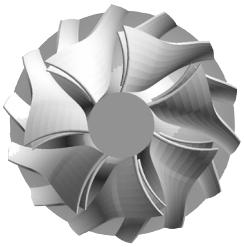
Concepts NREC

The Experts in Turbomachinery



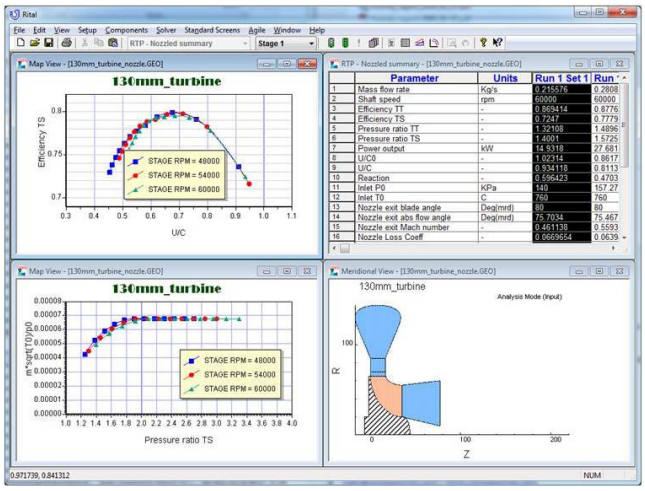
Preliminary Design Module for Radial and Mixed-Flow Turbines

RITAL™

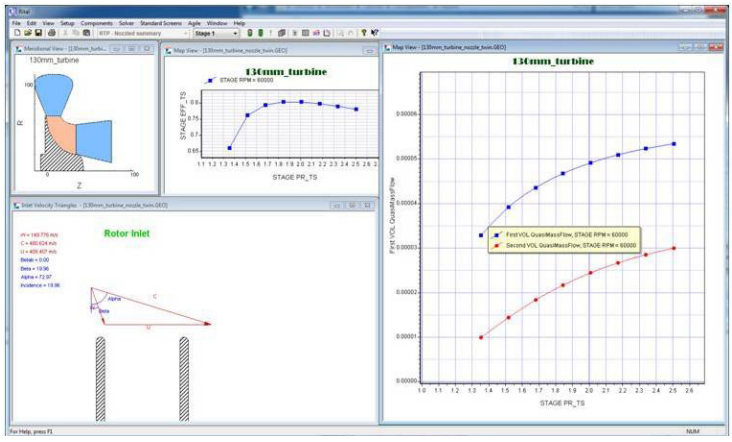
A meanline approach is used to design radial and mixed-flow turbines, Concepts NREC's RITAL™ CAE software program is used to design the turbine stage, analyze performance, refine parameters with data reduction, and model the machine according to several performance models. RITAL's unique Design Wizard leads the user through all the steps necessary for design, analysis, and data reduction. The meanline turbine design can easily migrate into the AxCent® program for further blade design and fluid dynamic analysis.

Components Supported by RITAL

- Inlet Volutes
- Nozzles
- Rotors
- Exhaust Diffusers



Multipoint performance analysis of a turbine with nozzle and diffuser.



Twin scroll multipoint performance analysis.

Modeling

RITAL has built-in models for inlet volutes, rotor and nozzle diffusion/losses, disk friction, and other losses related to subsonic turbine performance. The same consistent model is used in both the design and analysis modes of RITAL.

Integrated Performance Map Plotting

Review design performance, analysis, and test data with performance maps that are flexibly plotted and updated automatically with each geometric change.

Easy Editing

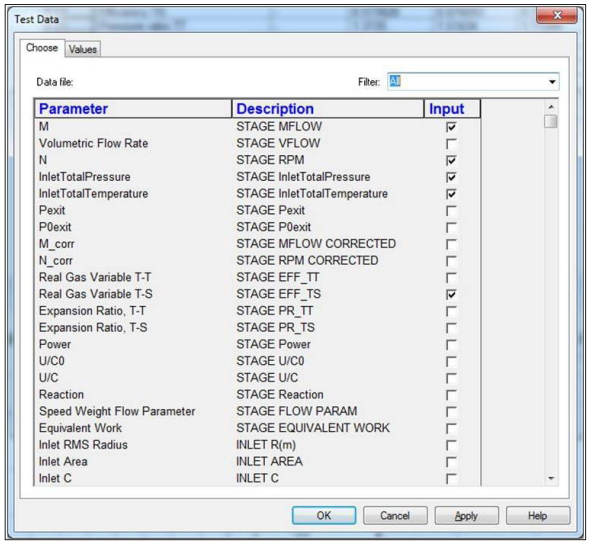
View the turbine stage in an active, true-scale meridional view. Edit the parameters by double clicking on the component in the meridional view. Also, edit parameters using a single text input/output file, a feature especially useful for optimization.

Table View of Results

View the results in a flexible, spreadsheet-like table format, customizable through separate filters. Create any number of filters, select what to display, and customize the labels as well.

A Real Fluid Program

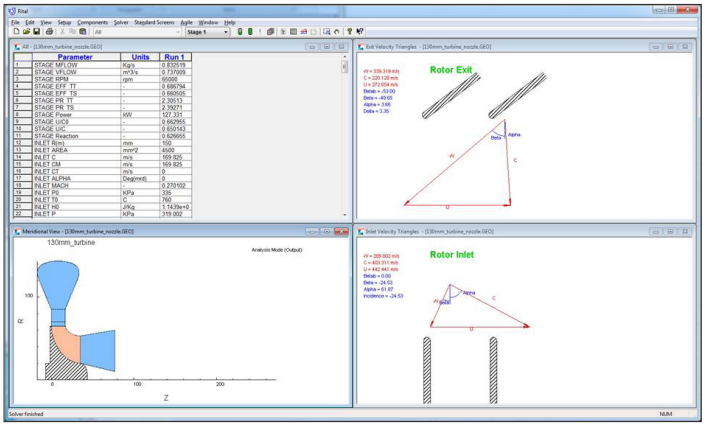
RITAL calculates Real Fluid properties using optional D.B. Robinson Real Fluid Properties, NIST, or ASME steam routines. Users can also incorporate their own proprietary fluid properties.



Import test data for overlays.

Concepts NREC's Agile Engineering Design System®		Radial				Axial			
		Compressors	Fans	Pumps	Turbines	Compressors	Fans	Pumps	Turbines
CAE Preliminary Design									
Meanline Approach	AXIAL™					√			√
Meanline Approach	COMPAL®	√							
Meanline Approach	FANPAL™		√				√		
Meanline Approach	PUMPAL®			√				√	
Meanline Approach	RITAL™				√				
CAE Detailed Design									
3D Geometric Design	AxCent®	√	√	√	√	√	√	√	√
Basic CFD Option for AxCent	FINE™/pbCFD*	√	√	√	√	√	√	√	√
CFD Option for AxCent	FINE™/Turbo™*	√	√	√	√	√	√	√	√
FEA Option for AxCent	Pushbutton FEA™	√	√	√	√	√	√	√	√
CAE Specialized Design Software									
Gas Turbine Blade Cooling	CTAADS™								√
Optimization	TurboOPT II™	√	√	√	√	√	√	√	√
Rotordynamics	Dyrobes®	√	√	√	√	√	√	√	√
Gas Turbine Cycle Analysis	Gas Turb®	√				√			√
CAM Toolpaths									
Base Platform	MAX-PAC™	√	√	√	√	√	√	√	√
Flank Milling Option	MAX-5™	√	√	√	√	√	√	√	√
Point Milling Option	MAX-AB™	√	√	√	√	√	√	√	√
Closed Impeller Option	MAX-SI™	√	√	√	√	√	√	√	√
Single Blade Option	MAX-SB™	√	√	√	√	√	√	√	√

*Offered in partnership with NUMECA International as part of the FINE/Agile™ integrated suite.



RITAL single-point calculation.

Axial View with Velocity Triangles

View blades and velocity triangles at the rotor inlet and exit in a window view.

OLE Automation Support

Control RITAL from an external program through industry-standard Object Linking and Embedding (OLE) automation, which supports full control of data entry, program execution, and result retrieval. External programs can be written in Visual Basic®, Visual C++®, FORTRAN, Python® or other languages that support the Microsoft® OLE standard.

Direct Integration with AxCent®

Start AxCent automatically from inside RITAL, which transfers the initial geometry automatically to AxCent for 3D geometry generation, rapid loading analysis, through-flow analysis, and output for CFD and FEA stress analysis. Changes in AxCent that affect the meanline analysis will cause the meanline analysis to be rerun and all performance maps to be regenerated.

Concepts NREC

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