



UWAL
University of Washington Aeronautical Laboratory

www.uwal.org



2008 Commercial Services & Rates Guide
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Introduction

The University of Washington Aeronautical Laboratory (UWAL) is a subsonic wind tunnel testing organization. As a self-sustaining, not-for-profit organization, UWAL charges its customers in order to pay its employees and to fund maintenance and upgrades to its facilities. This guide describes the most common services UWAL provides for its customers at UWAL's main facility, the Kirsten Wind Tunnel. UWAL also has access to other facilities and is capable of providing additional services. Please contact UWAL if you have special testing requirements.

Rates Summary

Tunnel Rental	
Occupancy	425.00 USD per hour
Overtime Occupancy	525.00 USD per hour
Idle-Time	250.00 USD per hour
Electronic Pressure Scanning	
EPS Setup	250.00 USD
EPS Usage	100.00 USD per wind-on hour
Powered Model Testing	
Setup	call
Usage	100.00 USD per power-on hour
Pretest Ground Plane Setup	
Aircraft Ground Plane	800.00 USD
Vehicle Ground Plane	2500.00 USD
2D Testing	
2D-Wall Pretest Installation	call
2D-Wall Usage	100.00 USD per wind-on hour
Deliverables	
Test Report	250.00 USD
Extra Printed Test Reports	100.00 USD each
Extra CD or DVD	100.00 USD each
Custom Services	
Software Programming	100.00 USD per hour
Electronics Support	100.00 USD per hour
Machine Shop Labor	75.00 USD per hour

Minimum Charge

The minimum charge for a test that includes Occupancy (as opposed to Idle-Time) shall be 2250.00 USD.

Tunnel Occupancy

Tunnel occupancy is defined in the UWAL Work Agreement that is made for each test. The standard occupancy shift length is 9 hours and goes from 7:30 am to 4:30 pm, Monday through Friday, excluding University of Washington holidays. The shift length can be extended from the nine-hour standard up to twelve hours per day under most circumstances if UWAL is provided written notice at least two-days in advance. The Tunnel Occupancy Rate will be charged for the entire amount of each scheduled shift under most circumstances.

Tunnel Occupancy includes the following:

Tunnel rental including use of UWAL computer systems for data acquisition, data reduction, and data output preparation.

Personnel to operate the tunnel, reduce the data, and assist with model changes.

Support for force & moment data acquisition, flow visualization, digital photographs and video.

Materials normally used during the test, including such things as office supplies, flow visualization materials, and nominal reproduction services.

Use of UWAL Plotting and Wind Tunnel Data Organizer software packages.

Preliminary test data, digital images, and run logs on disc in PC format, prepared at the conclusion of the test.

Final test data, digital images, and run logs on disc in PC format, following completion of final data processing, if needed.

Overtime Policy

Overtime occurs whenever testing runs beyond the scheduled shift, or whenever testing is scheduled for a Saturday, Sunday, or University of Washington holiday. Overtime charges are in addition to Tunnel Occupancy charges. Overtime charges will be waived for time used to recover from Downtime. UWAL cannot guarantee that Overtime will be available.

Idle-Time Policy

Occasionally customers may find themselves unable to continue with their test campaign. Perhaps a required model part is temporarily unavailable or the test matrix completed ahead of schedule. Once all work on the model and/or tunnel has been completed and the test section has been vacated then the Company representative may request a switch from Tunnel Occupancy to Idle-Time. Idle-Time is only allowed for durations of one hour or longer.

Electronic Pressure Scanning

UWAL has an Electronic Pressure Scanning (EPS) system, which is ideal for measuring large numbers of pressures. There is a per-test setup charge and a wind-on usage charge. EPS usage may be scheduled for an entire test, or only for specific portions of a test, at the customer's discretion. Please see the Kirsten Wind Tunnel Technical Guide for more information. If you would like to use EPS during your test please contact UWAL to discuss your pressure measurement objectives.

Powered Model Testing

The equipment for Powered Model Testing needs to be re-commissioned. Call for status. This equipment includes an Auxiliary Motor-Generator Set, which is suitable for powering high power density induction motors that can be placed in wind tunnel models. For powered model testing there is a per-test setup charge and a power-on usage charge. Charges for wiring may apply too. Model power usage may be scheduled for an entire test, or only for specific portions of a test, at the customer's discretion. Please see the Kirsten Wind Tunnel Technical Guide for more information. Contact UWAL to discuss your testing requirements.

Optional Pretest Ground Plane Setup

Sometimes UWAL may agree to install a ground plane prior to customer arrival for a fixed price, depending on tunnel availability. If available then this offers two advantages for UWAL customers. First, the fees have been set slightly below the expected Occupancy costs that would have otherwise been incurred if the ground plane had been installed during the test. And, since the price is fixed, this protects UWAL's customers from installation time variances.

2D Testing

The 2-D wall setup needs to be re-commissioned. Once that happens, as with ground plane testing, UWAL can install the 2D-Walls prior to customer arrival for a fixed price, depending on tunnel availability. There is also a wind-on usage charge for all 2D-testing.

Deliverables

Most customers choose to have UWAL write a formal report documenting the test. Purchase of a test report includes printing and shipping of up to two hardcopies of the test report along with a disc containing a digital version of the report in Adobe Acrobat PDF format, along with all of the test data and images.

Downtime Policy

Downtime occurs whenever UWAL is responsible for a problem that takes more than 15 minutes to resolve and that prevents proceeding with the test. UWAL does not charge Tunnel Occupancy or Overtime rates during Downtime. Note that activities that are a part of UWAL's standard operating procedures, such as calibration routines or tunnel checkouts, are not considered Downtime.

UWAL makes reasonable efforts to ensure that its facilities are operational during scheduled tests. In the event that Downtime occurs, the facility will attempt to recover lost test time by offering additional test time, if available. For example, if the downtime causes a delay of one entire shift and no additional days are available after the scheduled end of test, then one option is to work extended (12-hour) shifts for the remainder of the test. UWAL cannot guarantee recovery of lost test time.

Example Cost Estimate

This example cost estimate is for a customer interested in conducting a wind tunnel test of an aircraft. Electronic Pressure Scanning (EPS) data will be collected in addition to standard force and moment data. The proposed test matrix totals 300 wind-on runs. (Each run is a set of test points where only one parameter is varied, such as the angle of attack or sideslip.) The test matrix also calls for 100 model configuration changes. And the customer wants a test report.

Installation Time: 6 hours

Actual model installation times vary quite a bit depending on model complexity and the model manufacturer's familiarity with UWAL's model support systems. Sometimes it's as short as 2 hours, other times it's 2 days. For this example I'll use 6 hours as a reasonable estimate.

Total Wind-On Time: 25 hours

Assumes an average wind-on time of 5 minutes per run. Run durations primarily depend on number of test points. Runs typically last 4-7 minutes at UWAL.

Total Model Change Time: 30 hours

Assumes model changes take 18 minutes on average. Note that some model changes may take several hours.

Model Removal: 2 hours

Total Time Required: 63 hours (or 7 days at 9 hours/day)

Tunnel Rental:	\$26,775	(63 Occupancy hours at \$395/hour)
EPS Setup:	\$250	
EPS Usage:	\$2,500	(25 wind-on hours at \$100 each)
Test Report:	\$250	
Total:	\$29,775	