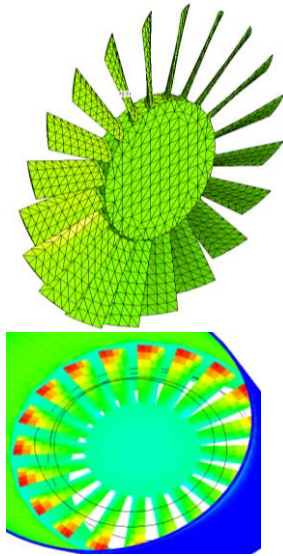




## RAREFIED GAS AND NAVIER-STOKES – COUPLED MODELLING SOFTWARE

Fluidyn has developed, in collaboration with Prof Graeme Bird, a software for rarefied gas dynamics for modeling all flow regimes of gas- from 2-phase till free molecular movement. A special module has also been prepared for the modeling of turbo molecular pumps. Rarefied gas flow modeling available through the Fluidyn software suite, includes:



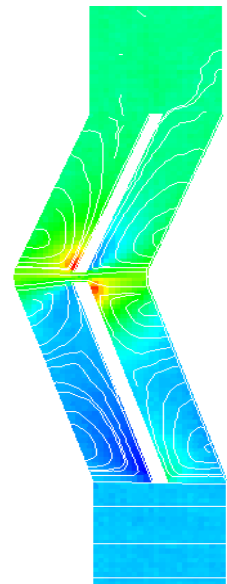
- Multi-stage 2D modeling of compressor stages for blade shape optimization: **fluidyn-TURBO2V**
- Multi-stage DSMC modeling of complete 3D compression stages. **Fluidyn-TURBO3V**.
- Navier-Stokes slip wall models for rarefied gas flow modeling at low Kn numbers.
- Navier-Stokes and DSMC coupled methodology for full pump performance modeling.

### SOFTWARES

Application dedicated modules for turbo pumps are ready to use tools :

- **FLUIDYN** Turbo2D is specific software for Turbo Molecular Pumps (TMP) modeling. It is available for a very wide range of Kn number, ranging from free molecular regime up to continuum regions. It offers:

- Graphical User Interface
- **Fluidyn**-CAE for Geometry generation, data input, results analysis having fully compatibility with DSMC & navier Stokes solvers
- The blade shape generate by **Fluidyn**-CAE from any other CAO geometry format.
- Advanced solvers for multistage compression analysis. 2D stator/rotor reference frame transition for molecules.
- Post processing in terms of:
  - Pressure, Velocities, Mach numbers, Density
  - Temperature, Stream Lines, Mean free path
- Open to 2D Navier-Stokes Coupling



- **FLUIDYN** Turbo3D is a full 3D software for Turbo Molecular Pumps (TMP) modeling. It is based on Turbo2V methodology and has following extensions:

- User friendly interface for 3D modeling.
- Fully compatible with 3D CAD format
- Advanced solvers for multistage compression analysis
- 3D stator/rotor reference frame transition for molecules.
- Additional 3D forces for rotating frame
- Rotating boundaries and modeling of gaps between blades tips and housing wall

Besides of course Post processing as for 2D modeling of: Pressure, Velocities, Mach numbers, Density, Temperature, Stream Lines, Mean free path

Fluidyn MP-DSMC is coupled with Fluidyn MP-CHT for heat transfer with structures along with a new slip wall model for Kn number near the continuum regime taking into account the slip velocity and the temperature drop at boundaries.

Fluidyn-Turbo 3D defines a virtual fluid surface used by the coupling with the two boundaries:

- Downstream boundary: A molecular data is output by Turbo3D and convert to macroscopic properties for DSMC.
- Upstream boundary: The macroscopic properties (Temperature, speed, temperature) are transposed by Fluidyn-Turbo3D into molecular properties.

This unique and complete modeling technique for rarefied gases keeps Fluidyn users a step ahead in industrial field of turbo molecular pumps.

<p><b>FLUIDYN FRANCE</b></p> <p>84, rue Charles Michels IRIS – HALL B F-93200 SAINT DENIS FRANCE Tél : 33-(0) 1-42 43 16 66</p>	<p><b>email:contact@fluidyn.com</b></p> <p><a href="http://www.fluidyn.com">www.fluidyn.com</a></p>	<p><b>FLUIDYN INDIA</b></p> <p>15, 4th Floor, 15th Cross J.P.Nagar 6th Phase Bengaluru - 560 078 INDIA Tel : (91)-(80)-26636959, 26636507</p>
---	---	---