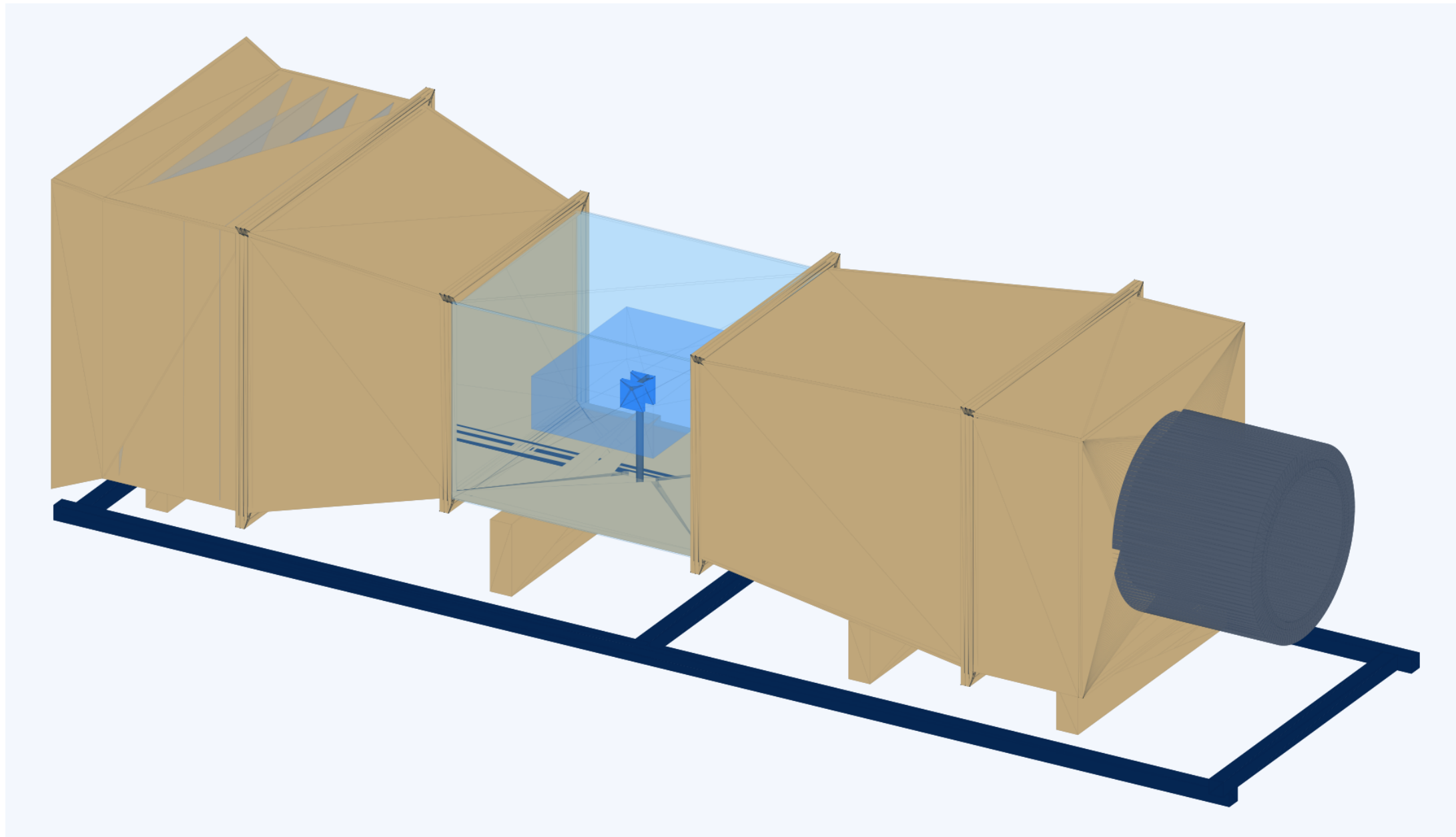


# FN-LAB-DESK / Compact surface-flow demonstrator

DESIGN REVIEW / RFQ ONLY -- NOT RELEASED FOR CUTTING OR OPERATION



USER BRIEF: THB 20,000 ceiling / tabletop / lightweight / surface tufts / adjustable model angle.

Nominal envelope: 1640 L x460 W x~460 H mm including base and fan allowance. Table:  $\geq 1800$  x600 mm.

Clear test section: 300 W x250 H x350 L mm. Nominal 1:40 clearance dummy: 230 span x170 length x70 height mm.

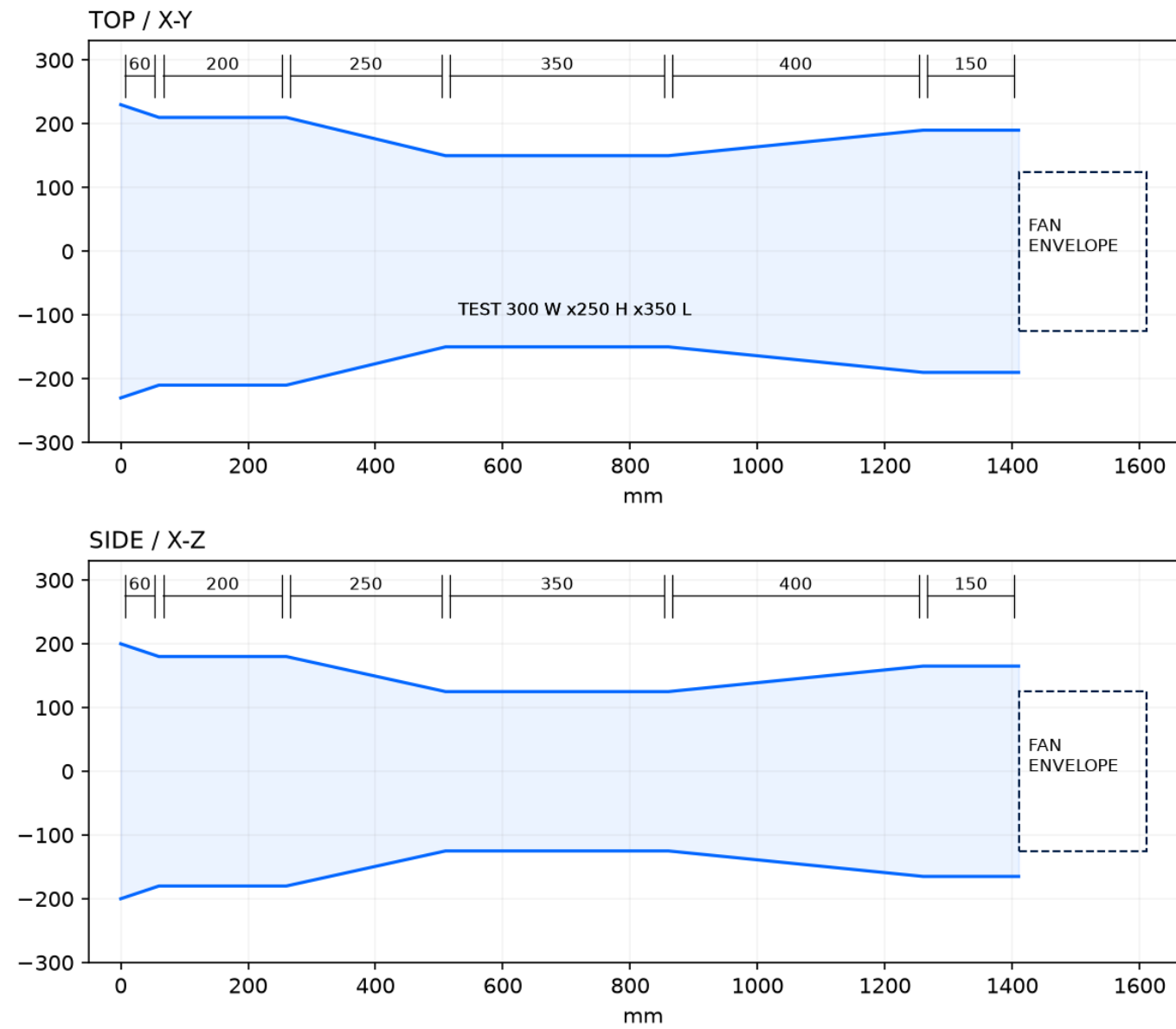
Baseline: 1-2 m/s survey target; 3 m/s stretch pending fan curve / pressure loss and commissioning.

No load balance, DAQ, automatic oscillation or smoke generator in baseline. Existing phone and table supplied by owner.

CAD is a coordination model: no aerodynamic test article, proprietary fan internals or fully detailed fastener schedule.

# GA-01 / General arrangement and station dimensions

DESIGN REVIEW / RFQ ONLY -- NOT RELEASED FOR CUTTING OR OPERATION



Stations X: 0 / 60 / 260 / 510 / 860 / 1260 / 1410 / 1610 / 1640 mm.

Flow order: inlet -> honeycomb/screens -> contraction -> clear test -> diffuser -> plenum -> fan -> guarded outlet.

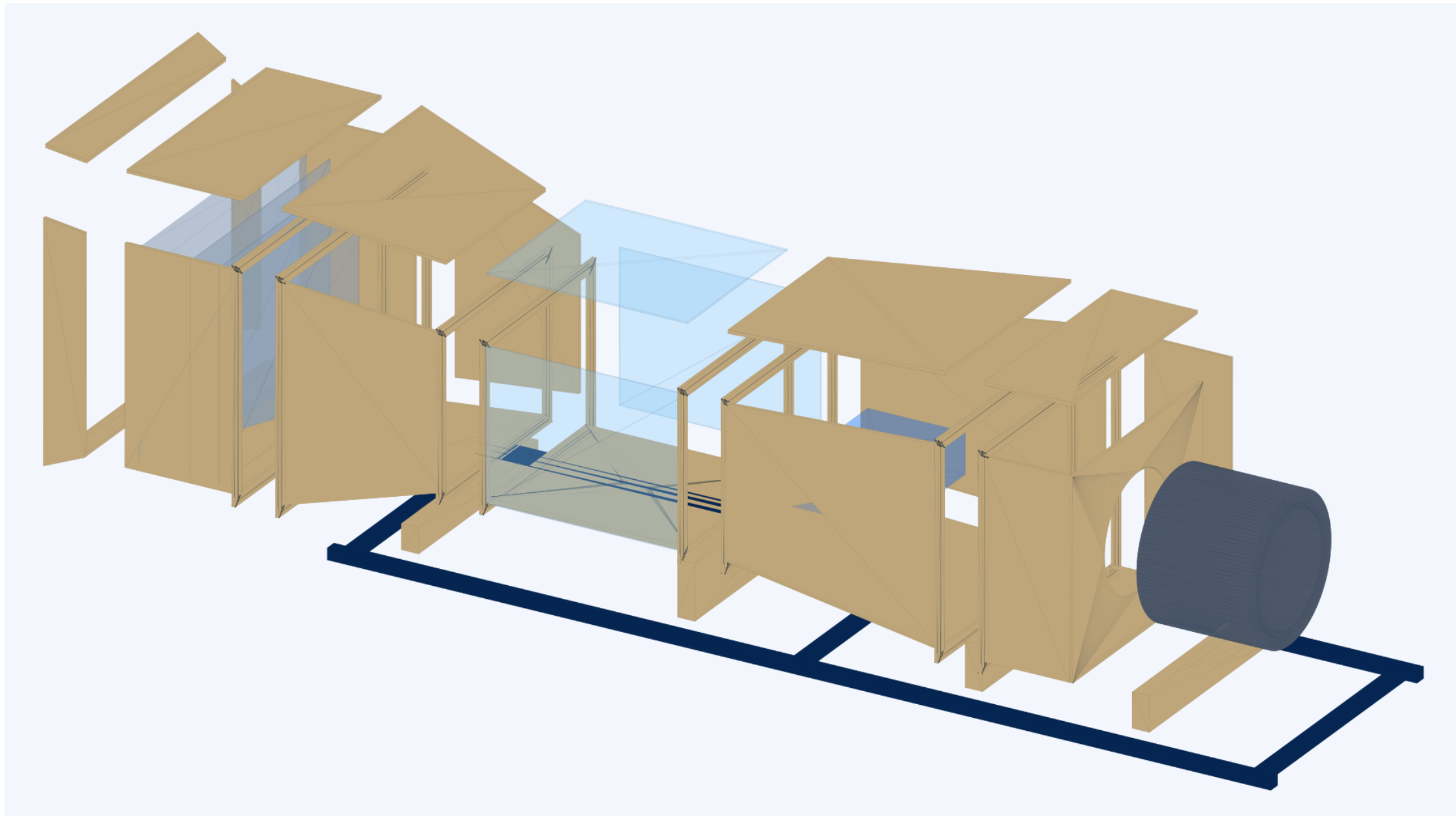
Contraction area ratio 2.016:1; linear prototype contour, not optimized. Diffuser wall half-angle ~5.71 deg.

Fan envelope 200 L /250 OD with 200 port is an assumption. Supplier envelope and connector can change total length.

Nominal butt-joint module lengths exclude gasket compression and final adapter detail; allow table clearance.

# GA-02 / Exploded assembly and module IDs

DESIGN REVIEW / RFQ ONLY -- NOT RELEASED FOR CUTTING OR OPERATION



P01 inlet | P02 settling | P03 contraction | P08-P11 clear test | P14 diffuser | P17/P18 fan plenum.

E01 fan envelope | E04 honeycomb | E05/E06 screen envelopes | F01-F05 base rails | A01-A05 manual pitch mount.

Exploded offsets are illustrative. STEP assembly, individual STEP files and register share the same part IDs.

Blue transparent R01 is clearance only, not a valid aircraft geometry. No airfoil/flight performance inferred.

# FAB-01 / Developed panel schedule -- nominal outlines

DESIGN REVIEW / RFQ ONLY -- NOT RELEASED FOR CUTTING OR OPERATION

P01-T / Bellmouth faceted inlet top



Material: ply / t 6 mm  
Flat bbox 63.25 x460.00 mm  
Qty 1 / see part-specific DXF  
No kerf / nesting / edge bevel allowance  
HOLD: shop joint + seal detailing

P01-B / Bellmouth faceted inlet bottom



Material: ply / t 6 mm  
Flat bbox 63.25 x460.00 mm  
Qty 1 / see part-specific DXF  
No kerf / nesting / edge bevel allowance  
HOLD: shop joint + seal detailing

P01-R / Bellmouth faceted inlet right



Material: ply / t 6 mm  
Flat bbox 63.25 x412.00 mm  
Qty 1 / see part-specific DXF  
No kerf / nesting / edge bevel allowance  
HOLD: shop joint + seal detailing

P01-L / Bellmouth faceted inlet left



Material: ply / t 6 mm  
Flat bbox 63.25 x412.00 mm  
Qty 1 / see part-specific DXF  
No kerf / nesting / edge bevel allowance  
HOLD: shop joint + seal detailing

P02-T / Settling chamber top



Material: ply / t 6 mm  
Flat bbox 200.00 x420.00 mm  
Qty 1 / see part-specific DXF  
No kerf / nesting / edge bevel allowance  
HOLD: shop joint + seal detailing

P02-B / Settling chamber bottom



Material: ply / t 6 mm  
Flat bbox 200.00 x420.00 mm  
Qty 1 / see part-specific DXF  
No kerf / nesting / edge bevel allowance  
HOLD: shop joint + seal detailing

P02-R / Settling chamber right



Material: ply / t 6 mm  
Flat bbox 200.00 x372.00 mm  
Qty 1 / see part-specific DXF  
No kerf / nesting / edge bevel allowance  
HOLD: shop joint + seal detailing

P02-L / Settling chamber left



Material: ply / t 6 mm  
Flat bbox 200.00 x372.00 mm  
Qty 1 / see part-specific DXF  
No kerf / nesting / edge bevel allowance  
HOLD: shop joint + seal detailing

DXF units mm / 1:1 nominal. Preview not to scale. Check thickness, kerf, expansion, joint overlap, screws and fan interface before cutting.

# FAB-02 / Developed panel schedule -- nominal outlines

DESIGN REVIEW / RFQ ONLY -- NOT RELEASED FOR CUTTING OR OPERATION

P03-T / Contraction (linear prototype) top



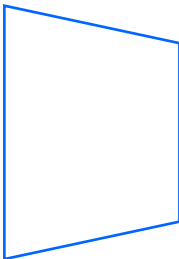
Material: ply / t 6 mm  
Flat bbox 255.98 x420.00 mm  
Qty 1 / see part-specific DXF  
No kerf / nesting / edge bevel allowance  
HOLD: shop joint + seal detailing

P03-B / Contraction (linear prototype) bottom



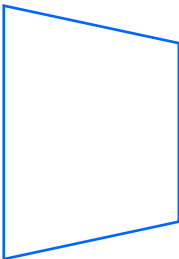
Material: ply / t 6 mm  
Flat bbox 255.98 x420.00 mm  
Qty 1 / see part-specific DXF  
No kerf / nesting / edge bevel allowance  
HOLD: shop joint + seal detailing

P03-R / Contraction (linear prototype) right



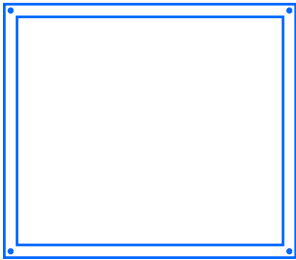
Material: ply / t 6 mm  
Flat bbox 257.10 x372.00 mm  
Qty 1 / see part-specific DXF  
No kerf / nesting / edge bevel allowance  
HOLD: shop joint + seal detailing

P03-L / Contraction (linear prototype) left



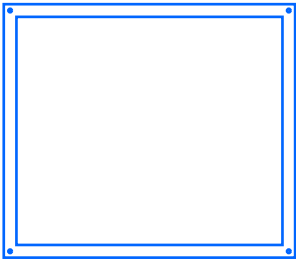
Material: ply / t 6 mm  
Flat bbox 257.10 x372.00 mm  
Qty 1 / see part-specific DXF  
No kerf / nesting / edge bevel allowance  
HOLD: shop joint + seal detailing

P04 / Module flange / M5 clearance



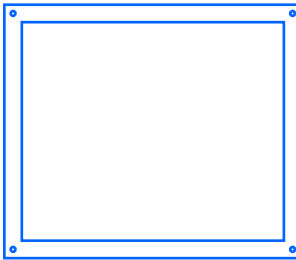
Material: ply / t 6 mm  
Flat bbox 460.00 x400.00 mm  
Qty 1 / see part-specific DXF  
No kerf / nesting / edge bevel allowance  
HOLD: shop joint + seal detailing

P05 / Module flange / M5 clearance



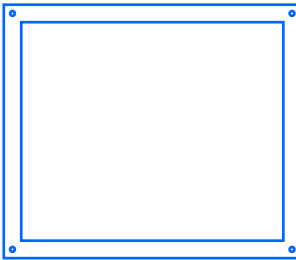
Material: ply / t 6 mm  
Flat bbox 460.00 x400.00 mm  
Qty 1 / see part-specific DXF  
No kerf / nesting / edge bevel allowance  
HOLD: shop joint + seal detailing

P06 / Module flange / M5 clearance



Material: ply / t 6 mm  
Flat bbox 340.00 x290.00 mm  
Qty 1 / see part-specific DXF  
No kerf / nesting / edge bevel allowance  
HOLD: shop joint + seal detailing

P07 / Module flange / M5 clearance



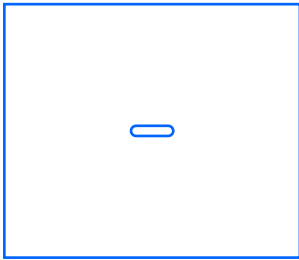
Material: ply / t 6 mm  
Flat bbox 340.00 x290.00 mm  
Qty 1 / see part-specific DXF  
No kerf / nesting / edge bevel allowance  
HOLD: shop joint + seal detailing

DXF units mm / 1:1 nominal. Preview not to scale. Check thickness, kerf, expansion, joint overlap, screws and fan interface before cutting.

# FAB-03 / Developed panel schedule -- nominal outlines

DESIGN REVIEW / RFQ ONLY -- NOT RELEASED FOR CUTTING OR OPERATION

P08 / Test floor / sealed 50 x 12 stem slot



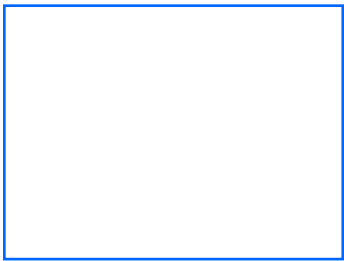
Material: ply / t 9 mm  
Flat bbox 350.00 x300.00 mm  
Qty 1 / see part-specific DXF  
No kerf / nesting / edge bevel allowance  
HOLD: shop joint + seal detailing

P09 / Clear test roof



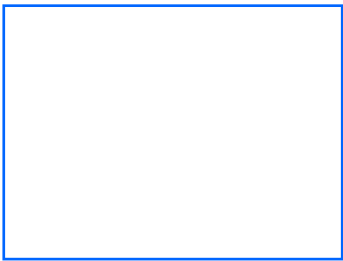
Material: clear / t 3 mm  
Flat bbox 350.00 x300.00 mm  
Qty 1 / see part-specific DXF  
No kerf / nesting / edge bevel allowance  
HOLD: shop joint + seal detailing

P10 / Clear test side



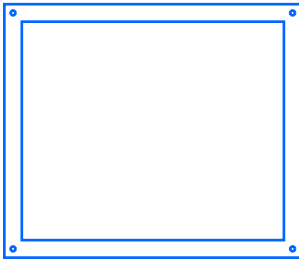
Material: clear / t 3 mm  
Flat bbox 350.00 x262.00 mm  
Qty 1 / see part-specific DXF  
No kerf / nesting / edge bevel allowance  
HOLD: shop joint + seal detailing

P11 / Clear test side



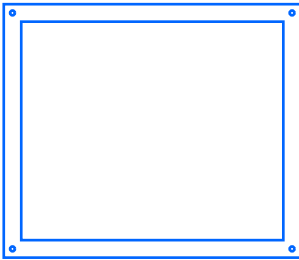
Material: clear / t 3 mm  
Flat bbox 350.00 x262.00 mm  
Qty 1 / see part-specific DXF  
No kerf / nesting / edge bevel allowance  
HOLD: shop joint + seal detailing

P12 / Module flange / M5 clearance



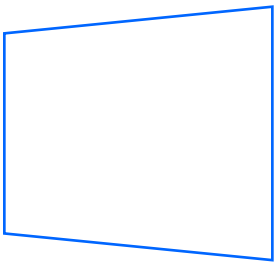
Material: ply / t 6 mm  
Flat bbox 340.00 x290.00 mm  
Qty 1 / see part-specific DXF  
No kerf / nesting / edge bevel allowance  
HOLD: shop joint + seal detailing

P13 / Module flange / M5 clearance



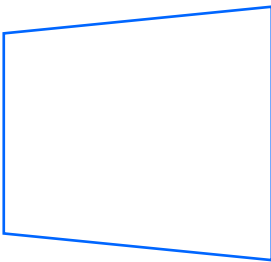
Material: ply / t 6 mm  
Flat bbox 340.00 x290.00 mm  
Qty 1 / see part-specific DXF  
No kerf / nesting / edge bevel allowance  
HOLD: shop joint + seal detailing

P14-T / Low-angle diffuser top



Material: ply / t 6 mm  
Flat bbox 402.00 x380.00 mm  
Qty 1 / see part-specific DXF  
No kerf / nesting / edge bevel allowance  
HOLD: shop joint + seal detailing

P14-B / Low-angle diffuser bottom



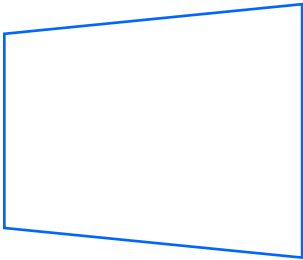
Material: ply / t 6 mm  
Flat bbox 402.00 x380.00 mm  
Qty 1 / see part-specific DXF  
No kerf / nesting / edge bevel allowance  
HOLD: shop joint + seal detailing

DXF units mm / 1:1 nominal. Preview not to scale. Check thickness, kerf, expansion, joint overlap, screws and fan interface before cutting.

# FAB-04 / Developed panel schedule -- nominal outlines

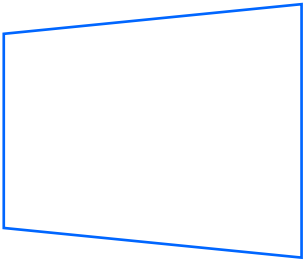
DESIGN REVIEW / RFQ ONLY -- NOT RELEASED FOR CUTTING OR OPERATION

P14-R / Low-angle diffuser right



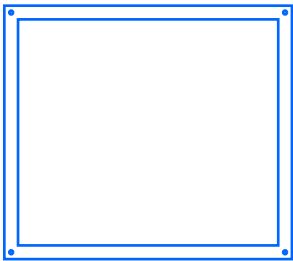
Material: ply / t 6 mm  
Flat bbox 402.00 x342.00 mm  
Qty 1 / see part-specific DXF  
No kerf / nesting / edge bevel allowance  
HOLD: shop joint + seal detailing

P14-L / Low-angle diffuser left



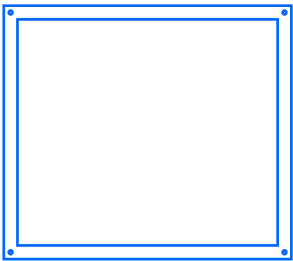
Material: ply / t 6 mm  
Flat bbox 402.00 x342.00 mm  
Qty 1 / see part-specific DXF  
No kerf / nesting / edge bevel allowance  
HOLD: shop joint + seal detailing

P15 / Module flange / M5 clearance



Material: ply / t 6 mm  
Flat bbox 420.00 x370.00 mm  
Qty 1 / see part-specific DXF  
No kerf / nesting / edge bevel allowance  
HOLD: shop joint + seal detailing

P16 / Module flange / M5 clearance



Material: ply / t 6 mm  
Flat bbox 420.00 x370.00 mm  
Qty 1 / see part-specific DXF  
No kerf / nesting / edge bevel allowance  
HOLD: shop joint + seal detailing

P17-T / Fan plenum top



Material: ply / t 6 mm  
Flat bbox 150.00 x380.00 mm  
Qty 1 / see part-specific DXF  
No kerf / nesting / edge bevel allowance  
HOLD: shop joint + seal detailing

P17-B / Fan plenum bottom



Material: ply / t 6 mm  
Flat bbox 150.00 x380.00 mm  
Qty 1 / see part-specific DXF  
No kerf / nesting / edge bevel allowance  
HOLD: shop joint + seal detailing

P17-R / Fan plenum right



Material: ply / t 6 mm  
Flat bbox 150.00 x342.00 mm  
Qty 1 / see part-specific DXF  
No kerf / nesting / edge bevel allowance  
HOLD: shop joint + seal detailing

P17-L / Fan plenum left



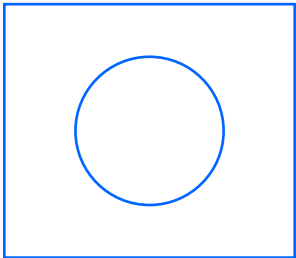
Material: ply / t 6 mm  
Flat bbox 150.00 x342.00 mm  
Qty 1 / see part-specific DXF  
No kerf / nesting / edge bevel allowance  
HOLD: shop joint + seal detailing

DXF units mm / 1:1 nominal. Preview not to scale. Check thickness, kerf, expansion, joint overlap, screws and fan interface before cutting.

# FAB-05 / Developed panel schedule -- nominal outlines

DESIGN REVIEW / RFQ ONLY -- NOT RELEASED FOR CUTTING OR OPERATION

**P18 / Fan bulkhead / provisional 200 mm port**



Material: ply / t 6 mm  
Flat bbox 392.00 x342.00 mm  
Qty 1 / see part-specific DXF  
No kerf / nesting / edge bevel allowance  
HOLD: shop joint + seal detailing

DXF units mm / 1:1 nominal. Preview not to scale. Check thickness, kerf, expansion, joint overlap, screws and fan interface before cutting.

# MECH-01 / Manual pitch support and airflow instruments

DESIGN REVIEW / RFQ ONLY -- NOT RELEASED FOR CUTTING OR OPERATION

A01 Manual mount base / M5 holes

Envelope 70.0 x60.0 x6.0 mm. 6 mm aluminum 70x60, holes 50x40 pattern; mount to external fixture, seal floor separately

A02 8 mm support stem / 137 mm

Envelope 8.0 x8.0 x137.0 mm. Ground rod + clamp. Deflection check and overload retention needed; not a calibrated balance

A03 Printed pitch clevis side / M5 pivot

Envelope 32.0 x5.0 x36.0 mm. RFQ geometry; print orientation, fasteners and strength to verify

A04 Printed pitch clevis side / M5 pivot

Envelope 32.0 x5.0 x36.0 mm. RFQ geometry; print orientation, fasteners and strength to verify

A05 M5 pivot envelope

Envelope 5.0 x40.0 x5.0 mm. Use shoulder bolt/bushings and locknut; no free swinging model

Pitch axis through approximate model CG. Manual range study -4 to +16 deg; validate swept envelope before use.

Lock pivot with shoulder bolt / bush / locknut; add positive retention. No freely suspended or hand-held model in airflow.

External stem support must connect to base fixture, not load clear windows. Seal the floor slot around the stem.

A01: 70x60x6 aluminum base / four 5.5 mm holes at +/-25 X, +/-20 Y; mount interface remains a hold point.

A03/A04 are print mockups, not rated load parts; proof-check with no fan and model restraint before any operation.

Tufts + LED + existing phone video. Anemometer for survey only; verify low-speed resolution and calibration.

At 2 m/s: Q=540 m3/h; 1:40 chord ~0.034 m gives Re~4,600. Not flight-Re simulation.

# BOM-01 / THB 20,000 planning ceiling

DESIGN REVIEW / RFQ ONLY -- NOT RELEASED FOR CUTTING OR OPERATION

|     |                                                                |                           |       |
|-----|----------------------------------------------------------------|---------------------------|-------|
| B01 | 6 mm plywood + panel cutting stock                             | 1 sheet / ~1220x2440      | 1,200 |
| B02 | 9 mm floor/support offcuts                                     | 1 lot                     | 400   |
| B03 | Clear polycarbonate 3 mm cut pieces                            | 3 panels + trim allowance | 1,200 |
| B04 | 2020 aluminum profile                                          | 5 m allowance             | 1,000 |
| B05 | M5 fasteners / brackets / roof clips                           | 1 lot                     | 700   |
| B06 | Gasket / split stem seal / tape                                | 1 lot                     | 450   |
| B07 | Honeycomb 420x360x50                                           | 1 panel                   | 600   |
| B08 | Flow-conditioning screens                                      | 2 x420x360                | 300   |
| B09 | Mixed-flow inline fan, 200 mm class                            | 1 provisional unit        | 3,500 |
| B10 | Fan-compatible speed controller                                | 1                         | 700   |
| B11 | Fan adapter / flexible connector                               | 1 lot                     | 400   |
| B12 | Two fan guards / retaining fixings                             | 2                         | 350   |
| B13 | Electrical protective enclosure / isolation / qualified wiring | 1 lot                     | 1,200 |
| B14 | Manual pitch fixture / scale / clamps                          | 1 set                     | 1,000 |
| B15 | Prototype print + finish / small test model                    | 1 lot                     | 800   |
| B16 | Tufts / LED / phone mount                                      | 1 set                     | 1,000 |
| B17 | Low-speed anemometer / survey allowance                        | 1                         | 1,500 |
| B18 | Sealant / interior finishing                                   | 1 lot                     | 600   |
| B19 | Cutting/drilling service allowance                             | 1 lot                     | 1,000 |
| B20 | Delivery / tax variance allowance                              | 1 reserve                 | 800   |

Subtotal THB 18,700 + contingency 1,300 = THB 20,000 ceiling.

All rows are allowances, not quotations. Only profile listing has an observed unit-price reference.

Fan / controller / anemometer and cutting quotes can exceed allowances. Obtain VAT-inclusive landed RFQs first.

Owner provides phone, table, DIY assembly and basic tools. No force balance / DAQ / fog / motorized motion.

Do not spend contingency before supplier interfaces and mandatory guards/electrical protection are covered.

# PLAN-01 / Assembly order, commissioning and purchase holds

DESIGN REVIEW / RFQ ONLY -- NOT RELEASED FOR CUTTING OR OPERATION

- 1. Verify table  $\geq 1800 \times 600$  mm, load capacity and keep inlet/outlet clear; no inlet-exhaust recirculation.
- 2. RFQ fan for installed  $Q=540$  m<sup>3</sup>/h at preliminary 50 Pa design allowance; require full Q-P curve.  
  
50 Pa is a selection allowance, NOT calculated loss. Revise after screen/honeycomb/adapter loss assessment.
- 3. Confirm supplier fan OD/length/hole pattern, controller compatibility, guards and electrician design before buying.
- 4. Dry-fit module panels, flange drilling jig and thickness; seal grain / corners. Inspect clear-panel fit and deflection.
- 5. Fit honeycomb aligned with X, screens taut/parallel; ensure no loose mesh or parts can reach fan.
- 6. Assemble guarded fan, flexible connector and isolation on base. Electrical installation by qualified person.
- 7. Test without model: current/temperature, vibration, leakage, fan protection and shutdown. Ramp speed gradually.
- 8. Survey a test-section grid at several speeds. Record uniformity, angularity, repeatability; do not assume low turbulence.
- 9. Fit and retain model; check AoA sweep/clearance, stem seal, support deflection, camera view and tuft disturbance.
- 10. Log geometry revision, scale, speed/conditions, angle and video time. Compare same-Re/same-surface cases.

HOLD POINTS BEFORE RELEASE: fan interface, guard aperture, screen material/porosity, panel deflection, fastener/roof-clip schedule, gasket stack-up, printed yoke proof test, electrical design and sensor resolution.

Flow quality, fan duty, noise and low-Re model relevance are not validated by this CAD package.

Optional phase: calibrated L/D/M balance + DAQ and controlled-motion rig require separate scope, budget and safety review.

# REF-01 / Source register and deliverables

DESIGN REVIEW / RFQ ONLY -- NOT RELEASED FOR CUTTING OR OPERATION

CAD: CadQuery 2.6.1 source + parameter JSON + named STEP assembly + exploded STEP + individual STEP parts.

2D: individual developed DXFs (mm) + GA SVG. A03/FN aircraft geometry is not altered by this package.

BOM: parts register, quantity-based budget CSV and purchasing holds. No procurement performed.

Profile listing: Arduino4Pro C004, 2020 / 490 g per m / observed 18 THB per 10 cm (regular 19).

<https://www.arduino4pro.com/product/129/> (16 Oct 2026; tax/delivery/stock to confirm)

Fan reference only: VENTS TT PRO 200 series datasheet states max free-air ~1040 m3/h on high speed.

<https://ventilation-system.com/download/tt-pro-datasheet-1357.pdf>

Candidate is NOT selected/quoted. Maximum free-air figure does not prove required installed duty or fit.

NASA tunnel layout / component order:

[https://www.grc.nasa.gov/www/k-12/WindTunnel/wandering\\_windtunnel.html](https://www.grc.nasa.gov/www/k-12/WindTunnel/wandering_windtunnel.html)

NASA similarity / Reynolds number:

<https://www1.grc.nasa.gov/beginners-guide-to-aeronautics/similarity-parameters/>

R01 clearance uses old concept dimensions 9.2 m span /6.8 m length, not frozen aircraft CAD.

User goal: surface flow / model attitude effects, not certification. No measured performance claimed.

No prescribed hot steam / combustion smoke. Baseline does not require a smoke generator.