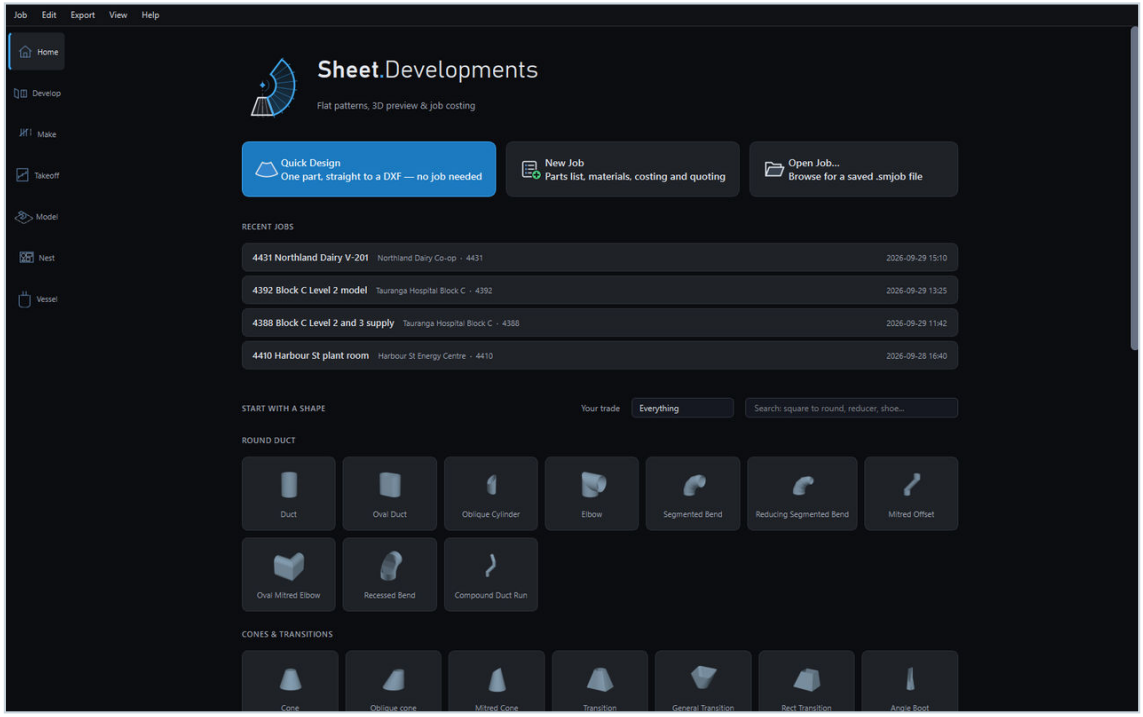
Sheet.Developments

The tutorial: four jobs, start to finish

Version 1.0.0-beta.1. Every picture is the app itself, taken working through these jobs.



Sheet.Developments develops flat patterns for sheet metal and plate, and runs the job around them: take-offs, the parts list, costing and the quote, the shop's paperwork, nesting and tracking on the floor.

This finds its way round the app, then walks through four jobs the way a shop would do them, a step to a page:

1. Getting around page 2
Where things are, before the first job.

2. An insulation job: Harbour St plant room page 3
Chilled, heating and condenser water lines, clad in 0.7 mm stucco aluminium: straight from a line list to a priced quote, the shop paperwork and the Make page.

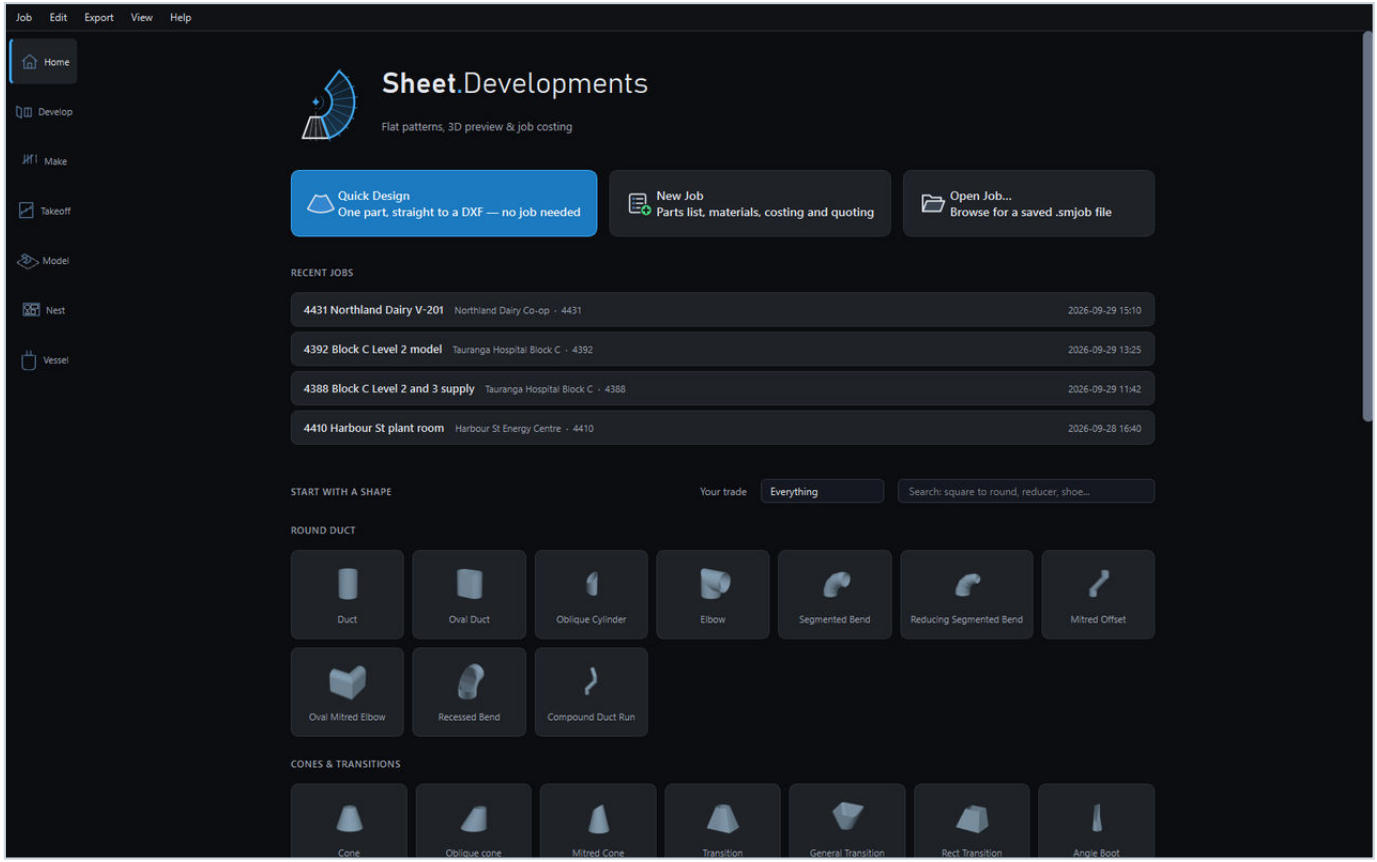
3. An HVAC job: Tauranga Hospital Block C page 17
Galvanised supply ductwork, from the building model and the builder's PDF drawings: the shop's seams, the IFC import, a measured takeoff and a sheet set, duct board, and a job shared with the workshop.

4. A floor in 3D: Block C Level 2 page 30
The same hospital's Level 2 supply, built in 3D over the builder's drawing: the floors and the grid, the drawing lined up, the ductwork set out at its heights and hung, then the install drawing for site.

5. A plate job: Northland Dairy V-201 page 39
A hot water tank in 8 mm plate: the design thicknesses and the nozzle reinforcement checked and printed for sign-off, then the shell, head, cone and nozzles developed, traced by heat number and nested.

The same tutorial is in the app, under **Help > Tutorial**.

The Home screen



Home is where the app opens. **Quick Design** is one part straight to a DXF, with no job. **New Job** starts a parts list with materials, costing and a quote, and **Open Job** finds a saved one. Your recent jobs are listed underneath with their customer and job number: click one to open it.

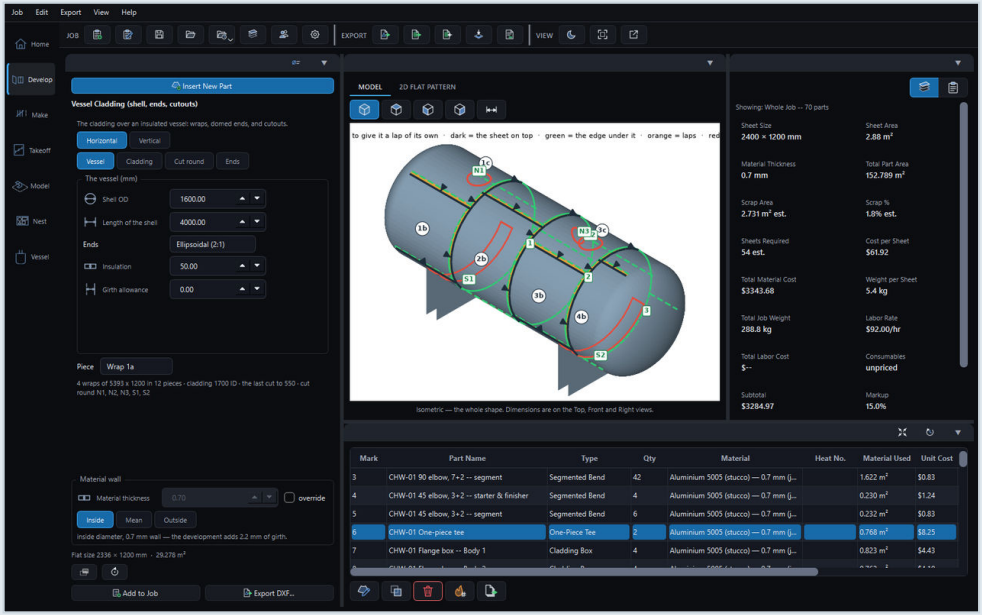
Below them, **Start with a shape** has every shape the app develops. Pick one, or type in the search box (square to round, reducer, shoe), and set **Your trade** to show the shapes your shop makes first.

The rail down the left takes you between the app's workspaces. **Develop** is the shapes, their flat patterns and the job's parts list. **Make** tracks what has been cut, formed, assembled and shipped. **Takeoff** measures PDF drawings, **Model** builds the job's ductwork in 3D over the builder's drawings, **Nest** lays parts onto sheets and plate, and **Vessel** checks pressure vessel thicknesses and nozzle reinforcement. Takeoff, Model, Nest and Vessel are add-ons.

PART 1

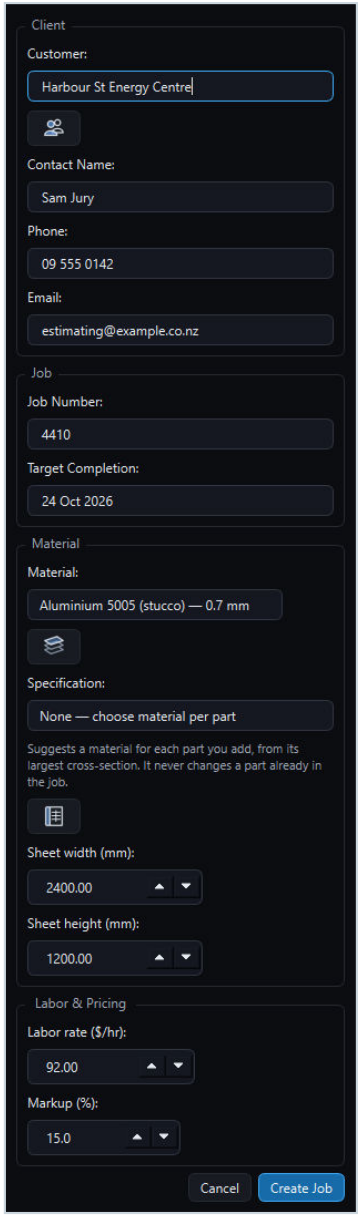
An insulation job: Harbour St plant room

Chilled, heating and condenser water lines, clad in 0.7 mm stucco aluminium: straight from a line list to a priced quote, the shop paperwork and the Make page.



2. Start a new job
3. The cladding take-off
4. The job's parts
5. A flange box and its laps
6. A one-piece tee, flat
7. A tank, clad
8. Labour and consumables
9. The job, priced
10. The quote
11. The cut list
12. Labels
13. A marking-out sheet
14. The Make page

Start a new job

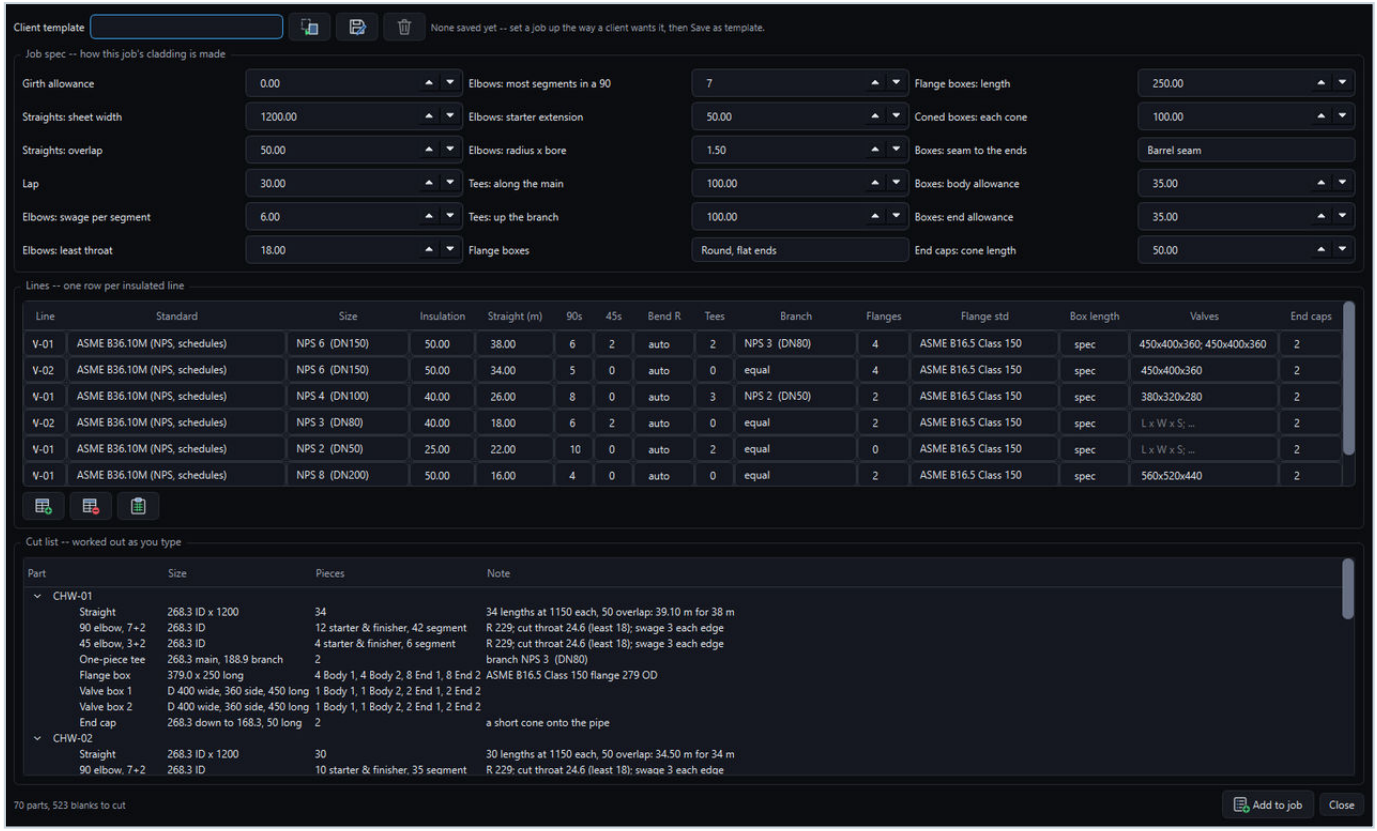


Job > New Job (Ctrl+N), or the first button on the toolbar. Fill in the customer, or pick a saved one with the people button under the name. Add the job number and the date it is due.

The **Material** is the job's sheet: every part you add takes it, unless you give that part its own. The sheet size is the stock you cut from; it decides how many sheets the job needs and whether a part fits. The labour rate and markup price the quote.

A **Specification** is optional. It suggests a material for each part from the part's size, for jobs where the gauge changes with the size of the duct or pipe.

The cladding take-off

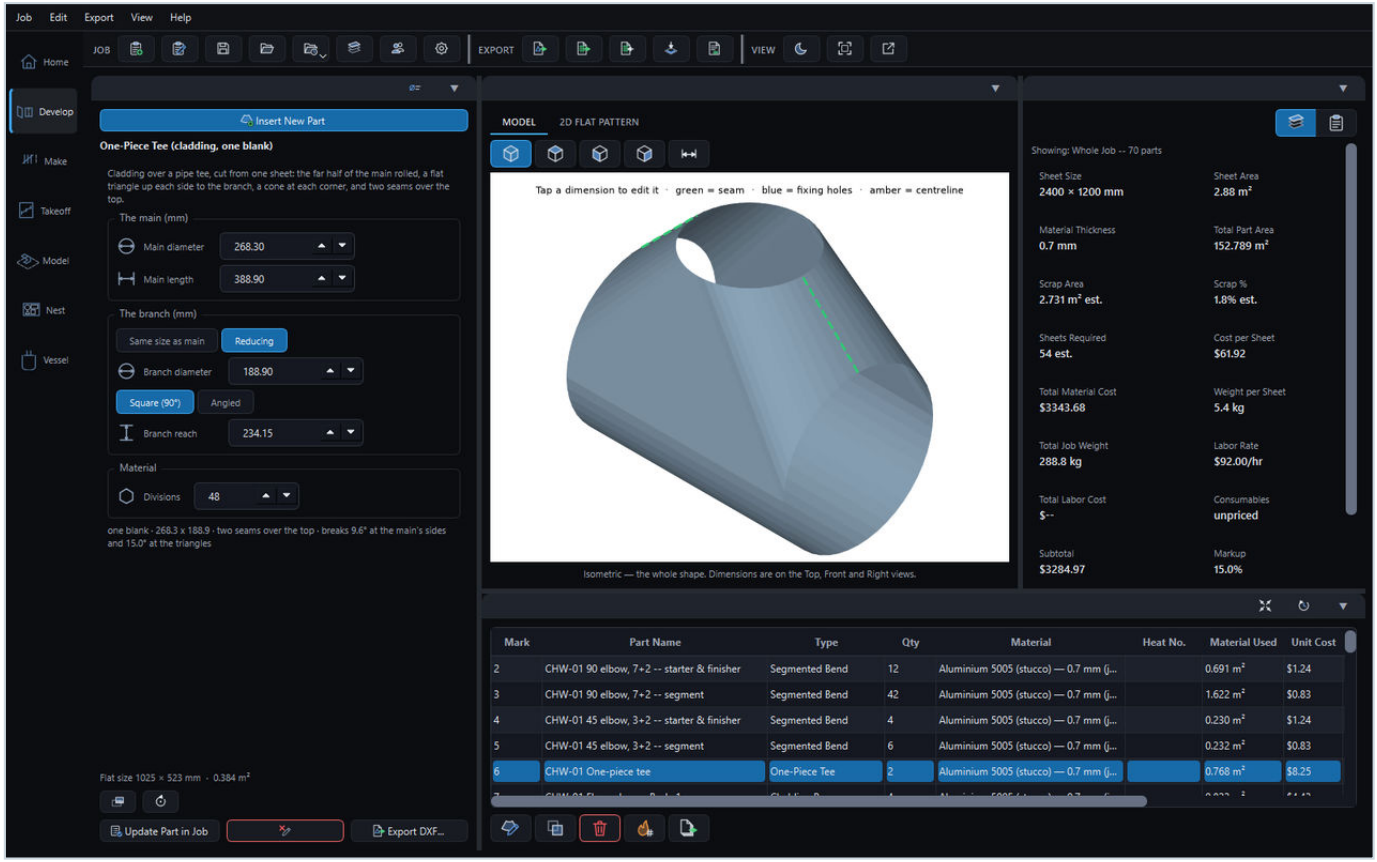


Job > Cladding Take-off turns a line list into every cladding part. Each row is one insulated line: its pipe standard and size, the insulation thickness, the metres of straight, the 90s and 45s, the tees and their branch size, the flange pairs, the valves (as length x width x side, separated by semicolons) and the end caps.

The **Job spec** above the lines is how your shop makes each fitting: the sheet width for straights and their overlap, the lap, the elbow segments, how tees and boxes are made. Set it once for a client and keep it with **Save as template**.

The **Cut list** at the bottom is worked out as you type. **Add to job** puts every part on the job: here 70 parts and 523 blanks from six lines.

The job's parts



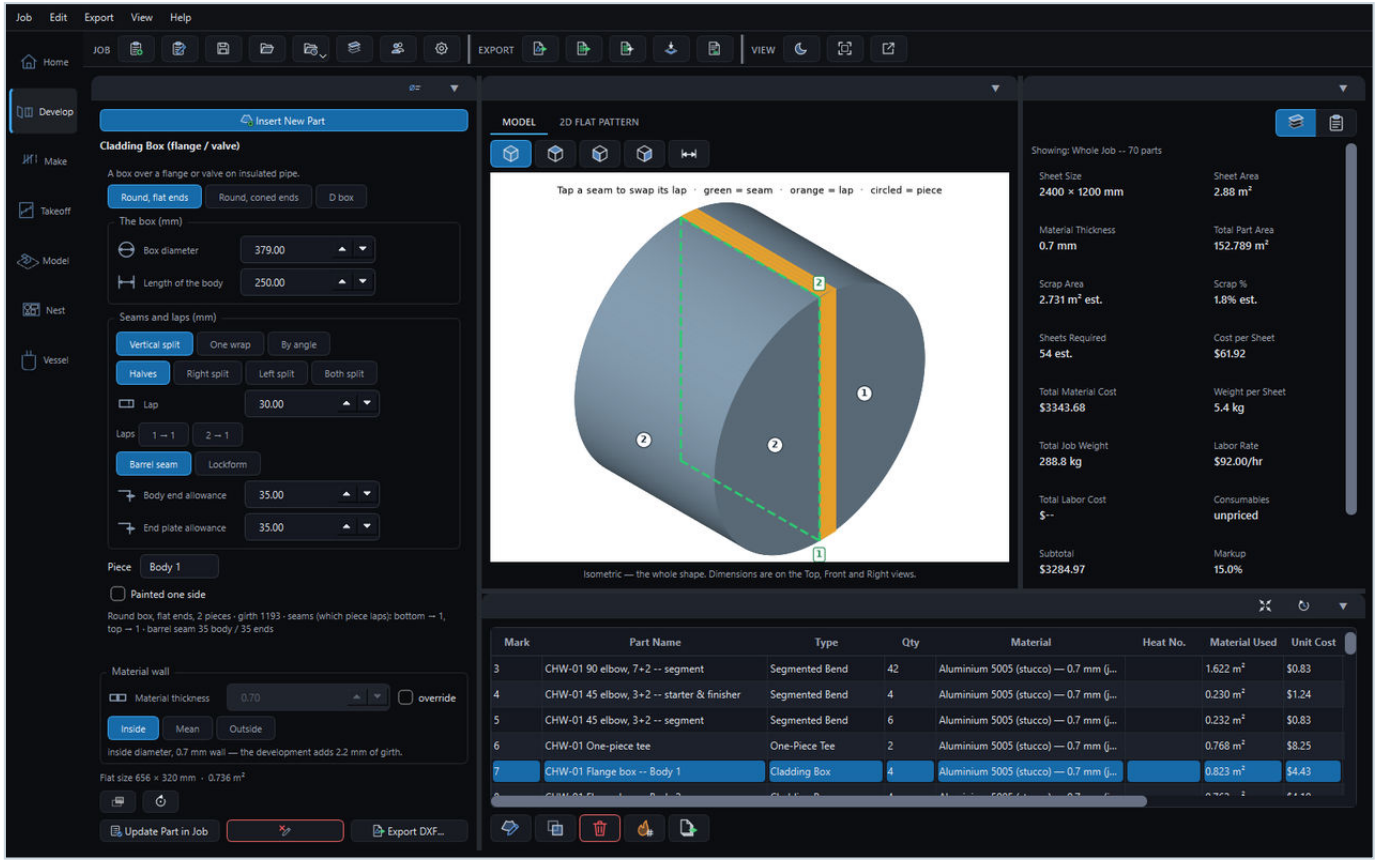
Every part is now on the job, each with its mark, quantity, material, area and cost. Click a row and the part loads into the form on the left, with its model and flat pattern in the middle.

Change a size and press **Update Part in Job**; the red button beside it cancels the edit. The buttons under the table edit, duplicate and remove parts, set a heat number, and export every part's DXF at once.

The panel on the right adds up the whole job: sheets needed, scrap, weight and cost.

Along the top, the **Job** buttons make, edit, save and open jobs and reach the materials, customers and settings. The **Export** buttons write DXFs, CSVs and the quote, and bring in a CSV or an IFC model. Hover over any button to see its name and what it does.

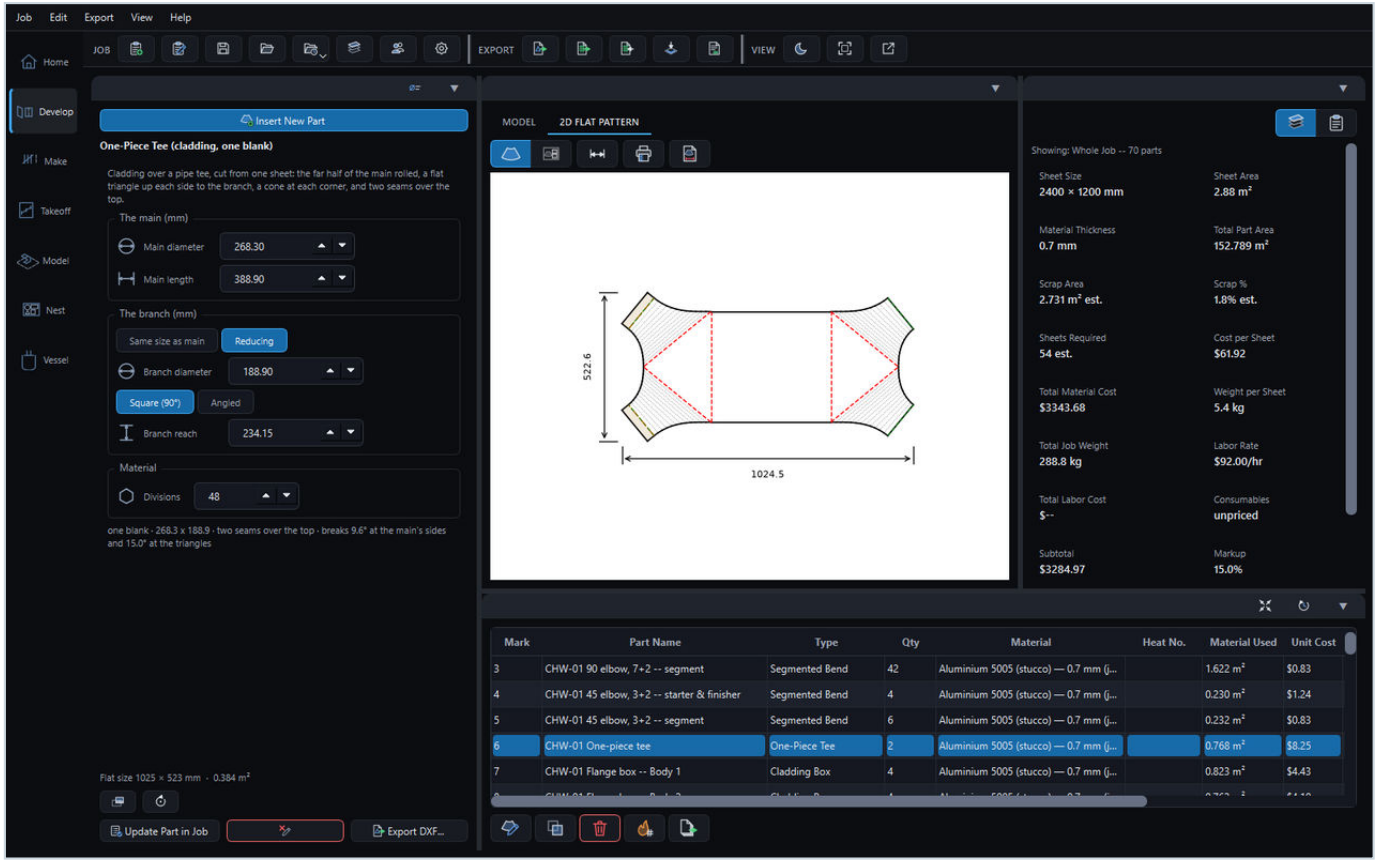
A flange box and its laps



Each flange and valve came in as a **Cladding Box**. The model shows how it is made: green lines are seams, orange strips are laps, and each circled number is a piece.

Click a seam on the model to swap which piece carries the lap. The **Piece** list picks which blank the flat pattern shows, and the line under the form sums up the box: its pieces, its girth and which piece laps onto which.

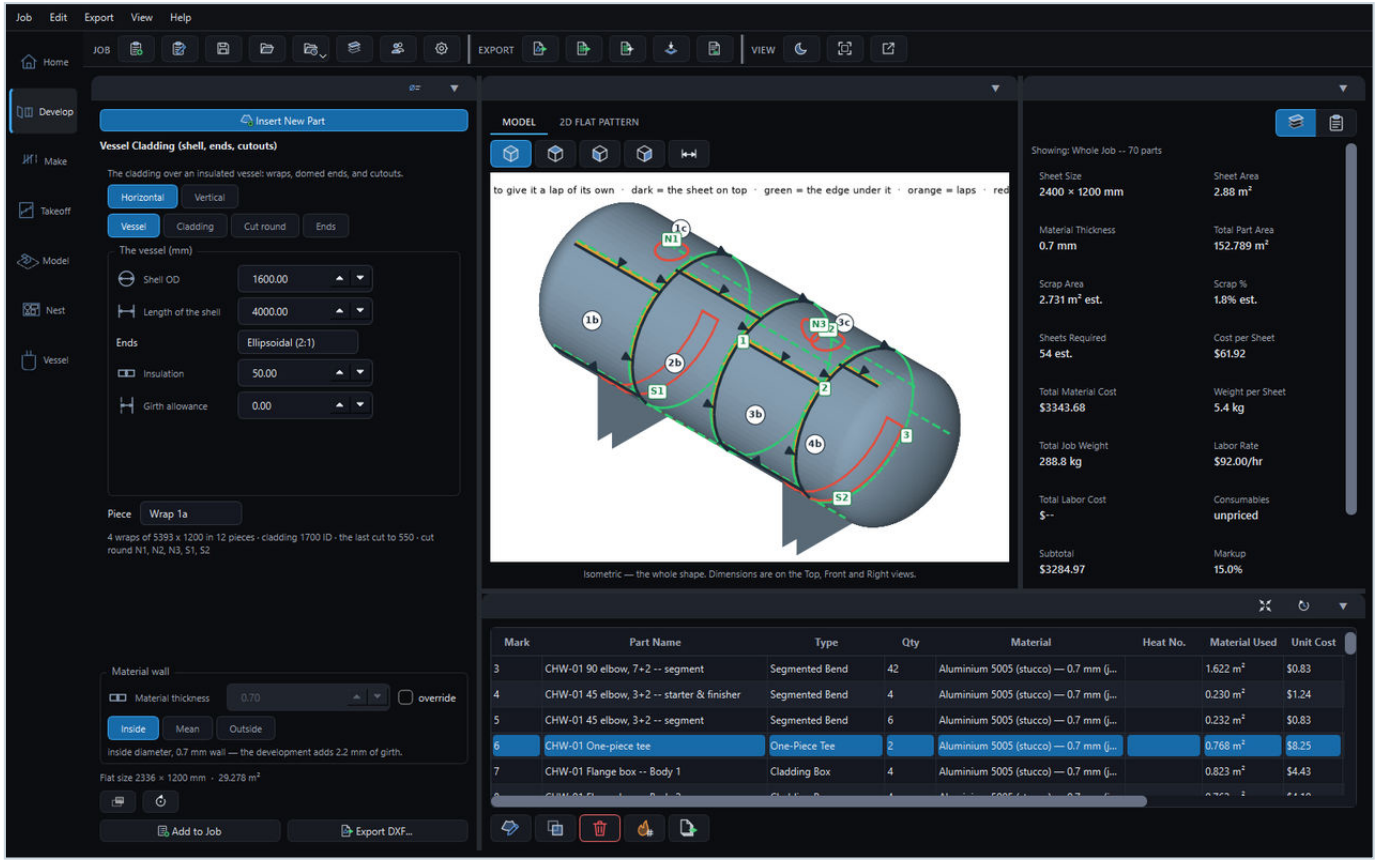
A one-piece tee, flat



The **2D Flat Pattern** tab is the blank as it is cut. On this one-piece tee the red dashed lines are folds, the fine grey lines are the cones rolled at each corner, and the green edges are the seams.

The buttons over the pattern show one piece or all of them, **Measure** the blank, **Print full size** across as many sheets as it takes, and save a **Marking-out sheet**. The blank's size and area are under the form.

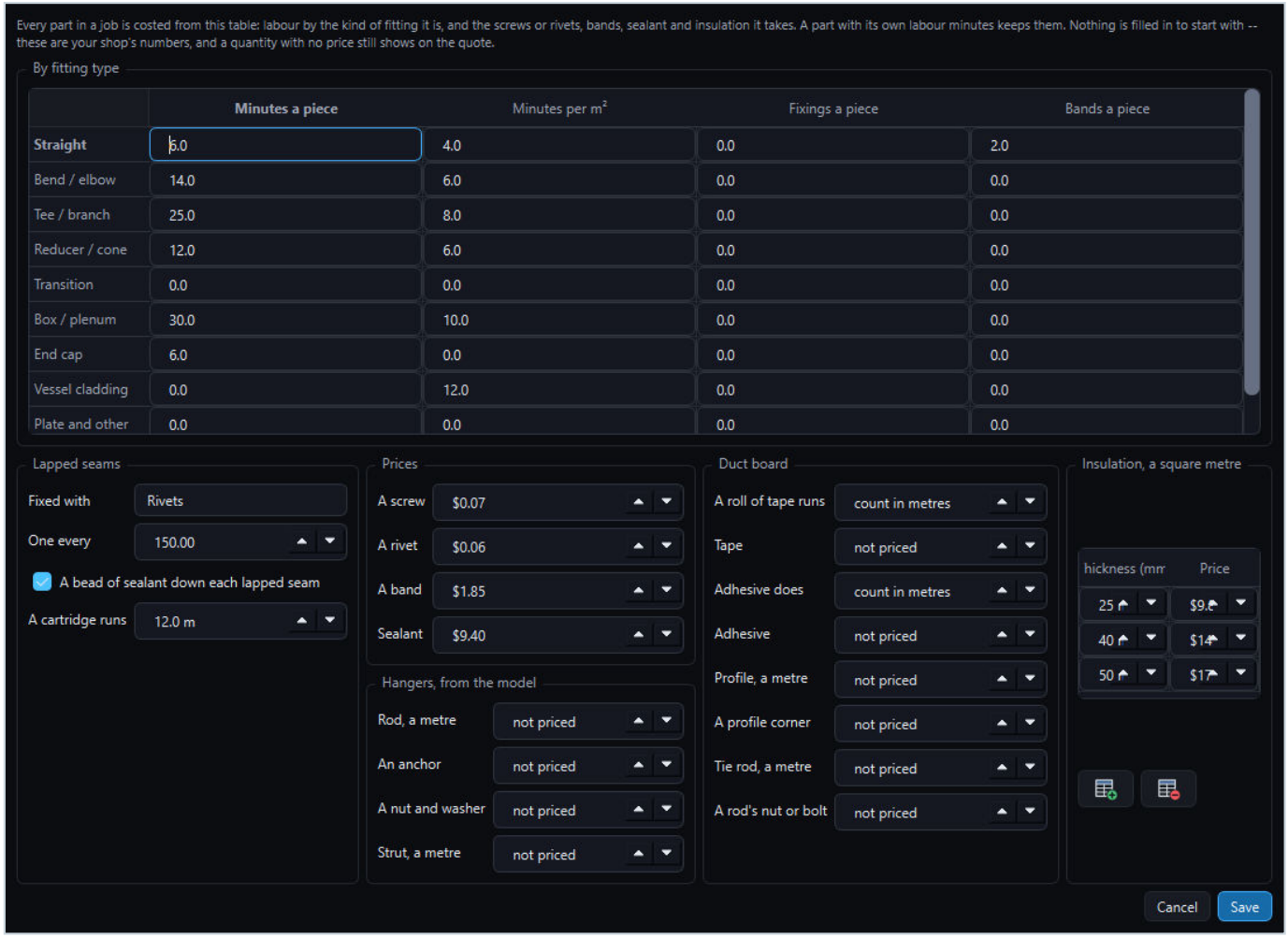
A tank, clad



The chilled water buffer tank is a **Vessel Cladding** part: a horizontal shell 1600 OD by 4 m, with 50 mm of insulation. Its nozzles and saddles are entered as openings and supports, and the wraps are cut round them.

The model numbers every wrap and marks where each cutout falls, with the laps in orange. **Add to Job** adds every piece of it, the wraps and the domed ends.

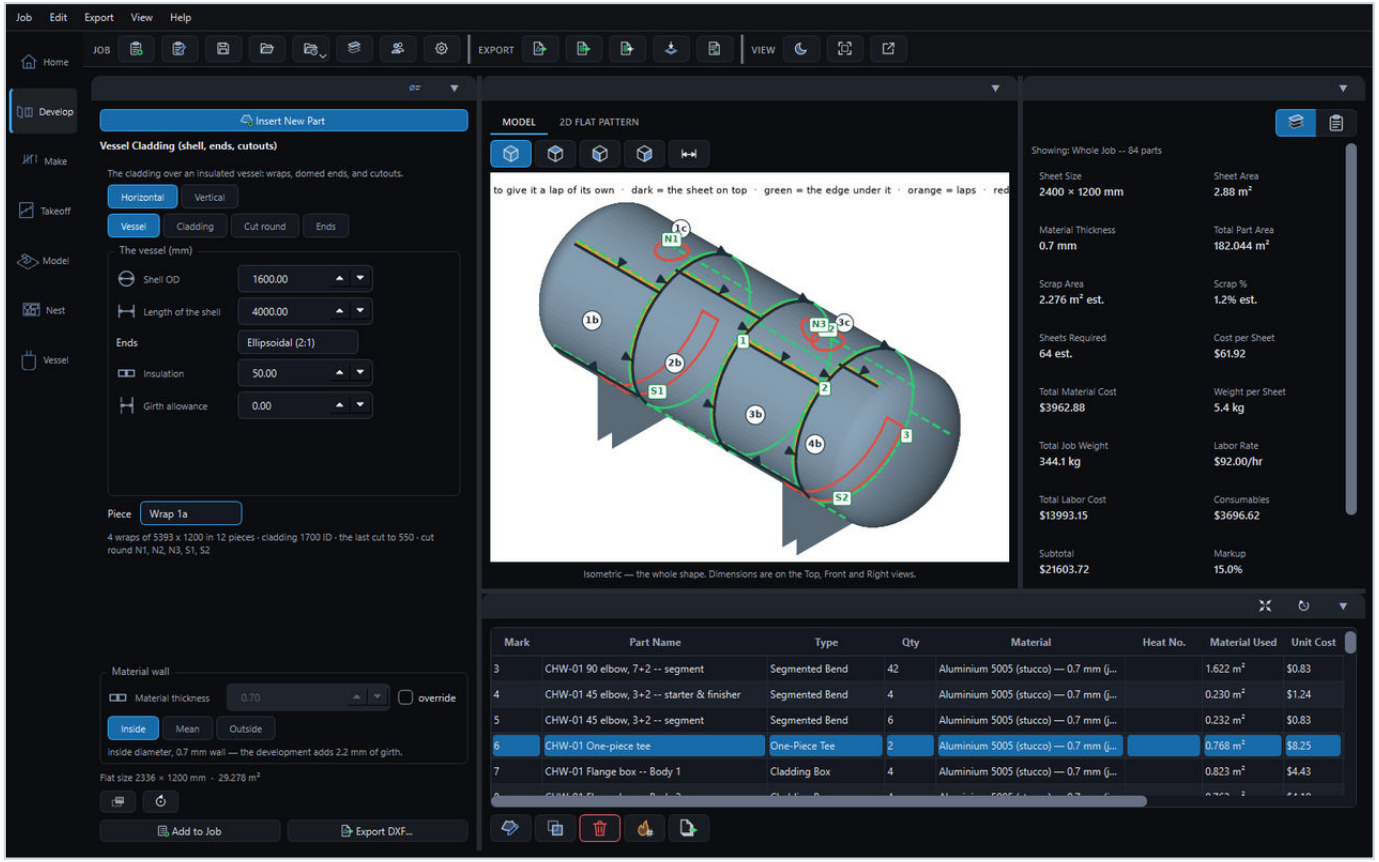
Labour and consumables



Job > Labour & Consumables is your shop's costing table. Each kind of fitting gets its minutes a piece and minutes per square metre, and the fixings and bands it takes. Below it are the fixings on lapped seams, the prices of rivets, screws, bands and sealant, and the insulation's price per square metre by thickness.

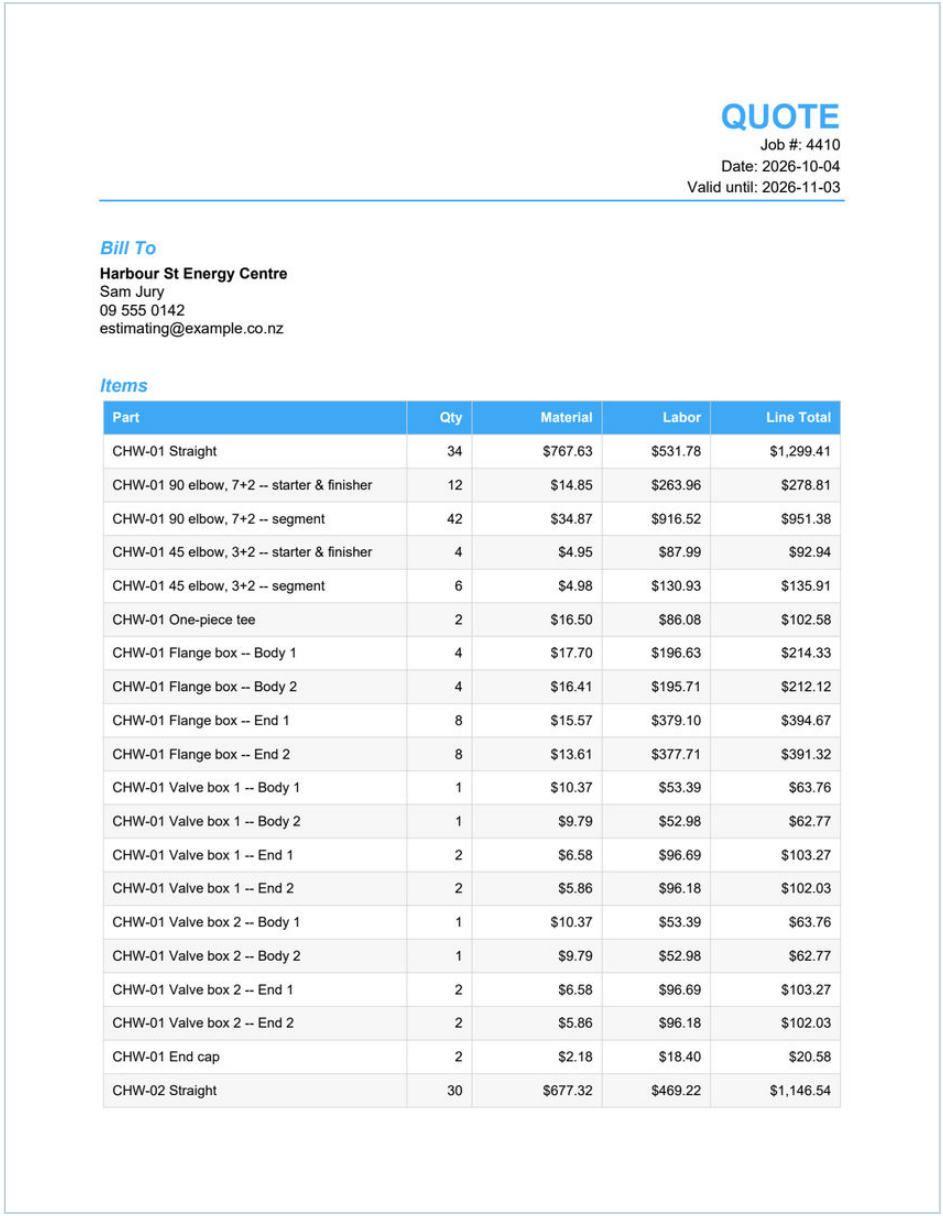
Nothing is filled in to start with: these are your shop's numbers. A quantity with no price still shows on the quote, as unpriced.

The job, priced



With the costing table filled in, the job panel on the right now carries labour and consumables as well as material, and the subtotal and markup make the quoted price.

The quote



QUOTE

Job #: 4410
Date: 2026-10-04
Valid until: 2026-11-03

Bill To

Harbour St Energy Centre
Sam Jury
09 555 0142
estimating@example.co.nz

Items

Part	Qty	Material	Labor	Line Total
CHW-01 Straight	34	$767.63	$531.78	$1,299.41
CHW-01 90 elbow, 7+2 -- starter & finisher	12	$14.85	$263.96	$278.81
CHW-01 90 elbow, 7+2 -- segment	42	$34.87	$916.52	$951.38
CHW-01 45 elbow, 3+2 -- starter & finisher	4	$4.95	$87.99	$92.94
CHW-01 45 elbow, 3+2 -- segment	6	$4.98	$130.93	$135.91
CHW-01 One-piece tee	2	$16.50	$86.08	$102.58
CHW-01 Flange box -- Body 1	4	$17.70	$196.63	$214.33
CHW-01 Flange box -- Body 2	4	$16.41	$195.71	$212.12
CHW-01 Flange box -- End 1	8	$15.57	$379.10	$394.67
CHW-01 Flange box -- End 2	8	$13.61	$377.71	$391.32
CHW-01 Valve box 1 -- Body 1	1	$10.37	$53.39	$63.76
CHW-01 Valve box 1 -- Body 2	1	$9.79	$52.98	$62.77
CHW-01 Valve box 1 -- End 1	2	$6.58	$96.69	$103.27
CHW-01 Valve box 1 -- End 2	2	$5.86	$96.18	$102.03
CHW-01 Valve box 2 -- Body 1	1	$10.37	$53.39	$63.76
CHW-01 Valve box 2 -- Body 2	1	$9.79	$52.98	$62.77
CHW-01 Valve box 2 -- End 1	2	$6.58	$96.69	$103.27
CHW-01 Valve box 2 -- End 2	2	$5.86	$96.18	$102.03
CHW-01 End cap	2	$2.18	$18.40	$20.58
CHW-02 Straight	30	$677.32	$469.22	$1,146.54

Export > Export Quote PDF writes the quote: the customer, the job number, the date and how long the price holds, and every line with its quantity, material, labour and total.

The cut list



Cut list

Customer: Harbour St Energy Centre · **Contact Name:** Sam Jury · **Phone:** 09 555 0142 · **Email:** estimating@example.co.nz · **Job Number:** 4410 · **Material:** Aluminium 5005 (stucco) · **Thickness:** 0.7 · **Target Completion:** 24 Oct 2026

Mark	Part	Shape	Qty	Material	Blank	Area ea.	Area total
1	CHW-01 Straight	Duct	34	Aluminium 5005 (stucco) — 0.7 mm	875.09 × 1200	1.050 m²	35.704 m²
2	CHW-01 90 elbow, 7+2 -- starter & finisher	Segmented Bend	12	Aluminium 5005 (stucco) — 0.7 mm	875.09 × 79.49	0.058 m²	0.691 m²
3	CHW-01 90 elbow, 7+2 -- segment	Segmented Bend	42	Aluminium 5005 (stucco) — 0.7 mm	875.09 × 71.52	0.039 m²	1.622 m²
4	CHW-01 45 elbow, 3+2 -- starter & finisher	Segmented Bend	4	Aluminium 5005 (stucco) — 0.7 mm	875.09 × 79.49	0.058 m²	0.230 m²
5	CHW-01 45 elbow, 3+2 -- segment	Segmented Bend	6	Aluminium 5005 (stucco) — 0.7 mm	875.09 × 71.52	0.039 m²	0.232 m²
6	CHW-01 One-piece tee	One-Piece Tee	2	Aluminium 5005 (stucco) — 0.7 mm	1024.54 × 522.61	0.384 m²	0.768 m²
7	CHW-01 Flange box -- Body 1	Cladding Box	4	Aluminium 5005 (stucco) — 0.7 mm	656.43 × 320	0.206 m²	0.823 m²
8	CHW-01 Flange box -- Body 2	Cladding Box	4	Aluminium 5005 (stucco) — 0.7 mm	596.43 × 320	0.191 m²	0.763 m²
9	CHW-01 Flange box -- End 1	Cladding Box	8	Aluminium 5005 (stucco) — 0.7 mm	254.51 × 448.99	0.091 m²	0.724 m²
10	CHW-01 Flange box -- End 2	Cladding Box	8	Aluminium 5005 (stucco) — 0.7 mm	224.51 × 448.99	0.079 m²	0.633 m²
11	CHW-01 Valve box 1 -- Body 1	Cladding Box	1	Aluminium 5005 (stucco) — 0.7 mm	935.41 × 520	0.482 m²	0.482 m²
12	CHW-01 Valve box 1 -- Body 2	Cladding Box	1	Aluminium 5005 (stucco) — 0.7 mm	875.41 × 520	0.455 m²	0.455 m²
13	CHW-01 Valve box 1 -- End 1	Cladding Box	2	Aluminium 5005 (stucco) — 0.7 mm	265 × 629.99	0.153 m²	0.306 m²
14	CHW-01 Valve box 1 -- End 2	Cladding Box	2	Aluminium 5005 (stucco) — 0.7 mm	235 × 629.99	0.136 m²	0.272 m²
15	CHW-01 Valve box 2 -- Body 1	Cladding Box	1	Aluminium 5005 (stucco) — 0.7 mm	935.41 × 520	0.482 m²	0.482 m²
16	CHW-01 Valve box 2 -- Body 2	Cladding Box	1	Aluminium 5005 (stucco) — 0.7 mm	875.41 × 520	0.455 m²	0.455 m²
17	CHW-01 Valve box 2 -- End 1	Cladding Box	2	Aluminium 5005 (stucco) — 0.7 mm	265 × 629.99	0.153 m²	0.306 m²

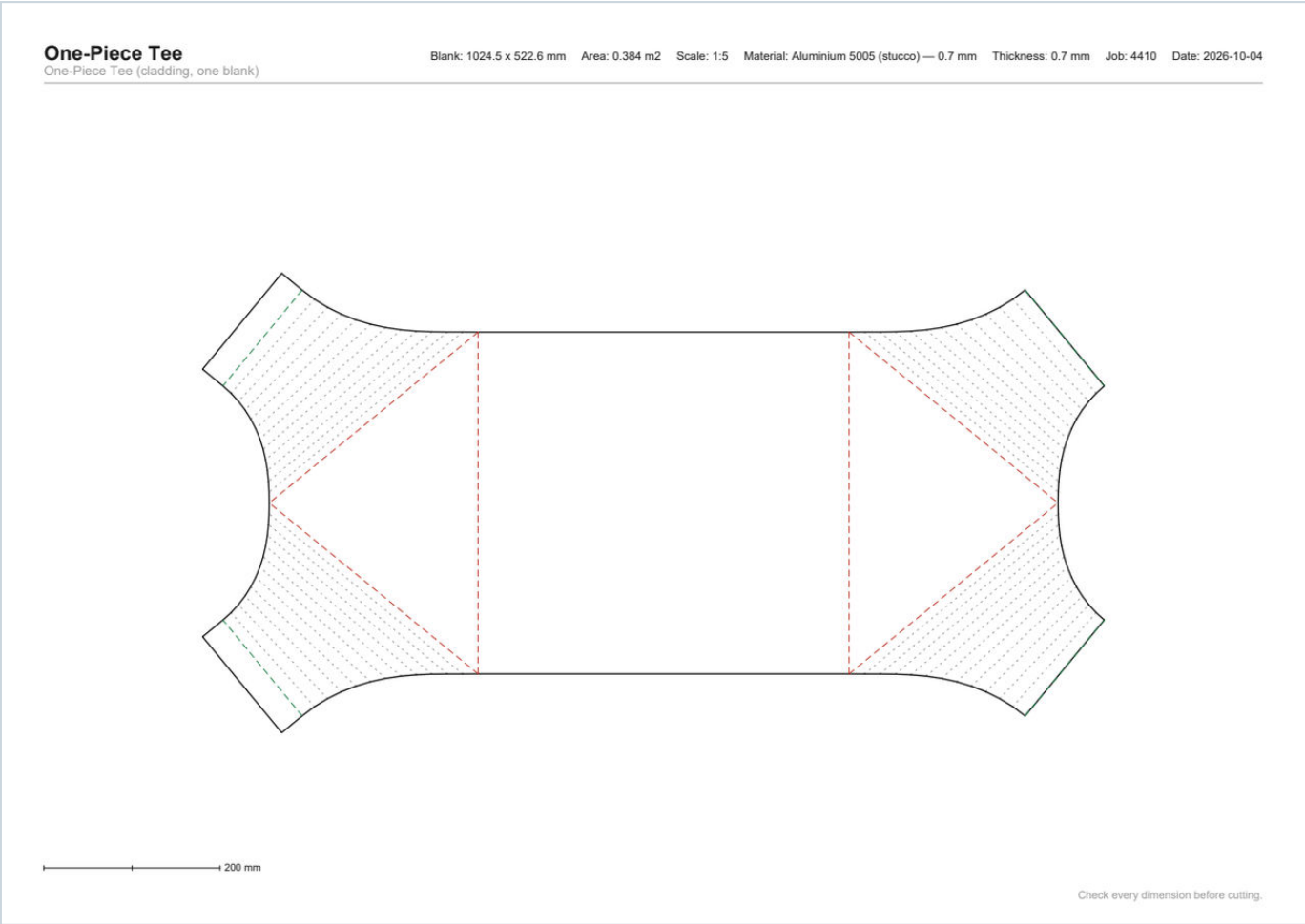
Export > Cut List PDF is the shop's copy: every part by its mark, with its shape, quantity, material, blank size and area.

Labels



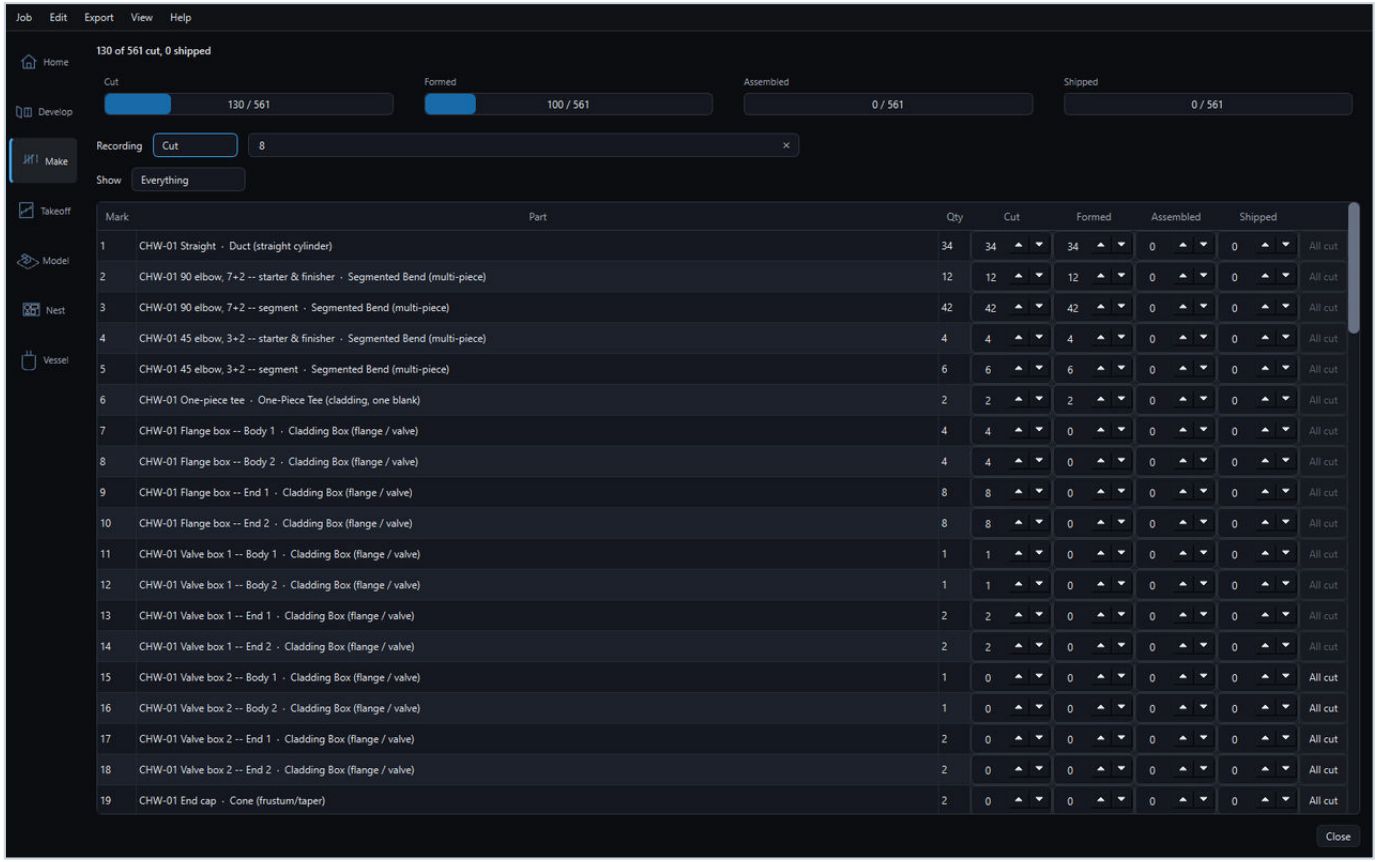
Export > Print Labels prints one label per piece, numbered "1 of 34", with the mark, the part, its blank and material, the job number and a QR code to scan on the Make page.

A marking-out sheet



The **Marking-out sheet** button over the flat pattern saves the piece on screen as a PDF to scale, with the job and material across the top and any measurements you have placed on it. It is for marking out by hand, or checking a cut piece.

The Make page



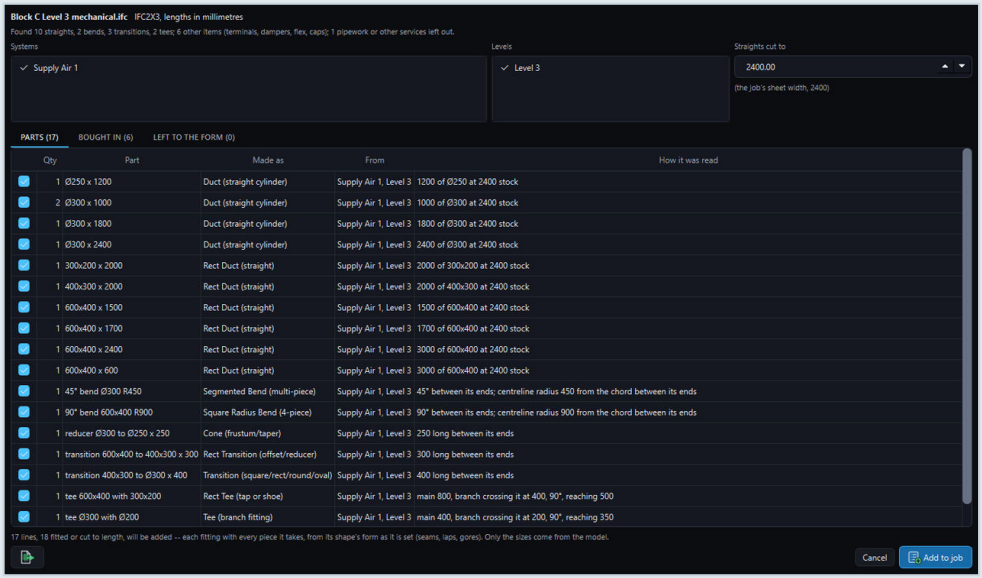
Make, on the rail, is the job on the shop floor. Each part shows how many have been cut, formed, assembled and shipped, and the bars at the top total the job.

Scan a label's QR code, or type a mark, into the box beside **Recording** and that part is counted at the stage chosen. The arrows beside each count correct it by hand.

PART 2

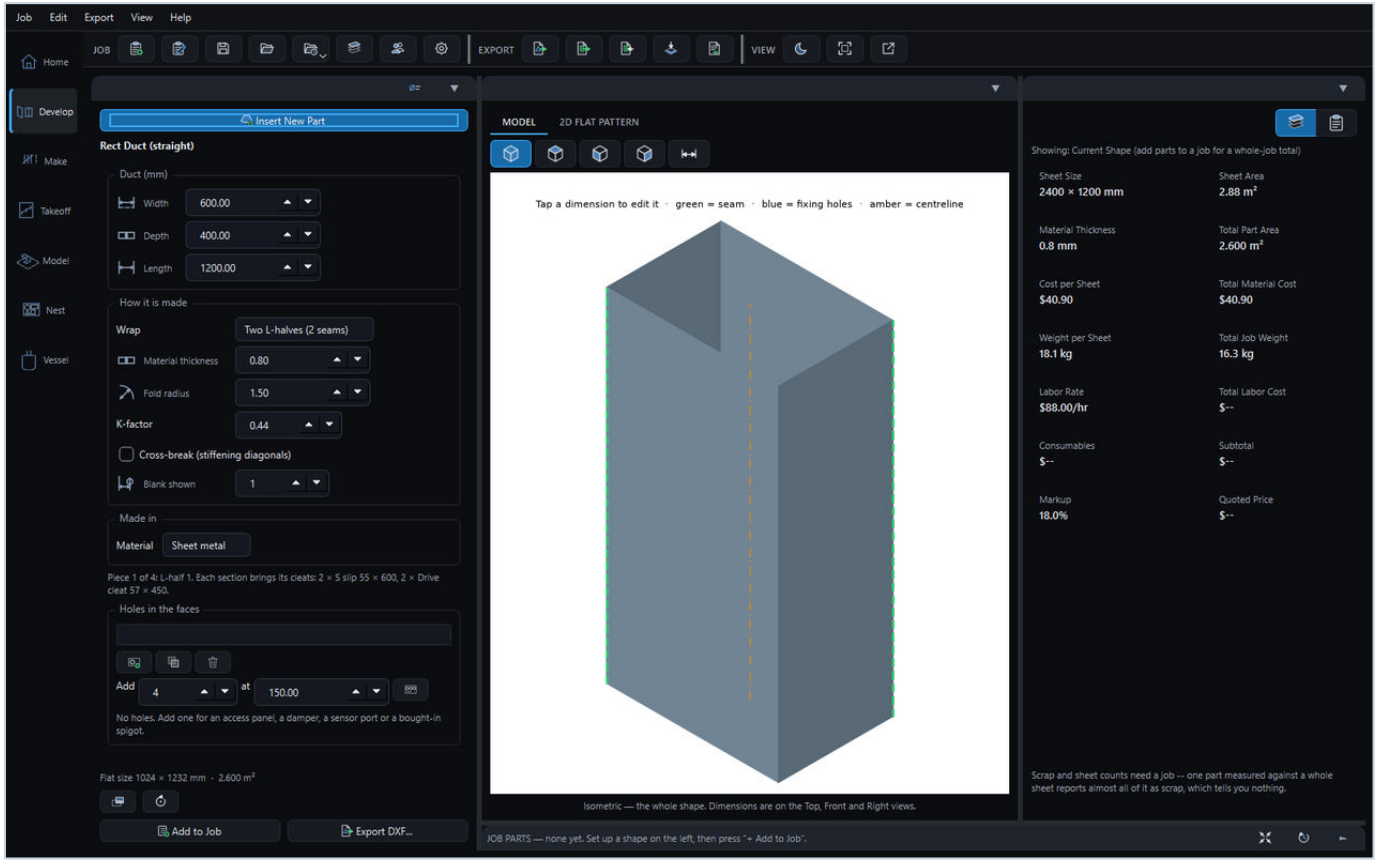
An HVAC job: Tauranga Hospital Block C

Galvanised supply ductwork, from the building model and the builder's PDF drawings: the shop's seams, the IFC import, a measured takeoff and a sheet set, duct board, and a job shared with the workshop.



15. Your shop's rectangular duct
16. Import the building model
17. What it will not make
18. The model's parts in the job
19. Measure the drawing
20. Compare two revisions
21. Push the takeoff into the job
22. A sheet set
23. The set's totals
24. Duct board
25. A job shared with the workshop
26. Job history

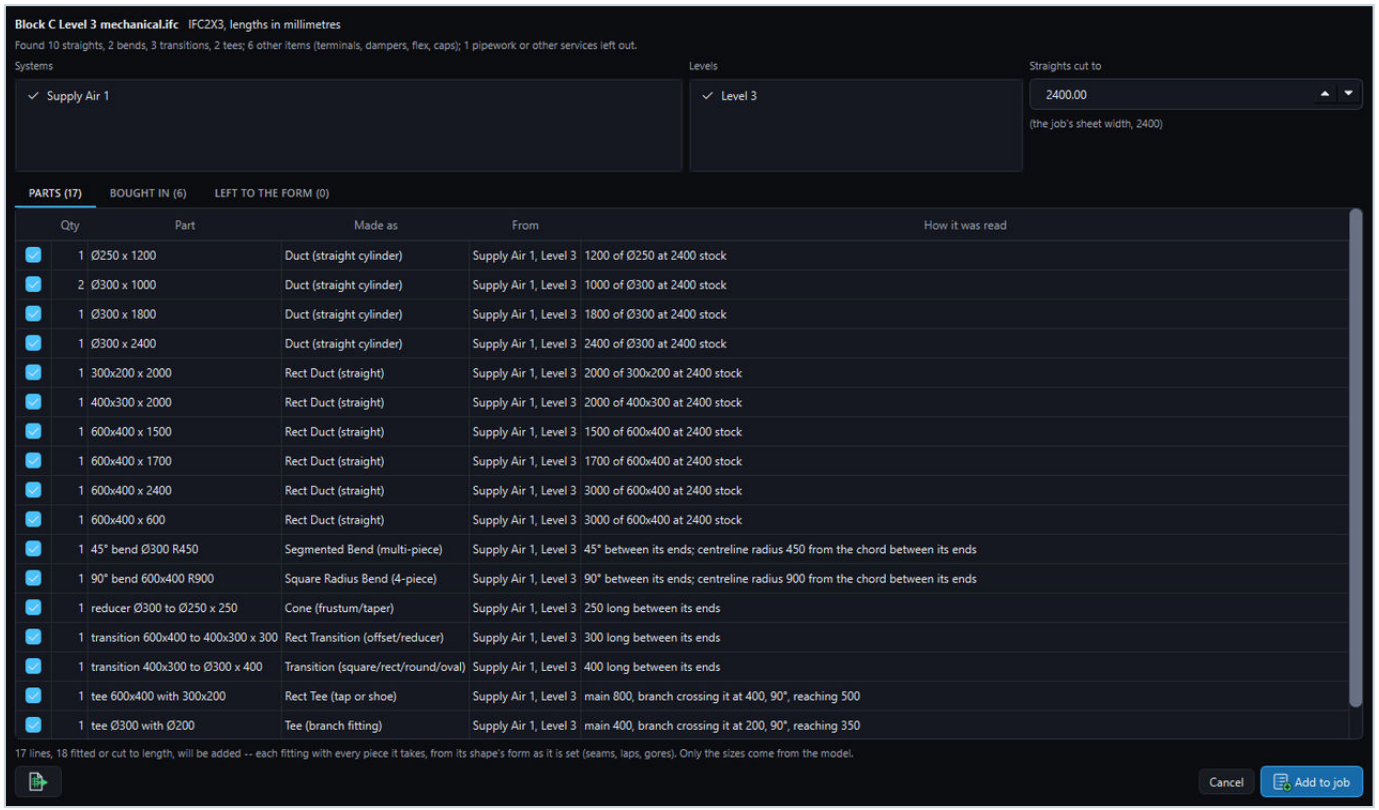
Your shop's rectangular duct



Set up the rectangular duct the way your shop makes it before anything comes in: here **Two L-halves**, Pittsburgh corners and slip and drive ends. The line under the form lists each piece and the cleats every section brings with it.

Every duct the model brings in is then made the same way.

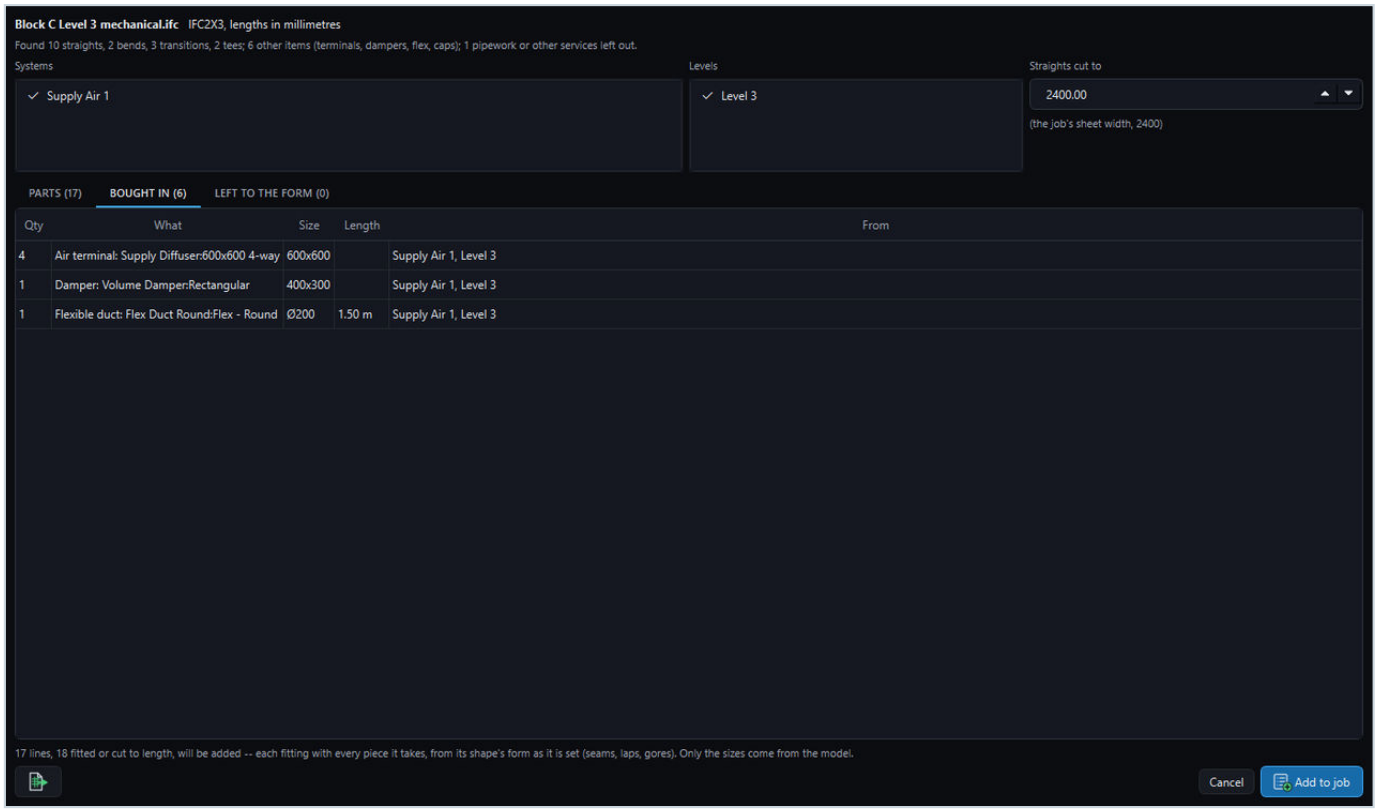
Import the building model



Export > Import from IFC Model reads the mechanical model the consultant sent. Each duct and fitting in it is listed with what it becomes in the shop: straights split to your stock length, bends, transitions and tees with their sizes carried through.

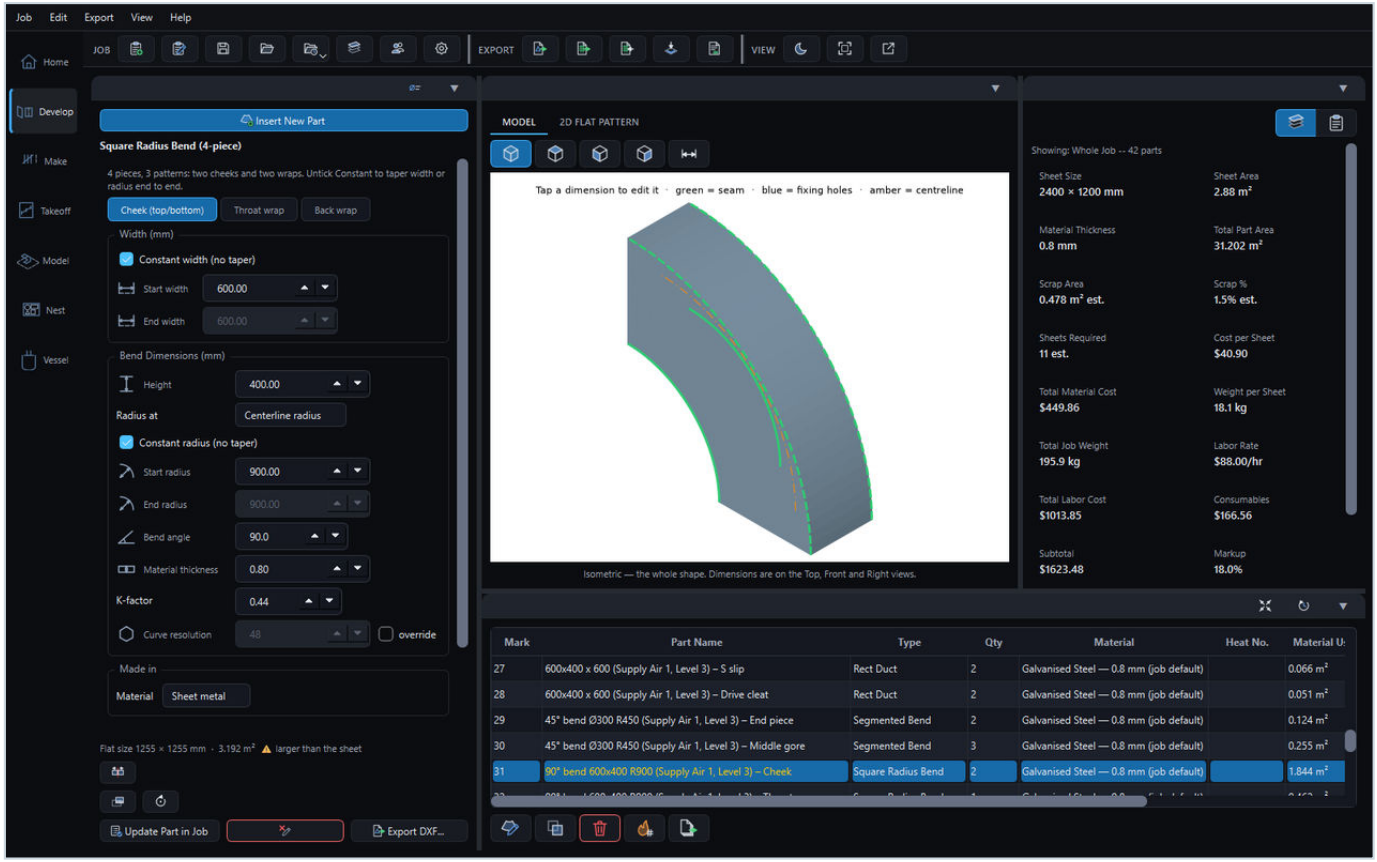
Untick anything you do not want, or leave out a whole system or level. Straights are cut to the stock length shown. Nothing goes on the job until you press **Add to job**.

What it will not make



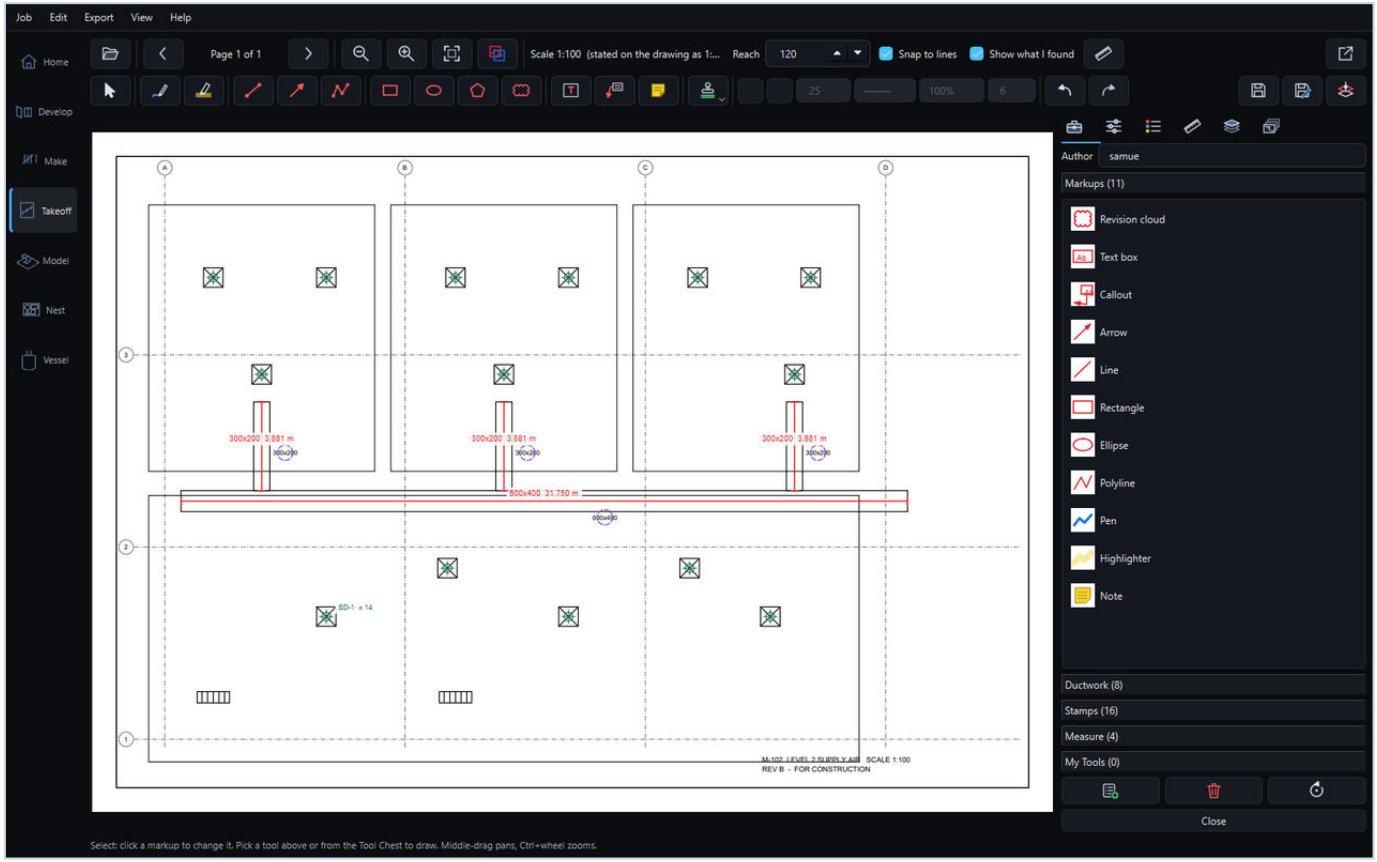
Bought in lists what the model has that the shop does not make: here the diffusers, a damper and the flex. **Left to the form** lists anything it could not turn into a part, with the reason, to make from the form by hand. Nothing is dropped without saying so.

The model's parts in the job



The model's ductwork is now on the job, every fitting with all its pieces: this square radius bend is its cheeks and its wraps. Each is an ordinary part from here, to change, cost and cut.

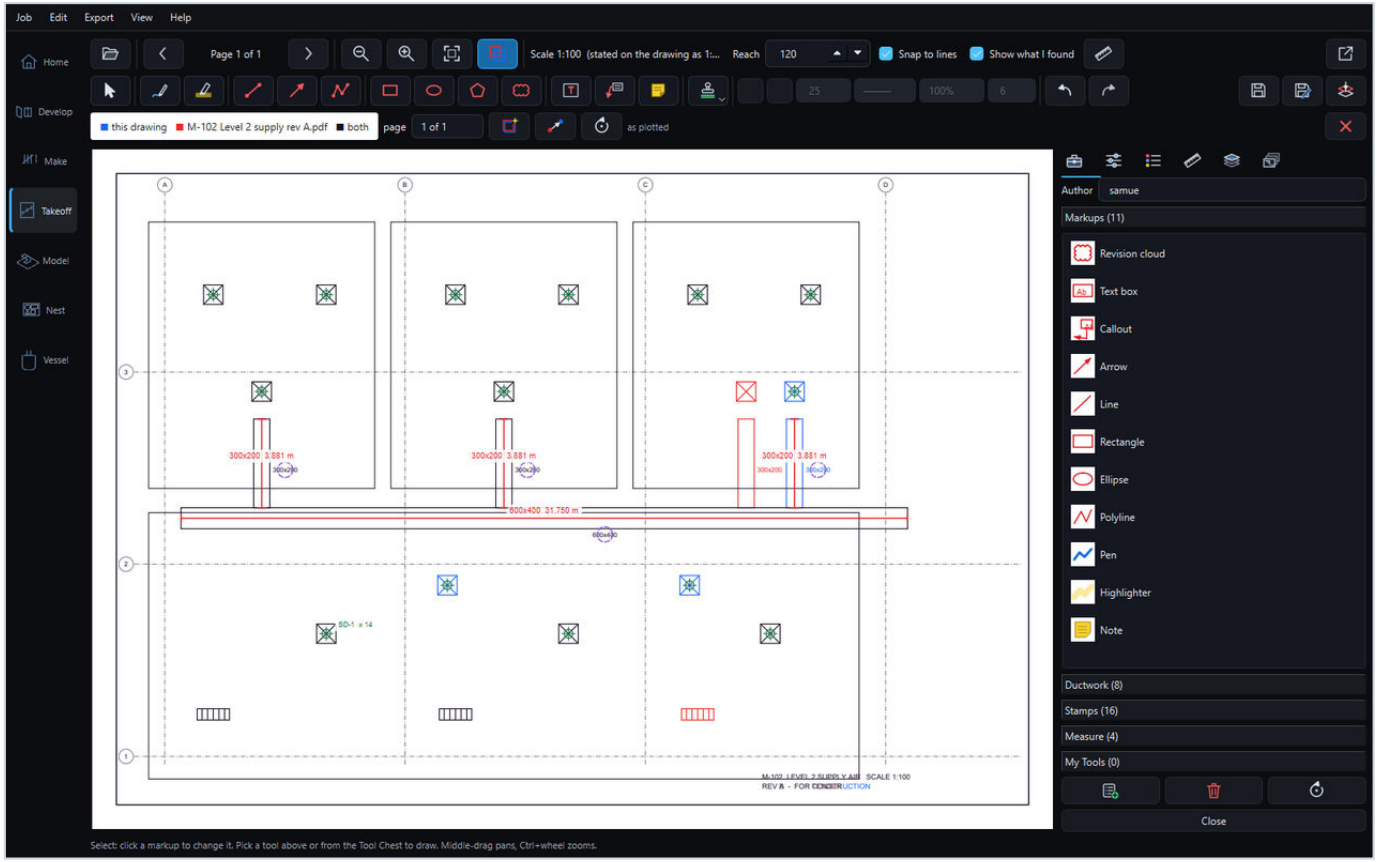
Measure the drawing



Takeoff, on the rail, opens the builder's PDF. Where the drawing states its scale (SCALE 1:100 in the title block) the app finds it and offers it; where it does not, set the scale from a dimension you know. The scale in use is shown along the top.

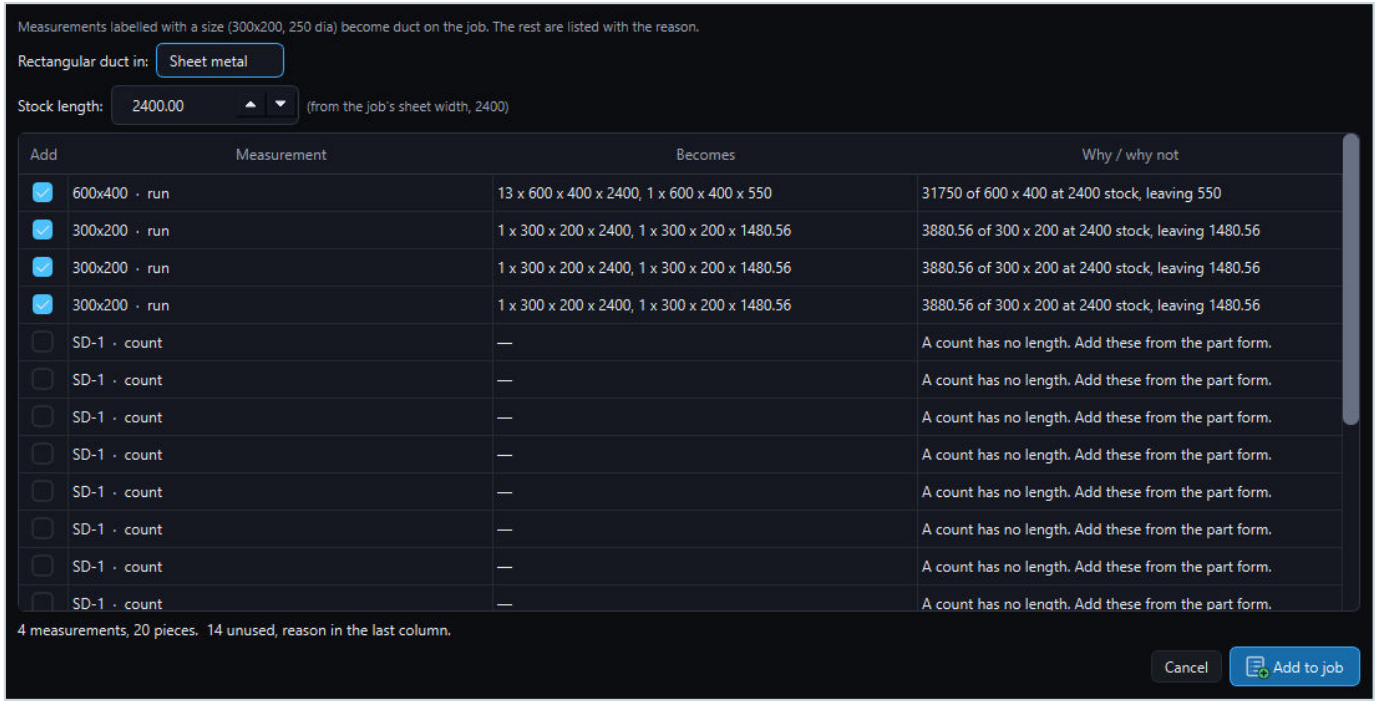
Runs are measured along the duct and labelled with its size. Box one diffuser, name it, and every symbol like it on the sheet is found and counted: here 14 of SD-1. The totals down the side add it all up.

Compare two revisions



When revision B arrives, compare it with A. The two are laid over each other, lined up, and coloured so that what moved, what was added and what was taken away stands out.

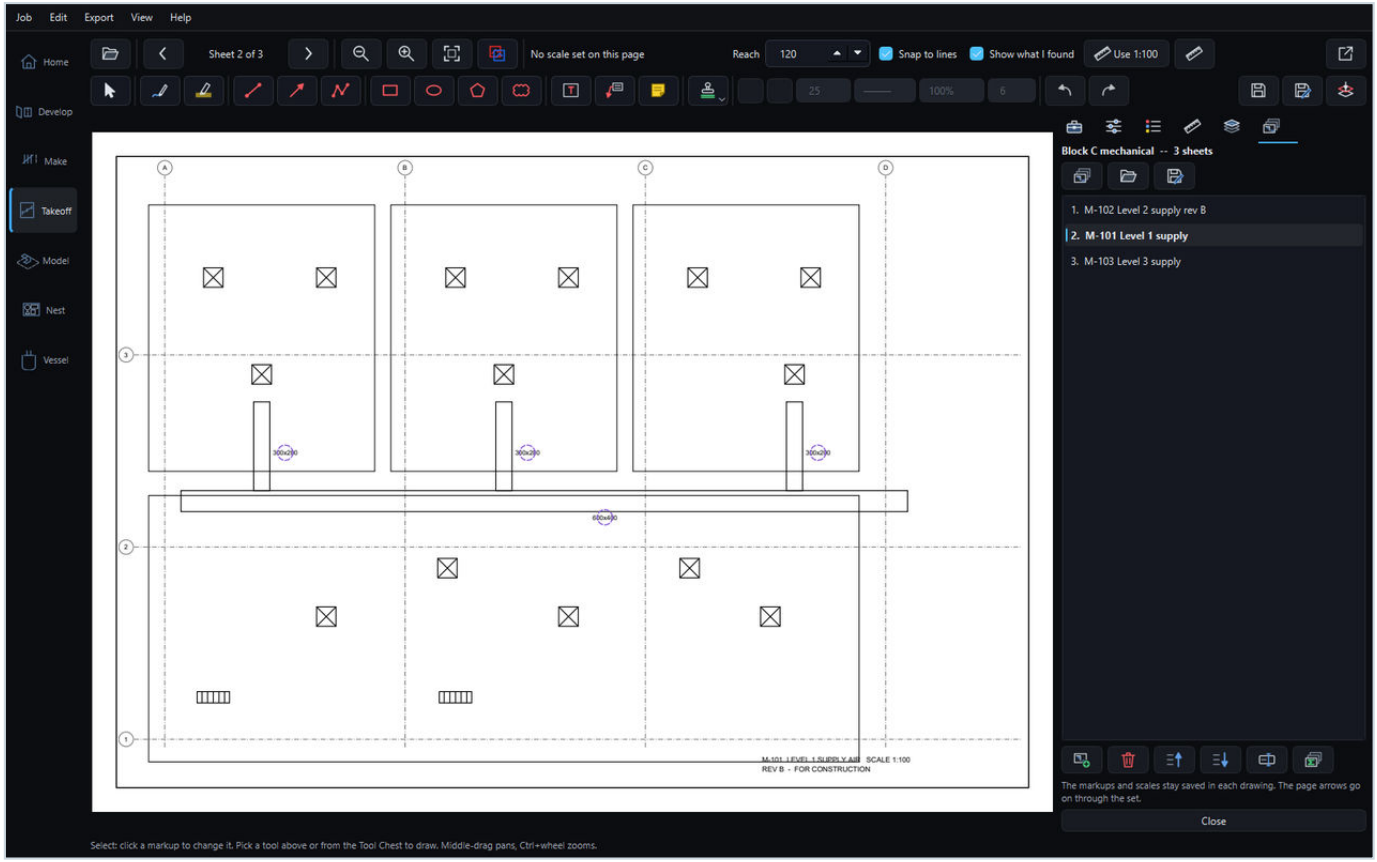
Push the takeoff into the job



Push to job turns the measured runs into duct. Every measurement is listed with what it would become at your stock length; the ones it cannot make anything of (a count has no length) say why and are left unticked.

Tick what you want and press **Add to job**.

A sheet set



A job is more than one drawing. A **sheet set** keeps the floors' drawings together in the **Sheets** tab, in order; the page arrows go on through the set, and each drawing keeps its own markups and scale.

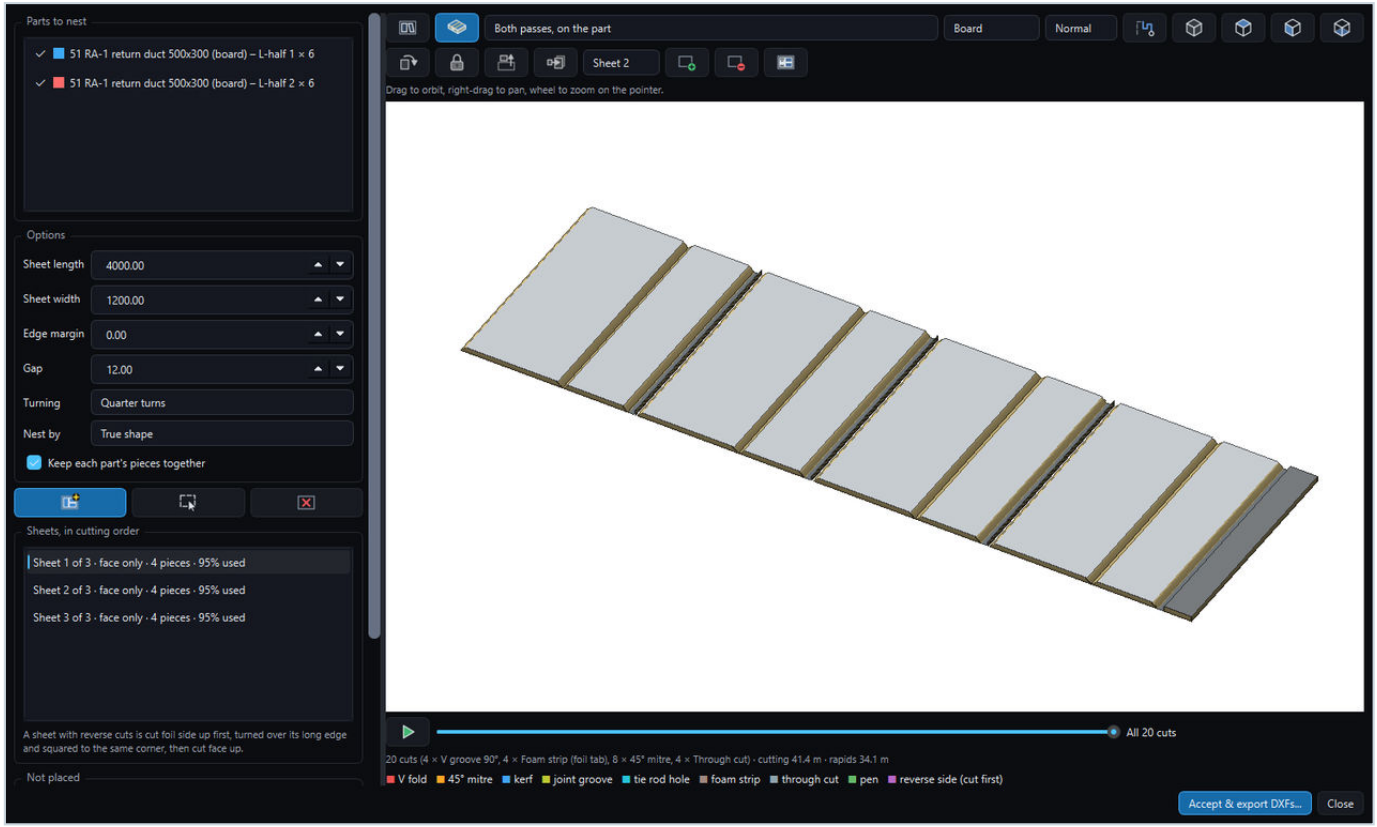
A sheet that has no scale yet says so along the top, and offers the one written on the drawing: **Use 1:100**.

The set's totals



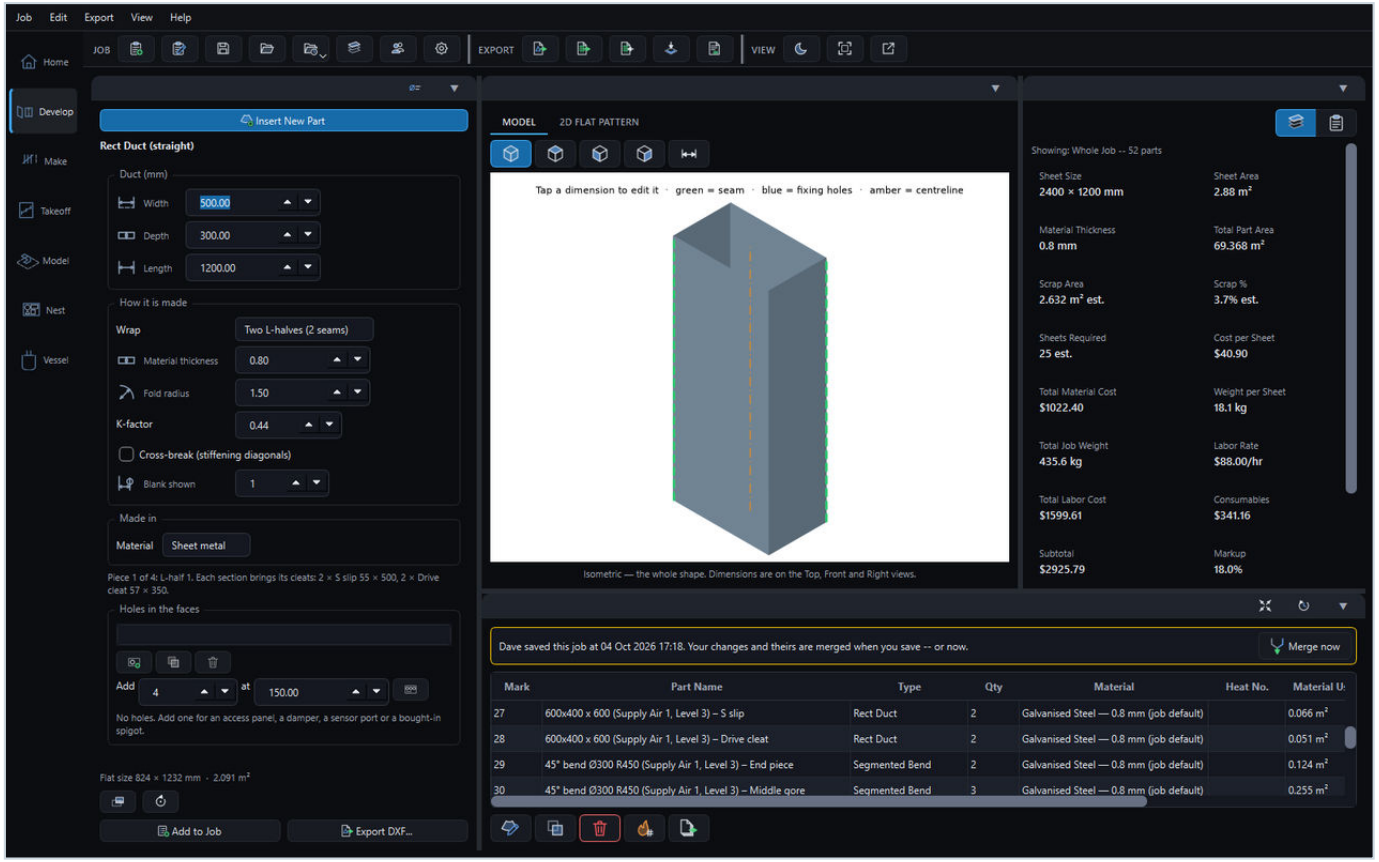
Set totals adds up every sheet in the set by what was measured, and says which sheet each total came from. **Export CSV** writes it out for a spreadsheet.

Duct board



The return air is in duct board. Set the rectangular duct to **Board**, add the ducts, and **Export > Duct Board Nesting** lays their panels out on the board's sheets, shown here in 3D as the router will cut them.

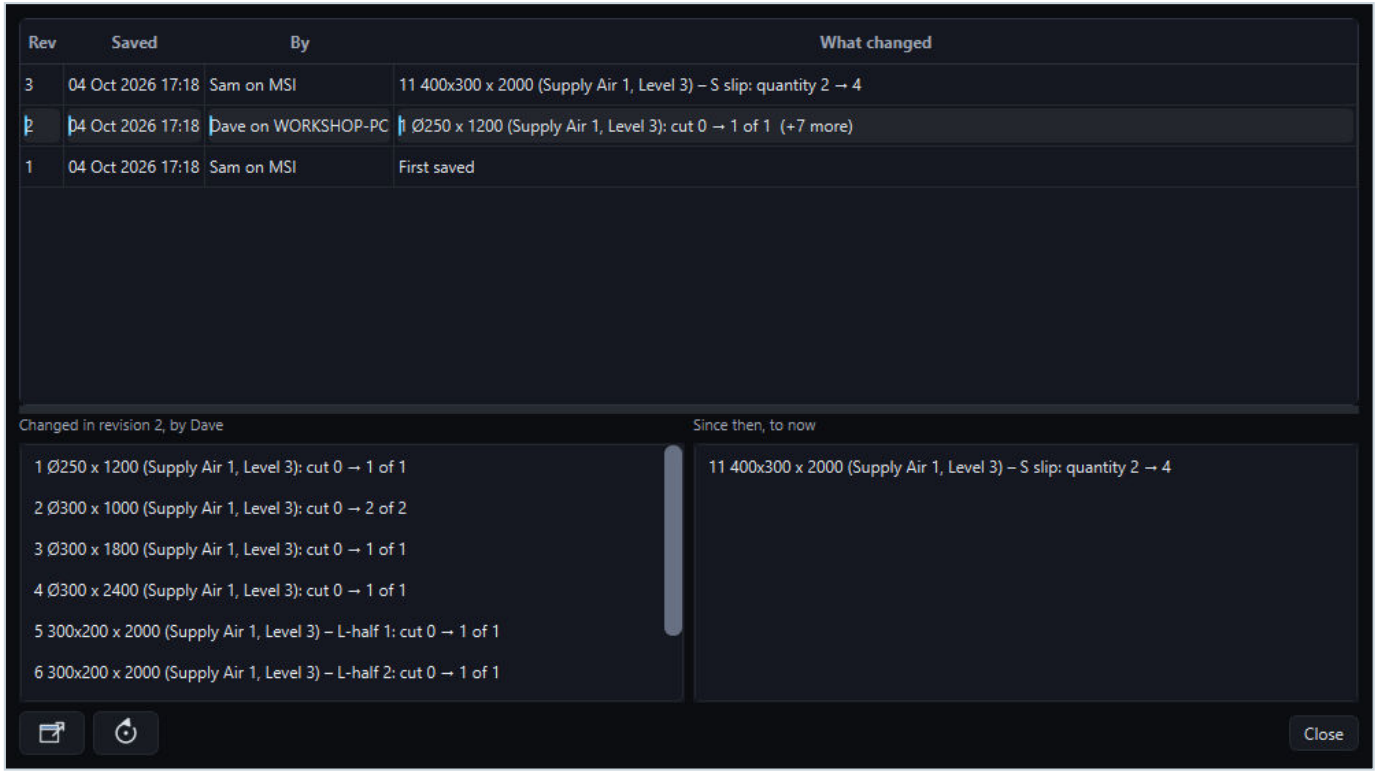
A job shared with the workshop



Keep the job on the shop's shared drive and the office and the workshop can both have it open. When someone else saves it, a bar across the top says who, and **Merge now** brings their changes into yours: here the workshop has ticked parts off as cut while the office changed a quantity.

Where the two of you changed the same thing, you are asked which to keep. Set your name under **Settings > You** so the others see who you are.

Job history



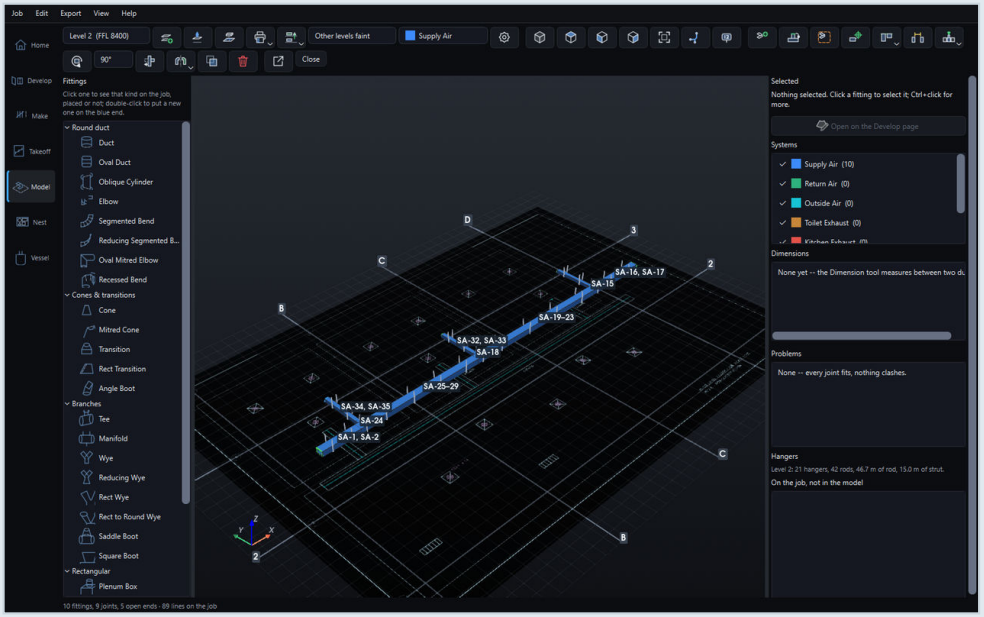
Job > Job History lists every save: who, when, on which computer, and what changed. Pick one to see what has changed since. Recent saves can be opened as a copy or put back.

PART 3

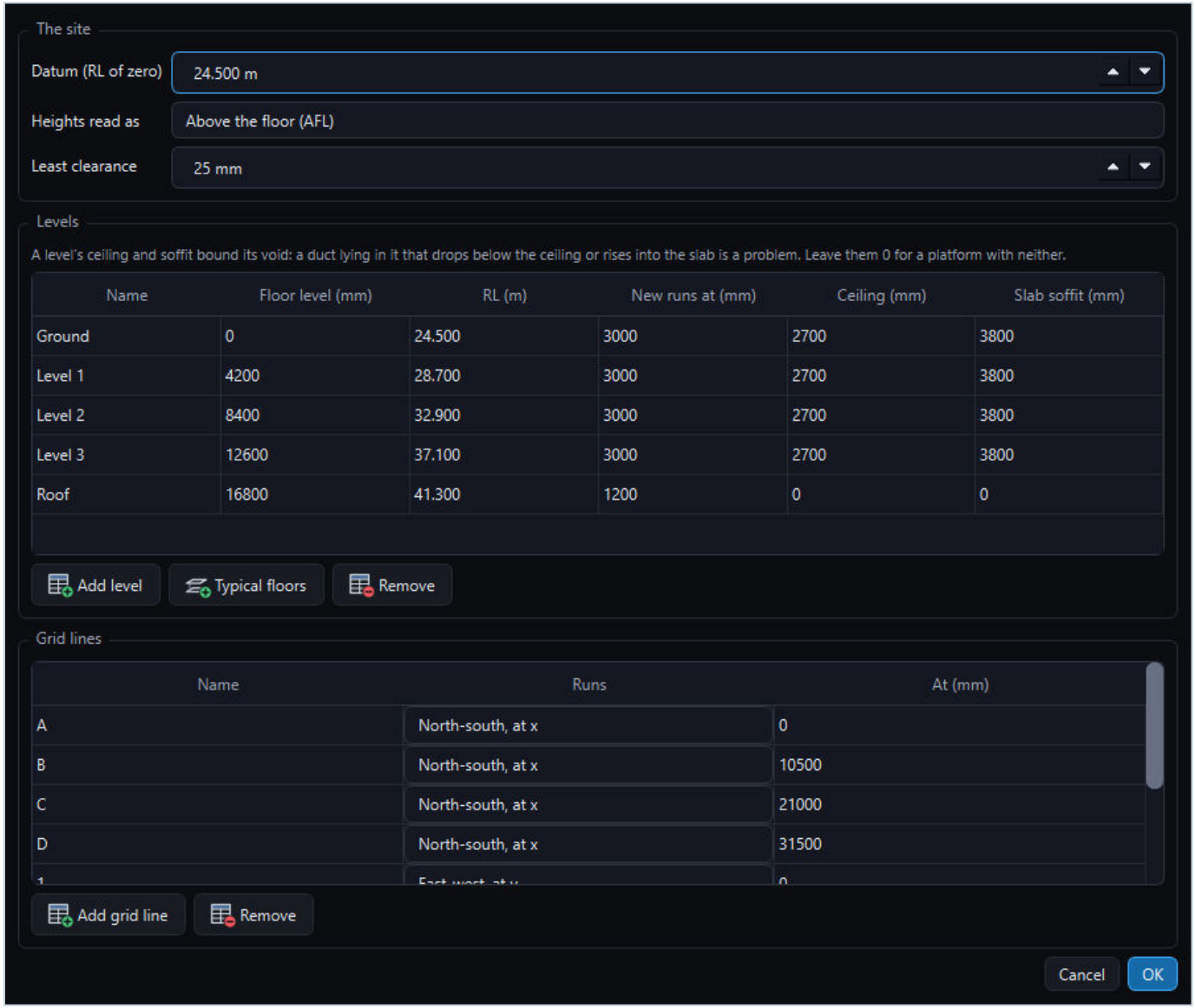
A floor in 3D: Block C Level 2

The same hospital's Level 2 supply, built in 3D over the builder's drawing: the floors and the grid, the drawing lined up, the ductwork set out at its heights and hung, then the install drawing for site.

27. Floors and the grid
28. The builder's drawing, lined up
29. Build the run over it
30. Turn a fitting
31. Set it out
32. Hangers
33. The install drawing
34. The model's parts on the job



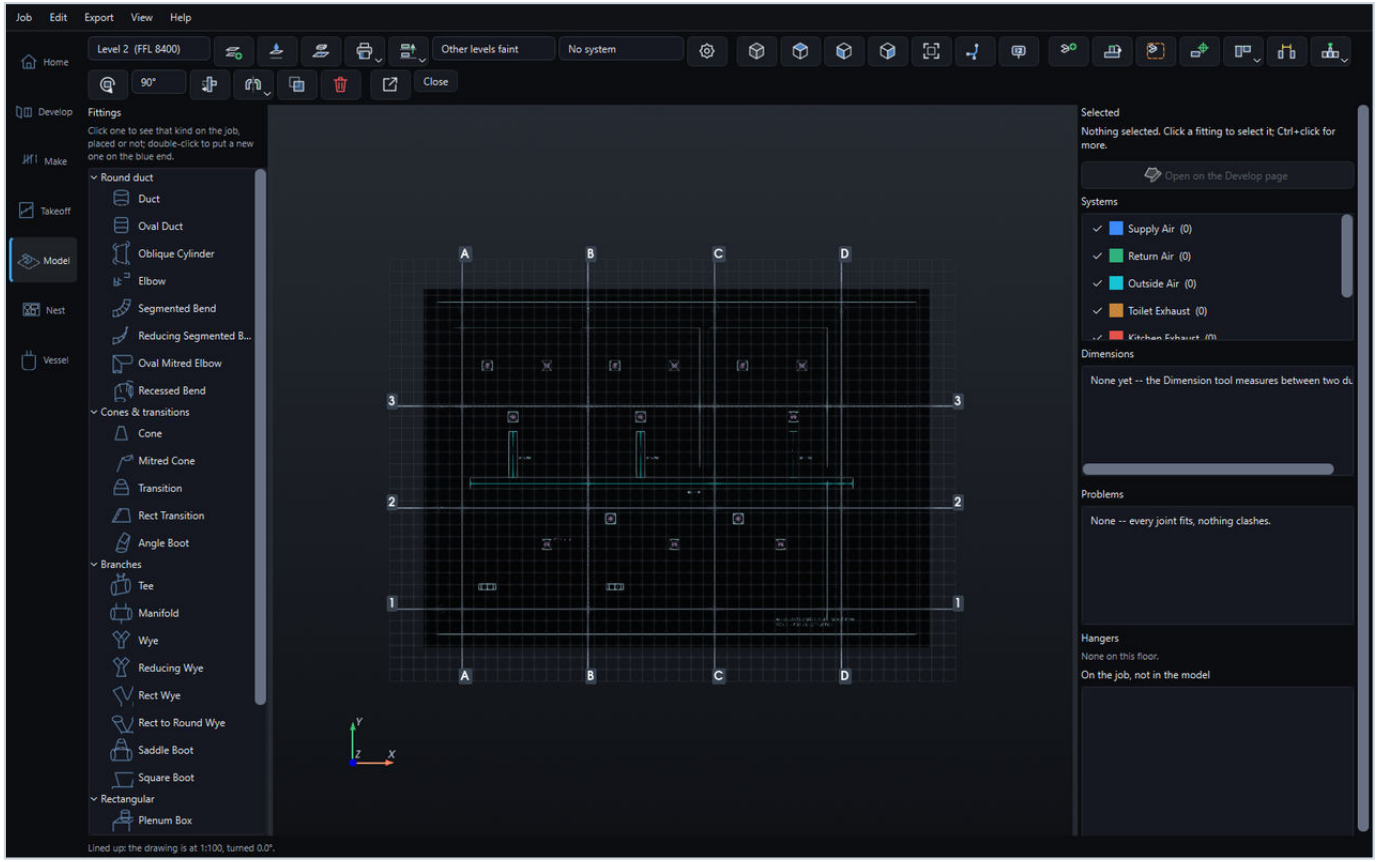
Floors and the grid



Model, on the rail, is the job's ductwork in 3D. Start with the building. **Levels and grid** lists every floor: its finished floor level, its RL off the site datum, the height new runs go in at, and the ceiling and slab soffit that bound the void above it. **Typical floors** adds a stack of floors, a floor-to-floor height apart, in one go.

The grid lines come off the architect's drawings, A to D one way and 1 to 3 the other. The ductwork is set out from them, as the installer will set it out on site. Here: the ground floor, three typical floors 4200 apart, the roof, and the site datum at RL 24.500.

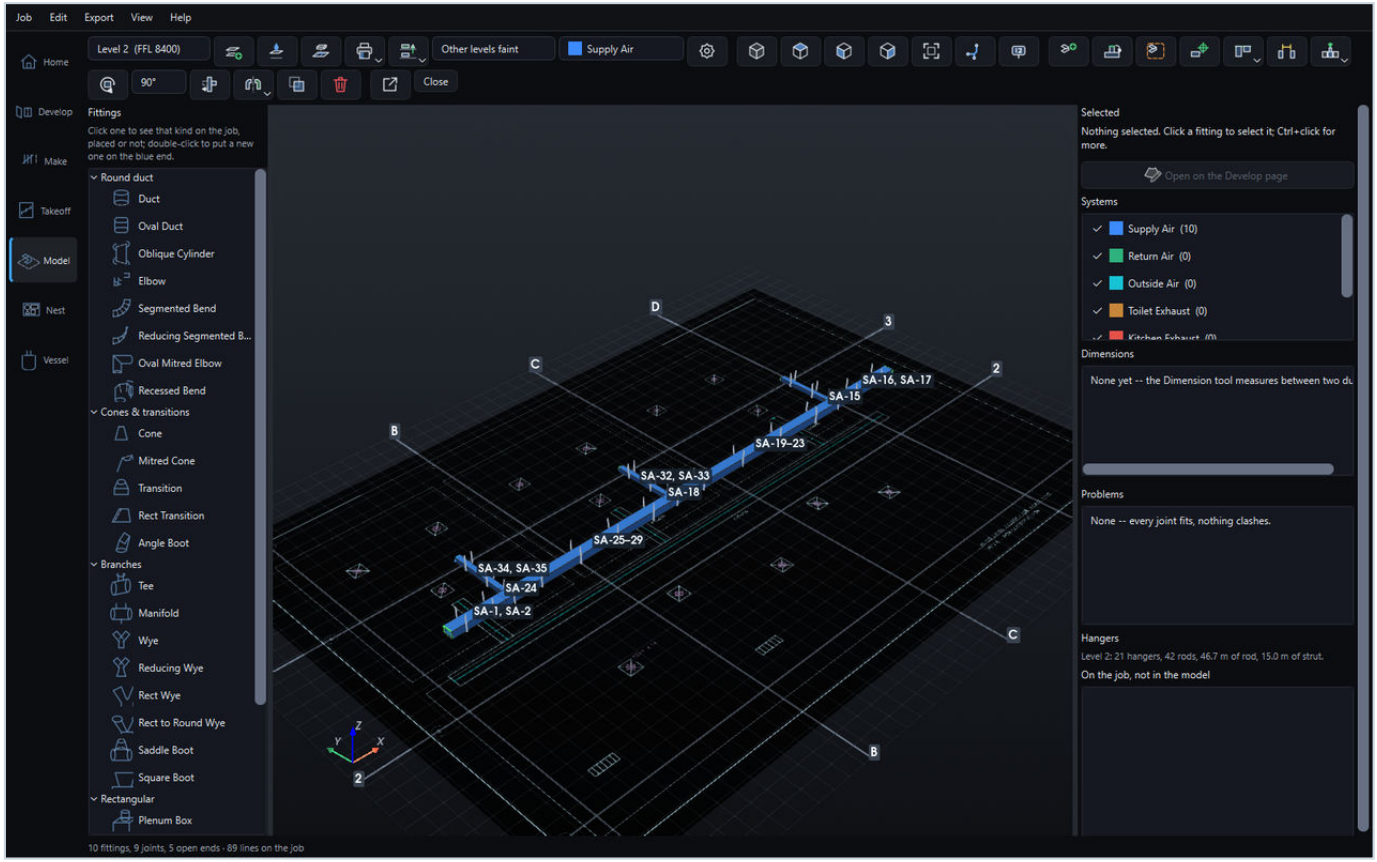
The builder's drawing, lined up



Drawing under this floor lays a PDF plan on the floor to build over. M-102 was scaled on the Takeoff page, so it comes in at 1:100.

Line it up by two points: click grid A/1 on the drawing and choose A/1 from the list, then D/3 across the plan. The drawing moves and turns until both sit on the model's grid, and the line along the bottom says the scale and the turn. If the second point lands well away from where you said, it says by how much: the scale may be wrong. A drawing with no scale takes its scale from the same two points. **Strength** fades it, and it can be shown light on dark, as a CAD screen shows it.

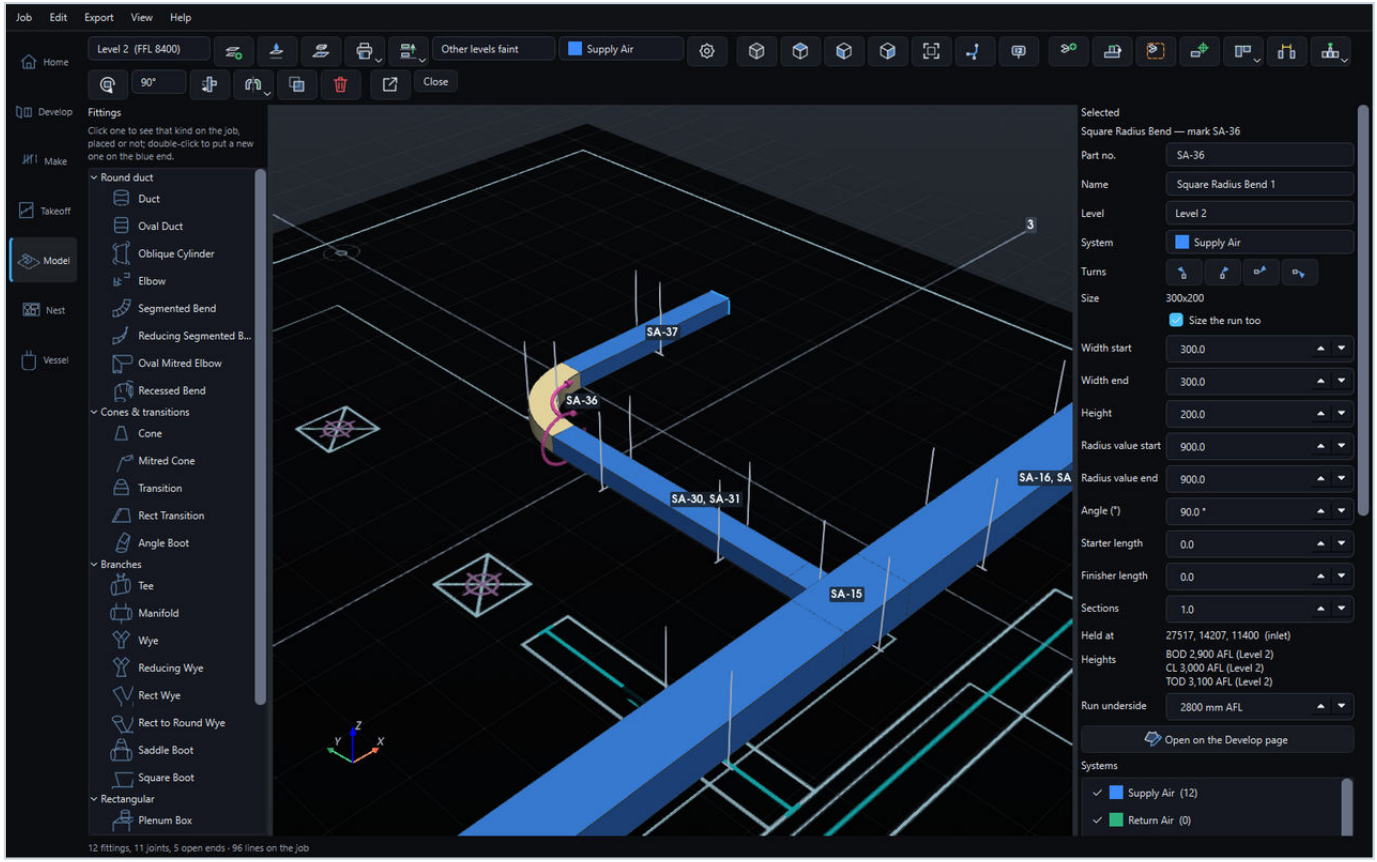
Build the run over it



Double-click a fitting in the list on the left and it goes on the end of the run, sized to match. **Insert** puts a tee, transition or reducer into a straight, and the straights either side close up round it. Here: the 600x400 trunk along the drawn one, a tee where each branch leaves it, and the 300x200 branches on to their diffusers, in the supply air's colour.

Every fitting is a part on the job as soon as it is placed, numbered by its system, and a straight longer than your stock is cut into stock lengths. A single click on the list opens a drawer of the job's parts of that kind, to place ones that are on the job already.

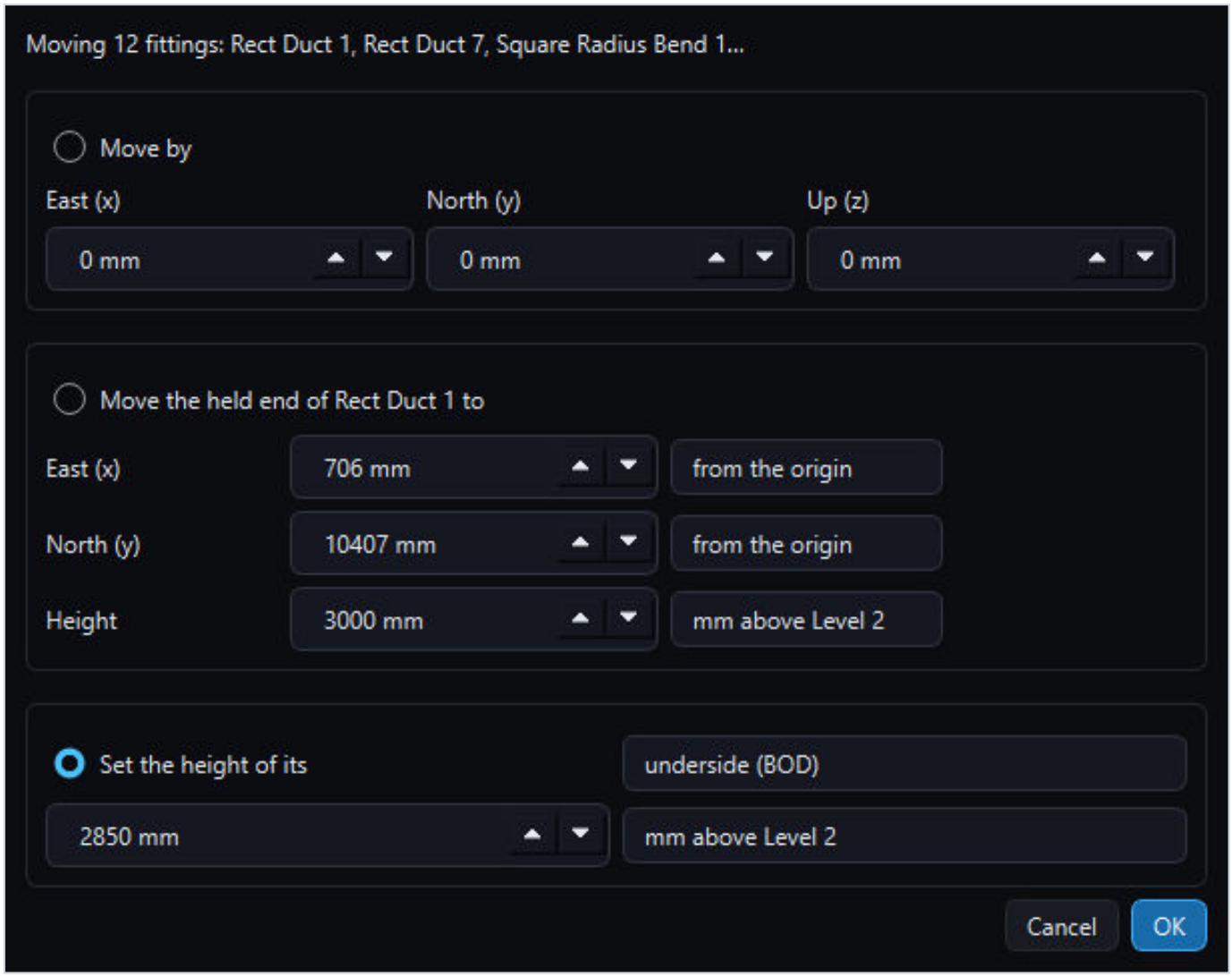
Turn a fitting



Select a fitting and arrows show the ways it can turn. Click one to turn the bend left, right, up or down, and everything after it follows. The ring rolls it round the end it hangs from.

Its sizes are on the panel on the right, to change there. **Open on the Develop page** shows it with its seams, laps, joints and blanks, like any other part.

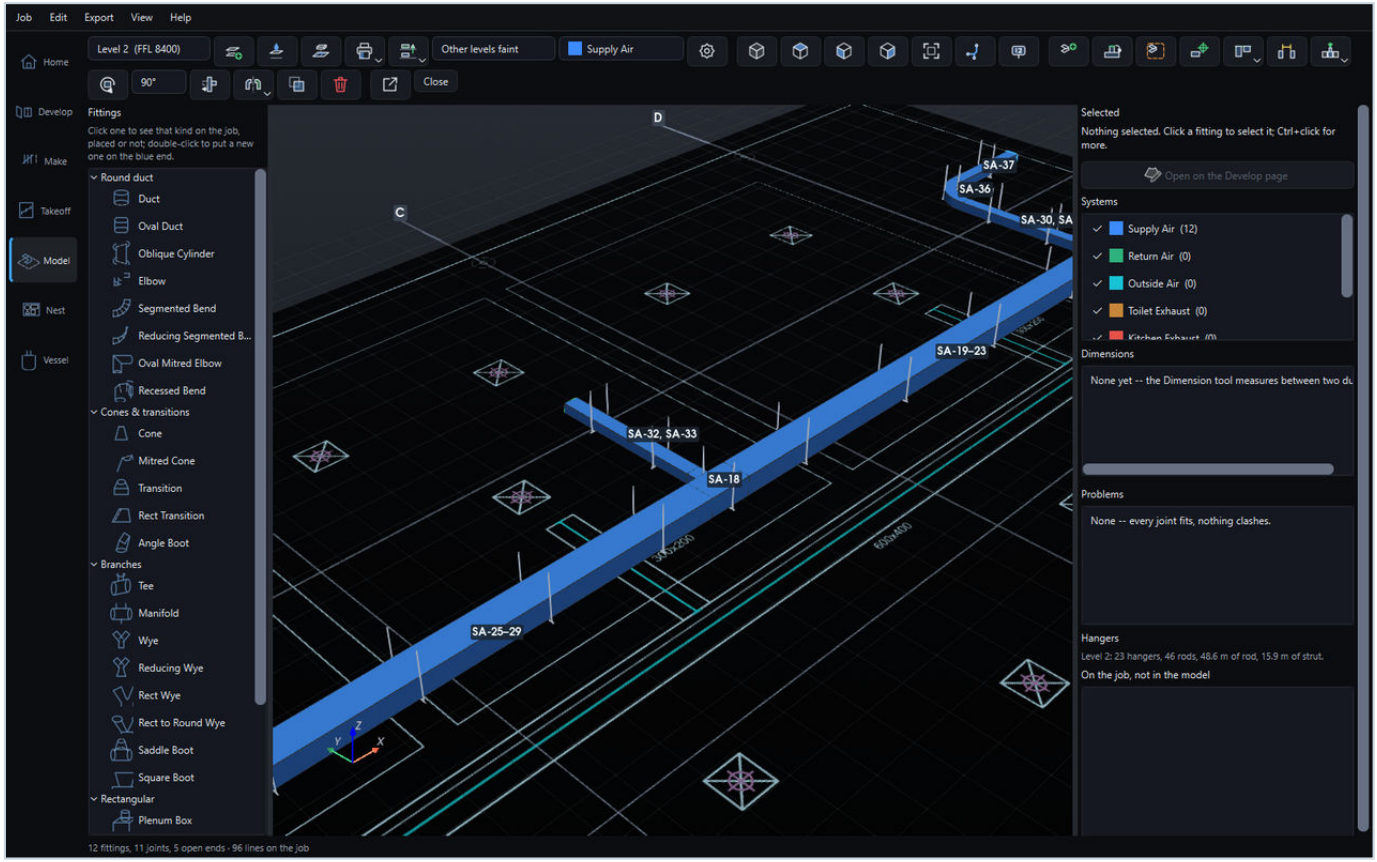
Set it out



Position moves the selection, one fitting or a whole run (**Select run**), by an exact amount, or to a point measured from a grid line. It also puts the underside, the centreline or the top at a height, above the floor or as an RL. Here the drawing's note, U/S duct 2850 AFL, is set on the trunk's whole run.

Dimension measures between two ducts, clear or centre to centre. Type a distance and the second run moves to it; lock it to hold it. **Align** brings the tops, undersides or centres of one run level with another.

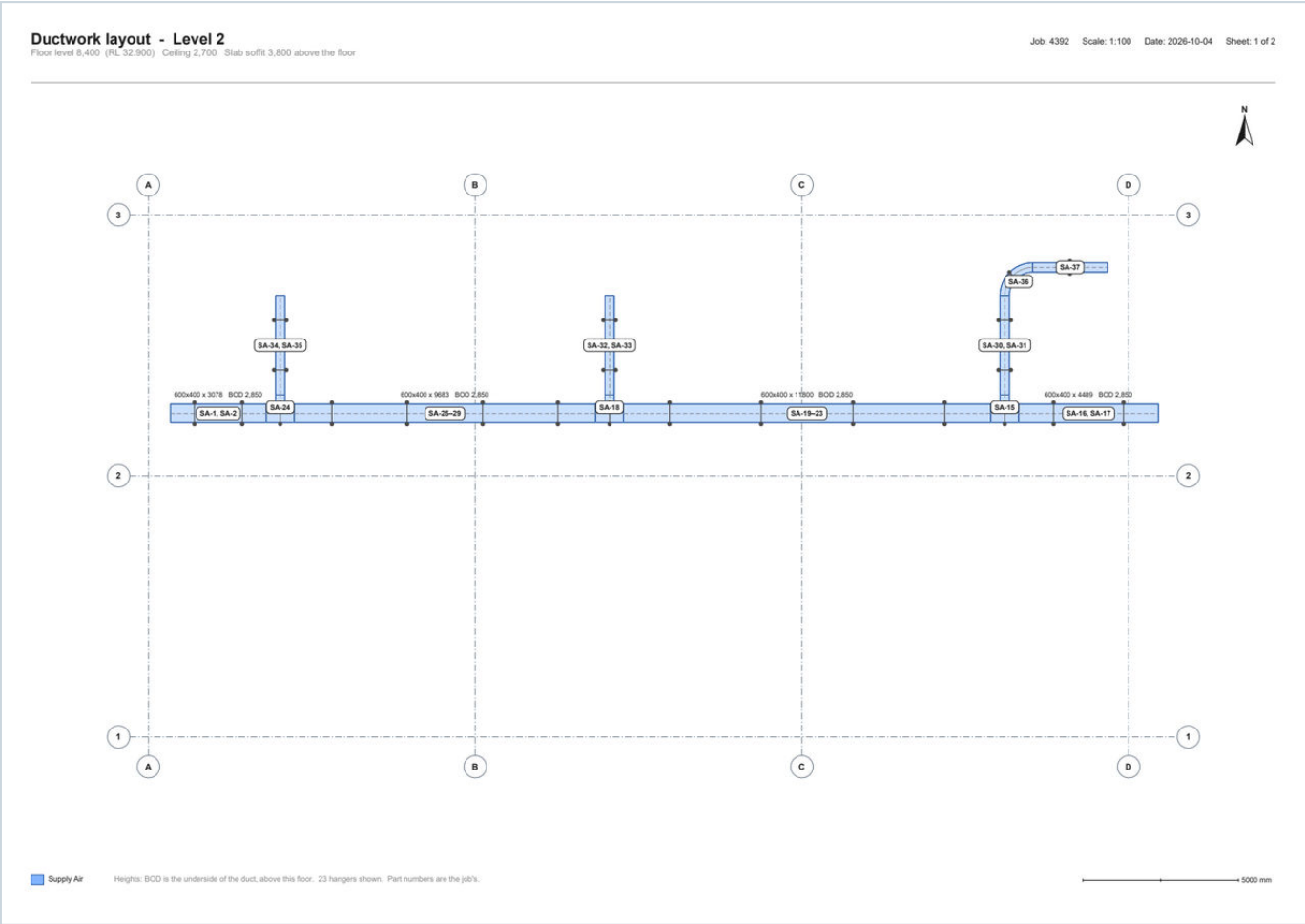
Hangers



Hangers are worked out from the model: straights at your spacing, every other fitting once. A rectangular duct sits on a trapeze, two rods down from the slab soffit to a strut under it; a small round duct hangs from one rod. The panel adds up the hangers, rods and metres of rod and strut, and the quote prices the rods, anchors, nuts and strut from **Labour & Consumables**.

The spacing, the largest round duct on one rod and the strut's overhang are yours to set, in **Model settings**.

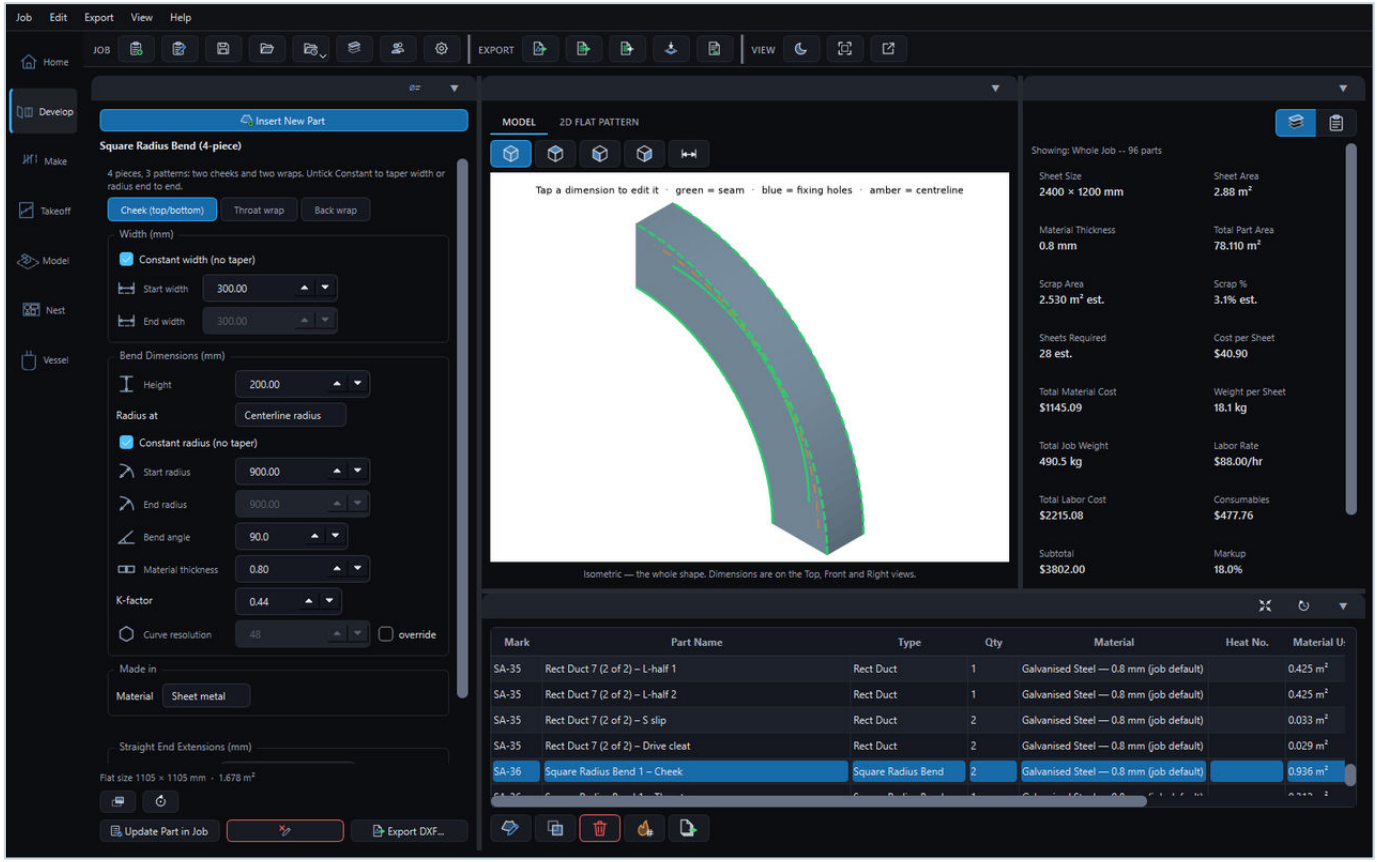
The install drawing



Print layout draws the floor for site: the ductwork in plan over the grid, each fitting with its part number, each straight with its size and the height of its underside, the dimensions you set, and every hanger. It picks the largest scale the floor fits on the sheet, says it in the title block and draws a scale bar. A schedule of every fitting follows on the next sheet.

Every floor can go out as one set, or as a DXF with each system on its own layer for the coordinator's model.

The model's parts on the job

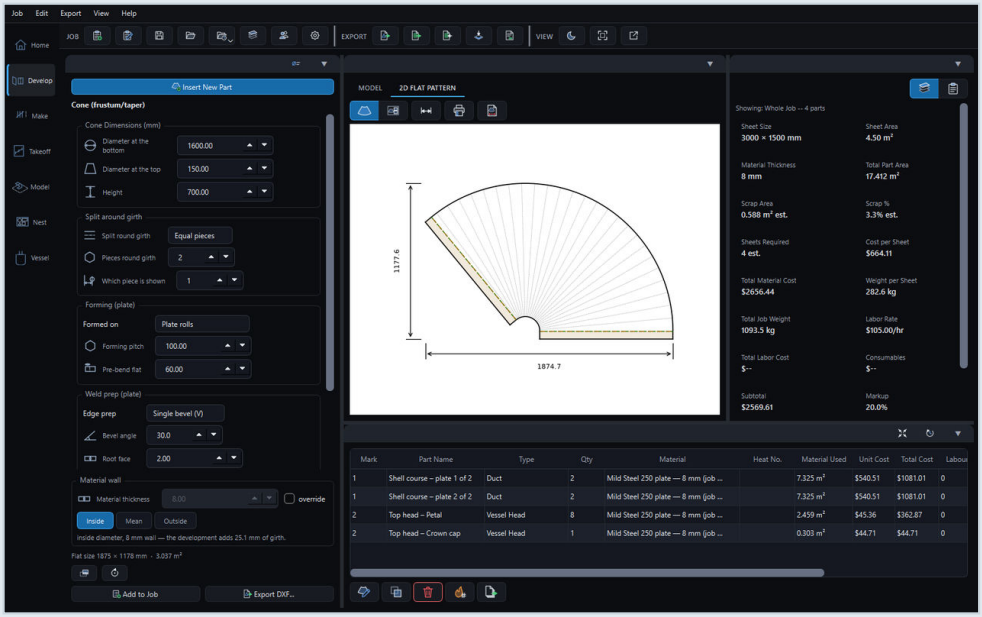


Develop has every fitting the model made, under the numbers the install drawing shows: SA-1 on the drawing is SA-1 on the cut list, the labels and the Make page. Open a fitting from the model and it loads into the form, to change its seams and joints like any other part. A change of size goes back into the model.

PART 4

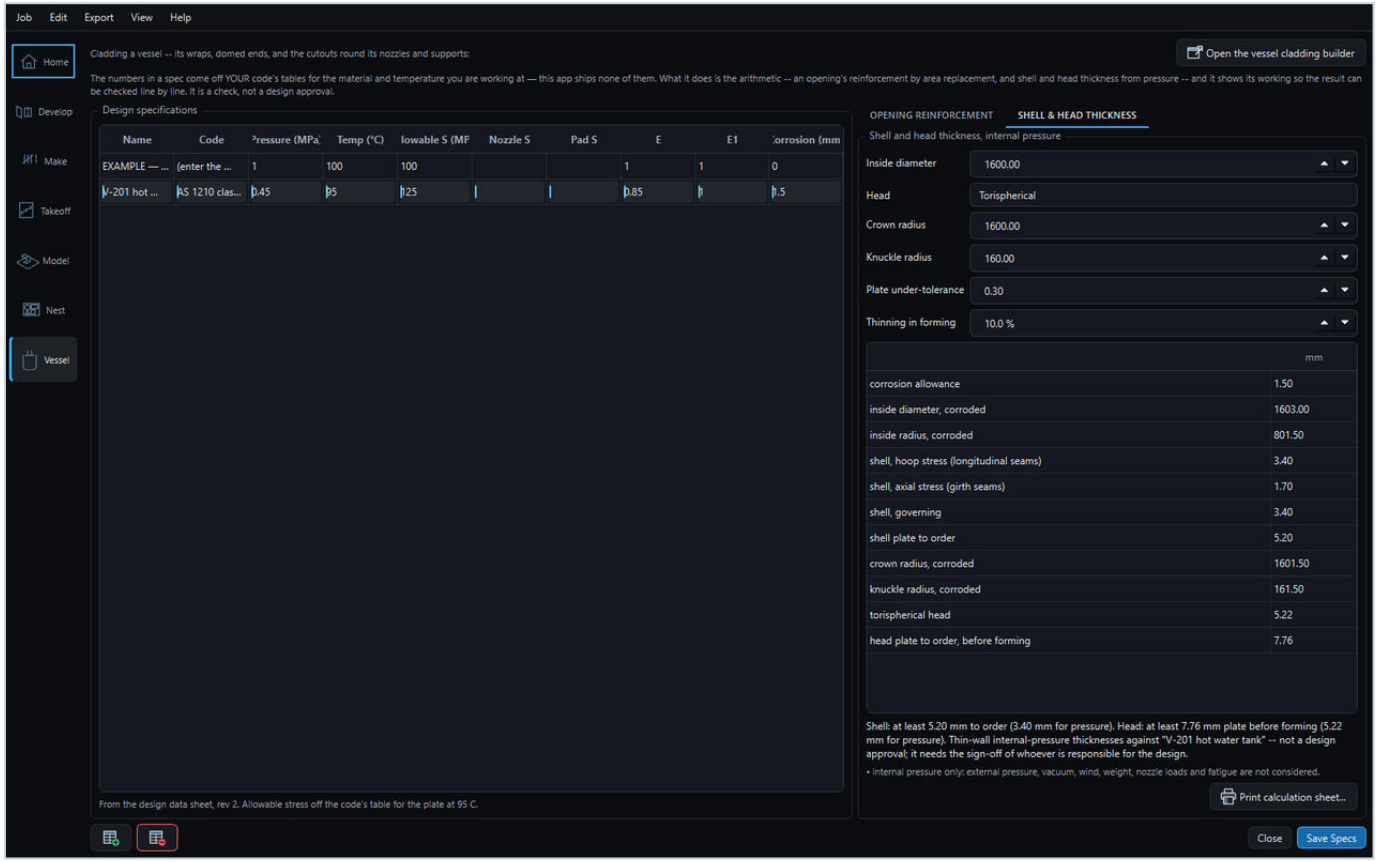
A plate job: Northland Dairy V-201

A hot water tank in 8 mm plate: the design thicknesses and the nozzle reinforcement checked and printed for sign-off, then the shell, head, cone and nozzles developed, traced by heat number and nested.



35. Shell and head thickness
36. Nozzle reinforcement
37. The calculation sheet
38. A shell course, too big for the plate
39. Split to fit
40. Head petals
41. A rolled cone
42. A nozzle through the head
43. The repad
44. Heat numbers
45. Labels with the heat
46. Measure the blank
47. Mark it out
48. Hand it to the nesting add-on
49. Nest onto plate

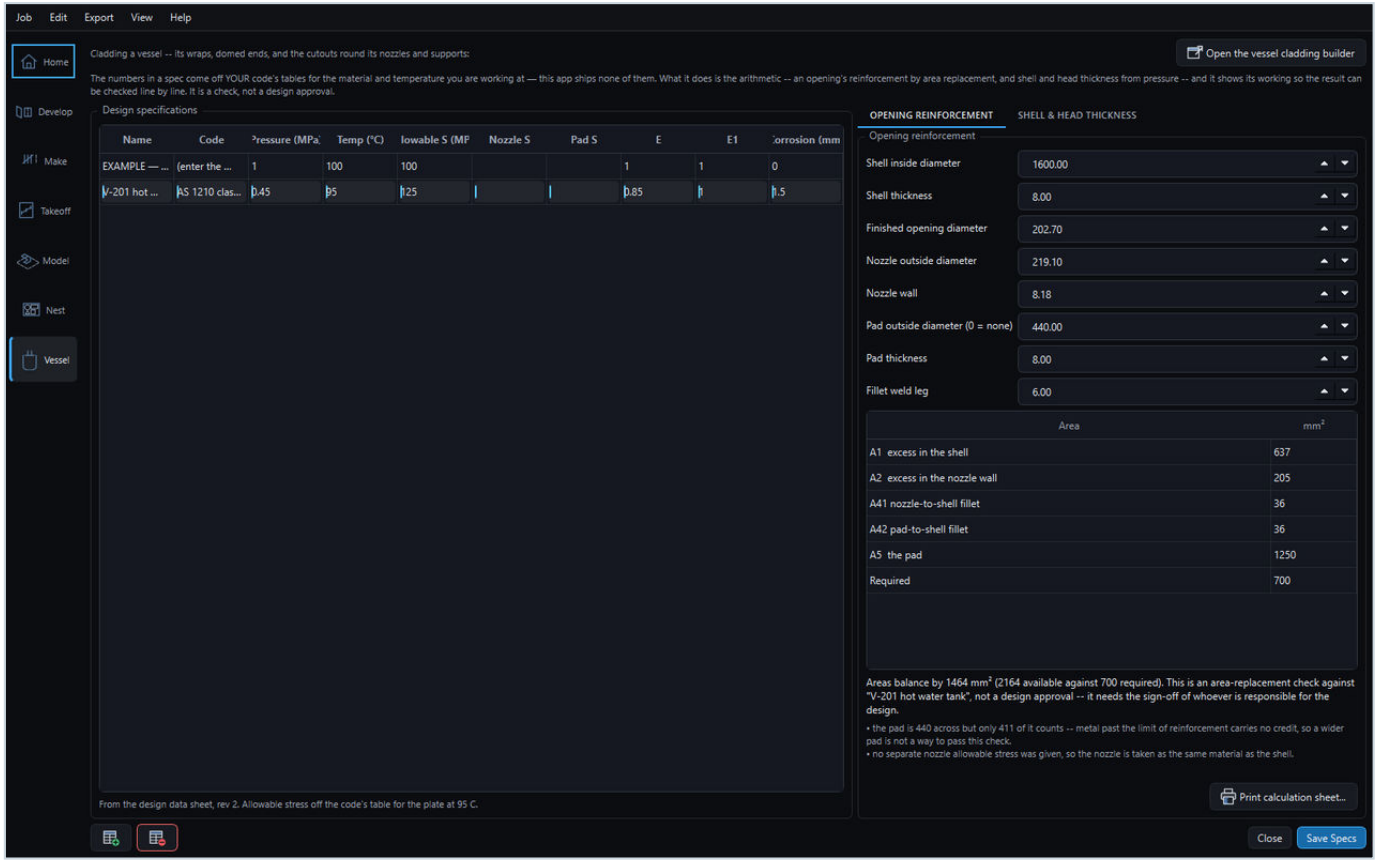
Shell and head thickness



Vessel, on the rail, starts from a design spec. Its pressure, temperature, allowable stress, joint efficiencies and corrosion allowance come off your code's tables and the design data sheet; the app ships none of them.

The **Shell & head thickness** tab works out the plate each needs for internal pressure, with the under-tolerance and the thinning in forming, and shows every line of the working. Here 8 mm plate is enough for both.

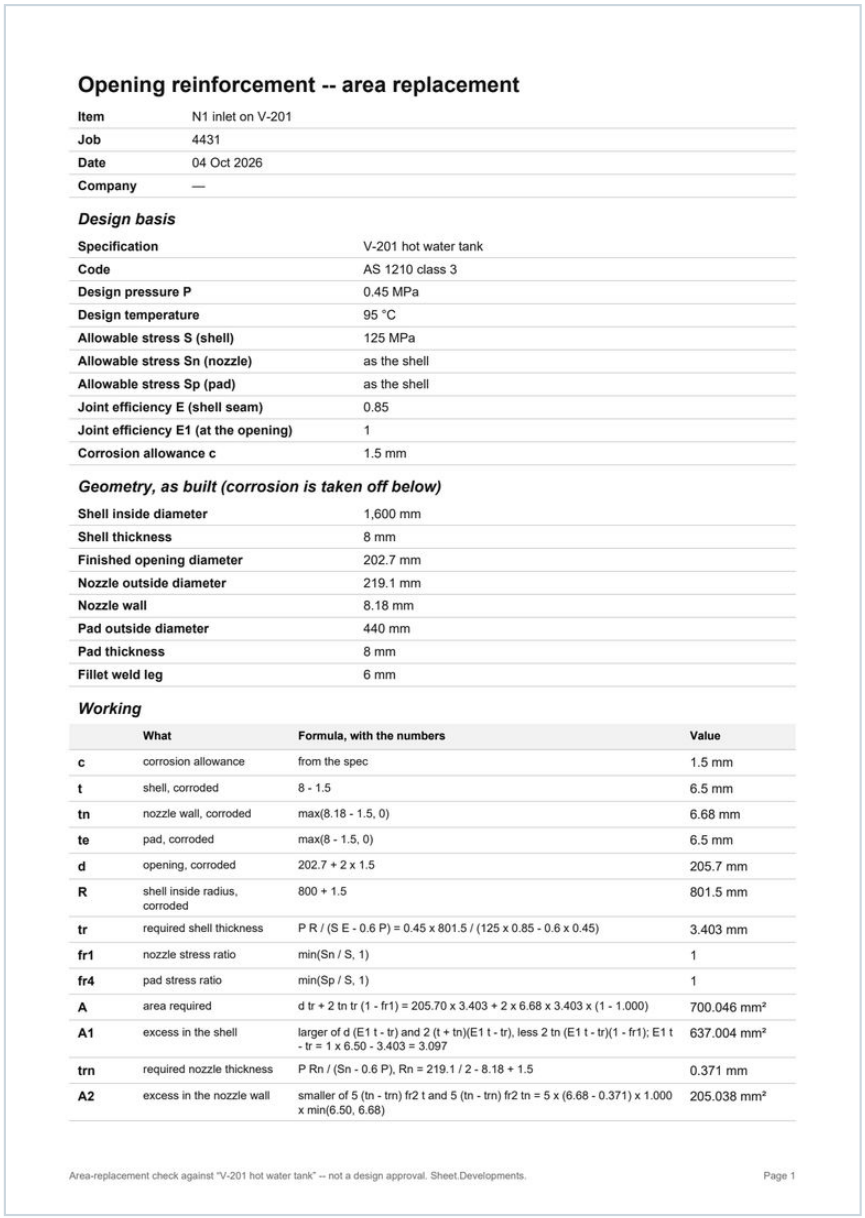
Nozzle reinforcement



The **Opening reinforcement** tab checks a nozzle by area replacement: the area the hole takes out against what the shell, the nozzle wall, the welds and a pad put back. Here a 440 mm pad on the 200 NB inlet leaves the areas balanced with room to spare.

It is a check, not a design approval: the verdict says it needs the sign-off of whoever is responsible for the design.

The calculation sheet



Opening reinforcement -- area replacement

Item	N1 inlet on V-201
Job	4431
Date	04 Oct 2026
Company	—

Design basis

Specification	V-201 hot water tank
Code	AS 1210 class 3
Design pressure P	0.45 MPa
Design temperature	95 °C
Allowable stress S (shell)	125 MPa
Allowable stress Sn (nozzle)	as the shell
Allowable stress Sp (pad)	as the shell
Joint efficiency E (shell seam)	0.85
Joint efficiency E1 (at the opening)	1
Corrosion allowance c	1.5 mm

Geometry, as built (corrosion is taken off below)

Shell inside diameter	1,600 mm
Shell thickness	8 mm
Finished opening diameter	202.7 mm
Nozzle outside diameter	219.1 mm
Nozzle wall	8.18 mm
Pad outside diameter	440 mm
Pad thickness	8 mm
Fillet weld leg	6 mm

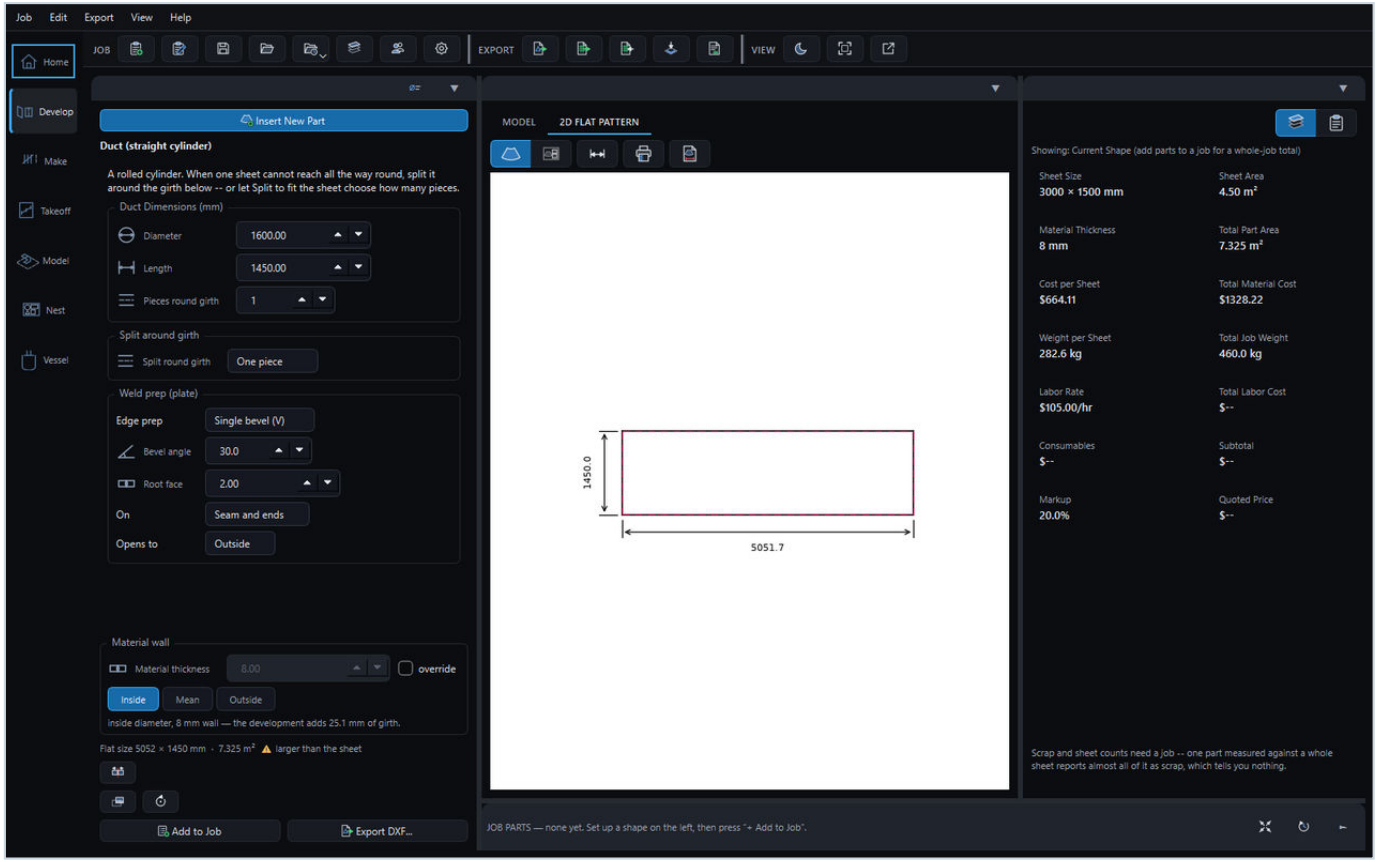
Working

	What	Formula, with the numbers	Value
c	corrosion allowance	from the spec	1.5 mm
t	shell, corroded	8 - 1.5	6.5 mm
tn	nozzle wall, corroded	max(8.18 - 1.5, 0)	6.68 mm
te	pad, corroded	max(8 - 1.5, 0)	6.5 mm
d	opening, corroded	202.7 + 2 x 1.5	205.7 mm
R	shell inside radius, corroded	800 + 1.5	801.5 mm
tr	required shell thickness	P R / (S E - 0.6 P) = 0.45 x 801.5 / (125 x 0.85 - 0.6 x 0.45)	3.403 mm
fr1	nozzle stress ratio	min(Sn / S, 1)	1
fr4	pad stress ratio	min(Sp / S, 1)	1
A	area required	d tr + 2 tn tr (1 - fr1) = 205.70 x 3.403 + 2 x 6.68 x 3.403 x (1 - 1.000)	700.046 mm²
A1	excess in the shell	larger of d (E1 t - tr) and 2 (t + tn)(E1 t - tr), less 2 tn (E1 t - tr)(1 - fr1); E1 t - tr = 1 x 6.50 - 3.403 = 3.097	637.004 mm²
trn	required nozzle thickness	P Rn / (Sn - 0.6 P), Rn = 219.1 / 2 - 8.18 + 1.5	0.371 mm
A2	excess in the nozzle wall	smaller of 5 (tn - trn) fr2 t and 5 (tn - trn) fr2 tn = 5 x (6.68 - 0.371) x 1.000 x min(6.50, 6.68)	205.038 mm²

Area-replacement check against "V-201 hot water tank" -- not a design approval. Sheet.Developments. Page 1

Print calculation sheet writes the check for signing: the design basis, the geometry, and every step of the working with the formula and the numbers in it, then a sign-off block.

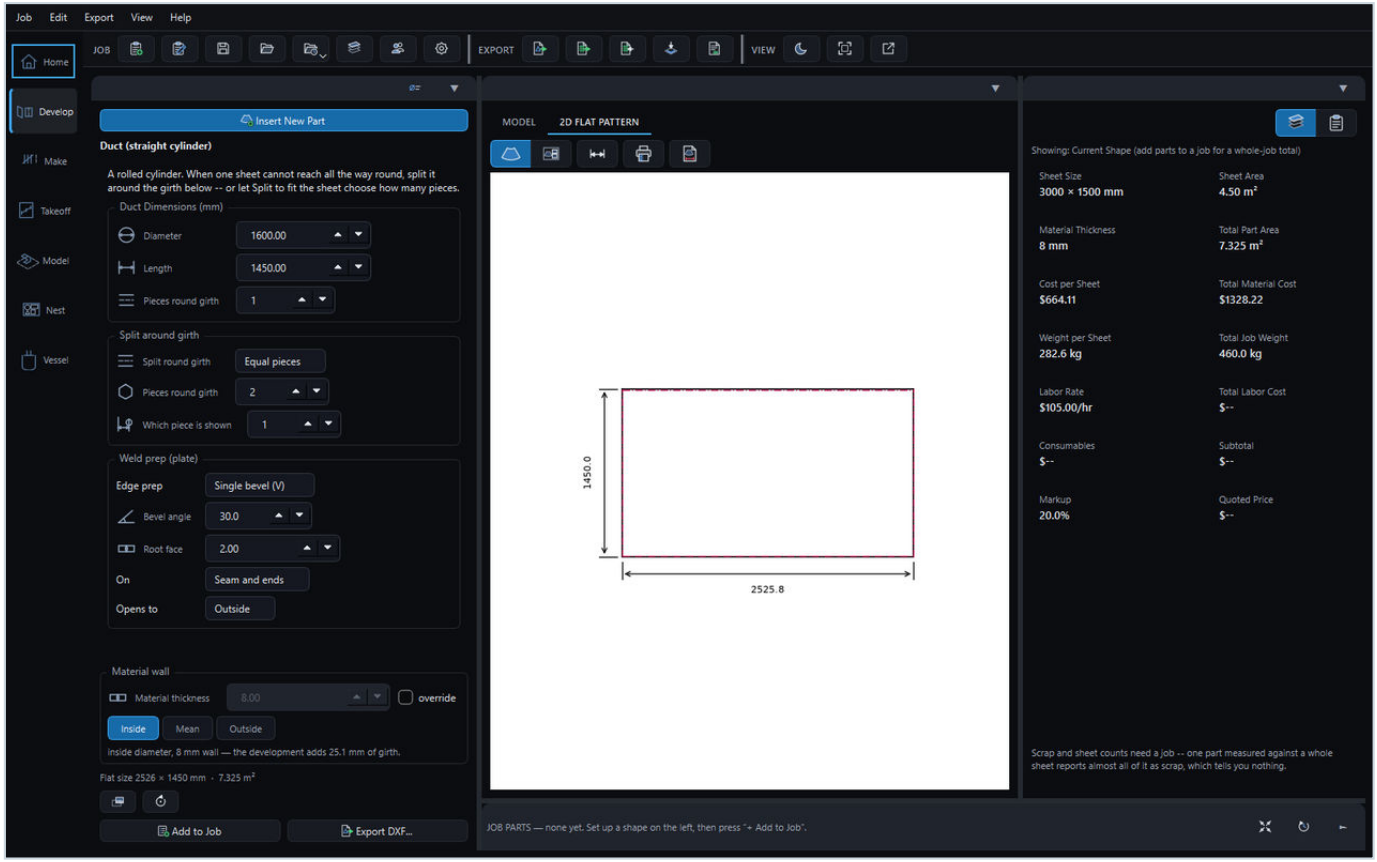
A shell course, too big for the plate



A shell course is a **Duct (straight cylinder)** 1600 ID by 1450, cut from 1500 plate. It is butt welded, so the laps are 0, and the **Weld prep** puts a 30 degree single bevel with a 2 mm root face on every edge.

The girth is over 5 m and the plate is 3 m, so the flat size says it is larger than the sheet, and the **Split to fit the sheet** button appears under it.

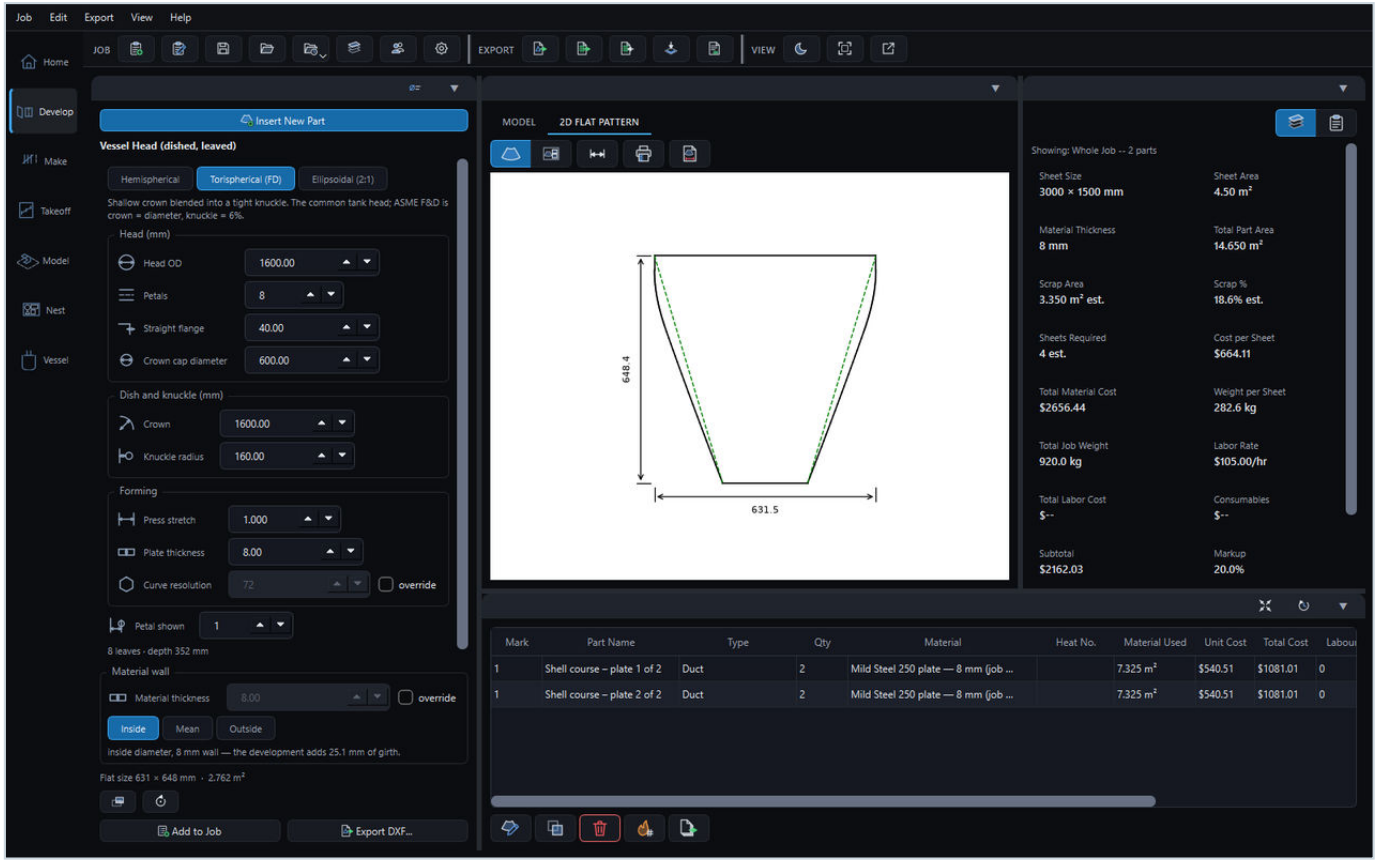
Split to fit



Split to fit the sheet splits the course round its girth into the fewest equal pieces that fit, inside the sheet's 5 mm edge: two plates, 2526 by 1450. **Which piece is shown** steps through them.

+ Add to Job with **Every piece** ticked puts both plates on the job under one part number; a quantity of 2 is two courses.

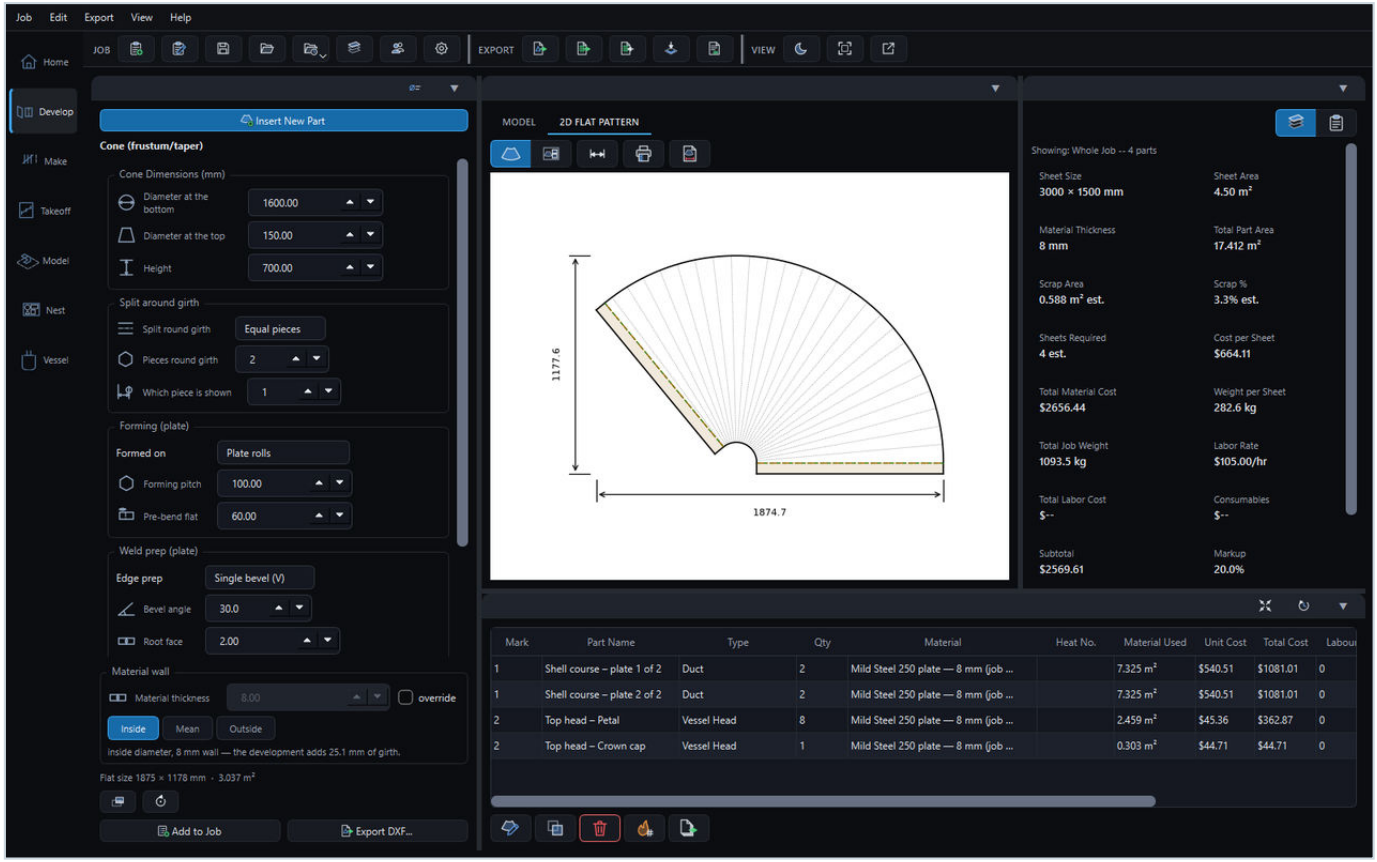
Head petals



The top head is a **Vessel Head**, torispherical, pressed from eight petals round a 600 crown cap. **Petal shown** switches the flat pattern between a petal and the cap.

Add to Job puts the whole head on as one part: its eight petals and the cap under one part number, labelled 1/9 to 9/9.

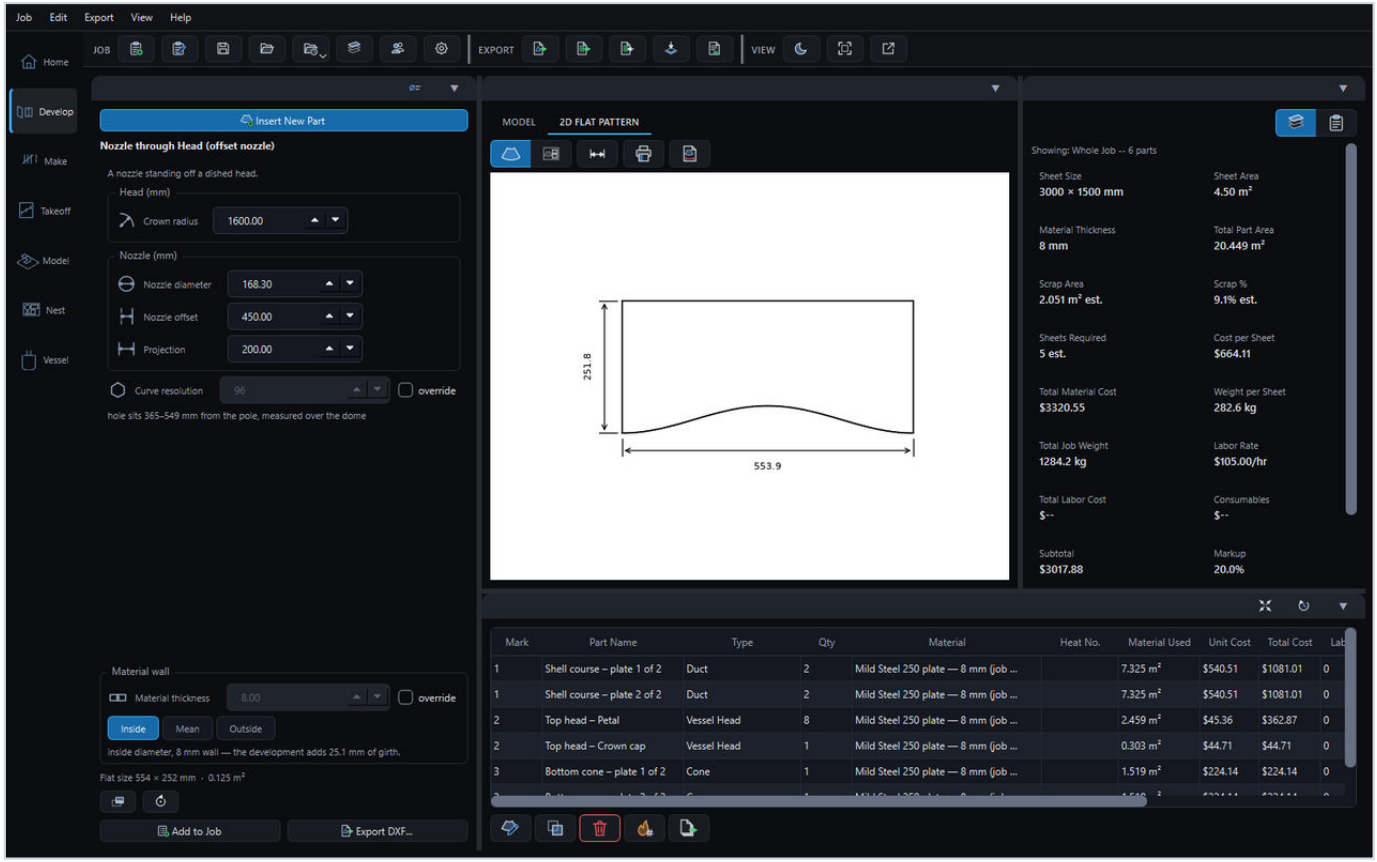
A rolled cone



The bottom cone runs down to the drain. **Formed on: Plate rolls** draws the roll lines across the blank and adds a **Pre-bend flat** past each seam, for the edges the rolls cannot reach. For a press brake it draws the bump lines instead, with their schedule under the form.

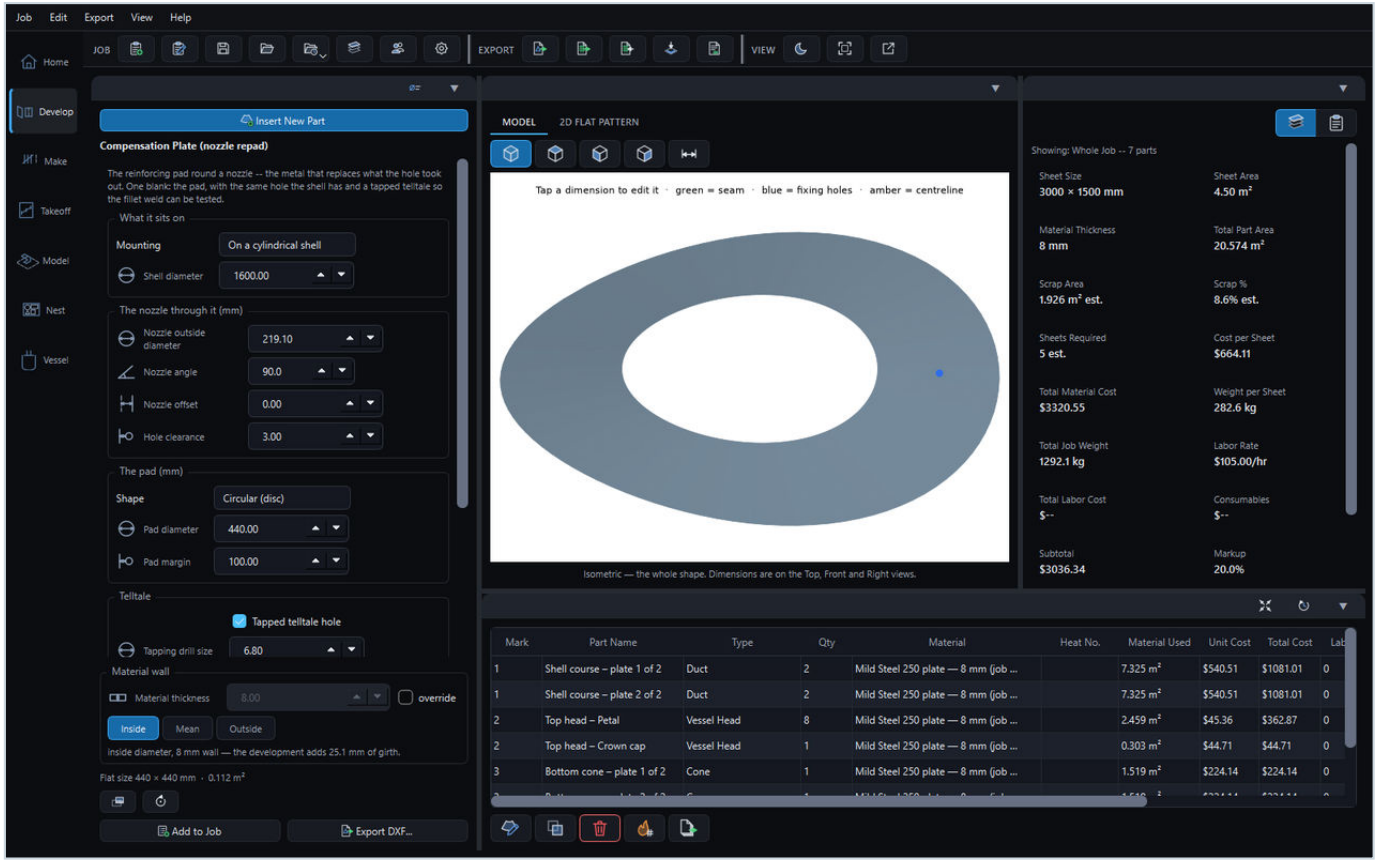
It is split to fit as well, the seams get the same weld prep, and both halves go on the job as one part.

A nozzle through the head



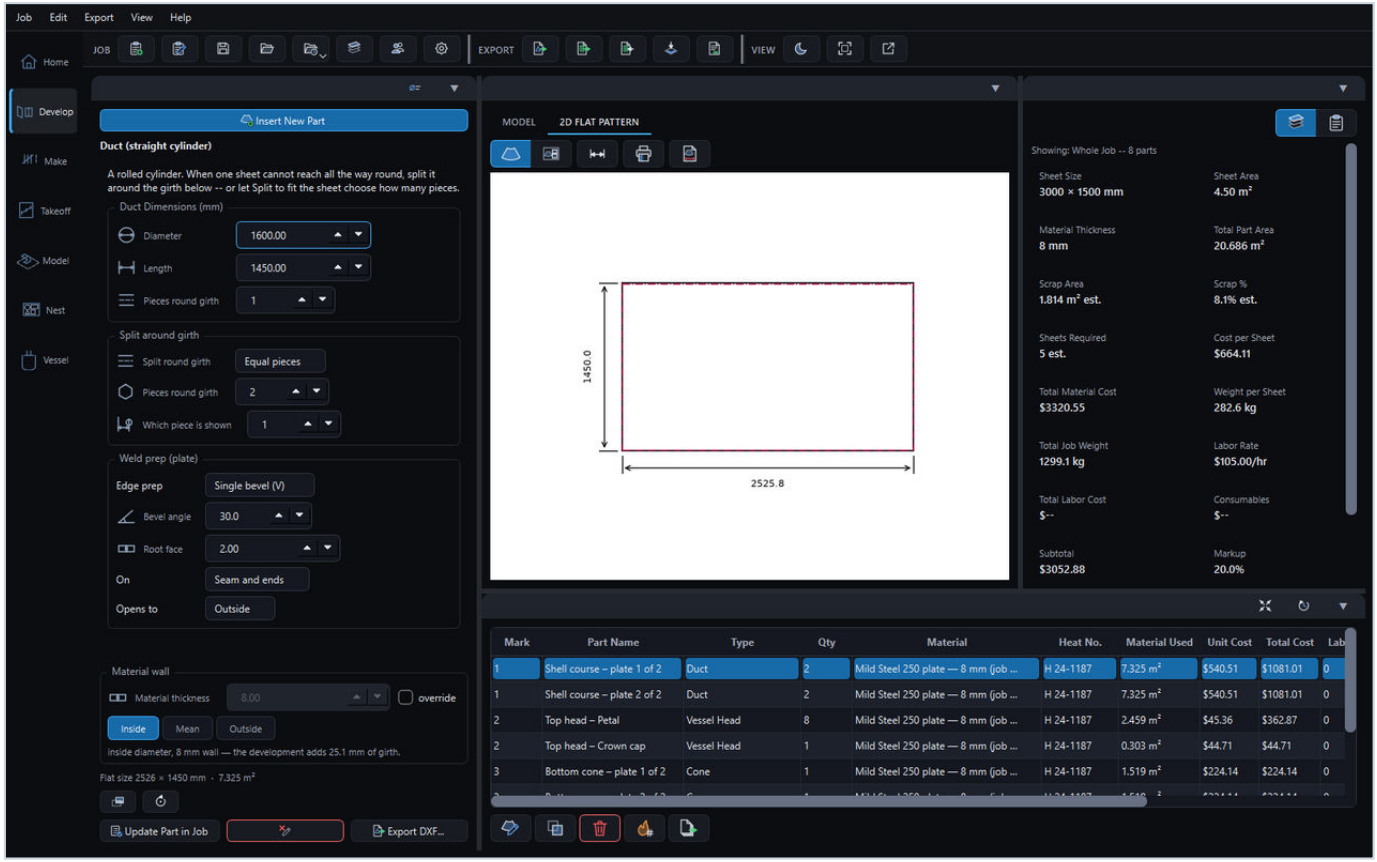
The vent is a **Nozzle through Head**: 150 NB, 450 off the centreline. The blank's bottom edge is the saddle it takes to sit on the head, and the line under the form says where the hole falls, measured over the dome.

The repad



The inlet's pad is a **Compensation Plate**: 440 across, curved to the shell, its hole the same cut as the shell's, with a tapped telltale hole to test the weld.

Heat numbers



Select the parts cut from one plate and press **Heat number** under the table. The heat goes on the parts table, the cut list, the labels and each part's DXF.

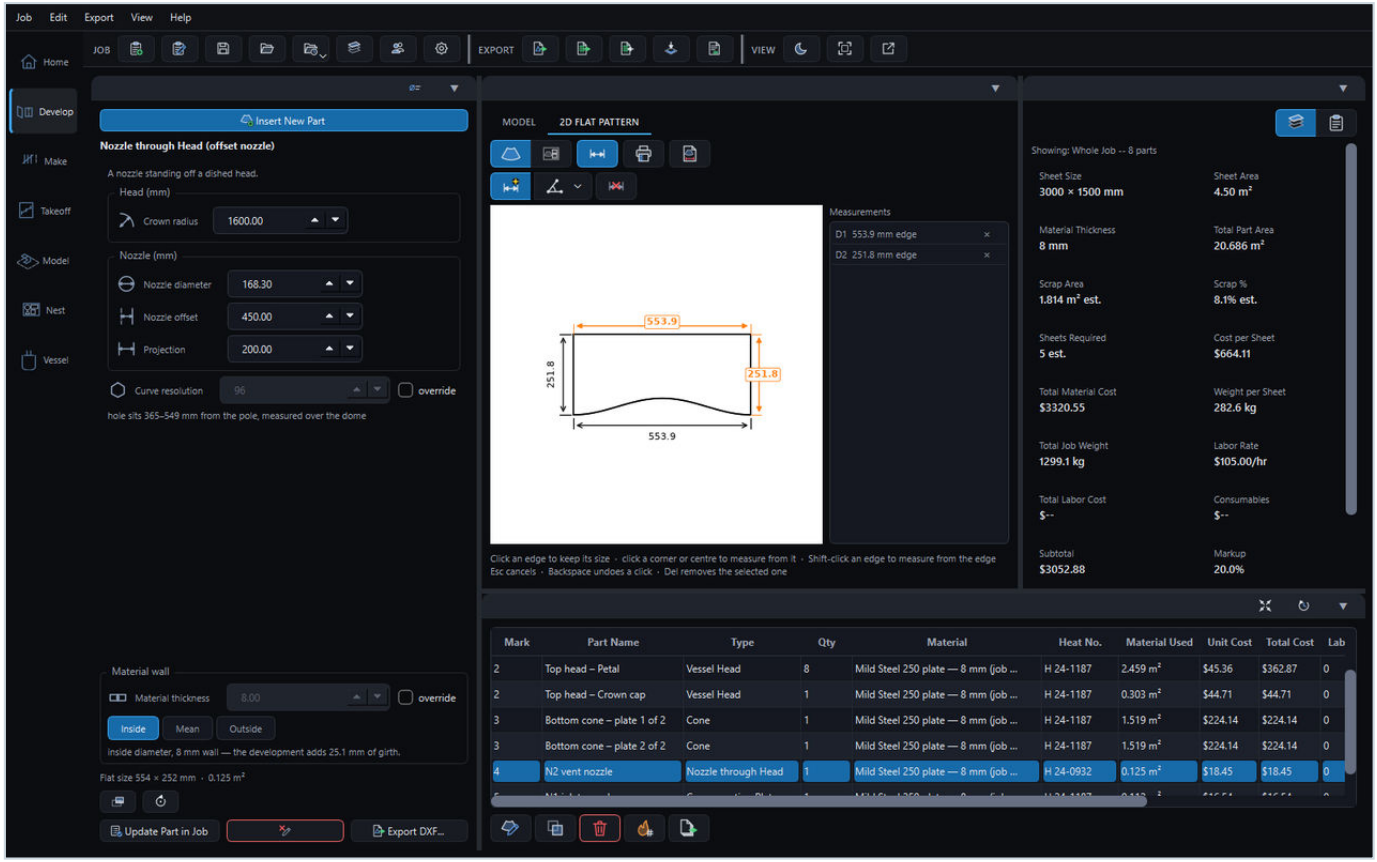
Here everything but the vent nozzle came off one heat; the nozzle came off another.

Labels with the heat



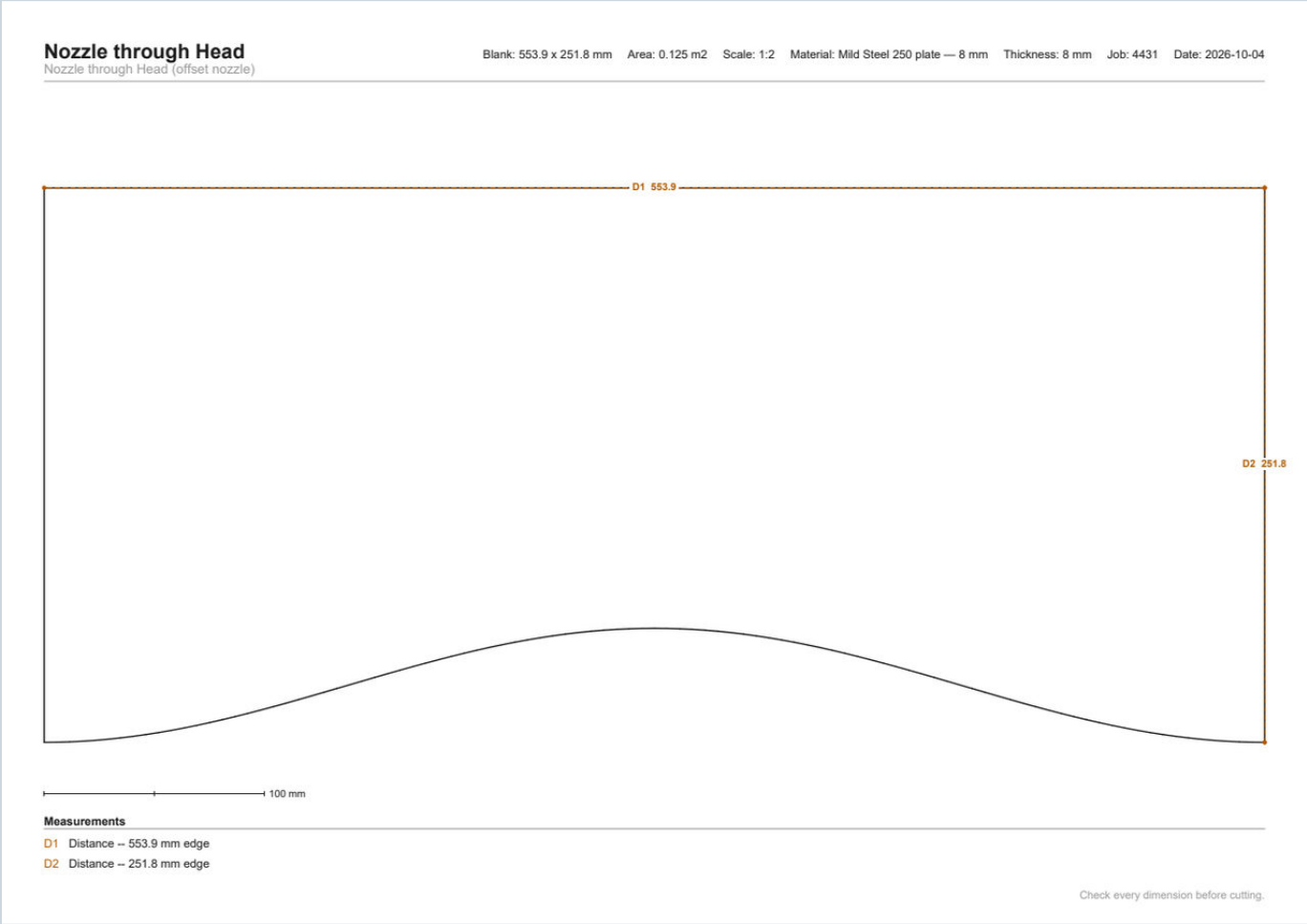
The labels now carry each part's heat number under its name, so it stays with the plate through the shop. The pieces of one part share its number and are counted across it: the shell course's plates are 1/4 to 4/4.

Measure the blank



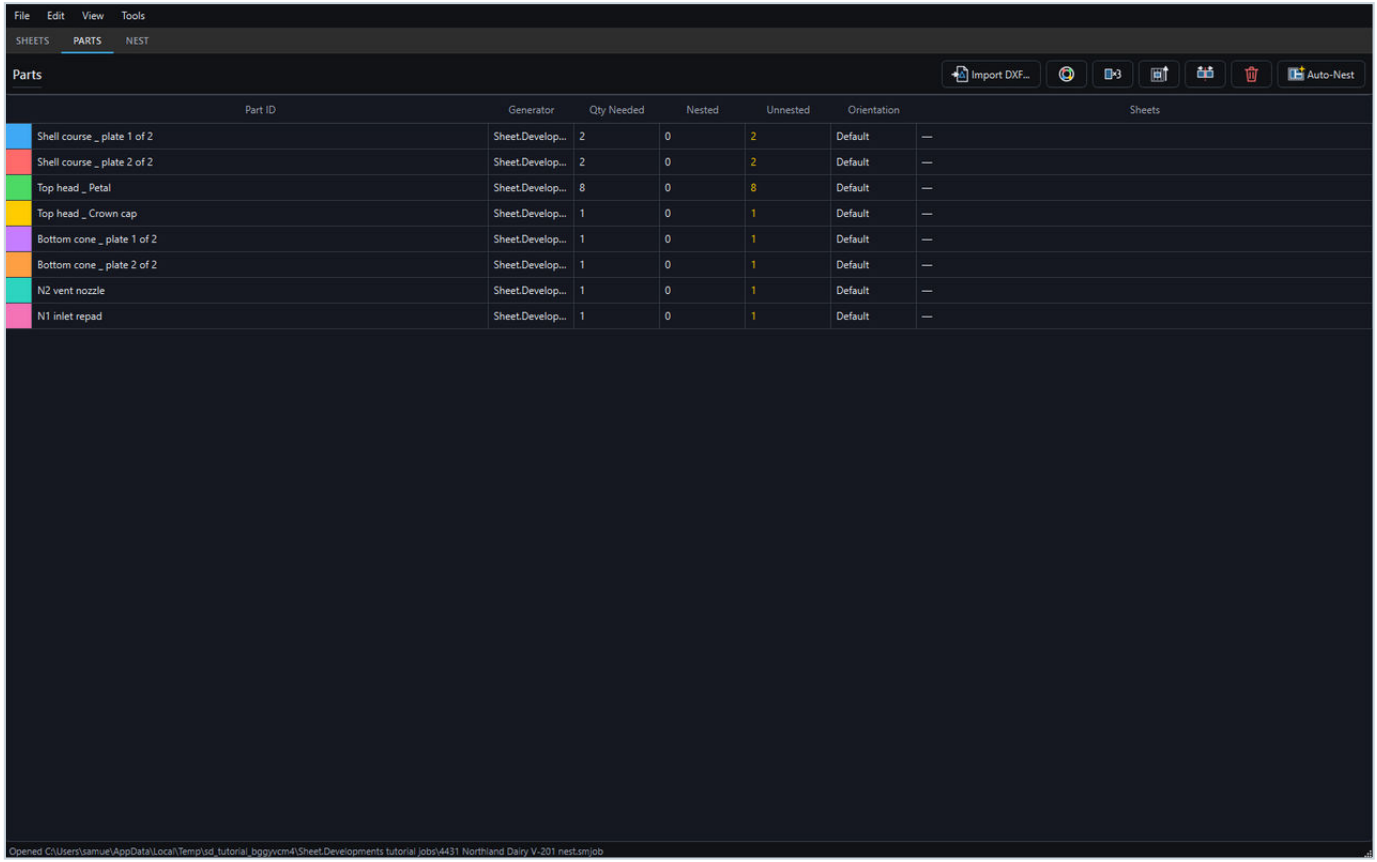
Measure, over the flat pattern, then click an edge to keep its size, or a corner then another for the distance between them. The measurements are listed beside the pattern and can be removed one at a time.

Mark it out



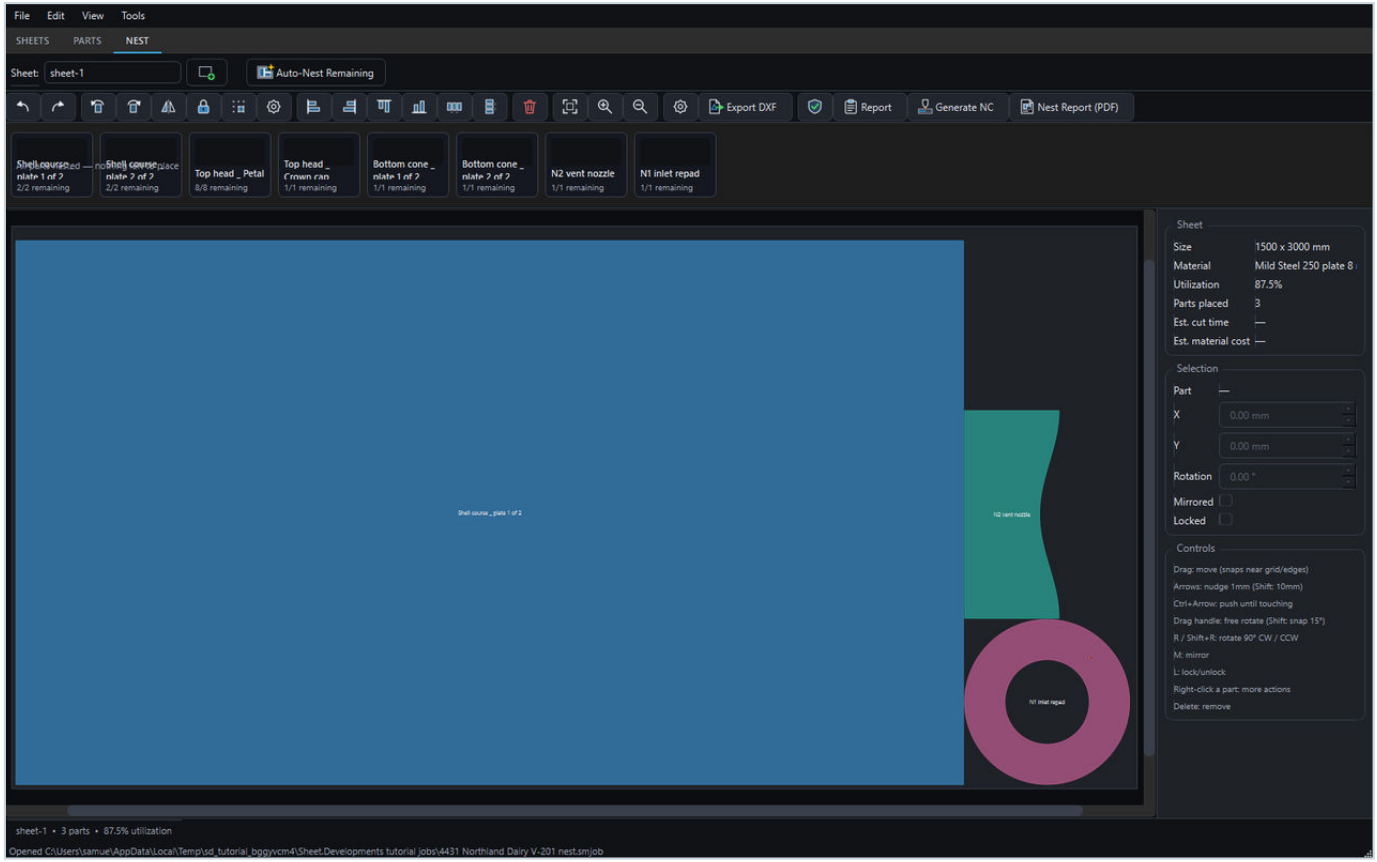
The **Marking-out sheet** then carries those measurements, lettered on the drawing and listed underneath, at a scale with a scale bar.

Hand it to the nesting add-on



Export > Nest this job hands the parts to the **Nest** add-on, one material at a time, each with its quantity. The add-on opens on them with every part listed and nothing placed yet.

Nest onto plate



Auto-Nest lays the parts onto 3000 x 1500 plate with your kerf and edge margin, and turns shaped parts to fit. Move, turn and lock parts by hand, then export the DXF, the nest report, or the NC program for your machine.