



Alaris30

Desktop 3-D Printing System

Operator Training Guide
Basic Course



The smallest details create the real design

Specification	Attribute
Tray Size (x,y,z)	300 × 200 × 150 mm (11.81 × 7.87 × 5.9 in)
Net Print Size	294 × 196 × 150 mm (11.57 × 7.72 × 5.9 in)
Layer Thickness	28 µm (0.0011 in)
Accuracy	0.1 – 0.2 mm (0.0039 – 0.0078 in) Accuracy varies according to geometry, part orientation and print size
Resolution	600 × 600 × 900 dpi
Materials	VeroWhite FullCure830 modeling material FullCure705 gel-like support material
Cartridge Weight	1 kg (2.2 lbs)
No. of Cartridges	2 for Model & 2 for Support
No of Print Heads	2
Machine Size	82.5 × 62 × 59 cm (32.28 × 24.4 × 23.22 in)
Machine Size (crate)	87 × 86 × 104 cm (34.25 × 33.85 × 40.94 in)
Machine Weight	83 kg (183 lbs)
Power Requirements	110 – 240 VAC 50/60 Hz 1.5 KW single phase
Operational Environment	Temperature: 18°C to 25°C (64 to 77°F) Relative Humidity: 30 – 70 %
Input Format	STL and SLC file

VeroWhite FullCure830 Material Data Sheet

Property	ASTM	Metric Units	Imperial Units
Tensile Strength	D-638-03	49.8 MPa	7,221 psi
Modulus of Elasticity	D-638-04	2495 MPa	361,775 psi
Elongation at Break	D-638-05	20 %	20 %
Flexural Strength	D-790-03	74.6 MPa	10,817 psi
Flexural Modulus	D-790-04	2137 MPa	309,865 psi
Izod Notched Impact	D-256-06	24.1 J/m	0.45 ft lb/in
HDT at 0.45 MPa	D-648-06	43°C	109.4°F

Print Detailed, True-to-life Models

From the convenience of your office, now you can print high-quality, detailed 3-D models more easily than ever before. The Alaris™30 Desktop 3-D Printer delivers a unique combination of high-quality, finely detailed models in a compact, office-friendly system – Just the technology you need to shorten design cycles and propel your business forward.

Based on Objet's proven PolyJet™ Photopolymer Jetting Technology, the Alaris30 creates true-to-life parts of any kind with superb accuracy. Creates smooth surfaces, complex geometries, small moving elements, fine details, stand-out text and whatever else your design demands. The Alaris30 can build models simply, cost effectively and precisely as you design them.



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March 2009

DOC-04023 Rev. A

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Welcome to the world of Objet 3-D printing!

Objet is pleased to present this training guide, for designers, engineers and printer operators. It accompanies the basic on-site training following the installation of your new Objet 3-D printer, and supplements the comprehensive user guide provided with the printer. It was designed to help you get up to speed as quickly as possible so that you can make the most of your Objet software and equipment.

The guide contains a technology overview, a look at Objet software applications, printer operations and maintenance, and simulations of situations that you are likely to encounter when using and maintaining your Objet 3-D printer—together with exercises that prepare you for dealing with them.

In addition to delivering basic instruction, the Objet Customer Support engineer who installs your system targets the on-site training to your needs. Even after installation and basic training, the Objet Customer Support organization remains ready to help you meet your specific needs and brings you regular updates that are relevant to your system.

Objet Customer Support engineers, worldwide, bring with them tools and knowledge for successfully implementing Objet 3-D printing solutions to suit your needs. Most of them have a wealth of experience, both in servicing printers and training customers around the world.

We value your feedback

Please feel free to contact me with any comments you may have. The valuable Objet-customer partnership enables support personnel and developers to continually improve our products and services for the benefit of present and future customers.

We wish you success in using your 3-D printer and an enjoyable learning experience.

Objet Customer Support

Training@objet.com

Course Description

Description



Alaris30 3-D Printer for Operators – Basic Course

Designed specifically for Objet operators and provides hands-on experience in operation and maintenance procedures.

Hands-on



The course combines the presentation of conceptual information with hands-on sessions for operating and maintaining your 3-D printer.

A comprehensive training guide is provided to ensure an effective learning experience.

Objectives



Upon completion of **Alaris30 3-D Printer for Operators** course, the trainee will be able to operate and maintain the Alaris30 3-D Printing System.

Participants



Alaris30 3-D Printer for Operators course is designed for operators who are responsible for operating and maintaining Alaris30 3-D Printing System.

Prerequisites



Technical background or experience in mechanics, software and computers

Duration



1.5 Days

Course Outline

The operator training should be implemented during the Alaris30 installaion.

The following is the outline for the operator training course.

Day 1 – System Installation & Initial Print Job		
Topics	Duration	Activity
1. Unpack the Printer shock sensors, printer positioning	4 hrs	Observation
2. Prepare for Printing head- cover removal, inserting cartridges, printer calibration, scaling		
3. Safety Procedures review safety guidelines		
4. Initial Print Test Send a print job: print a wrench key, glossy (1 hr). Use the quick start.		
*****Lunch*****		
5. Install the WaterJet	1 hr	Observation
6. Operating the WaterJet learn to operate the WaterJet	1 hr	Hands-on
7. Send an Overnight Print Job Review Objet Studio & Job Manager with operator. Send a customer's tray to print	1 hr	Hands-on
Day 2 – Using Objet Software & Operator Maintenance		
Topics	Duration	Activity
1. Printer Software Control become familiar with the application	1 hr	Hands-on
2. Operator Maintenance <ul style="list-style-type: none"> • cover glass & build tray • wiper • Pattern test • waste container • odor system • roller waste collector • manual head replacement • head alignment • load cell calibration • system shutdown 	4 hrs	Hands-on
3. Operator Print Job The operator sends a print job. CSE makes sure printer is printing properly and then departs.	1 hr	Hands-on
4. Start Up Kit Familiarize operator with Start-Up kit contents	0.5 hr	Observation

Safety Guidelines

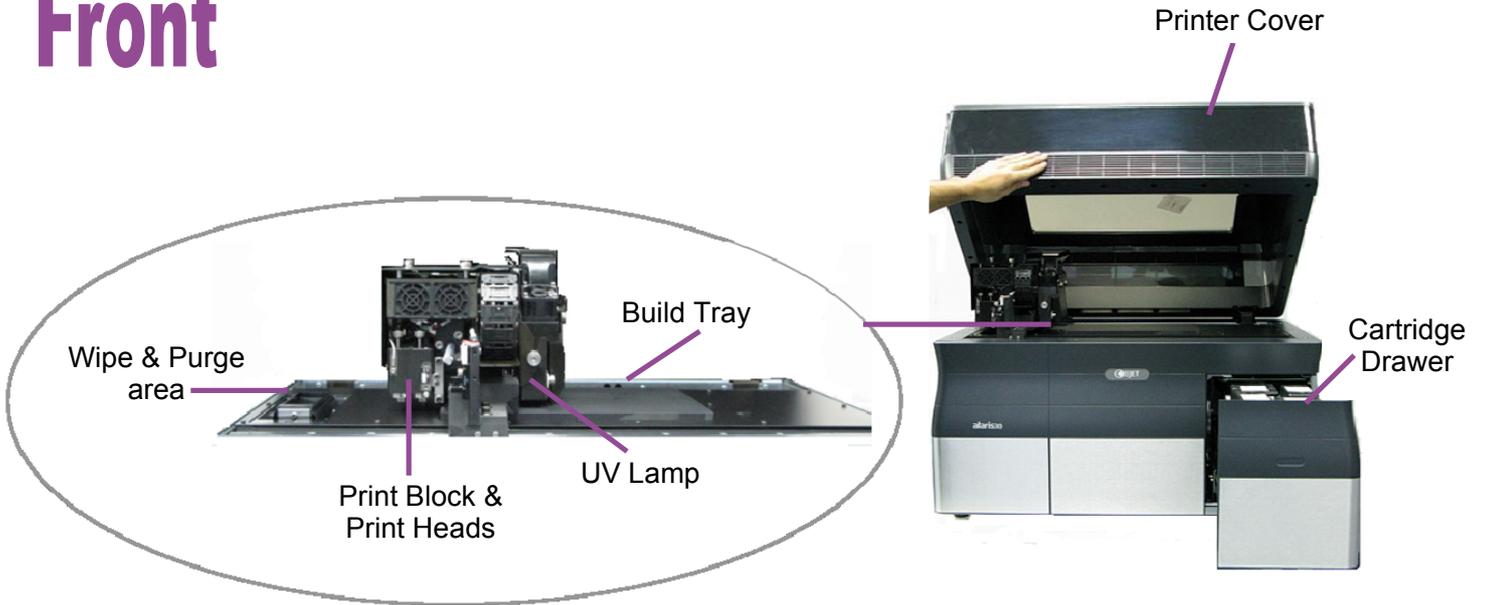
	<p>Hot surface</p>	<p>Risk of burns from:</p> <ul style="list-style-type: none"> • Build tray – 40°C (104°F) • Print block – 70°C (158°F) • Print heads - 70°C (158°F) • UV-lamp assembly <p>Do not touch these surfaces while they are hot.</p>
	<p>High voltage</p>	<p>Risk of electric shock from:</p> <ul style="list-style-type: none"> • Main power supply • UV-lamp power supply • UV-lamp connectors
	<p>Ultraviolet radiation</p>	<p>Risk of injury from ultraviolet radiation from the UV Lamp.</p> <ul style="list-style-type: none"> • Always use protective eyewear during operation. • Do not open the cover while printer is printing. • When the cover is open, do not stare at the UV light.
	<p>Moving Parts</p>	<p>Risk of injury from moving parts:</p> <ul style="list-style-type: none"> • 4 axes (X, Y, Z, T) • Fans • Pumps <p>Do not touch while moving.</p>
	<p>Handling Printing Materials</p>	<ul style="list-style-type: none"> • Always wear protective gloves when handling uncured printing materials. • Printing materials (resins) are flammable. Do NOT expose them to flames, heat or sparks. • Keep the printing materials away from food and drink. • Uncured resin is toxic - minimize direct contact with the skin to prevent irritation and other health hazards. Prolonged contact may cause burns.

Safety Guidelines

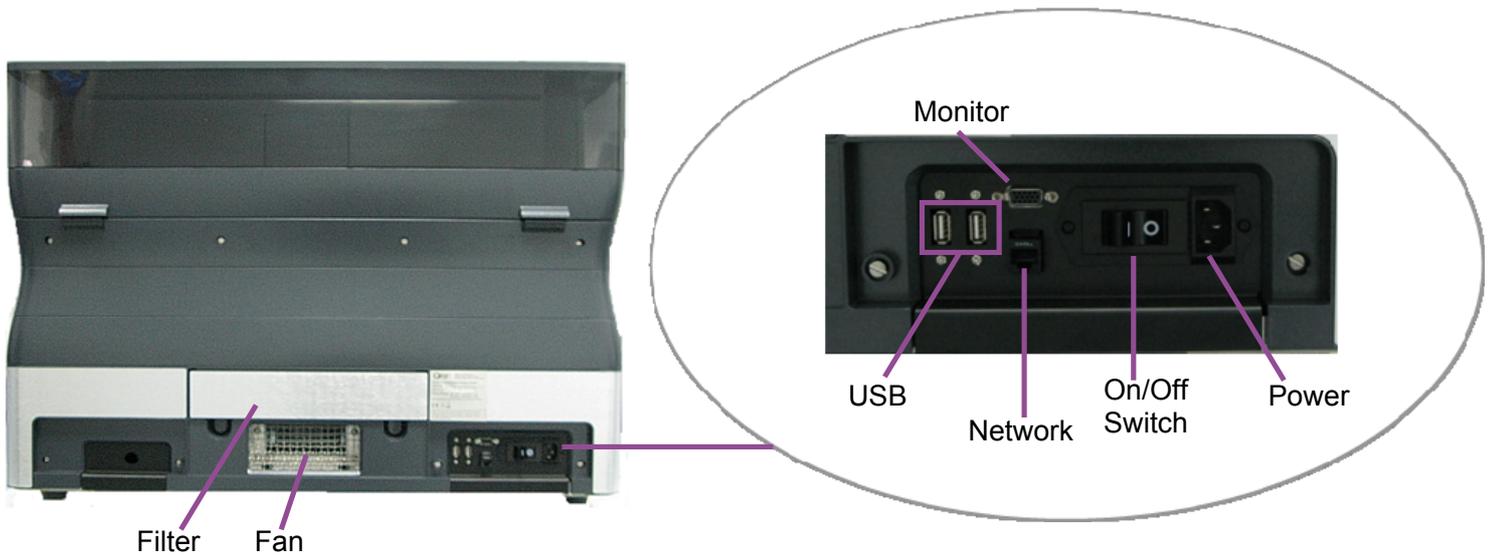
	First Aid for Working with Materials	<ul style="list-style-type: none"> • If skin or eyes come in contact with the material, flush with plenty of water for 15 minutes and seek medical attention. • If respiratory irritation occurs, expose the victim to fresh air immediately.
	Dealing with Waste	<ul style="list-style-type: none"> • Dispose according to the local laws and regulation. • Empty cartridges are sealed to prevent leakage. Do not attempt to puncture them
	General Safety Guidelines	<ul style="list-style-type: none"> • Be familiar with the location and use of safety equipment. (Fire extinguisher, first-aid kit etc.) • Do not use broken equipment. • Machinery with moving parts must have a working safety interlock, and a protective cover over the moving parts.

Alaris30 3-D Printer

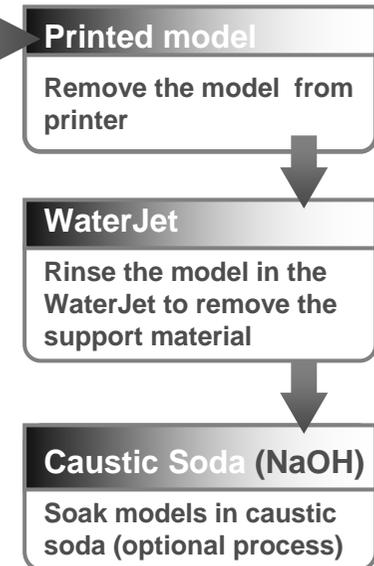
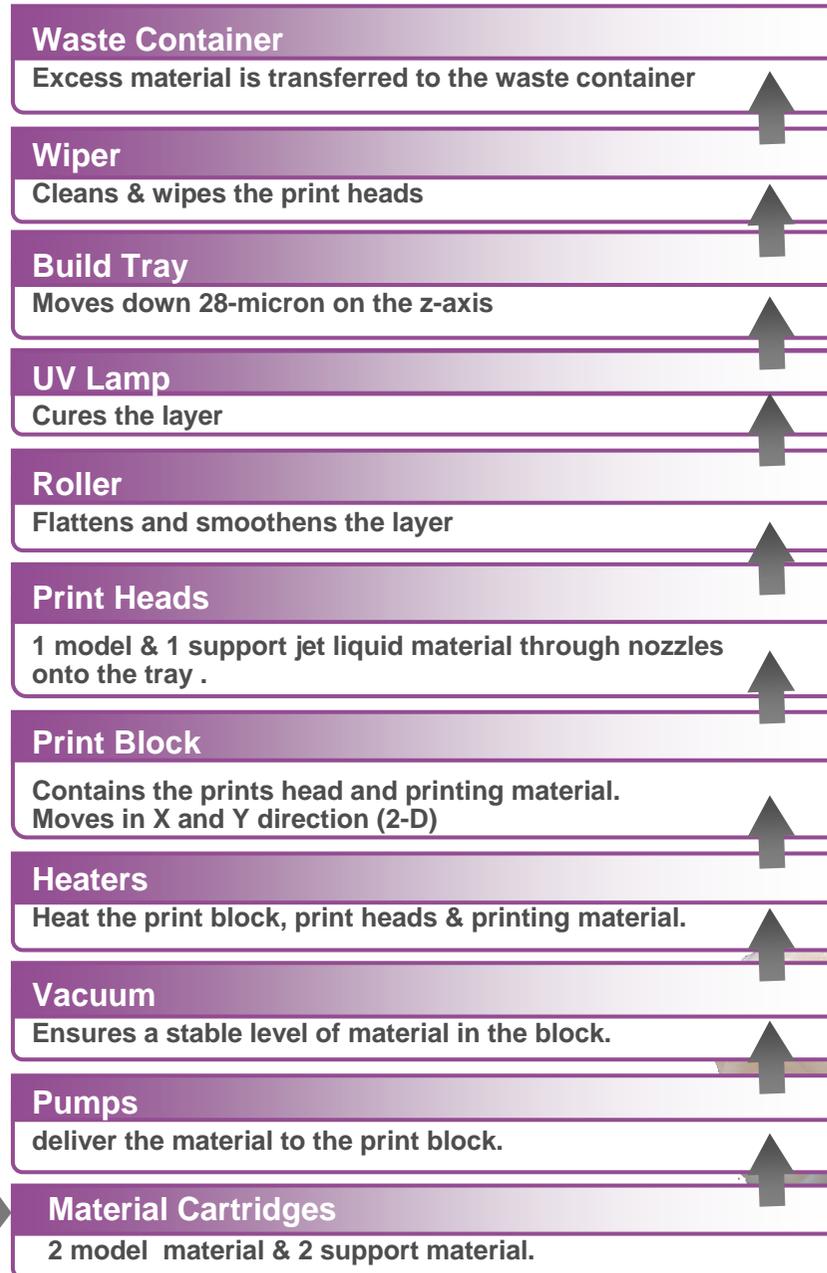
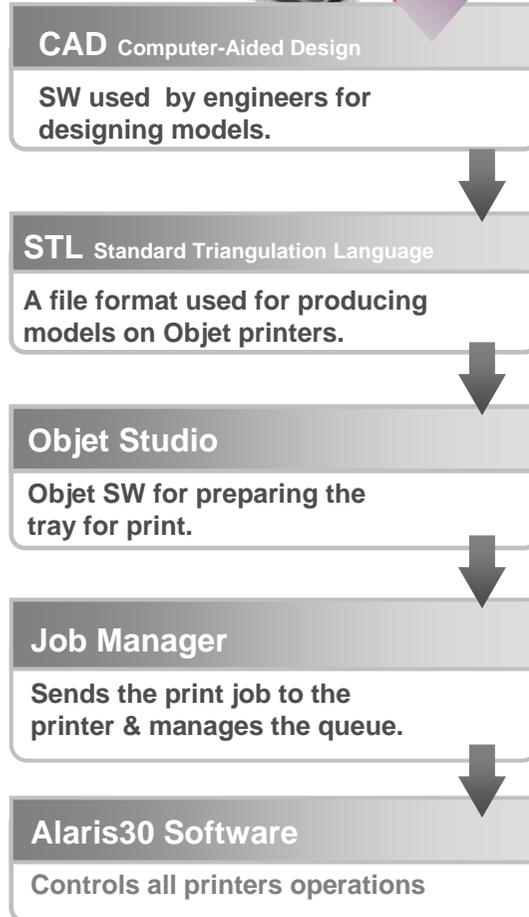
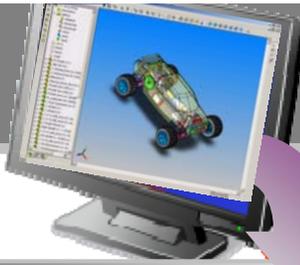
Front



Rear



Objet 3-D Printing Workflow



alaris30

Tutorial Companion Quick Start Reference

Insert Model to the Tray

Models that are saved in a CAD program as .STL files may be inserted into the Objet Studio tray.

To insert a model to the tray use the **Insert Model** button



Or by *right-mouse-click* menu by right mouse clicking anywhere on the tray.

Place and Orient a Model on the Tray

Select **Automatic Placement**



Or use the manual placement tools



Relative Transform Tab



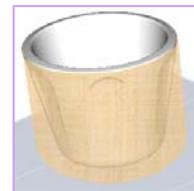
Plane Alignment Tool



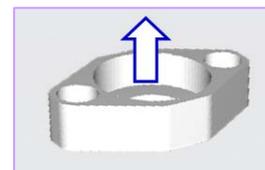
Free Translate and Rotate

Manually place and orient a model according to your personal printing preferences using the following guidelines:

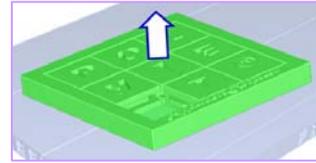
To print a model with a glossy finish, place it so that glossy sides are not surrounded by support material.



To use minimum support material when printing, Place a model with holes and hollows facing up

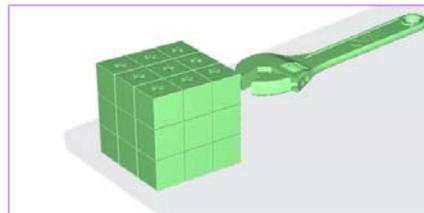
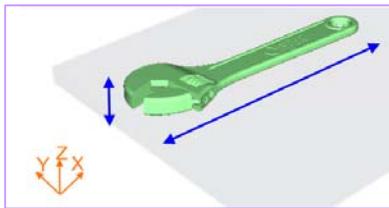


Place model sides with fine details facing up and select glossy printing to create smooth finish for the fine details



To minimize printing time:

- Place the longest dimension of a model along the X-axis,
- Place the smallest dimension of a model along the Z-axis,
- Place the tallest model on the left of the tray.



After manual placement, use the **Tray Validation tool**  to ensure that a tray is printable

Use the **Estimate Tool**  to estimate the amount resources required to print a tray.

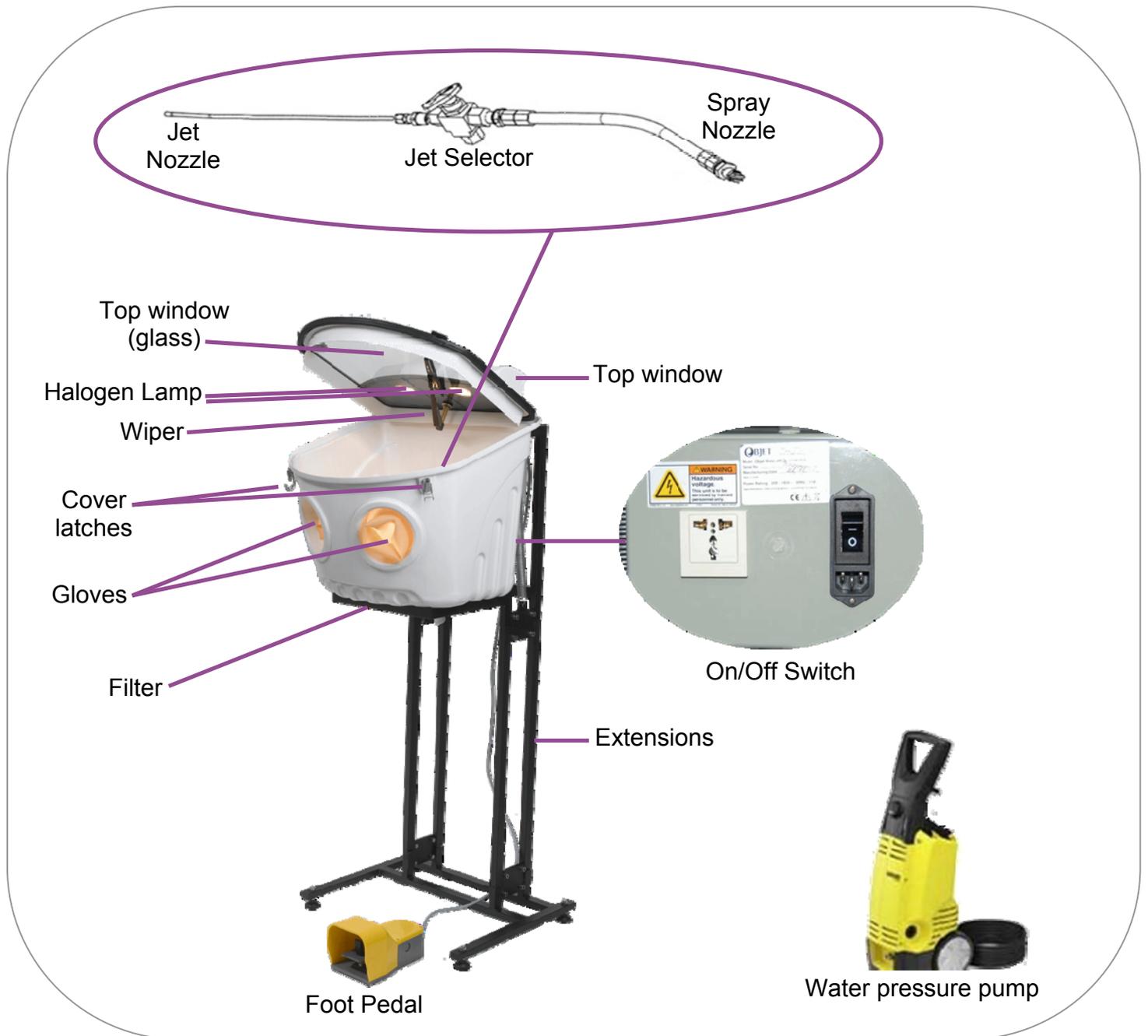
Save the tray and send to print

- Make sure the build tray is clean.
- When you're ready to print the tray, press the **Build Tray** button  to save the tray as an *Objet Tray File* (.objtf) and send the tray to the Job Manager queue.
- Click the Online/Offline button to set the printer to Online mode.



The Objet WaterJet

The Objet WaterJet provides easy and fast cleaning of support material from models printed on Objet 3-D printing systems. WaterJet comes equipped with two types of nozzles, enabling you to choose the flow rate and pressure suitable for cleaning, both delicate and robust models.



Operating the WaterJet

Safety Guidelines

- Always open the water supply source (tap) before activating the Objet WaterJet.
- *Do not* open the main cover of the WaterJet cabinet while it is working and *do not* operate the WaterJet cabinet while the cover is open.
- The water tap/supply *must* remain open when the WaterJet is activated to prevent damage to the pressure pump.
- The water pressure pump requires a water supply pressure of at least 1 atm.
- Always turn off the water supply source to the pump after use.

Procedure

1. Turn the WaterJet on.
2. Open the cover and place all the models to be cleaned inside the cabinet.
3. Close cover and secure latches.
4. Insert hands into the built-in gloves.
5. Select the cleaning nozzle.
6. Activate the WaterJet using the foot pedal.



Alaris30 Software Control



Objectives

Become familiar with Alaris30 printer control software and its features



Objet Software

The Objet software consists of three applications:



Objet Studio

The software with which the users prepare jobs for producing models.



Job Manager

The software that manages production jobs before they are sent to the printer (tutorial +user guide).



Printer Control

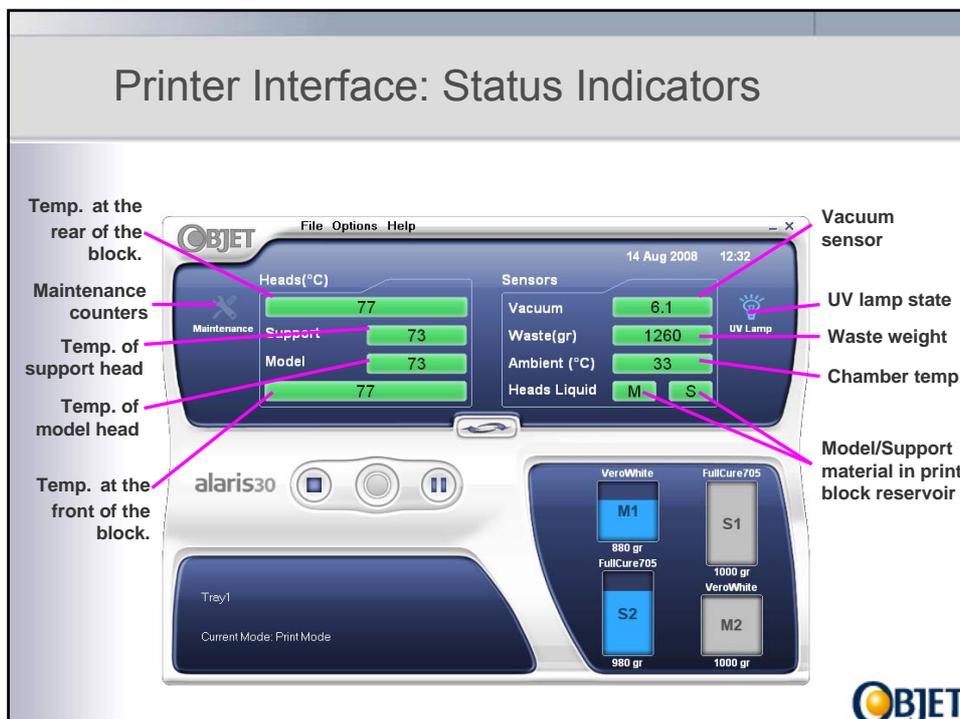
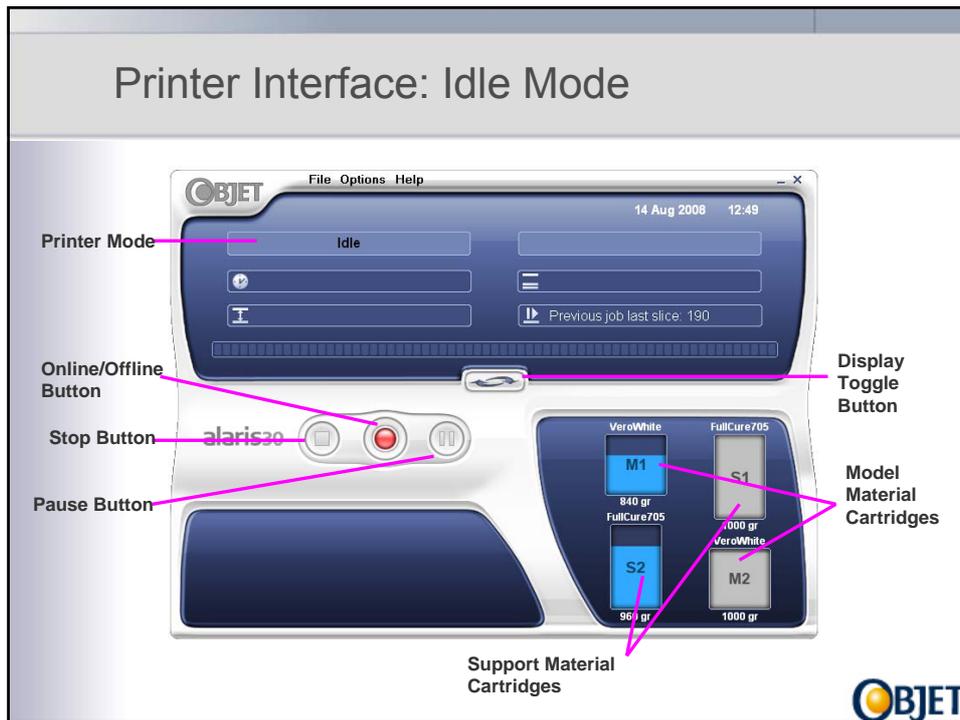
The software running inside the printer that controls all the printer operations.



Printer Software Control

- Features powerful wizards that facilitate and speed system maintenance.
- Includes all monitoring and controlling of the printer.
- Located within the machine





Printer Interface Color Key

The background colors in the printer indicator fields tell you whether or not the value or item is suitable or ready for printing:

Green — suitable/ready for printing
For example – The vacuum level in the system is within the acceptable range.

Vacuum 6.0

Red — not suitable for printing or indicates a warning.
For example - The weight of the waste container close to upper allowed limit (2 kg.).

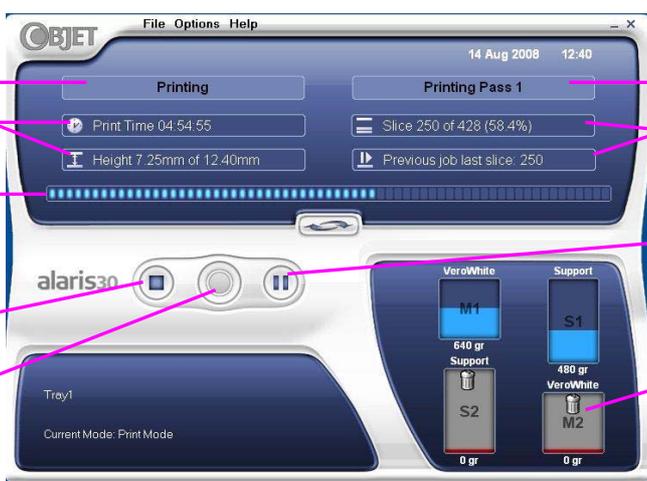
Waste(gr) 1800

Blue — not ready for printing
For example, the UV is not on or not operating at full power.

UV Lamp



Printer Interface – During Printing



The screenshot shows the printer's control panel with the following components labeled:

- Printer Mode:** Printing
- Current Activity:** Printing Pass 1
- Job Information:** Print Time 04:54:55, Height 7.25mm of 12.40mm, Slice 250 of 428 (58.4%), Previous job last slice: 250
- Progress Bar:** A horizontal bar showing the current progress of the print job.
- Pause Button:** A button with a pause symbol (two vertical bars).
- Stop Button:** A button with a square symbol.
- Online/Offline Button:** A button with a square symbol.
- Empty Cartridge:** Labels for M1 (640 gr Support), S1 (480 gr Verowhite), S2 (0 gr), and M2 (0 gr).



Printer Interface – During Printing

Empty Bottle Mechanism

A mechanism that fully drains the material cartridges.

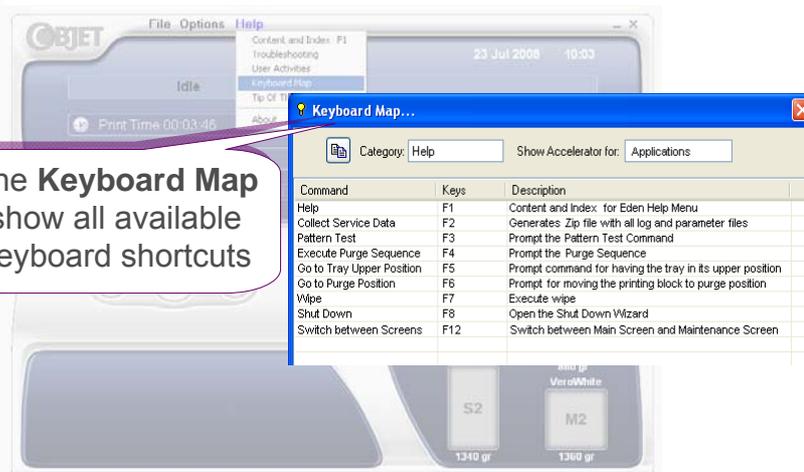


Empty Bottle Mechanism



Keyboard Map

The Keyboard Map show all available keyboard shortcuts



Options Menu

Go to Tray Upper Position

sends the print block
and all axes to their
Home position



The screenshot shows the control panel interface with the 'Options' menu open. The menu items are: Go to Tray Upper Position (F5), Goto Service Position (F6), Wipe (F7), Execute Purge Sequence (F4), Pattern Test (F3), Wizards, Maintenance Counters..., Collect Service Data (F2), and Shutdown Wizard (F8). The 'Go to Tray Upper Position' option is highlighted in blue. Below the screen are three physical buttons: a square stop button, a red emergency stop button, and a vertical bar pause button.



Options Menu

Go to Service Position

positions the print
block over the purge
area



The screenshot shows the control panel interface with the 'Options' menu open. The menu items are: Go to Tray Upper Position (F5), Goto Service Position (F6), Wipe (F7), Execute Purge Sequence (F4), Pattern Test (F3), Wizards, Maintenance Counters..., Collect Service Data (F2), and Shutdown Wizard (F8). The 'Goto Service Position' option is highlighted in blue. Below the screen are three physical buttons: a square stop button, a red emergency stop button, and a vertical bar pause button.



Options Menu

Wipe

Sends the print block to wipe position and wipes the heads of excess material



The screenshot shows the printer's control panel with the 'OBJET' logo at the top left and 'alaris30' at the bottom left. A menu is open, displaying the following options:

Option	Function Key
Go to Tray Upper Position	F5
Goto Service Position	F6
Wipe	F7
Execute Purge Sequence	F4
Pattern Test	F3
Wizards	
Maintenance Counters...	
Collect Service Data	F2
Shutdown Wizard	F8

The 'Wipe' option is highlighted in blue. The printer's physical buttons (stop, power, and pause) are visible at the bottom of the panel.



Options Menu

Execute Purge Sequence

The print heads are purged of model and support material, and wiped twice.



The screenshot shows the printer's control panel with the 'OBJET' logo at the top left and 'alaris30' at the bottom left. A menu is open, displaying the following options:

Option	Function Key
Go to Tray Upper Position	F5
Goto Service Position	F6
Wipe	F7
Execute Purge Sequence	F4
Pattern Test	F3
Wizards	
Maintenance Counters...	
Collect Service Data	F2
Shutdown Wizard	F8

The 'Execute Purge Sequence' option is highlighted in blue. The printer's physical buttons (stop, power, and pause) are visible at the bottom of the panel.



Options Menu

Pattern Test

Perform the Pattern test to demonstrate the condition of the nozzles in the print heads



The screenshot shows the control panel interface with the 'Options' menu open. The menu items are as follows:

Option	Function Key
Go to Tray Upper Position	F5
Goto Service Position	F6
Wipe	F7
Execute Purge Sequence	F4
Pattern Test	F3
Wizards	
Maintenance Counters...	
Collect Service Data	F2
Shutdown Wizard	F8



Options Menu

Wizards

More information on using wizards can be found in the Operator Maintenance lesson.



The screenshot shows the control panel interface with the 'Options' menu open and 'Wizards' expanded. The sub-options are as follows:

Option	Function Key
Go to Tray Upper Position	F5
Goto Service Position	F6
Wipe	F7
Execute Purge Sequence	F4
Pattern Test	F3
Wizards	
Head Alignment	
Heads Cleaning	
UV Lamp Replacement	
Wiper Cleaning	
Head Replacement	
Load Cell Calibration	
Maintenance Counters...	
Collect Service Data	F2
Shutdown Wizard	F8



Options Menu

Maintenance Counters

Item	Total	Dated	Warning Time	
Total Printing time	0	10/10/07	N/A	
Support Resin Filter	0	10/10/07	300	Reset
Head Fan Filter	95	10/10/07	4800	Reset
Vacuum Filter	95	10/10/07	12000	Reset
Carbon Filter	0	10/10/07	3000	Reset
UV Lamps				
UV Lamp	0	10/10/07	1500	Reset
UV Lamp Ignitions	0	10/10/07	N/A	Reset
Printing Heads				
Model Head	0	10/10/07	N/A	Reset
Support Head	0	10/10/07	N/A	Reset
Blades				
Wiper Blade	0	10/10/07	1000	Reset
Ruler Blade	0	10/10/07	1000	Reset
General				
PM is Due	0	10/10/07	2000	

Options Menu

Collect Service Data

Service information is gathered and saved.

Name	Size	Type	Date Modified	Date Picture Taken
alaretch-2008_14-46704965.zip	298 KB	Compressed (zipped) file	11/20/07 11:46 AM	
alaretch-2007_11-19704965.zip	695 KB	Compressed (zipped) file	11/20/07 11:46 AM	
alaretch-2007_14-46704965.zip	467 KB	Compressed (zipped) file	11/20/07 11:46 AM	
alaretch-2007_11-19704965.zip	467 KB	Compressed (zipped) file	11/20/07 11:46 AM	
alaretch-2008_11-46704965.zip	314 KB	Compressed (zipped) file	11/20/07 11:46 AM	
alaretch-2007_11-19704965.zip	523 KB	Compressed (zipped) file	11/20/07 11:46 AM	
alaretch-2007_11-19704965.zip	314 KB	Compressed (zipped) file	11/20/07 11:46 AM	

Options Menu

Shutdown Wizard

- If you are not going to print models for a week or more, shut down the printer.
- Use the Shutdown wizard to perform the shutdown.



Thank You

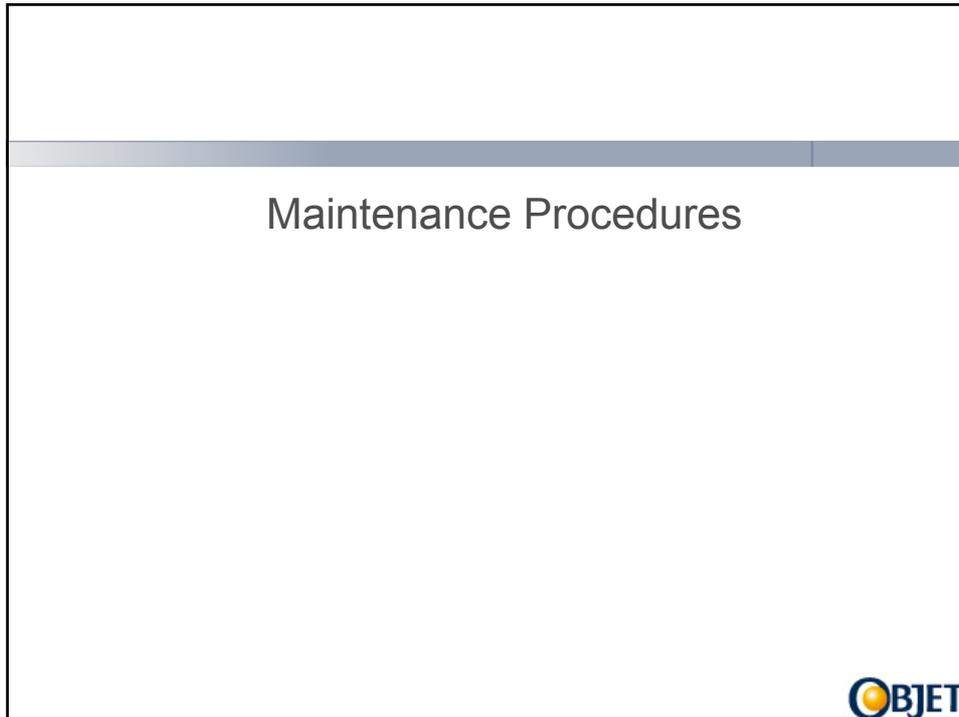


Operator Maintenance



Objectives

- To become familiar with the preventive and reactive maintenance tasks performed by the customer/operator.
- To practice the maintenance tasks.



Maintaining the Alaris30 Printer

Maintenance tasks consist of preventive and reactive tasks.

<p>Preventive maintenance tasks:</p> <p>routine, performed on a daily, weekly or monthly basis</p>	<p>Reactive maintenance tasks:</p> <p>performed in case of a malfunction or if model quality is unsatisfactory.</p>
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 Proper maintenance is essential for getting satisfactory results from your Alaris30 3-D printer.

OBJET

Preventive Maintenance Tasks

Periodically you must conduct the following maintenance tasks:

- Clean the print heads
- Clean the build tray and surrounding area
- Clean the cover glass
- Clean the roller waste collector
- Inspect the wiper blade
- Perform a pattern test
- Calibrate the load cells
- Align the print heads
- Replace the waste container



The routine maintenance schedule is listed in the *Alaris30 User Guide*, Chapter 7, "Operating and Maintaining the Alaris30 3-D Printer"



Reactive Maintenance Tasks

Reactive maintenance includes the following tasks:

- Replace a print head
- Replace the odor filter
- Replace the waste container
- Replace the wiper blade
- Replace the roller waste collector



Cleaning the Print Heads

Preventive Maintenance

Why To prevent the nozzles from clogging with printing material

Main Steps

1. Run the Head Cleaning wizard.
2. When prompted, wipe the heads with an isopropanol-soaked cloth and a mirror.

When At the beginning of a work day or before a big print job.

 The print head surface and orifice plate may be hot.
Do not touch it with your bare hands.

 **Do not** use sharp tools to clean between the heads.



Cleaning the Build Tray

Preventive Maintenance

Why To remove material residue

Main Steps Clean the build tray and surrounding area with a wet cleaning cloth or paper towel.

When After printing

 You can use a small vacuum cleaner to clean the surrounding area



Cleaning/Replacing the Wiper Blade

Preventive Maintenance

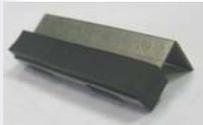
Why To prevent material build-up and clogging of the print heads

Main Steps

1. Run the Wiper Cleaning wizard.
2. When prompted, wipe the wiper blade and the surrounding area with an isopropanol-soaked cloth.
3. Inspect the wiper. If the blade is worn out, replace it.

When

- Clean once a week
- Replace if worn out



Replacing the Waste Container

Preventive Maintenance

Why The waste container is full (2 kg.)

Main Steps

1. Assemble the cardboard box with a waste bag.
2. Unscrew the cap securing the waste tube drain and remove the waste container from the printer.
3. Close the full container with a sealing cap.
4. Place a new waste container in the cartridge drawer and attach the drain tube to it.

When A warning appears in the printer software



Dispose of the full waste container in accordance with the environmental and safety regulations.

Make sure that the plastic bag inside is not twisted



Cleaning the Cover Glass

Preventive Maintenance

Why To remove material residue and to maintain the condition of the glass.

Main Steps Clean the glass with window-cleaning liquid.

When Once a month



Replacing the Odor Filter

Reactive Maintenance

Why To remove odors

Main Steps

1. Remove the old filter.
2. Install the new filter.

When Once a year, if needed replace before

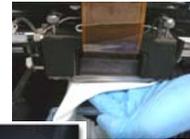


Hands-on 1

30 Min



1. Practice cleaning the build tray and replacing the waste container
2. Practice cleaning the print heads
3. Practice inspecting, cleaning and replacing the wiper



To perform the tasks, follow the instructions as described in the *Alaris30 User Guide*: Chapter 7, "Operating and Maintaining the Alaris30 3-D Printer".



Pattern Test (1)

Why

- Basic verification of the printer's ability to produce quality models.
- To test print head condition and jetting ability

Main Steps

1. Tape a sheet of pink paper to the center of the build tray.
2. Run the Pattern test. (*Options > Pattern test.*)
3. Inspect the pink paper to see if there are missing lines.

When

- Weekly
- if a printing problem is suspected



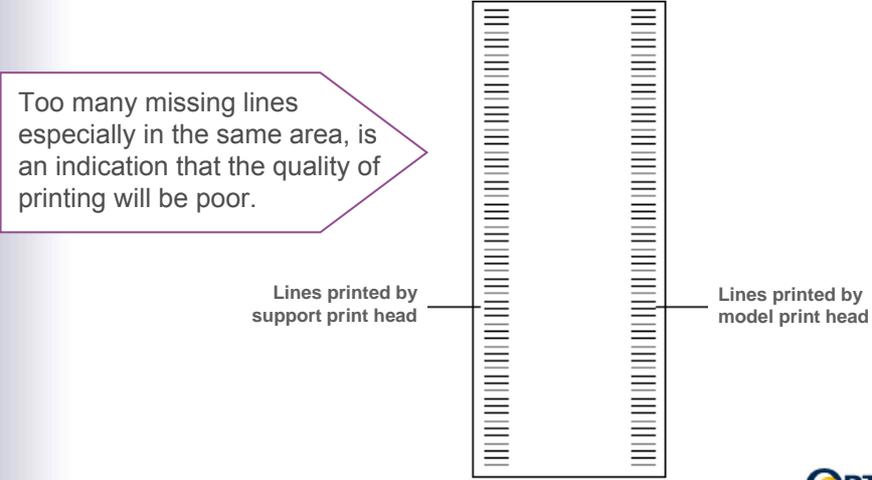
Pattern Test (2)

The following is an example of the Pattern test print out.

Too many missing lines especially in the same area, is an indication that the quality of printing will be poor.

Lines printed by support print head

Lines printed by model print head



OBJET

Hands-on 2

15 Min 

Practice performing the Pattern test

Lines printed by support print head

Lines printed by model print head

 To perform the task, follow the instructions as described in the *Alaris30 User Guide*: Chapter 7, "Operating and Maintaining the Alaris30 3-D Printer"

OBJET

Cleaning the Roller Waste Collector

Reactive Maintenance

Why To remove material residue that accumulates in the roller waste collector.

Main Steps

1. Remove the roller waste collector from the printer.
2. Wipe the waste collector with an isopropanol-soaked cloth until clean.
3. Inspect the roller knife. If it's worn out, replace the waste collector.
4. Install the waste collector in the printer.

When Once a month



Be careful **not** to damage the roller knife





Calibrating the Load Cells

Preventive Maintenance

Why

- To check that the weight measurements of the printing cartridges and the waste container are accurate.
- To prevent a head filling error.

Main Steps

1. Start the Load Cell Calibration wizard.
2. Indicate in the wizard which cartridge (s) you want to calibrate.
3. Remove the cartridge.
4. Wait until the level is relatively stable.
5. Select *Weight is stable*.

When Every 500 printing hours or every half a year, which ever comes first.



Hands-on 3

30 Min



1. Practice replacing the roller waste collector



2. Practice calibrating the load cells



To perform the tasks, follow the instructions as described in the **Alaris30 User Guide**: Chapter 7, "Operating and Maintaining the Alaris30 3-D Printer"



Aligning the Print Heads (1)

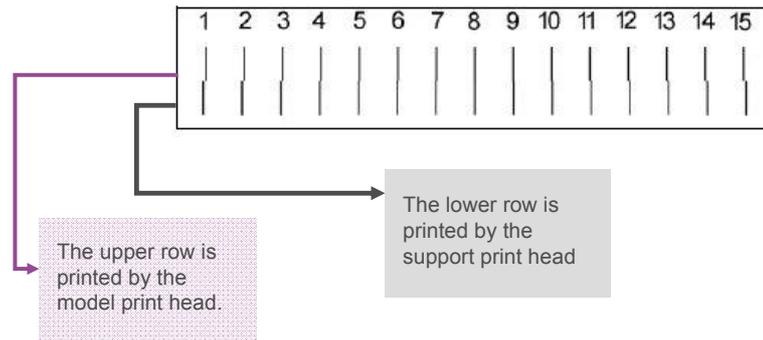
Preventive Maintenance

Why	To ensure acceptable model quality
Main Steps	<ol style="list-style-type: none"> 1. Run the Head Alignment wizard. 2. Fasten the transparency sheet onto the build tray. 3. Inspect the transparency to determine if heads need to be aligned. 4. Align the print heads using the Head Alignment wizard.
When	Every half a year



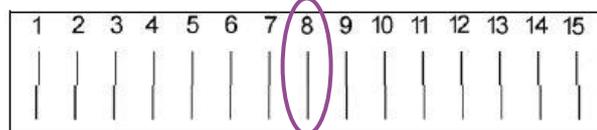
Head Alignment (2) Transparency Sheet

The transparency sheet is printed with a set of vertical lines. Each vertical line is made up of two rows, upper and lower.



Head Alignment (3) Transparency Sheet

The alignment of the upper and lower rows in line 8 is the optimum alignment.



If the upper and lower rows of another line align, such as line 10, the wizard updates the parameters for the head alignment and prints another transparency.



Hands-on 4

30 Min



Practice performing the aligning a print head



To perform the tasks, follow the instructions as described in the *Alaris30 User Guide*: Chapter 7, "Operating and Maintaining the Alaris30 3-D printer"



Replacing a Print Head

Reactive Maintenance

Why

Main Steps

When

- The Pattern test reveals that more than 12 nozzles in one column or 4 missing lines in a specific area.
- Visual inspection reveals that the surface of the head is damaged.
- Tests reveal that the material printed is underweight.
- Lines appear on the model surface.
- Warning messages: Head Heater temperature timeout, Head Heater thermistor open, Head heater thermistor short

1. Perform the Pattern test.
2. Examine the pattern test to decide which print head needs replacing.
3. Run the Head Replacement wizard.
4. Replace the defective print head.
5. Complete the wizard.



- Too many missing nozzles
- Printed material weight underweight



Hands-on 5

45 Min



Practice aligning a print head.



To perform the tasks, follow the instructions as described in the **Alaris30 User Guide**:
Chapter 7, "Operating and Maintaining the Alaris30 3-D printer"



Summary

- Maintenance tasks are essential for ensuring proper operation of the system, high printing quality and for preventing malfunctions.
- Use the printer control application wizards when possible.
- Always use gloves and follow the safety guidelines.
- When encountering difficulties performing a procedure contact your local distributor for customer support.



Thank You



Objet Studio Exercises

For detailed information on Objet Studio, refer to the *Alaris30 User Guide*, Chapter 5: "Using Objet Studio"



Exercise 1 – Inserting Models

Task 1.1 - Place a model on the build tray

- Right-click on the build tray, and select **Insert**. The Insert dialog box appears.
- In **Look in**, display the appropriate folder. You may open *Objet Studio/Samples/STL Files* directory
- In **File of type**, select the file types to display.
- Select the desired file, and make sure that it appears in the **File name** field.
- Select **Units** of measure—millimeters or inches



The 3-D file contains the model's proportions, but not the units of measure. Therefore, make sure to correctly select either millimeters or inches when inserting a model. Otherwise, the size of the model on the build tray will be either much too large or much too small.

- Select 2 as **Number of copies** to place on the build tray
- Select the **Preview** checkbox (for STL files only)
- Select the **Arrange models** checkbox, to automatically position the model(s) on the build tray for efficient model building
- Click **Open**. The dialog box closes and Objet Studio places the model(s) on the build tray.
- Place another model on the build tray by repeating this procedure.



What do the **Extents** values displayed at the bottom of the dialog box represent?



Exercise 2 – Display Options

Task 2.1 - Customize the toolbars displayed

- From the **View** menu, select **Toolbars**.
- In the Customize dialog box, select all toolbars, and click **OK**.
- Click and drag the toolbars to position them on the Objet Studio screen.

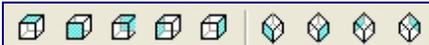
Task 2.2 – Change the default screen layout

- From the View menu, select **Layout**, then the desired number of build-tray views
- Change the screen layout using the toolbar icons. 



What are the differences between the screen layouts?

Task 2.3 - Change the perspective of the active viewing pane

- From the View menu, select **Layout**, then **1 View** to expand the *perspective* view to fill the screen.
- Click any of the nine viewing icons: 

Task 2.4 - Display the build tray in *wire frame* view

- Select **View** → **WireFrame** or click the WireFrame icon 
- Select **View** → **Shaded** or click the Shaded icon  , to revert to the *shaded* view

Task 2.5 - Display models as boxes, showing their maximum dimensions

- Select View → Display Bounding Box.

Task 2.6 - Display the area around models needed for support material

- Select View → Display Thickening Box.

Task 2.7 - Change the display color of an model

- Select the model. Its color changes to blue, indicating that the model has been selected.
- From the Object menu, select **Fill Color** or click the Fill Color icon 
- Select a color from the color palette and click **OK**.
- When the model is de-selected, it appears in the new color.

Task 2.8 - display a cross section of the tray

- From the Tools menu, select Section.
- Select the Enable Clipping check box.
- Use the slider controls for the X-, Y-, and Z-axes to cut the tray so that you see the cross section you want.



The Objet Studio toolbars contain several icons for changing the appearance of the display screen, enabling you to view the tray and models in different magnifications and from various perspectives.

Try each icon to learn and practice it

Icon	Purpose
	Reverts to normal view after using various zoom options.
	Fills the viewing pane with the selected model(s).
	Reverts to normal view after using various zoom options.
	If enabled,  and  effect all viewing panes.
	When selected, the tray is displayed with depth perspective—closer objects appear bigger. When not selected, the tray is displayed in two dimensions—identical models appear the same size, regardless of their position on the screen.
	Fills the active viewing pane with an area of the build tray after you select it with the left mouse button.
	Continuously zooms in/out of the point at which you click and hold down the left mouse button, when you move the cursor up and down.
	Moves the build tray in the viewing pane according to the line you extend on the screen with the left mouse button.
	Moves the build tray in the viewing pane as you move the cursor on the screen while holding down the left mouse button.
	Zooms and moves the build tray as you hold down the left mouse button and move the cursor on the screen.
	Enables you to inspect the build tray from every angle and perspective. As you hold down the left mouse button and move the cursor on the screen, the view of the build tray changes.

	When used with  and  , the movement of the build tray continues after you release the mouse button. To stop the movement, click in the active view pane or click one of these icons.
	Each mouse click zooms one step to the center of the active viewing pane.
	Each mouse click zooms-out one step from the center of the active viewing pane.
	Each mouse click moves the build tray to the left in the viewing pane by one step.
	Each mouse click moves the build tray to the right in the active viewing pane by one step.
	Each mouse click moves the build tray up in the active viewing pane by one step.
	Each mouse click moves the build tray down in the active viewing pane by one step.
F	Each mouse click expands the contents of the active viewing pane in size.
B	Each mouse click reduces the contents of the active viewing pane in size.
	Each mouse click rotates the build tray to the left in the active viewing pane by one step.
	Each mouse click rotates the build tray to the right in the active viewing pane by one step.
	Each mouse click rotates the build tray up in the active viewing pane by one step.
	Each mouse click rotates the build tray down in the active viewing pane by one step.
	Displays a virtual camera and its viewing angle of the tray.



Exercise 3 - Positioning Models on the Build Tray

Task 3.1 – Arrange models

- Insert a model and select the **Arrange models** checkbox
- Insert another model and uncheck the **Arrange models** checkbox



What are the results of selecting the **Arrange models** checkbox when inserting an model?

Task 3.2 – Automatic Placement

- Place several models on the build tray. Make sure the **Arrange models** checkbox is checked.
- After placing several models on the build tray, select **Tools → Automatic Placement**.



What are the results?

Task 3.3 – Manual position

- Insert the model TrainingSample1.STL
- Select **Tools → Automatic Placement**.



According to the positioning rules, is this the most effective position?

- Try to place the model manually
- Click the On/Off Grid button  or go to Tools → Grid to display a grid on the image of the build tray



Select and manipulate models on the build tray using the following icons or menu options:

Icon	Menu Option	Purpose	What to do
	(none)	For selecting a model.	Left-click the model on the build tray.
	Object → Translate	For selecting and moving a model with the mouse.	Left-click the model to select it. Drag the model to a new location while holding down the mouse button.
	Object → Rotate	For selecting and rotating a model on the Z-axis.	Left-click the model to select it. Hold down the left mouse button and move the mouse left/right.
	Object → Scale	For selecting and changing the size an model.	Left-click the model to select it. Hold down the left mouse button and move the mouse left/right.

	(none)	Click to move the model 20 mm along the X-axis.	Select the model and click on the icon
	(none)	Click to move the model 20 mm along the Y-axis.	Select the model and click on the icon
	(none)	Click to move the model 20 mm along the Z-axis.	Select the model and click on the icon
	(none)	Click to rotate the model 30 degrees on the X-axis.	Select the model and click on the icon
	(none)	Click to rotate the model 30 degrees on the Y-axis.	Select the model and click on the icon
	(none)	Click to rotate the model 30 degrees on the Z-axis.	Select the model and click on the icon
	Tools → Grid*	Displays a grid over all build tray views.	Click the icon
	Tools → Snap to grid	When moving the model, it aligns with the nearest grid line.	Click the icon and move the model
	(none)	Enables you to change the grid origin (X- and Y-axis meeting point) by clicking on the build tray.	Click the build tray while the icon is selected
	(none)	Cancels the changes made to the grid origin and restores the default grid.	Click the icon

- Click on Estimate Consumption  and compare the estimations of each position of the model.



Which rules effect your decision when placing the model on the tray?

- Repeat the process using the model TrainingSample2.STL (bicycles)

Task 3.4 - Change the Model's Orientation

- Click the Select Plane icon.
- Click a plane on a model displayed on the build tray.
- Click the appropriate align icon to re-align the model, relative to the selected plane on the model:

-  Align Bottom
-  Align Top
-  Align Front
-  Align Back
-  Align Left
-  Align Right

Task 3.5 – Change the model dimensions from the Properties dialog box

- To make precise changes to the model on the build tray, select it (either on the tray or in the tray hierarchy pane).
- Click the Transform tab of the Entities Properties dialog box. The properties displayed in the Transform tab of the Entities Properties dialog box are *absolute values*, representing the actual position of the model on the build tray.

- Change the dimensions of the model in the dialog box.

	Width (X)	Depth (Y)	Height (Z)	Units
Translate :	2177.7E	-3307.2	3504.6	mm
Rotate :	131.74	318.68	149.49	Degrees
Scale:	36.469E	36.469E	36.469E	Ratio
Dimensions:	6199.81	728.71	2552.8E	mm

Uniform Scaling Change Units

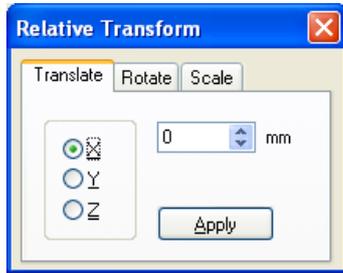
Task 3.6 – Apply changes to model properties *relative to the current position*

- Select the model (either on the tray or in the tray hierarchy pane).
- Click the R. Trans tab of the Entities Properties dialog box.
- Rotate and change the scaling of the model in the dialog box.

	Width(X)	Depth(Y)	Height(Z)
Translate:	0	0	0
Rotate:	0	0	0
Scale:	1	1	1

Uniform Scaling Apply Init

- Change the model position, using the Relative Transform dialog box, from the Object menu.



Task 3.7 – Model Height



If automatic positioning was used to arrange models on the build tray, models are placed one millimeter above the tray. This is the minimum recommended height, so that the model does not stick to the tray. If you do not position models with Automatic Placement, they are often inserted either above or below the tray.

- To ensure that models are always positioned just above the tray, from the Tools menu, select **Options**, and display the Settings tab.
- Select “Always” as the *Automatic Lay On (Gravity)* option - models inserted are automatically placed one millimeter above the tray, and their height cannot be changed.

Task 3.8 - Freeze the model's orientation

- Select a model on the build tray.
- In the Options tab of the Entity Properties dialog box, click **Advanced**.
- Select the *Lock Orientation* check box.
- Close the Advanced Properties dialog box.
- Perform Automatic Placement.



What are the results of the Automatic Placement? Does the model orientation change?



Exercise 4 – Copy & Paste

Task 4.1 – Copy and paste a model on the tray

- Select a model by clicking it, either on the tray or in the tray hierarchy pane. Notice that the model's image on the build tray changes color (to light blue) and its name is highlighted in the tray hierarchy pane.
- Open the Edit menu on the main toolbar. Select Copy
- Open the Edit menu on the main toolbar. Select Paste

Task 4.2 – Use the Paste Special option

- Select a model by clicking it, either on the tray or in the tray hierarchy pane. Notice that the model's image on the build tray changes color (to light blue) and its name is highlighted in the tray hierarchy pane.
- Open the right-click pop-up menu; Select Copy
- Open the right-click pop-up menu; Select Paste
- Specify the number of duplicates to place on the build tray at once.
- Set the distance, on each axis, between the duplicate models.
- Place mirror images of the original model.
- Repeat this procedure selecting different options of the Paste Special



What should you do in order to change the position of one model located on the tray?



Exercise 5 – Surface Finish

Models can be produced with a matte or glossy finish. To produce a matte finish, the model is completely surrounded by support material.

Task 5.1 - Choose the finish type for a model

- Select the model.
- In the Options tab of the Entity Properties dialog box, select **Matte** or **Glossy**.

OR —

- Right-click the model on the build tray.
- At the bottom of the pop-up menu, the current finish type is *not* enabled. Select the other option.



Exercise 6 – Support Strength

Task 6.1 - Change the support strength of the material used when printing a model

- Select a model on the build tray.
- In the Options tab of the Entity Properties dialog box, click **Advanced**.
- In the *Grid Style* section, choose the support strength suitable for the selected model



When will you use each strength option?



Exercise 7 - Exporting and Importing Objet Build Trays

Task 7.1 - Create an *objzf* file

- From the File menu, select **Export Packed Job...**
- Select the appropriate folder and change the file name (if necessary).
- Click **Save**.

Task 7.2 - Open an *objzf* file

- From the File menu, select **Import Packed Job...**
- In the Open dialog box, display the appropriate folder and select the file.
- In the Browse for Folder dialog box, display the folder in which you want Objet Studio to unpack the compressed file, and click **OK**. The *objtf* file and associated *stl* files are expanded and placed in the selected folder, and the tray is displayed in Objet Studio.



What is the difference between saving the build tray as OBJTF and exporting the build tray into OBJZF?

Task 7.3 - save a group of models positioned on the tray as an *stl* project

- From the File menu, select **Save Tray As...**
- At the top of the dialog box, select the appropriate folder.
- At the bottom of the dialog box, enter a file name.
- Open the *Save as type* pull-down menu, and select **STL Files (*.stl)**.
- Click **Save**.

Task 7.4 - Display *stl* files without the build tray

- From the File menu, select Open Tray.
- In the Open dialog box, open the *Files of type* pull-down menu, and select **STL Files (*.stl)**.
- Click **Open**.



Exercise 8 - Handling Completed Trays

Task 8.1 – Check that the tray is "valid"

- Move the model to be outside the tray
- Click the Tray Validation button.



What are the results?

- Try to fix the problem and click the Tray Validation icon again

Task 8.2 – Change the Tray Validation color settings

- From the Tools menu, select **Constraints Settings**.
- Click the current color displayed in the Constraints Settings dialog box.
- From the color palette that opens, select a color and click **OK**.
- Repeat task 9.1 and view the change

Task 8.3 - Save the Tray File

- Click .



What the file format used for saving the tray?

Task 8.4 - Save the Screen Display as an Image File

- From the File menu, select **Save Bitmap...**
- At the top of the dialog box, select the appropriate folder.
- At the bottom of the dialog box, enter a file name.
- Open the *Save as type* pull-down menu, and select the file format.
- Click **Save**.

Task 8.5 - Print the Tray File

- Click 



Describe the next occurrences on your screen

Job Manager Exercises

For detailed information on Objet Studio, refer to the *Alaris30 User Guide*, Chapter 6: "Using Job Manager"

Prior to performing the following exercises, send at list 3 jobs to print. At this stage, do not connect your client/server station to the printer.



Exercise 1 - Job Manipulation

Task 1.1 - Inspect and edit the build tray:

- Select a job that is not in building process.
- Click the Job View icon  to display the selected tray and view the tray from different angles.
- Click the Edit Job icon  or select Edit from the Job menu. Objet Studio opens, in which you can edit the tray.

On what condition you can edit the tray after sending a tray to the 3-D printer?



Task 1.2 – Restart a job (server only)

- Select a job from the queue
- Click the Restart icon



What are the results of restarting a job from the printing queue?

Task 1.3 – Stop and resume a job (server only)

- Select a job from the queue
- Click the Stop icon
- While the job is selected, click the Resume icon



What are the results of resuming a job that was stopped?



What is the difference between restarting a job and resuming a job?



How can you see the last layer that was printed?

Task 1.4 (server only) – Remove a job from the print queue

- Select a job from the queue
- Click the Delete icon or select Delete from the Job menu.

Task 1.5 (server only) – Remove a job from the history

- Select a job from the history

- Click the Delete icon or select Delete from the Job menu.

What is the difference when deleting a job from the printing queue and history?



Task 1.6 (server only) - Change the order of jobs in the queue

- Select a job from the queue
- Click the Step Up and Step Down icons



Rearranging the order of jobs in the queue is useful to group jobs for printing with the same type of model material.

Task 1.7 (server only) - Move a job from History to the print Queue

- Select the job in History.
- Click the Restart icon. The job moves from History to the end of the job queue.
- Drag a job from History to Job's Queue

Task 1.8 (server only) – Open a new job

- Click on 
- Select an OBJTF file



What are the results?

- Drag a Tray (objtf/objzf) from Windows Explorer to the icon 
- Drag a Tray (objtf/objzf) from Windows Explorer to the Job's Queue (both client and server).

Task 1.9 - Excluding a model from a tray

- Send to print a tray which includes several models
- From Job Manager – click the Job View icon  to display the selected tray
- Double-click on one of the models on the tray.
- Click the Build tab and check the “Exclude from tray” checkbox
- Click Yes to exclude the model from the build process



What are the results?



What is the difference when excluding a model from a tray, which is in 'Building' status and a tray, which is in 'Preprocessing' status or the printing did not start?



Exercise 2 – Job Information

Task 3.1 – Open the Job Properties

- Select a job from the printing queue
- Click the Job Properties icon

What are the results?



Exercise 3 – Producing an OBJZF file

- Select the Job you wish to export
- Click the job tab and choose "export"

