



Yesha

YESHA ELECTRICALS PVT. LTD.



Quality

Reliability

Economy



COMPANY PROFILE

Yesha Electricals Pvt. Ltd. was established in 1962 in technical collaboration with Shizuki Electricals Works Co. Ltd., Japan to manufacture a wide range of power capacitors.

Over the years, the company has expanded its product line through a combination of in-house developments and licence collaboration with worldwide industry leaders.

Yesha exports worldwide and has an extensive distribution network across India.

Our in-house Research and Development Division had developed a number of capacitors for customized applications using unique production methods that also enables Yesha to produce small order quantities economically.

Yesha has been accredited with ISO 9001:2015 for the Manufacture and Supply of Stainless Steel Cable Ties and Accessories.

The Quality Control Division is an independent unit dedicated to training employees and developing process control systems to ensure quality.

Quality Control begins with the selection of raw materials, extending to the stringent testing procedures developed from over 50 years of experience.

YESHA has a fully equipped Testing Facility, which is upgraded continuously. All products comply with tests specified in relevant Indian Standards, IEC, Underwriters Laboratories (UL) Standards or customer specification, as applicable.

YESHA manufactures a wide range of Power Capacitors.

Let's explore the capacity and applications of various power capacitors.

For further details visit our website www.yeshaelectricals.com or e-mail us at : yesha@usa.net

INDUCTION FURNACE CAPACITORS (WATER /AIR COOLED)



INTRODUCTION

Yesha Medium Frequency Water Cooled Capacitors are designed for use in induction heating apparatus like Melting Furnace. Billet Heating, Forging, Induction Heating application etc. YESHA'S Water Cooled Capacitors are specially designed for the tropical conditions of India. We are in this line from over 40 years and have supplied our High Voltage Medium Frequency and High Frequency Capacitors to all major Original Equipment Manufacturers in India. We have also entered into a technical collaboration with WESTINGHOUSE, U.S.A. for manufacturing these Capacitors. The agreement was concluded to introduce the latest technological advances into the manufacturing range of our High Voltage Medium and High Frequency Capacitors. This enabled us to accelerate the process of development in this highly sophisticated area and bring our Capacitors at par with world's best products.

CHARACTERISTICS

In main frequency capacitors the inherent losses are such that the internal heat which is generated can readily be dissipated by the surface area of the container. With higher frequencies, the KVAR output of the capacitor proportionately increases. This make it possible to obtain about 600 KVAR from a capacitor of dimensions which at 50 cycles would be more than what could be dissipated from the surface of the container without giving rise to harmful internal temperature. To prevent this overheating the water cooling method is adopted. The calculations of KVAR from MFD rating of the Capacitor or vice versa can be done by a direct formula

$$\text{KVAR} = 2 \pi \text{FCV}^2 \times 10^{-9}$$

CONSTRUCTION

YESHA Medium Frequency Water Cooled Capacitors are low loss type with high dielectric strength. These capacitors utilise a Polypropylene/ Paper- Foil construction with a non-PCB Dielectric impregnant. Generally, unpainted aluminium case material is utilized. After winding the extended foil capacitor elements, one edge is soldered to a tinned copper tube, through which water is passed to dissipate the heat generated in the capacitor. For a successful joint between the foils and the tube, it is essential to have:

1. Good electrical conductivity.
2. High thermal conductivity.
3. High mechanical strength

These points are of fundamental importance. Through years of experience YESHA has successfully developed special techniques to achieve these objectives. Capacitors can be made in three basic modes of construction viz.

- (1) The cooling pipe is connected to one electrode of the capacitor elements and it is also connected to the case i.e. the cooling pipe is common terminal and the capacitor

case is live. (This method is most widely used and is the preferred method)

- (2) The cooling pipe is connected to one electrode of the capacitor elements but it is isolated from the case. i.e. cooling pipe is one terminal but the case is dead. This is a dead can type design.
- (3) The cooling pipe is isolated both from the capacitor elements and the container. (This method is not ideal)

WATER

The following criteria should be borne in mind while providing adequate water supply.

- (1) Maximum permissible inlet temperature must not exceed 40°C.
- (2) Maximum permissible outlet temperature must not exceed 45°C. Low temperature at inlet will increase efficiency and reduce the amount of water required. Flow of water must be such that difference between inlet and outlet temperature must not be more than 4°C.
- (3) Maximum pressure of the water must not exceed 60 p.s.i.
- (4) Water must be clean and solids in water must not exceed 20 ppm The water must have a calcium carbonate substance of less than 100 ppm.
- (5) P.H. of the water should be in the range of 7 to 8.3 and resistance should not be less than 2900 Ohms per cubic centimeter.
- (6) Flow rate of the water should be 7 liters per minute. PLEASE NOTE flow rate faster than 7 LPM will not provide better cooling.





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D.C. CAPACITORS



YESHA manufactures DC Capacitors in a wide range that solves the problems of various DC applications, such as filtering, bypass, coupling, etc. YESHA has been manufacturing these capacitors since mid-sixties and an innumerable number of them are in operation. Many of the leading companies have standardized on YESHA make DC Capacitors, these being fitted in their prestigious and vital equipments. Besides the standard ranges, YESHA designs Capacitors to suit any specific requirement.

DIELECTRIC

The dielectric of YESHA DC Capacitors consists of all Polypropylene film or Mixed Dielectric (PP + Paper) or all Paper depending on rating, application, etc. However, in Indian conditions, it is noticed that DC capacitors with all paper dielectric is still, more economical than all polypropylene dielectric.

HOUSING

Small Capacitors of light duty are housed in soldered containers where as heavy duty and large units are housed in thick gauge MS containers which are hermetically sealed. For special applications, a tubular type insulated body is also used.



TESTING

All Capacitors are tested as per IS 590 or as per customer's requirements. The following tests are normally carried out:

- Capacitance Test - $\pm 10\%$ for Capacitors rated above 1 MFD and $\pm 20\%$ for those rated below 1 MFD (Closer tolerance can be supplied on request)
- Insulation resistance test between terminals - More than 5000 Ohm-Farads at 20 C.
- Insulation resistance test between terminal and case - More than 1000 Meg ohms between terminals connected and the case.
- High Voltage Test - Normally 2 times the rated Voltage for capacitors of rated voltage above 5000 VDC and 2.5 times for those having rated voltage below 2000 VDC. For higher voltage class the test voltage is as per requirement.

Besides above, tests at every stage of production are carried out to ensure the highest quality.

Capacitance : 0.1 μ fd to 1640 μ fd

Voltage : 150 VDC to 150 KVDC

DISCHARGE INSTRUCTIONS

Filter Capacitors should not be discharged across terminals directly after charging. Permanent sorting link is recommended when capacitor is not in use.



PULSE POWER ENERGY STORAGE CAPACITOR

INTRODUCTION

Energy Storage Capacitors are highly effective for storing electrical energy which can be subsequently released for short durations at extremely high rates to produce high peak current and power under discharge conditions. They are very effective for applications like:

- Plasma physics
- Subatomic particle research
- Controlled nuclear fusion.
- Lasers
- Impulse generators
- High energy x-rays
- Metal forming, and many more.

YEPL has 40 years of experience and expertise in this field with technical support and know-how in the past from Maxwell Laboratories Inc. USA. We have a fully developed range of Energy Storage Capacitors designed to your specifications.

ENERGY STORES

Energy Storage Capacitors can be used individually or in banks.

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The stored energy in joules is given by:

$$\text{JOULES} = \frac{1}{2} \times C \times V^2$$

where C = Capacitance in Farads.

V = Charging voltage in volts



CHARACTERISTICS

To achieve an optimum balance performance and cost for any application, it is necessary to design the capacitor to suit the waveform and duty cycle to which it will be subjected in service and the life it is expected to give.

The life expectancy of an Energy Storage Capacitor is a function of the electrical stress, the voltage reversal and the repetition rate of discharges.

A Capacitor designed with low electrical stress will have a long life, however, it will be large in size and high in cost. Capacitors, can be designed for limited life with higher electrical stress to make them more economical.

To obtain maximum peak current, the Self Inductance Value of the capacitor should be low. Specific designs are available from our range to meet this requirement.

Today, we manufacture several ratings of standard capacitors, classified broadly into three categories:

1. Welded mild steel with one or two bushings.
2. Double ended plastic case.
3. Single ended plastic case.

Our standard capacitor line is designed to cover a very wide range of applications. However, we have the design, manufacturing and testing capabilities to provide suitable custom built units for special applications.

An Energy Discharge Capacitor Application Questionnaire will be provided for your requirement. It lists the information which will help us in selecting the best possible capacitor for your specific application. If a capacitor from our standard range is not suitable, we will custom design the capacitor for you. We recommended you to make use of this questionnaire to enable us to provide the optimum solution for your requirement.

Capacitance : 0.01 to 200 Microfarad

Voltage : 1 to 1000 KVDC

Peak Ampere : 0.2 to 500 kilo amps

Self-Inductance : 17 to 250 nano henry

Repetition rate : 1PPM to 1000 PPS

Voltage reversal : Max 80%

Life Expectancy : upto 10^9 Discharges

LOW VOLTAGE POWER FACTOR IMPROVEMENT CAPACITORS



INTRODUCTION

In 1963, with the technical assistance of Shizuki Electric Works. Co., one of the foremost Capacitor manufacturers in Jan, the first 'YESHA' Capacitor manufactured in backed by the export supervision of engineers trained abroad.

The use of Power Factor Improvement Capacitors helps in reduction of electrical energy costs and in improving the utility of electrical installations.

Most AC electrical machines draw from the supply source an apparent power in terms of KVA (Kilovolt-amperes) which exceeds the useful power KW (Kilowatts) required by each machine. The ratio of these two measures, i.e.

$$\frac{\text{Useful Power}}{\text{Apparent Power}} \quad \text{OR} \quad \frac{\text{KW}}{\text{KVA}}$$

is known as the power factor of the load and is dependent upon the type of machine in use. A large proportion of electrical machinery used in industries has an inherently low Power Factor, which means that the supply source has to generate current in excess to the actual requirement and the transformers and cables have to carry this the extra useless current. To overcome this the supply authorities impose penalty for low power factor and at many places they offer concession for higher power factor.

Installing a suitable capacitor will enable the user to take advantage of the concession, and to avoid penalty. Thus the of capacitors is covered normally in 12 to 15 months. Thereafter it is clear profit. The main advantages of installing power factor capacitors are:

1. Reduced power cost, due to reduced KVA demand or exemption from any penalty for low power factor and concession for high power factor.
2. Release of power system capacity. Additional load can be installed without investment in additional capital equipment.
3. Reduced overloading and therefore less heating of cables and other expensive control panels.
4. Reduced losses in Feeders.
5. Reduction in voltage interference due to welding equipment, etc.
6. Reduction in size of electrical equipment for new installation and, therefore, less capital expenditure.

WHY YESHA CAPACITORS

YESHA Capacitors, from the smallest to the largest are robust in construction, of pleasing appearance and manufactured throughout to the same high standard of engineering.

SELECTION OF RAW MATERIALS

Raw material selection is very critical in the case of capacitors. All

the raw materials in our capacitors are subjected to rigid quality tests before and during manufacture and the material is not released for manufacture until it has been proved suitable.

ELEMENTS WINDING

The capacitor elements are wound on precision machines, under controlled and dust free specially constructed winding rooms, which ensure accurate and uniform winding.

DRY ASSEMBLY

Dry assembly is done under strict supervision to ensure proper construction of capacitors. Ceramic insulators are fitted on the containers using silicon rubber seal to ensure 100% leakproofness. Containers are pressure tested.

DRYING AND IMPREGNATION PROCESS

After assembly the capacitors are dried and impregnated under high vacuum and controlled temperature, in special tanks, to ensure proper drying and impregnation.

PAINTING

Capacitor containers are first sprayed with one coat of zinc chromate primer and them two coats of superior quality paint.

TESTING

All capacitors comply with tests specified in IS:13585. Rigid inspection and testing throughout all stages of manufacture ensures that the product reaching the customer is of the highest quality.

GUARANTEE

All "YESHA" Power Factor Improvement 415-440 Volts Capacitors are guaranteed for 30 months from the date of supply against any manufacturing defects.

Capacitance : 1 to 25 KVAr & above 25 KVAr are provided in bank formation

Voltage : 415 / 440 AC

Phase : Single or Three

Frequency : 50Hz / 60Hz





HIGH VOLTAGE POWER FACTOR IMPROVEMENT CAPACITORS

INTRODUCTION

YESHA has been manufacturing High Voltage Paper Dielectric Power Factor Improvement Capacitors for several years. As a result of the Company's policy of Research and Development, and to market the latest technology, Mixed Dielectric and All Polypropylene Capacitors for High Voltage applications were introduced in the early eighties.

The introduction of High Voltage Mixed Dielectric Capacitors was the outcome of many years of continuous research of M/s. General Electric Co. U.S.A., under licence from whom we started manufacturing these type of Capacitors. Simultaneously continuous research and development at YESHA made it possible to come out with All Polypropylene Capacitors for High Voltage Applications.

There are low loss Capacitors, impregnated with Non-PCB Oil which is non-pollutant and non-toxic. The sizes are far more compact than that of conventional Paper Dielectric Capacitors, resulting in lighter weight and facilitating handling.

Unit life tests for many hours under accelerated voltage and temperature conditions amply prove that Mixed Dielectric and All Polypropylene Capacitors have increased life expectancy as compared to Paper Dielectric Capacitors and the incidence of random failure is greatly reduced.

CAPACITORS AVAILABLE

A wide range of Capacitor units is available complying with relevant IS Specifications. The voltage of a capacitor unit can be selected from 660 V to 33 KV. The great number of different voltage ratings which can be supplied enables a wide variety of needs to be met. This flexibility is advantageous when series parallel combinations are required for high power bank arrangements.

FUSES

In general, external fuses are recommended. Either expulsion type or H.R.C. type fuses are mounted adjacent to a live bushing terminal. It is suggested that details of service requirements and the nature of the installation should be given to enable to indicate the fuse type and characteristics most appropriate.

DISCHARGE DEVICE

Resistors of suitable ratings are fitted to each Capacitor unit and the maximum discharge time for all ratings is five minutes.

TERMINATIONS

Capacitor units are fitted with one or two bushings depending on the application; and the main insulation to the container is graded accordingly.

CAPACITOR BANK CONSTRUCTION

Capacitor banks can be supplied for any desired level of reactive power voltage rating. The assembly of capacitor units into banks can be facilitated by using prefabricated steel structure supplied on request.

The complete rack assemblies can quickly be built into a stack at

site by means of a mobile crane or similar equipment, once the relatively simple foundations have been prepared.

PROTECTION OF CAPACITOR BANKS

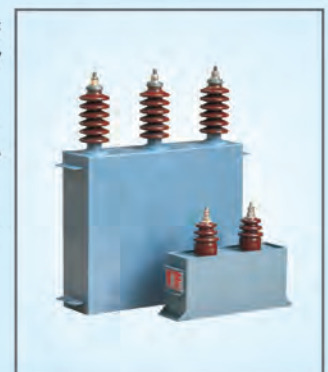
It is desirable to provide safeguards for capacitor banks in addition to the fuse protecting the individual capacitor units. Economic considerations determine which of the several forms should be used; the preferred methods are fundamentally balanced circuit systems giving indication of disconnections due to faults within the bank. Although in many cases out-of-balance conditions can be withstood safely for short period, it is advisable to restore the bank to normal working as quickly as possible. For medium size and large banks from about 600 KVAR upwards, the use of damping devices is necessary for the parallel switching of a number of capacitor circuits. This reduces the stressing of the capacitors and switchgear and also prevents reactions on the network.

INFORMATION REQUIRED WITH ENQUIRY

To design the most suitable capacitor to suit your requirement, it is necessary to have all relevant details of the installation or system to which the capacitors are to be applied. For instance, equipments such as rectifiers, arc furnace or transformer (under certain conditions) produce harmonics, necessitating special considerations. Therefore, following information should accompany any enquiry:

1. The main purpose for which capacitors are being considered, e.g. Increased KW transmission on a line, reduced voltage drop on a line; decreased Power loss on a line, increased transformer capacity, increased alternator capacity, etc.
2. Output in KVAR or load details like KVA load, present power factor and power factor required.
3. System voltage, frequency and number of phases.
4. State whether any abnormal voltage rises are expected. If yes, what is the highest Voltage expected.
5. State whether waveform is sinusoidal or whether harmonic voltages are present. If harmonics are present give Percentage voltage for each harmonic frequency.
6. Insulation voltage required, if different from the line voltage.
7. Type and details of load, preferably give a simple schematic diagram.
8. Proposed location of capacitors Indoors / outdoors.
9. Ambient temperature - peak value and average over 24 hours.
10. Any other relevant details.

Capacitance : Upto 200 KVAR
Voltage : Upto 33 KV
Phase : Single or Three
Frequency : 50 Hz / 60Hz



SURGE PROTECTION CAPACITORS FOR HIGH VOLTAGE EQUIPMENTS



In practice, due to limitations in size, space and cost, rotating machines are not insulated to the same impulse levels as oil insulated apparatus of same voltage class.

These machines when connected to system are subjected to surge voltage hazards.

The major insulation of any machine is stressed by magnitude of the surge voltage to ground and is protected by a lightning arrester.

The minor insulation of any machine is stressed by rate of rise of Surge Voltage, which can be limited by Surge Protection capacitor.

For the above purpose, normally 0.1 μ fd to 0.5 μ fd value is used & voltage upto 45 KVAC.

YESHA Surge Capacitors are made from highest quality material and every capacitor is subjected to rigid quality control at every stage of production to ensure a quality product. All Surge capacitors are subjected to following tests:

1. Capacitance
2. Tan Delta
3. 4.3 times the rated voltage as D.C. Voltage test for 10 Sec.
4. Sealing Test for oil leakage
5. Surge protection capacitors are normally are a following ratings :

Capacitance: 0.1 μ fd to 0.5 μ fd;

Voltage: Up to 45 KVAC,

Phase: Single or Three

With or without series resistance.



HIGH VOLTAGE DIVIDER CAPACITORS



Capacity : 100 Pico farads to 25000 Pico farads

Voltage : upto 500 KV AC & DC

Frequency : Upto 150 Hz

Application: Yesha high voltage divider capacitors are designed for use in measurement of voltage in high voltage laboratories and test houses.

Yesha high voltage divider capacitors are partial discharge free specially design for measurement of voltage in high voltage laboratories and test houses.



NOTES

Yesha
CAPACITORS

QUALITY • RELIABILITY • ECONOMY

YESHA ELECTRICALS PVT. LTD.

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