TUNNEL TECH

Technical Requirements

Project: UF25SL

Section: A. Building requirements

Architect:

Lead design engineer:

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Project Number: UF32SL
Revision: 0
Date:

Project scope

No	Project Section	Code
1	Builging requirements *	A
2	Wind tunnel equipment location *	T
3	Equipment loads *	E
4	Equipment bases tolerance requirements *	H
5	Cooling system *	C
6	Cable networks *	P
7	Service floors and ladders *	K
8	Building markup and inspection *	M
9	Site works execution program *	X

* - Full versions of all documents are available in the TunnelTech customer portal.
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UF25SL Building requirements		TUNNEL TECH			
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Project scope					
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Revision Schedule

No.	Index	Description	Date
1	0	Release of technical requirements	

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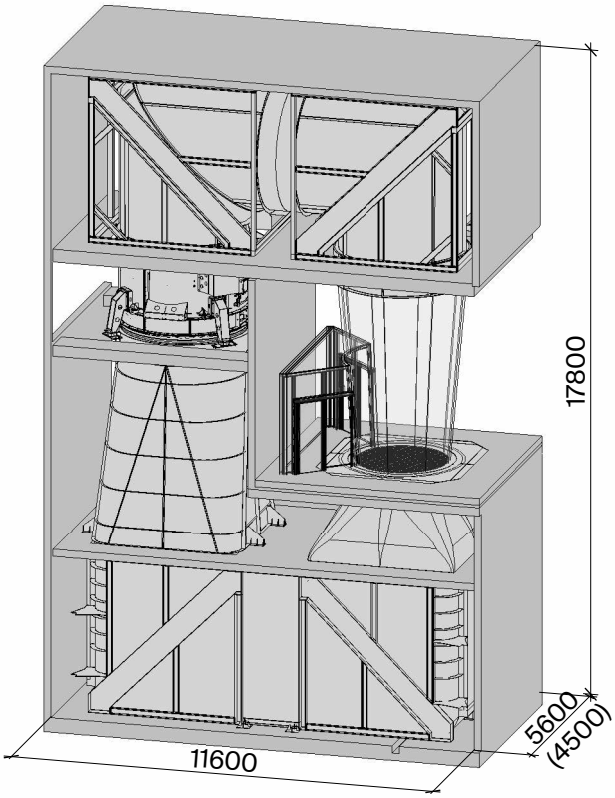
Introduction

This section of the technical requirements documentation contains explanations on the following:

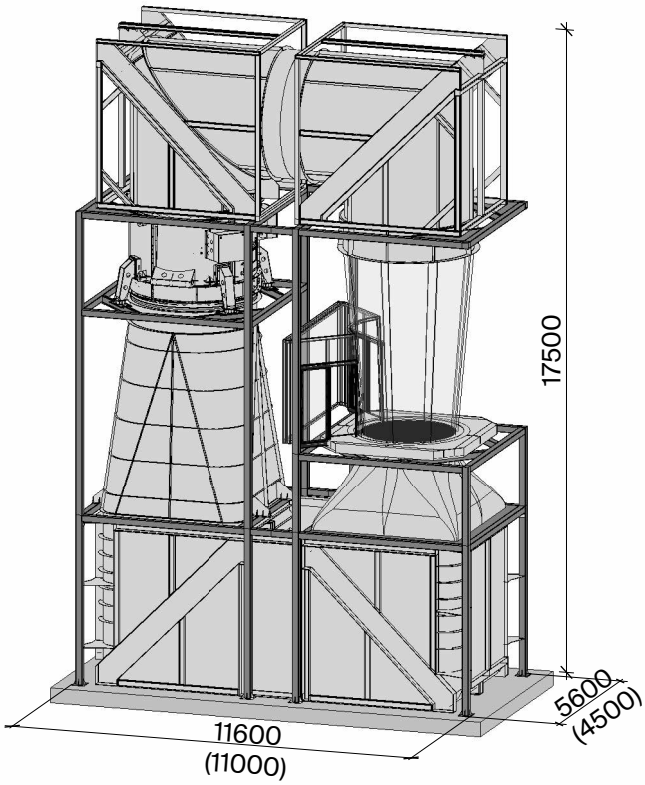
- Architectural restrictions for the technological space of the wind tunnel in the building;
- Requirements and recommendations for the technological space of the wind tunnel and ways of access there;
- Specifics of the building design in order to provide the installation, commissioning and maintenance of the wind tunnel.

The design of the wind tunnel technological space can be self-supporting or can be integrated into reinforced concrete structures. The document describes both possible cases.

Reinforced concrete structure



Self-supporting steel structure



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Technological space of the wind tunnel

The technological volumes of the wind tunnel are aligned and described in relation to 2 main axes and 5 levels. See the following drawings for the necessary axes positioning and the relative elevations of the levels.

The intersections of the 2 principal axes of the wind tunnel mark the centers of the 2 vertical shafts of the technological volumes:

- The central shaft (where the Flight Chamber is located)
- The side shaft has an Axial Fan that creates the air flow;

The following levels and their relative elevations are crucial for the wind tunnel equipment:

1. The level of the Lower Duct. The base face for the Lower Turning Vanes' Blocks;
2. The level of the Airjet and Axial Fan's Outlet Duct. The base face of the Airjet and of the Axial Fan's Outlet Duct;
3. The level of the Waiting Zone. The base surface of the Lower Ring, the base face of the Waiting Zone frame, the finish floor thickness;
4. The level of the Axial Fan. The base face of the Fan's Suspension in the side shaft;
5. The level of the Upper Duct. The base face of the Upper Axial Fan's Turning Vane Block above the main shaft and the base surface of the Upper Flight Chamber Turning Vane's Block.

Dimensions of the technological space of the wind tunnel

The internal dimensions of the technological space of the wind tunnel are shown in the following architectural drawings.

All dimensions (linear, radial and elev. marks) that are shown in the architectural drawings are dictated by the wind tunnel technology. The dimensions must be respected in order to provide the wind tunnel equipment installation, functioning and maintenance.

Dimensions marked with '#' and '*' are shown only as a reference and are not dictated by TunnelTech.

Prior to the wind tunnel equipment installation the measurements of the technological space must be conducted by the contractor. The measured data must be provided by the contractor to TunnelTech in accordance to "Marking and Inspection" section of the technical requirements documentation.

If, according to the meterings' report, the precision of the structure is not sufficient for the equipment installation purposes, after careful consideration TunnelTech might request the contractor to fix.

See the "Marking and Inspection" section of the technical requirements documentation for further information.

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The specifics of installation, commissioning and maintenance of the wind tunnel by levels of the building.

Lower Duct level.

A pit for collecting water and draining must be provided on the foundation slab.
A slope between the base faces of the Lower Turning Vanes' Blocks must be organized on the foundation slab to direct the water to the draining pit.
The Lower Duct level can be accessed via a door from the other volumes on the level or via manholes in the slab above the level. The general requirement for the door or the manhole cover is that it must be airtight to withstand the pressure up to 2000Pa. The final position of the door/manhole must be confirmed with TunnelTech.

Airjet and Axial Fan Outlet Duct level.

To provide access to the side shaft during the installation and commissioning of the wind tunnel equipment technical opening must be provided. After the wind tunnel equipment is installed, the access to the side shaft on the level is not needed and the opening can be bricked or filled with other material to reduce the noise propagation.
The dimensions of the opening in the floor slab at the cross-sections of the principal axes must be respected in relation to the principal axes of the wind tunnel equipment with the tolerance of -20mm .. +20mm.
Openings for air intake and exhaust must be implemented above the Airjet and Axial Fan Outlet Duct level. The position and dimensions of the openings must be clarified in course of the project and confirmed with TunnelTech.

Waiting Zone level.

The final position of the Waiting Zone and the Airlock and their attachment to the building structure must be clarified in course of the project. The slab elevation and the thickness of the finish floor under the Airlock and the Waiting Zone must be implemented in accordance with the technical requirements.
The tolerance for the position of the central opening in plan view in relation to the project values is 15mm;
The dimensions of the central opening in the floor slab and the consoles at the cross-sections of the principal axes must be respected in relation to the principal axes of the wind tunnel equipment (of the steel frame of the Flight Chamber) with the tolerance of -10mm .. +10mm.
The stability requirement for the slab around the central opening (Lower Ring base slab) and the four consoles is that the slab and equipment bases must not bend or shift more than 5mm. That includes the shifts of the structure (if any) during the first years after the construction.

Axial Fan level.

To provide the possibility of extracting the Axial Fan for maintenance after the equipment is installed, the technological opening must be created in the external wall of the side shaft. The opening must have demountable filling. The position and dimensions of the opening must be clarified in course of the project and confirmed with TunnelTech.
The additional beams needed for the Axial Fan extraction are supplied by TunnelTech.
After an Axial Fan is rolled out of a side shaft volume on the additional beams, it is the customer's responsibility to provide a way of replacing the Axial Fan.
An access to the Machine Rooms, where the Axial Fan is located, must be provided for the installation, commissioning and maintenance.

Upper Duct level.

An access to the Upper Duct level must be provided for the installation, commissioning and maintenance.
The structure of the roof is to be installed after the equipment of the Upper Duct is placed in the building.
The structure of the building is introductory before the approval of the project. The exact structural plan of the building and the procedure for installing the wind tunnel equipment will be presented in subsequent revisions and in the technical requirements section of the "X - Site works execution program"

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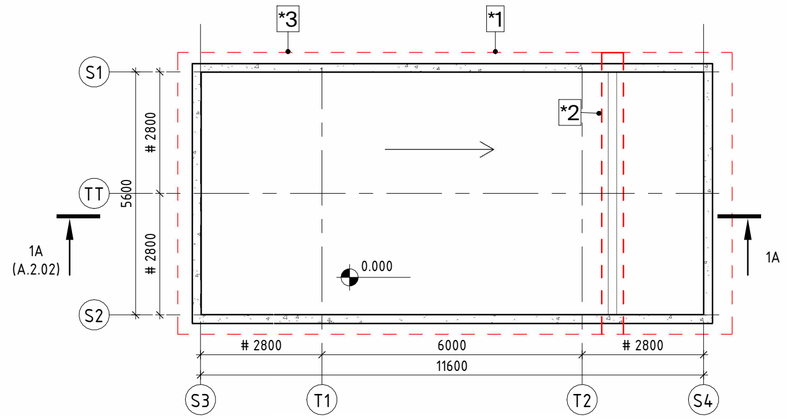
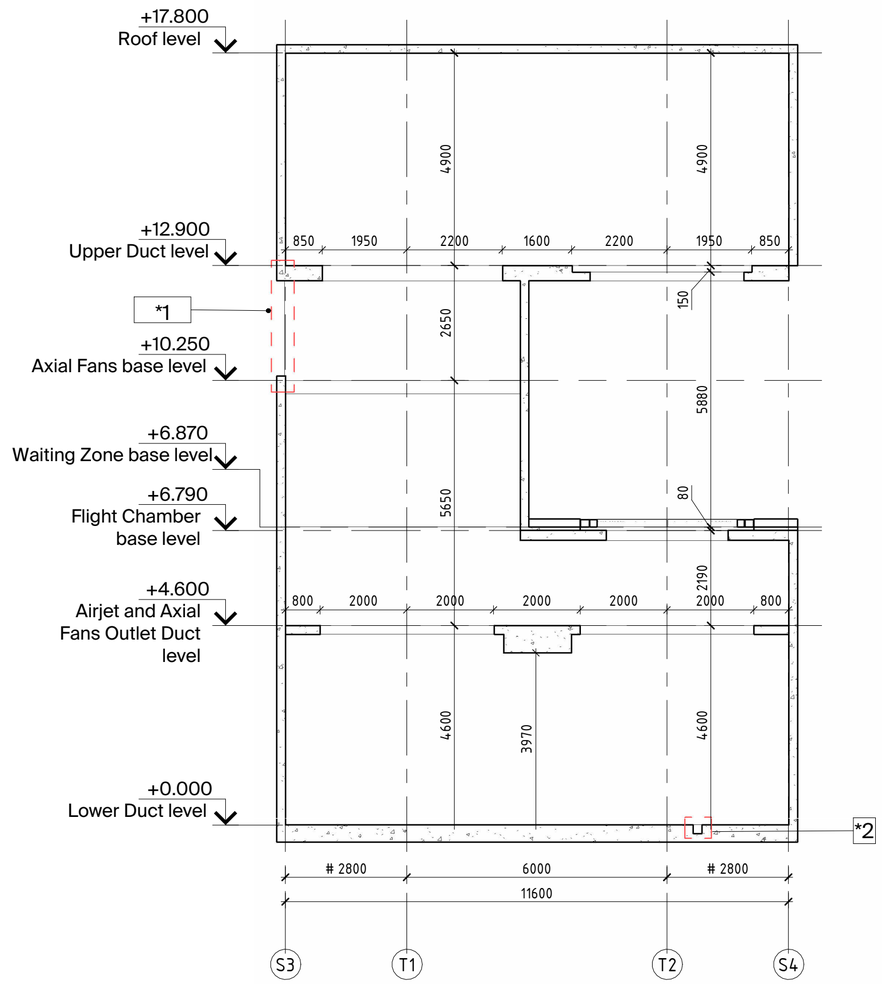
Lower Duct level

1 : 100



1A - 1A

1 : 100



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LEGEND

- Annotation frame

Dimensions marked with '#' are shown only as a reference and not dictated by TUNNEL TECH .

Dimensions marked with '*' are shown only as a reference
and must be specified and confirmed with the local engineer.

NOTES

Lower Duct level

*1 - A draining pit must be organised on the level for draining water removal.

*2 - Slope for collecting water.

*3 - It is necessary to provide free space for the placement of cooling system collectors and chillers at the Lower Duct base level. The chillers must be located outside the building, in an open or well ventilated area. The position of the chillers is discussed during the project.

REVISIONS

No.	Ind	Date

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PROJECT, SECTION

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Building requirements

TITLE

Reinforced concrete structure plan views

CLIENT

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