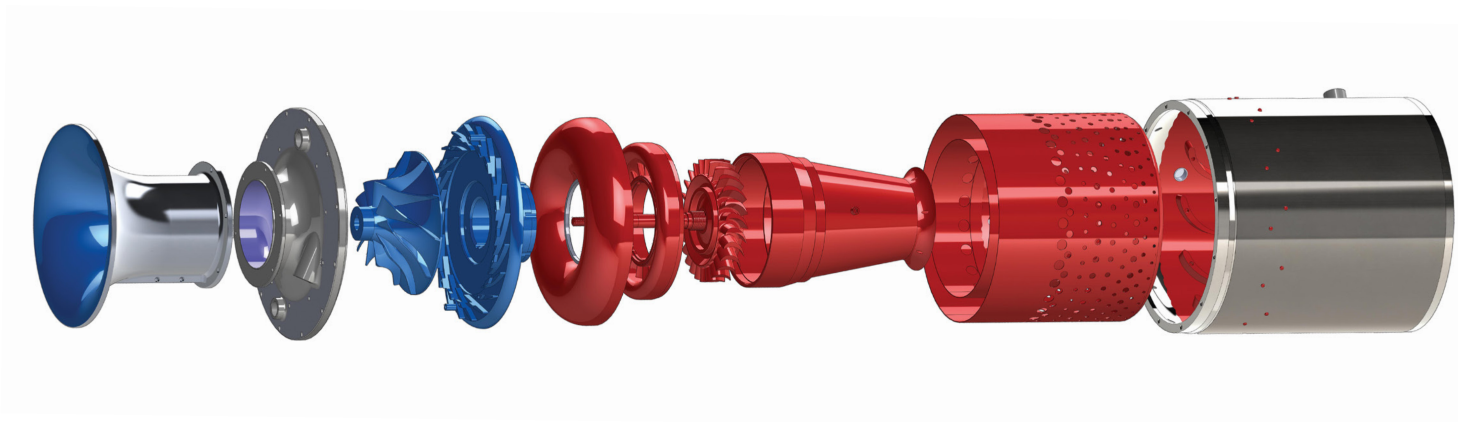
SR-30™ Turbojet Engine CAD Model



PRODUCT SUMMARY

- Electronic solid models of all major SR-30 turbojet engine components
- Material specifications for each component with associated mechanical properties
- Supports FEA and CFD analysis
- Assists in volumetric & mass flow calculations & velocity vector diagram generation
- License includes unlimited use by faculty and enrolled students

Description

This CAD model package contains twelve electronic solid models in both IGES and STL format. It facilitates basic flow analysis to include design parameters like velocity vector diagram generation and also provides geometry for import into CFD and FEA packages. Information is included regarding material properties for each component.

1. Engine inlet
2. Intake case
3. Centrifugal flow compressor
4. Bladed diffuser
5. Reverse flow annular combustor
6. Combustor straightener vanes
7. Combustor transition liner
8. Nozzle vane guide ring
9. Axial flow turbine
10. Turbine containment ring
11. Thrust nozzle cone
12. Engine outer mantle

Additionally, information is included regarding material types and properties for each component. The SR-30 engine is designed and manufactured by Turbine Technologies, Ltd. specifically for the MiniLab™ Gas Turbine Power System. A pure turbojet, the SR-30 is representative of all straight jet engines in which combustion results in an expanding gas that is sufficiently capable of producing useful work and propulsive thrust. The SR-30 engine is typical of the gas generator core found in turbofan, turboprop and turboshaft gas turbine engines, which are typically used for aircraft and marine propulsion as well as stationary and industrial power generation.

Warranty 2 Year Warranty

SR-30™ Turbojet Engine CAD Model has a free two year warranty on the entire system

All SR-30™ Turbojet Engine CAD Model specifications are subject to change

SR-30™

Turbojet Engine CAD Model

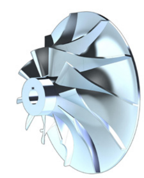
Students will Learn: Standard component geometries utilized in all commercial engines, to include axial flow stators and rotors, annular combustors and centrifugal flow rotors and diffusers. Students can then apply this knowledge in areas of flow and energy analysis, finite element analysis (FEA) and computational fluid dynamics (CFD).

Inlet Bellmouth

The inlet bellmouth (ASME Long Nozzle type) is the first engine component to encounter the gaseous working fluid (atmospheric air) necessary for the operation of a gas turbine engine. Not to be confused with the external inlet and ducting associated with a particular engine's specific installation (e.g. the aerodynamic inlet on the nose of a fighter aircraft), the engine inlet performs the final conditioning of inlet air prior to its entering the interior of the engine. The inlet bell of the SR-30 Cutaway is illustrative of a typical subsonic inlet duct in which ambient air is directly routed to the face of the compressor.

Centrifugal Flow Compressor

The compressor (rotor), along with the compressor turbine, makes up the rotating assembly of the turbojet engine. The SR-30 engine utilizes a centrifugal (radial flow) compressor, with the flow path being referenced to the rotation axis of the compressor itself. As viewed from the front, the compressor rotates in the counter-clockwise direction to properly function. Through this mechanical rotation, energy is imparted to the inlet air. The compressor, also known as an impeller, rotates upwards of 80,000 revolutions per minute. This high rotational speed takes inlet air at the impeller hub and centrifugally accelerates it in a radial direction toward the outer circumference of the impeller where it is discharged through the diffuser.

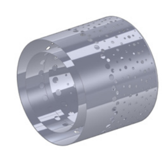


Diffuser

The diffuser (stator) works in conjunction with the compressor to further process the working fluid. The compressor discharge air is directed through the diffuser where the fluid velocity is decreased and the static pressure increased. This discharge air also undergoes a 90 degree change in direction, transitioning from a radial to axial flow. The compressor and diffuser working together comprise the compressor stage of the engine.

Annular Combusor

The SR-30 engine features an annular type combustor composed of two perforated tubes fixed in concentric relation to one another. The combustor is oriented in a reverse flow arrangement with the inlet of the combustor situated at the rear of the engine.

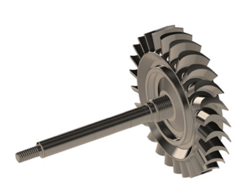


Vane Guide Ring

The vane guide ring (stator) is the first component in the turbine stage and permits the turbine to extract useful work from the combustion process. This ring consists of a shrouded series of small airfoil blades each facing into the oncoming combustion gas flow as directed by the transition liner. As the flow path narrows between the individual blades, the hot, high pressure combustion gases are accelerated to a high velocity, high energy flow. The vane guide ring further directs this accelerating gas in such a manner as to produce the most effective reaction against the turbine blades.

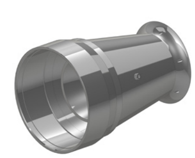
Axial Flow Turbine

The turbine (rotor) absorbs energy from the accelerating gas flow and converts it into usable mechanical power. Further acceleration of the expanding flow takes place through the turbine blades. Much like the blades of the vane guide ring, the individual turbine blades are also airfoil shaped. A combination of aerodynamic and reaction forces cause the turbine to rotate. Coupled to the compressor, the sole job of the turbine is to effect a rotation of the compressor to perpetuate the entire flow process. Only the power necessary to drive the compressor is extracted from the flow as it expands through the turbine blades. The remaining energy is available and utilized for the generation of propulsive thrust.



Thrust Nozzle / Exit

A convergent tube of gradually reducing cross-section, the thrust nozzle converts the remaining combustion heat energy into kinetic energy. The gas accelerates through the nozzle at high velocity resulting in propulsive thrust at the nozzle exit.



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