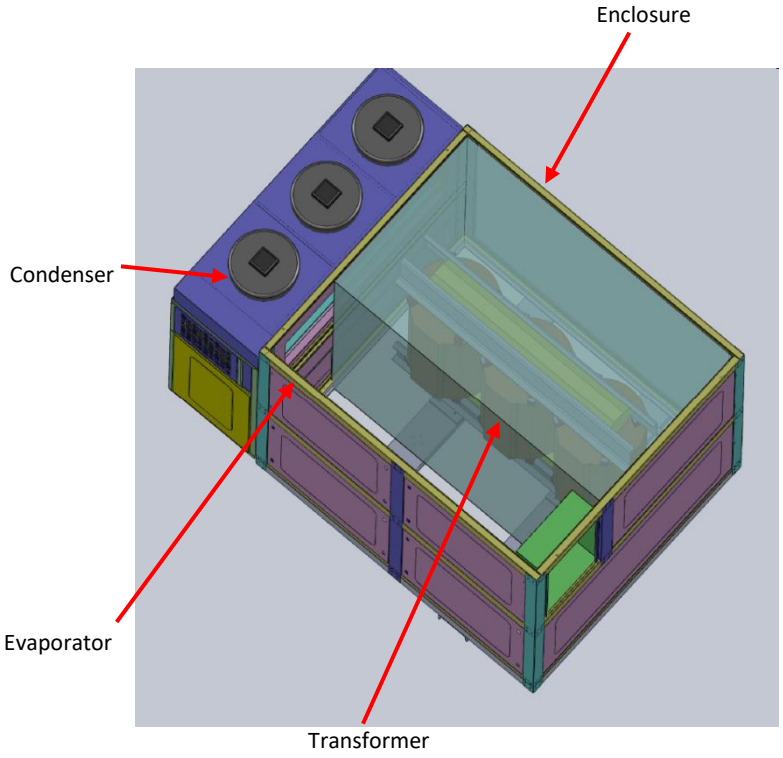
# PATENTED Refrigerant Cooled Transformers (Air Conditioned)

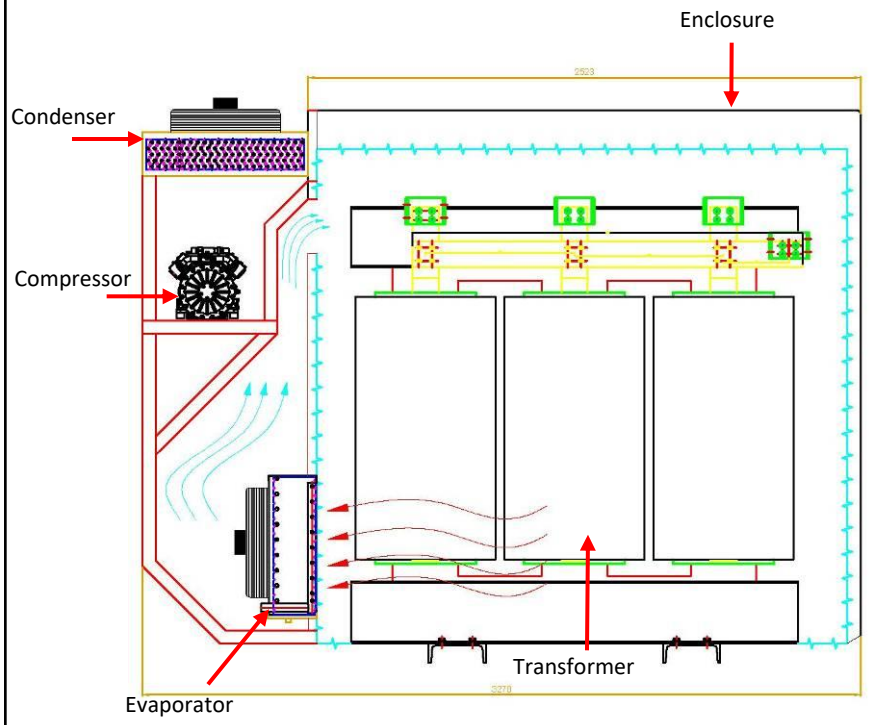
# Product Description

## – Definition

AFRF is a dry type transformer cooling system which can operate stand alone as self-cooled without any additional equipment or source.

## – Design figures



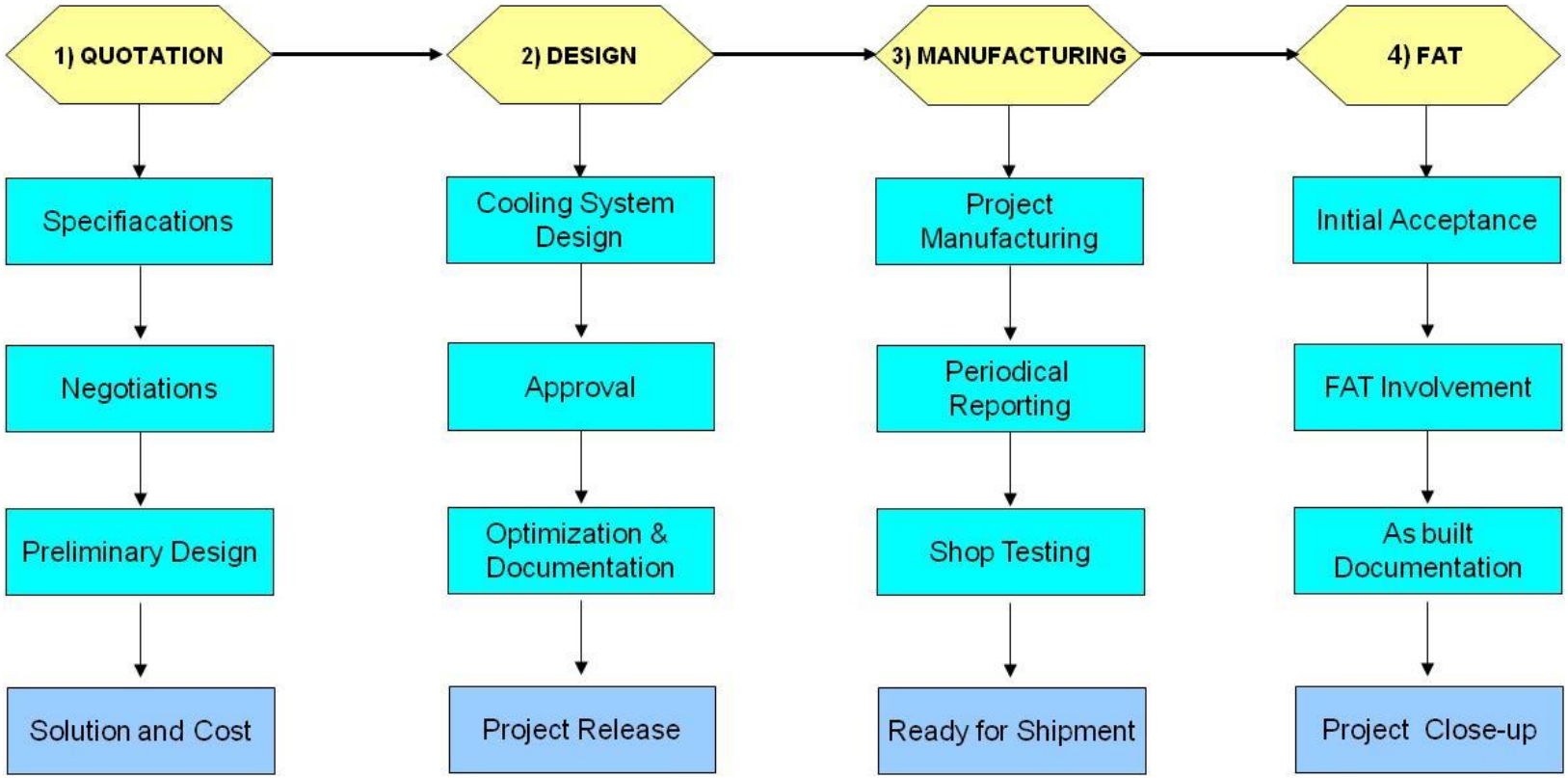




* Design and devices can be different depends on requirements and limits

- Project Flow
  - How to design?

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

  - Flow Chart



# Type of cooling system

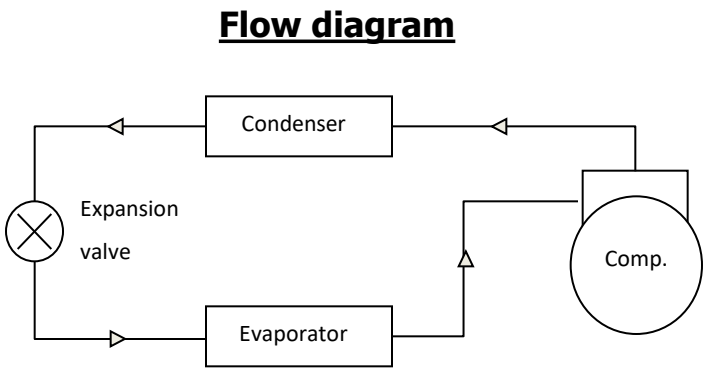
## – Design details

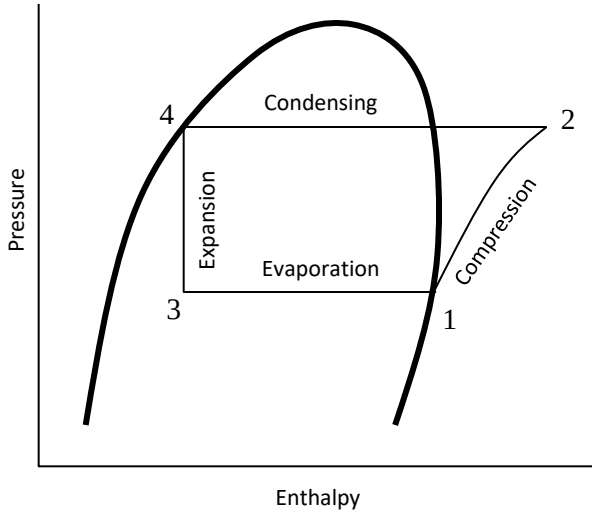
Transformer enclosure is conditioned by an industrial air conditioner unit integrated which is using R134A refrigerant coolant (or equivalent) enabling high performance heat dissipation of transformer no-load and load losses, radiation and convection effects at various kind of areas with ambient temperatures range of -40°C<T<60°C.

By doing so, transformer enclosure can have IP54 or IP55 protection class.

## – Statements

Cooling system is designed as Carnot cycle (refrigeration cycle) methodology and parts as in the flow-diagram which refers to enthalpy-pressure diagram below.



# Main parts of AFRF CRT

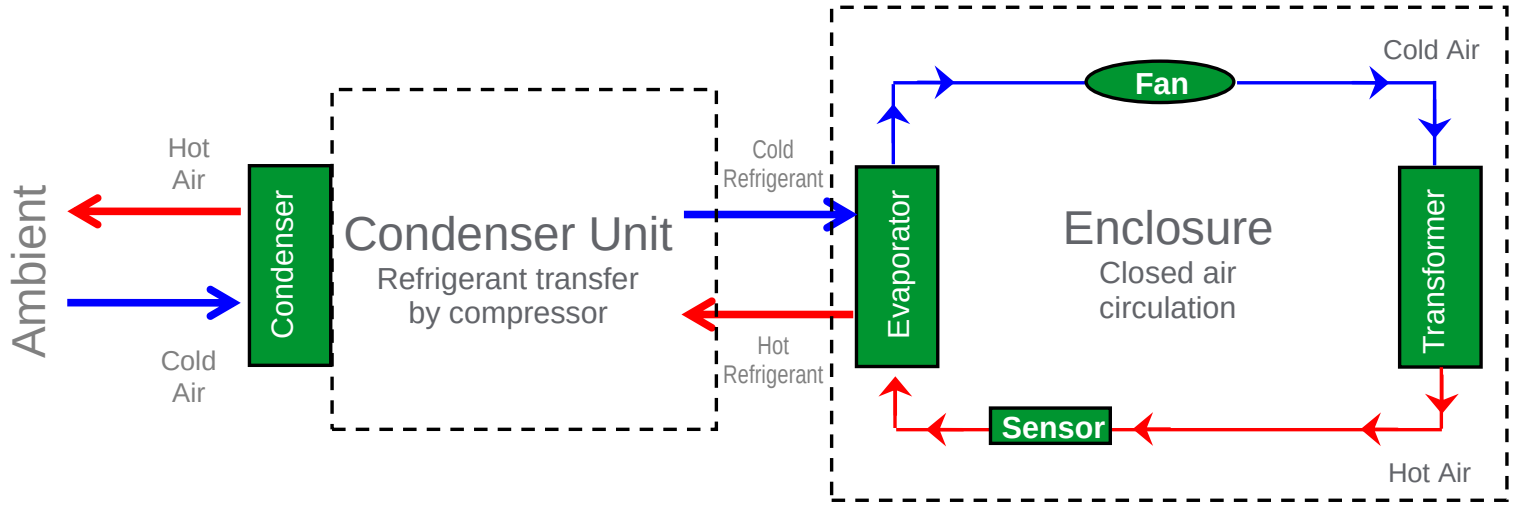
- Main Parts list

  - Condenser (Installed outside of the enclosure)
  - Evaporator (Installed inside the enclosure)
  - High corrosion resistant enclosure (up to 750hrs salt spray tested)
  - Compressor (Installed outside of the enclosure)
  - Air circulating axial fans (Installed on evaporator & condenser)
  - Expansion valve (Optimizes refrigerant flow)
  - Cooling system control unit (Set and manage system)
  - Control Box (Operates transformer and cooling system)

# Main parts of AFRF CRT

– Part Details

- Condenser → To exchange heat of coolant refrigerant to outside air
- Evaporator → To transfer the heat inside of the enclosure to coolant refrigerant
- Compressor → To transfer refrigerant with pressurizing
- Fans → To transfer air through condenser and evaporator individually



# Customer Benefits

## – Application areas

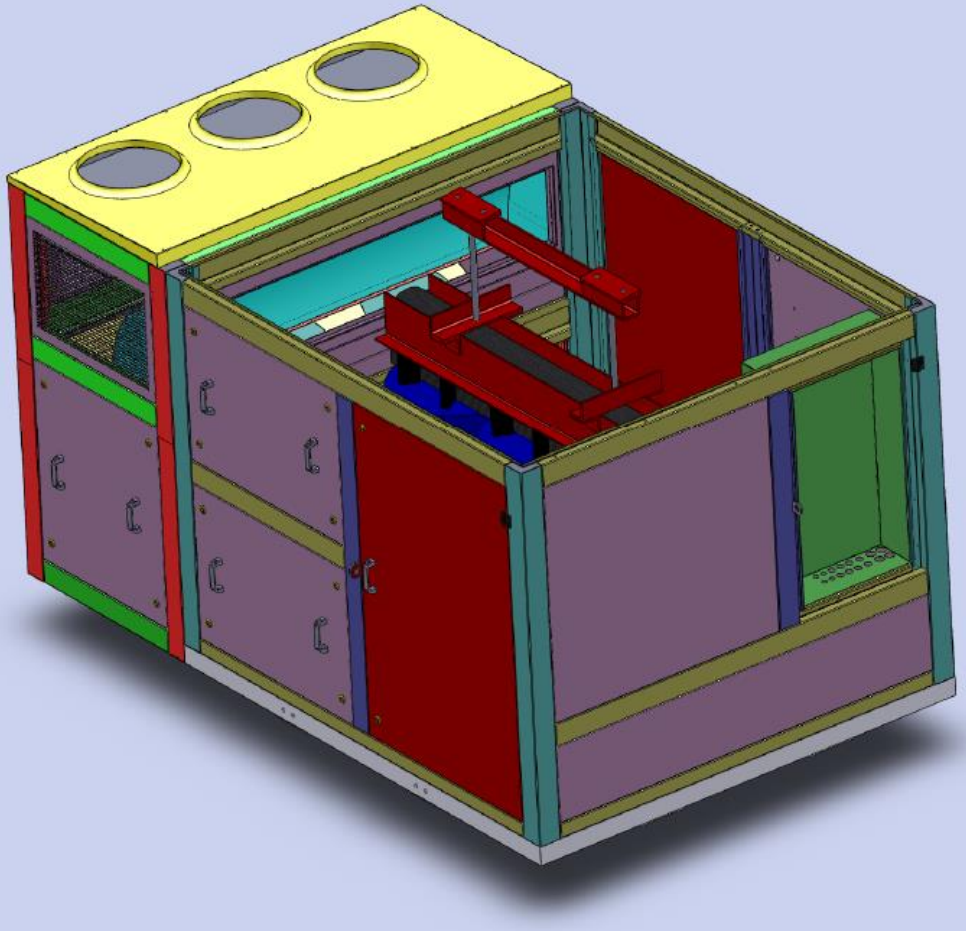
AFRF Dry Type Transformer is an air-conditioned special dry type transformer which is designed to achieve high IP ratings and efficient cooling solution that can not be reached with conventional enclosures and cooling systems.

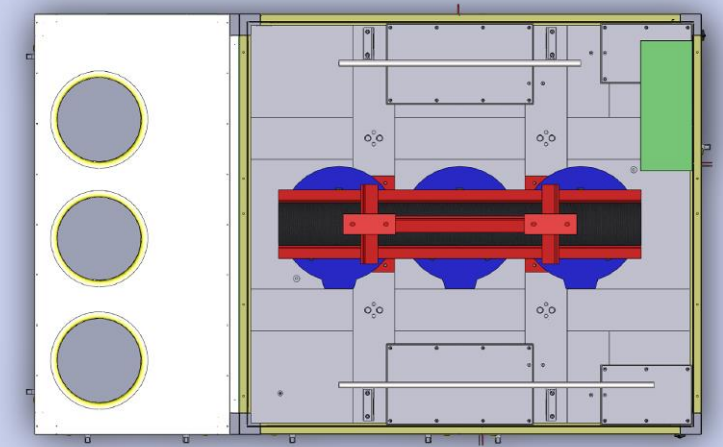
It is now possible to utilize dry type transformers at extreme temperatures (-40°C~+60°C), dusty and dirty sites, indoor or outdoor 100% humid ambient without need of filters and any other disposal materials. External air, water or another coolant is not required at site since AFRF is a complete stand-alone solution and needs just to be powered up in order to fully operate.

## – Requirements

Design is compact which shipped as ready to be installed and no external source except power supply is needed. It is also possible to supply power from the transformer secondary.

# Pictures





* Design and appearance can vary according to requirements and restrictions.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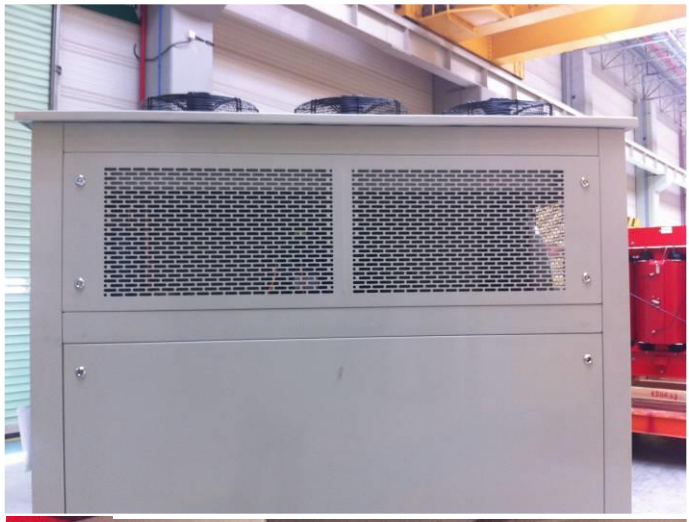


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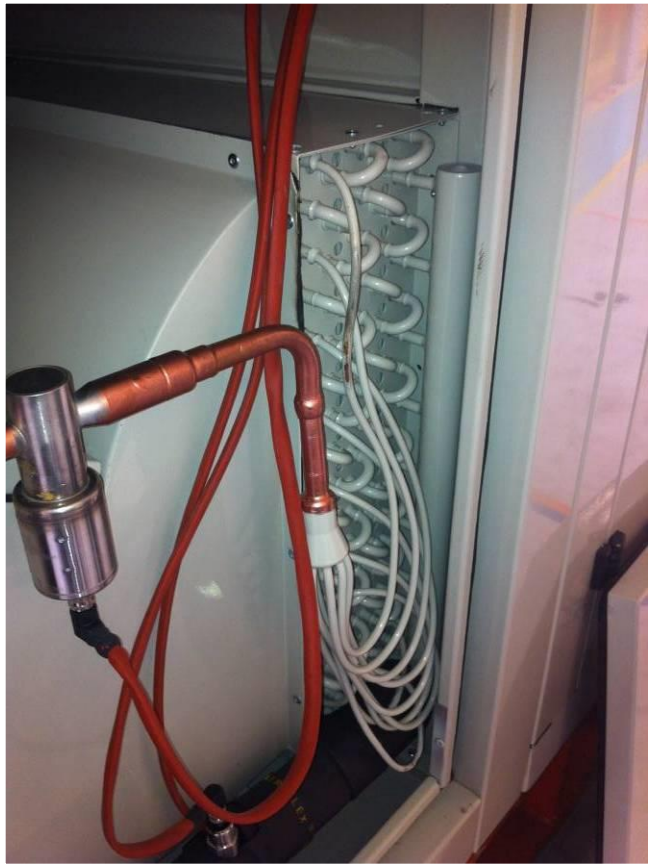

- References