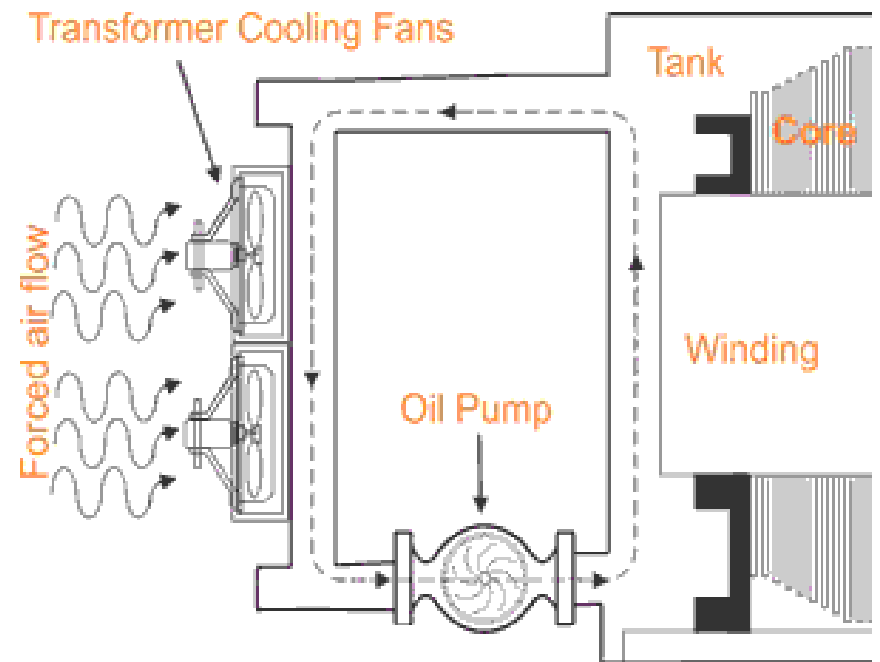


Oil to air cooled transformers



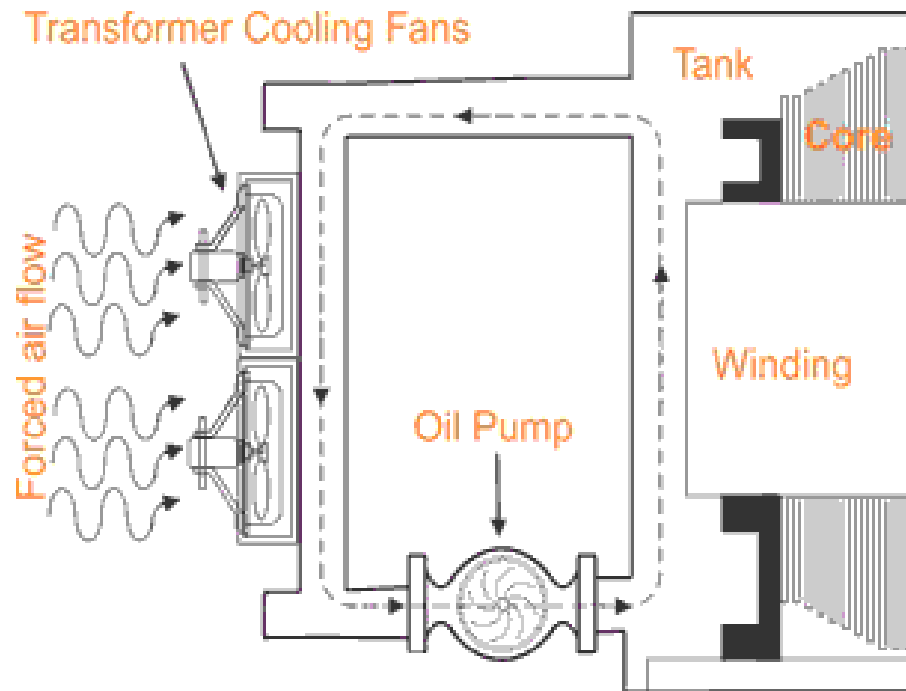
Oil Forced Air Forced or OFAF Cooling of Transformer

● Product Description

– Definition

OFAF is a oil type transformer (**Distribution or Power**) system which can **stand alone as self-cooled** with only supply of fan power.

– Design figures



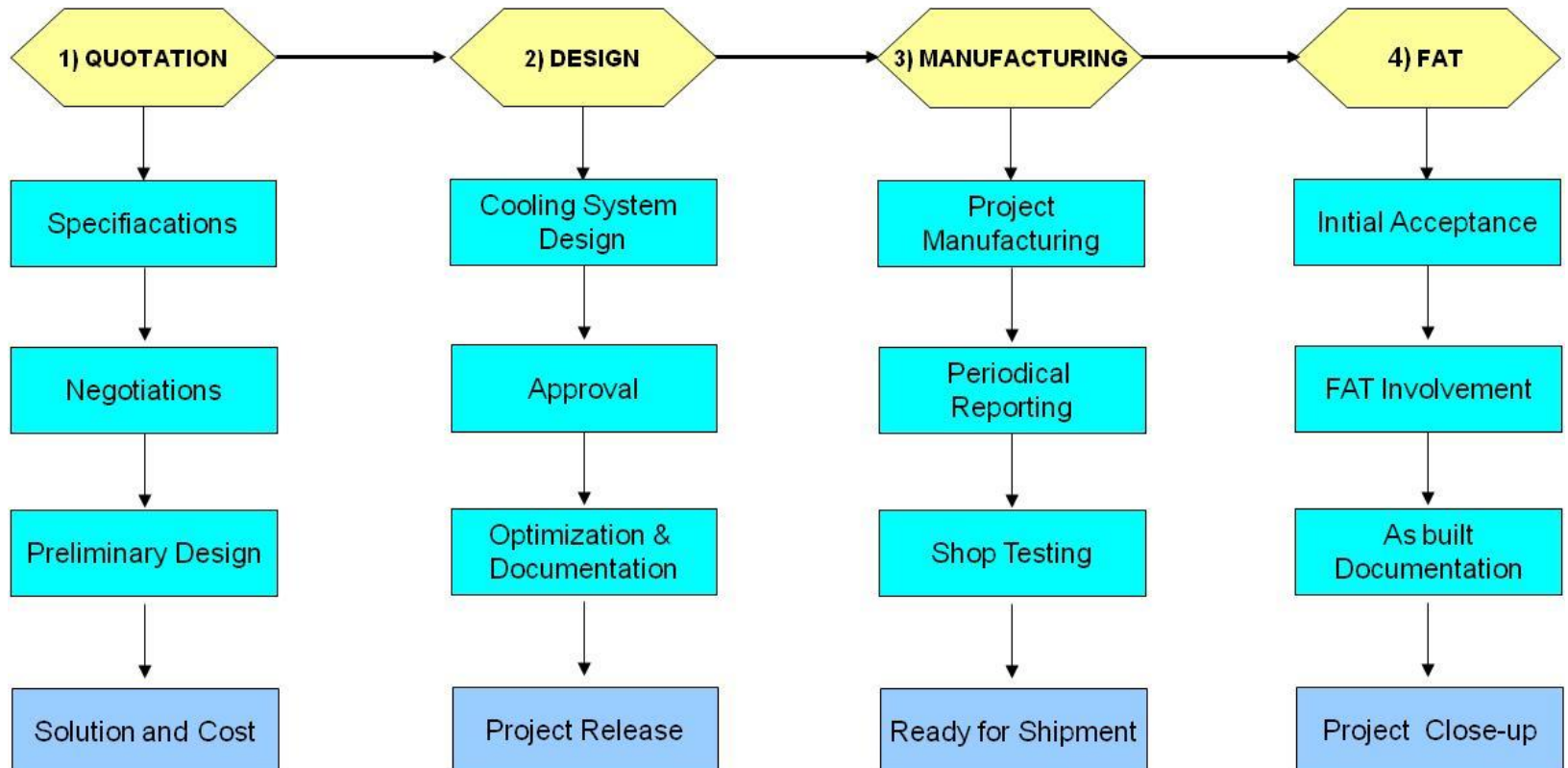
Oil Forced Air Forced or OFAF Cooling of Transformer

● Project Flow

– How to design?

As STE Technic, we support you from quotation to FAT. We support all the design, manufacturing, testing, customer negotiations.

– Flow Chart



● Type of cooling system

– Design details

Transformer radiators can be removed and tank size can be reduced. Also oil and tank cost can be decreased. By doing so it is possible to put the exchangers far from the transformer.

Also it is possible to decrease the temperature rise of the transformer which causes less amount of conductor usage.

– Statements

System can be optimized with the information of environment, losses, temperature and transformer design temperature. With those inputs, pump, HEX and fans can be verified. Also other sensors can check system status.

● Main parts of OFAF OTT

– Main Parts list

- Heat exchanger
- Axial Fans
- Oil pump
- Cooling Control System

– Part Details

- Heat Exchanger → To dissipate heat of transformer to air with a closed loop of oil circulation. Made of oxidation-proof coated Aluminum/Copper fins and copper/stainless steel piping.
- Axial fans → To circulate air through the exchanger for heat transfer.
- Oil pump → To circulate oil.
- Cooling control system → To control all system and give feedback to control room

● Main parts of OFAF OTT

– Part Details

- Sensors → Cooling system control devices;

1) Oil flow-rate meter (Optional)

Used to check oil flow-rate supplied to heat exchanger. If below the limits gives warning.



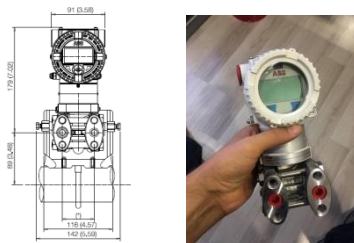
2) Fan operational control (Optional)

Fans can be turned-on all the time or the times when the oil temperature reaches to a predefined value and an indication of fan fault and alarm can be prepared.



3) Leakage detector (Optional)

Used to check oil-in and oil-out pressure difference and check any leakage occurs by measuring the pressure difference.



4) Temperature control (Optional)

Oil-in and oil-out temperature can be monitored if above limits gives warning.



● Customer Benefits

– Application areas

OFAF systems are designed specially for indoor and outdoor operation where there is need of **decreased overall dimensions** and **optimum cooling**

– Requirements

Design is compact which **can be shipped as ready to be installed**.

The technical requirements for the design are as follows;

- **Transformer ambient** temperature (Design temp °C)
- Transformer **temperature rise** (K)
- **Transformer losses** ($P_0 + P_k$, kWh)
- **Supply voltage** (For fans & Pumps)
- Working **conditions** (Marine, Indoor, Outdoor, Tropical, etc..)

● Figures



* Design and appearance can vary according to requirements and restrictions

● Figures



* Design and appearance can vary according to requirements and restrictions

● Figures



* Design and appearance can vary according to requirements and restrictions

● Optimization Software



Dry Coolers &
Oil Coolers

CPU Usage: 35%
2834Mb





Unit Air Coolers &
Industrial Air Coolers
(Refrigerant,DX)

+



CO2 DX Evaporator

+



Unit Air Coolers &
Industrial Air Coolers
(Water/Glycol)

+



Air Cooled
Condensers
(Refrigerant)

+



Air Cooled
Ammonia Condenser

+



Dry Coolers &
Oil Coolers

+



Pump Evap

+



Blast Freezers
(Refrigerant,DX)

+

Project Info

Dry Coolers &
Oil Coolers

Capacity limits kW % %

Air & Fluid Properties

Product Properties

Results

Product Properties

FDH-2E

☒



FDV-2E

☐



FDW-2E

☐



☐ Product Name

Fan calibre

Fan count

Dimensions code

Finpitch code

Fan code

Pass count

Tube Material

Accessories

Power supply

Motor technology

☐ Gold Epoxy Coated Fins

☐ Mounted Legs

☐ EC Fans

☐ EC Fans and Wiring

☐ EC Fans Wiring and Control Panel

☐ Speed Control Unit

☐ Monophase Step Control Terminal Box

☐ Ecomesh Spray System

☐ Direct Spray System

☐ Multiple Circuits

☐ Threephase Step Control Terminal Box

☐ Cool Pad

Extra Accessories

Extra Accessories Option

Accessories Name

Calculate

Cancel

- Certificates



Certificate of Registration

CE

STE PROJE MÜHENDİSLİK HİZMETLERİ TİCARET LTD.ŞTİ.

Address :
Şekerpınar Mah. MGD Sanayi Sitesi Çiğdem Sok. No:22 Çayırova/Kocaeli/TURKEY



Product :
OFAF DRY COOLERS (OIL FORCED AIR FORCED)

Branded:
STE TECHNIC

Type :
FD SERIES

Related Standard :

- TS EN ISO 12100:2010(TR 2011) Safety of machinery - General principles for design - Risk assessment and risk reduction,
- TS EN ISO 13351:2010 Fans - Dimensions,
- TS EN ISO 5801:2017 Industrial fans - Performance testing using standardized airflows (ISO 5801:2007 including Cor 1:2008)
- TS EN ISO 5802:2010 Industrial fans - Performance testing in situ
- TS EN ISO 5802:2015 Industrial fans - Performance testing in situ
- TS EN ISO 12499:2010 Industrial fans - Mechanical safety of fans - Guarding
- TS EN ISO 13346:2012 Industrial fans - Vocabulary and definitions of categories
- EN 60204 -1 Safety of machinery – Electrical equipment of machines-Part 1: General requirements;
- EN 60204 -1:2006/AC:2010 Safety of machinery - Electrical equipment of machines – Part 1: General requirements; Corrigendum
- EN 60204-2:2018 Operational Manual For The Certification Of Heat Exchangers

The above mentioned Technical Construction File presented by manufacturer **complies with** requirements referred to in 2006/42/EC Machine Safety Directive, 2009/125/EC Ecodesign Directive, 2014/30/EU EMC Directive and 2014/58/EU PED Directive applying to it.

The certificate is issued for the purposes of:

- drawing up EC declaration of conformity
- affixing to the machine the CE marking.

This certification is concerning to above mentioned products.

Certificate No	: TR-MAK-1758
Certificate Date	: 14.01.2019
Issue Date	: 14.01.2019
Certification Period	: 1 YEAR
Expiry Date	: 14.01.2020



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June 2018

Comes into effect from:

Modifications as against last version:

No.	Modifications	Section	Page
1	Scope (Expansion of the list of the refrigerants)	II	4
2	Operation of the programme (rated performance data :sound)	IV	5
3	Tests at laboratory (Clarification of the conditions of the participant attendance in laboratory)	IV-4	9
4	Update of the form HE-0: Declaration file for certification	Appendix F.I	17
5	Update of the form HE-3: Technical form for unit to be tested	Appendix F.II	19

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