



## Main Technical Parameters

|                                          |                                  |
|------------------------------------------|----------------------------------|
| Flow M number .....                      | 7.5...18.6                       |
| Re number per 1 m .....                  | (0.15...8.5)·10 <sup>6</sup>     |
| Total pressure .....                     | 0.8...20 MPa                     |
| Dynamic pressure .....                   | up to 12 kPa                     |
| Stagnation temperature .....             | 600...3400 K                     |
| Run duration .....                       | 30...180 s                       |
| Angle of attack ( $\alpha$ ) range ..... | -5°...50°; -25°...30°; 25°...80° |
| Side slip angle ( $\beta$ ) range .....  | ± 30°                            |

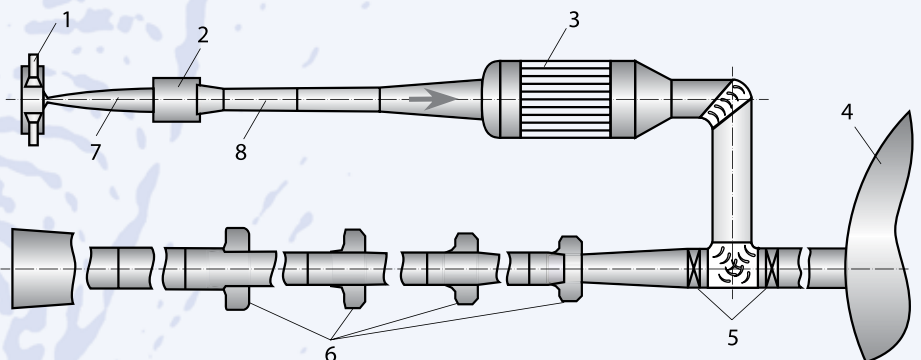
### Tests section sizes (Eiffel chamber):

|                       |       |
|-----------------------|-------|
| Length .....          | 2.5 m |
| Width .....           | 2.4 m |
| Height .....          | 1.9 m |
| Nozzle diameter ..... | 1 m   |

### Tested object sizes:

|                 |             |
|-----------------|-------------|
| Length .....    | up to 1 m   |
| Wing span ..... | up to 0.4 m |

1. Electric arc heater
2. Test section
3. Heat exchanger
4. Vacuum container
5. Section gate
6. Ejectors system
7. Nozzle
8. Supersonic diffuser



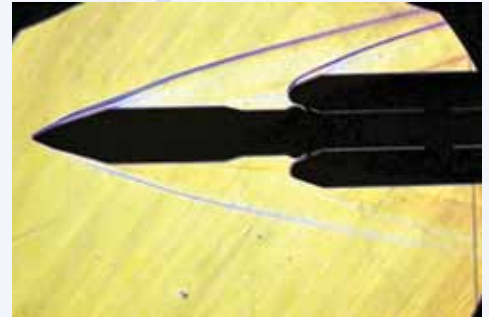
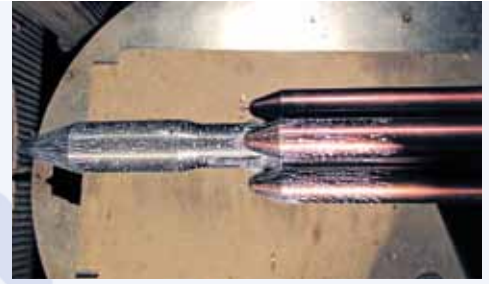
## General Description

T-117 Wind Tunnel is a hypersonic test facility of cyclic operation type with open loop, destined for the investigations of aerothermodynamic characteristics of rocket and space vehicles and their components models.

The WT is equipped with the set of profiled axisymmetric nozzles with 1m outlet diameter in order to create an operation flow with a wide range of M and Re numbers. The compressed air is ducted from the cylinder (up to 28 MPa pressure) to the equalization chamber, where it is heated up to the required temperature by electro arc heaters. The WT is equipped with two systems: a four supersonic ejectors system and a vacuum system in order to generate a negative pressure/vacuum in operation duct.

The test section constitutes an Eiffel chamber with cooled walls. It is equipped with two suspension systems which make it possible to insert quickly the model into a flow and to change its attitude position. There are optical windows in test section walls in order to visualize the model airflow by various methods and to make video recording.

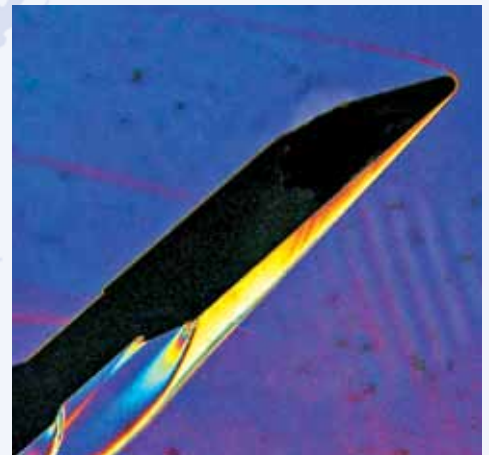
The WT is equipped with a set of strain gauge balance for measuring the aerodynamic forces and moments of models and their components as well as with the automated measuring computational controlling complex.



## Capabilities

The following types of tests can be carried out in T-117:

- Determination of total aerodynamic characteristics of aircrafts and their components;
- Testing the models with wakes;
- Measuring the stationary and nonstationary pressure distribution upon the model surface;
- Determination of heat flow distribution upon the model surface by the temperature-indicating method and with the help of sensors;
- Natural investigations (flow visualization by shadow method and by interferometric one, flow marginal lines visualization by diffused paint drops method etc.).



## Technological Advantages

- The presence of two systems, which create the vacuum in the WT operation duct, enhances significantly the WT capability.
- The presence in a test section of two suspension systems makes it possible to test two different models within one run.

## Application

All the above mentioned T-117 WT abilities are widely used for experimental investigations of rocket and space vehicles and their components models.

