# Automation Engine 18.1

## Gang Run Printing

ESKO✷

# Contents

# 1.  What is Gang Run Printing?

Gang Run Printing enables you to efficiently match graphic designs to be printed with the available substrate (to have as little substrate waste as possible and faster turnaround), with:

- *Nesting*,

- *Ganging*,

- *Tiling*.

This is especially useful when printing Sign and Display material and for shorter production runs.

It takes into account the designs' sizes, shapes and ordered quantities to produce layouts on substrate sheets.

## 1.1.  Nesting

Nesting is laying out several graphic files in the most efficient way so that waste is minimized.

When working with non-rectangular graphics, their bounding boxes may overlap in the layout.



For more information about nesting in Gang Run Printing, see *Creating Nested Layouts on the Nesting Server* on page 12.

## 1.2.  Ganging

Ganging is combining several different graphic files, in one print job, even if those files belong to several orders (for example if one order doesn't fill a whole substrate sheet).

This helps drive production costs down and helps you offer a competitive price to your customers.

## 1.3.  Tiling

Tiling is splitting oversize graphics into rectangular pieces (tiles) for printing. These tiles are separate files that the Gang Run Printing mode can then *nest* with other tiles or even other graphics.

A typical example are billboards:



This example could be tiled into these 10 smaller parts:
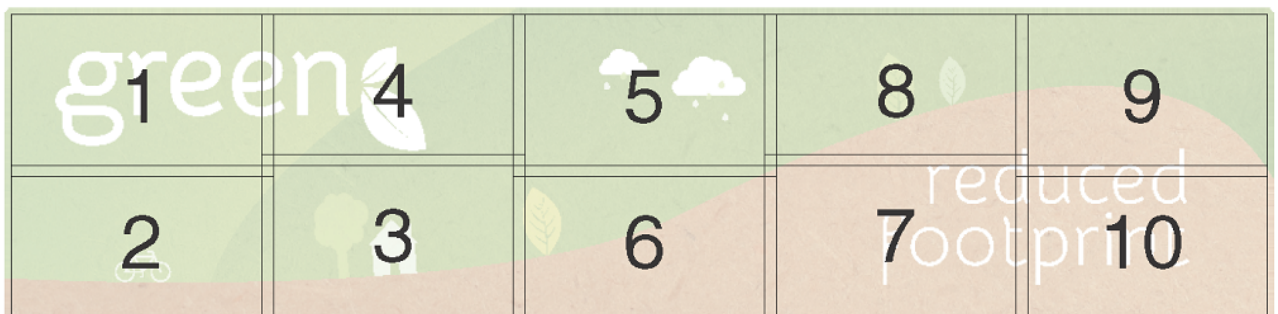
Typical for tiling are the overlaps. We distinguish 3 classic concepts:

- Standard **overlap**: a side without overlap is placed on top of the overlap of the neighbouring tile:
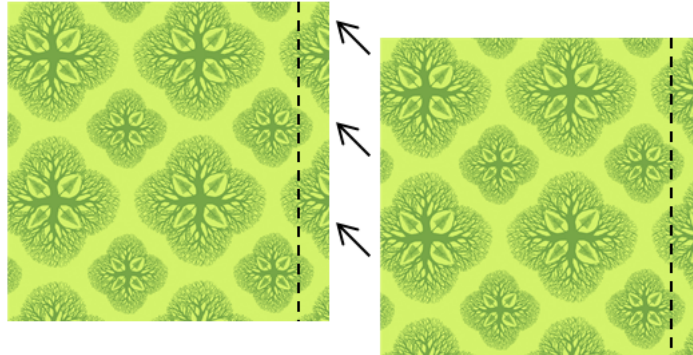


- When producing wallpaper or murals that are applied with a **double cut**, you need an **overlap on both sides**:
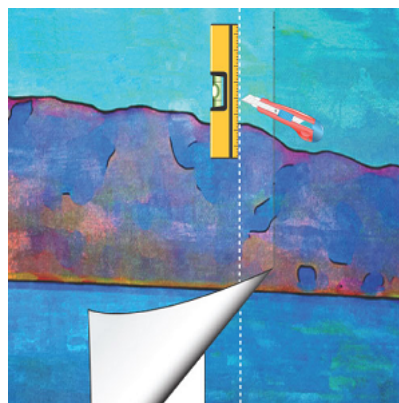


See a video of an example *here*.

- When producing wall prints in thick material or tiles that are inserted in a framework, you might not need any overlap. This could be an example:

## 1.4. Manual or Automated Gang Run Printing

- In the Esko editor **i-cut Layout**, you can perform manual Gang Run Printing: selecting and preparing each graphic individually, then finding layouts (the most efficient layouts are calculated automatically).

  When working in i-cut Layout, you can tweak the results if necessary. Learn more in the *i-cut Layout manual*.

- In **Automation Engine**, you can automate all parts of the workflow: the preparing of he graphics, the submitting to **Substrate Queues**, their nesting settings and the output of the resulting layouts.

  When working automatically in Automation Engine, you can process more graphics in parallel, and you don't need an operator to keep checking when to generate layouts (this is done automatically).

# 2. Working with Gang Run Printing

Here is an overview of how you can work with the Pilot's Gang Run Printing mode.
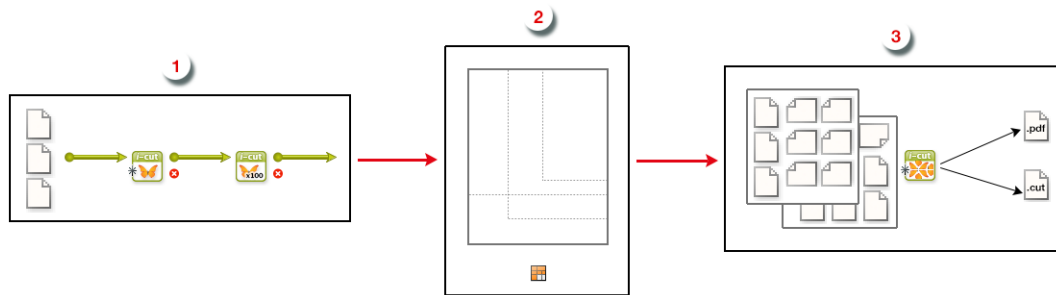


1. You first **prepare** your graphics and **submit** them to be nested on a particular substrate, in your chosen quantity.

   You do this through an **input** workflow, that should contain the **Prepare Graphics for Nesting** task and the **Submit to Gang Run** task.

   Learn more in *Preparing and Submitting your Graphics (Input Workflow)* on page 9.

   Optionally, you can add the *Create Tiles* task to split the prepared graphics into tiles before submitting them.

2. Once the graphics are submitted, they go in a **substrate queue** and the **nesting server** calculates the best possible **nested layouts**, based on the **sheet or roll sizes** and their **nesting settings**. All this is set up and can be monitored in the Pilot's Gang Run Printing view.

   Learn more in *Creating Nested Layouts on the Nesting Server* on page 12.

3. Once the nesting server has decided one or more **optimal nested layouts**, it delivers them to your **output workflow**, that creates **production files** (layout PDFs, cut files and reports).

   The output workflow must contain the **Export Nested Layouts** task. You can make this workflow copy the production files to a specific folder where they are picked up by the press.

   Learn more in *Getting Production Files out of your Nested Layouts (Output Workflow)* on page 16.

## 2.1. Preparing and Submitting your Graphics (Input Workflow)
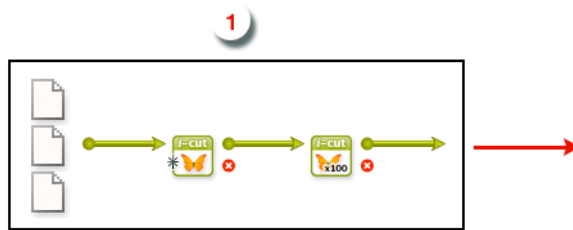
## 2.1.1. Preparing your Graphics

The nesting is based on the graphic's **cut path**, so before you submit graphics to a substrate queue you need to make sure they have a cut path. You may also want to add **bleed** and **SmartMarks**. This what the **Prepare Graphics for Nesting** task is for.

Learn more about the task's options in *Prepare Graphics for Nesting* on page 44.

### Identifying or Extracting a Cut Path

As mentioned, the cut path defines how graphics can be nested.

For example, cardboard cut-outs of a tree (as below left) will be nested and cut differently than postcards of a tree (as below right). Depending on the case, your tree graphic will need a different cut path (shown in red).
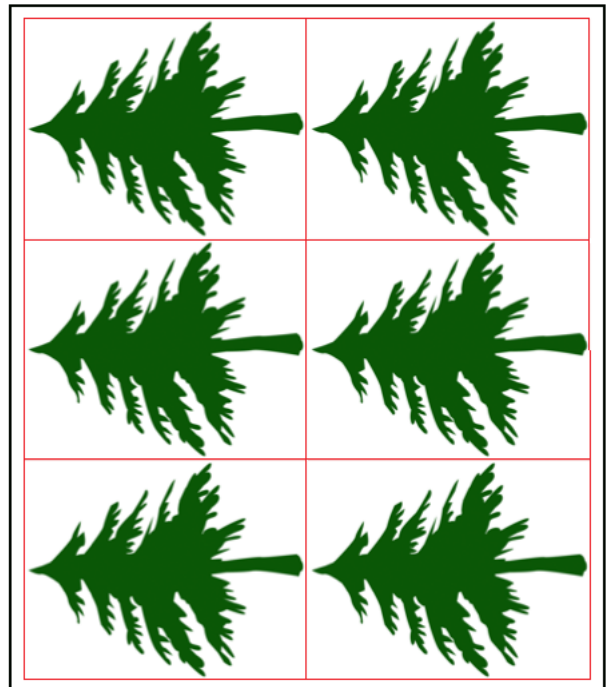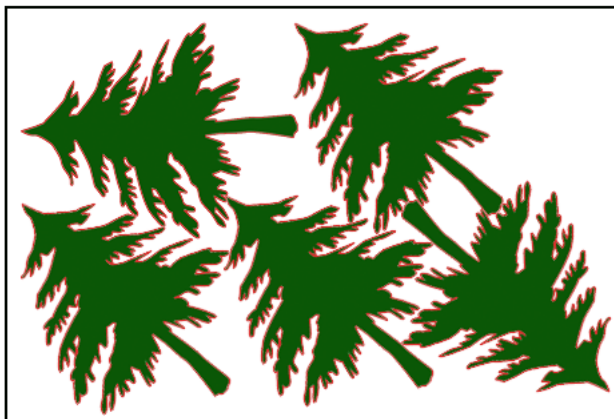


The cut path is typically provided in the file as a contour line in a spot color.

For graphics that don't already contain a cut path, you can generate one from the white background, the trim box, or use a separate file.

### Adding Bleed

If your file doesn't already have bleed outside the cut path or trim box, you can generate some using the Prepare Graphics for Nesting task.

### Adding SmartMarks

SmartMarks are marks that automatically update based on changes to the sheet size, the number of inks on the sheet, etc. You can use them as regular marks or as production controls. There are many types of SmartMarks: registration marks, barcodes, text, placeholders for eyelets, etc.

You typically add SmartMarks to your nested layout in your *output workflow* (mostly for cutting the sheet), but in some cases you need to add some SmartMarks to your graphic in your input workflow.

For example:

- You can add eyelet marks to a graphic that will be used for a large eyeleted banner. You need to add the eyelet marks before *tiling the graphic* to fit the substrate.

- When defining the cut path in the input workflow, you can add text on this cut path for easy processing after cutting (for example to indicate the job-order and customer reference, or the order the tiles must be glued in...).

## 2.1.2. Tiling Oversize Graphics

When the final printed object is too big to fit on your largest substrate size (for example when printing billboards), you can split the graphic into rectangular tiles (fitting the substrate size) that can later be glued back together.

You can do this with the *Create Tiles* task. This task allows adding overlaps to be able to glue the tiles on top of each other.

## 2.1.3. Submitting your Graphics

Once your graphics *are ready*, you can send them to the 'nesting server' using the *Submit to Gang Run* task.

**Note:** This task also allows to submit ARD file (CAD) files to be nested on a layout.

The most important things to define in this task are:

- how many copies you want of that graphic,
- on which substrate you want it printed (and optionally on which substrate size),
- if you have a specific due date to get that graphic printed.

**Note:** Substrates are organized into substrate queues, which not only define the substrate to use but also how its entries will be nested.

Learn more in *Working with Substrate Queues* on page 13.

## 2.2. Creating Nested Layouts on the Nesting Server
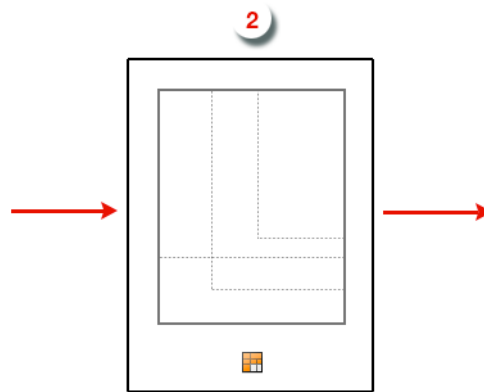


### Automatic Calculation of Nested Layouts

Once your graphic(s) arrive in the *substrate queue*, the nesting server calculates possible layouts to nest those graphics, together with any graphic(s) already in the queue.

The nesting server tries to find the most optimal layout(s) possible, based on these settings:

- the *nesting settings* you set up,

- the different possible **substrate sizes** (if applicable),

- the **minimum fill** percentage for that substrate queue,

- the use of any **grouping keys** (custom labels added to graphics when you submit them, to control the grouping of graphics for nesting).

When the minimum fill is reached, the nesting server sends the layout(s) to the output workflow to generate production files. All graphics that have been nested in these layouts are then removed from the substrate queue.

If it isn't reached, the graphics stay in the substrate queue until new graphics are submitted to the queue, at which point the nesting server calculates possible layouts again.

### Outputting a Partial Quantity of a Graphic's Order

Sometimes the nesting server cannot fit all of the ordered copies of a graphic on layout(s) that satisfy the substrate queue settings.

In this case, rather than generating an extra layout with the remaining copies, the nesting server only outputs the quantity that does fit on the optimal layouts.

For example, if 10 copies of a graphic are ordered but only 8 fit on a layout satisfying the minimum fill, the nesting server does not generate a layout with only the remaining 2 copies. These 2 will stay in the substrate queue.

Once new graphics are submitted to that queue, the nesting server will again try to generate a nested layout with those remaining 2 copies and the new incoming graphics.
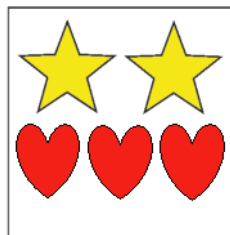


### When Time becomes More Important Than the Minimum Fill

As your customers expect their printed goods to be delivered by a certain date and time, sometimes you cannot wait for the minimum fill to be reached. In this case, you can either:

- manually force a layout to be generated from the remaining urgent graphics,
- enter a due date when submitting these graphics. The graphics will then be force-nested in time for that due date.

In both cases the nesting server generates a layout ignoring the minimum fill. However, it may also use other graphics from the queue in the layout to still raise the substrate's fill percentage.

## 2.2.1. Working with Substrate Queues

A substrate queue acts like a printer queue to which you can send files you want to nest and print on a particular substrate.

### Substrate Queues Based on Material Types

For each type of substrate material you have in your stock (and still plan to use), you should have a substrate queue.

For example:

In your stock you have 2 piles of PVC substrates, one with thickness 3 mm and one with thickness 5 mm. For these you should set up 2 substrate queues with for example these names:

- `PVC 3mm`

- `PVC 5mm`

### Substrate Queues Based on Nesting Settings

It can also be useful to define substrate queues based on how the graphics will be nested and printed.

- If you have an expensive substrate, you can set the nesting server to always nest the graphics so that the substrate waste is minimal.
- If your graphics need to be nested on a material that will be printed in offset, you could aim for less plates (so less layouts) and accept the higher waste factor.

So if some graphics need to be nested differently (even if it is on the same material), you might need to create a different substrate queue for each type of printing/processing.

For example:

In your stock you have a pile of 250 g/m cardboard both for business cards and door hanger orders.

Business cards and door hangers will be cut differently:

- business cards will be cut by a paper guillotine,
- door hangers will be cut on a cutting table.

The way graphics are cut influences the way they need to be nested. Since nesting settings are attached to a substrate queue, you need different substrate queues.

In this case you should set up 2 substrate queues:

- `Cardboard for Business Cards`

- `Cardboard for Door Hangers`

### Grouping Certain Graphics Together

Even when graphics are to be printed on the same substrate or using the same printer, you may still want control with which other graphics they are nested. Using **grouping keys** allows you to do this without the need to set up separate substrate queues for this.

When *submitting the graphics*, you can add grouping keys to help control which group of graphics can be considered to end up on the same layout. To the nesting server, these key words act like limitations in its freedom to decide nesting groups.

Even when submitting them to the same substrate queue, the nesting server will only nest graphics together that have the same value for a same grouping key.

Some examples:

- In your stock you have 1 pile of photo paper type "220 gsm". Depending on the order, some graphics printed on this paper need to be laminated, some don't. You can use a grouping key called "`Lamination`", with the values "`Yes`" or "`No`", to prevent laminated graphics being mixed with normal graphics.

  In this case you only need to set up 1 substrate queue, for both regular and laminated graphics.

- A similar case is when you do not want to mix graphics that need varnishing with graphics that don't.

- Some customers do not want to mix graphics from different customers. In that case they use the customer ID as grouping key.

**Note:** Find a step by step example of a workflow using grouping keys *here*.

## 2.2.2. Substrate Sizes

If you have a substrate material in several sizes (sheet or roll), you can add these sizes to the substrate queue for that material.

For example:

In your stock you have 3 piles of substrates:

- 1 pile of cardboard 2000x1000mm
- 1 pile of cardboard 750x1200mm
- 1 pile of polystyrene 750x1200mm

For this stock you should set up 2 substrate queues:

- **Cardboard** (with 2 substrate sizes)

- **Polystyrene** (with 1 substrate size)

## 2.2.3. Keeping Track of your Stock

### Keeping Track of Stock or Not

Per substrate size, you can decide to keep track of its stock. For sheets this is done in units and for rolls in length.

When you select this option for a substrate size, you first manually enter its current quantity. Then, every time the nesting server uses that size for a nested layout, it will be subtracted from the available quantity. In this workflow, Automation Engine will refuse to create a layout for a size that is out of stock.

When you choose to not have the Gang Run Printing mode keep track of your stock, the nesting server then always considers that substrate size 'available'.

Learn more about this setting in *Adding Sheet Sizes* or *Adding Roll Sizes*.

### Substrate Offcuts

The nesting server always tries to create layouts with as little waste as possible. However, an approaching due date might force you to produce a sheet or roll that has a significant empty area that could actually be re-used.

Such rectangular left-overs are often called "offcuts". When the substrate is not that cheap, many users store those offcuts in stock and manually add them as a smaller sheet or roll size of that substrate queue, together with their current quantity.

Learn more about offcuts in *this page about nesting settings*.

### Manual or Automatic way to Keep Track of Stock

- Manual means that a person checks your stock and manually types in those latest amounts directly in the Automation Engine Pilot, in the definition of each substrate size.

- Automatic means that a person checks your stock and manually types in those latest amounts in your stock management system, typically a part of your business system. This business system then updates Automation Engine by sending an XML that is picked up by the dedicated *Import Substrate Sizes from XML task*.

**Note:** Learn more about using XML in *Automating your Workflow Using XML* on page 42.

## 2.3. Getting Production Files out of your Nested Layouts (Output Workflow)
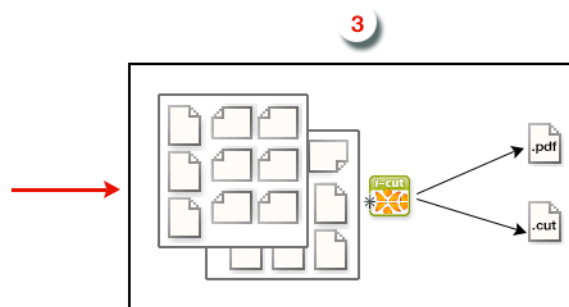


Every *substrate queue* is linked to an output workflow. You can build this workflow to your own needs, but it should at least contain the *Export Nested Layouts* task.

As soon as the nesting server has found one or more optimal nested layouts for your substrate queue, it delivers them to its output workflow, which is started automatically.

The output workflow then generates production files:

- A PDF file for the press, containing the nested layout including marks for printing and cutting, but without technical inks.
- A CUT file for the cutting table, containing the combined cut path of the nested graphics. You can choose from many different formats.
- (Optionally) a nesting report, in PDF format (which is useful for a cutting table operator) and/or in XML format (which is useful for a business system). Learn more in the *Export Nested Layouts task*.

# 3.  The Gang Run Printing View

The **Gang Run Printing** view is part of the category **Sign & Display**. It gives an overview of all graphics that have been submitted for nesting on each of the available substrate queues.
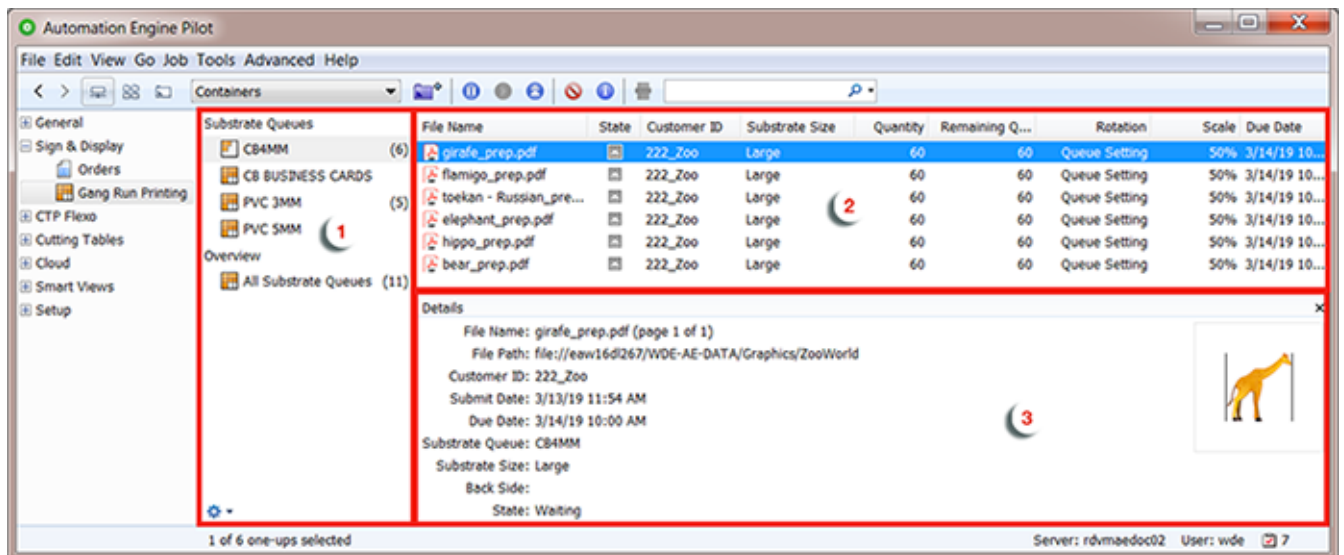


1.  Substrate queues.

     - Select one to see which one-ups are in this queue at the moment.

       **Note:**  One-ups can be graphics but can also be CAD files.

     - Or choose **All Substrate Queues** to see the contents of all of them. In the contents view ('2'), make sure you see the column **Substrate queue** so you can still see which queue these items are in. The column **Order ID** will show which ones belong to the same order. You could choose to sort by any of these columns.

     - Right-click **All Substrate Queues** to start creating queues. or click the settings-button at the bottom.

2.  One-Ups submitted for nesting on the selected substrate queue. Once they have been nested (and are no longer needed for other layouts), the output workflow starts for the layout they belong to and then they disappear from this list.

3.  Details of the selected one-up.

From this view, you can:

- *Create or change substrate queues* and their characteristics,

- have an overview of all one-ups *submitted* to each substrate queue, and their *state*,

- *change the parameters they were submitted with* or even *move them to another queue*.

- *control the printing flow* (for example you can put some graphics on hold, or force-print some of them).

## 3.1. Working with Substrate Queues

When *submitting graphics* (or CAD files) to be nested on a substrate, they become an entry in the corresponding *substrate queue*.

**Substrate Queues** are shown in the **Gang Run Printing** view. A number indicates how many entries have been submitted to that queue. For example: ⊞ Polystyrene ②.

The "nesting server" then calculates the best possible nested layout(s) for these entries, based on:

- the quantity that was ordered,
- the sheet sizes and nesting settings that you defined for that substrate queue.

When a substrate queue is busy calculating layouts, its icon becomes animated 🖿.

You can also **pause** a substrate. This stops its automatic calculations. The icon changes to 🖿. Learn more *here*.

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**Important:** We strongly recommend that you define your substrate queues before submitting graphics to them.

If you submit graphics to a substrate queue that is not defined yet in the list of **Substrate Queues** (by entering an unknown substrate in the *Submit to Gang Run* task), then this substrate queue will be created automatically in the **Substrate Queues** list, but it will miss crucial parameters (such as sheet sizes and a link to an output workflow).

In such a case, the nesting server is not able to calculate layouts for it and a warning sign on the substrate icon ⚠🖿 indicates that the substrate queue isn't properly configured. In this case, make sure to *add the missing parameters*.

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### 3.1.1. Adding a Sheet Substrate Queue

**1.** Click the action button ⚙ ▾ at the bottom of the **Substrate Queues** list and select **New Substrate Queue...**

You can also

- go to **File** > **New Substrate Queue...** or press **Ctrl + N** on Windows / **Cmd + N** on Mac.

- right-click any other queue and choose **New Substrate Queue...**.

**2.** In the **New Substrate Queue** dialog, select the icon for the type '**Sheet**' click **OK**.

> ⚠ **Attention:** In this page, we continue explaining how to set up a Sheet based substrate queue. Learn how to add a Roll based substrate queue in '*Adding a Roll Substrate Queue* on page 30'.

**3.** In the **New Substrate Queue** dialog, enter a **Name** for this substrate queue.

> **Note:** Substrate queue names (and also names of their sizes, see below) are often used in names of output files. That is why it is advised to avoid too special characters in these names.

4. **Material**: When you are using a Kongsberg table to cut the print results, this field serves to communicate the exact name of the material to the cutting table. It is then already part of the job specification on iPC. Mind that only the formats i-script and JDF (Kongsberg) will contain this name of the material and so allow the cutting table to select the right material settings.

   Click 🗉 to see a list with all materials that are currently configured on your Kongsberg tables (that you added as a *Device*). Select the one you want for this substrate queue and click **OK**.

   > **Note:** If you type in a name of a material that is not yet in that list, it will appear with that name in iPC. You can there choose to add it to the list in iPC.

   When you leave this field blank, the name of the substrate queue will be used instead.

   > **Note:** This field has no use when you do not use a Kongsberg table.

5. Click **Add** to add a **Sheet Size** for this queue. Learn more in *Adding Sheet Sizes* on page 19.

   > ⚠️ **Attention:** You need to define at least one sheet size per substrate queue, otherwise graphics sent to this substrate queue will not be nested and printed.

6. Click **Nesting Settings...** to define how this queue will create a nested layout. Learn more in *nesting settings*.

7. In **Output Workflow**, *select the output workflow* that will be launched on the nested layout(s).

   > ⚠️ **Attention:** You need to define an output workflow here, otherwise you won't get production files for the files you submitted to this substrate queue!

   > **Note:** An output workflow will be launched as soon as a nested layout is made that fits the queue's settings.

8. Click **OK** to save your substrate queue.

> **Note:** It is possible to save your substrate queue without having defined all the necessary settings (for example if you haven't linked a workflow to your substrate), but you will get a warning message and the substrate queue icon 🔶 will show a warning sign.
>
> If this is the case, you need to *edit your substrate queue* to define the missing settings. When you are done, you should see this default icon for a substrate queue: 🔶.

## Adding Sheet Sizes

For every sheet size you want to add:

1. Click **Add** (on Windows) or **+** (on Mac).
2. In the **Add Sheet Size** dialog, enter a **Name** for the sheet size.

**3.** In the **Size** parameters, enter the sheet's width and height.

The units used here are those you defined in the Pilot Preferences (in **Edit** > **Preferences** > **Units** on Windows or **Automation Engine** > **Preferences** > **Units** on Mac).

**4.** Enter the **Margins** to use.

The margins won't contain nested graphics, but can contain marks.

**5.** **Usage**: Select one of these extra selection criteria, next to size.

- **Preferred**:
  - Will be used whenever possible.
  - Typically for offcuts and scrap material that you want to be used first.
  - Other use case: You have a roll-fed printer and 2 widths of paper rolls. When you have the wide roll mounted, you may set that one as your preferred one. This avoids having to switch these rolls too often. And when you mount the other roll, you then set that one as your preferred one.

- **Standard**:
  - Default value
  - Only when the graphics can not be positioned on 'preferred' sheets.

- **Exceptionally**:
  - Typically for expensive sheets. You want good control over when this special material is used.
  - Only used when there are graphics that don't fit on the other substrate sizes.

  **Note:** One of the above will only be considered when the submit task had the **Substrate Size** on '**Any**'.

**6.** If you want, you can keep track of the stock you have of that sheet size.

To do this, select **Keep track of stock** and enter the number of sheets you currently have **Available in Stock**. Every time the nesting server uses that sheet size for a nested layout, it will be subtracted from the available quantity.

> ⚠️ **Attention:**
> - When **Keep track of stock** is selected and the stock reaches 0, the nesting server no longer create layouts that need that sheet size.
>
>   This can cause graphics to be stuck in the substrate queue (when this was the only sheet size defined for that substrate queue, or when you chose to nest the graphics *on that sheet size specifically*).
>
>   When you again get sheets available in that size, you should re-edit the available quantity.
>
>   As introduced in *Keeping Track of your Stock* on page 15, the stock of sheet (or roll) sizes can also be controlled from an external system. Learn more in *Import Substrate Sizes from XML* on page 50.
>
> - When **Keep track of stock** is not selected, no quantity is shown. The nesting server then also does not check this and will so always be willing to create a layout using this size.

**7.** Click **OK**.

The resulting list of sizes also show a column **Available in Stock**. When **Keep track of stock** was not selected for a size, no number will be shown.
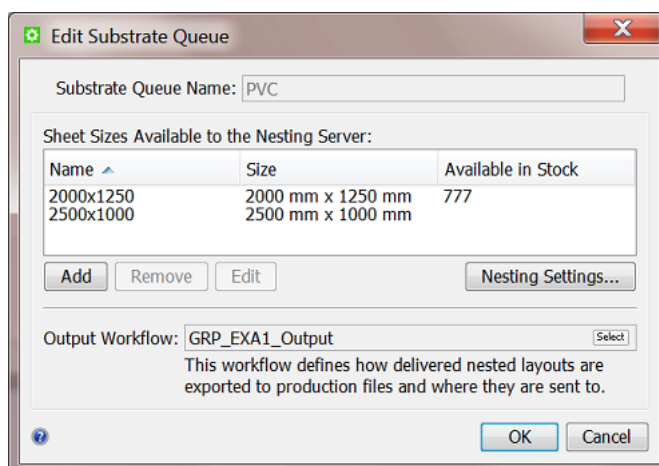


## Defining Nesting Settings for Sheets

### Minimum Fill Tab

- Enter a **Minimum Fill** if you only want to output the sheet when it's filled to a certain level. By default, the minimum fill is set to 75%.

  > ⚠️ **Attention:** Do not put 100% here as only the graphics inside the cut path count as fill. The margins, gutters etc. all count as waste.

**Note:** When nesting is based on an irregular shape, be aware that a minimum fill may need to be set quite low. Here is an example of a layout that looks rather full but still only has a fill rate of 38%:
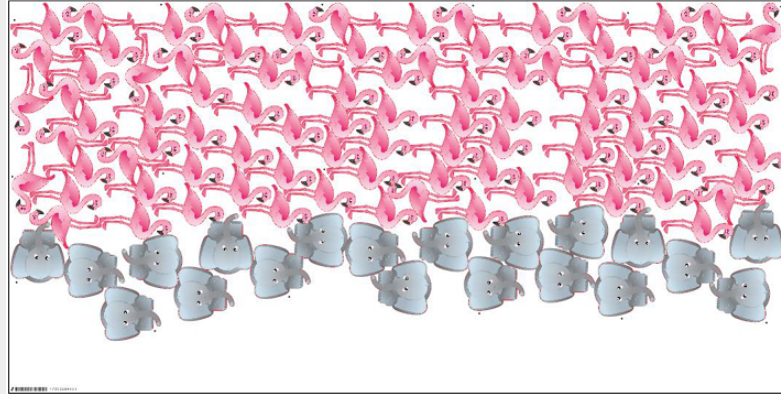


**Note:** Some users still prefer to put this % to a very high level because they deliberately want to avoid any nesting happening automatically. They prefer to use the tools in the *'Show Layouts' view* to have full manual control over their creation.

• **Overrule Minimum Fill**: Set the hours and minutes before the due date at which you no longer want to wait for the minimum fill, because the job-order becomes too urgent.

**Layout Tab**

• Select the **Nesting Type** to use for the layout:

   • **Minimal Waste** tries to reduce the waste in material to a minimum.

   • **Minimum Layouts** aims to generate as few layouts as possible, potentially at the cost of having some more waste.

   **Tip:** Having fewer layouts can reduce setup time, making this option interesting for offset printing.

   • **Guillotine Cut** generates layouts that can be cut on a guillotine cutting table (which can only cut in straight edge-to-edge movements).

   This usually reduces the number of cuts per layout but may increase the number of layouts and the waste.

   In the example below, the layout on the left can not be cut on a guillotine table. The one on the right can, but includes one graphics or copy less:
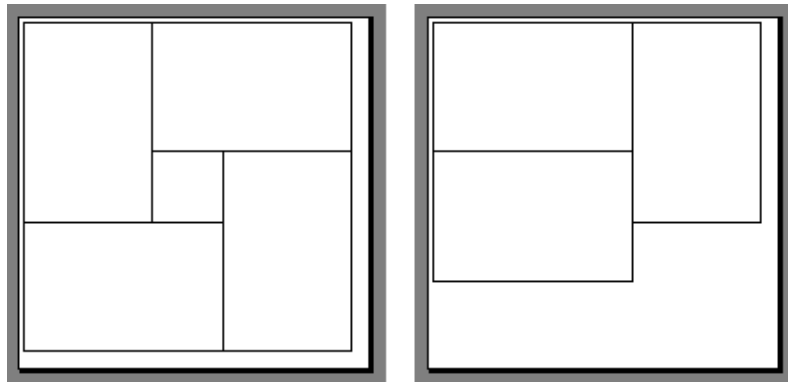
- Select the **Search Method** to use for calculating the layout.

  Depending on if you are running a test or processing graphics for production, you can set the layout search from **Very Fast** to **Slow (Very Accurate)** (the faster the search, the less accurate the result can be).

- **Graphics Order**: (disabled when choosing **Minimal Layouts**). Once the calculation for the chosen nesting type is done, the system needs to decide in which order the one-ups will be placed.

  - **Any**: The order of the one-up on the layout(s) is based on its size, taking the largest one first.
  - **By Submit Date**: This will nest the graphics in the order in which they are were submitted to the substrate queue.

    The position where the graphic is placed is decided by the nesting software. This means that the graphic will likely to be placed near the previously placed graphic (although there is no 100% guarantee). In case of guillotine nesting, which has a more strict notion of rows and columns, selecting this option will be more clearly reflected in the output rows and columns.

    **Note:** When graphics have different sizes, it can happen that no space is found for some graphic but that the next graphic can be placed. For example: A sequence of A, B, C, D, E, F comes in, producing a layout with A, B, D and a layout with C, E, F.

    **Note:** Before v18.1, this choice was called '**Respect the graphics order**'.

  - All other methods: **By Order ID**, **By Customer ID**, **By Custom Field 'x'**: The order of placing is, as mentioned above, based on the size, but you can here select a method that the system will use to group all graphics that have the same value for that selected method.

    **Note:** Custom fields that are used as a grouping key are not available here (grouping keys are used to sort graphics over different sheets).

    **Attention:** When, for example, you choose 'By Order ID', but these ID's are (almost) all different, then the system cannot really make any groups... The groups will then be groups of '1'. And then it will fall back on deciding the sequence by size (the default). Note that it will *not* check the order ID *values* to decide the sequence, it only uses the value to try to make these groups!

- Depending on the **Nesting Type** you selected, you can set extra options:

Table:

| When you selected... | ...you can set: |
|---|---|
| **Minimal Waste** or **Minimum Layouts** | • the **Fill Starting Point on Sheet** (where the first graphic will be placed): at the **Top Left**, **Top Right**, **Bottom Left** or **Bottom Right**,<br><br>• the **Primary Fill Direction** (in which direction the sheet will be filled): **Horizontal** or **Vertical**. |
| **Guillotine Cut** | the direction of the **First Cut**: **Horizontal**, **Vertical** or **Don't care**. |

• A **Gutter** is the distance between the cut-paths of 2 stations. If it is zero, then these stations have a common cut-line.

• If the graphics in your files have a bleed outside the cut path, you can clip it away by entering the bleed distance in **Bleed Clipping Mask**.

> **Note:** An example: When there is a gutter of 10 mm, then both stations better not have more than 5 mm bleed. To avoid that their bleeds overlap, set a mask to clip the bleed to 5 mm or less.

• **Maximum Overrun**: When choosing the **Nesting Type** '**Minimum Layouts**' or '**Guillotine Cut**', you can choose to allow the nesting server to print a few extra copies of some of the graphics, so that you have more printed sheets with the same layout.

Allowing some overrun increases the chance of getting the least amount of layouts. This reduces the amount of plates needed for offset printing, so reducing the amount of needed press setups.

  • If you want to do this, set a **Maximum Overrun**. For example set a **Maximum Overrun** of 10.0% if you don't mind printing up to 10% more of some of the graphics to have less layouts.

  • If you only want to print the exact ordered quantity of each graphic, and don't mind the number of layouts, keep the Maximum Overrun at 0.0%.

  • **An example**:

    You need to print 100 "BLUE" graphics and 10 "RED" graphics, on a sheet size that can fit 10 graphics.

    • If you don't allow overrun, you will have 2 layouts:

      • A layout with 9 "BLUE" and 1 "RED" graphics, to be printed 10 times (giving 90 "BLUE" and 10 "RED" graphics).
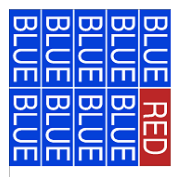
- A layout with 10 "BLUE" graphics, to be printed 1 time (for the remaining "BLUE" graphics).
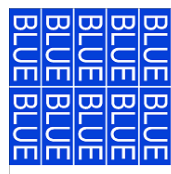


- If you allow a **Maximum Overrun** of `20.0%`, you will have only 1 layout, with 9 "BLUE" and 1 "RED" graphics, to be printed 12 times.

  This gives 108 "BLUE" graphics (8% more than ordered) and 12 "RED" graphics (20% more than ordered).
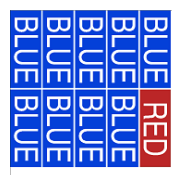


- In **Rotation**, specify if the nesting server is allowed to rotate the graphics in the layout to get a better fit. You can choose:

  - **Allow Any Angle**,

  - **Allow 180 degrees** (clockwise),

  - **Allow 90, 180 or 270 degrees** (clockwise),

  - **Not Allowed**.

**Offcuts Tab**

### Concept

- Offcuts are unused rectangular parts of a sheet that were cut off but that you still want use.

  Selecting '**Save offcuts**' in this tab outputs offcut areas as XML files. This can be **one XML file per layout PDFPLA file** that this task creates. The XML file describes one or multiple offcut areas.

  An example: The XML from this PDFPLA layout would describe 2 offcuts areas:
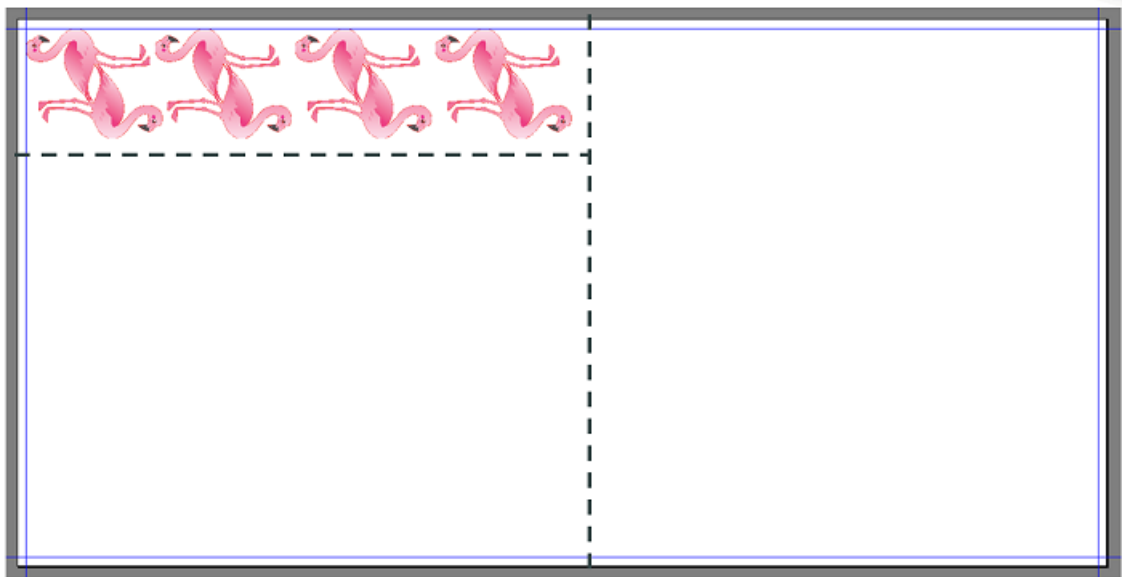
- When you use the task '*Import Substrate Sizes from XML*' on such an XML file, that offcut sheet size will appear in the list of **Sheet sizes** of that **Substrate Queue**. They so become available for the nesting server.

  An example: See how next to the manually defined sizes 'Large' and 'Small', there are also various sizes named after their custom size:
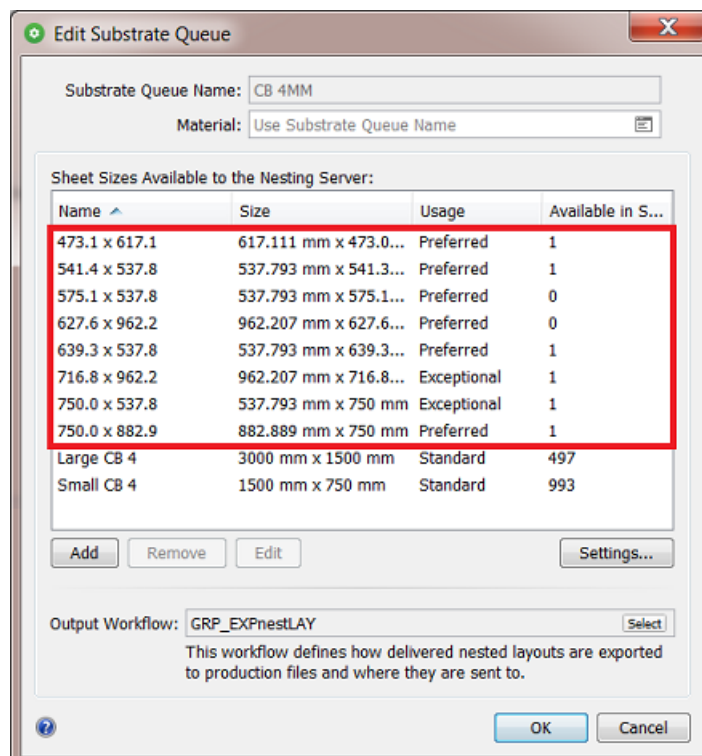


- We can distinguish different workflows in using offcuts:
  - **Automatic**: The system decides to use the offcut sheets as soon as they become available as a sheet size.

- **Manual**: You decide when it's time to start using (specific) offcuts.

Learn more below about these workflows.

- You can also work with offcuts that you already made in I-Cut Layout. Learn more below.

### Settings

- **Save offcuts**. Select this to have the system save offcut areas as an XML file. Mind that one XML file can describe multiple offcut areas.

See below description on what to do with these XML files (importing them automatically or manually).

  - **Minimum Width and Height**. Enter a value to limit offcuts to those that minimally have this size (in both directions). For example: '`500 mm`'

- **Restrict amount of offcut sizes**. Select this to restrict how many different sizes of offcuts you want.

  - **Extend Minimum Size with Steps**: An example: Enter '`100 mm`' to only save offcuts that are any step of 100 mm larger than the here above specified minimum size. This will then only create offcuts with size 500, 600, 700... etc.. This fixed set of possible sizes reduces the amount of offcut sheet sizes.
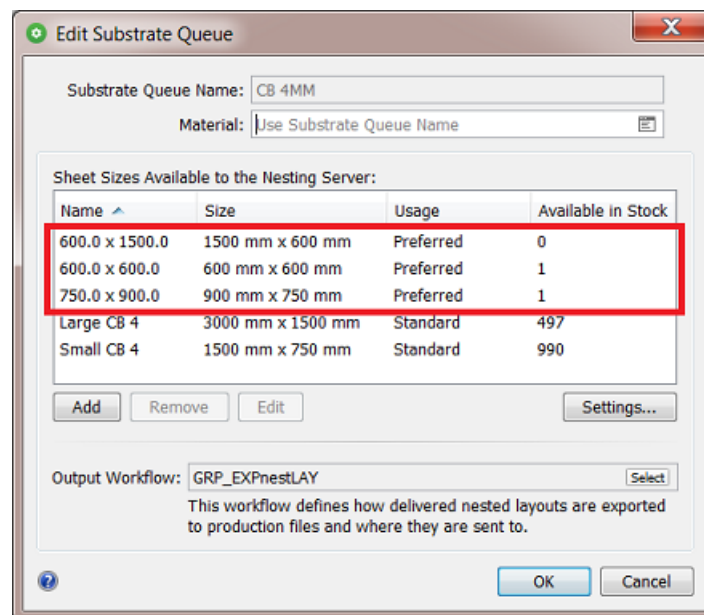


When this setting is not selected, the system will save any size of offcut sheet.

- **Safety Margin**: You can add an extra margin around the (bounding box of the) printed area. This will make the offcut smaller.

**Note:** The offcut size can also be reduced by any i-Cut marks that also take up some space on the sheet.

### Automatic or Manual workflow

The difference between the two is how and when you import those XML files into Automation Engine's database of sheet sizes:

- **Automatic workflow**

  To see the offcut sheet sizes automatically appear in your list of sheet sizes, add the task *Import Substrate Sizes from XML* to the output workflow of that substrate queue and make sure it imports the offcut XML files.

  An example:

  - In this output workflow, see how the task *Export Nested Layouts* also has a dedicated output pin for the XML files that describe offcuts:



> ⚠️ **Attention:** The output pin 'Offcuts' requires an 'Export Nested Layouts' ticket from AE v18.1.1 or later. To see the 'offcuts' pin on workflow tickets that you made sooner, just open and close that ticket to make this pin appear.

  - When this workflow sends those XML files to the *Import Substrate Sizes from XML* task, they will automatically appear in the list of sheet sizes of that queue. See an example above in the first picture that shows the 8 offcuts that were imported. Their parameters are defined in the ticket of the *Import Substrate Sizes from XML* task.

  > **Note:** Offcut (or other) sheet sizes that have 0 in stock are not removed automatically.

  These offcuts can be used by the system from the moment they appear. When you do not want that to happen, you could for example add a 'Wait' step before importing, or make a dedicated Substrate Queue for offcuts, or pause a queue and first check its contents etc. Or you can have full manual control, as we describe next.

- **Manual workflow**

  When you want full control over when and how the offcuts are used, then just manually use the *Import task* when you want, and on the XML files you want.

  For example: Each Friday afternoon, you want to produce using the offcuts of that week.

  An example:

  1. This time, the output workflow does *not* include the *Import Substrate Sizes from XML* task. We'll only import them Friday noon.

See how this example moves the offcut files to a separate folder: You could do this for example to make it easier to access or select them, or to avoid that they get imported somehow...

**2.** At the time you want to use the offcuts, go to their folder in the Files view in the Pilot.

When you didn't specify an output folder, these XML files are by default written in `\ExampleJobContainer\SnDTemp`.

Select the ones you want to import and launch this type of workflow that also moves or deletes the imported ones, this to avoid that you import them again.



> **Note:** Notice that you need to use the 'Mark File' tools because this Import task does not report any output files.

### About the Name of an Offcut XML file

Their name is decided by the field '**Output Name**' in the '*Export nested Layouts*' task. Learn more *here*.

The below table shows an example when using the *default set of SmartNames* in this field:

Table: Default (SmartName based) name of an Offcut XML file

| Part type | Part | Meaning | Example |
|-----------|------|---------|---------|
| SmartName | wfp.substrate | Name of the substrate queue | `CBstndrd 4mm` |
| SmartName | wfp.substrate.size | Name of the sheet size that was selected to produce | `Large 3000x1500` |
| SmartName | wfp.substrate.size.quantity | Amount of offcut sheets of this size output by this workflow task | `1` |
| SmartName | shortid | Short ID nr of the task that produced this offcut | `2712` |
| Fixed | OFFCUT_ | Automatically added to help identify the XML file | OFFCUT |

Resulting name: `CBstndrd 4mm_Large 3000x1500_1_2712_OFFCUT.xml`

> **Note:** One XML file can have the description of multiple offcut sheet sizes. This is why we can not add the size to name.

### Offcuts already made in i-cut Layout

When you already made one or more offcuts in the editor **i-cut Layout**, they will be saved in the resulting PDFPLA.

When, in Automation Engine, you launch the task Export Nested Layouts on that PDFPLA file, those offcuts will also be exported as an XML file.

### Linking a Workflow to Your Substrate Queue

Select the output **Workflow** to launch on the layouts that the nesting server created. This workflow minimally needs the *Export Nested Layouts* task.

This *output workflow* will be launched either:

- when the *minimum fill percentage* for that substrate queue is reached,

- in time for the submitted graphics's *due date* (if they have one),

- when you *force print* one or more graphics from the substrate queue.

> ⚠ **Attention:** You must link an output workflow to your substrate queue, otherwise you won't get production files for the graphics you submitted to that substrate queue!

## 3.1.2. Adding a Roll Substrate Queue

Adding a substrate queue for a roll is very similar to adding one for a sheet, as explained in *Adding a Sheet Substrate Queue* on page 18.

When you add a **New Substrate Queue**, you there select the icon for the type **Roll**.

We here list the other differences:

### Adding Roll Sizes

**Adding a Roll Size** is identical to *Adding Sheet Sizes* on page 19, with these differences:

1. The **Size** is the width of the web (across the roll).
2. You can define a **Min** and **Max** length (along the roll):

   > ⚠ **Attention:** Nesting on roll will:
   >
   > - generate a layout in case the layout exceeds the minimum length and reaches the minimum fill percentage. In case the due date has expired, a layout will be generated even if the minimum length is not reached.
   > - reject graphics that exceed the maximum length (these graphics can't fit on the substrate).
   > - always set the **Primary Fill Direction** or **First Cut** to the direction across the roll.

   > **Note:** In case the PDF file for printing needs a different orientation, use the rotation option in the **Export Nested Layouts** task.

3. **Usage**: A use case to have a type of roll as '**Preferred**' roll size, is that you prefer continue using this roll that was mounted already than going through a roll-change. So temporarily it is your preferred substrate.

4. **Stock**: With roll sizes, the stock is the amount of meters left on all your rolls of the same type of substrate. It is a 'global' stock for that roll. It is not the amount of rolls or the amount per roll.

### Defining Nesting Settings for Rolls

Roll **Nesting Settings** are identical to *Sheet nesting settings*, with these differences:

• The **Primary Fill Direction** is always vertical, across the roll.

• **Fill Starting Point on Roll**: choose the icon for **Top Right** or **Top Left**. The filling will always be across the roll.

• When the nesting type is **Guillotine cut**, there is no **First Cut** setting. It will then always be across the roll.

### Linking a Workflow to Your Substrate Queue

This is identical *as we explained for sheet type substrates queues*.

## 3.1.3. Editing a Substrate Queue

1. Double click the substrate queue that you want to edit.

> **Tip:** You can also go to **File** > **Open** or press **Ctrl + O** on Windows / **Cmd + O** on Mac, or click the action button ⚙ ▾ and select **Open**.

2. In the **Edit Substrate Queue** dialog, you cannot change the substrate queue **Name**, but you can edit all the other settings.

> **Note:** If you want to change the substrate queue name, we recommend you *duplicate the substrate* under your chosen name and then delete the original substrate queue.

3. You can add, modify or delete sheet or roll **Sizes**.

   • To add a sheet size, click **Add** (on Windows) or **+** (on Mac) and define the sheet or roll size settings (for *sheets* or for *rolls*).

   • To modify a size, select it, click **Edit** (on Windows) or ✏ (on Mac), and change the settings.

   • To delete a size, select it and click **Remove** (on Windows) or **-** (on Mac).

4. Click on **Nesting Settings...** to check or change *nesting settings* for this substrate queue.

5. Check or change the **Output Workflow** that this queue will launch on the nested layouts.

6. Click **OK** to save your changes or **Cancel** to revert.

**Note:** After changing the settings, the nesting server will automatically re-calculate nesting layouts for the graphics in that substrate queue, even if no new graphic was submitted.

### 3.1.4. Duplicating a Substrate Queue

1. Select the substrate queue that you want to duplicate, click the action button ⚙ ▾ and select **Duplicate...**.

   You can also

   • go to **File** > **Duplicate...** or press **Ctrl + D** on Windows / **Cmd + D** on Mac.
   • right-click any other queue and choose **Duplicate...**.

2. In the **Duplicate Substrate Queue** dialog, enter a **Name** for the new substrate queue.

3. The queue settings are the same as the old substrate queue's, but you can modify them if necessary.

   See:

   • *Adding Sheet Sizes* on page 19 or *Adding Roll Sizes* on page 30.
   • *Defining Nesting Settings for Sheets* on page 21 or *Defining Nesting Settings for Rolls* on page 31.
   • *Linking a Workflow to Your Substrate Queue* on page 30.

4. Click **OK** to save your new substrate queue.

### 3.1.5. Deleting a Substrate Queue

1. Select the substrate queue that you want to delete and press the **delete** key.

   **Tip:** You can also go to **File** > **Delete** or click the action button ⚙ ▾ and select **Delete**.

2. In the dialog that pops up, click **Delete** to confirm that you want to delete that substrate queue.

   **Note:** When you confirm to delete, also a queue that still has graphic entries will be deleted.

### 3.1.6. Pausing and Resuming a Substrate Queue

• Right click the name of a substrate queue and choose **Pause Substrate Queue** to stop the queue from calculating layouts. Any already running calculations will still continue until finished.

  The icon will change to 🖫.

• Right click the name of a paused substrate queue and choose **Resume Substrate Queue** to reactivate the automatic calculations. This action itself is also a trigger to recalculate.

The icon will change back to .

## 3.2. Working with Substrate Queue Entries

### 3.2.1. Overview of Substrate Queue Entries

#### List of Entries per Substrate Queue

The name of each **substrate queue** is followed by a number that indicates how many entries its has (graphics or CAD). For example:  Polystyrene  2 .

Select the substrate queue to see a list of its entries on the right, including some printing information. Select an entry to see a bottom pane showing some **Details**.

**Tip:** When this list is long, use the filter in the menu bar to easily find back entries. You can filter on **File Name**, **File Path**, **Customer ID** and **Substrate Size**.

#### Printing Information

For each entry, you will see this information, defined by the settings that were chosen when *submitting* the entry to that queue:

- the **File Name** of the entry and the page to be printed,
- the **File Path**,
- the **Customer ID**,
- the **Submit Date**,
- the **Due Date**,
- the **Substrate Queue**. This can be important when viewing **All Substrate Queues**.
- the **Substrate Size** it should be printed on (if this was defined when submitting the entry),
- the **Quantity** ordered,
- the **Remaining Quantity** to be printed (if some copies of the entry have already been included in a nested layout, this is what remains in the queue). When this number drops to '0', this entry is removed from this queue.
- the **State** of the entry in this substrate queue (learn more on states of entries below),
- the date it was submitted (**Submit Date**),
- the **Rotation**,
- (if used) **Custom labels**. These may have been used as grouping key or just serve a labels (here and in the report PDF). Learn more about their use in *the page about the 'extra' tab of the 'Submit' task*.

If you want to find a specific entry in this overview, you can filter the list using the search field , or sort the entries by clicking the column header. The sorting order has no influence on the output.

> **Tip:** You can also show / hide or reorganise columns by going to **View** > **Select columns in 'Gang Run Printing'…**
>
> For example, you can also show columns with your *labels and grouping keys* and use that to sort entries.

### States of Queue Entries

| | |
|---|---|
| ⌃ | The entry is **waiting** to be placed on a layout. |
| | When the nesting server calculates possible layouts, it will try to include all of the entries in this state in the most efficient layout(s) possible. |
| | A typical reason when an entry has this state for a long time is that the minimum fill percentage is not reached. |
| ⊟ | The entry is **on hold**. |
| | Entries in this state will not be included in the layout calculations. |
| ⌃ | Someone requested this entry to be **forced out**. This forces it to output regardless of the fill percentage of the layout(s) that it is placed on. |
| | It is still in this queue because not all related layouts were exported yet. |
| ☒ | The entry checked and **rejected** by the nesting server. It can not placed on a layout. The **Details** pane below explains why: |
| | • Because it is **too big**. It could be that: |
| |     • The entry is too big for any available size of that substrate. In this case, consider either *defining a bigger sheet size* (if you have some available), or choosing a different substrate in **Edit** mode or when *re-submitting* this entry to the queue. |
| |     • The entry is too big for the substrate size that you chose when submitting it to the queue. In this case, choose a bigger size, or set the entry to be nested on **Any** size of your substrate. Do this in **Edit** mode or when submitting it to the queue. |
| |     • The entry is too big to fit within the rotation possibilities of this substrate queue. In this case, change the *rotation parameter* to **Allow any angle** (when in **Edit** mode) or change it in the *Submit to Gang Run task* (which can overrule the setting of the substrate queue). |
| |     If none of these solutions help, you need to ***tile*** your entry before submitting it to the substrate queue. |
| | • Because the file (or its backside) **can not be found**. |
| | • Because the **cut path is not closed**. The system fails to create a closed outline based on the selected cut path. |
| | • Because the system **failed to set cut path** using the selected ink name. |

• Because the number in stock of the requested substrate size is insufficient.

## 3.2.2. Managing Substrate Queue Entries

By default, entries in a substrate queue will **automatically** be sent to the output workflow

• either when they were placed on a layout with the *desired minimum fill*

• or when their due date has come (or the *time that was set before their date*).

You can however also manage these entries **manually**. Right-click them or use the menu bar to chose a function:

• Select one or more and click the **Hold** button ⏸. An entry that is on hold will not be considered in the calculation of layouts, even when its due date has passed. In the column '**State'**, the icon changes to: ⊟.

> **Note:** Alternatively, you can choose to put the whole queue on hold. This will stop the queue from calculating new layouts, even when new entries come in.

> **Note:** You will notice that if you delete or put a queue entry on hold that was already placed on a layout, that this triggers a re-calculation of the layouts (unless the queue was put on hold). You can see this more visual when you work with *the Layouts Gallery*.

• To release entries that are on hold, select them and click the **Release** button ▶. In the column 'State', their icon changes back to the (default) icon ▱ ('waiting').

• **Force out**: This forces the creation of one or multiple layouts containing that entry regardless of the fill percentage of the layout(s). Select one or multiple entries and click the **Force out** button ⬆.

> ⚠ **Attention:** To get a better substrate usage, some other entries that you didn't select may be printed along with the entries you forced out. In this case, you will see that either these entries (also) disappear from the list, or that their **Remaining Quantity** is reduced.

Entries that are on hold will not be included. If you want to force out an entry that is on hold, you need to release it first.

> **Tip:** When, even after a while, still nothing happens with the entries that you forced out, check if the substrate size that was requested for those entries:
>
> • (still) exists
> • still has stock left (learn more in *Keeping Track of your Stock* on page 15).

• **Show Layouts**: This opens the layouts gallery and shows the layouts that this entry was placed on. Learn more in *Viewing and Choosing Nested Layouts* on page 37.

• To remove entries from the queue, select them and click the **Delete** button 🚫. You will be asked to confirm.

> **Note:** This will not delete the file of that entry. It only removes it from that substrate queue.

**Note:** You will notice that if you delete or put a queue entry on hold that was already placed on a layout, that this triggers a re-calculation of the layouts (unless the queue was put on hold). You can see this more visual when you work with *the Layouts Gallery*.

- **Edit**: This allows to make changes to how this entry was submitted. Alternatively you could remove the entry and use the tasks to re-submit it with the different settings.

  Select one or multiple entries and choose **Edit**.

  **Important:** Currently, you can only edit multiple entries when they are in a same substrate queue.

  You can adapt these settings:

  - **Quantity**: Type in the new (absolute) value.

    **Attention:** The entry will immediately disappear from the queue when the new quantity is
    - less than the remaining quantity
    - 0
    - a negative number rounded off to '0' .

  - **Substrate Size**

  - **Scale**

  - **Rotation**

  - **Due Date**

  - **Custom fields**

  **Note:** When you selected multiple entries before clicking 'Edit', some of their settings may have different values. When that is the case, the value field will be greyed out and mention '**Mixed**'. You can overrule this by simply typing in or selecting a new value which will then be used for all entries in your selection.

  **Note:** When a user clicked **Edit**, the queue is automatically locked:

  When you click **OK** to confirm the changes, the queue becomes actives again and:

  - All layout proposals that contain the selected one-up(s) are removed from the list of layout proposals.
  - A new nesting calculation is triggered on the substrate queues to which the affected one-ups belonged.

  **Note:** The substrate queue will be locked while one of its entries is in this 'Edit' mode.

  **Note:** The changes that you here make to the quantity will also be updated in the **Orders** view.

> **Note:** You can't edit an entry when another user is already 'editing' it. A message will appear. It will also mention the name of the user that is blocking the access.

- **Move to**: This allows to move one or multiple entries to another substrate queue.

  Right-click the entries (of a same substrate queue), select '**Move to...**' and choose the new **Substrate Queue** and **Size**.

  > **Note:** The substrate queue will be locked while one of its entries is in this 'Move To' mode.

  > **Note:** You can't move an entry when another user has already opened that dialog. A message will appear. It will also mention the name of the user that is blocking the access.

- **Go to File**: This opens the **Files** view and selects the file for that queue entry. This can be useful to launch some task on it or to check related files.

- **Info** (or click ⓘ): This opens the XMP (metadata) dialog of the file for that queue entry. This can be useful to check its dimensions or inks.

## 3.3. Viewing and Choosing Nested Layouts

### 3.3.1. Concept

#### Concept

Nested layouts that do not have the required minimum fill will not be output automatically. Still, you can open a gallery view to see these **layouts that are considered to be not good enough** yet. And you can even select them to print anyway.

There are 2 main use cases:

- When you want to check the nesting process of a specific substrate queue in detail, you want to see the gallery of all layouts that that queue calculated for all its entries.
- When you wonder why a specific entry is still waiting in a substrate queue, you want to see the gallery of only the layouts that this queue entry is part of.

#### Manual Control over Layouts

Some customers prefer to always check the layouts visually and then manually decide when which ones are good enough to print. To avoid that any automatic nesting takes place, they typically put the minimum required fill percentage very high (for example 95%).

### 3.3.2. Working with the Layouts Gallery

#### Opening the Layouts Gallery

- Right-click a substrate **queue** and choose "**Show Layouts**" (or use `Alt-Cmd-Down`) to see the layouts that were calculated of all entries in that queue (that have the status 'waiting').

- Right-click an **entry** in a substrate queue and choose "**Show Layouts**" (or use `Alt-Cmd-Down`) to see only the layouts that contain that entry.
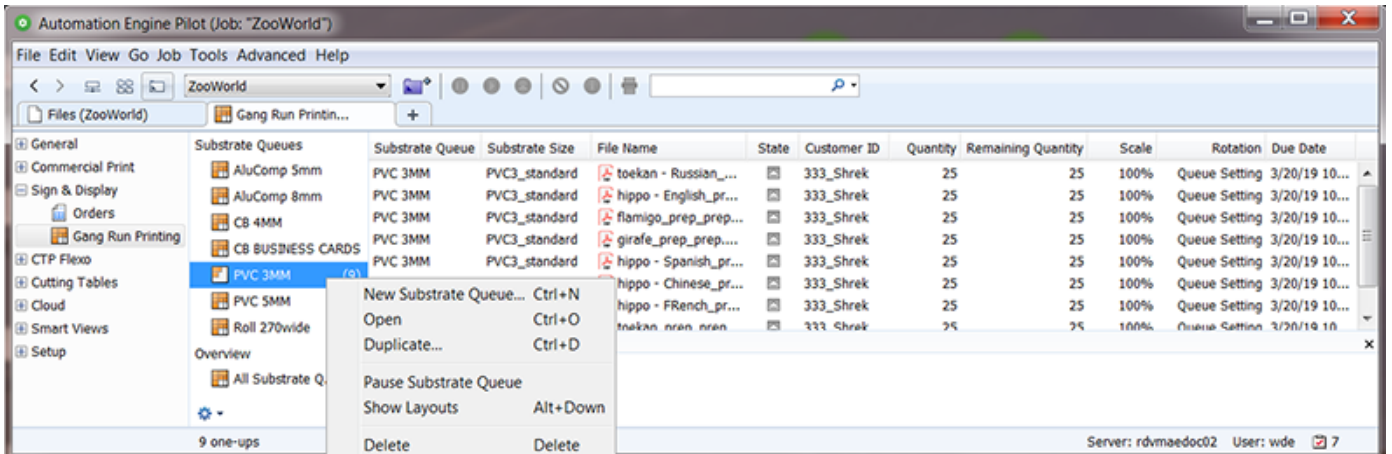


### The Layouts Gallery

This gallery automatically refreshes when any changes occur. These changes can be caused by:

- one or more new entries in a queue
- one or more queue entries were put on 'hold'
- one or more queue entries were deleted
- the queue was resumed after being paused
- the settings of the queue were changed.

See this example, the numbers are explained below:
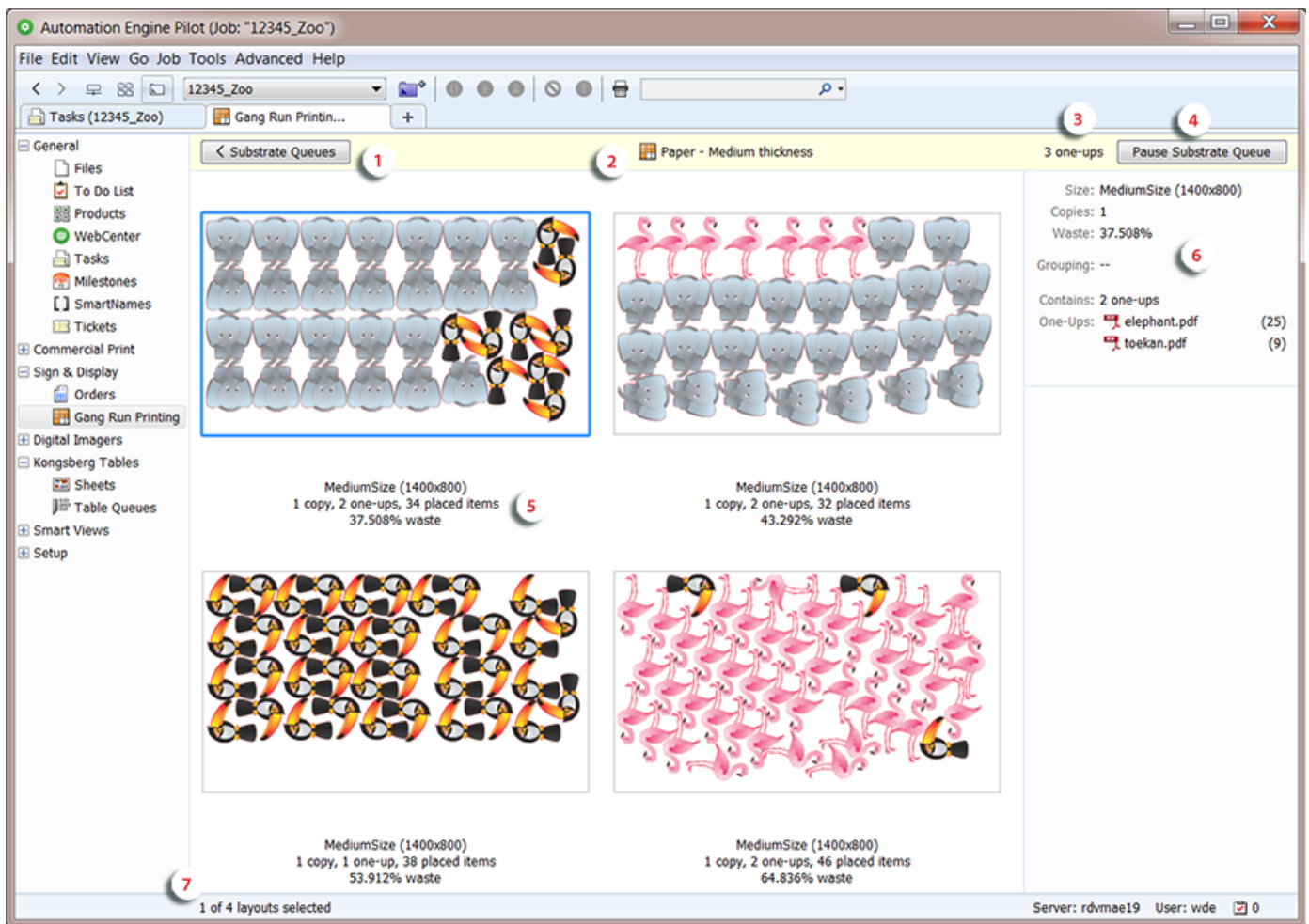
1. Click '**< Substrate Queues**' (or use `ALT/Cmd-Up`) to return the list of queues and their entries.
2. Name of the substrate queue.

> **Tip:** Just like in the list of substrate queues, the icon adapts to the queue's state (active / paused / animated when calculating).

Double click the queue name to open the dialog with the queue's settings.

> **Attention:** When you make any changes to a queue's settings, a layout calculation will be done right after you close this dialog.

3. The amount of **one-ups** of which the layouts are currently shown.
4. Click '**Pause Substrate Queue**' to prevent it from calculating (new or different) layouts. When paused, click '**Resume**' to resume the calculations (one will be done instantly).
5. Below each preview, three lines describe the layout:

- Top line: The name of the **Sheet** or **Roll Size** used for this layout (the *name as defined in the substrate queue*).

- Middle line:
  - **copies**: How many times this layout needs to be printed to produce the required quantities.

  - **one-ups**: How many different files (graphics or CAD) are present on this layout.

    **Note:** CAD files (ARD) are visualized with a random selected color.

  - **placed items**: The total amount of placed items on this layout.

- Bottom line: The percentage of **waste** on this layout.

  **Note:** Any possible *offcuts* are visualised in the display by a thin light red line.
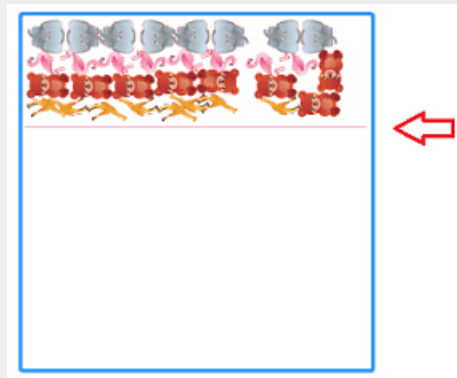
  

  Offcuts are also visualised in this way when opening the PDFPLA file in the Viewer or I-cut Layout.

6. The right pane shows details of the selected layout.
   - **Substrate Queue**, **Substrate Size**, **Copies**, **Waste**: See above.

   - **Due Date**

   - **Grouping**: These are the values of the parameters that were involved in grouping these one-ups onto a same layout. For example the grouping keys used in the *Submit to Gang Run* task.

   - **Contains**: How many different one-ups are present on this layout.

   - **One-Ups**: The file name and the amount of times it is placed on the selected layout.

> ⚠️ **Attention:** When you asked to see the layouts of only a selection of items in the substrate queue, the names of these files will here be highlighted. For example:

> One-Ups: 🅟 elephant.pdf      (25)
> 🅟 flamigo.pdf      (7)

When you select a name of a one-up, the bottom pane shows more details. For example:

- **Quantity**: Total amount of copies of this one-up that was ordered to be printed (output).

- **Remaining Quantity**: Amount of copies of this one-up still to be printed.

- **Placed Quantity**: Amount of copies of this one-up placed on this layout.

- **Resulting Quantity**: Amount of copies of this one-up still to be printed once this layout is printed (how many then still need to be produced).

**7.** How many layouts are shown (and how many are currently selected).

### 3.3.3. Printing a Layout from the Gallery

Although the layouts in this gallery do not meet the required fill percentage, you can still choose to print them.

To do this, select one or multiple layouts and click 🖶 in the menu bar. Alternatively, right-click them and choose **Print**.

This will remove those layouts from the gallery and start *the output workflow* assigned to this substrate queue.

> ⚠️ **Attention:** The layouts that were not selected will not be printed, even when they contain the same one-ups.

> **Note:** Requesting to **Print** a layout will fail when this queue is calculating at that moment.

Choosing to print one or more layouts changes the content of the layouts gallery. This is why the substrate queue then also automatically recalculates a new set of layouts.

# 4. Automating your Workflow Using XML

The use of XML enables many ways to integrate Automation Engine's Gang Run Printing mode with an external system, typically the system that manages orders, production details and stock.

This bidirectional communication via XML results in a high form of automation.

We can distinguish a basic and an advanced level of such integration:

- **Basic use of XML in Gang Run Printing**



Schema: *Using XML in GRP (basic use)*
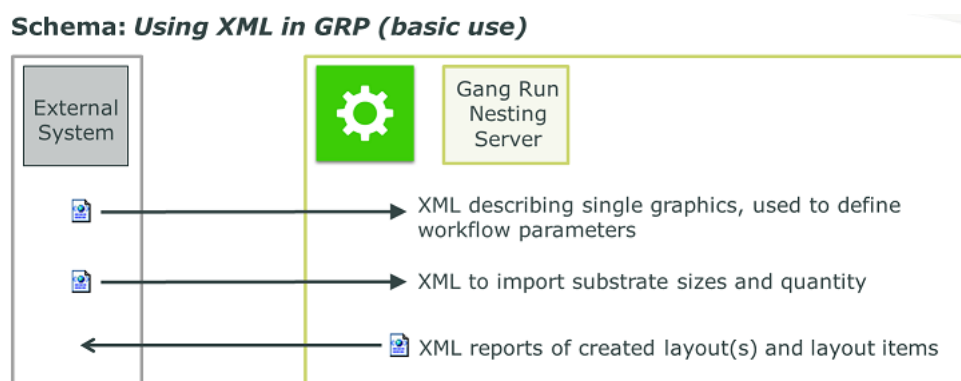
- An XML file describing a job is sent to Automation Engine (typically a Folder Access Point). The XML informs the workflow of the name of the graphic file (only one per XML) and also what to do with it (substrate, quantity, etc.). This is illustrated in detail in the example *Basic XML driven workflow* on page 126.

  **Note:** These XML files can be very simple and serve a workflow where you mostly get orders for copies of one graphic at a time. See the below 'advanced' section to read about more complex XML files that ask the nesting server to calculate layouts for a list of files.

- A dedicated task uses an XML file to update the list of the available substrate sizes and also of their current quantity in stock. Learn more in *Import Substrate Sizes from XML* on page 50.

- The task that exports the nested layouts into print and cut files also writes report files. You can choose to have them in XML form, so that an external system can use them for production status (how many were already nested?) or for post-production cost-calculation (material usage/waste). Learn more in *Export Nested Layouts* on page 85.

- **Using XML for Advanced Communication with the Nesting Server**

  The dedicated *Submit XML to Gang Run* task enables these advanced forms of XML based communication:

  - The business system sends XML files that represent 'nesting requests', possibly of complex orders. They can be about different graphics, each with their own quantity, substrate, etc. By doing this, the business system can ask the nesting server possible

layouts for estimation purpose only. It then uses the return data for its own cost calculation and maybe production preparation.

- After the layouts have been exported, the feedback XML to the business system describes the whole order and includes references to the actual production files.

Here 's a schema about this workflow:
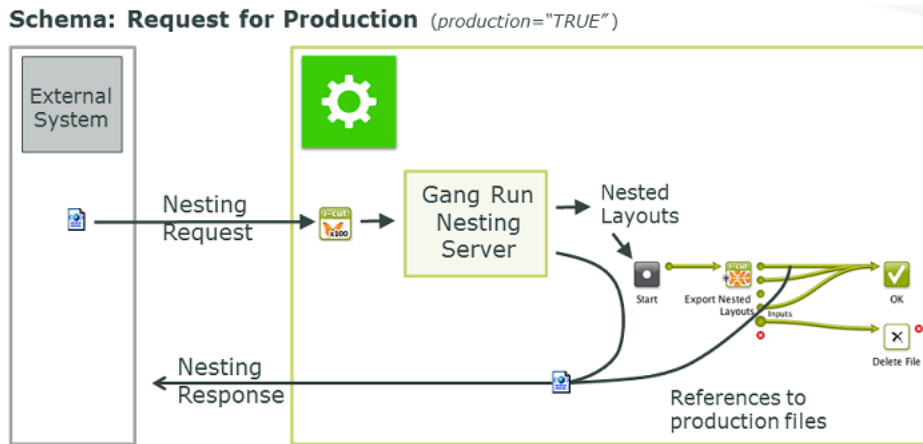


The XML files that the business system sends must match a *detailed specification*.

Learn more in *Submit XML to Gang Run* on page 74.

# 5. The Gang Run Printing Tasks

> **Note:** In a standalone setup of **Device Manager**, several of these tasks are not available.

## 5.1. Prepare Graphics for Nesting

Use this task to *prepare* individual graphics for Gang Run Printing. You can create a cut path, extend the graphics and add SmartMarks.

This task supports these input file types:

- PDF (single page or multipage),
- Normalized PDF (single page or multipage).
- TIFF (CMYK or grayscale),
- JPEG (CMYK or grayscale. Progressive JPEG compression is not supported.),
- PSD (CMYK or grayscale),

Typically, you use this task before a *Submit to Gang Run* task in an *input workflow*. The input workflow prepares the graphics and submits them to a *substrate queue* on the nesting server (see *Working with Gang Run Printing* on page 9 for an overview of the whole Gang Run Printing process).

### 5.1.1. Create Cut Path From

In **Create Cut Path from**, define what to use as a cut path, and how to generate one.

| If you want to... | do the following... |
|---|---|
| use an **Ink** as cut path | **1.** Select **Ink**.<br><br>**Note:** Only objects with a 100% fill or stroke of this ink are taken into account to make the cut paths.<br><br>**2.** Enter the name of the ink to use in the field below. |

| If you want to... | do the following... |
|---|---|
| | **Tip:**<br>• If the ink to be used for the cut path has different names in different input files (for example if you have customers using names in different languages like `cut`, `découpe`, `taglio`...), you can add several ink names, separated by a comma ( , ).<br>Their order is important because the task will use the first ink it finds in the list as cut path!<br>• You can use wildcards and/or SmartNames to define ink names. For example use `Pantone*` if you want to use any Pantone ink used in the file as a cut path.<br><br>**Tip:**<br>When building a workflow using an example file, click 🗒 to select one or more of the inks from the example file.<br>If you always receive CMYK graphics with one spot color used for the cut path, select **ANY SPOTCOLOR**.<br><br>**3.** Define what to do if the ink(s) you defined are **not found** in the file:<br>• If you want to use the trim box as cut path instead, select **Create cut path from trim box**.<br>• If you want the task to end in error, select **Generate an error**. |
| use the **Trim Box** as cut path | Select **Trim Box**. |
| use the cut path defined in an external ARD, PDF or Normalized PDF **File** | Select **File** and **Browse** to that file (or use SmartNames to define the path to the file). |
| create a cut path from the contour of the graphic on its **White Background** | Select **White Background**.<br><br>**Note:** This will include both the contour of the design on the white background and the contours of any "white holes" in the design in the cut path. You can then remove the "white holes" contours using the *Remove holes* option. |

## Optimize Cut Path

This **Optimize...** dialog offers ways to optimize the shape of your cut path.

**Important:** Especially when you created the cut path with the *From White Background* method, you typically need to optimize the automatically generated cut path contours to facilitate and speed up the cutting process.

You can:

- **Remove holes** in your cut path.

  Select this if the cut path was extracted from a white background and your graphic contains white. This option makes sure that the white parts in your graphic are not considered part of the background (which would create holes in your graphic).

- Smooth small jagged edges in your cut path.

  Select **Smooth cut path** and enter the desired minimum distance. Any point that deviates from the cut path by less than that distance will be smoothed.

- Remove small objects from your cut path.

  Select **Remove small contours** and enter the minimum contour size. Any objects smaller than this will be removed from the cut path.

- Move the cut path inwards or outwards.

  Select **Offset cut path** and enter a positive offset value (to move it outwards) or a negative one (to move it inwards).

- Make **Round corners**.

  Both inside and outside corners will get rounded with the defined **Radius**.

  This is especially advised to shorten the production time on a cutting table. Also when the cut path serves to help peel off self-adhesive labels from a matrix.

  **Note:** A corner needs to be formed by one same line. This option does not work when the corner is formed out of two different lines.

## 5.1.2. Cut Path's Ink Name

In **Cut Path's Ink Name**, enter the ink name to use for the cut path you just defined.

- If you defined the cut path based on an ink in your file, this will rename that ink to the name you enter here.

  **Note:** Only objects with a 100% fill or stroke of this ink are taken into account to make the cut paths.

  **Tip:** Use this to standardize cut path ink names across files (especially when your files come from different customers).

- If you defined the cut path from the file's trim box, white background, or an external file, this will add the cut path in that ink in your graphic file.

Later in the *input workflow*, the cut path ink name you enter here will be used to identify the cut path in the *Submit to Gang Run* task.

## 5.1.3. Extend Graphics

If you want to extend the graphics, choose one of these modes:

### Create Bleed

If the graphic contains no bleed, you can add some here. Select **Create Bleed** and choose from these **Options**:

• the **Bleed Distance** (the distance outside the cut path).

• the **Bleed Type**. You can choose between:

  • Choose **Clone** to take the part of the graphic just inside the cut path and clone it to the outside of the cut path.



  • **Clone From**: choose the distance on the inside of the cut path from which data will be cloned. This is useful in cases where graphic elements are very close to the cut but are not required to bleed out. This can avoid unwanted effects. An example:



  This option works on cut paths with any shape (free form or rectangular).

  **Note:** When an RGB image is cloned, the cloned bleed will contain CMYK information. The image data within the cut path remains unchanged.

  • Choose **Mirror** to take part of the graphic (as much as the bleed distance) and mirror it to the outside of the cut path. This option is only useful on rectangular cut paths.
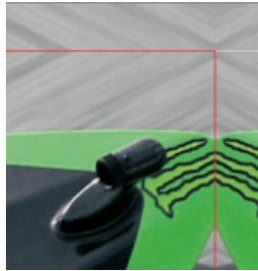
The visual effect is less distracting and is advised with large bleeds or when the bleed remains visible (as in below example of a photo canvas).

### Extend Content

This mode mirrors the graphic content over the 4 sides and corners of the original cut path, and extends the cut path. This can be used to create a hem for a flag, banner or canvas.
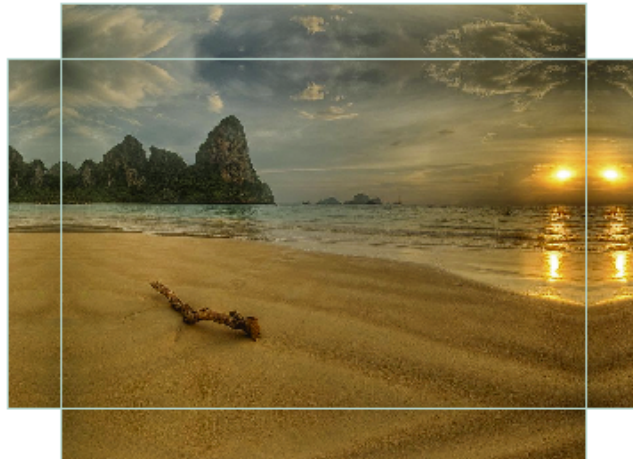


In the **Options**,

- Set the **Hem Size**, defining how much the cut path needs to be extended.
- Define the shape for the **Corner**: square, round, bevel or cut-out. Use **Edit...** to control the shape with a SmartName. Learn more about using SmartNames for buttons in *SmartNames of Parameter Values*.
- For round and beveled corner shapes you can supply a **Bevel Distance**.
- In **Limit Bleed**, you can add bleed on the extended cut path. As the hems are created by mirroring the graphics, the bleed will also make use of those mirrored graphics.

### Use backside graphic

In this case the graphic is extended with content taken from the backside graphic. This is useful when producing banners that have a printed front and back.
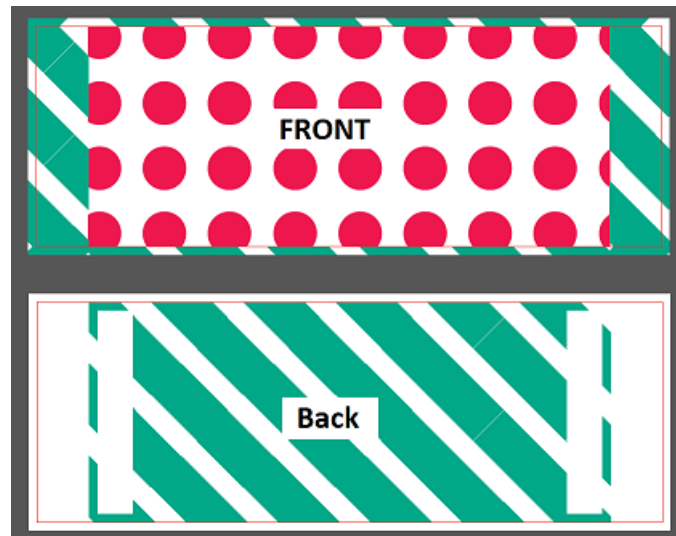
Its **Options** are identical as mentioned above in **Extend Content**, except for these that are specific for this method:

- **Backside Graphic**:

- **Even Pages**: Select this when the backside of the graphic is the even page of the multipage PDF that was selected as input file for this task.

- **File**: Select this to indicate a separate PDF that will serve as backside graphic in the production process.

- **Glue area**: This area will knock out the graphics on the back side, so creating a non-printed area where glue will be applied.

An example result:



### Use solid color

In this case the graphic is extended with a solid color. This might be useful when the graphic also ends in a solid color (on all 4 sides).

Its **Options** are identical as mentioned above in **Extend Content**, except for this one that is specific for this method:

- **Solid Color**: Type in the values of **C**, **M**, **Y** and **K** that will define the solid color.

## 5.1.4. SmartMarks

You can add **SmartMarks** to the resulting graphics (a SmartMarks set that you created in an Esko editor **i-cut Layout** or **PackEdge**).

For example, you can add a **Text on Cut Path** mark to automatically add the name of the graphics file and other info on the cut path, for example in the bleed zone. This information is then visible on the cutting table and so helps organize your printed graphics after cutting. An example:
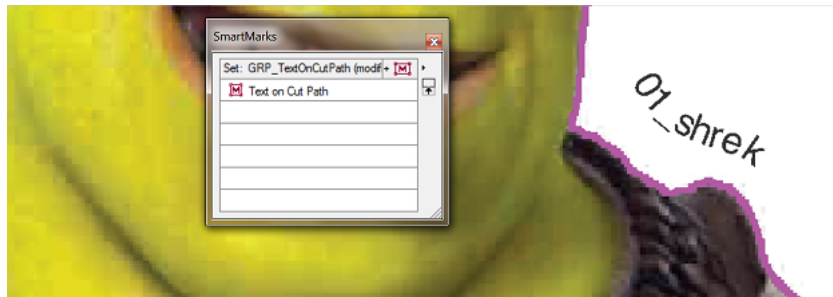
**Note:**

Before you can do this, you need to:

1. Make sure your i-cut Layout or PackEdge application is connected to your Automation Engine server.
2. Create and save a SmartMarks set in i-cut Layout or PackEdge (this automatically saves it to the correct location on your Automation Engine server: `\\AEservername \bg_data_marks_v010\dat`).

See the *i-cut Layout* or *PackEdge manual* to learn more about connecting to an Automation Engine server and creating a SmartMarks set.

## 5.2.  Import Substrate Sizes from XML

### Concept

This task allows to use an XML file to

- import (and create) substrate sizes into the Gang Run Printing database
- update substrate size information (for example the available quantity).

This XML file typically comes from a business system: the MIS or ERP that also manages the stock of printing material. Such an XML file is very useful for example to regularly import a list of left-over stock entries (a.k.a. "offcuts").

### Usage

The task panel serves to map the language in the XML to the required terms in Automation Engine for these substrate parameters. The result will be visible in the list of substrate queues or in the details of their substrate sizes.
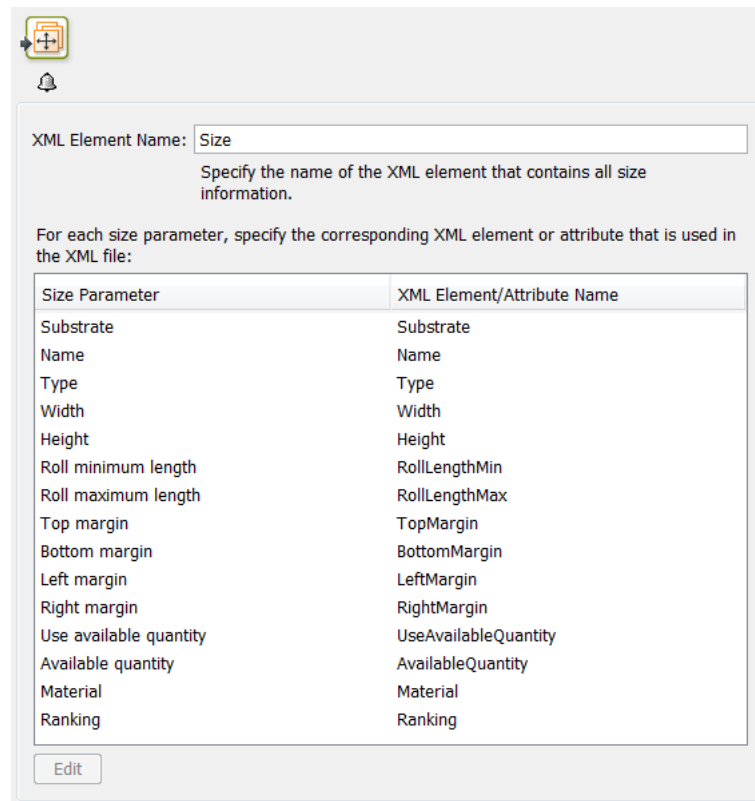
**XML Element Name**: You first need to specify the name of the XML element that contains the substrate size information.

Then, for each **Size Parameter**, select and click **Edit** to specify the corresponding **XML Element or Attribute** that is used in the XML file.

The **Size Parameter** 'Name' is the name of the substrate size and the **Size Parameter** 'Substrate' is the name of the substrate queue that that size will be added to (or be updated when already there).

**Important:** Substrate queues mentioned in the XML file that do not exist yet in Automation Engine are automatically created using the default nesting settings. Note that you will still need to complete their settings by adding an output workflow.

**Important:** All sizes are assuming the units as defined in the Pilot's *Preferences*.

These examples illustrate the XML specifications:

### Example XML to Import Sheet Substrate Sizes

In this example, as shown in above screen shot, the **XML Element Name** is 'Size' and there are 2 such elements. Their XML attributes are also those that the default task ticket proposes. The 2 substrates described in this XML file are sheets. That is defined by their attribute **Type** 'P' (for 'Plano').

```xml
<?xml version="1.0"?>
<ForEsko>
  <Size>
      <Substrate>AluComp 5mm</Substrate>
      <Name>Medium</Name>
      <Type>P</Type>
      <Height>1000</Height>
      <Width>1500</Width>
      <TopMargin>5</TopMargin>
      <BottomMargin>5</BottomMargin>
      <LeftMargin>5</LeftMargin>
      <RightMargin>5</RightMargin>
      <Ranking>5</Ranking>
  </Size>
  <Size>
      <Substrate>AluComp 8mm</Substrate>
      <Name>Large</Name>
      <Type>P</Type>
      <Height>1250</Height>
      <Width>2000</Width>
      <TopMargin>5</TopMargin>
      <BottomMargin>5</BottomMargin>
      <LeftMargin>5</LeftMargin>
      <RightMargin>5</RightMargin>
      <Ranking>9</Ranking>
  </Size>
</ForEsko>
```

**Note:**  The parameters for margins are not mandatory. When they are not present the substrate size will fall back on the default settings (0).

**Note:**  The element 'Ranking' defines the sheet size '**Usage**': possible values are '1' for 'Preferred', '5' for 'Standard' (=default), '9' for Exceptional.

### Example XML to Import Roll Substrate Sizes

To *define a roll size*, the XML file needs XML attributes that the ticket then maps to

- **Type**, which for a roll is 'R'

- **Width**

- **Roll Minimum Length** and **Roll Maximum Length**.

An example (the default ticket will map these to the right **Size Parameters**):

```xml
<?xml version="1.0"?>
<ForEsko>
  <Size>
      <Substrate>MyStandardRoll</Substrate>
      <Name>RollNarrow</Name>
      <Type>R</Type>
      <Width>390</Width>
      <RollLengthMin>720</RollLengthMin>
      <RollLengthMax>900</RollLengthMax>
      <TopMargin>5</TopMargin>
      <BottomMargin>5</BottomMargin>
      <LeftMargin>5</LeftMargin>
      <RightMargin>5</RightMargin>
      <Ranking>5</Ranking>
  </Size>
</ForEsko>
```

### Method and Example XML to Update the Available Quantities of Substrate Sizes

**Note:** For sheets, the quantity is the number of sheets. For rolls the quantity is the amount of units (as defined in *Preferences*).

In the task ticket,

• the **Size Parameter** "**Available quantity**" allows to define a stock quantity of a substrate size.

• the **Size Parameter** "**Use available quantity**" allows to define whether the quantity of that size should be tracked (counted) when nesting layouts use that substrate size.

See an example (same syntax for sheet or roll):

```xml
<?xml version="1.0"?>
<ForEsko>
  <Size>
      <Substrate>MyStandardRoll</Substrate>
      <Name>RollNarrow</Name>
      <Type>R</Type>
      <Width>390</Width>
      <RollLengthMin>720</RollLengthMin>
      <RollLengthMax>900</RollLengthMax>
      <AvailableQuantity>5550</AvailableQuantity>
      <UseAvailableQuantity>1</UseAvailableQuantity>
      <TopMargin>5</TopMargin>
      <BottomMargin>5</BottomMargin>
      <LeftMargin>5</LeftMargin>
      <RightMargin>5</RightMargin>
  </Size>
</ForEsko>
```

The above example created or updated this **Roll Size** in this **Substrate Queue**:
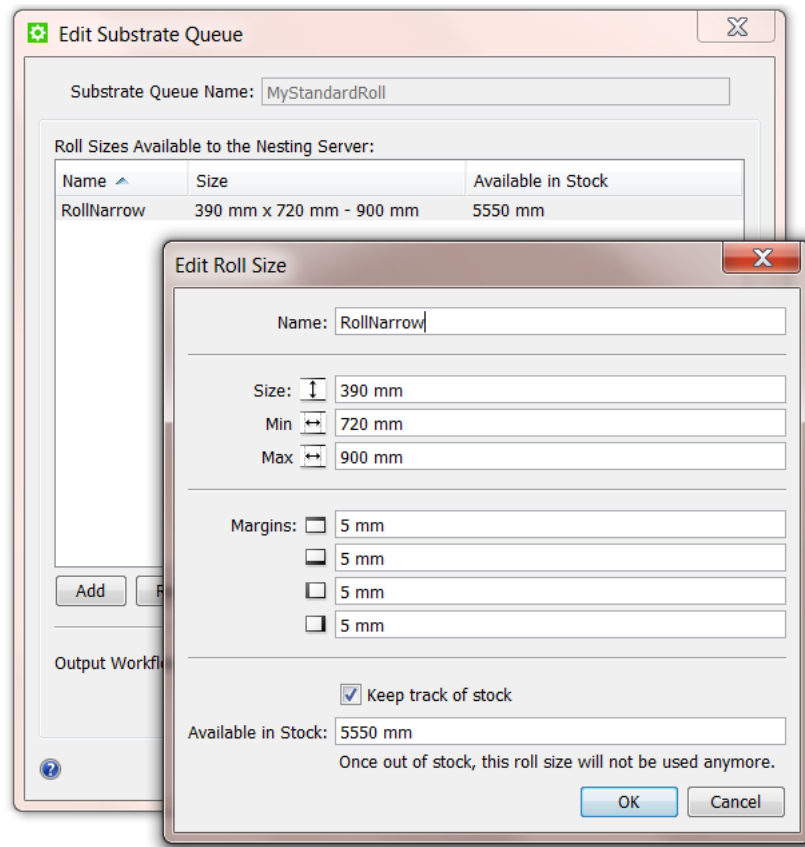
For the **Size Parameter** "**Use available quantity**" (in this XML described as **<UseAvailableQuantity>**), you can set these values:

- 0 : this disables **Keep track of stock**.
- 1 : this enables **Keep track of stock** (used in above XML example).
- 2 : this deletes the substrate size (for example because all left-over pieces have been used in production).
- 3 : same as value 2.
- 4 : this disables **Keep track of stock** and removes the substrate size if the quantity defined in the XML <=0.
- 5: this enables **Keep track of stock** and removes the substrate size if the quantity defined in the XML <=0.

**Note:** When using the values 4 or 5, the MIS (business system) only needs to pass 1 parameter to manage the stock: the one that maps to **Available quantity**. And when that quantity is <= 0, Automation Engine will also remove that substrate size. That way, there is no need for the MIS to explicitly mention the value 2.

So depending on the logic the MIS applies,

- it can either use the value 0 or 1 and at a certain time also use 2 if it wants to remove a substrate size. Automation Engine then does not remove the substrate size unless it is explicitly told so (by that value 2).
- or the MIS can focus on the value of the available quantity and in its XML consistently use the value 4 or 5. When that available quantity reaches <=0, Automation Engine then automatically also removes the substrate size.

**Important Note when you used this task before v 14.1**

In Automation Engine v 14.0 this task was named "Import Sheet Sizes from XML". In v 14.1, dedicated support for roll sizes was added and this task was renamed to "**Import Substrate Sizes from XML**".

Also, since v 14.1, the default ticket for the task **Import Substrate Sizes from XML** was adapted: `SheetSize` was renamed to `Size`, `Sheet Name` was renamed to `Name`, `SheetHeight` was renamed to `Height` and `SheetWidth` was renamed to `Width`.

This means that if you used the default ticket in v 14.0, that the default ticket in v 14.1 will generate an error.

To correct this situation, choose one of the following approaches:

- adapt the XML files to make sure they use the new names (advised).
- copy the default ticket to a new ticket, adapt the names to the old names and use this new ticket.

## 5.3. Create Tiles

Use this task to tile oversize graphics, used for example for billboards, into smaller graphics to be printed. You can select the size and number of the tiles, and allow for an overlap if necessary.

You can send these graphic file formats to this task:

- PDF (single or multipage),
- Normalized PDF (single or multipage),
- TIFF (CMYK or grayscale), 8-bit TIFF also supported.
- JPEG (CMYK or grayscale. RGB JPEGs result in CMYK PDF. Progressive JPEG compression is not supported),
- PSD (CMYK or grayscale).

**Note:**

- For each image file or single page PDF, the task outputs a multipage PDF in which each page contains a tile.
- For multipage PDFs, the task outputs a multipage PDF (in which each page contains a tile) for each page of the input multipage PDF.

**1.** In **Method**, choose how to determine the number and size of the tiles:

- If the tile size is the most important (if for example you can only print a certain size),

  choose **Use Fixed Tile Size** and enter the horizontal ↔ and vertical ↕ **Tile Size**.

  **Note:** The last tiles might be smaller (depending on the tile size and the size of the original file).

  Select **Allow Rotation** if you don't mind having the graphic rotated by 90 degrees in case this fits better and generates less tiles.

- If the number of tiles is more important to you than their size, choose **Use Grid** and

  enter the **Number of Tiles** you want horizontally ▭ and vertically ▯.

- If you don't know the exact number or size of the tiles you want, but you can only print up to a certain size, choose **Automatic Tiling** and enter the **Maximum Tile Size** horizontally ↔ and vertically ↕.

  The number and size of the tiles are calculated to have the least waste and the least tiles possible, within that maximum size.

  All tiles will have the same size, except when adding an **overlap** (see below).

  Select **Allow Rotation** if you don't mind having the graphic rotated by 90 degrees in case this fits better and generates less tiles.

- If you have a tiling template that you have created in **i-cut Layout** and want to use here, choose **Use Template** and select your template in the **Template** list.

  > **Note:**
  >
  > To do this, you need to:
  >
  > 1. Make sure your i-cut Layout application is connected to your Automation Engine server.
  > 2. Create and save the template in i-cut Layout (this automatically saves it to the correct location on your Automation Engine server: `\\AEservername \bg_data_custom_v010\dat\tiling`).
  >
  > See the i-cut Layout manual for more information about connecting to an Automation Engine server and creating a tiling template.

  With a tiling template:

  - you can see exactly how your graphic will be tiled when creating the template in i-cut Layout (if you create the template from the same/a similar graphic that you will use in Automation Engine),
  - you make sure you have consistent tiling in i-cut Layout and Automation Engine (for example if you use i-cut Layout for some graphics orders and Automation Engine for others).

    > ⚠ **Attention:** If you want to add overlaps to your tiles when using a template, you need to already add them in the template in i-cut Layout. You cannot add overlaps to tiles created from a template in this **Create Tiles** task.

  If you enable **Fit graphics to grid**, your graphic will be scaled to match the grid size, both vertically and horizontally. This can result in non-proportional scaling!

2. Open **Tiling Sequence...** to define the sequence of the tiles (not available when you use a template).

   a) In **Tile Start Position**, select where you want the first overlap to be: on the top left ⬚, top right ⬚, bottom left ⬚ or bottom right ⬚ tile.

      > **Note:**
      >
      > You can use SmartNames for most options of this dialog. For button options like **Tile Start Position**, **Direction** and **Pattern**, you can set a SmartName by clicking 🔲, and edit it by clicking **Edit...**

**Tip:**

To know what the SmartName should resolve to to get a certain value for a parameter, do the following:

1. Right-click the parameter value and select **Copy Parameter Value**.

   - For a parameter with a field to edit (like **Overlap**), enter the desired value in the field then right-click in that field.

   - For a parameter with buttons (like **Tile Start Position**), right-click the button of your choice.

2. Paste this in a text editor.

   For example, the SmartName to get a top left ⬚ **Tile Start Position** should resolve to `tl`.

b) In **Direction**, select whether the overlaps should run horizontally → or vertically ↓.

Depending on the **Tile Start Position** you chose, horizontal overlaps can run from left to right → or from right to left ←, and vertical overlaps can run from top to bottom ↓ or from bottom to top ↑.

c) In **Pattern**, choose whether you want the overlaps to run snake-wise ↵ or in zig-zag Ƶ.

The exact snake-wise or zig-zag pattern depends on what **Tile Start Position** and **Direction** you selected.

For example, when starting on the top left tile ⬚ and running horizontally → with a snake-wise pattern ↵, you will get something like this:

We advise that you run a test to determine exactly what pattern works best for your graphic.

> **Note:** When using overlaps, the direction is often decided by physical laws like the direction of rain and wind.

> **Note:** When using a vertical snake direction, the tiles in the uneven columns will be rotated 180 degrees. This is done to optimize color consistency between rows when printing on large printers. You can see this rotation in their page in the output multipage PDF and also in the tiling report. See this illustration where 2 columns of tiles will be created with a 180 degree rotation:
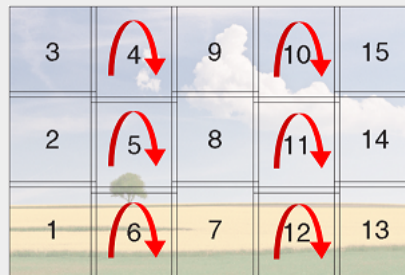


3. Define what to use as **Cut Path**.

> **Note:** Whereas the *Prepare Graphics for Nesting* task allows you to generate a cut path if the graphic doesn't contain one, the **Create Tiles** task needs the cut path to be already available, either as an ink or by using the trim box as cut path.

> **Note:** The task actually checks this information first because it is the cut path that decides the size of the input graphic that should be tiled. This overall size then influences the required number of tiles (unless you set a fix number).

| If you want to... | do the following... |
|---|---|
| use an ink as cut path | 1. Enter it in the **Cut Path** field. |

| If you want to... | do the following... |
|---|---|
| | **Tip:**<br><br>• If the ink used for the cut path has different names in different input files (for example if you have customers from different countries using names like `cut`, `découpe`, `taglio`...), you can add several ink names, separated by a comma ( , ).<br><br>  The order you use is important as the task will use the first ink it finds in the list as cut path!<br><br>• You can use wildcards and/or use SmartNames to define ink names. For example use `Pantone*` if you want to use any Pantone ink used in the file as a cut path.<br><br>**Tip:**<br><br>When building a workflow using an example file, click 🖹 to select one or more of the inks from the example file.<br><br>If you always receive CMYK graphics with one spot color used for the cut path, select **Any SpotColor**.<br><br>**2.** Define what to do if the ink(s) you defined are not present in the file:<br><br>• If you want to use the trim box as cut path instead, select **Create cut path from trim box if no ink is found**.<br><br>• If you don't want to use the trim box but want the task to end in error, leave **Create cut path from trim box if no ink is found** deselected. |
| use the trim box as cut path | Leave the **Cut Path** field empty.<br><br>If you always want to use the trim box as cut path (usually for rectangular graphics like business cards), you don't need to select **Create cut path from trim box if no ink is found** (as this option is only applicable when you want an ink as cut path as your first choice). |

The task will tile the graphic that is inside the cut path. The tiles created will have a cut path in the same ink as the input graphic's cut path (if the cut path is created from the trim box, this will be the `Cut` ink.

**4.** Graphics for large banners or billboards are often not supplied in the size at which they will be printed. In that case, you can **Scale** the tiles here.

For example, enter `1000%` if your input graphic is only 10% of the size you will need it to be.

**5.** If the input file (the non-tiled full graphic) has a bleed, the resulting tiles will show that bleed on their outside sides (except those surrounded by other tiles). You can limit that bleed on the tiles by setting a maximum bleed in **Bleed Clipping Mask**.

See this example of a full graphic with a bleed. The trim box is shown in red. This graphic will be tiled in 4 tiles:



Here is the below left tile:
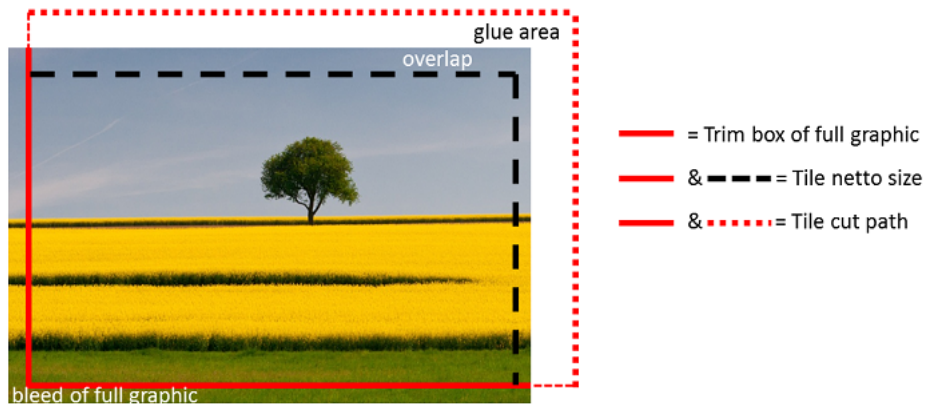


In this example the bleed of the full graphic is similar to tile's overlap. But sometimes this bleed can be too large for a tile. That is why you can reduce that original bleed by setting a **Bleed Clipping Mask** on tile level.

**Note:** In i-cut Layout, in the **Tiling** dialog, this same function is named **Tile Bleed**.

**6.** If you want, you can add **SmartMarks** to the tiles. SmartMarks sets can be created in i-cut Layout or PackEdge. We advise to create them in i-cut Layout because it offers extra SmartMarks fields that are specific for tiling.

You can for example add SmartMarks containing glueing instructions in the overlap zones. *Below page* illustrates a typical example.

**7.** If you want to include overlaps (we mentioned a few types when introducing *Tiling* on page 6), select **Add Overlap** and click **Options...**

a) Enter the **Overlap Distance**.

b) You can choose to add an **Overlap on both sides** of each tile (using the overlap distance on both sides).

In this case, you can not add a glue area.

c) If you want, also add a **Glue Area**.

This is an extra area that is not printed:



d) Click **OK**.

> ⚠ **Attention:** Adding overlaps and glue areas increases the size of a tile (except if it is the last one on the grid). If you selected the tiling method **Use Fixed Tile Size** or **Automatic Tiling**, you should take these extra distances into account.

**8.** If you want a report detailing how the graphic was tiled, select **Create tiling report** and click the **Options...** button to define some options like the report **Size** and the used **Units**.

See (part of) an example of a report in below described example.

## 5.3.1. Example of SmartMarks for Tiles

### Concept

This page shows how to add specific tiling related information into the glue or overlap areas of a tile. A typical example is to put the number of the neighbouring tile in this area. This helps those who apply the tiles.

See this (first page of a) tiling report where we added red squares to help you recognize the SmartMarks we added:
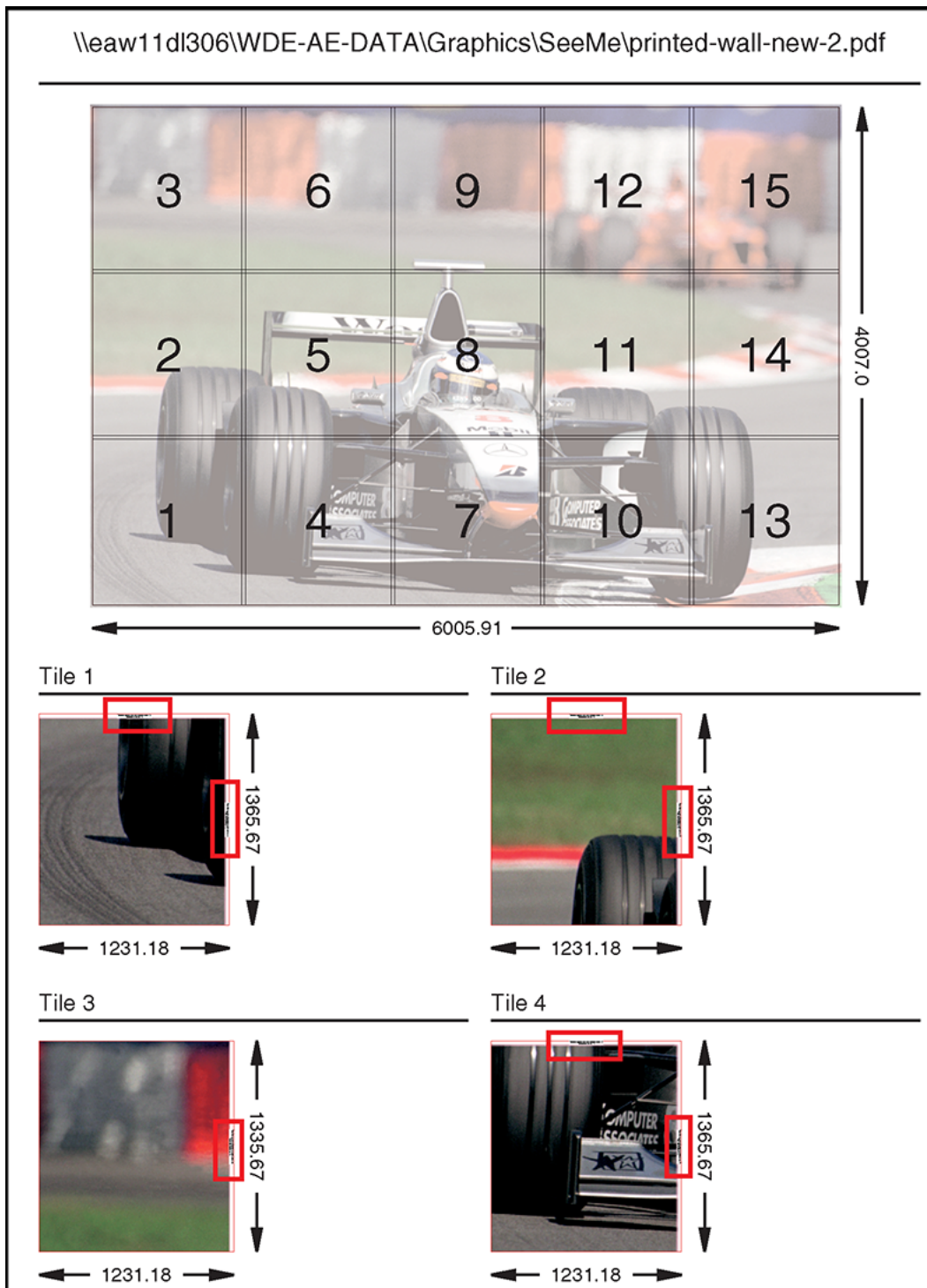
Notice that tile nr. 3 only has these marks in its glue area on the right. This is because the SmartMarks know that this tile has no glue area on any other side.

The next image zooms in on this mark (a view from I-cut Layout or PackEdge), both in contour and preview mode. Its shows an overlap of 10 mm and a glue area of 20 mm. Notice that the text appears mainly in the glue area, but also partially in the overlap. And to make sure it can always be read, a white rectangle is placed behind the text area:
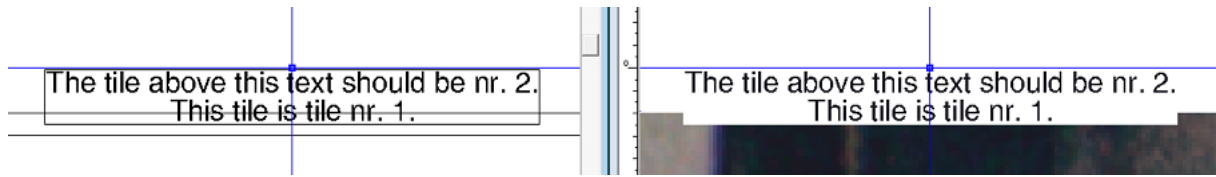
### How to Create this SmartMark Set

> **Note:** In below instructions, we assume you have basic knowledge of both i-cut Layout and SmartMarks.

Follow below steps to create a set of SmartMarks as shown above.

1. You can use any of your files that may need tiling. Choose one and write down its size (V-H).
2. In i-cut Layout, create a **New** layout. Set the height and width to that of the file you choose to use. In our example we will create a layout of `4000 mm` by `6000 mm`. The name or place is not important. Click **OK**.
3. In **Graphics** mode, click on  to **Add a Graphic**. Select the file you chose in step1 and click **OK**.
4. In the list of **Graphics**, double click the thumbnail of the graphic.
5. While in **Graphic View** (  ), choose **Tools** > **Tiling**.
6. In the **Create Tiling Grid** dialog, specify a number of tiles: set 3 vertical and 3 horizontal and click **OK**.
7. In the **Tiling** dialog, select **Include Overlaps** and click on **Set Up Overlaps...**. Set an **Overlap** of `10 mm`, deselect **Overlap on both sides** and set a glue area of `20 mm`. Set a **Tile Bleed** of `3 mm` (though we will not use this in the SmartMark). Keep the dialog open.
8. Select a tile that is surrounded by other tiles on all 4 sides. The **Tiling** dialog shows the settings for this tile:
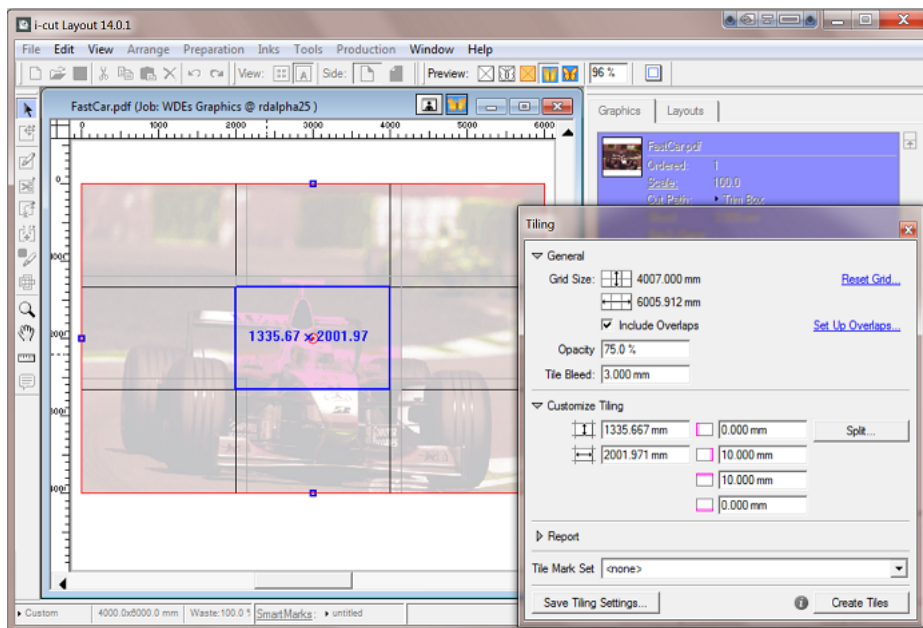
The SmartMark set that we will make needs to add marks on every overlap that the tile has, no matter what tile it is, so no matter of that tile has overlaps on one or two or more sides. To do this, we need to simulate a tile that has an overlap on all 4 sides.

9.  Select the central tile (tile 5). In the **Tiling** dialog, make sure all 4 sides have an overlap. Based on above example, you therefore need to manually add a `10 mm` overlap to also the left and bottom side:
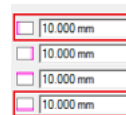


We can now use this tile 5 to create our SmartMark set.

10. In the **Tiling** dialog, click on **Create Tiles**. The 9 tiles are created and added to the list of **Graphics**.

11. In the list of **Graphics**, scroll down to tile 5 and double click its thumbnail to open it . Then go to **Production** >  **SmartMarks**. See how the  **SmartMarks** dialog already shows many **named objects**, including 4 **Overlap** and 4 **Glue** objects.
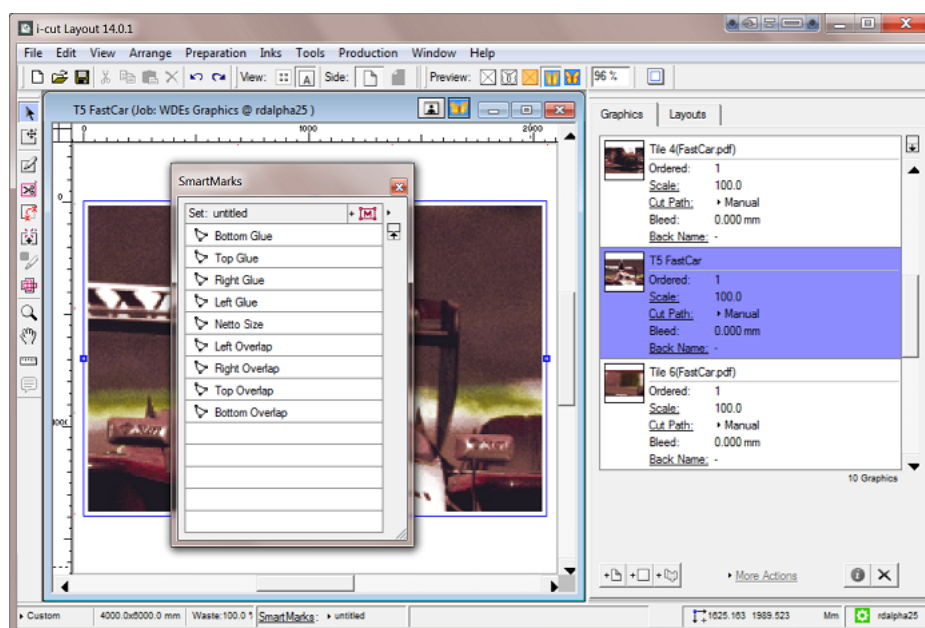


12. We now start adding the marks. We start with the one on the right side, though the order is not important. In the **SmartMarks** dialog, select the named object **Right Overlap**, then click on  and choose to add a **Text Mark**.

> **Note:**  In this example, we will position the text inside the overlap area. You can also put it in the glue area, but often users avoid any printing the glue area.

13. In the **Text Mark** dialog,

- As **Text**: keep **Automatic Size** selected and add the text as shown below. To insert the smart text fields, click on **Smart Text**, scroll down to the category **i-cut layout**, choose

**tiling** and in **Options**, choose to insert (in two times) `[Right Tile]` and `[Current Tile number]`.
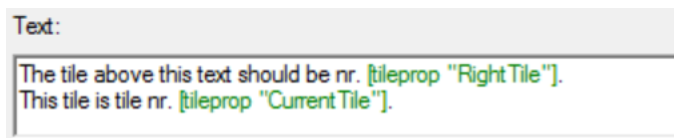


Click on **Style**, set the font size to `36` and align the text centered (H & V).

> **Note:** This font size may be too large when you create tiles with smaller glue areas. This could cause the text to enter in the tile area itself. To avoid this, choose **Smart Text** and in the category **Typographic** choose **Automatic Point Size** and set a minimum and maximum size.

- In **Inks**, choose **Darkest** to avoid too much ink in this glue area. Also select **Ignore Technical Inks**.

- In **Position**, attach this text mark to the **Right Overlap**. Position it as shown below. Add a small offset versus the (left) end of the overlap area. Make sure you rotate the text 90 degrees.
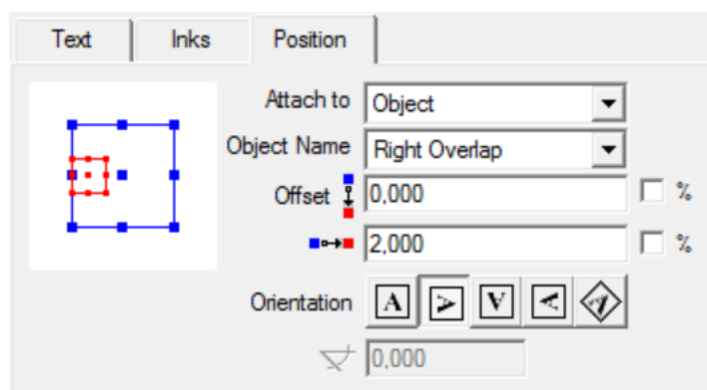


Click **Apply**.

14. As good practice, rename the text mark to a logical name like "`Text Mark – Name of Right Tile`". To do this, select the text mark, then right-click it to enable renaming it.

15. Now add a white rectangle below this text box. Add the mark of category **rectangle** and manually drag and drop it onto the text mark. It should appear as shown here:
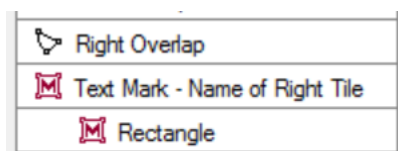


In the **SmartMark Options - Rectangle** dialog:

- in the **Rectangle** tab: select **Fit (to object)** to create a rectangle that adapts to the text box (both V and H). Set an **Extra Height and Width** of `1 mm`.

• in the **Inks** tab, select **Knockout**.

• in the **Position** tab, position the rectangle central versus the text mark **object**.
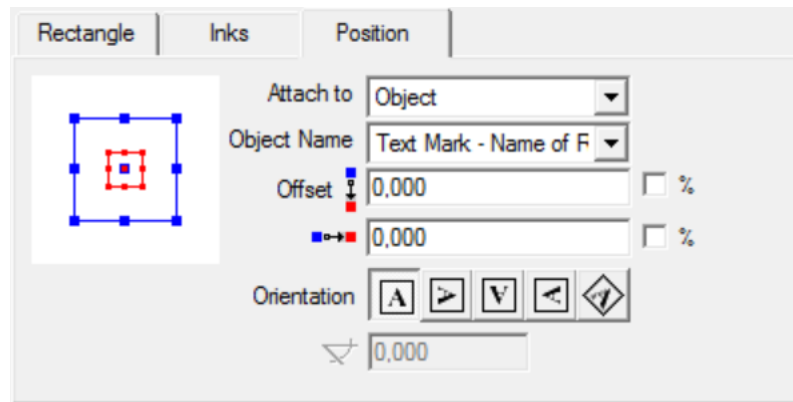


Click **Apply**.

**16.**Save your SmartMarks set with a logical name.
**17.**Now repeat the above steps 11 to 14 for the 3 other sides.
**18.**Save your SmartMarks set again (and close i-cut Layout).
**19.**In Automation Engine Pilot, test this SmartMarks set by using it in the **Create Tiles** task.

## 5.4. Submit to Gang Run

Use this task to *submit* a graphic file to a *substrate queue*, where it will be nested with other graphics to optimize substrate usage.

You can also submit ARD files (1-up CAD). This is useful for example when you want to fill a sheet with samples of shapes and send that merged resulted to a Kongsberg cutting table to cut these samples.

In this task, you can specify parameters (quantity, scale factor...) for nesting graphics based on their cut path.

You can send these file formats to this task:

• TIFF (CMYK or grayscale),
• JPEG (CMYK or grayscale, progressive JPEG compression is not supported),
• PSD (CMYK or grayscale),
• PDF (single page or multipage),
• Normalized PDF (single page or multipage),
• ARD files (1-up CAD).

Learn more in:

*General Tab* on page 67

*Back Tab* on page 70

*Substrate Tab* on page 70

## 5.4.1. General Tab

1.  Define how many of each input graphic you want to print.

    You can either:

    - Enter the **Quantity** to print.
    - Select **Maximum Fill** if you want to print as many copies as will fit in one sheet.

2.  Typically, graphics for large banners or billboards are not supplied in the size at which they will be printed out. In this case, you can **Scale** them up here.

    For example, enter `1000%` if your graphic is only 10% of the size you will need it to be.

3.  Define the **Rotation**. This is helpful when all or some of the graphics are only allowed a specific rotation.

    You can either:

    - Use the rotation that was **Set by the Substrate Queue**.
    - **Force a 0, 90, 180 or 270** degrees clockwise rotation. This choice overrules the substrate queue *nesting settings*.
    - **Force Allow Any Angle**: You don't care, you let the software decide. Also this choice overrules the substrate queue *nesting settings*.
    - Select a SmartName.

    **Note:** The **Gang Run Printing** view also shows the rotation for each entry in that queue.

4.  Define what to use as **Cut Path**.

    **Note:** Whereas the *Prepare Graphics for Nesting* task allows you to generate a cut path if the graphic doesn't contain one, in the **Submit to Gang Run** task the cut path needs to be already available, either as an ink or by using the trim box as cut path.

    | If you want to...        | do the following...                      |
    |--------------------------|------------------------------------------|
    | use an ink as cut path   | 1.  Enter it in the **Cut Path** field.  |

| If you want to... | do the following... |
|---|---|
| | **Tip:** <br><br> • If the ink used for the cut path has different names in different input files (for example if you have customers from different countries using names like `cut`, `découpe`, `taglio`...), you can add several ink names, separated by a comma ( , ). <br><br> The order you use is important as the task will use the first ink it finds in the list as cut path! <br><br> • You can use wildcards and/or use SmartNames to define ink names. For example use `Pantone*` if you want to use any Pantone ink used in the file as a cut path. <br><br> **Tip:** <br><br> When building a workflow using an example file, click ▤ to select one or more of the inks from the example file. <br><br> If you always receive CMYK graphics with one spot color used for the cut path, select **Any SpotColor**. <br><br> **2.** Define what to do if the ink(s) you defined are not present in the file: <br><br> • If you want to use the trim box as cut path instead, select **Create cut path from CAD object or trim box if no ink is found**. <br><br> • If you don't want to use the trim box but want the task to end in error, leave **Create cut path from CAD object or trim box if no ink is found** deselected. |
| use the trim box as cut path | Leave the **Cut Path** field empty. <br><br> If you always want to use the trim box as cut path (usually for rectangular graphics like business cards), you don't need to select **Create cut path from CAD object or trim box if no ink is found** (as this option is only applicable when you want an ink as cut path as your first choice). |
| gang run ARD files | ARD files can only be submitted when the field **Cut Path from Ink** is left empty and when the option **Create cut path from CAD object or trim box** is selected. When this is not the case, the submit task ends in error with the message `"Only default cutting path is allowed"`. |

**5.** If you want to set a due date (when the sheet with the nested graphics needs to be printed), select **Due Date** and choose when you want the due date (and time) to be.

- If you set a due date, the nesting server will always *generate a nested layout* that includes this graphic before your due date, even when the minimum fill has not been reached.

   **Tip:** In your substrate queue settings, you can choose to generate the nested layout and send it to the output workflow *a specific time before the due date*. This allows time for printing, finishing, packing...

- If you don't set a due date, the nesting server will only generate a nested layout when the minimum fill is reached.

| Select... | to... |
|---|---|
| **Immediate** | generate a nested layout including your graphic immediately (this is the same as when you use *Print Now* in the **Gang Run Printing** view). |
| **Today** | set the due time to a certain time today (this is the default option).<br><br>The nesting server will generate a nested layout including your graphic *the specified amount of time before the due time*. |
| **Tomorrow** | set the due date to a certain time tomorrow.<br><br>The nesting server will generate a nested layout including your graphic the specified amount of time before the due time. |
| **In ... hours** | set the due time a certain number of hours after the task is launched (you can set this with a SmartName). |
| **In ... days** | set the due date a certain number of days after the task is launched (you can set this with a SmartName).<br><br>You also need to set the due time. |
| **On** | set the due date to a specified date (and time) in the future. |
| **Job due date** | set the due date to the due date specified in the **Job** setup (only valid when the graphics are stored in a **Job folder**). |
| **Select SmartName...** | set the due date using a SmartName.<br><br>This opens the **SmartNames** dialog where you can select your SmartName. |

| Select... | to... |
| --- | --- |
| | **Note:**<br><br>• See the separate chapter *SmartNames* for information about SmartNames and how to create custom ones.<br><br>• Your SmartNames must resolve to a value in the **ISO 8601 standard** format (for example `2014-09-27T11:08:00+02:00`).<br><br>• If your due dates are supplied in a different format (for example `27/09/14`), use the *formatting options* for date and time SmartNames to convert this format to the ISO standard. |

## 5.4.2. Back Tab

- You can here specify what to print on the back of each graphic:
  - **No graphics**: choose this if you don't want any back side for the graphic.
  - **Even pages of multipage file**: choose this to print the odd pages of the file on the front, and the even pages on the back (this only works with multipage PDFs).
  - **Graphics from front side**: choose this to print the same graphic on the front and on the back.

    If your graphic has an irregular shape, you can select **Flip horizontally** so both graphics face the same direction and have the exact same contour for cutting.

    **Note:** If your graphic contains text, you shouldn't flip it as this will make the text unreadable.

  - **Other graphics**: choose this to print different graphics on the back, and **Browse** to these graphics.

    **Tip:** Give the graphics to print on the back a consistent name, and use SmartNames to retrieve them (for example, `[File]_back.[Extension of File]`).

## 5.4.3. Substrate Tab

1. Choose the **Substrate Queue** to send your graphics to.

> **Attention:**
>
> You should choose (one of) the substrate(s) you have defined as a *substrate queue* in the ***Gang Run Printing** view*.
>
> If you submit your graphics to a non existent substrate, a substrate queue will be created automatically for this substrate, but it won't be ready to process your graphics (so your graphics will be stuck in the queue until you *configure it* properly).

2.  If this substrate has several sizes defined, you can choose the name of the **Substrate Size** to use.

    Leave this on **Any** to let Automation Engine find the best fit.

> **Attention:** You here define the **Name** of the substrate size as defined in the setup of the substrate queue. Do not enter actual size information here.

## 5.4.4. Extra Tab

In this tab you can enter:

1.  A **Customer ID** identifying the customer who ordered the graphics. Whether it is also used as a grouping key is one of the settings the *Configure tool*.
2.  An **Order ID**: Every graphic file that you here submit with the same Order ID will show up as part of one same order in the *Orders View*. When working with the Job concept, a logic value would be the SmartName `[Order ID]`. When you don't enter a value, a system generated ID will be used.
3.  Your desired values for the custom fields that you defined in the *Configure tool*.

You can use both customer ID and custom fields either as:

*   labels in the *reports* from the nested layouts or the graphics ,

*   grouping keys to define *which graphics can be nested together*.

### Example 1: Using Custom Fields as Labels

You get graphics orders from national and international customers. You are using different shipping companies for national and international orders.

When generating layouts, you want to indicate which graphics are for national and for international shipping, so the cutting operator can store the finished graphics in the right places.

1.  In the *Configure tool*, define a **Custom Field** as `Shipping`.

    The corresponding **Custom Field** parameter in this task tab will now be called **Shipping** instead.
2.  When launching the task on graphics from international orders, enter `International` in that parameter, otherwise enter `National`.
3.  In your *output workflow*, choose to generate a **layout PDF report** in the *Export Nested Layouts task*.
4.  In the layout report, you will see for each graphic name:

    *   the label **National** if the copies of this graphic need to be shipped nationally,

• the label **International** if the copies of this graphic need to be shipped internationally.



**5.** If you open the report in an application that can show PDF layers (for example Adobe Reader), you will see that the report has a layer called **Shipping**.

If you hide the layers above this layer (so it only shows the layers **Base** and **Shipping**), you will see that:
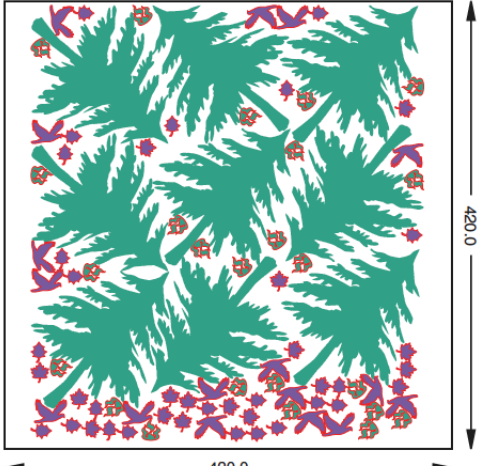
• graphics that need to be shipped nationally are shown in the color of the **National** label (purple in the example below).

• graphics that need to be shipped internationally are shown in the color of the **International** label (green in the example below, cut paths are shown in red).

**Note:** The way the software chooses the 'random' color for the color patches is identical to how it is done when SmartMarks can use a **"random color based on"**. A specific value (text?) will always return a same color based on that value.

### Example 2: Using Custom Fields as Grouping Keys

You need to print different graphics on the same substrate, but some will need to be laminated and some not.

1. In the *Configure tool*, define a **Custom Field** as `Lamination`, and select **Use as grouping key**.

   The corresponding **Custom Field** parameter in this task tab will now be called **Lamination** instead.
2. When launching the task on graphics to be laminated, enter `Yes` in that parameter, otherwise enter `No`.
3. The nesting server will generate layouts with either:

   • only graphics to be laminated,
   • only graphics that shouldn't be laminated.

**Note:** If you generate a layout report, it will have the label **Yes** if the graphics on that layout need to be laminated, **No** if they don't.

See an elaborate example on using grouping keys and how they show up on reports in *step 10* of the below example on *Working with Grouping Keys* on page 113.

# 5.5. Submit XML to Gang Run

## 5.5.1. Concept

The **Submit XML to Gang Run** task was designed to enable a business system (MIS, ERP...) full interaction with Automation Engine's Gang Run Printing mode.

The business system writes an XML file that serves as the input file of the **Submit XML to Gang Run** task. This XML is minimally a **request** for information about a nesting layout, possibly of a combination of different graphics (known as *ganging*). The MIS can then interpret the detailed **response** XML that it gets back (for example if the waste factor is acceptable). The MIS so decides if and when to re-send that XML file, but now using an extra option to also request links to the actual production files of the nested layout(s).

Let's have a closer look at the two main steps in this process:

- **Request for Nesting information**

  To assist with estimating the cost of producing specific jobs, the MIS asks Automation Engine's "Nesting Server" a detailed calculation of a layout of (a batch of) graphics on a specified **Substrate Queue**. The business system wants answers to these questions: How much material will be consumed with this substrate size and this quantity? What will be the waste factor?



**Schema: Nesting Request for estimation purpose only** *(production="FALSE")*
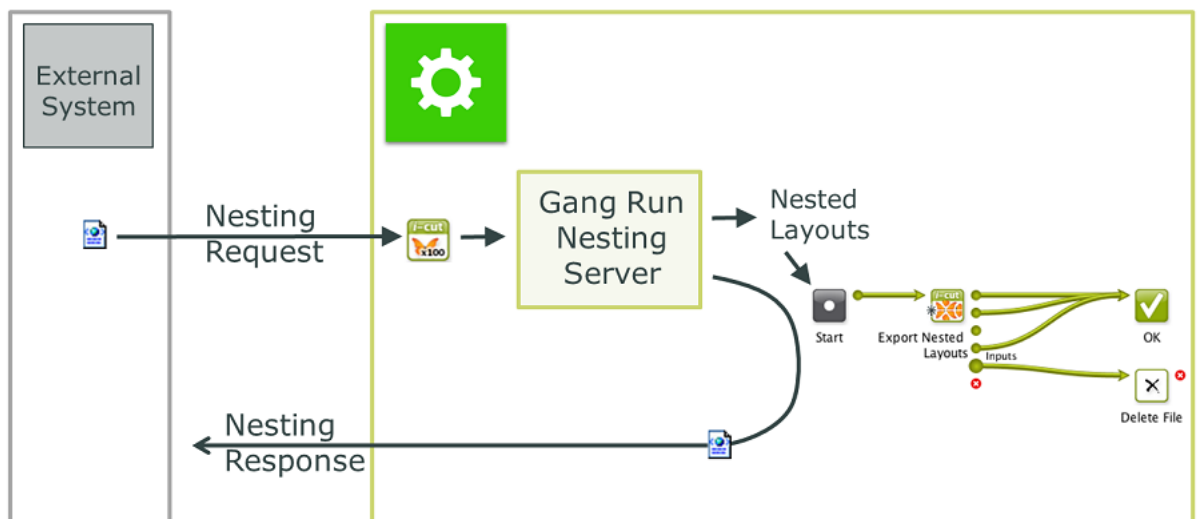
  The nesting server calculates and creates the requested layout files and also launches its assigned output workflow. The XML attribute `production="FALSE"` indicates that the response XML can happen immediately, because it does not have to wait for the production files to be created. The MIS interprets the Response XML.

- **Request to Nest and Produce**

  When the XML contains the attribute `production="TRUE"`, the response XML will contain links to the production files. To enable this, the response XML is only sent when the workflow that created them has finished.
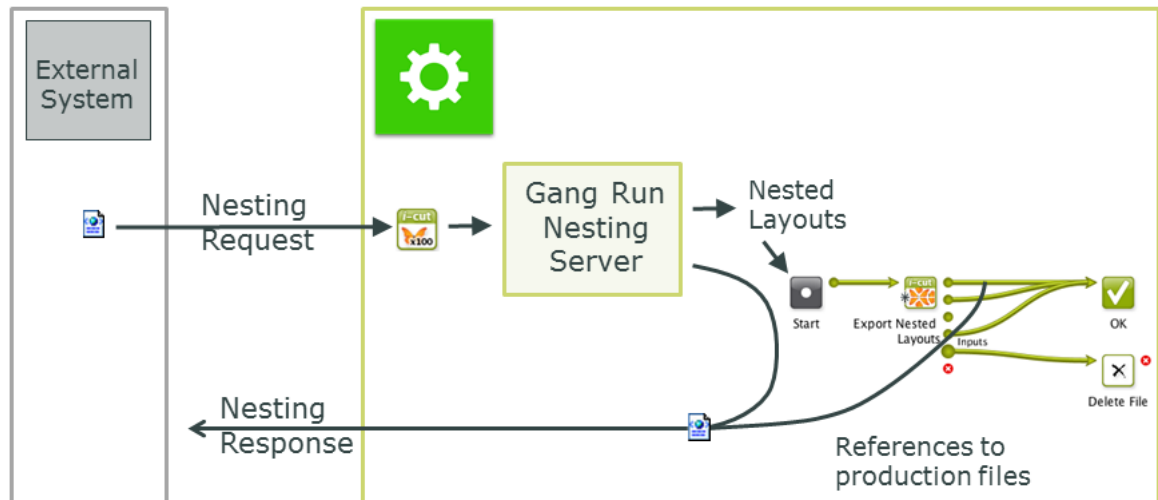


## 5.5.2. Using the Submit XML to Gang Run Task

The task ticket has no interface options. Everything needs to be defined in the input XML file.

As usual, this task can also be triggered by the external system, for example by using a *Folder Access Point*.

Here is some background on what happens when the task is launched:

- The graphics ("`<jobs>`") listed in the XML enter into the specified Gang Run Substrate Queue(s).

- The "Nesting Server" starts calculating possible layouts. Depending on any specified grouping keys (learn more in *Working with Substrate Queues*) it is possible that other graphics that were already present in those substrate queues join the nested layout.

- The nesting server decides and creates an optimized layout.

- When all graphics ("`<jobs>`") for a certain `NestingRequest` have been placed, a `NestingResponse` output XML file is written (on the requested location defined in the input XML file).

- The MIS monitors the URL that it specified as `ReturnURL` and reads the `NestingResponse` XML as soon as it becomes available.

## 5.5.3. Examples of a Nesting Request XML

### Example Nesting Request for 3 Jobs and 2 Substrates

In our example, your customer with ID `123456` asks you what it will cost to produce the following items, before noon of 5th of June of 2014:

- 10 items of AmericanCars_7 on Dibond-4mm, 1100x2400 mm
- 12 items of AmericanCars_2 on Dibond-4mm, 600x1100 mm
- 12 items of AmericanCars_1 on Forex-3mm, any size

Your company's sales price will depend on how much it will cost yourself to produce these items. Surely, you want to produce them the most cost-effective way. To get this information, your MIS creates this XML file:

```xml
<?xml version="1.0" encoding="UTF-8"?>
<NestingRequest Id="2014-84103">
    <ReturnURL>file://aeserver01/Data1/SnDResponses</ReturnURL>
    <CustomerId>123456</CustomerId>
    <Substrate>Dibond-4mm</Substrate>
    <SubstrateSize>1100x2400</SubstrateSize>
    <Quantity>12</Quantity>
    <DieShape>Cut</DieShape>
    <GroupingKey1>Finishing-Method5</GroupingKey1>
    <GroupingKey4>2014-84103</GroupingKey4>
    <DueDate>2014-06-05T12:00:00+01:00</DueDate>
    <JOBS>
      <JOB>
          <FileName>file://aeserver01/Data1/Jobs/SnDJob1/sndprepared/AmericanCars_7.pdf</FileName>
          <Quantity>10</Quantity>
      </JOB>
      <JOB>
          <FileName>file://aeserver01/Data1/Jobs/SnDJob1/sndprepared/AmericanCars_2.pdf</FileName>
          <SubstrateSize>600x1100</SubstrateSize>
      </JOB>
      <JOB>
          <FileName>file://aeserver01/Data1/Jobs/SnDJob1/sndprepared/AmericanCars_1.pdf</FileName>
          <Substrate>Forex-3mm</Substrate>
      </JOB>
    </JOBS>
</NestingRequest>
```

**Note:** This example shows that a `NestingRequest` can contain multiple jobs, possibly on multiple substrates, possibly on a specified, a non-specified or on multiple substrate sizes. This allows the XML to describe a production order containing multiple components as 1 `NestingRequest`.

This is a conceptual difference with the *Submit to Gang Run* task, which can also report back an XML file but always on 1 single job. The nature of the XML version of this task is the ability to calculate and feedback on batches of jobs.

**Examples with front and back graphics:**

> ⚠️ **Attention:** In the 2 below examples, only one `<JOB>` element of the XML is shown:

- **Using the same graphic on the back but flipped:**

```
<JOB>
    <FileName>file://AEServer01/Data1/labels/111_kriek belle vue.pdf</FileName>
    <Quantity>3</Quantity>
    <Scale>100</Scale>
    <DieShape>BORDERS</DieShape>
    <Bleed>2.0</Bleed>
    <SameGraphic>1</SameGraphic>
    <FlipGraphic>1</FlipGraphic>
    <Page number="1"/>
</JOB>
```

The same graphic is used a back-graphic, but will be flipped.

- **Using a specific graphic for the back and filling the sheet:**

```
<JOB>
    <FileName>file://AEServer01/Data1/labels/111_kriek belle vue.pdf</FileName>
    <Quantity>Maximum</Quantity>
    <Scale>100</Scale>
    <DieShape>BORDERS</DieShape>
    <Bleed>2.0</Bleed>
    <BackGraphic>file://AEServer01/Data1/labels/111_kriek belle vue_back.pdf</BackGraphic>
    <Page number="1"/>
</JOB>
```

### Nesting Request for a Roll substrate

There is no difference in the nesting request XML when the substrate is a roll.

## 5.5.4. XML documentation

### Technical summary

The **Submit XML to Gang Run** task always outputs a return XML. Its path is specified by the `ReturnURL=` element in the input `NestingRequest` XML.

Once the nesting request has been processed fully, the nesting server writes a `NestingResponse_[date].xml` file in the specified `ReturnURL` folder. This response can always be linked to the original request via the `id=` attribute. The (MIS) system that submitted the `NestingRequest` should monitor that `ReturnURL` folder and so pick up the response to its request.

When adding the attribute `production="TRUE"` to the input XML, the return XML will also include references to the actual production files.

### Documentation of the XML for the Submit XML to Gang Run task

| XML Element | Description |
|---|---|
| NestingRequest (mandatory) | Mandatory root element (max 1). Many sub elements can be specified directly under this element and/or under a sub-element JOB. In the first |

| XML Element | Description |
|---|---|
| | case they serve as 'global' parameter, in the second as a job-specific one. A job parameter overrules a same type already specified 'globally'. |
| Id  (mandatory) | The `Id` attribute of the element `NestingRequest` comes back in the `NestingResponse` output XML file. Based on this `Id`, the MIS knows which response matches which request. |
| ReturnURL | A `file:`-based URL that specifies the folder where the `NestingResponse` output XML file will be written once all jobs have been nested. |
| production="FALSE" | Attribute of the element `ReturnURL`. Default setting. |
| production="TRUE" | Attribute of the element `ReturnURL`. As described in *Concept*, this attribute means that the response XML will wait for the workflow to finish to also add the references to the files produced by the **Export Nested Layouts** task. |
| DueDate | To be defined in ISO 8601 format. |
| GroupingKey(n) | Add up to 4 grouping keys to help control groups of nested jobs.<br><br>**Tip:** Using the `NestingRequest Id` as grouping key prevents these jobs from being nested with any job that is not part of this request. |
| JOBS (mandatory when more than 1 JOB element) | Contains one or more `JOB` element(s). |
| JOB  (mandatory) | Contains the definition of a graphic. At least 1 `JOB` element must be present. |
| FileName (mandatory | A `file:`-based URL indicating the one up graphics to be nested. A sub element of a `JOB` element. |
| Substrate | The name of the **Substrate Queue** that will calculate the layout(s).<br><br>⚠ **Attention:** This element can be specified as global setting under the `NestingRequest` element. When it occurs under a `JOB` element, it is valid for that job only, and overrules any global values appearing under the `NestingRequest` element. |
| SubstrateSize | The name of the sheet or roll **Size** of the specified substrate queue. Same remark as for `Substrate`: can be used as global or job element. |
| Quantity | Desired quantity for the specified job(s). Same remark as for `Substrate`: can be used as global or job element. |
| Rotation | Rotation of the graphic. When not specified, the rotation setting specified in the substrate queue ("**nesting settings**") will be used. Possible values are:<br><br>• `sub` : use the rotation settings as defined by the substrate queue's nesting settings.<br><br>• `0` or `90` or `180` or `270` : fixed rotation angle (clockwise). This will overrule the rotation setting specified in the substrate queue's nesting settings. |

| XML Element | Description |
|---|---|
| | • `any` : this allows any rotation for the graphic. This will overrule the rotation setting specified in the substrate queue's nesting settings.<br><br>Same remark as for `Substrate`: can be used as global or job element. |
| Scale | To scale the graphic. Value unit is percentage. No scale = `100`. Same remark as for `Substrate`: can be used as global or job element. |
| DieShape | The die shape for the graphic. Allowed values: the name of a spot color, the keywords `TRIMBOX` , `BORDERS` or `DEFAULT`.<br><br>`TRIMBOX` (or `BORDERS`) will use the trim box of the PDF graphic. `DEFAULT` will search for a CAD object inside the normalized PDF(STA) file ; if no CAD object is found, the trim box will be used. |
| Bleed | The amount of bleed (in `mm`) allowed outside the die shape. If no bleed is specified, no bleed mask will be applied, unless the input is a PDFSTA file, in which case the bleed setting from the PDFSTA file will be used. |
| Page Number | Page selection of the multi-page PDF. Can only be used inside a `JOB` element. |
| SameGraphic | Value on `1` means that the (front) graphic defined in `FileName` will be used as back graphic. Can only be used inside a `JOB` element. |
| FlipGraphic | Only valid when value of `SameGraphic` is on `1`. `FlipGraphic` on `1` defines that the back graphic will be flipped around the vertical axis (mirrored). Mind not to flip graphics that contain text. Can only be used inside a `JOB` element. |
| RectoVerso | When the input file is a multipage PDF, this will use the uneven pages as front pages and the even pages as back pages. This element overrules any use of the elements `SameGraphic` and `FlipGraphic`. Can only be used inside a `JOB` element. |
| BackGraphic | A `file:`-based URL indicating the graphic to be used as back graphic. Can only be used inside a `JOB` element. |

## 5.5.5.  Example of a Nesting Response XML

A `NestingResponse` XML file contains 2 main elements: `Sheets` and `Jobs`.

• The **Sheets** element describes which (part of) sheets were used to nest the given files. It refers to the files by a `<Job id="">` element.

• The **Jobs** element lists all jobs that were nested.

The below example shows these 3 sheet elements:

• The first `sheet` element states, in `UsedSheets`, that it will take 6 sheets of Forex-3mm 900x900 to deliver the wanted `Quantity` of 12 `AmericanCars_1`. The MIS can calculate that such a sheet places 2 of these graphics. The waste is 0,54 m2. The MIS can calculate that this is 11%.

• The second `sheet` element states, in `UsedSheets`, that it will take 12 sheets of Dibond-4mm 600x1100 to deliver the wanted `Quantity` of 12 `AmericanCars2`. The MIS can calculate that only 1 fits on such a sheet. The waste is 2,56 m2. The MIS can calculate that this is 32%.

- The third `sheet` element states, in `UsedSheets`, that it will take 2 sheets of Dibond-4mm 1100x2400 to deliver the wanted `Quantity`of 10 `AmericanCars_7`. The MIS can calculate that such a sheet places 5 of these graphics. The waste is 0,82 m2. The MIS can calculate that this is 16%.

```xml
<?xml version="1.0" encoding="UTF-8"?>
- <NestingResponse id="2014-84103" Created="2014-05-20T10:01:06.206+02:00">
   - <Sheets>
      - <Sheet id="419801a2-a743-4628-8119-3abaf1418154" Created="2014-05-20T10:01:00.360+02:00">
            <Substrate>Forex-3mm</Substrate>
            <SubstrateSize>900x900</SubstrateSize>
         - <Jobs>
            - <Job id="adf105b0-ce2d-4fbc-a96e-ae1efa56558e">
                  <Quantity>12</Quantity>
                  <UsedSheets>6.0</UsedSheets>
                  <UsedSurface unit="m2">4.314980209851265</UsedSurface>
                  <TotalSurface unit="m2">4.859999999999999</TotalSurface>
                  <Waste unit="m2">0.5450197901487349</Waste>
               </Job>
            </Jobs>
         </Sheet>
      - <Sheet id="b802d6f3-31a6-466e-88f3-95e101ae5704" Created="2014-05-20T10:01:06.380+02:00">
            <Substrate>Dibond-4mm</Substrate>
            <SubstrateSize>600x1100</SubstrateSize>
         - <Jobs>
            - <Job id="b6258add-e501-464c-bb85-398e92d88fe6">
                  <Quantity>12</Quantity>
                  <UsedSheets>12.0</UsedSheets>
                  <UsedSurface unit="m2">5.350619541508913</UsedSurface>
                  <TotalSurface unit="m2">7.92</TotalSurface>
                  <Waste unit="m2">2.569380458491087</Waste>
               </Job>
            </Jobs>
         </Sheet>
      - <Sheet id="f36b931f-4064-4aad-8bed-4b6640332a7e" Created="2014-05-20T10:01:02.166+02:00">
            <Substrate>Dibond-4mm</Substrate>
            <SubstrateSize>1100x2400</SubstrateSize>
         - <Jobs>
            - <Job id="2d05b634-e4a4-4906-97d9-6cc6759d505c">
                  <Quantity>10</Quantity>
                  <UsedSheets>2.0</UsedSheets>
                  <UsedSurface unit="m2">4.458849617924094</UsedSurface>
                  <TotalSurface unit="m2">5.279999999999999</TotalSurface>
                  <Waste unit="m2">0.8211503820759057</Waste>
               </Job>
            </Jobs>
         </Sheet>
   </Sheets>
   - <Jobs SubmitDate="2014-05-20T10:00:55.654+02:00">
      - <Job id="adf105b0-ce2d-4fbc-a96e-ae1efa56558e">
            <FileName>file://aeserver01/Data1/Jobs/SnDJob1/AmericanCars_1.pdf</FileName>
            <Page>1</Page>
            <Quantity>12</Quantity>
            <Scale>100.0</Scale>
            <DueDate>2014-06-05T12:00:02.626+02:00</DueDate>
            <CustomerId>123456</CustomerId>
            <GroupingKey1>Finishing-Method5</GroupingKey1>
            <GroupingKey4>2014-84103</GroupingKey4>
         </Job>
      - <Job id="b6258add-e501-464c-bb85-398e92d88fe6">
            <FileName>file://aeserver01/Data1/Jobs/SnDJob1/AmericanCars_2.pdf</FileName>
            <Page>1</Page>
            <Quantity>12</Quantity>
            <Scale>100.0</Scale>
            <DueDate>2014-06-05T12:00:02.626+02:00</DueDate>
            <CustomerId>123456</CustomerId>
            <GroupingKey1>Finishing-Method5</GroupingKey1>
            <GroupingKey4>2014-84103</GroupingKey4>
         </Job>
      - <Job id="2d05b634-e4a4-4906-97d9-6cc6759d505c">
            <FileName>file://aeserver01/Data1/Jobs/SnDJob1/AmericanCars_7.pdf</FileName>
            <Page>1</Page>
            <Quantity>10</Quantity>
            <Scale>100.0</Scale>
            <DueDate>2014-06-05T12:00:02.626+02:00</DueDate>
            <CustomerId>123456</CustomerId>
            <GroupingKey1>Finishing-Method5</GroupingKey1>
            <GroupingKey4>2014-84103</GroupingKey4>
         </Job>
      </Jobs>
</NestingResponse>
```

**Response XML for a Roll substrate**

A response XML for roll substrates is the same as for sheet substrates, except for an extra `RollLength` element in each `Sheet` Element.

An example (only one `Sheet` element is unfolded):

```xml
<?xml version="1.0" encoding="UTF-8"?>
- <NestingResponse id="26139" ReturnURL="file://AEserver01/Data1/SnDResponses" Created="2015-06-
  09T12:05:31.795+02:00">
    - <Sheets>
        - <Sheet id="6741c48f-9a23-480f-aa67-30dd294dc802" Created="2015-06-09T12:04:10.132+02:00"
          WorkflowId="9c1ede38-6a93-4d7a-99c6-3e94c64f0098">
            <Substrate>Roll5-1mm</Substrate>
            <SubstrateSize>Large</SubstrateSize>
            <RollLength unit="mm">3829.079</RollLength>
            - <Jobs>
                - <Job id="d4ec0526-8328-4102-819c-0706a0931c1c">
                    <Quantity>117</Quantity>
                    <UsedSheets>13.0</UsedSheets>
                    <UsedSurface unit="m2">33.29332812337053</UsedSurface>
                    <TotalSurface unit="m2">46.79134538</TotalSurface>
                    <Waste unit="m2">13.498017256629472</Waste>
                </Job>
            </Jobs>
            + <FileList Created="2015-06-09T12:07:28.429+02:00">
        </Sheet>
        + <Sheet id="87447e2f-3ddc-444e-a59c-4393ca8303c4" Created="2015-06-09T12:04:39.716+02:00"
          WorkflowId="1dd2adc2-2dbf-4b48-82ae-004e9c79ec2c">
        + <Sheet id="e2712b56-1066-419b-b685-bb9a4c69b8dd" Created="2015-06-09T12:04:53.718+02:00"
          WorkflowId="7627556b-9316-4ba0-97e2-03f008d6a613">
        + <Sheet id="a3db2f96-fd1a-44f0-aa7d-8631ffde9a08" Created="2015-06-09T12:05:32.362+02:00"
          WorkflowId="17c836c8-b791-40ae-b633-ca63305b29c8">
    </Sheets>
    + <Jobs SubmitDate="2015-06-09T12:03:29.492+02:00">
</NestingResponse>
```

## 5.5.6. Example of a Response XML after the Production Workflow

As mentioned earlier, the `NestingResponse` output XML can be extended to contain references to the actual production files.

**Note:** Production files are the files generated by the **Export Nested Layouts** task, as part of the *Output Workflow* of the **Substrate Queue**.

To do this, the MIS must add the attribute `production="TRUE"` to the `ReturnURL` element of the `NestingRequest` XML.

An example:

```xml
<?xml version="1.0"?>
- <NestingRequest Id="21185">
    <ReturnURL production="TRUE">file://AEserver01/Data1/SnDResponses</ReturnURL>
    ...
</NestingRequest>
```

As a result, each `/NestingResponse/Sheets/Sheet` element will be extended with a `FileList` element.

For each production file, there will be a `File` element attached to the `FileList` element.

**Example of a NestingResponse XML with references to production files:**

```xml
<?xml version="1.0" encoding="UTF-8"?>
- <NestingResponse id="21185" ReturnURL="file://AEserver01/Data1/SnDResponses" Created="2014-05-27T11:45:21.191+02:00">
  - <Sheets>
    - <Sheet id="2fdb7110-98a5-4ab5-bc64-676d16aa6a3d" Created="2014-05-27T11:45:21.160+02:00" WorkflowId="035db4f8-a7fe-4c36-b2ec-668dc6a0ba20">
        <Substrate>Dibond-4mm</Substrate>
        <SubstrateSize>600x1100</SubstrateSize>
      - <Jobs>
        - <Job id="86301612-5c10-4b0e-8aa0-489a55237d83">
            <Quantity>12</Quantity>
            <UsedSheets>12.0</UsedSheets>
            <UsedSurface unit="m2">5.350619541508913</UsedSurface>
            <TotalSurface unit="m2">7.92</TotalSurface>
            <Waste unit="m2">2.569380458491087</Waste>
          </Job>
        </Jobs>
      - <FileList Created="2014-05-27T11:45:39.563+02:00">
          <File>file://AEserver01/Data1/SnDoutput/21185/Dibond-4mm/600x1100/nesting17624_265965%201%2012.pdf</File>
          <File>file://AEserver01/Data1/SnDoutput/21185/Dibond-4mm/600x1100/nesting17624_265965%201%2012_LAYOUT.xml</File>
          <File>file://AEserver01/Data1/SnDoutput/21185/Dibond-4mm/600x1100/nesting17624_265965%201%2012_LAYOUT.pdf</File>
          <File>file://AEserver01/Data1/SnDoutput/21185/Dibond-4mm/600x1100/AmericanCars_2.xml</File>
          <File>file://AEserver01/Data1/SnDoutput/21185/Dibond-4mm/600x1100/nesting17624_265965%201%2012_CUT.pdf</File>
        </FileList>
      </Sheet>
    - <Sheet id="831fdba7-ffdd-4289-a5ba-866ffb153c59" Created="2014-05-27T11:45:21.294+02:00" WorkflowId="728ca7ee-c071-482d-8a98-cbd312a78756">
        <Substrate>Dibond-4mm</Substrate>
        <SubstrateSize>900x1100</SubstrateSize>
      - <Jobs>
        - <Job id="f11e2e1c-4d35-4ef8-b357-c99d8ca3b6f5">
            <Quantity>12</Quantity>
            <UsedSheets>6.0492</UsedSheets>
            <UsedSurface unit="m2">4.9683519386757915</UsedSurface>
            <TotalSurface unit="m2">5.989269327278993</TotalSurface>
            <Waste unit="m2">1.020917388603202</Waste>
          </Job>
        - <Job id="43e38513-391d-4388-b911-2eb2abb74ad1">
            <Quantity>12</Quantity>
            <UsedSheets>5.9508</UsedSheets>
            <UsedSurface unit="m2">4.8866099617074426</UsedSurface>
            <TotalSurface unit="m2">5.8907306727210065</TotalSurface>
            <Waste unit="m2">1.004120711013564</Waste>
          </Job>
        </Jobs>
      - <FileList Created="2014-05-27T11:45:39.563+02:00">
          <File>file://AEserver01/Data1/SnDoutput/21185/Dibond-4mm/900x1100/nesting17624_265965%202%2012.pdf</File>
          <File>file://AEserver01/Data1/SnDoutput/21185/Dibond-4mm/900x1100/nesting17624_265965%202%2012_LAYOUT.xml</File>
          <File>file://AEserver01/Data1/SnDoutput/21185/Dibond-4mm/900x1100/nesting17624_265965%202%2012_LAYOUT.pdf</File>
          <File>file://AEserver01/Data1/SnDoutput/21185/Dibond-4mm/900x1100/AmericanCars_3.xml</File>
          <File>file://AEserver01/Data1/SnDoutput/21185/Dibond-4mm/900x1100/AmericanCars_4.xml</File>
          <File>file://AEserver01/Data1/SnDoutput/21185/Dibond-4mm/900x1100/nesting17624_265965%202%2012_CUT.pdf</File>
        </FileList>
      </Sheet>
    </Sheets>
  - <Jobs SubmitDate="2014-05-27T11:45:13.094+02:00">
    - <Job id="86301612-5c10-4b0e-8aa0-489a55237d83">
        <FileName>file://AEserver01/Data1/SnDFiles/AmericanCars_2.pdf</FileName>
        <Page>1</Page>
        <Quantity>12</Quantity>
        <Scale>100.0</Scale>
        <DueDate>2014-05-27T11:45:21.206+02:00</DueDate>
        <CustomerId>123456</CustomerId>
        <GroupingKey4>21185</GroupingKey4>
      </Job>
    - <Job id="f11e2e1c-4d35-4ef8-b357-c99d8ca3b6f5">
        <FileName>file://AEserver01/Data1/SnDFiles/AmericanCars_4.pdf</FileName>
        <Page>1</Page>
        <Quantity>12</Quantity>
        <Scale>100.0</Scale>
        <DueDate>2014-05-27T11:45:21.206+02:00</DueDate>
        <CustomerId>123456</CustomerId>
        <GroupingKey4>21185</GroupingKey4>
      </Job>
    - <Job id="43e38513-391d-4388-b911-2eb2abb74ad1">
        <FileName>file://AEserver01/Data1/SnDFiles/AmericanCars_3.pdf</FileName>
        <Page>1</Page>
        <Quantity>12</Quantity>
        <Scale>100.0</Scale>
        <DueDate>2014-05-27T11:45:21.206+02:00</DueDate>
        <CustomerId>123456</CustomerId>
        <GroupingKey4>21185</GroupingKey4>
      </Job>
    </Jobs>
</NestingResponse>
```

## 5.5.7. Using Workflow Parameters in this Process

### Concept

Having these production files created on specific folders and with specific names will be important for the MIS to recognize and read them.

You can organize the production files that were created by a `NestingRequest` by using some **workflow parameters** that are available in the workflow that was launched on the generated Nested Layout files. See an example below where we picked some from the list of SmartNames.

Also the **Grouping Key**'s and custom fields used in the *Submit to gang Run* task can be used to help determine names of folders and files. Note that these only appear in the list of SmartNames after you first used that workflow ticket.

#### Example

- In *Pilot > Configure > Gang Run Printing*, we renamed the `customfield 4` to `OrderId` and confirmed that we want to use this field as a grouping key.

- In the **Export Nested Layouts** ticket of the workflow that the substrate queue launches on the generated nested layouts, set up the **Output Folder** for the *Production Files* as in this example:





**Note:** Learn more about these SmartNames in *this page about the 'Export Nested Layouts' task*.

- As a result, the production files are organized in a folder structure that makes it easy for the MIS to find the files related to its initial `NestingRequest`:
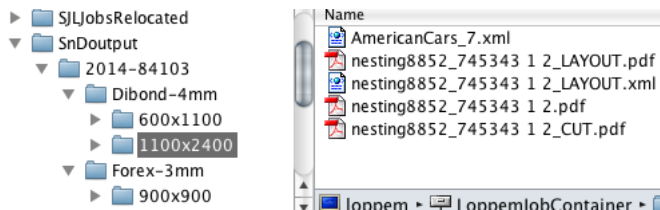


## 5.5.8. Workflow Extensions

#### Concept

Production files that are mentioned in the `NestingResponse output` XML can then be picked up again in an Automation Engine workflow for further processing. You can use the workflow control *Select Referenced File* to do this.

#### Example workflow

This enables a lot of extensions to the workflow. In this example we select the production files and ZIP them before sending them to an external system or partner. You can also choose to delete those files locally.
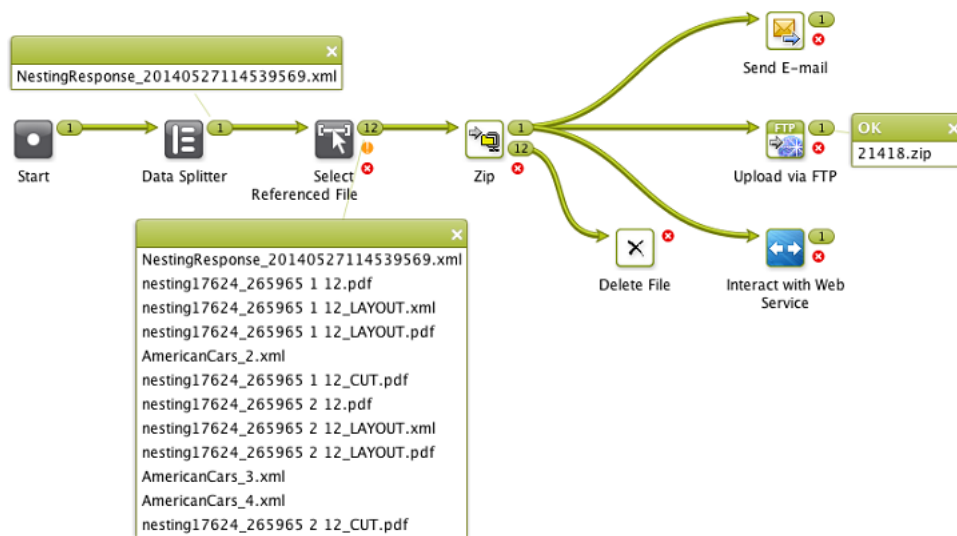
## 5.6.  Export Nested Layouts

Use this task to create production files (a PDF print file and a cutting file) from your nested Gang Run Printing layouts.

Typically, the **Export Nested Layouts** task is the main step of your Gang Run Printing **output workflow**.

When working with Gang Run Printing:

1.  You submit the graphics to be nested and printed through the *input workflow*.
2.  The *nesting server* automatically nests the graphics on the substrate, and sends the resulting nested layouts to the output workflow *that is linked to that substrate queue*.
3.  The *output workflow* generates production files from the nested layouts.

**Note:**  In a workflow, this task has five output pins: **Print Files**, **Cutting Files**, **Offcuts**, **Inputs** and **Error**. This makes it easy to redirect each type of file to the right place.

If you ask to **Create Reports**, the task will show an extra output pin for these report files.

> ⚠️ **Attention:**  The output pin **Offcuts** requires an 'Export Nested Layouts' ticket from AE v18.1.1 or later. To see the 'offcuts' pin on workflow tickets that you made sooner, just open and close that ticket to make this pin appear.

Learn more in:

### Managing the Nested Layout PDFPLA files

The nested layouts that the nesting server creates are written as PDFPLA files on a central folder. By default, this folder is **ExampleJobContainer/SnDtemp**. To optimize data traffic, we

advise to have this folder on a disk away from your system drive. You can change this folder *in the configure panel*.

These PDFPLA files are not cleaned up automatically. We advise to build this cleanup into your output workflow. This is easily done as in below example, where you delete this PDFPLA input file that arrives on the "Inputs" output pin:
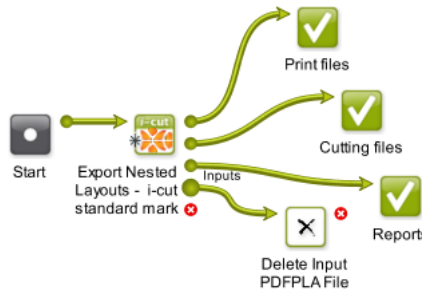


## 5.6.1. Production Files Tab

The task will output:

- **PDF print files** that are to be printed. When the input PDFPLA file only contains CAD data (you only submitted ARD files to the Gang Run), the option **Save Print Files** is skipped.

- **Cutting files**. These are used by cutting tables to print the printed sheet or roll. There are many formats available.

**Note:** Every resulting layout is a single page PDF print file, unless you are printing front and back (in which case the back graphic(s) will be on a second page).

1. In **Save Cutting Files**, choose the cutting file format you want to generate (**i-cut**, **HPGL**, **PDF**, **MFG**, **ACM** or **JDF** for *Kongsberg cutting tables* or **JDF** for guillotine cutters).

   **Tip:**

   - If you have several cutting tables and you don't know yet which one you will use, you can generate several file formats: choose **Select File Types...**, select all the file types you want to generate and click **OK**.

   - If you want to check your cutting files for quality control, you can also output a PDF file and inspect it in Acrobat.

When generating an **ACM** file (for an Esko Kongsberg table), you can select **Print Side Up** to cut with the print side visible.

For all cutting file types except **JDF**, you can influence the knife or cutting head's cutting sequence:

- Leave **Sequence lines** deselected if you want to use the original cut paths for the cutting lines (this way, common lines between graphics are only cut once, but every graphic is still cut individually).
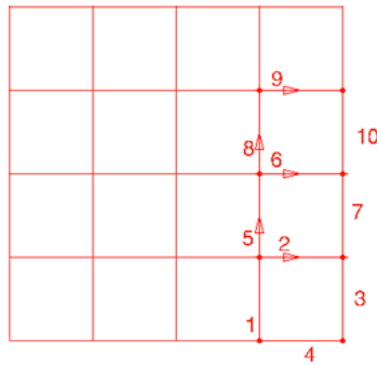
- Select **Sequence lines** if you want the vertical and horizontal cutting lines to be concatenated so that the knife can cut longer lines at once (the cutting process is faster when the knife doesn't need to be lifted and brought down, and accelerate and decelerate many times).
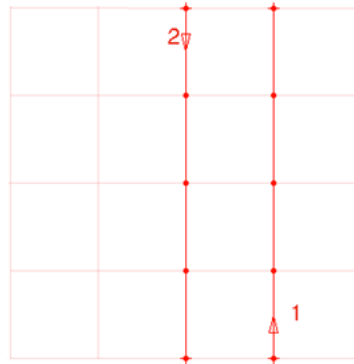


If you selected **Sequence lines**, you can choose to **Cut Across Gaps** to cut longer lines at once even if there is a *gutter* between your graphics.

> ⚠️ **Attention:**
>
> When you export an **i-cut** file, make sure you have **i-cut marks** in your file as they are needed to define where to start cutting.
>
> Other SmartMarks in your file will not be used for that purpose when working with an i-cut file.
>
> Learn more about i-cut marks in the *i-cut Layout manual*.

**Note:** When the PDFPLA only contains CAD data (you only submitted ARD files to the Gang Run), then all structural lines get exported when choosing MFG or ACM (using the default ArtiosCAD sample making output). With all the other cutting formats, only the cut and crease lines get exported.

2. By default, all inks with the ink type "technical", including the ink used for the cut path, are considered structural inks, and are included in the cutting file but not in the print file.

If you want to include other inks from your graphic in the cutting file but not in the print file, enter their names in **Add Extra Structural Inks**.

When adding several inks, you should separate their names with a comma, for example `Crease,Kiss-cut`. You can also use wildcards (`*`) and SmartNames.

3. If you want to give your output files a specific name, enter it in **Output Name**. By default, the output files have an automatically generated name containing unique identifiers. The default ticket proposes you to use smart workflow parameters. It also proposes to end the name with a unique ID like **[ Short Task ID ]**. This will prevent that output files overwrite each other (which can happen for example when several layouts are generated):

Output Name: [wfp.substrate]_[wfp.substrate.size]_[wfp.substrate.size.quantity]_[Short Task ID]   []

Table: Meaning of SmartNames useful in this workflow:

| SmartName (wfp) | meaning |
| --- | --- |
| `substrate` | This is the name of the substrate queue. |
| `substrate.size` | This is the name of the sheet (or roll) size. |
| `substrate.size.quantity` | This is the number of times the nested layout needs to be printed in order to get to the requested quantity of the submitted graphics. |
| `substrate.size.type` | This is the substrate type: Sheet (value `P` for plano) or Roll (value `R`). |
| `customer.id` | Mind that this one will only appear when you selected the option **Use the Customer field as grouping key** in the *Configure tool*. This is the one you used as 'CustomerId' in the *Submit to Gang Run task (tab 'Extra')*. |

**Note:** When multiple copies of the same layout need to be printed, the number of copies will automatically be added to the PDF file name.

4. Define where to save the production files and the report(s):

- If you want to save all output files in the same folder, select **Save all files in the same folder**, and browse to that **Output Folder**.
- Otherwise, deselect **Save all files in the same folder** and browse to your specific folder for the **Print Files**, **Cutting Files** and **Report Files**.

When you didn't specify an output folder, the files are by default written in `\ExampleJobContainer\SnDTemp.`

## 5.6.2. Sheet Tab

1. If you want, you can add **SmartMarks** to the nested layout (a SmartMarks set that you created in i-cut Layout or PackEdge).

   You can for example use a SmartMarks set containing registration and/or cut marks. You can use SmartNames to enter your SmartMarks set's name.

2. When the *nesting server* generates a nested layout, it places the layout on the sheet based on the settings of the substrate queue (*sheet size and margins* and *nesting settings*).

   However, for printing and finishing purposes, you may want to reposition the nested layout on the sheet. In **Center Layout on Sheet** you can choose to center the layout either **Vertically**, **Horizontally**, or **Vertically and Horizontally**.

   In the example below, the nested layout (left) has been centered both vertically and horizontally (right).
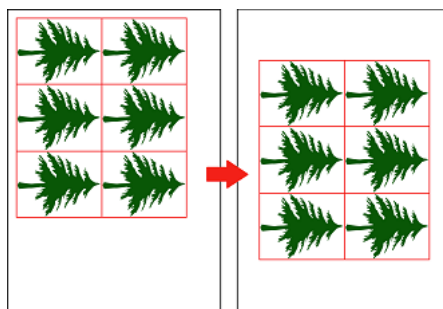


> ⚠️ **Attention:** The option is ignored when an offcut area has been found. Learn about offcuts in the *page about offcuts* (part of the nesting settings of a (sheet) substrate queue).

3. If you are working with substrate rolls or large sheets, you can choose to fit the final PDF that will be printed (the "sheet" file containing your nested layout) to one or both of the layout's dimensions.
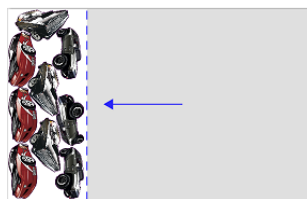
   This way, you can cut closer to the layout and have less substrate waste (for rolls) or save the remaining blank area as an offcut so you can reuse it (for large sheets).
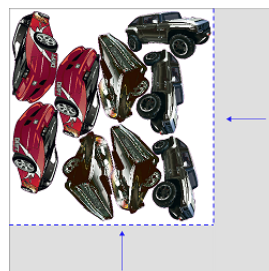
   For **Fit Sheet**, choose either:

   • **To Layout Height** to fit the sheet height to the height of your nested layout.
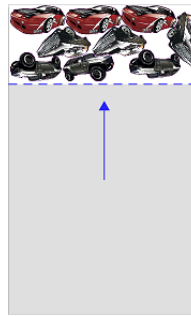
- **To Layout Width** to fit the sheet width to the width of your nested layout.



- **To Layout Width & Height** to fit the sheet height and width to the height and width of your nested layout.



**Note:** When using the option **Fit Sheet**, no *offcuts* will be generated.

4. If you are printing front and back, define how the sheet will be turned in **Backing Up**: either **Work-and-Turn** or **Work-and-Tumble**.

This influences how the back graphics will be placed in your final PDF.

Front (at left) and back (at right) with **Work-and-Turn**:

Front and back with **Work-and-Tumble**:

### 5.6.3. Reports Tab

Reports can help production and finishing and can also serve as feedback to your business system.

#### XML Reports

•   Select **For every layout** if you want an XML report describing the layout: its size and substrate, the graphics used, their quantity, cut files, URLs, etc.

•   Select **For every graphic** if you want an XML report of each graphic used in that layout. This file describes the layout that this graphic was used in, how many times it was used, remaining quantity, etc.

   **Example of XML Report of a Layout:**

```xml
<?xml version="1.0" encoding="UTF-8" ?>
- <LAYOUT>
    <CUTFILE>\\eaw11dl306\WDE-AE-DATA\GRP_output\155040_AluComp 8 mm_CUT.pdf</CUTFILE>
    <CUTFILE>\\eaw11dl306\WDE-AE-DATA\GRP_output\155040_AluComp 8 mm.cut</CUTFILE>
    <PDFFILE>\\eaw11dl306\WDE-AE-DATA\GRP_output\155040_AluComp 8 mm.pdf</PDFFILE>
    <TotalLength number="63233.79" />
    <WIDTH number="2468.619" />
    <HEIGHT number="1216.476" />
    <COPIES number="1" />
    <SUBSTRATE>AluComp 8 mm</SUBSTRATE>
    <YIELD number="1751767.0" />
  - <JOBS>
    + <JOB>
    + <JOB>
    - <JOB>
        <JOBNAME>fiona_Prep.pdf</JOBNAME>
        <NUMBERUP>7</NUMBERUP>
        <REMAINING>13</REMAINING>
        <VSIZE>325.2</VSIZE>
        <HSIZE>140.38</HSIZE>
      - <POSITIONS>
        - <POSITION>
            <V>330.69</V>
            <H>2013.52</H>
            <SCALE>1.0</SCALE>
            <ANGLE>90.0</ANGLE>
          </POSITION>
        + <POSITION>
        + <POSITION>
        + <POSITION>
        + <POSITION>
          <POSITION>
        </POSITIONS>
        <CustomerId />
        <ExtId>182534fa-ce67-4745-bc65-f2ba7e71a507</ExtId>
        <Folder>\\eaw11dl306\WDE-AE-DATA\GRP_output\GRP_Prep</Folder>
        <ForceOut>Y</ForceOut>
        <GroupingKey1>LamNo</GroupingKey1>
        <GroupingKey2 />
        <GroupingKey3 />
        <GroupingKey4 />
        <Id>ebb93a7e-ec0c-4cbb-b62c-1bbd75633e56</Id>
        <PageCount number="1" />
        <PageNr number="1" />
        <Rotation>sub</Rotation>
        <Substrate>AluComp 8 mm</Substrate>
        <SubstrateSize>2500x1250</SubstrateSize>
      </JOB>
    + <JOB>
    + <JOB>
    </JOBS>
  </LAYOUT>
```

Table: Clarification of above XML Report of a Layout

| Part of Element | Element | Meaning |
|---|---|---|
| LAYOUT | **TotalLength** | In mm, the total length of the cut path. This enables to get an idea how long a cutting table would take to cut this path. |
| LAYOUT | **COPIES** | The amount of times that his layout will need to be printed (as calculated by the nesting server). |

| Part of Element | Element | Meaning |
|---|---|---|
| LAYOUT | **YIELD** | The surface of used substrate material by this layout ((WIDTH * HEIGHT) * %)). The % of used material is shown in the PDF report (⬛). |
| JOB | **NUMBERUP** | Amount of times this <JOB> (graphic) is present on this layout. |
| JOB | **REMAINING** | Amount of times this <JOB> (graphic) still needs to be printed to produce the requested amount. |
| JOB | **VSIZE** and **HSIZE** | In mm, V and H size of surface that this <JOB> (graphic) occupies on this layout (bounding box), before any rotation. See also below illustration. |
| POSITION | **V** and **H** | In mm, V and H position of this <JOB> (graphic), calculated from the top left of he bounding box of the graphic to the top left of the layout. See this example (to keep the overview, all cut paths were based on the graphic's trim box and not on 'white background'):  |
| JOB | **Folder** | URL of file that was submitted to the nesting server. This is typically the output file of the **Prepare Graphics for Nesting** task. |
| JOB | **ExtId** | Esko internal ID, not useful to non-Esko systems. |
| JOB | **ForceOut** | **Y** indicates that this layout was made after someone used the **Print now** button or after a deadline was reached. This element is not present when the layout was made because the nesting server reached a minimum fill. |
| JOB | **Id** | Esko internal ID, not useful to non-Esko systems. |
| JOB | **PageCount** | Total number of pages of the file in **JOBNAME**. |
| JOB | **PageNr** | Number of page of file in **JOBNAME** that was placed on this layout. |
| JOB | **Rotation** | Rotation of this graphic as it was set in the *Submit to Gang Run* task. **Sub** means "**Set by Substrate Queue**", **Any** means "**Force Allow Any Angle**" and **0, 90, 180** or **270** (clockwise) means those specific angles were decided there. See in above illustration how the rotation is done using the top left corner as axis. |
| JOB | **Substrate** | Name of the substrate queue that this layout was made for. |

| Part of Element | Element | Meaning |
|---|---|---|
| JOB | **SubstrateSize** | Mind that this is the **name** of the substrate size as defined for that substrate queue. |

### Example of XML Report of a Single Graphic:

```xml
<?xml version="1.0" encoding="UTF-8" ?>
- <JOB>
    <Quantity>13</Quantity>
    <FileName>\\eaw11dl306\WDE-AE-DATA\GRP_output\GRP_Prep\fiona_Prep.pdf</FileName>
    <Scale>100.0</Scale>
    <DieShape>CUT</DieShape>
    <Bleed>2.0</Bleed>
  - <Layouts>
      <CUTFILE>\\eaw11dl306\WDE-AE-DATA\GRP_output\155040_AluComp 8 mm.cut</CUTFILE>
      <PDFFILE>\\eaw11dl306\WDE-AE-DATA\GRP_output\155040_AluComp 8 mm.pdf</PDFFILE>
      <WIDTH number="2468.619" />
      <HEIGHT number="1216.476" />
      <COPIES number="1" />
      <NUMBERUP number="7" />
    </Layouts>
    <CustomerId />
    <ExtId>182534fa-ce67-4745-bc65-f2ba7e71a507</ExtId>
    <Folder>\\eaw11dl306\WDE-AE-DATA\GRP_output\GRP_Prep</Folder>
    <ForceOut>Y</ForceOut>
    <GroupingKey1>LamNo</GroupingKey1>
    <GroupingKey2 />
    <GroupingKey3 />
    <GroupingKey4 />
    <Id>ebb93a7e-ec0c-4cbb-b62c-1bbd75633e56</Id>
    <PageCount number="1" />
    <PageNr number="1" />
    <Rotation>sub</Rotation>
    <Substrate>AluComp 8 mm</Substrate>
    <SubstrateSize>2500x1250</SubstrateSize>
  </JOB>
```

In addition to above table for the XML report for layout, this table shows specifics for the XML report of a single graphic:

**Table: Clarification of above XML Report of a Single Graphic**

| Part of Element | Element | Meaning |
|---|---|---|
| JOB | **Quantity** | Remaining quantity for the nesting server to put on other layouts to reach the requested amount for this graphic. |
| JOB | **DieShape** | Name of the cut path as defined in the *Submit to Gang Run* task. |
| JOB | **Bleed** | Maximum bleed for this graphic. This value is the one set as **Bleed Clipping Mask** in the nesting settings of the substrate queue. |
| Layouts | **COPIES** | The amount of times that his layout will need to be printed (as calculated by the nesting server). |
| Layouts | **NUMBERUP** | The amount of times this graphic is placed on this layout. |

| Part of Element | Element | Meaning |
|---|---|---|
| JOB | **ExtId** | Esko internal ID, not useful to non-Esko systems. |
| JOB | **ForceOut** | **Y** indicates that this layout was made after someone used the **Print now** button or after a deadline was reached. This element is not present when the layout was made because the nesting server reached a minimum fill. |
| JOB | **Id** | Esko internal ID, not useful to non-Esko systems. |
| JOB | **PageCount** | Total number of pages of the file in **FileName**. |
| JOB | **PageNr** | Number of page of file in **FileName** that was placed on this layout. |
| JOB | **Rotation** | The value indicates the rotation of this graphic as it was set in the *Submit to Gang Run* task. **Sub** means "**Set by Substrate Queue**", **Any** means "**Force Allow Any Angle**" and **0, 90, 180** or **270** means those specific angles were decided there. |

## PDF Report

A PDF report can be made **For every layout**. Such a report is typically used as instruction for the cutting table operator.

The template of this PDF is fixed, but you can define:

- the **Report Size** (**A4** or **Letter**),

- the **Report Resolution** used for the graphics preview in the report (in **ppi**),

- the **Units** used in the report (**mm** or **inch**).

An example:

173707_PVC

1250.0

2500.0

PVC - 2500x1250mm # = 1 ☑ 76.01% 🗑 23.99%
\\eaw11dl306\WDE-AE-DATA\GRP_output\173707_PVC.pdf
\\eaw11dl306\WDE-AE-DATA\GRP_output\173707$PVC.pdf
\\eaw11dl306\WDE-AE-DATA\GRP_output\173707$PVCT.cut

| | | | | | |
|---|---|---|---|---|---|
| 🟩 | Stevens_Dog_LamNo_100_Prep.pdf | 185.34 x 185.42 | 12/12 | ■Stevens | ■LamNo |
| 🟩 | Stevens_Dog_LamNo_100_Prep.pdf | 185.34 x 185.42 | 76 | ■Stevens | ■LamNo |

A PDF report shows following information:

- (on top) name of the layout and, when not 1, the amount of copies this layout needs to be printed.
- preview and size of the layout
- an area with text:
    - the first line mentions this information: `name_of_substrate`, `name_of_substrate_size`, `# =` `amount_of_copies_this_layout_needs_to_be_printed`, ☑ `used_material` %, 🗑 `wasted_material` %
    - URLs to the print and cut file(s).
- below right, a thumbnail showing the back graphics (⟜🗗). When there are no back graphics, a 🗗 icon is shown instead.
- a list of the graphics on this layout. Per graphic:
    - a patch with an arbitrary chosen color that is also used in the PDF layer "Dummy Colors" (learn more below),
    - name and size of the graphic file on the layout,

- amount of times the graphic is placed on this layout / total requested amount. When **maximum fill** was chosen, only the amount in this layout is shown.

- (when used) custom labels: their name and a patch with an arbitrary chosen color. See further below to learn how hiding PDF layers visualises which graphics have these labels.

### Layers in Layout Reports

When graphics look much alike, it can be helpful to not see the preview but see dummy colors in stead. This makes it much easier to see which one is placed where. An example:
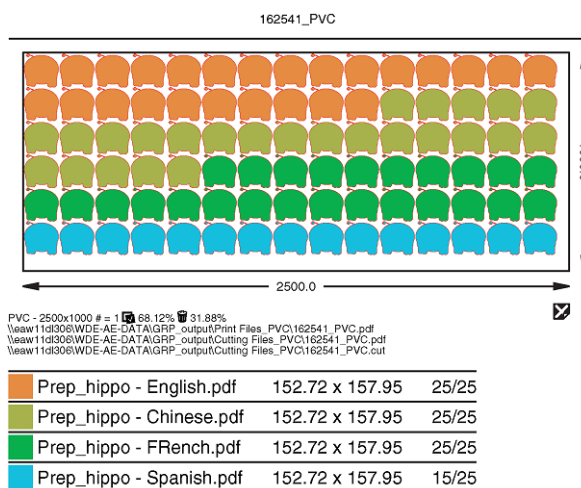


In these PDF reports, the preview of the graphics is a separate layer. You can see or hide layers by switching them on or off in Acrobat. You can also have your workflow create extra versions of this report by removing the preview layer for example. See such a workflow in *this step of one of the examples at the end of this chapter*.

Also the custom labels are shown in a separate layer (learn about custom labels in *Overview of Substrate Queue Entries* on page 33). See this report example in Adobe Acrobat of a layout containing graphics with two custom labels, one for finishing (need for lamination) and one for shipping (type of transport). Only the **Base** layer and the **Transport** layer are shown:
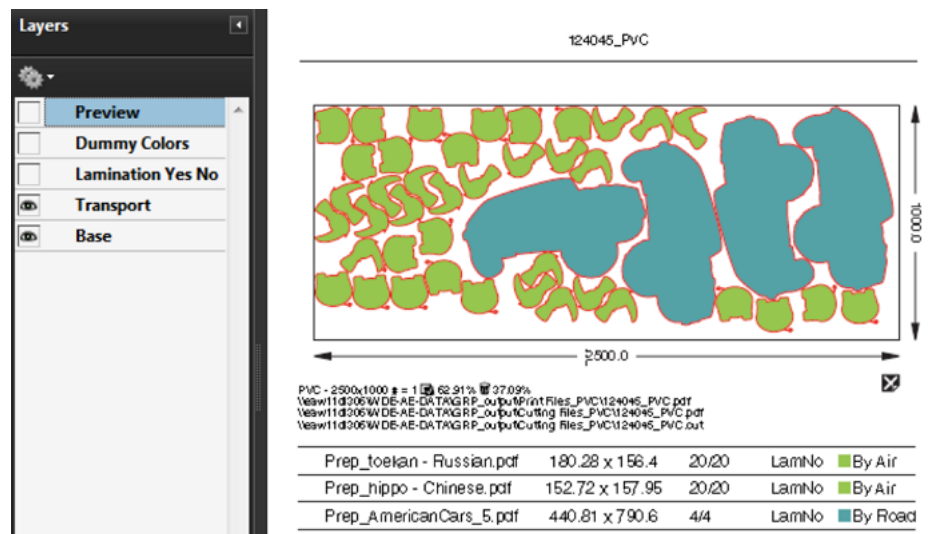
By hiding some layers, it quickly becomes visible which graphics need their transport by air and which ones by road. This quick visual helps your colleagues in the packing and shipping.

See more examples of PDF reports in *Step 10* of the example on *Working with Grouping Keys* on page 113.

# 6. The Orders View

### Concept

This view is targeted to customer service people or production floor managers who want to track orders that used the Gang Run mode and that then (typically after printing) will be produced on a Kongsberg cutting table.

**Note:** Learn more about using Automation Engine to manage your production on a Kongsberg table in the chapter *Kongsberg Production Workflow*.

All information in this view is updated live. It shows the status of all parts of a job **Order** that was processed by a *Gang Run queue*. It helps to monitor orders, especially those where multiple graphics need to be printed and cut.

This workflow and View is also valid when you *submit ARD or MFG CAD files to a Gang Run queue*. For sake of convenience, this view describes both graphics or ARD / MFG input files as '**One-Ups**'.
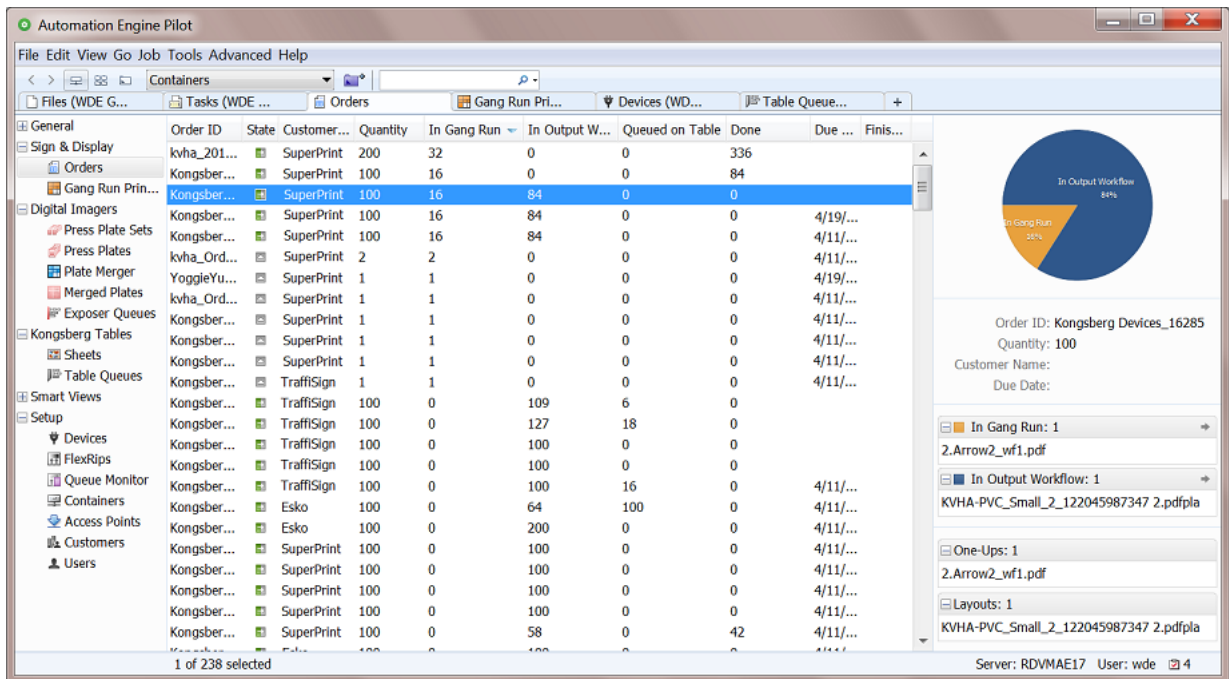


- **An Order is created when** you *submit file(s) to a Gang Run queue* and you there specified an **Order ID** (in the *tab 'Extra'*).

> **Note:** An example: When you have 7 one-ups residing in a same Automation Engine Job and you first submit 5 of them and later the 2 remaining, then:
>
> - Order ID = `[Job Name]_[Short task ID]` will result in 2 different orders (the task IDs are different).
>
> - Order ID = `[Job Name]` will assemble all 7 one-ups in one same order.

To get feedback from the Kongsberg table in this Orders view, the substrate queue needs to, in its *Export Nested Layouts* task, create a cutting file of the type "**JDF file for Kongsberg**". Only this JDF file format can provide that feedback.

- **An Order is Done** when all ordered quantities are produced by one or multiple Kongsberg cutting tables, on one or multiple sheets. When later, extra one-ups enter the gang run queue that use that same Order ID, the state changes from ☑ (Done) back to ⬛ (Partially Done).

- **An Order is removed from this list** when it was removed by the automatic clean up tool *as configured for Device databases* or when its total number of ordered copies changed to 0 (see the note below).

### Columns

> **Note:** As in many views in the Pilot, you can
>
> - re-arrange columns by dragging their title to a new position
> - sort them by clicking on a column title
> - right-click a column title and choose to **Hide** this one or any other. In the list that appears, select **Select Columns...** if you want to change or re-arrange multiple items.
>
> - use filters and optionally save them as a *Smart View*.
>
> - define your preferred unit in **Edit** > **Preferences** > **Units**.

- **Order ID**: ID defined in the *Submit to Gang Run task* that was launched on the one-ups in this order.

- **Customer Name**: Name of the customer of which the Customer ID was defined in the *Submit to Gang Run task* that was launched on the one-ups in this order.

- **Quantity**: Total of all ordered copies, as requested in the *General tab of the Submit to Gang Run task*, for all one-ups belonging to this order. For example: The Quantity of the order is 44 when it expects 44 fruit displays in total, of which 22 apple and 22 banana variants.

  When a one-up is submitted to the Gang Run with quantity "**Maximum Fill**", its (part in the) ordered **Quantity** is counted or shown as " `0` " until the nesting has taken place. Only then, the amount of this one-up that was placed on the layout is added to the total amount of one-ups for the order.

> **Attention:** When one or more one-ups are deleted from a Gang Run substrate queue, or when the quantity was there changed through the **Edit** mode, the order's details in this view will automatically adapt:
>
> • The **Remaining Quantity** of those one-ups is subtracted from the total amount of ordered copies (**Quantity**).
>
> • When the total ordered amount of copies for an order reaches zero, the order is removed.
>
> • The one-ups that, by removing them from the Gang Run, are no longer ordered are also removed from the list of one-ups shown in the right pane.

• **In Gang Run**: Amount of ordered copies (of which the one-ups are still) present in a Gang Run queue.

• **In Output Workflow**: Amount of ordered copies (of which the one-ups are still) in the output workflow of a Gang Run queue.

• **Queued on Table**: Amount of ordered copies present in an iPC's **My Jobs** list (still to be produced).

• **Done**: Amount of ordered copies produced on a Kongsberg table.

• **Status**. General status of the order:

  • **In Gang Run**: When all ordered copies are still in the Gang Run queue.

  • **Done**: When all ordered copies are produced by one or multiple Kongsberg tables.

  • **Partially Done**: This is the status shown in all other cases.

• **Created Date**: Date when order was created, i.e.: when the (first) one-up was submitted for this order.

• **Due Date**: Due date of the first submitted one-up for this order.

• **Finished Date**: Date when the order reached the status **Done**.

### The Right Pane: Pie Chart and Details

• A colored pie chart shows the percentage of ordered copies in one of these states:

  • **In Gang Run**: Part that is still in the substrate queue, waiting to be merged.

  • **In Output Workflow**: Part that are in the workflow where print and cutting files are being made of the nested layout.

  • **Queued on Table**: Part that has its cutting file present as a job in a Kongsberg queue (iPC).

  • **Done**: Part that has been produced on the Kongsberg table. These numbers are updated each time you close or suspend a job in iPC.

• Click ⊞ to see the amount and the names of all the **One-Ups** that were submitted and the amount and names of all the **Layouts** that substrate queues created for this order.

- "**In Gang Run**" shows the amount and the names of one-ups that are still in their substrate queue. Click ➡ to switch to the *Gang Run Printing view* and see the substrate queue where the related one-ups still are. When you here click on the name of the one-up, the same view opens but that one-up is also selected.

| ⊟ 🟧 In Gang Run: 1 | ➡ |
|---|---|
| Arrow2_wf1.pdf | |

**Tip:** Use the arrow buttons ◁ ❯ 🖥 🔲 in the Pilot tool bar to come back to this previous view.

- "**In Output Workflow**" shows the amount and the names of layouts that the gang run created but that have not yet arrived in a Kongsberg queue (iPC). Click ➡ or on a layout name to open the Tasks view and see only the corresponding tasks.

| ⊟ 🟦 In Output Workflow: 1 | ➡ |
|---|---|
| KVHA-PVC_Small_1_107805637199.pdfpla | |
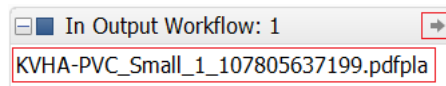
- "**Queued on Table**" shows the amount and the names of layouts that are present in a Kongsberg queue (iPC). Click ➡ or on a layout name to open the *Table Queues view* and see that item selected.

| ⊟ 🟦 Queued on Table: 1 | ➡ |
|---|---|
| KVHA-PVC_Large_1_6292126148.pdfpla | |
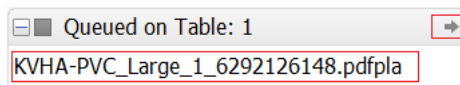
**Seeing Overruns**

When the percentage of copies of one-ups in one part of the chart is larger than 100%, the part above 100% is shown in a slightly darker color. This visualises the size of the overrun.

See this example where 25 were ordered but 31 were produced ("Done" = 124%):
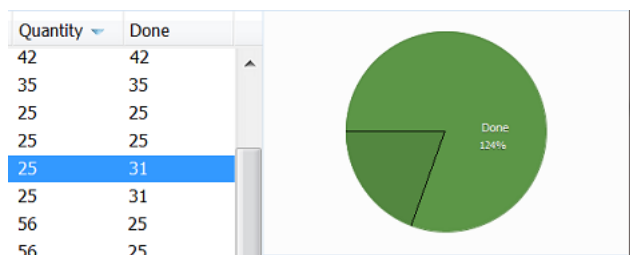


The amount of copies can become larger than 100% in these cases:

- When the gang run queue places more copies on a sheet than initially ordered (see the option *Maximum Overrun* in the Substrate Queue's Nesting Settings).

- When the Kongsberg table operator decides to cut more sheets than initially ordered.

- When more sheets are submitted to the Kongsberg table than initially ordered. This can happen when you overruled the number of copies in the *Submit to Kongsberg table* task.

For orders with a large number of copies, in stead of there leaving the option **Copies** to its default value **From Input File**, you could edit that field and for example submit half of the copies to table A and then launch the task again and submit the other half to table B.

# 7. Examples

These examples will help you build and understand some typical workflows.

- *This example* shows a basic workflow. It uses the **Shuttle** and shows how to uses **Public** and **Workflow parameters**.

- *This example* shows how grouping keys help control the nesting. It uses a **Folder Access Point** and **SmartNames** to extracts parameters from the names of the incoming files.

- *This example* shows how a workflow that is based on delivery of XML files. All required parameters are defined in the XMLs, including references to graphics.

## 7.1. Basic workflow using the Shuttle

### Summary

In this example, a user will use the **Shuttle** to drop PDF files onto a "Submit to Gang Run" workflow. He will be asked to specify some options for that workflow. All the rest, including the output of nested layouts, will happen fully automatic.

This example specifically guides you in using workflow parameters that also become public parameters.

We assume you have been introduced to the tools we use in this example:

- The *Pilot*. To create the workflows and the substrate queue.

- The *Workflow Editor*.

- *Public parameters*.

- *Workflow parameters*.

- The *Shuttle*. This basic client tool enables to drag and drop files onto Automation Engine workflows.

### 7.1.1. Step 1 - Create the Substrate Queues

In the Pilot, create these 3 substrate queues:

- **PVC** (sheet)

- **AluComp 8 mm** (sheet)

- **Vinyl Roll 2 mm** (roll)

For each of these substrate queues,

- add minimally 1 substrate size

- in their **Nesting Settings**, set the minimum fill to 50%

- we do not have an output workflow yet, so leave that setting open. The icon of the substrate queue will show a warning sign, but we will ignore and solve this in step 5 of this example.

## 7.1.2. Step 2 - Create the Submit Workflow

The "submit" workflow is the workflow that will be launched on the files dropped on the Shuttle. Typically it prepares your PDFs and ends with the **Submit to Gang Run** task.

The workflow that we here create is one of many possible variations. More important is the way we create the workflow parameters and public parameters.

Here is our example:
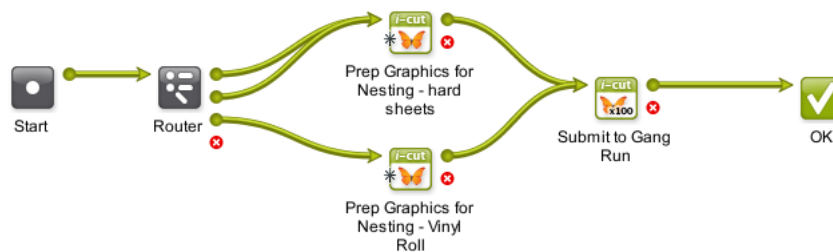


Follow these steps to create this workflow:

1.
   In the Pilot **Tickets** view, click  to open the workflow editor and create a workflow. First simply add and connect the above steps. We will add details later, including the Router's 3 different output pins. Learn more about creating workflows *here*.
2. Save your workflow as "`GRP_EXA1_Submit`".
3. Go to the menu **Advanced** > **Manage Workflow Parameters**. Click **Add** to add these 3 parameters, their value is at this point less important:
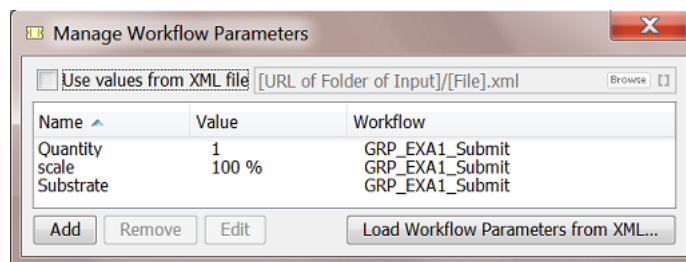


   When finished, close this dialog. We can now use these new workflow parameters in the tickets.
4. The **Router** uses the new (workflow) SmartName `[wfp.Substrate]` that you just created. We route based on the name of the substrate queue, a decision taken by the Shuttle user.

   **Note:** You can use "**is equal to**" and enter their name in detail or use **"contains"** if this is easier.
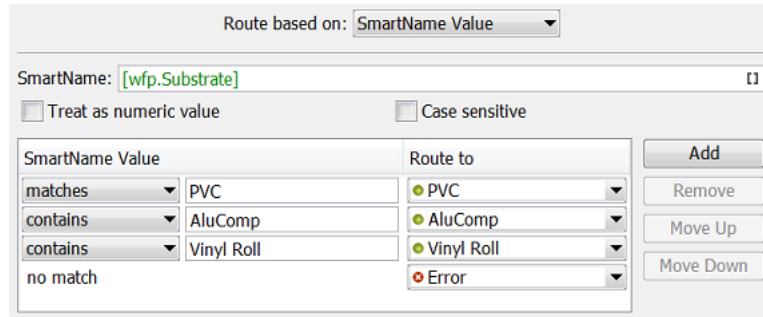
5. Next we have 2 different **Prepare Graphics for Nesting** steps. This is only a suggestion ; their only difference could for example be the way they create the cut path or the SmartMarks they add. In our example, the bottom step is used for roll-output.

6. Connect the **Router** output pins to their matching **Prepare Graphics for Nesting** step.

7. In the **Submit to Gang Run** step, add the other 2 workflow parameters for **Quantity** and **Scale** as shown here:
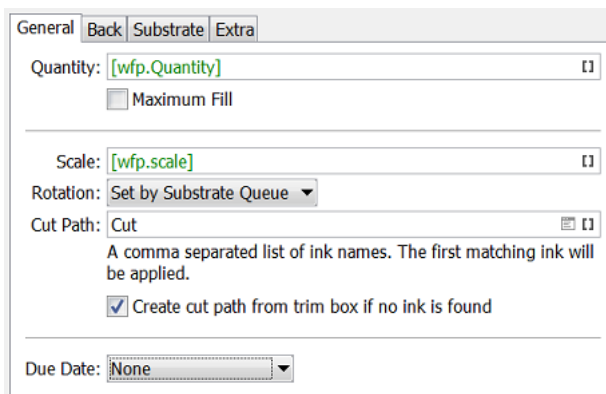


8. Workflow parameters automatically become public parameters. Follow the next steps to fine-tune the dialog in which they will be shown to the Shuttle user. Still in the workflow editor, go to the menu **Advanced** > **Manage Public Parameters**. The dialog will already list the workflow parameters. We only need to add some details.
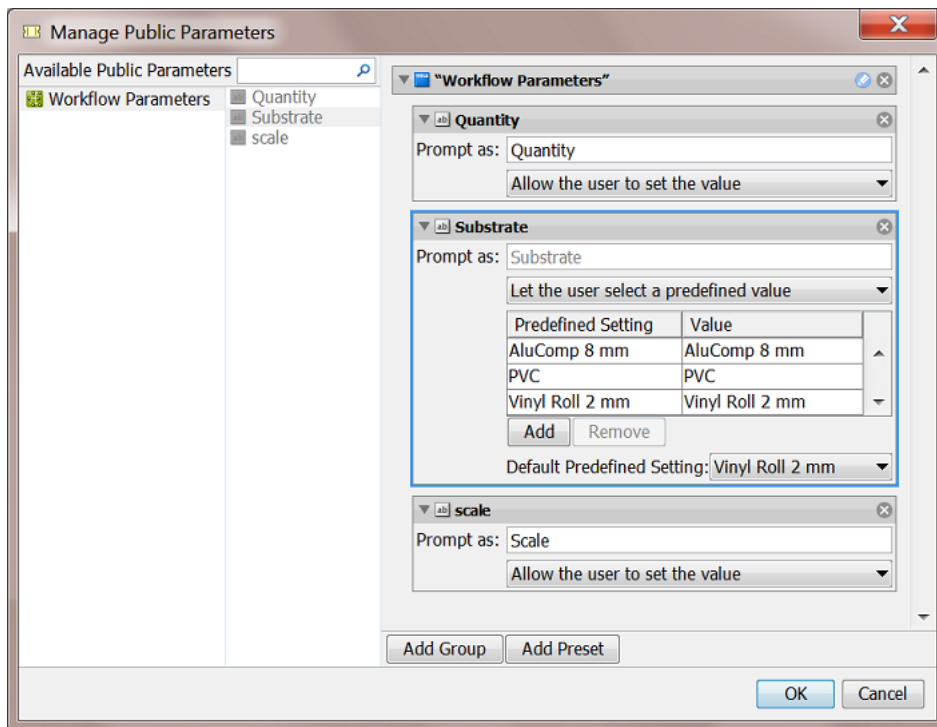
9. Add the specifics as shown in above screen shot. Click **OK** to confirm.
10. Save your workflow and close the workflow editor.

### 7.1.3.  Step 3 - Create the Output Workflow

The output workflow is the one launched by the substrate queue on the nested layouts that it created.

We will use below example. Just like with the 'Submit' workflow in *Step 2*, this is also just one of many possible variations. Again, the most important here is how we use workflow parameters.
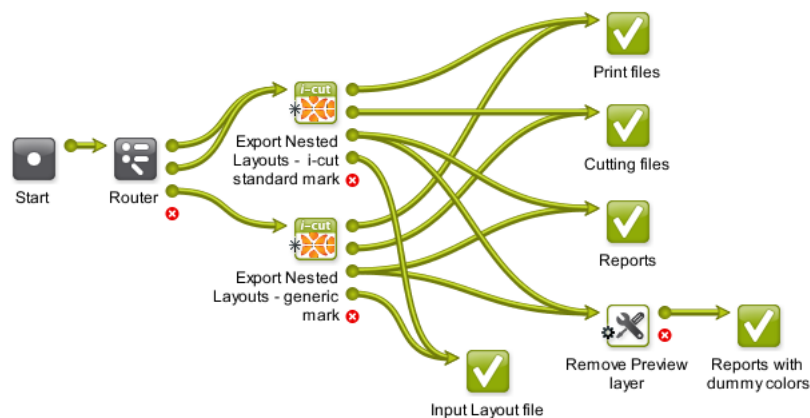


Follow these steps to create such a workflow:

1. As you did in the previous step, just simply add the workflow's steps. We will add details and more transitions later. The "Remove Preview Layer" step at the end is actually an **Optimize PDF document** ticket that was renamed. Learn more about creating workflows *here*.

2. Save your workflow as "`GRP_EXA1_Output`".

3. Go to the menu **Advanced** > **Manage Workflow Parameters**. You will see 4 substrate related parameters that were added by default. This is because we used the **Export Nested Layouts** step in this workflow. In this example, we do not need any others. Close the dialog.
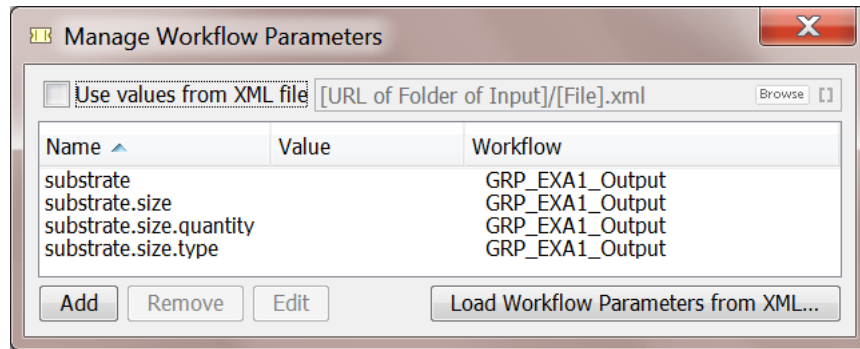


We will now use one of these workflow parameters in the tickets:

4. Much like in *Step 2*, the **Router** should use the (workflow) SmartName `[wfp.substrate]`.
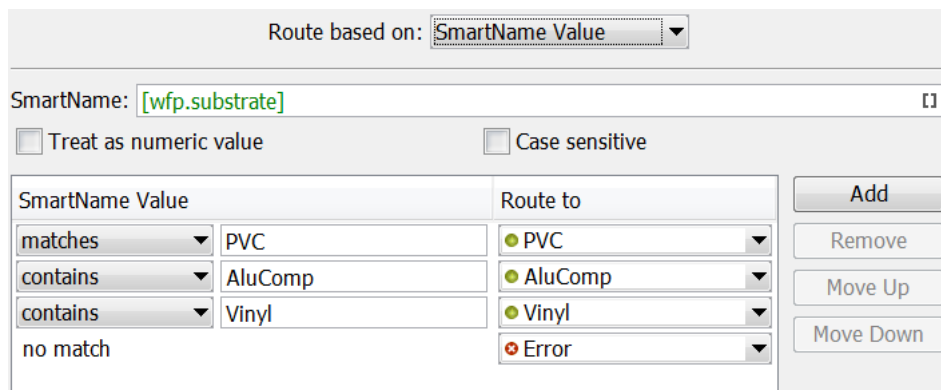


5. The 2 **Export Nested Layouts** only differ in the set of SmartMarks that they add. The `Vinyl` route uses the bottom one. Here is an example of how we use the workflow parameter `[wfp.substrate]` in output file names and folders:

6. The default output pins of both **Export Nested Layouts** steps (print, cut, report and input files) connect to an own end **OK** step that was renamed.

7. The **Report** files of the **Export Nested Layouts** steps continue to an **Optimize PDF document** step that creates an extra report in which the preview layer was removed:



Learn more about layout reports and their layers in *here*.

8. Save your workflow and close the workflow editor.

## 7.1.4. Step 4 - Add the Output Workflow to the Substrate Queue

Now complete the setup of the 3 substrate queues.

For each substrate queue, follow these steps:

1. double click the substrate queue to open and edit it.
2. in **Output Workflow**, select the workflow we created in *Step 3* ("GRP_EXA1_Output").
3. click **OK**.

Here is an example of the PVC substrate queue:
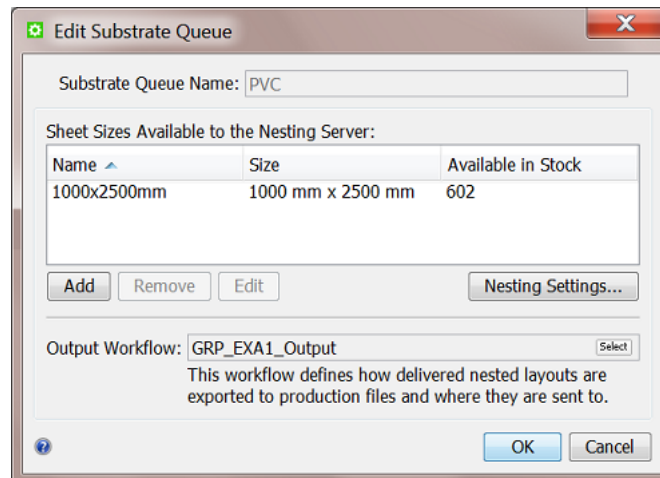
## 7.1.5. Step 5 - Add the Submit Workflow to the Shuttle

Our Gang Run workflow is now ready for use from the Pilot.

When you set up a **Folder Access Point** and have it launch the submit workflow on the PDFs that you drop on that folder, you will not have an opportunity to specify important parameters like **Quantity** and **Substrate Queue**...

That is why we will here use the **Shuttle**. This tool enables us to have the user that drops the files answer some quick questions about the wanted parameters.

Follow these steps to set this up:

1. On your client, start the **Shuttle** and login with an Automation Engine user name and password.
2. Use the Shuttle's **View** menu to make sure you see the **Launch Panel**.
3. Click left-below on the ⊕ icon to create a launch pad for a workflow. Files that you drag and drop onto this pad will be launched on an Automation Engine workflow.
4. Select the workflow from the list. We here only need the submit workflow, the one we named "`GRP_EXA1_Submit`".
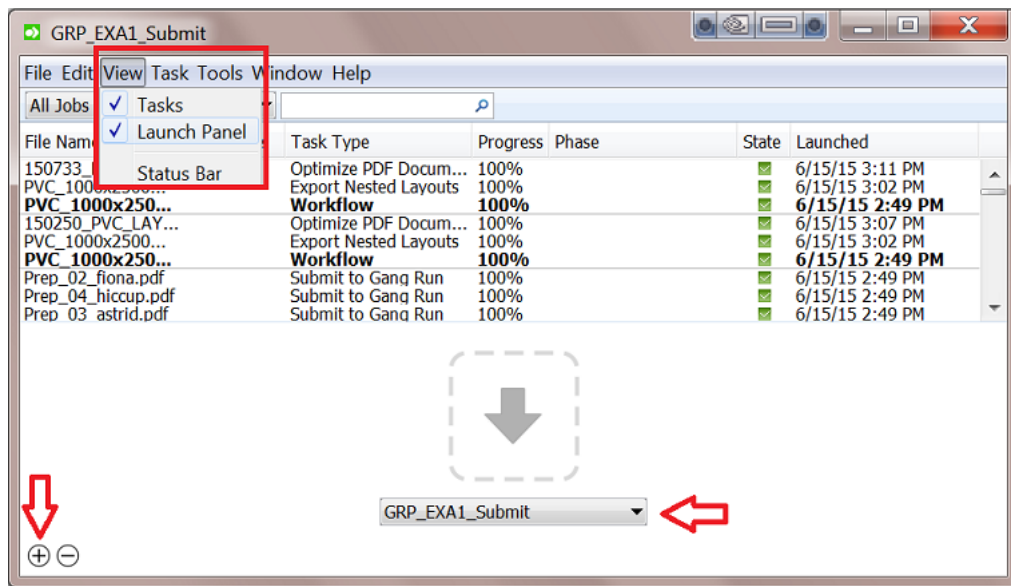
## 7.1.6.  Step 6 - Test and Monitor

We test our workflow by dropping files on the **Shuttle** and defining the public parameters. All the rest happens fully automatic. Many of below steps only serve to illustrate how you can monitor this workflow in more detail.

1.  On your local PC or any place you can access in your network, select files that will share the same production parameters. In our example we select 3 PDFs of which we need 10 prints on PVC sheet material.

2.  Drag and drop these files together on the launch pad of our submit workflow.

3.  A **New Task** dialog will appear asking you only to define the values for the public parameters:
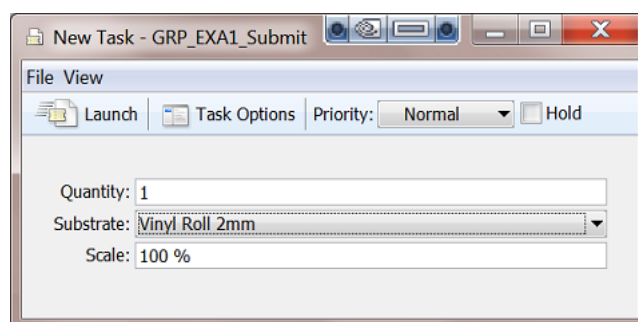


**Note:**  The way they appear in this dialog (name, order, default value) is as we set up in *Step 2* in the **Public parameters** dialog.

4.  Set the **Quantity** to `10`, change the **Substrate** to `PVC` and click on **Launch** You will see the tasks start in the Shuttle's **Tasks** view.

5. Just for information, we have a look at the **Substrate Queue** in the Pilot, which is waiting for more graphics to reach its minimum fill.
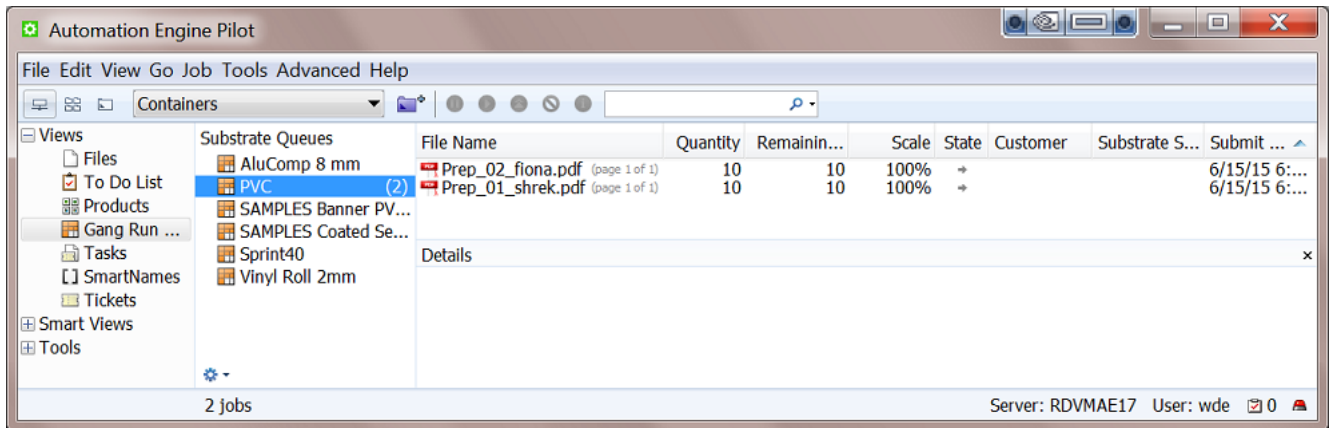


6. We go back to the Shuttle and now drag and drop the same 2 files + 2 other files on that workflow launch pad. This time we will want a different quantity and scale.

7. Because Shuttle recognizes files, it now first asks if you want to be shown the parameters again that you used the last time for that same file:
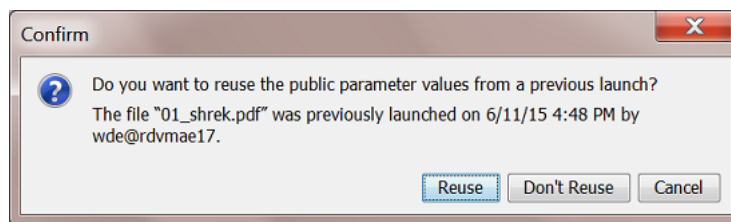


We here click on **Reuse**.

8. A **New Task** dialog opens and shows the parameters that we used previously for the mentioned file. For the 4 files that we are dropping now, set the **Quantity** to `20`, keep (reuse) the **Substrate** to `PVC`, and change the **Scale** to `200`. Then click on **Launch**.

9. In the Pilot, we can monitor the PVC substrate queue. In our example, it reaches a minimum fill and so starts creating layouts on which it then launches the output workflow.

> **Tip:** You can force this layout-creation by using the ⬆ **Print Now** button or by lowering the **Minimum Fill** percentage in the substrate queue's **nesting settings**.

10. When files are disappearing from the substrate queue, you can go to the **Tasks** view to monitor their output. Double click (one of) the launched output workflow(s) to open the workflow editor. This is how one of them looks in our example:
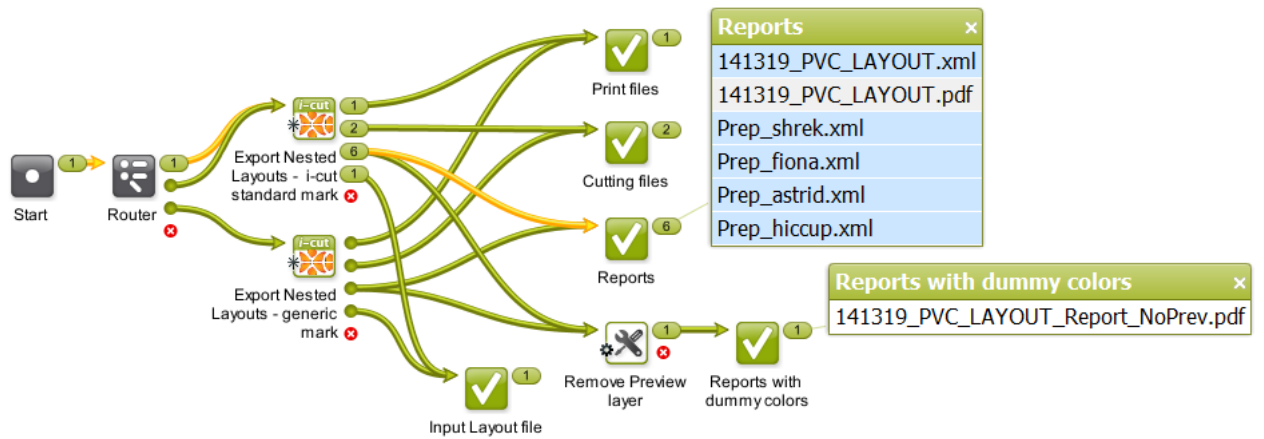
Here's a view of the report file with the preview:



## 7.2. Working with Grouping Keys

As explained in *Working with Substrate Queues*, **Grouping Keys** can help control which graphics end up on the same layout.

In this example we will submit a group of PDFs to be nested but we will make sure there are no layouts with graphics from different customers nor layouts that combine graphics who need lamination and others that don't.

### Where can we get that information from a PDF (it's customer and whether it needs to be laminated)?

There are multiple ways to get such information:

- When using the Shuttle, **a user could type in** the customer name (as a public parameter). This concept was illustrated in the previous example *Basic workflow using the Shuttle* on page 104.

- When the PDF resides in a Job Folder of an Automation Engine **Job**, then the customer and production parameters will be available as Job Parameter *SmartNames*. However, many customers using the Gang Run Printing mode choose to not use this *Job concept*.

- These parameters can also be part of an **XML** that your MIS (business system) sends to Automation Engine. This is a powerful automated workflow that is illustrated in *the example of an XML driven workflow*.

- In this example, we will assume that those parameters are **part of the name of the PDF** input files that are dropped on a *Folder Access Point*. SmartNames will extract those fields from the file name and workflow tickets will then use those SmartNames as values.

### Tools used in this example

Next to the Gang Run Printing view, we also make use of

- String Extract *SmartNames*

- A *Folder Access Point*

- *Building Workflows*.

## 7.2.1. Step 1 - Set up the Grouping Keys

Grouping keys can be created in the **Configure** panel. Learn details about this panel in *Gang Run Printing*.

For this example, follow these steps:

1. In the Pilot, go to **Tools** > **Configure**.
2. In the **Gang Run Printing** item of this Configure panel,
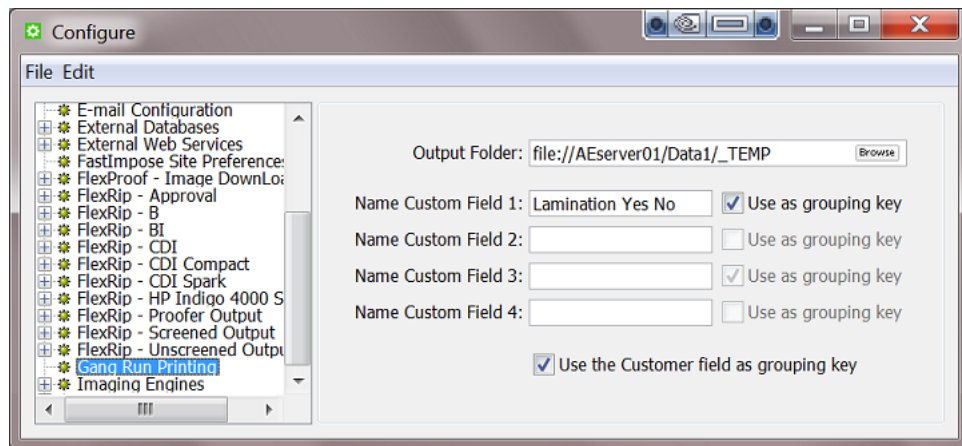
- name the **Custom Field 1** "`Lamination Yes No`" and select the option **Use as grouping key**

- select the option **Use the Customer field as grouping key**.

3. Save these settings (**File** > **Save**) and close the panel.

We will use these grouping keys in *Step 4*, when we pick them up in the **Submit to Gang Run** ticket.

### 7.2.2. Step 2 - Create the SmartNames

We will use these 4 files:

| PDF file name | Preview |
|---|---|
| Stevens_Dog_LamNo_36.pdf |  |
| Stevens_Entrance_LamYes_36.pdf |  |
| ZooWorld_Flamingo_LamYes_90.pdf |  |
| ZooWorld_elephant_LamYes_20.pdf |  |

Notice how the PDF file names are constructed as
`CustomerName_DesignName_NeedForLamination_Quantity.pdf`. We will use
SmartNames to extract the needed information from the file name.

> **Note:** To give you an idea when selecting your own graphics for this example, know that above
> samples are all approximately 200 mm by 200 mm.

### String Extract SmartNames

Follow these steps to create the required SmartNames (find more details in *Use Separation
Character*):

1. In the Pilot's **SmartNames** view, click 〔〕⁺ to create a new SmartName.
2. Keep the default type **String Extract**.
3. Click **Insert SmartName** and in the category **File Information**, select the **File** and **Insert** it
   onto the canvas.
4. In **Extract part**, select **use separation character**.
5. In **Separation Character**, select the underscore character.
6. In **String Part**,

   a. select 1, click **Save As...** and name it `Underscore_Sep_Part1`.
   b. select 2, click **Save As...** and name it `Underscore_Sep_Part2`.
   c. select 3, click **Save As...** and name it `Underscore_Sep_Part3`.
   d. select 4, click **Save As...** and name it `Underscore_Sep_Part4`.

7. Now test the SmartName by, in the **Extract part of...** canvas, replacing `[File]` by typing
   an example of such a complete file name. Then change the **String Part** settings below to
   immediately see the result below in the dialog. There is no need to save at this point.
8. Click **Cancel** to close the dialog.
9. Back in the **SmartNames** view, see the resulting 4 SmartNames:
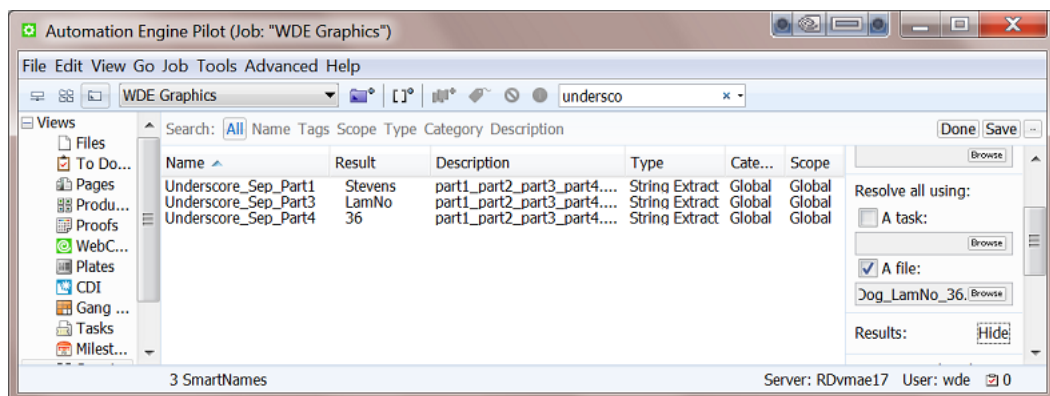


The screen shot also shows the **description** (added in the save-dialog). We also used the
function **Resolve all using** and selected a valid example file. This allows to preview the
**Results** in the extra column. Learn more on this in *this page in the chapter on SmartNames*.

## 7.2.3.  Step 3 - Create the Substrate Queue

1. In the Pilot's **Gang Run Printing** view, go the menu **File** > **New Substrate Queue...**.

2. Choose **Sheet** or **Roll** (not relevant for this example) and click **OK.**
3. Set the name to "`PVC`" and add a **Size** of `2500 x 1250 mm`. In **Nesting Settings...**, set the **Minimum fill** to `45%`. We will add the output workflow later in *Step 7*.
4. Click **OK** to confirm and close.

## 7.2.4.  Step 4 - Create the Submit Workflow

The *"submit"* workflow is the workflow that will be launched on the files that are dropped onto the Folder Access Point. Typically it prepares your PDFs and ends with the **Submit to Gang Run** task.

The workflow that we create in this step is one of many possible variations. More important is the way we use the SmartNames.

Here is our example:
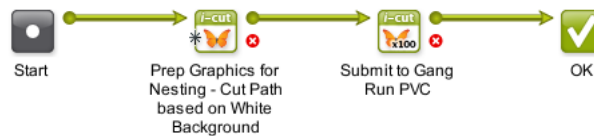


Follow these steps to create this workflow:

1. In the Pilot's **Tickets** view, click  to open the workflow editor and create a workflow. First simply add and connect the above steps. We will add details later. Learn more about creating workflows *here*.
2. Save your workflow as "`GRP_EXA2_Submit`".
3. In the **Prepare Graphics for Nesting** step, use **White Background** to base our cut path on (with our example PDFs). Choose bleed and SmartMarks as you wish. We propose to write the resulting prepared files in a specific folder and with a specific name like `[File]_Prep`.

   **Note:**  Notice that this will add another suffix with an underscore to the input file name. This will not break the extraction logic that the SmartName uses.

4. In the **Submit to Gang Run** step, use the SmartNames:

   • in the tab **General**, add the SmartName that uses the extracted value for **Quantity**:
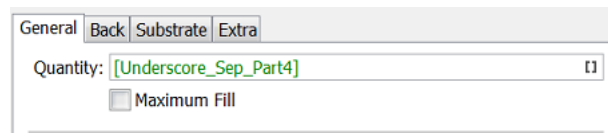
   

   • in the tab **Substrate**, do not use a SmartName for the substrate but we pick **PVC** from the list.

> **Attention:** This makes our submit workflow one that is only fit for this substrate queue. We will remember this in *Step 5* when we define the name of the **Folder Access Point** that will start this workflow.

- in the tab **Extra**, add the SmartName that uses the extracted value for **Customer ID** and for the custom field **Lamination Yes No** (that we created in *Step 1*):

| General | Back | Substrate | Extra |
| --- | --- | --- | --- |

| | |
| --- | --- |
| Customer ID: | [Underscore_Sep_Part1]  Select  [] |
| Lamination Yes No: | [Underscore_Sep_Part3]  [] |
| Custom Field 2: | [] |
| Custom Field 3: | [] |
| Custom Field 4: | [] |

**5.** Save your workflow and close the workflow editor.

## 7.2.5.  Step 5 - Create the Folder Access Point

Creating **Folder Access Point**s is documented in detail in *Creating or modifying a Folder Access Point*.

Follow these steps to create what we need for this example:

**1.** In the Pilot, go to **Tools** >  **Access Points**.

**2.** Click on 🔽, choose the type "**Folder**" and click **OK**.

**3.** Choose a logic name. Remember that the workflow it will launch is specific for the substrate queue "PVC". We therefore advise to put that important fact in the name. For example: "`GRP_EXA2_PVC`".

**4.** In **Folder settings**, choose the folder that will serve as Access Point for the incoming PDFs.

**5.** In **Automatic Actions**, define a processing folder and choose to **Launch a Workflow** and select "`GRP_EXA2_Submit`" (the one we created in *Step 4*).

| Modify Folder Access Point | | |
| --- | --- | --- |
| Name: | GRP_EXA2_PVC | |
| Description: | For example 2 in doc GRP | |

| Folder Settings | Monitoring | Automatic Actions |
| --- | --- | --- |

| | |
| --- | --- |
| Move Files to: | file://AEserver01/PDF_DATA/GRP_HOT_AP/work  Browse  [] |
| | This is the folder where files will be processed. |
| Rename Files to: | [] |
| Action: | Launch Workflow ▼  Options... |
| Workflow: | GRP_EXA2_Submit  Select |

OK   Cancel

6. Click **OK** to close the dialog.
7. Check the updated list of Access Points. Notice whether it is **Active** or not.

## 7.2.6. Step 6 - Create the Output workflow

We still need to define what needs to happen to the layouts that our Substrate Queue "PVC" will create.

We will create this basic example (a simplified version of the one we already used in *Example 1*):
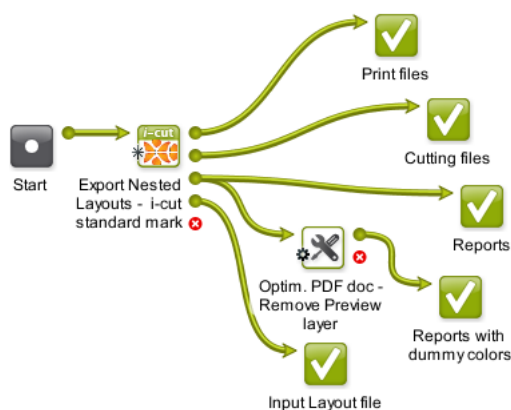


Follow these steps to create this output workflow:

1. 
In the Pilot **Tickets** view, click [icon] to open the workflow editor and create a workflow. First simply add and connect the above steps. Learn more about creating workflows *here*.
2. Save your workflow as "`GRP_EXA2_Output`".
3. In the **Export Nested Layouts** step, the only thing that is specific in this example is the smart definition of the **Output Name** of (all) our **Production File(s)**:

- the SmartName `[wfp.substrate]` is a workflow parameter that is created automatically when you use this task type in a workflow. Click on `[ ]` and select it from the list of SmartNames, from its **category** "Workflow Parameters".

- the SmartName `[wfp.Lamination Yes No]` is also one that we want to add here but it will not yet appear in the list of SmartNames. Remember that this one started as a custom field (and grouping key) that we created in *Step 1*.

  This custom field will only appear automatically as a SmartName Workflow Parameter after the nesting server passed this information a first time to this output workflow. This means that we first have to run the whole workflow once and can then come back to this part of the workflow to pick up that new SmartName.

  At this time, we will continue without adding that extra SmartName `[wfp.Lamination Yes No]`, but we will come back to this ticket in *Step 9*.

4. Much like in the previous example, the **Report** files continue to an **Optimize PDF document** step that creates an extra report in which the preview layer was removed (*same settings as in previous example*).
5. Save the workflow.

## 7.2.7.  Step 7 - Add the Output Workflow to the Substrate Queue

Although the output workflow is not final yet, we can already complete the setup of the substrate queue by adding it's name to the queue's setup.

Follow these steps:

1. Double click the substrate queue "PVC" to open and edit it.
2. In **Output Workflow**, select the workflow we created ("`GRP_EXA2_Output`").
3. Click **OK**.

## 7.2.8.  Step 8 - Test a first time

We now do a test-run of our whole example workflow, starting with the Folder Access Point.

Follow these steps:

1. Drop the 4 files described in *Step 2* on the folder that the **Folder Access Point** is monitoring.
2. Unless a minimum fill is not reached, all the rest should happen automatically.

   - The Pilot's **Tasks** view should show the 4 submit workflows, one for each input file.
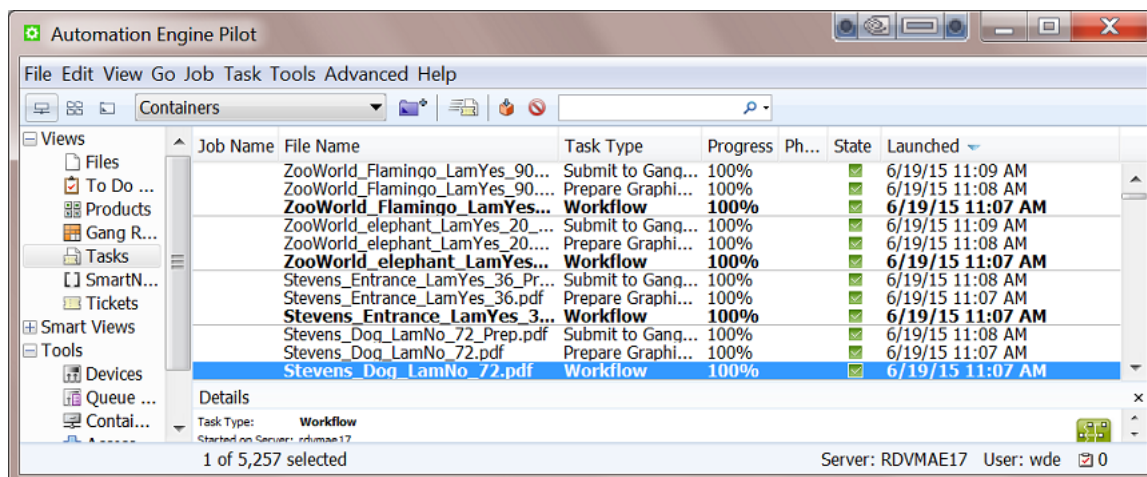
- Shortly after, the **Gang Run Printing** view should these show graphics entering our **PVC** substrate queue.

- If, after a few minutes, these jobs are not output automatically, you can force the layout-creation by using the  **Print Now** button or by lowering the **Minimum Fill** percentage in the substrate queue's **Nesting Settings**.

- Once output workflows have started (we only need one), we can open one of them and add the extra workflow parameter SmartName (see ).

## 7.2.9.  Step 9 - Add the Custom Workflow Parameter to the Output Workflow

After this first execution of this workflow, we can pick up the extra workflow parameter and start using it inside the workflow tickets.

Follow these steps:

1. In the Pilot **Tasks** view, double-click (one of the ) finished output workflows to open them in the workflow editor.
2. Go to **Advanced** >  **manage Workflow Parameters** and notice that we now have 2 extra workflow parameters:
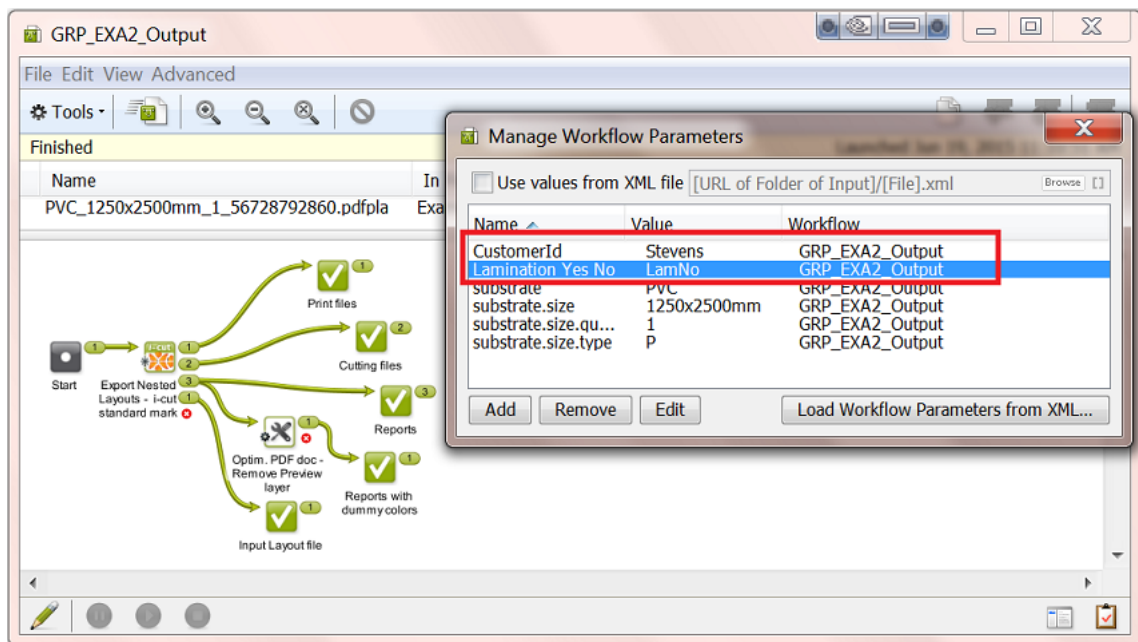
3. Double click the step **Export Nested Layouts**. In the tab **Production Files**, in the field for **Output Name**, click on [ ] and see the new workflow parameter SmartNames. Select `[wfp.Lamination Yes No]` and insert it to the Output Name field. This should be your result: Output Name: `[Time]_[wfp.substrate]_[wfp.Lamination Yes No]` [ ] .

4. Close the **Export Nested Layouts** step and choose **Save Ticket as...** to save it with the same name it had before: "`GRP_EXA2_Output`". Confirm to **replace** the ticket with the same name.

The workflow is now complete.

## 7.2.10. Step 10 - Test Again and See Result of Grouping Keys

We now test the completed workflow again. We will also indicate the effect of the grouping keys that we used.

Follow these steps to test the whole workflow:

1. Remove any remaining graphics in the **PVC** substrate queue.
2. As we did in *Step 8*, again drop the 4 input PDF files onto the **Folder Access Point**.
3. Now monitor what is happening in the Pilot's Gang Run Printing view: we see all 4 graphics and also see that the custom fields created *Step 1* are appearing as extra columns:
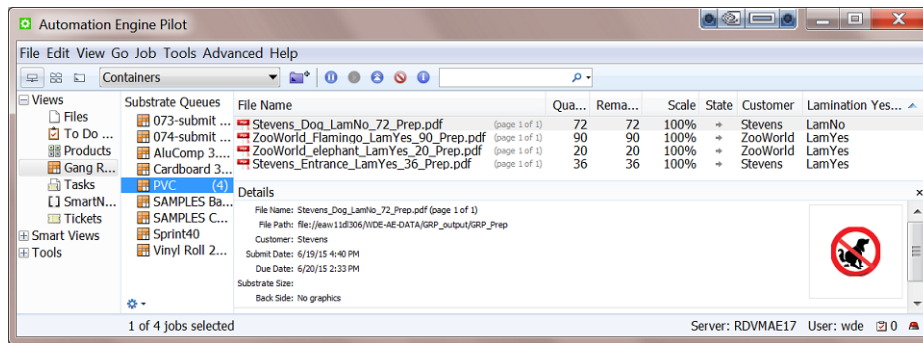
4. In this example, the combination of the grouping keys and the queue's nesting settings makes that no layouts are decided (and no output workflows are launched).

   To force this output, we select all 4 graphics and click the **Print Now** button 🔼. The nesting server calculates and creates layouts.
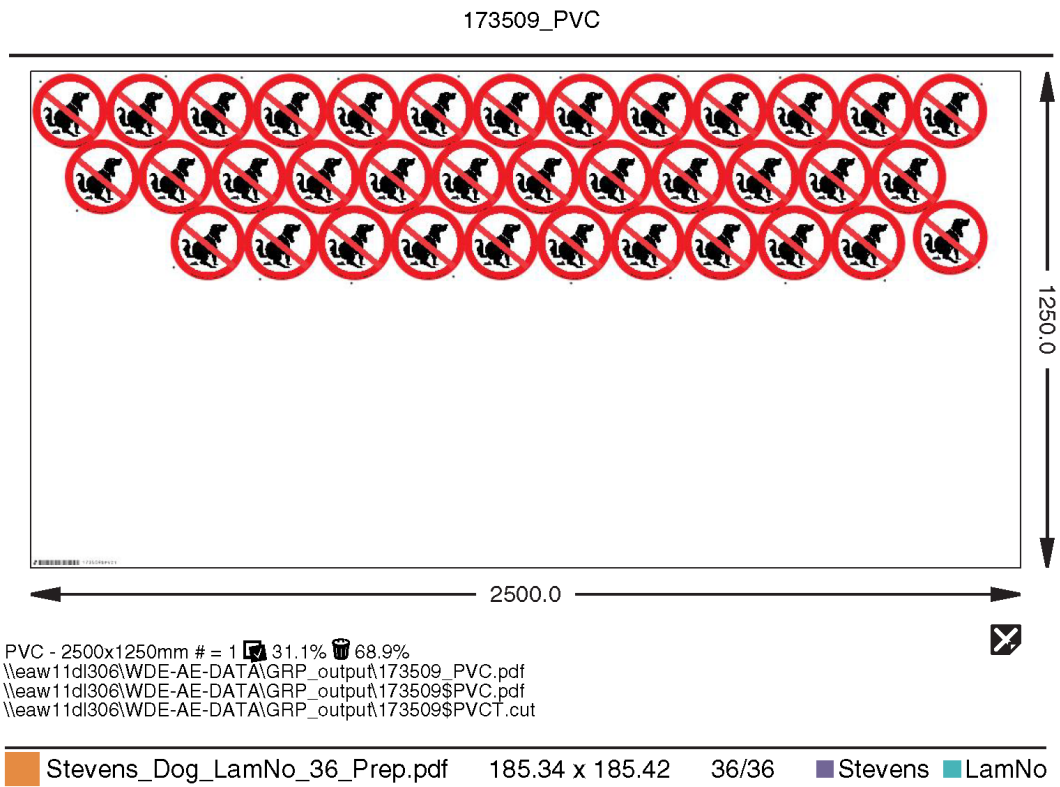
5. In the Tasks view, we see the output workflows start, one for each created layout. Below we show the output PDF reports of each of these workflows. Open it by double clicking the Report PDF on the `Report Files` output pin:
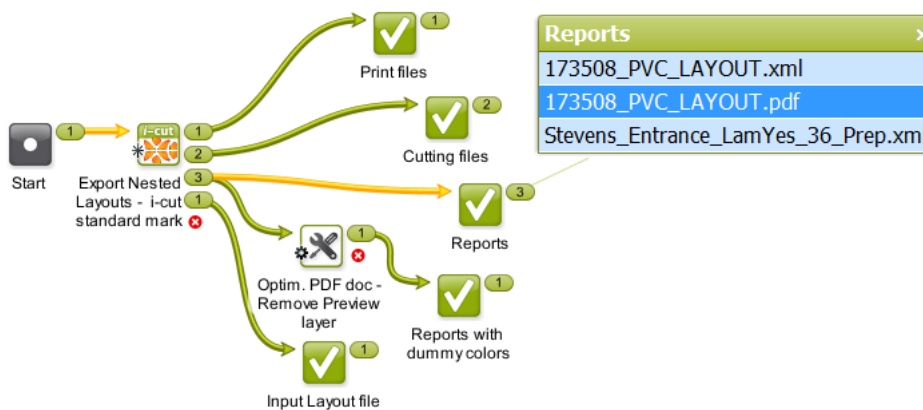


### Layout 1: the "Dog" file

This file used the grouping key values "`Stevens` and "`LamNo`". No other file shared both of those, so the output depended solely on the queue's minimum fill percentage.

The resulting report shows us

173509_PVC

PVC - 2500x1250mm # = 1 ☑ 31.1% 🗑 68.9%
\\eaw11dl306\WDE-AE-DATA\GRP_output\173509_PVC.pdf
\\eaw11dl306\WDE-AE-DATA\GRP_output\173509$PVC.pdf
\\eaw11dl306\WDE-AE-DATA\GRP_output\173509$PVCT.cut

| | | | | |
|---|---|---|---|---|
| 🟧 | Stevens_Dog_LamNo_36_Prep.pdf | 185.34 x 185.42 | 36/36 | 🟪 Stevens 🟦 LamNo |

- only "dog" signs, no other graphics, not even the "Entrance" file that was also for customer Stevens.

- a fill rate of 31,1 %, lower than the queue's minimum fill rate of 45%.

- below right, the report mentions the custom fields as 2 extra labels.

### Layout 2: the "Entrance" file

This file used the grouping key values "Stevens and "LamYes". There were 2 other graphics with "LamYes", but they had a different customer grouping key. So also here, the output depended solely on the queue's minimum fill percentage.

The resulting report shows us

173508_PVC
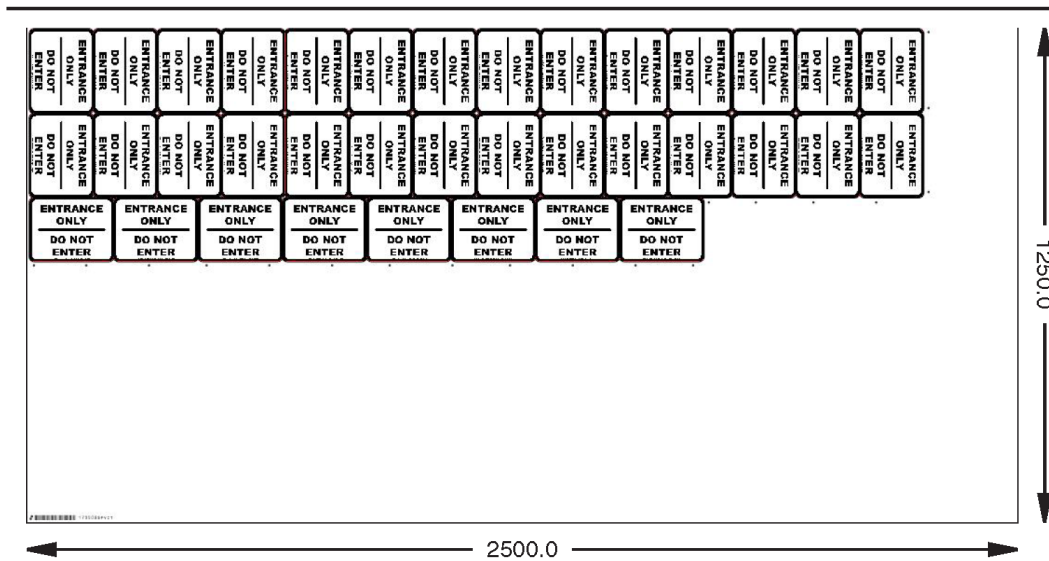


PVC - 2500x1250mm # = 1 ☒ 39.42% 🗑 60.58%
\\eaw11dl306\WDE-AE-DATA\GRP_output\173508_PVC.pdf
\\eaw11dl306\WDE-AE-DATA\GRP_output\173508$PVC.pdf
\\eaw11dl306\WDE-AE-DATA\GRP_output\173508$PVCT.cut

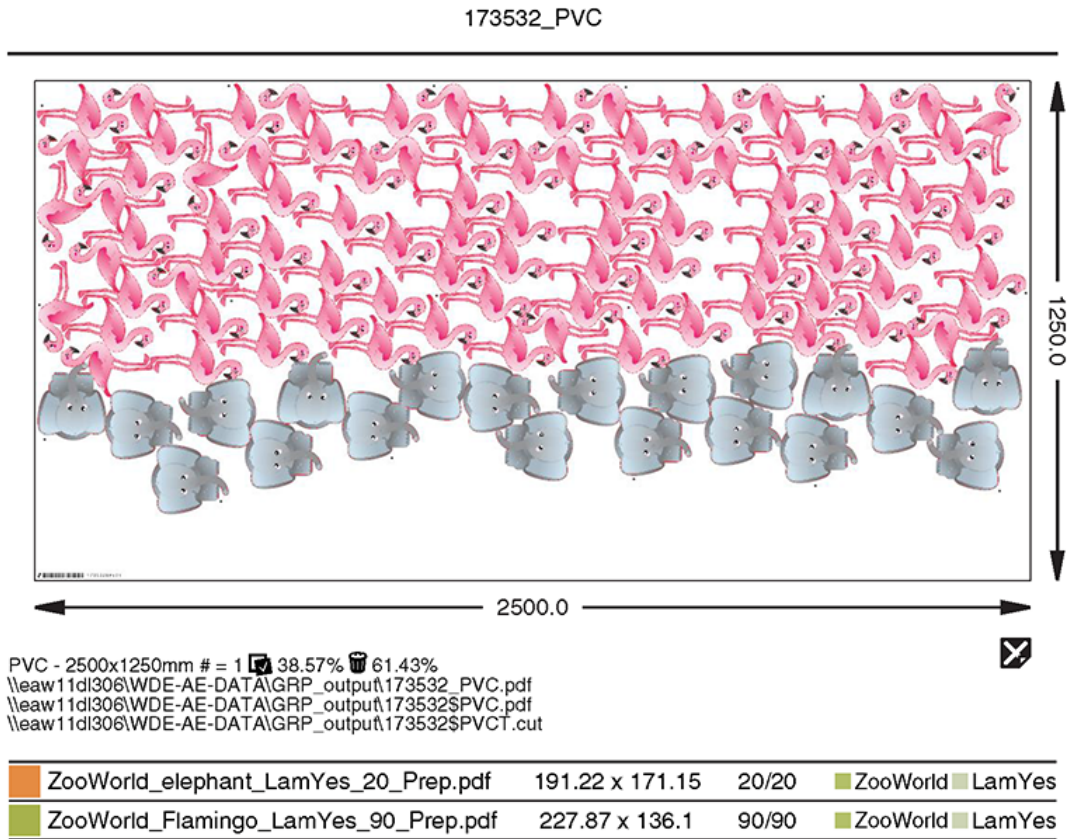| | | | | |
|---|---|---|---|---|
| Stevens_Entrance_LamYes_36_Prep.pdf | 161.31 x 212.93 | 36/36 | ■ Stevens | ■ LamYes |

- only "`entrance`" signs, no other graphics, not even the "`dog`" file that was also for customer `Stevens`.

- a fill rate of 39,42 %, lower than the queue's minimum fill rate of 45%.

- below right, the report mentions the custom fields as 2 extra labels.

### Layout 3: the "Flamingo & Elephant" files

These graphics used the grouping key values "`ZooWorld` and "`LamYes`". No other file shared both of those, so the output depended solely on the queue's minimum fill percentage.

The resulting report shows us

173532_PVC

PVC - 2500x1250mm # = 1 ☑ 38.57% 🗑 61.43%
\\eaw11dl306\WDE-AE-DATA\GRP_output\173532_PVC.pdf
\\eaw11dl306\WDE-AE-DATA\GRP_output\173532$PVC.pdf
\\eaw11dl306\WDE-AE-DATA\GRP_output\173532$PVCT.cut

| | | | | | |
|---|---|---|---|---|---|
| 🟧 | ZooWorld_elephant_LamYes_20_Prep.pdf | 191.22 x 171.15 | 20/20 | 🟩 ZooWorld | 🟩 LamYes |
| 🟩 | ZooWorld_Flamingo_LamYes_90_Prep.pdf | 227.87 x 136.1 | 90/90 | 🟩 ZooWorld | 🟩 LamYes |

- only the 2 graphics from customer `ZooWorld`, no other files. Although there was some extra space available on the sheet, we here do not see the "`Entrance`" job that also had the grouping key `LamYes`, because it did not have the same grouping key for customer ID.

- a fill rate of 38,57 %, also lower than the queue's minimum fill rate of 45%.

- below right, the report mentions the custom fields as 2 extra labels.

# 7.3. Basic XML driven workflow

### Summary

In this example, we simulate a business system that writes XML files onto a Folder Access Point. These simple XML files contain both a reference to a graphic file and parameters that describe what to do with it.

As explained in *Automating your Workflow Using XML* on page 42, the difference with using the *Submit XML to Gang Run* task is that these XML files are much simpler and also that we here stick to descriptions of 1 graphic file at the time.

In this example we assume you have read the previous examples and are thus familiar with these tools in the *Pilot*:

- creating a *Folder Access Point*

- working with *Substrate Queues*

- working with the *Workflow Editor* and *Workflow parameters*.

> **Note:** In this example, the workflow parameters get their value from the input XML file.

## 7.3.1. Step 1 - Content of XML files

### Incoming XML Files

The business system sends XML files that have a simple structure. They only list the name of the graphic file and some production parameters. They are all for the same substrate queue and size. In our example, we use 10 different XML files:

- 6 XML files represent large graphics of "American Cars" for the customer "ToyToy". Some graphics need scaling, some need different quantities. Here is one example:

```xml
<?xml version="1.0" encoding="UTF-8"?>
- <JOB>
    <Customer>ToyToy</Customer>
    <FileName>AmericanCars_1.pdf</FileName>
    <Quantity>10</Quantity>
    <Scale>50</Scale>
    <Substrate>AluComp 8 mm</Substrate>
    <Size>2500x1250</Size>
    <LaminationYesNo>LamNo</LaminationYesNo>
  </JOB>
```

- 4 XML files represent smaller graphics for displays of movie characters for the customer "MovieWorld". Here is one example:

```xml
<?xml version="1.0" encoding="UTF-8"?>
- <JOB>
    <Customer>MovieWorld</Customer>
    <FileName>shrek.pdf</FileName>
    <Quantity>20</Quantity>
    <Scale>100</Scale>
    <Substrate>AluComp 8 mm</Substrate>
    <Size>2500x1250</Size>
    <LaminationYesNo>LamNo</LaminationYesNo>
  </JOB>
```

They share a same value for the element "LaminationYesNo" that we will again use as a grouping key. So in our final output, we do allow these graphics to appear on a same layout. Learn more about using grouping keys in *the previous example*.

### Graphic Files Data Structure

In this example, the business system does not know the exact place of the graphics data (full URL).

In our example, all graphics data are available as PDF in a folder named after the customer. This means that the file name and the customer name will suffice because we will use those as SmartNames to find the data.

## 7.3.2. Step 2 - Set up the Grouping Keys

This step is identical to *the one in the previous example*, except that in this example we will not **use the Customer field as grouping key**. So that option needs to be switched off.

We will here only use the custom field that we named "`Lamination Yes No`".

### 7.3.3.  Step 3 - Create the Substrate Queue

In this example, we only need one substrate queue. Learn how to create Substrate Queues *here*.

Very similar to how we did it in the previous examples, follow these steps:

1.  Create a substrate queue of the type **Sheet** and name it "**AluComp 8 mm**".
2.  Add a substrate size with the name "**2500x1250**" and give it those dimensions (in mm).
3.  In **Nesting Settings**, set the minimum fill to 50%.
4.  We do not have an output workflow yet, so leave that setting open. The icon of the substrate queue will show a warning sign, but we will ignore this for now and solve this in *step 7*. Click **OK** to close.

### 7.3.4.  Step 4 - Create the Submit Workflow

This submit workflow is very similar to the one we created in *step 4 of the previous example*. We here only list the differences.

Follow these steps:

1.  Create a workflow with these steps (you can already rename them as we did here):
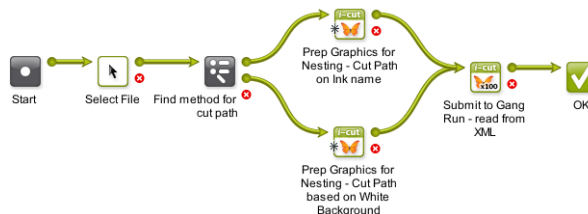


2.  Save this workflow as "`GRP_EXA3_Submit`".
3.  Still in the workflow editor, go to **Advanced** >  **Manage Workflow Parameters...**. In this menu,
    a.  click **Load Workflow Parameters from XML file...** and select one of the XML files that the business system sends. In the dialog that asks to select an XML element, leave the field blank and click **OK**. This creates the `[wfp. ...]` SmartNames that we will use later.
    b.  select **Use values from XML file** and keep the default path **[URL of Folder of Input]/ [File].xml**. This tells the workflow that the values for those workflow parameter SmartNames are those as specified in the input file of the workflow.
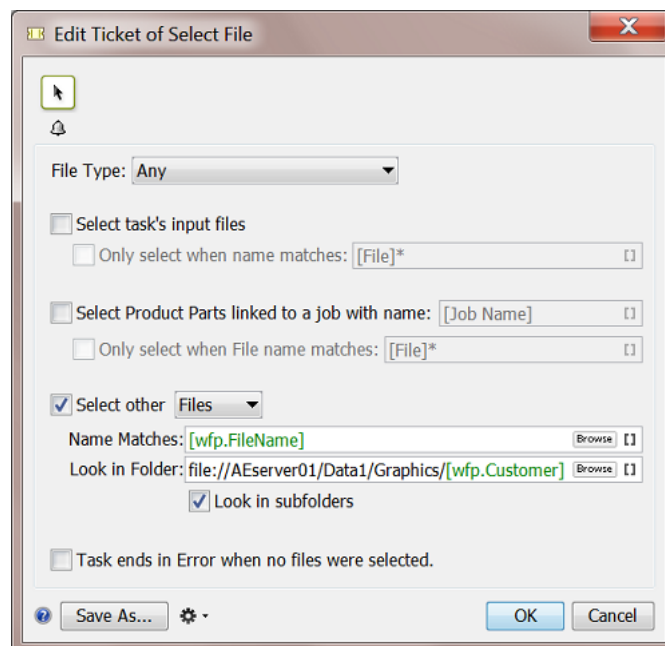
    This should be the result:
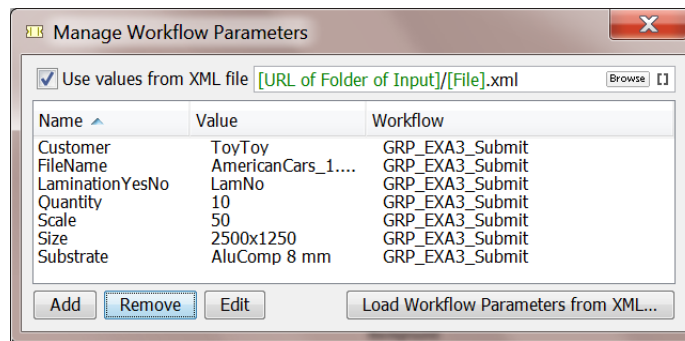
Learn more on using XML when working with workflow parameters in *Using Workflow Parameters*.
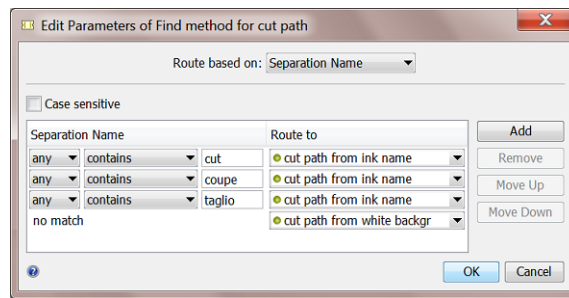
Close the dialog and save your workflow again.

4. In the **Select File** step,

   • select **Select other Files**

   • in **name matches**, enter the SmartName `[wfp.FileName]`

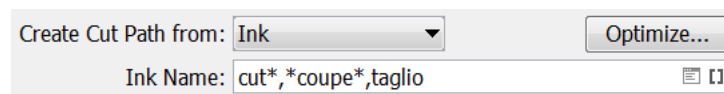   • in **Look in Folder**, enter a path that uses the SmartName `[wfp.Customer]`.



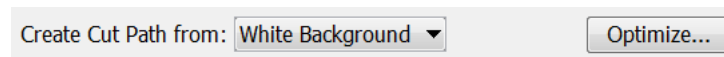5. The **Router**  serves to find if the graphic file already has a **Separation Name** that can serve as cut path.

6. The two **Prepare Graphics for Nesting** steps differ in their setting **Create Cut Path from**:

   • one uses an **Ink Name**:

   

   • the other one creates the path from the **White Background**.

   

   Choose bleed and SmartMarks as you wish. We propose to write the resulting prepared files in a specific folder and with a specific name like `[File]_Prep`.

7. In the **Submit to Gang Run** step, use the SmartNames:

   • in the tab **General**, use the SmartName `[wfp.Quantity]` to define the **Quantity**.

   • in the tab **Substrate**, use the SmartNames `[wfp.Substrate]` and `[wfp.Size]` to define the **Substrate** and **Substrate Size**.

   • in the tab **Extra**, use the SmartName `[wfp.LaminationYesNo]` to define the value for the custom field **Lamination Yes No**.

8. Click **OK** to close the step. Save your workflow and close the workflow editor.

## 7.3.5.  Step 5 - Create Folder Access Point

Setting up this Access Point is very similar to the one we set up *in the previous example*.

Follow those same steps and mind these 2 differences:

• The behavior of (the workflow started by) this Access Point is decided by the values in the XML files, so its name can be generic, for example "`GRP_HOT_SINGLE_XML`".

- In **Automatic Actions**, the workflow to launch is "`GRP_EXA3_Submit`" (the one we created in the previous step).

### 7.3.6. Step 6 - Create the Output Workflow

The output workflow can be identical to *the one we used in the previous example*. It was named "`GRP_EXA2_Output`".

The only SmartName we use in this output workflow is to help name the output **production files**.

### 7.3.7. Step 7 - Add the Output Workflow to the Substrate Queue

Follow these steps:

1. Double click the substrate queue **AluComp 3.4 mm** to open and edit it.
2. In **Output Workflow**, select the workflow "`GRP_EXA2_Output`" (yes the same one as in our previous example).
3. Click **OK**.

### 7.3.8. Step 8 - Test

All we need to do to test this workflow is dropping the XML files onto the Folder Access Point.

For every XML, one graphic file should appear in the substrate queue.

Depending on the size of the graphics and the nesting settings, some or all graphics might automatically end up on a layout and continue to the output workflow.

Here is an example result of one of the output workflows:



The **Reports** output pin shows us a link to the report PDF shown below (and also lists the other report data in XML form).

154935_AluComp 8 mm



1227.58

2476.18
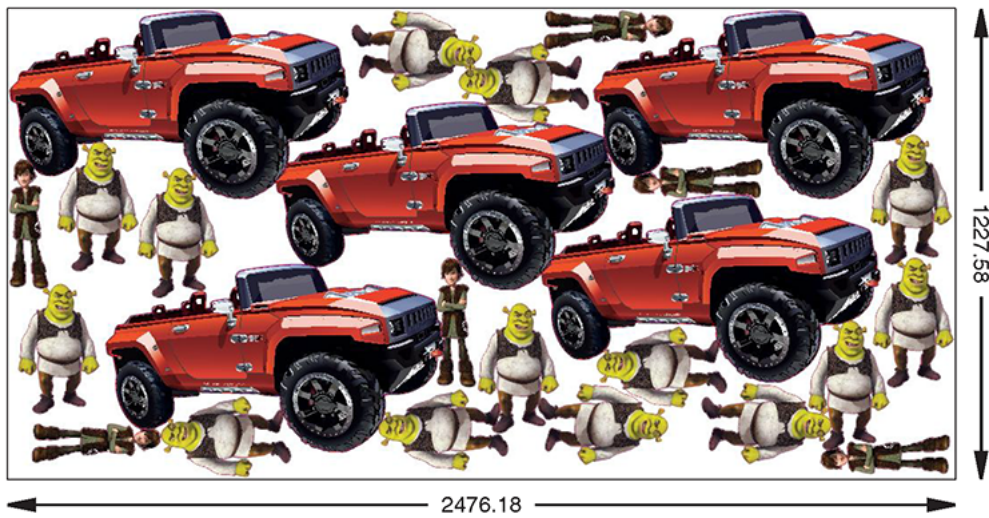
AluComp 8 mm - 2500x1250 # = 1 ☑ 65.42% 🗑 34.58%
\\eaw11dl306\WDE-AE-DATA\GRP_output\154935_AluComp 8 mm.pdf
\\eaw11dl306\WDE-AE-DATA\GRP_output\154935_AluComp 8 mm_CUT.pdf
\\eaw11dl306\WDE-AE-DATA\GRP_output\154935_AluComp 8 mm.cut

| | | | | |
|---|---|---|---|---|
| ■ | shrek_Prep.pdf | 336.33 x 207.71 | 14/20 | ■ LamNo |
| ■ | hiccup_Prep.pdf | 334.78 x 98.6 | 6/6 | ■ LamNo |
| ■ | AmericanCars_2_Prep.pdf | 489.21 x 883.2 | 5/7 | ■ LamNo |