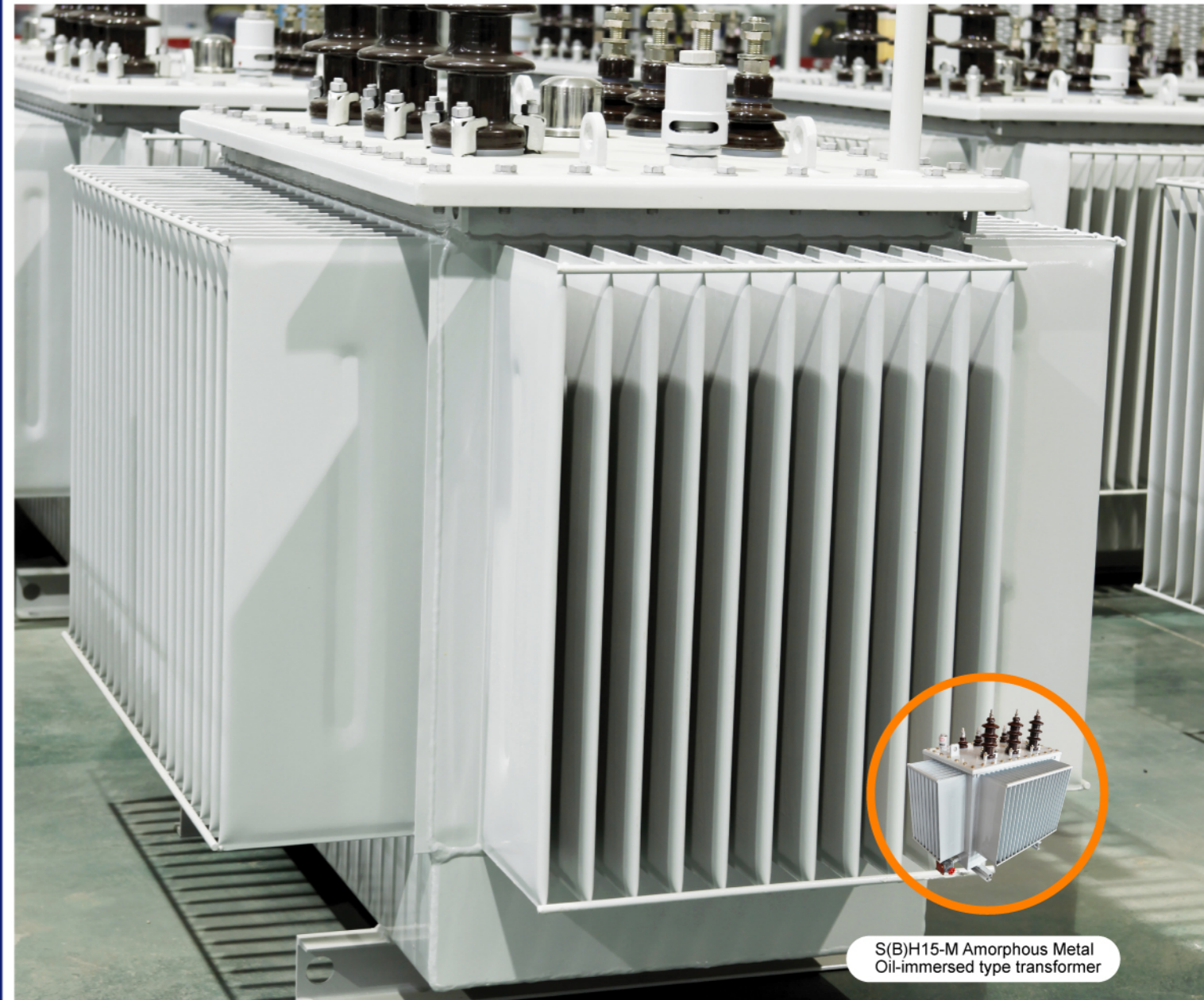


S(B)H15-M AMORPHOUS METAL OIL-IMMERSED TYPE TRANSFORMER

Three phase three column



S(B)H15-M Amorphous Metal
Oil-immersed type transformer



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China Electric Equipment Group(CEEG) is the world leading supplier of transmission and distribution and new energy, has been involved in Power Transformer, PV Technology, Insulation Materials and Complete Substation. CEEG consists of 15 holding, wholly-owned subsidiary companies, and possess Nanjing, Yangzhong, Shanghai, Jingdezhen four major industrial bases. We employ about 6,000 employees and more than 300 sales & service sites spread all over the major cities of the whole country. CEEG has "China's Resounding Brand", "China Top Brand" and other national honors. There are more than 60 famous domestic and foreign experts in which some of them have participated in drafting out national transformer standard. A group of PV scientists still hold the world record of photovoltaic efficiency so far. CEEG provides world-class products and quality services for electricity, electronics, hydropower, nuclear power, wind power, coal mine, telecommunications, construction, petroleum, chemical engineering, aviation, transportation, railage and other industries.

CEEG transformer, made from US DUPONT NOMEX® Paper as a main insulation material, has changed the traditional concept of transformer industry, filled up our domestic blank with their unique safe function and achieved international advanced level. CEEG has an annual output of 30 million KVA of transformer. CEEG established photovoltaic industry from silicon materials, silicon chip, solar cell, solar modules, solar photovoltaic power system including the complete industrial chain.

We developed application of DUPONT Nomex Paper as the core of new transformer technology and three phase three column energy-saving amorphous alloy transformers. Transducer, rectifier frequency transformer, reactor as the representative of efficient power transmission and distribution solutions which means that fewer resources you can get more power, saving a large expenditure. In these ways, CEEG opened the path to a new energy-saving electric era.

In recent years, CEEG involved in the construction of key projects in many countries, such as Beijing Olympic Project, Shanghai World Expo Project, Manned Space Flight Project, the Guangzhou Baiyun Airport, the Beijing South Railway Station, the Nanjing South Railway Station, so as to secure the maximum power and solar energy solutions meet customer needs. From transmission and distribution, power electronic to solar pv industry, CEEG can provide customers with forward-looking solutions. No matter when and where, the group always carry out the core value of "Foresight, Innovation and Responsibility". With these values, CEEG will make the complex power system more efficient, productive and energy-saving.



Navigator



中国驰名商标 China's Resounding Brand

2008



PCCC产品质量认证 PCCC Product's quality certificate

2005



全国用户满意产品 Users-Satisfaction Product of the whole nation

2006



全国售后服务十佳单位 Industry and circuloton united hand in hand

2007



中国环境标志 China Environment Labeling Products Certificate

2003

AAA

3A资信企业 AAA Grade Credit Company Certificate

2002



ISO9001
质量管理体系认证



ISO14001
环境管理体系认证



OHSAS18001
职业健康安全体系认证



IEC 60076
KEMA认证



IEC 60726
KEMA认证

2000

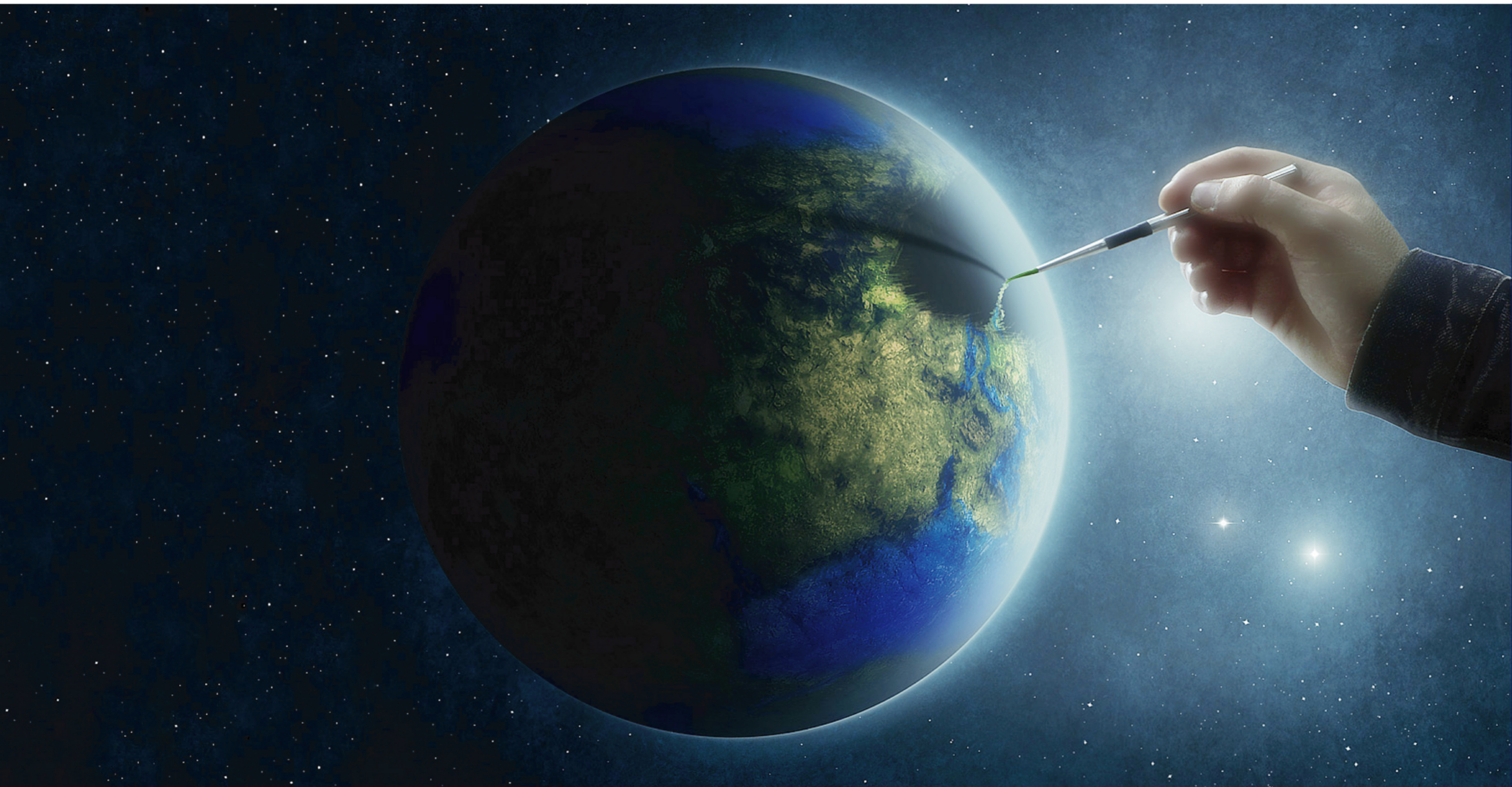


2005年10月，国务院总理温家宝在中央及省市领导的陪同下莅临中电电气视察，充分肯定了中电电气在科技创新、发展自主知识产权方面所做出的不懈努力。
On October 2005, accompanied by central and province leaders, Prime Minister Wen Jiabao arrived CEEG for inspection, and fully affirmed CEEG's continuous effort on technology innovation and self intellectual property at rights development.



2007年中电电气光伏在美国纳斯达克证交所上市，股票代码“CSUN”。
In 2007, CEEG was listed on the Stock Exchange of NASDAQ. The stock code is CSUN.







It Is One Of The World Most Advanced Transformer Production Line

It Is One Of The World Most Advanced Transformer Production Line

CEEG has built a unique, sophisticated amorphous metal oil-immersed transformer production base. The factory area has 15500 meter square, 3000 meter square of office building. Air conditioning clean factory room, which improved the working environment and provide better quality control and efficiency on the production line. First phase of the production line is designed to be 40,000 sets transformer per year; and 45,000 sets transformer per year for the second phase.



Has Established Long Term Strategic Partnership With Dupont

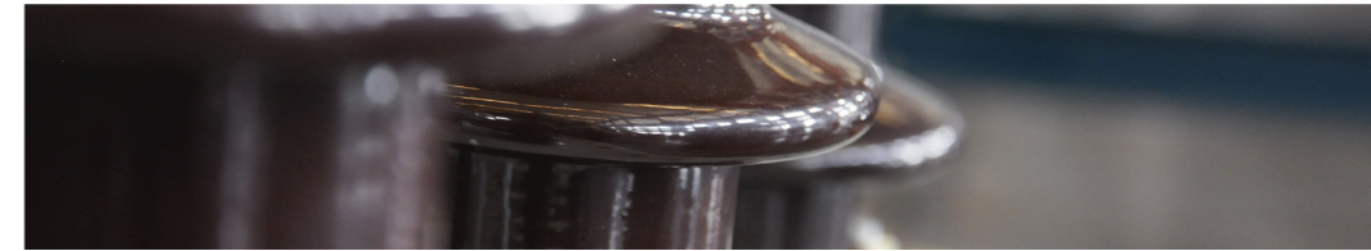
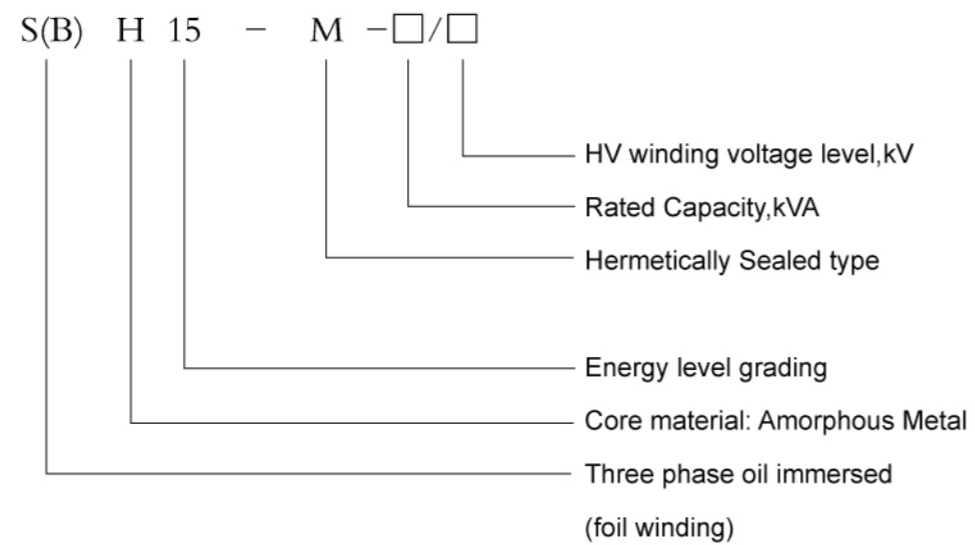
**Production Line Use Automation
Flow Production Process**



SH15-M



S(B)H15-M Amorphous Metal Oil-immersed type transformer



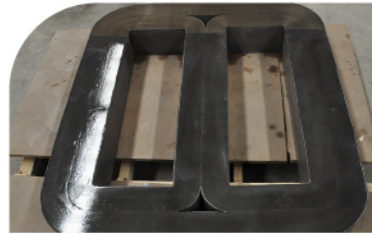
Three phase three column

The Chinese only flow production line. Transformer has great energy saving, environmental friendly. Largely reduce the no load loss. Good quality and supreme product.





FEATURE



Small in size, low noise

Small in size, low noise



Radiator Design

Hermetically sealed corrugated tank structure. Good for air flow, low temperature rise, work good with different circuit breaker.



Vector group connection and high capability on short circuit resistant

Regular five column amorphous transformer can only has Yyn0 vector group, which has its limitation and the short circuit resistant capability low.



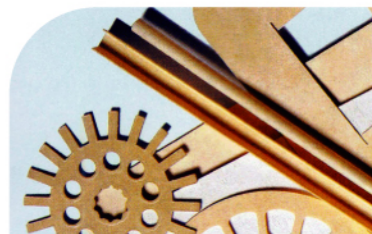
Maintenance Free

Anti-aging, transformer is hermetically sealed no need for maintenance.



Strong Insulation

Vacuum impregnating oil eliminate gas bubble in winding, this assure the insulation of the transformer.



High Insulation level

Based on the client request, Nomex paper and other high temperature resistant oil can be applied into the transformer for different application.

TECHNIQUE PARAMETER

Oil Immersed Amorphous Metal Core Transformer

Capacity kVA	Voltage Ratio			Vector Group	LWA	No load loss W	Load loss at 75°C W	No load current %	Impedance 75°C %	
	High Voltage kV	HV Tapping %	Low Voltage kV							
30	6.0	± 2 × 2.5% or +3 × 2.5% -1	0.4	Dyn11	50	33	600	1.7	4	
50						43	870	1.3		
63						50	1040	1.2		
80					52	60	1250	1.0		
100						75	1500	1.0		
125						54	85	1800		0.9
160							100	2200		0.7
200					56	120	2600	0.7		
250						140	3050	0.7		
315					58	170	3650	0.5		
400	200	4300	0.5							
500	240	5150	0.5							
630	60	320	6200	0.3						
800		380	7500	0.3						
1000	62	450	10300	0.3						
1250		65	530	12000	0.2					
1600			630	14500	0.2					
2000	67	750	17400	0.2						
2500		900	20200	0.2						
									4.5	
									5	

S(B)H15-M-30~2500/10 Outer dimension

Rated Capacity (KVA)	Length (mm)	Width (mm)	Height (mm)	Total Weight (kg)	Implement Weight (kg)	Oil Weight (kg)	Wheel dimension (mm)
30	1020	760	965	410	185	115	400/400
50	1055	760	965	480	250	110	
63	1055	800	990	550	290	125	
80	1100	820	1015	610	350	135	
100	1110	800	1045	700	410	160	
125	1185	840	1095	810	485	180	550/550
160	1210	810	1135	910	565	205	
200	1365	930	995	1045	660	220	
250	1320	980	1140	1220	780	250	
315	1400	1020	1175	1370	895	270	
400	1430	980	1240	1620	1090	310	
500	1490	1140	1250	1920	1260	330	660/660
630	1610	1180	1300	2250	1470	375	
800	1660	1190	1370	2570	1730	445	
1000	1750	1380	1515	3120	2000	600	
1250	1830	1380	1620	3700	2500	700	820/820
1600	1970	1300	1710	4450	3000	800	
2000	2250	2290	2460	5100	3500	1100	820/1070
2500	2200	2400	2450	5800	4100	1150	820/1070

For reference only, the specific data should base on the actual design.



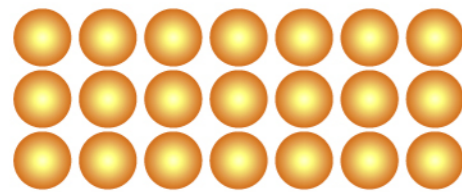
AMORPHOUS METAL COIL FEATURE

Amorphous Metal transformer introduction

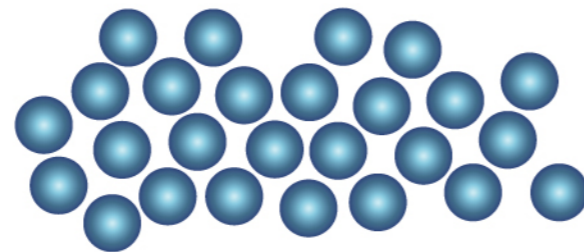
The development of the amorphous metal in 1970s, it has become widely use in 1990 for a high energy saving material for the transformer industry. Right now, over 1million sets of amorphous metal type transformer had been connected to grid all over the world. The longest proven save and reliable transformer had been running for more than 30 years, and it still perform satisfactory in the power industry. The energy saving is huge and it shall be the new era products in the power industry.

Amorphous Metal replacing silicone steel

Amorphous metal is a metallic material with a disordered atomic-scale structure.

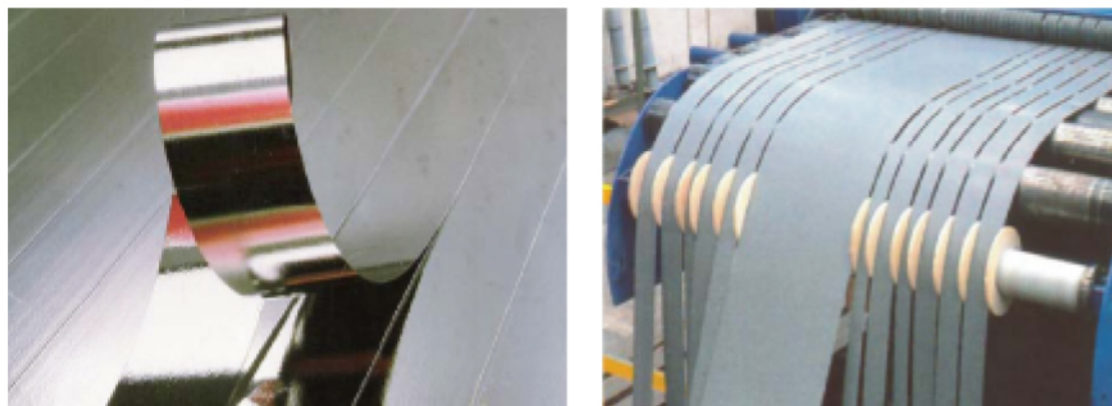


Crystalline Silicone Steel



Non-crystalline amorphous metal

Amorphous metal is non-crystalline; the alloys of boron, silicon, phosphorus, and other glass formers with magnetic metals (iron, cobalt, nickel) are magnetic, with low coercivity and high electrical resistance. The high resistance leads to low losses by eddy currents when subjected to alternating magnetic fields, a property useful for e.g. transformer magnetic cores.



- Protect The Magnetic Ability Compare To Silicone Steel Is 1/3 → Hysteresis loss
- Thickness Is Silicone Steel' s 1/10 → Eddy current loss
- High Resistivity Is Silicone Steel' s 3 Times → Eddy current loss

Amorphous Metal and Silicone Steel comparison

Type	Description	Material	
		Amorphous Metal 2605SA1	Silicon steel
Magnetic Ability	Iron loss W13/50Hz(25°C) Saturation magnetic flux density(25°C) Curie temperature	0.2W/kg 1.56T 415°C	0.63W/kg 2.0T 745°C
Physical Ability	Density Lamination factor Hardness Hv Resistivity	7.18g/cm3 >85% 860 130 μ Ω .cm	7.65g/cm3 >94% 180 45 μ Ω .cm
Dimension	Width Thickness	142,170,213mm 0.025mm	950mm 0.3mm
Others	Annealing	Magnetic field /380°C ~ 400°C	750°C ~ 850°C

Amorphous metal is the low loss material. Core loss compare to the normal silicone steel transformer has at least 20-30% lower. The transformer has the advantage of temperature rise low, operating noise low, small in size. Although the investment of the transformer is higher than the regular silicone steel transformer, the saving of the no load loss can save client's electricity bills; which can be retain back in 3 to 5 years, based on the assumption of 60% loading rate.

Feature of Amorphous Core



Three phase three column, self invention by CEEG, which received many patent, low iron loss, temperature rise and noise level, transformer dimension small.

- 1) All raw material are supplied by Hitachi Metals with iron loss less than 70-80% of the standard silicon steel
- 2) Company has special treatment, procedure and manufacturer process; which has patent number as: 200810238258.6, 20082015857.5, 200820215858.X, 200820215812.8, 200820215814.7.
- 3) Core structure is clean and strong, which do not influenced by the movement created during transportation.
- 4) The three column structure has capability to withstand high level harmonics; At Y-y connection the transformer can resist the 3rd harmonic in the network.

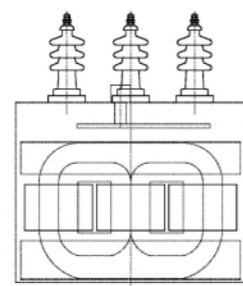
Amorphous Metal Oil transformer Job Reference

Amorphous metal oil immersed transformer VS regular oil type transformer S11

Capacity (KVA)	No load loss(W)		No load loss decrease(%)	Electricity	Year in operation	Saved money (RMB,0000)	Oil transformer price(RMB,0000)	Price saving (%)
	S11Oil Transformer(W)	Amorphous Oil Transformer(W)						
30	100	33	67	587	5	0.29	1.15	25 %
50	130	43	67	762	5	0.38	1.45	26 %
100	200	75	62.5	1095	5	0.55	2.2	25 %
160	280	100	64.3	1576.8	5	0.79	2.7	29 %
200	340	120	64.7	1927.2	5	0.96	3.2	30 %
315	480	170	64.6	2715.6	5	1.36	4.3	32 %
400	570	200	64.9	3241.2	5	1.62	5.3	30 %
500	680	240	64.7	3854.4	5	1.93	6.3	30 %
800	980	380	61.2	5256	5	2.63	8.6	30 %

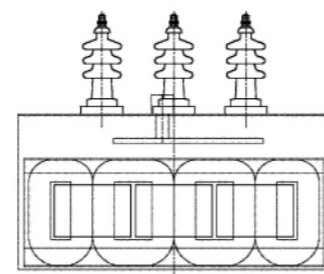
Remark: Amorphous metal oil immersed transformer and S11 oil immersed type transformer load loss same. Electricity price at RMB1/kWh

In the market, the amorphous metal transformer is higher than the regular oil transformer around 25%. As per shown in above chart, the transformer can retain it's rate different in 5 years. However, this is reducing the carbon emission to the society and will sure reduce the electricity consumption and wastage per year.



Three phase Three column amorphous metal oil immersed transformer

Three columns VS Five columns
(Amorphous Metal Oil immersed transformer)



Three phase five column amorphous metal oil immersed transformer

Assembly difficulties Less accessories needed, outer appearance clean and neat.

Insulation and temperature rise No external column problem, insulation design is same as regular transformer. Give Safety and reliability to you. Temperature rise low.

Others New type of transformer has a small size, low noise level and lighter structure. Three phase three column type can connect Dyn11, Yyn0 and can withstand greater short circuit ability.

More accessories parts, body and appearance complicated.

Side column require attention on insulation protection, Side column create difficulty on air flow.

Transformer design complicated, big and heavy
Primary voltage must be Delta connection, Star connection may create high harmonic; so must use Dyn11 connection.

用户单位	产品	数量
陕西省电力公司	SH15-315/10	5
陕西省电力公司	SH15-400/10	5
山东嘉祥县供电公司	SH15-100/10	10
山东嘉祥县供电公司	SH15-160/10	10
山东嘉祥县供电公司	SH15-200/10	10
中国神华能源股份有限公司神朔铁路分公司	SBH15-100/10	3
中国神华能源股份有限公司神朔铁路分公司	SBH15-160/10	4
中国神华能源股份有限公司神朔铁路分公司	SBH15-250/10	2
中国神华能源股份有限公司神朔铁路分公司	SBH15-400/10	2
中国神华能源股份有限公司神朔铁路分公司	SBH15-800/10	1
CEEG上海邦电设备制造有限公司	SHB15-1000/6.3	2
CEEG上海邦电设备制造有限公司	SHB15-1250/6.3	1
上海光大电力设备制造有限公司云南分公司	SBH15-160/10	1
上海光大电力设备制造有限公司云南分公司	SBH15-100/10	1
上海光大电力设备制造有限公司云南分公司	SBH15-200/10	2
上海光大电力设备制造有限公司云南分公司	SBH15-250/10	1
金华电力开发有限公司	SBH15-315/10	2
金华电力开发有限公司	SBH15-400/10	1
金华电力开发有限公司	SBH15-500/10	3
东台市佳达新型建材有限公司	SH15-250/10	1
江苏涟水经济开发区常委会	SHRN-630/10	1
南通苏能渗锌开关有限公司->如东东大工程	SHRN-500/10/0.4	2
南通苏能渗锌开关有限公司->如东东大工程	SHRN-630/10/0.4	2
南通天翔电器成套设备有限公司	SH11-315/10	1
南通天翔电器成套设备有限公司	SH11-500/10	1
楚雄滇中电力实业有限公司开发区分公司	SRH11-200/10	1
楚雄滇中电力实业有限公司开发区分公司	SRH11-315/10	1
楚雄辉煌电力实业有限公司	SRH11-50/6.3	2
滇中电业局	SRH15-125/10	1
滇中电业局	SRH15-160/10	1
滇中电业局	SRH15-200/10	1
滇中电业局	SRH15-315/10	2
滇中电业局	SRH15-50/10	5
上海申新电气有限公司	SRH15-250/10	1
上海直辉电气有限公司	SRH15-1000/10	1
深圳市金能源电器有限公司->深圳深港西部通道	SRH15-100/10	1
深圳市金能源电器有限公司->深圳深港西部通道	SRH15-80/10	1
深圳市金能源电器有限公司->深圳深港西部通道	SRH15-60/10	5
深圳市金能源电器有限公司->深圳深港西部通道	SRH15-30/10	4
深圳市金能源电器有限公司->深圳深港西部通道	SRH15-50/10	2
深圳市金能源电器有限公司->深圳深港西部通道	SRH15-80/10	5
云南禄丰跃龙电力电器有限责任公司	SRH11-125/10	1
云南禄丰跃龙电力电器有限责任公司	SRH11-160/10	1
云南禄丰跃龙电力电器有限责任公司	SRH11-50/10	2

Natural intelligence certificate

CTQC 试验合格证书 No: CTQC/B-10_457. 生产单位: 中电电气(江苏)股份有限公司. 样品名称: 非晶合金电力变压器. 试验项目: 例行试验, 温升试验, 声级测定, 三相空载损耗等.

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