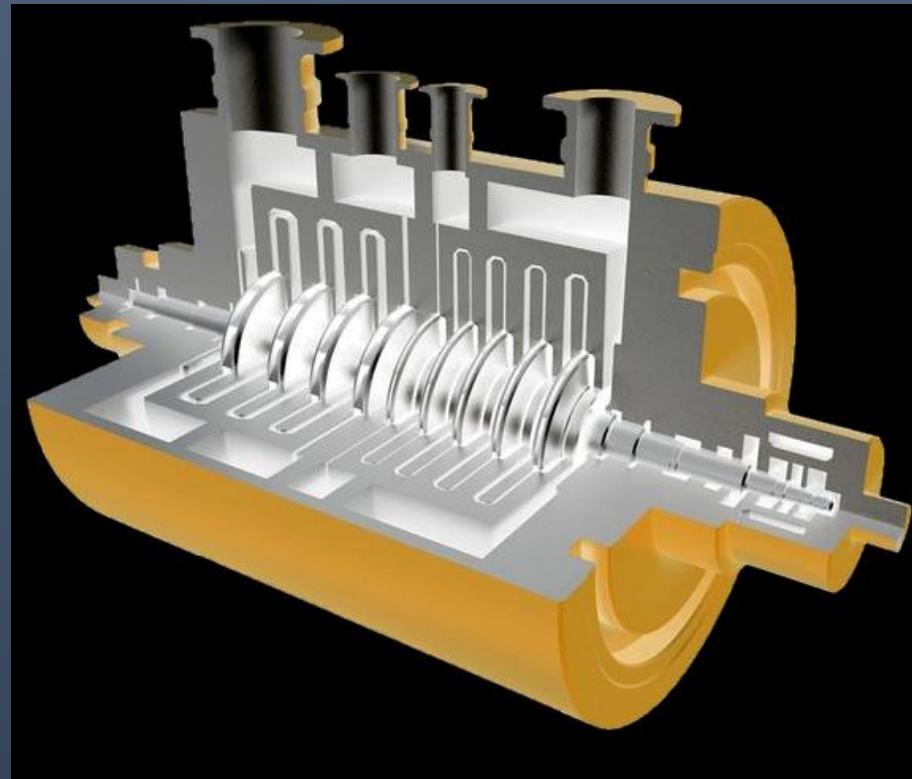# *CTrend* Performance Simulation Software for API617 Process Centrifugal Compressors
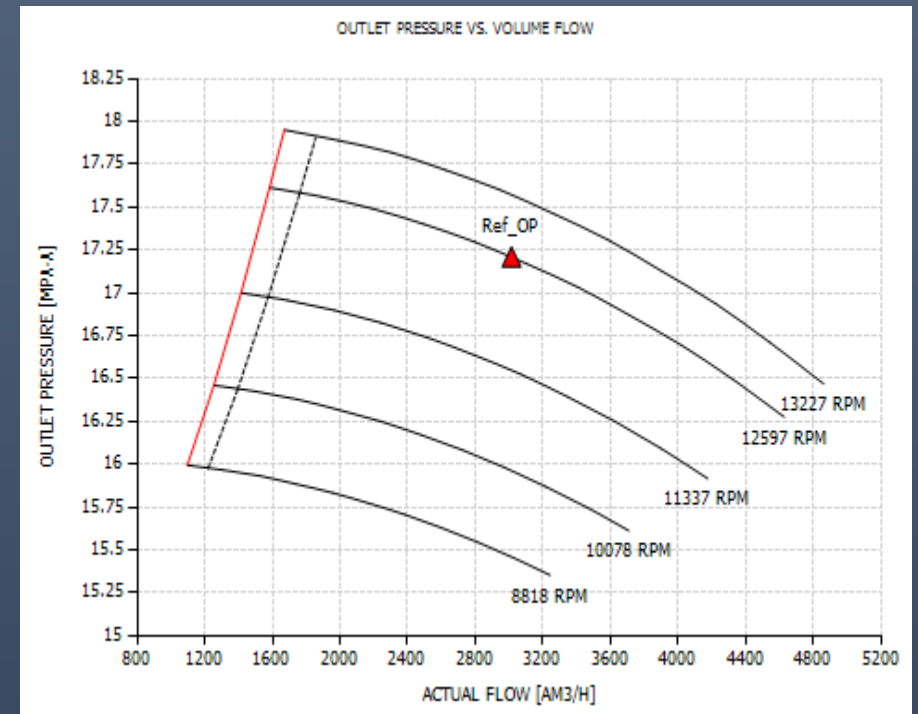
Summary

- Introduction
- Modeling Process & Software Description
- Benchmarking & Demo (Case Study)

Introduction

Illustration of Existing Compressor

Photo: Siemens Energy

Reference Compressor Map
(provided by Vendor as part of Databook)

OUTLET PRESSURE VS. VOLUME FLOW

Ref_OP

13227 RPM
12597 RPM
11337 RPM
10078 RPM
8818 RPM

OUTLET PRESSURE [MPA.A]

ACTUAL FLOW [AM3/H]

Introduction

Centrifugal compressor map is dependent upon inlet conditions

Changes in field conditions, gas composition etc.
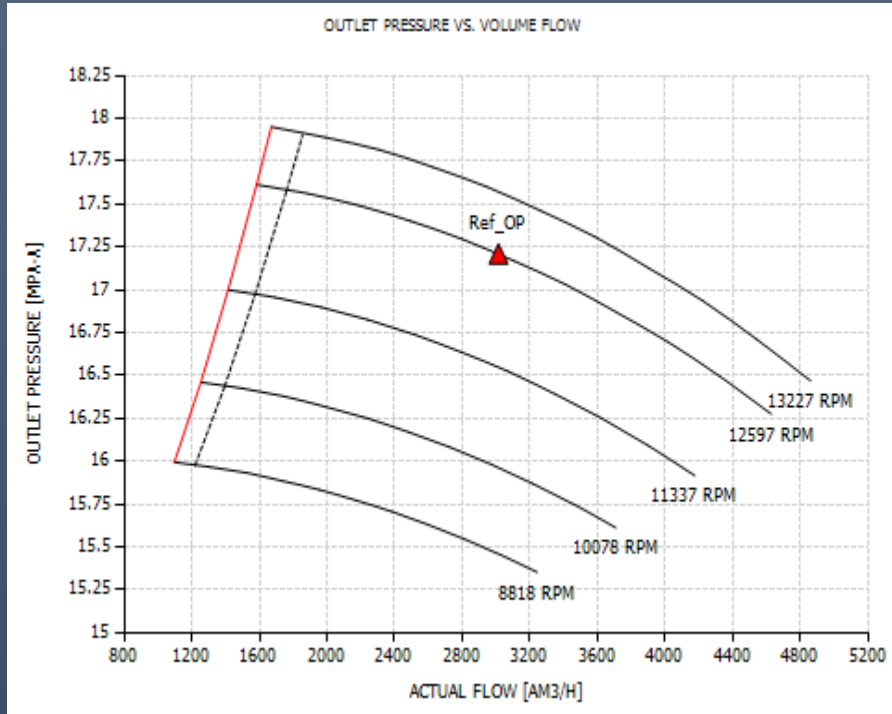
Compressor operating
@ REFERENCE conditions
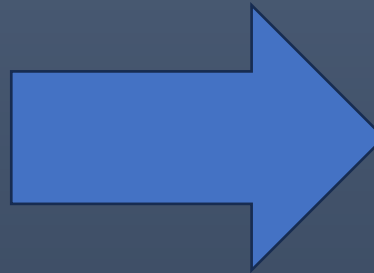
Compressor operating
@ NEW conditions

Introduction

- Tandem Train / Multi-Casing & Back-to-Back Compressors
- Changed Field Conditions and Gas Composition
- Higher Pressures (Compressibility ↗↗)

Ctrend simulates performance output @ new conditions based on reference map information

Inlet conditions
P1, T1, MW

Outlet conditions
P2, T2, MW
Shaft power

Modeling Process & Software Description

STEP 1

Obtain existing compressor process data and impellers information (datasheet)

Obtain existing compressor map (convert in tabular format)

Define design condition and speed

STEP 2

Enter data into CTrend and generate automatically a so-called thermodynamic signature of the existing compressor section

STEP 3

Simulate off-design and new conditions performance

Modeling Process & Software Description

Modeling Process & Software Description

OEM REFERENCE MAP DATA

Modeling Process & Software Description
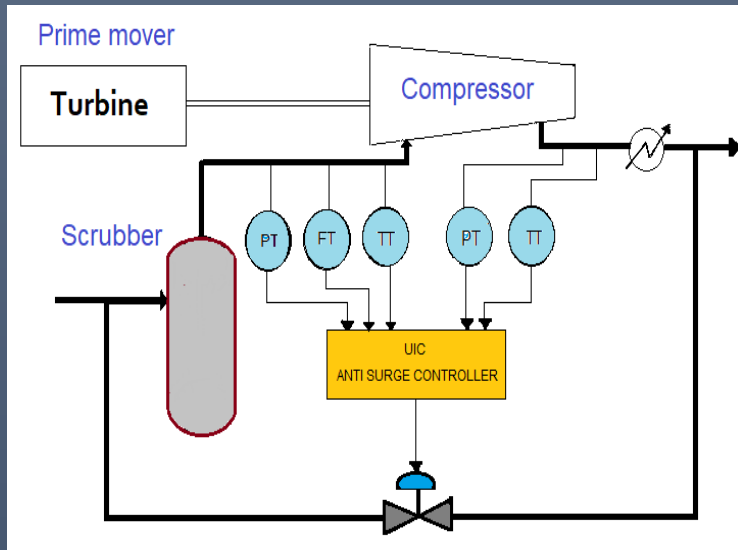
Monitoring & Trending

MODBUS CONFIGURATION

Benchmarking & Demo (Case Study)

Benchmarking
- NIST Data (US Institute of Standards and Technology)
- GASCALC Software

CTrend Case Study
Fixed speed machine application

Utilities Demonstration
- NACE risk analysis tool
- QHmap tool
- GERG head calculation tool