

Retrofit Solutions

FOR TRANSFORMER BUSHINGS

Rated Voltage : 24 kV – 245 kV

Rated Current : 400 A – 25000 A

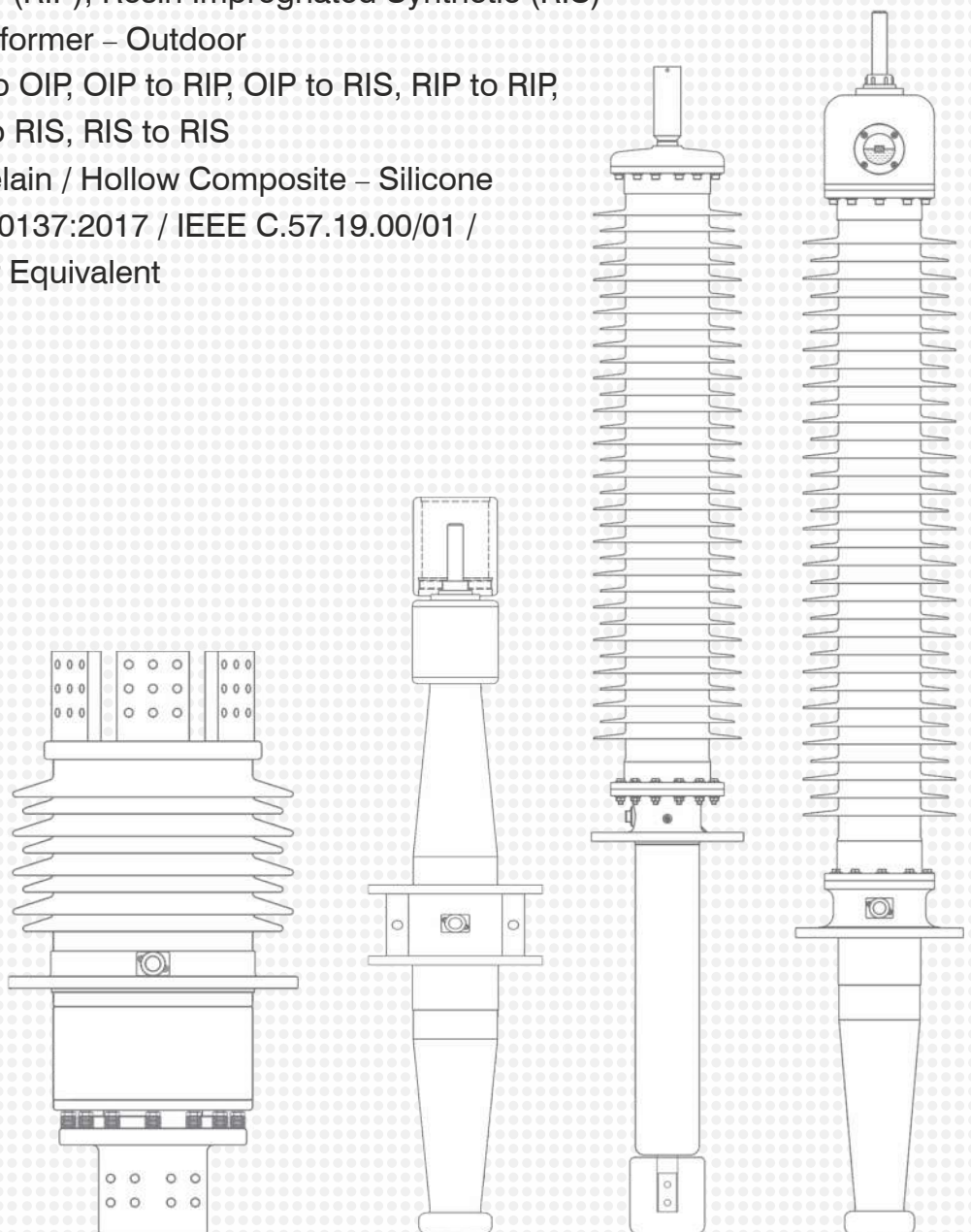
Insulations : Oil Impregnated Paper (OIP), Resin Impregnated Paper (RIP), Resin Impregnated Synthetic (RIS)

Application : Transformer – Outdoor

Types : OIP to OIP, OIP to RIP, OIP to RIS, RIP to RIP, RIP to RIS, RIS to RIS

Insulators : Porcelain / Hollow Composite – Silicone

Standards : IEC 60137:2017 / IEEE C.57.19.00/01 /
Other Equivalent





Yash Highvoltage Ltd.® [Yash®], an ISO 9001certified company based in Western India and listed on the BSE SME segment, is a leading name in the manufacturing of high-voltage and high-current transformer bushings. Specializing in high voltage applications up to 245 kV and high current applications up to 25000 A, Yash® caters to a wide range of industry needs.

Equipped with a state-of-the-art manufacturing and testing facility featuring advanced equipment from renowned manufacturers in Germany, Switzerland, the USA, and across Europe, Yash® combines cutting-edge technology with unparalleled expertise. Backed by a team of technical professionals with over 100 years of collective experience, Yash® is dedicated to delivering world-class quality solutions to customers worldwide.

35000+

Bushings supplied globally

100+

Standardized models type tested

60+

Global installation bases in countries like - America, Europe, Australia, Middle East, etc.

20+

years of field experience

Major Approvals



And many more...

Domestic Customers



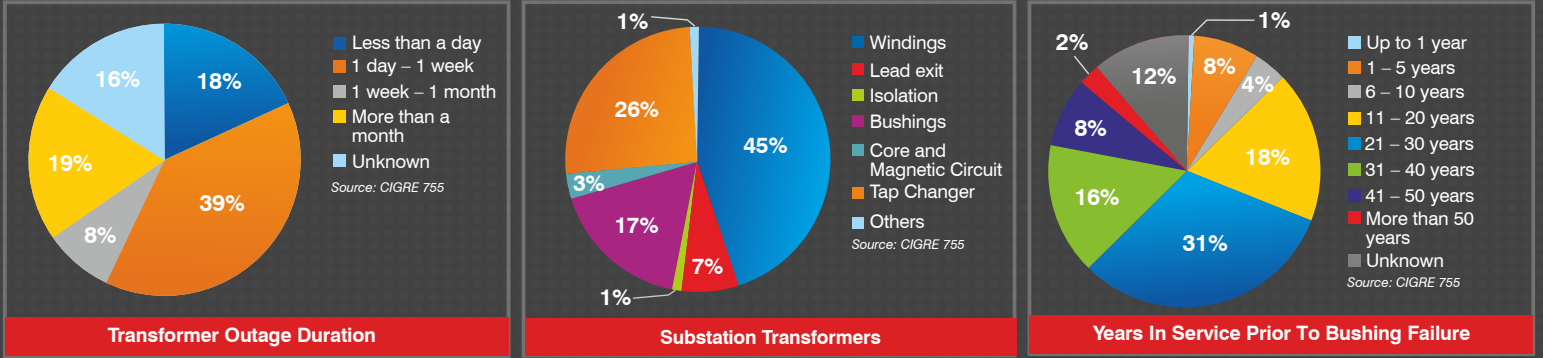
And many more...

Export Customers



And many more...

Bushing failures constitute the third largest cause of transformer failures globally i.e., approximately 17%. According to the latest statistics, the contribution of transformer damage due to bushing failures is even higher in India (30 – 35%).



Major reasons of bushing failures

- Lack of timely condition monitoring.
- Aging fleet of OIP bushings operational for >15 years and not replaced with suitable spares on time.
- Aged Oil type/Oil filled bushings population is high (>90%) in the country's transmission network.

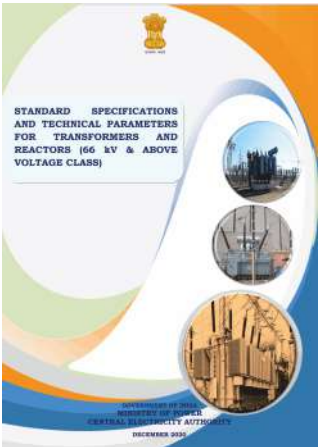
Table 1. Significance of condenser bushing tan δ and capacitance test values - analysis and interpretation of results [5, 8]

| Tan δ and capacitance - trend of test results | Analysis |
|--|---|
| Increase in tan δ (between 0.7% and 1%) accompanied by marked increase of capacitance. | Points to excessive moisture in the insulation. |
| Very high increase in tan δ alone (over 1%). | Points to thermal deterioration, aging or contamination other than the moisture. |
| Low tan δ. | Points to weak potential connections. |
| Increased capacitance. | Points to possible short-circuited condenser layers. |
| Decreased capacitance. | Points to possible floating ground sleeve, or open or poor test tap connection. |
| Very large variation in tan δ and capacitance values. | Points to no oil in the bushing. |
| Negative tan δ accompanied with small reduction in capacitance. | May result from external surface leakages or internal leakages resulting from carbon tracking, etc. |

Source: Transformers Magazine/Special Edition/Bushings, 2017.

Extract from CEA's latest standard specification for power transformers, (Page II - 27)

During the discussion in standing committee meetings relating to failure of sub-station equipment, it is observed that bushing is one of the major causes of failure of transformers. Although bushings constitute only 2 – 3% of the transformer cost, failure arising from bushings has often led to severe consequences like explosion, tank rupture, hazardous fire and colossal damage. Hence **RIP/RIS bushings** have been specified at various voltage levels in place of conventional **OIP bushings**. **RIS would be a better/preferred alternative to OIP, but due to limited manufacturers in the world, both RIP and RIS have been considered.**



For various voltage class of transformer/reactor, type of bushings shall be as follows:

| Voltage Rating | Bushing Type |
|--|---|
| 145 kV, 245 kV and 420 kV bushings for 400 kV and below voltage class transformers and reactors. | RIP/RIS |
| 420 kV and 800 kV bushings for 765 kV class transformers; 800 kV bushings in 765 kV Class reactor. | OIP/RIP/RIS |
| Bushings of 36 kV and below. | Solid porcelain or oil communication type OIP (for high current requirement e.g., for GTs). |
| Bushings of other rating. | OIP/RIP/RIS |

Comprehensive Bushing Retrofit Solutions by YASH®

For a long transformer service life

Taking cognizance of the criticality of bushings in a transformer, premiere policy makers of the nation as well as other national and domestic utilities have progressively adopted specifications for transformers and reactors with the use of safe and reliable RIP/RIS bushings for all new transformers. Many utilities are also actively replacing their existing OIP bushing fleet with retrofitted RIP/RIS bushings on the old transformers.

At YASH®, we have proven ability to be a large-scale supplier of standard design IEC/IEEE bushings. We have also gone beyond to become a comprehensive solution provider for highly sought-after repairs/replacements and retrofit solutions to old/existing transformer bushings of any reputed global make, which may have developed deficiencies/damage over years of service or have been damaged during transportation/handling/commissioning or long-term storage at the site. YASH® gives a unique opportunity to end users and utilities to leverage the latest RIP/RIS dry-type bushing technologies, that are highly safe and reliable for your transformers fleet, by retrofitting and replacing existing OIP bushings on the transformers.

While there are numerous global providers offering solutions for power transformer repairs and overhauling, YASH® stands unrivaled in delivering retrofit/repair solutions tailored specifically to transformer bushings and recognized by global utilities/power substations/EPCs and transformer repairing/overhauling enterprises.



Interchangeable solutions possible for OIP to OIP (Oil Impregnated Paper), OIP to RIP (Resin Impregnated Paper) and OIP to RIS (Resin Impregnated Synthetic) bushings!



YASH® make 245 kV RIP bushing installed on a transformer as replacement to existing OIP bushing in Y phase, with R & B phase operating with old OIP bushings, at a site in Northern India.

YASH® offers a blanket solution to meet your customized retrofit and repair service needs

Expert Support



Engineering consultation by experienced service and retrofit engineers with customer's technical team to evaluate existing products and drawings and arrive at ditto interchangeable solutions.

Highly Customizable



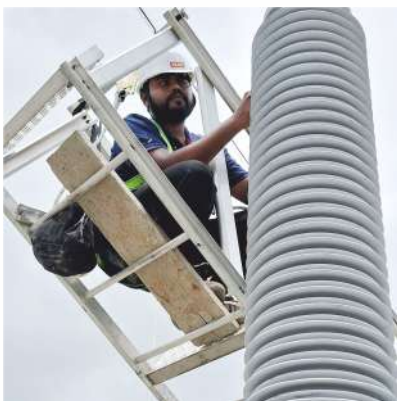
Ability to interchange, to a large extent, mounting, BCT, oil end length, creepage, terminations amongst other specifications.

Condition Assessment



On-site and off-site capacitance and $\tan \delta$ test services for condition monitoring of transformer bushings of any global make, early fault detection, with the help of state-of-the-art portable test kit, and spot recommendations by experts.

Repairing Services



Specialized repairing solutions for damage in transformer bushings caused during handling, transportation, storage, erection, etc.

Site Visits



On-site physical evaluation and measurement services available if old drawings are not available.

Standard Warranty



Full standard warranty offered on bushings supplied as retrofit solution to existing bushings.

Retrofit Solutions Supplied by YASH®



145 kV OIP bushings as Retrofit to old 145 kV SRBP bushings at an MPPTCL site



145 kV RIS bushing as Retrofit to old 145 kV OIP bushing at CESC



145 kV OIP bushing as Retrofit to damaged OIP bushing at Hindalco



245 kV OIP bushing as Retrofit to damaged bushing of other manufacturer at an RDSO site



245 kV RIP bushing as Retrofit to damaged OIP bushing at JSW Dolvi

Number of bushings supplied by YASH®

1000+

Retrofit solutions executed over past 3 years

100+

Customers served with customized retrofits

Few critical damage repairing done by YASH®

Through our services team, we offer specialized bushing repair solutions that include but are not limited to:

- Porcelain replacement
- Silicone insulator shed repair
- Part replacement
- Complete overhauling of bushing



YASH® make 36 kV 12500 A 0 CT HC bushing with octagonal termination – to retrofit old Mitsubishi Japan make bushings for NTPC



24 kV 12500 A 0 CT HC bushing with copper strip oil end termination – executed for various Generation utilities' retrofit needs to replace legacy bushings



24 kV 4000 A, 5000 A, 8000 A – custom made retrofits supplied to various NTPC sites



YASH® Make 24 kV 4500 A bushing with custom flat terminations to suite NTPC Kawas's retrofit needs



Damaged Silicone sheds at site



Repaired Silicone sheds on-site



24 kV 5500 A – developed for Torrent Power and NPCIL



36 kV 16000 A Retrofit Solution – Developed for CENAL Turkey



36 kV 16000 A – Copper – Developed for NTPC Singrauli



145 kV RIS bushing as Retrofit to 145 kV OIP bushing at CESC



24 kV 12500 A BHEL design retrofit solution



36 kV 10000 A – Developed for Export customer in Ecuador



36 kV 16000 A 0 CT – Developed for NSPCL



145 kV OIP bushing with transit damage to Air end porcelain



Porcelain part replacement, bushing refurbished and supplied after complete routine testing

Solutions above 245 kV bushings are available from our RIP/RIS technology partner – MGC Moser Glaser AG Switzerland – a Pfiffner company.

Product Range



HIGH CURRENT BUSHINGS

Rated Voltage:
24 kV – 52 kV

Rated Current:
4000 A – 25000 A

Standard:
**IEC-60137:2017 / IEEE
C57.19.00/01 / Others**

Types:
**Oil filled / Communicating /
OIP condenser**



OIP CONDENSER BUSHINGS

Rated Voltage:
24 kV – 245 kV

Rated Current:
Upto 3150 A*

Standards:
**IEC-60137:2017 / IEEE
C57.19.00/01 / Others**

Connection:
**Draw lead / Draw rod /
Stem type**

Housing:
**Porcelain / Composite /
Silicone / Polymer**

*Customized rated current >3150A
are available upon request



RIP/RIS CONDENSER BUSHINGS

Rated Voltage:
24 kV – 245 kV

Rated Current:
400 A – 3150 A*

Standard:
IEC-60137:2017

Connection:
**Draw lead / Draw rod /
Stem type**

Housing:
**Composite / Silicone /
Polymer**

*6300 A and other special current
ratings also available on request.

Technology collaboration
MOSER GLASER
[For Indian supplies]



OIP WALL BUSHINGS/ OIL TO OIL BUSHINGS

Rated Voltage:
24 kV – 245 kV

Rated Current:
400 A – 3150 A*

Standard:
**IEC-60137:2017 / IEEE
C.57.19.00/01 / Others**

Connection:
**Draw lead / Draw rod /
Solid conductor**

Housing:
**Porcelain / Composite /
Silicone / Polymer**

*Customized rated current >3150A
are available upon request



YASH HIGHVOLTAGE LIMITED®

Office & Manufacturing Plant
84/1-B, Khakhariya, Halol-Savli Road,
Vadodara, Gujarat - 391510, India
Email: sales@yashhv.com
Website: www.yashhv.com
Mobile: +91 90990 96577

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guarantee that it is entirely complete, correct or up-to-date.

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**NABL accredited
EHV lab**



Represented By

