

# ACC Performance measurements

ASME PTC 30.1-2007 / VGB-R 131 Me

There are two different performance measurement procedures

1. During commissioning
2. During operation

We will discuss performance measurements during operation



# Performance measurement during operation

During operation, the operator could be interested in the level of performance of the ACC

From the performance measurement, the operator can decide what kind of modifications are required to maximize the performance

# Items to be measured.

As performance deficiencies can be caused by different causes several items have to be measured before the performance can be established.

These are:

- Fan performance
- Thermal performance air-side
  - Fouling
  - Leak rate



# Performance calculation method

With the data measured and the operational data, the thermal design model can be used to recalculate the performance.

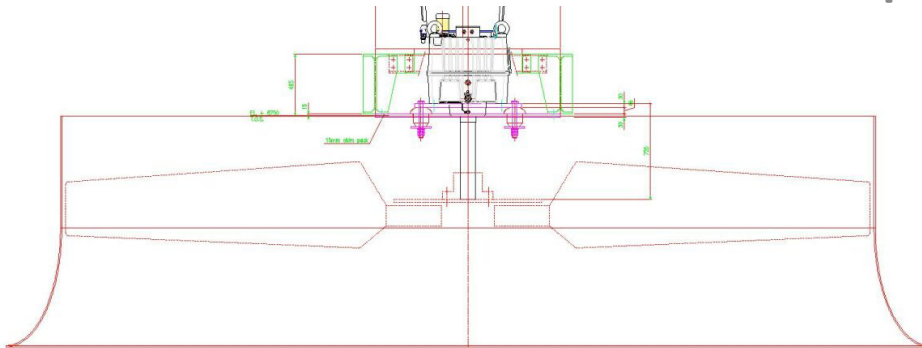
This means the model with all geometric data is completed with the actual operational data.

With this model the back pressure at the turbine exhaust as it should be, is calculated and compared with the actual Turbine back pressure.

# Fan Performance measurements

With the fan performance measurements, the following data must be measured.

- Actual air flow from the fan.
- The static pressure in the plenum
- The static pressure at the suction side of the fan



Fan power

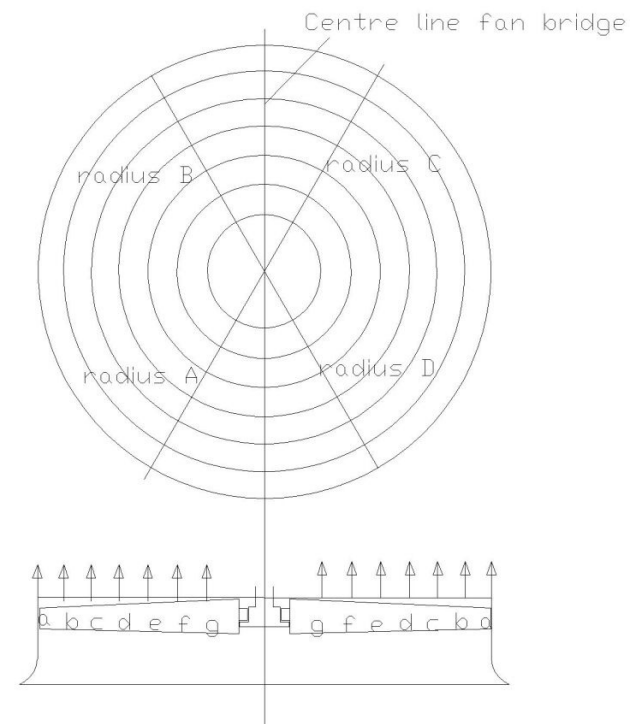
# Thermal performance air side

The air side performance is the temperature rise of the air.

The ambient temperature, this means the air temperature in the plenum and the air temperature from the weather station are recorded.

The hot air temperature is measured at the outlet of the bundles. 50 positions.

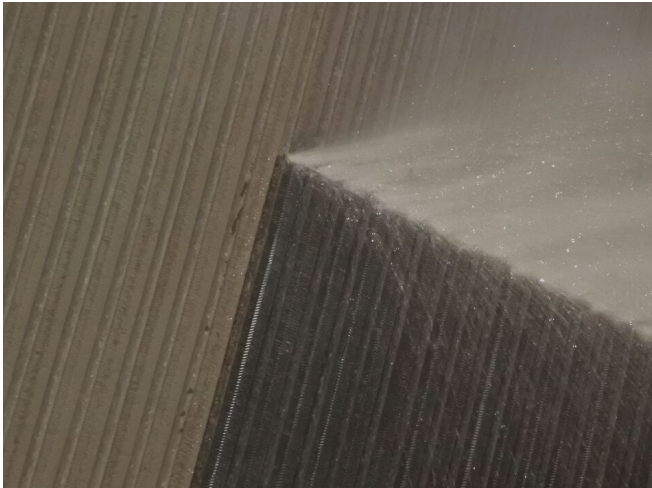
Air flow is measured from the fan bridge in at least four directions.



# Fouling

There are two effects of fouling

1. The air flow is restricted resulting in a higher static pressure. For multi row systems with wide tube arrangements the static pressure increase will be limited. The measured static pressure compared with the original static pressure is a good way to indicate the fouling
2. The HTC of the finned tube is reduced by insulation layers on the aluminium finned surface.



As a result of the above it is recommended to do the performance test after cleaning

# Leak rate

The leak rate is an important impact on the performance.

If the leak rate is in excess of the standard leak rate of 0.3 to 0.5 mbar/min , air from the ambient is entering the ACC trough a leak.

This air can, depending on the location of the leak, has a blanketing effect and reduces the heat transfer.

Values of 7 to 10% have been encountered.



# Data from the DCS

From the DCS the following data is recorded.

- Turbine back pressure
- Steam temperature at turbine exhaust
- Condensate temperature
- Extraction temperature
  - Steam flow
- Ambient temperature weather station

# Data processing

With the data recorded the thermal calculation model is used as was done during the initial design.

In this model all dimensional data is used as it was.

With the operational data recorded the model will calculate the back pressure at the turbine exhaust as it should be.

This can then be compared with the back pressure recorded

Differences indicate performance loss or improvement.

With performance losses the engineer can indicate the reason(s) after which remedial actions can be organized.