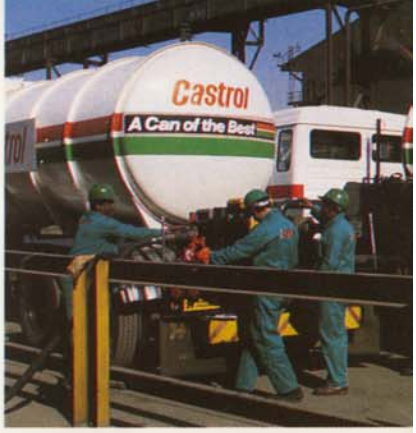
E L E C T R I C I T Y


# Castrol

A Can of the Best

*RELIABLE AND ADEQUATE SUPPLY of electricity is essential for the continued functioning of modern society. Quality of life for the domestic consumer and profitability for the industrial user are dependent on electricity, a commodity which is so often taken for granted.*




For those who are responsible for the provision of electricity, from its generation stage through to the end consumer, reliable performance of electrical equipment is paramount. The reliability of electrical equipment, transformers particularly, is in turn dependent on its insulation system of which transformer oil is a major component.

**FOR RELIABLE, TROUBLE FREE PERFORMANCE OF ELECTRICAL EQUIPMENT, TRANSFORMER OIL MUST BE KEPT IN GOOD CONDITION.**

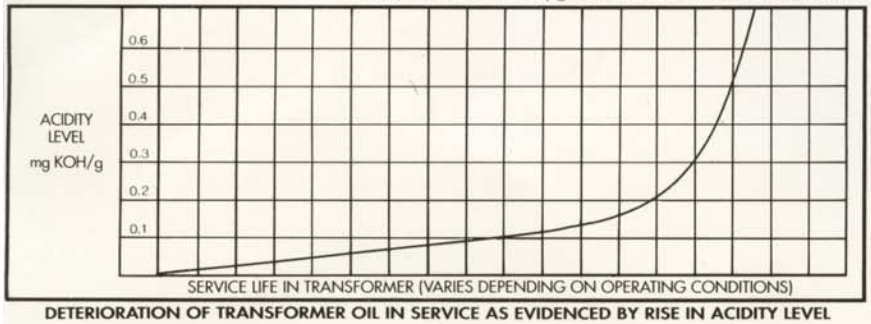
## THE FUNCTION OF TRANSFORMER OIL

The oil in a transformer has two primary functions; to act as a coolant and to insulate electrically. To perform these functions satisfactorily the oil used must:

- Maintain good electrical properties
- Be free from contaminants
- Remain chemically neutral to transformer components
- Have a very low water content, and
- Viscosity, Flash Point and Pour Point must be kept within specification.

Transformer oils do deteriorate under continuous, long-term, service. High operating temperatures, the presence of oxygen and water, as well as the catalytic action of materials within the transformer itself, result in oxidation and partial cracking of the oil.

Acidic by-products of oxidation, the formation of sludge, water and gasses in the transformer, are an expected result of these operating conditions over a period of years, and can reach the stage where the life and performance of the transformer is severely effected. This deterioration will take place very slowly at first, but once started will accelerate at an increasing rate.




**DETERIORATION OF TRANSFORMER OIL IN SERVICE AS EVIDENCED BY RISE IN ACIDITY LEVEL**

The most convenient measure of transformer oil deterioration is the increase in acidity measured in mg KOH/g, we recommend that you contact us for expert advice when the acidity level approaches 0.3 mg KOH/g.

## CASTROL-PIONEERS IN OIL REGENERATION

A highly cost effective method for returning unserviceable transformer oil to specification was developed by Castrol over 50 years ago. This technique has been perfected over the years and since then introduced internationally, with Castrol South Africa building its first plant in 1976. Locally, Castrol now has three plants strategically located in Johannesburg, Durban and Cape Town.

Castrol

Transformer oil is regenerated by Castrol on an exchange basis and the product supplied conforms in all respects to qualities required in a new oil.

In addition to this, Castrol has successfully provided a Drain-Flush and Fill service for larger transformers. Old oil is drained, the transformer is flushed and refilled with SABS 555 specification regenerated transformer oil.

Satisfied customers for our services include; The Electricity Supply Commission (ESKOM), most City Councils, Spoornet, Iscor, as well as many mining and industrial companies.

## NEW! THE CASTROL MOBILE OIL REFINERY

### CASTROL NOW BRINGS THE REFINING PLANT TO THE TRANSFORMER

As an additional service to the industry, Castrol South Africa has mobilised this highly developed refining technology and proudly introduces the **CASTROL MOBILE OIL REFINERY**. Using tried and proven technology, the **CASTROL MOBILE OIL REFINERY** offers you the following:

- **QUALITY OF PRODUCT, QUALITY OF SERVICE** – Oil in the transformer is GUARANTEED to be returned to SABS 555 (1985) and BSS 148 (1984) specification ensuring continued top performance from your transformer.
  Acidity levels are guaranteed to be reduced back to specification.
  The **CASTROL MOBILE OIL REFINERY** is approved to SABS 0157 Part II quality standard.
- **COST SAVINGS** – By refining the transformer oil on-site, there is no transportation cost for moving oil to and from stationary plant. Labour costs are also reduced.
- **COST OF ADDITIONAL SERVICES ELIMINATED** – **THE CASTROL MOBILE OIL REFINERY** does a complete service in one operation. There is no need to filter, de-gas or dehydrate oil prior to energising the transformer.
- **REDUCED DOWN-TIME** – Non productive time is kept to the minimum as the **CASTROL MOBILE OIL REFINERY** accomplishes its task in a remarkably short period of time.
- **ENVIRONMENTAL BENEFITS** – The refining process does not produce any harmful by-products to contaminate the environment and by refining on-site, wastage and spillage is eliminated.
  Being a closed system, there is no danger of harmful chemicals entering the environment.


## COMPREHENSIVE INTEGRATED LABORATORY

Castrol is committed to providing its customers with the best quality control service available and has, therefore, invested in additional laboratory facilities, which are installed inside the **CASTROL MOBILE OIL REFINERY**. This comprehensive laboratory provides these additional benefits:

1. **Quality of Product** – Consistently high quality product is ensured as the refining process is constantly monitored. Over-refining of oil is avoided.
2. **Reduced down-time** – Transformer can be energised without the delay of waiting for laboratory clearance.

SEE TABLE OVERLEAF

## TYPICAL PERFORMANCE OF CASTROL MOBILE OIL REFINERY

| TEST | METHOD | SABS 555 LIMITS | USED OIL | AFTER REFINING |
|---|---|---|---|---|
| Density @ 20°C kg/l | I.P. 160 | 0,895 max. | 0,873 | 0,875 |
| Kinematic Viscosity @ 40°C $mm^2/s$ | I.P. 71 | 16,5 max. | 12,5 | 12,4 |
| @ –15°C $mm^2/s$ | | 800 max. | 330 | 328 |
| Flash Point °C | I.P. 34 | 140 min. | 150 | 153 |
| Pour Point °C | I.P. 15 | –21 max. | –33 | –33 |
| Neutralisation Value mg KOH/g | I.P. 1(b) | 0,03 max. | 0,53 | 0,01 |
| Corrosive Sulphur | I.P. 315 | Non Corrosive | Non Corrosive | Non Corros |
| Electric Strength kV | I.P. 295 | 30 min. | 16 | 72 |
| Resistivity @ 20°C G ∩ m | ASTM D1169 | – | 2 | 15 000 |
| @ 90°C G ∩ m | | – | 0,1 | 450 |
| Dielectric Dissipation Factor @ 90°C | IEC 250 | 0,005 max. | 3,5 | 0,0018 |
| Water Content mg/kg | ASTM 1533 | 35 max. | 205 | 8 |
| Oxidation Test Neutralisation Value mg KOH/g | I.P. 307 | 0,4 max. | – | 0,21 |
| Sludge % | | 0,1 max. | – | 0,036 |
| Colour | | | Red/Brown | Straw |
| Appearance | | | Cloudy | Clear |
| Particles | | Nil | Present | Nil |
| Fibres | | Nil | Present | Nil |

**Castrol**

**SOUTH AFRICA (PTY) LIMITED**


HEAD OFFICE
CASTROL HOUSE
7 JUNCTION AVENUE, PARKTOWN
JOHANNESBURG
P.O. BOX 87013, HOUGHTON 2041
TEL: (011) 643-7161 FAX: (011) 643-7269

TVL. AND O.F.S. BRANCH
FORSDICK ROAD
ROODEKOP, GERMISTON
P.O. BOX 4139
ALRODE
1451
TEL: (011) 865-3001
FAX: (011) 865-1781

NATAL BRANCH
34 ESSEX TERRACE
WESTVILLE, DURBAN
P.O. BOX 536
DURBAN
4000
TEL: (031) 86-7018
FAX: (031) 86-7009

EASTERN CAPE
86 COMMERICAL ROAD
SIDWELL
PORT ELIZABETH
P.O. BOX 131
PORT ELIZABETH
6000
TEL: (041) 41-2924
FAX: (041) 43-1425

WESTERN CAPE
66 UPPER AUCKLAND STREET
PAARDEN EILAND
CAPE TOWN
P.O. BOX 1372
CAPE TOWN
8000
TEL: (021) 511-0574
FAX: (021) 511-2633