



## BS EN 61936-1:2010

### Transformer Bund

#### 8.8 Protection against leakage of insulating liquid and SF6

##### 8.8.1 Insulating liquid leakage and subsoil water protection

###### 8.8.1.1 General

Measures shall be taken to contain any leakage from liquid-immersed equipment so as to prevent environmental damage. National and/or local regulations may specify the minimum quantity of liquid contained in an equipment for which containment is required. As a guideline, where no national and/or local regulations exist, **containment should be provided around liquid immersed equipment containing more than 1,000litres** (according to IEEE 980: 2,500litres).

###### 8.8.1.2 Containment for indoor equipment

In indoor installations, spills of insulating liquid may be contained by providing impermeable floors with thresholds around the area where the equipment is located or by collecting the spilled liquid in a designated holding area in the building (see Figure 11).

The volume of the insulating liquid in the equipment as well as any volume of water discharging from a fire protection system shall be considered when selecting height of threshold or volume of the holding area.

###### 8.8.1.3 Containment for outdoor equipment

The quantity of insulating liquid in equipment, the volume of water from rain and fire protection systems, the proximity to water courses and soil conditions shall be considered in the selection of a containment system.

**NOTE 1:** Containments (sumps) around liquid immersed equipment and/or holding tanks (catchment tanks) are extensively used to prevent escape into the environment of insulating liquid from equipment.

Containments and holding tanks, where provided, may be designed and arranged as follows:

- tanks;
- sump with integrated catchment tank for the **entire quantity of fluid** (Figure 8);
- sump with separate catchment tank. Where there are several sumps, the drain pipes may lead to a common catchment tank; this common catchment tank shall then be **capable of holding the fluids of the largest transformer** (Figure 9);
- sump with integrated common catchment tank for several transformers, **capable of holding the fluids of the largest transformer** (Figure 10).

The walls and the associated pipings of sumps and catchment tanks shall be impermeable to liquid. The capacity of the sumps/catchment tanks for insulating and cooling fluids shall not be unduly reduced by water flowing in. It shall be possible to drain or to draw off the water.

A simple device indicating the level of liquid is recommended.

Attention shall be paid to the danger of frost.

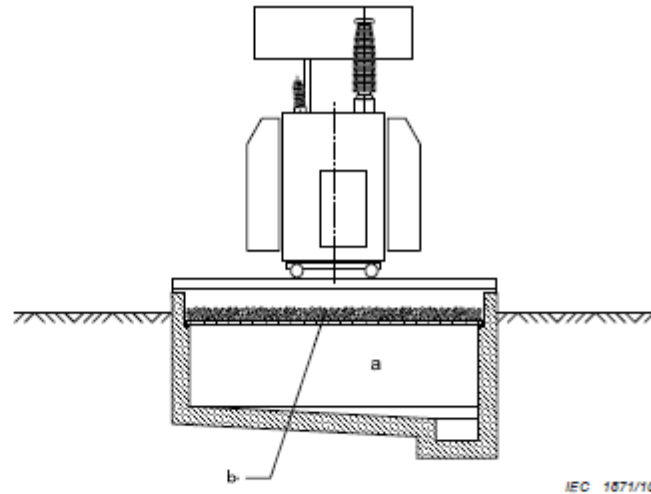
The following additional measures shall be taken for protection of waterways and of ground water:

- the egress of insulating and cooling fluid from the sump/tank/floor arrangement shall be prevented (for exceptions, see 8.8.1.1);
- drained water should pass through devices for separating the fluids; for this purpose, their
- specific weights shall be taken into account.

**NOTE 2:** For outdoor installations, CIGRE Report 23-07 [30] recommends that the length and width of the sump is equal to the length and the width of the transformers plus 20 % of the transformer's height (including the conservator) on each side. IEEE 980 recommends that spill containment extends a minimum 1,500 mm beyond any liquid-filled part of the equipment.

**NOTE 3:** Examples for the automatic draining of water and separating of liquids is given in CIGRE Report 23-07 and IEEE 980.

State and regional laws and regulations shall be taken into account.



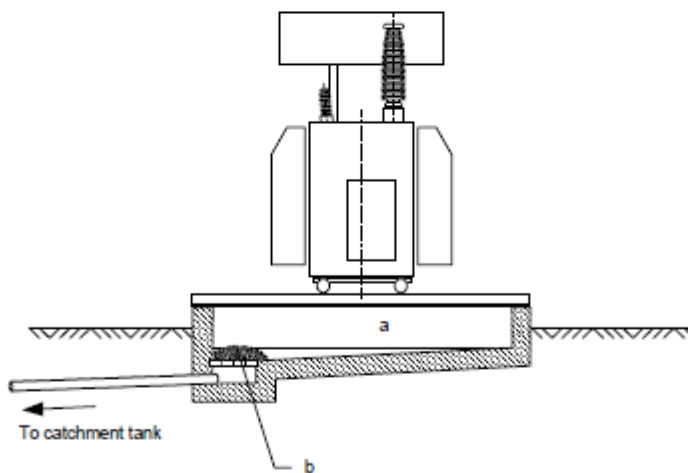
IEC 1071/10

**Key**

- a Containment: the entire quantity of fluid of the transformer plus rain water
- b Gravel layer for fire protection see 8.7.2

NOTE In addition, the water from the fire-extinguishing installation (if any) should be considered.

**Figure 8 – Sump with integrated catchment tank**

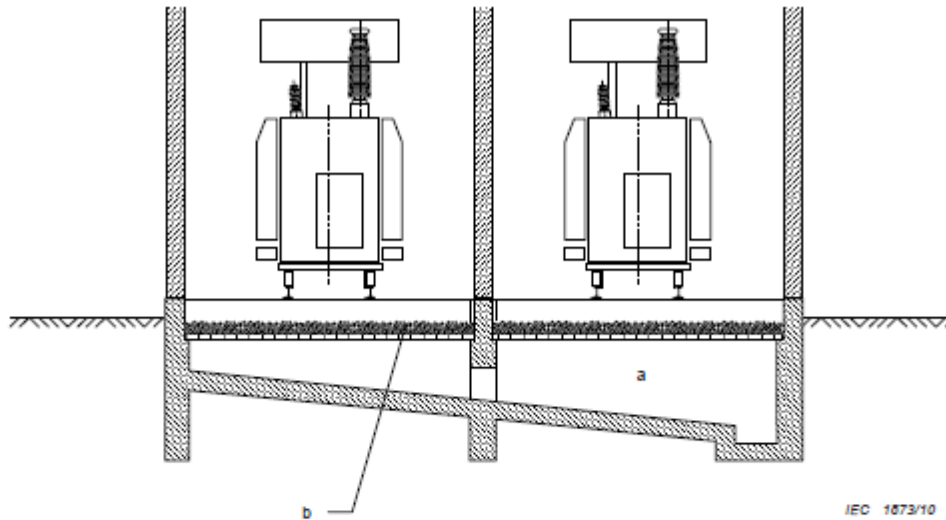


IEC 1072/10

**Key**

- a Containment: minimum 20 % of the fluid from the transformer
- b Gravel layer for fire protection see 8.7.2

**Figure 9 – Sump with separate catchment tank**



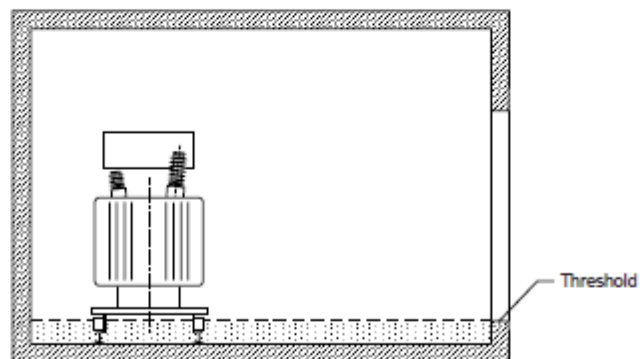
IEC 1873/10

**Key**

- a Containment outdoor: the entire quantity of fluid of the largest transformer plus rain water  
Containment indoor: the entire quantity of fluid of the largest transformer
- b Gravel layer for fire protection see 8.7.2

NOTE In addition, the water from the fire-extinguishing installation (if any) should be considered.

**Figure 10 – Sump with integrated common catchment tank**



IEC 1874/10

NOTE The dotted area denotes the volume of the entire quantity of insulating fluid of the transformer spilled on the floor.

**Figure 11 – Example for small transformers without gravel layer and catchment tank**



**THORNE &  
DERRICK  
INTERNATIONAL**

**Thorne & Derrick**  
+44 (0) 191 410 4292  
www.powerandcables.com