

FORMLABS SOP V1.1



This SOP will guide you through the process of 3D printing on Formlabs printers **ONLY**. If you are not sure of anything having to do with this printer, **STOP AND SEEK CLARIFICATION**. Please follow all safety and PPE (personal protective equipment) recommendations.

You are expected to clean up after each and every use. You are expected to help maintain the station if you ever use it.

Tools you'll need:

1. Safety glasses
2. Latex or nitrile gloves
3. Preform nesting software
4. Formlabs Form2 printer
5. Silicone spatula
6. Paper towels
7. 91% Isopropyl alcohol
8. Strainer
9. 16 oz plastic cups

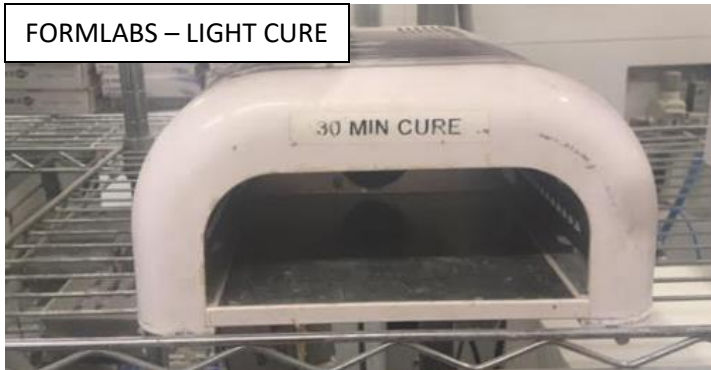
- 10. Putty knife / removal tool
- 11. Shop rags
- 12. Formlabs cure box
- 13. Alcohol bath setup
- 14. Timer

See photos for reference.

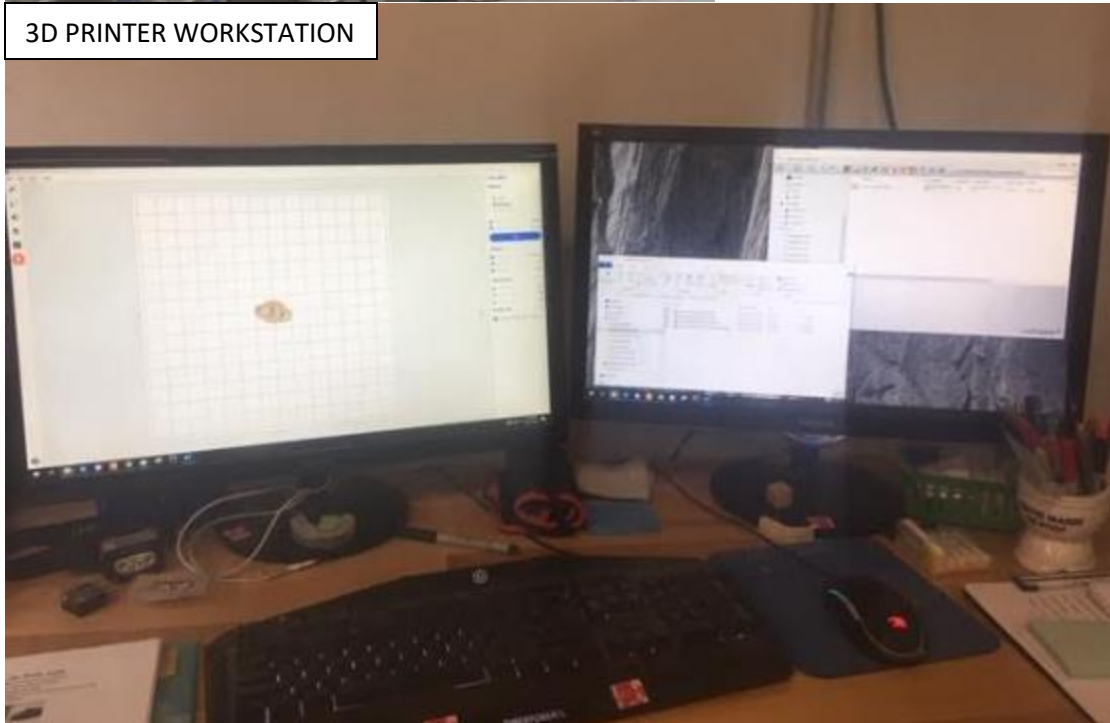
Layout



FORMLABS – LIGHT CURE



3D PRINTER WORKSTATION



Gloves and safety glasses should be worn throughout the process both for contamination prevention and safety.

What NOT to do:

Do NOT put any other material in the alcohol baths or risk unintended chemical reactions.
(See SDS located online for isopropyl bath)



Isopropyl Alcohol (2-Propanol)

Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Date of issue: 11/14/2013

Revision date: 01/26/2018

Supersedes: 09/29/2015

Version: 1.2

SECTION 1: Identification

1.1. Identification

Product form	: Substance
Substance name	: Isopropyl Alcohol (2-Propanol)
CAS-No.	: 67-63-0
Product code	: LC15750
Formula	: C ₃ H ₈ O
Synonyms	: 1-methylethanol / 1-methylethyl alcohol / 2-hydroxypropane / dimethyl carbinol / ethyl carbinol / hydroxypropane / IPA / i-propanol / isoethylcarbinol / propan-2-ol / sec-propanol

1.2. Recommended use and restrictions on use

Use of the substance/mixture	: Disinfectant Solvent
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1.3. Supplier

LabChem Inc
Jackson's Pointe Commerce Park Building 1000, 1010 Jackson's Pointe Court
Zellienople, PA 16063 - USA
T 412-826-5230 - F 724-473-0647
info@labchem.com - www.labchem.com

1.4. Emergency telephone number

Emergency number	: CHEMTREC: 1-800-424-9300 or 011-703-527-3887
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SECTION 2: Hazard(s) Identification

2.1. Classification of the substance or mixture

GHS-US classification

Flammable liquids Category 2	H225	Highly flammable liquid and vapour
Serious eye damage/eye irritation Category 2A	H319	Causes serious eye irritation
Specific target organ toxicity (single exposure) Category 3	H335	May cause respiratory irritation

Full text of H statements : see section 16

2.2. GHS Label elements, including precautionary statements

GHS-US labelling

Hazard pictograms (GHS-US)



GHS02

GHS07

Signal word (GHS-US)

: Danger

Hazard statements (GHS-US)

: H225 - Highly flammable liquid and vapour
H319 - Causes serious eye irritation
H335 - May cause respiratory irritation

Precautionary statements (GHS-US)

: P210 - Keep away from heat, hot surfaces, open flames, sparks. - No smoking.
P233 - Keep container tightly closed.
P240 - Ground/bond container and receiving equipment.

Do NOT expose the alcohol solution to sparks or heat.

Do NOT forget models in alcohol baths.

Solutions list

Formlabs resin – purchased and premixed

Lifespan – until it no longer allows for accurate creations of models

Replacement – when empty and must replace tray after fourth bottle

Disposal – Dispose of contents / container in accordance with local / regional / national / international regulations.

Isopropyl alcohol – purchased premixed

Lifespan – 3 years from mfg date

Replacement – when discolored / dirty

Disposal – Dispose of contents / container in accordance with local / regional / national / international regulations.

Best practices

Always F7 models prior to printing to be sure you get the latest design.

Always check all dies for supports on margins.

Always set a timer for alcohol baths.

Always let models sit for a few minutes to air dry prior to cure.

Always be sure the models are clean prior to curing.

Always save your print job to local disk drive with proper naming convention.

Be sure all tools and station are clean prior to use. Change resin and alcohol solution if necessary.


Follow due date priority when deciding what to print first.

Step 1. Find and F7 models in Dental manager.

3Shape Dental Manager

Orders 3Shape Communicate Inbox Options Help

2 Order(s) in 3Shape Communicate Inbox ▼ r4130


Number	Last modified	Operator	Creation date	Delivery date	Patient	Status
 RUSSO JACOBS R4130	12/20/2019 3:48:14 PM	Lisa	12/17/2019 12:20:23 PM	1/4/2019	Jacobs, Phyllis	Des

Scanned
Designed
Sent
Closed
Other filters
Checked out
All open
My recent
Search
Results for '5169'
Results for 'I123'
Results for 'I132'
Results for 'I122'
Results for 'I104'
Results for 'r4130'

Number: RUSSO JACOBS R4130
Customer: SLIGHTLY OUT OF OCCLUSION
Patient: Jacobs, Phyllis
Creation date: 12/17/2019
Manufacturer: 1454646475 (Team Solutions Dental LLC - 914578 - US1)

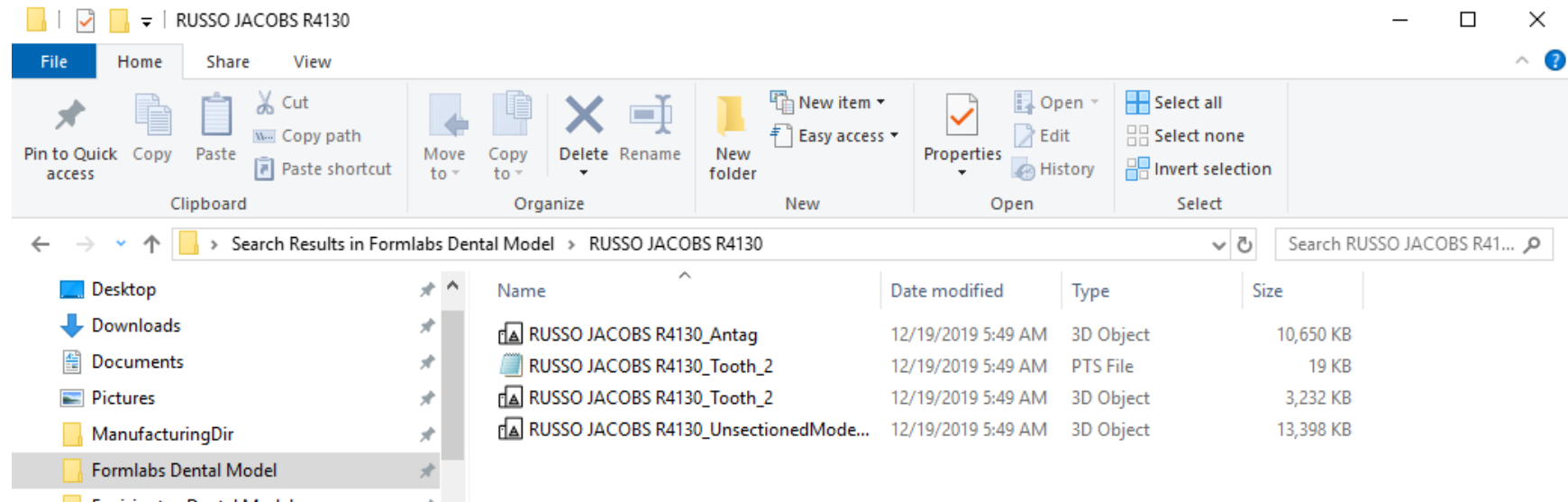
[Crown 2](#) FCZ or PFZ
[Die 2](#) Formlabs Dental Model
[Unsectioned model](#) Formlabs Dental Model
[Antagonist model](#) Formlabs Dental Model

Comments: Please remake crm done last ye



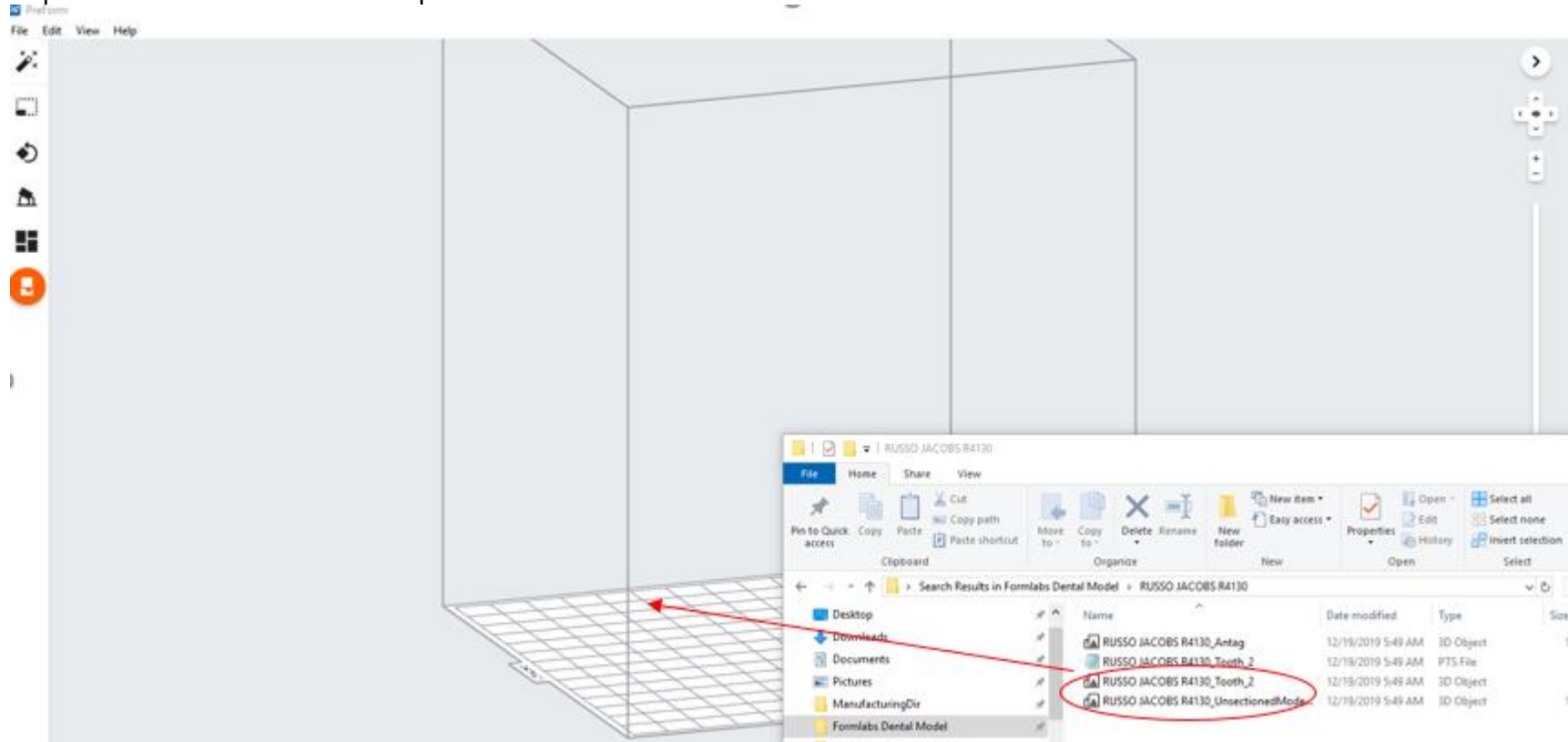
3shape


Step 2. Open file explorer to model location, find models, and open folder to find items to be printed (****Full arches and quads will require that everything be printed. Solids only require unsectioned [sic] model and all dies.****)





Step 3. Open preform nesting software by clicking icon . Choose the printer to gain access to virtual build plate. Drag and drop model items onto virtual build plate.



Step 4. Click the support icon  and change the density settings to the following:

SUPPORTS ×

Auto-Generate All

EDIT SUPPORTS

Edit All... Clear All

BASIC SETTINGS

Density

1.00

Touchpoint Size

0.60 mm

Internal Supports

☒

Raft Label

☒

Raft Type

Raft

On Build Platform i

☐

ADVANCED SETTINGS ▶

Reset

Solid = 1.2

Quad = 1.2 – 1.3

Full = 1.3 – 1.35

Change the touchpoint size settings to the following:

SUPPORTS ×

Auto-Generate All

EDIT SUPPORTS

Edit All... Clear All

BASIC SETTINGS

Density

1.00

Touchpoint Size

0.60 mm

Internal Supports

☒

Raft Label

☒

Raft Type

Raft

On Build Platform i

☐

ADVANCED SETTINGS ▶

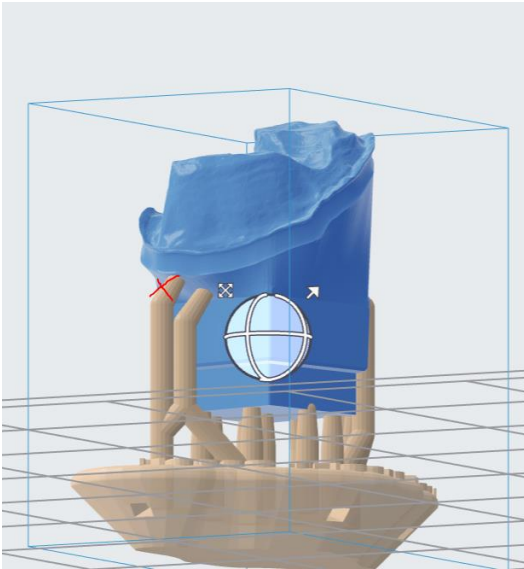
Reset

Solid = .75

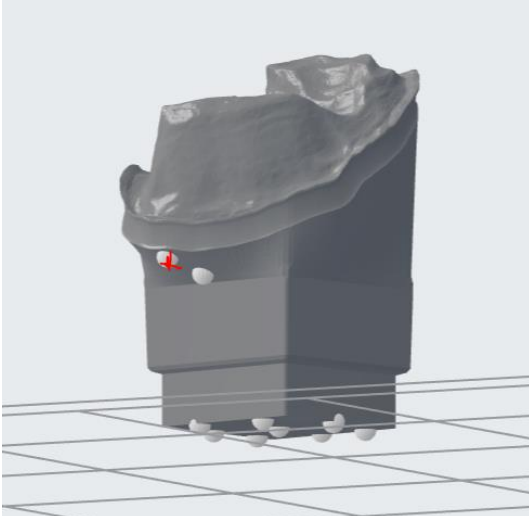
Quad = .75 - .8

Full = .8 - .85

Step 5. Edit the supports if any are too close to margins. The marked support is too close to the margin and would need to be deleted / moved:

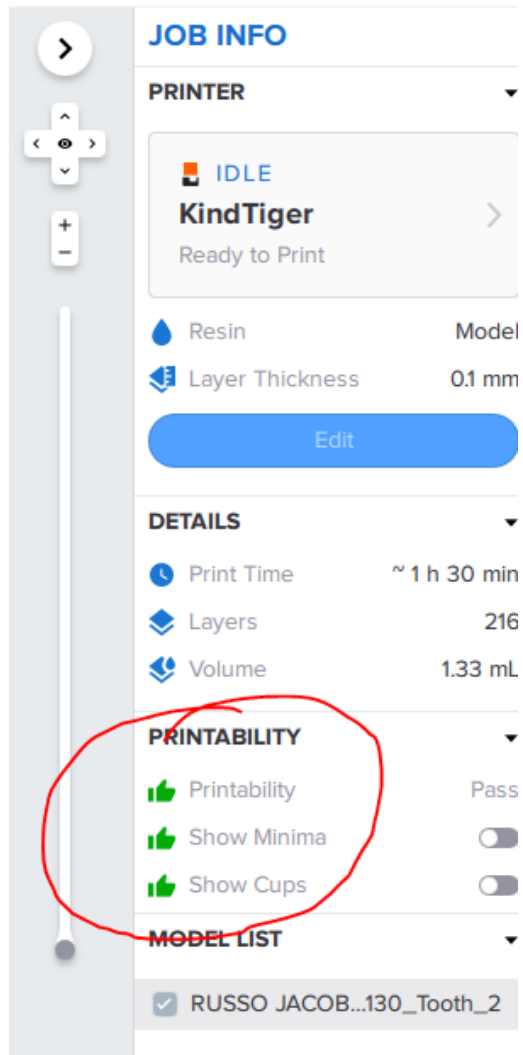


To remove, click edit support and left click on the point to be removed.



Click anywhere else to create a new support.

Check for printability.



The screenshot shows a software interface for 3D printing. On the left is a vertical toolbar with navigation icons (back, forward, home, zoom in, zoom out) and a slider. The main panel is titled 'JOB INFO' and contains several sections: 'PRINTER' showing 'KindTiger' as 'IDLE' and 'Ready to Print'; 'DETAILS' showing 'Print Time' as '~ 1 h 30 min', 'Layers' as '216', and 'Volume' as '1.33 mL'; 'PRINTABILITY' which is circled in red and shows 'Printability' as 'Pass', 'Show Minima' as a toggle switch, and 'Show Cups' as a toggle switch; and 'MODEL LIST' showing a single model 'RUSSO JACOB...130_Tooth_2' with a checked checkbox.

JOB INFO

PRINTER

IDLE
KindTiger
Ready to Print

Resin Model
Layer Thickness 0.1 mm

Edit

DETAILS


Print Time ~ 1 h 30 min
Layers 216
Volume 1.33 mL

PRINTABILITY

Printability Pass
Show Minima ☐
Show Cups ☐

MODEL LIST

☒ RUSSO JACOB...130_Tooth_2

Step 6. Click on the layout icon  to choose layout all for automatic layout functions.

LAYOUT

Layout All

LAYOUT SETTINGS

Model Spacing

5.0 mm

Overlap Rafts

☐

Lock Rotation

☐

DUPLICATE


Duplicate Count

1

Create

Mirror Models

Step 7. Click file – save as to save the print job prior to sending it to the printer.

 Save Job


<div> <div> <div>←</div> <div>→</div> <div>⌵</div> <div>⬆</div> <div>📁</div> </div> <div> <div>This PC</div> <div>Desktop</div> <div>3D PRINTING HOW-TO</div> <div>Formlab Print Archive</div> </div> </div>			
<div> <div>Organize</div> <div>New folder</div> </div>			
<div> <div>📁 Formlabs Der</div> <div>📁 Envisiontec D</div> <div>📁 Stratasys Verc</div> <div>📁 dima Print M</div> </div>	<div> <div>Name</div> <div>12-24-702-1-RM</div> <div>12-21-702-1-js</div> <div>12-20-702-1-EB</div> </div>	<div> <div>Date modified</div> <div>12/24/2019 11:27 ...</div> <div>12/21/2019 1:05 PM</div> <div>12/20/2019 9:23 AM</div> </div>	<div> <div>Type</div> <div>FORM File</div> <div>FORM File</div> <div>FORM File</div> </div>





Then click the printer icon and upload job to send the job to the printer.

PRINT ×

Printer

 **IDLE**
KindTiger
Ready to Print

 Cartridge

 Tank

Model V2
Model V2

▼

Job Name

Account Or

Step 8. On the printer, gently agitate the resin cartridge to help the resin flow. Press the print now button on screen and follow directions to start print job.

Step 9. Post process job by removing build platform upon completion of print job. Please use proper PPE per training.

Step 10. Remove print from build platform and place in first alcohol bath for 10 min. Brush and place in second bath for 10 min.

Step 11. Remove from bath, dry with compressed air, and let stand for 3 – 5 minutes prior to cure.

Step 12. Cure for 30 minutes, remove supports, clean up, and place in appropriate case for movement to next step.

Step 13. Complete all necessary maintenance prior to starting next job.

In conclusion, the steps to excellence are as follows:

- Keep everything CLEAN
- WORK SAFE **and FOLLOW THE PROCEDURE**