

## Facility Requirements Checklist – L1 Production Solution: North America

V01.30  
03 SEPTEMBER 2024

## Core Requirements

Use this document to track your progress as you prepare your facility to receive Carbon products.

| Requirements                                     | Specification                                    | Quantity                                                                                                                                                                                                                                                                                                  | Related Items                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|--------------------------------------------------|--------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ELECTRICAL                                       | <input type="checkbox"/> <a href="#">Printer</a> | 200-240V / 50-60 Hz / Single Phase – 30A dedicated circuit                                                                                                                                                                                                                                                | 1 per printer                                                                                                                                      | <a href="#">NEMA L6-30 socket</a> installed within 1.8 m (6') of printer power entry                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|                                                  | <input type="checkbox"/> <a href="#">Spinner</a> | 200-240V / 50-60 Hz / 3phase – 20A dedicated circuit                                                                                                                                                                                                                                                      | 1 per spinner                                                                                                                                      | <a href="#">NEMA L15-20R socket</a> installed on the circuit.<br><br>The following <b>should not</b> be on the circuit for the spinner: <ul style="list-style-type: none"><li>• ELCB (Earth Leakage Circuit Breaker) / RCBO (Residual Circuit Breaker with Overload);</li><li>• GFCI/RCD (Ground-Fault Current Interrupter / Residual Current Device) / RCCB (Residual Current Circuit Breaker)</li></ul>                                                                                                                                       |
|                                                  |                                                  | OR                                                                                                                                                                                                                                                                                                        |                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|                                                  | <input type="checkbox"/> Chiller                 | 380-480V / 50-60 Hz / 3phase – 20A dedicated circuit                                                                                                                                                                                                                                                      | 1 per spinner                                                                                                                                      | <a href="#">IEC/EN60309/CEE Red 3P+N+E, 6h, 32A, 5pin socket</a> installed on the circuit.                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|                                                  | <input type="checkbox"/> Oxygen Concentrator     | 208-230V / 60 Hz / Single phase – 15A dedicated circuit                                                                                                                                                                                                                                                   | 1 per chiller                                                                                                                                      | <a href="#">NEMA 6-15 socket</a> installed                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| VENTILATION                                      | <input type="checkbox"/> <a href="#">Printer</a> | 120V ±10% VAC / 60 Hz / 5 A                                                                                                                                                                                                                                                                               | Shared circuit OK                                                                                                                                  | <a href="#">NEMA 5-15 socket</a> available                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|                                                  | <input type="checkbox"/> <a href="#">Spinner</a> | 220-230V / 50-60 Hz / Single Phase - 20A dedicated circuit                                                                                                                                                                                                                                                | 1 per curing unit                                                                                                                                  | <a href="#">NEMA 6-20 socket</a> installed                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|                                                  | <input type="checkbox"/> <a href="#">Printer</a> | 50 cfm per device                                                                                                                                                                                                                                                                                         | 1 hose per device                                                                                                                                  | 4" flexible hose with blast gate (mechanical/fixed ventilation or portable fume extractor)                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|                                                  | <input type="checkbox"/> <a href="#">Spinner</a> |                                                                                                                                                                                                                                                                                                           |                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|                                                  | COMPRESSED AIR                                   | <input type="checkbox"/> <a href="#">Printer</a>                                                                                                                                                                                                                                                          | <ul style="list-style-type: none"><li>• Pressure: 6.5-8 bar (95-115 psi) at inlet</li><li>• Purity: ISO 8573-1:2010 Class 2.4.3 Standard</li></ul> | 1 of each fitting per printer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <input type="checkbox"/> <a href="#">Spinner</a> |                                                  | <ul style="list-style-type: none"><li>• Minimum pressure required: 5.5 bar (80 psi) at inlet</li><li>• Maximum allowable pressure: 8.3 bar (120 psi) at inlet</li><li>• Consumption: 205 L/min ANR (7.2 cfm) for 15 seconds every 3 minutes</li></ul>                                                     | 1 of each fitting per spinner                                                                                                                      | There are Quick-Disconnect male plugs on Carbon machines. <b>This requires the customer to provide <a href="#">female socket couplings</a> (pictured at right).</b><br><br><a href="#">Carbon has <u>3/8 NPT male plug on the printer</u> (pictured at right).</a><br><a href="#">Carbon has <u>1/4 NPT male plug on the spinner</u> (pictured at right).</a><br><br> |
| ROOM                                             | <input type="checkbox"/> Air Quality             | <ul style="list-style-type: none"><li>• Install printer away from sources of particulate matter (smoke, dust from grinding, milling, sanding, polishing, or any known sources of dust or air contaminants).</li><li>• To maintain clean air, install the printer in a room with air filtration.</li></ul> |                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|                                                  | <input type="checkbox"/> Humidity                | 30-60%; Less than ± 5% change per hour                                                                                                                                                                                                                                                                    |                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|                                                  | <input type="checkbox"/> Temperature             | 18-24 °C (64-75 °F); Less than 2 °C (3.8 °F) change per hour                                                                                                                                                                                                                                              |                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|                                                  | <input type="checkbox"/> UV Exposure             | Limit UV exposure by placing hardware, resin, and work areas away from windows and UV light sources. We recommend LED lighting. Coating exterior windows will minimize transmission of wavelengths < 420 nm.                                                                                              |                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|                                                  | <input type="checkbox"/> Floor                   | FF 25/FL 20 (moderately flat); Hard, level, non-porous, easily cleanable surface. No carpet. No foam tiles. Sealed concrete.                                                                                                                                                                              |                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|                                                  | <input type="checkbox"/> Ceiling                 | Min height: 2750 mm (108"/9')                                                                                                                                                                                                                                                                             |                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|                                                  | <input type="checkbox"/> Elevation               | 0-2000 m (0-6560 ft)                                                                                                                                                                                                                                                                                      |                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|                                                  | <input type="checkbox"/> Link                    | Our Team has reviewed the <a href="#">Site Prep Document Lab General</a> and agree that our facility meets the specifications.                                                                                                                                                                            |                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

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## Dispensing &amp; Reclamation Options

| Options        |                                                                                                                                                                                                                                                                              | Specification    | Quantity                         | Related Items                                                                                                                                                                                           |
|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| COMPRESSED AIR | <input type="checkbox"/> Resin Pump                                                                                                                                                                                                                                          | 10 cfm           | 1 of each fitting per resin pump | Customer to provide both male plug and female socket fittings: <ul style="list-style-type: none"> <li>Overview (see specifics below)</li> <li><a href="#">McMaster-Carr Product Examples</a></li> </ul> |
|                | <input type="checkbox"/> Vac-U-Max Pump Vac                                                                                                                                                                                                                                  | 35 cfm at 60 psi | 1 of each fitting per Pump Vac   | Customer to provide both male plug and female socket fittings: <ul style="list-style-type: none"> <li>Overview (see specifics below)</li> <li><a href="#">McMaster-Carr Product Examples</a></li> </ul> |
|                | <p>There are Quick-Disconnect male plugs on Carbon machines. <b>This requires the customer to provide <a href="#">female socket couplings</a> (pictured at right).</b></p> <p>Carbon has <a href="#">1/4 NPT male plug</a> on the <b>resin pump</b> (pictured at right).</p> |                  |                                  |                                    |

## Additional Information

| Requirements |                                                | Description                                                                                                                                                                                                                                                                         |
|--------------|------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| STORAGE      | <input type="checkbox"/> Printer Crate Storage | Crates are required to return a printer. Customers are encouraged to arrange storage space for these items. If the customer needs to return a printer and the original crate is not available, they will need to purchase another container from Carbon to safely ship the printer. |
| INSTALLATION | <input type="checkbox"/> Chiller               | The chiller must be installed on the same level as the printer.                                                                                                                                                                                                                     |
|              | <input type="checkbox"/> Safety                | For the safety of our FSEs, Carbon will not install anything at a facility that requires the use of a ladder, scissor lift, etc.                                                                                                                                                    |
| OTHER        | <input type="checkbox"/> Drum Plug Wrench      | The customer will have a drum plug wrench on hand to open the resin drum and install the pump. Visit the <a href="#">Carbon Accessories Shop</a> for more information.                                                                                                              |

Continued on the next page.

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## Day of Installation

Please have these essential items readily available the day of your printer installation.

| Requirements     |                                                                     | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|------------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PERSONNEL        | <input type="checkbox"/> 2x Persons on Site                         | The customer will have a minimum of 2 persons on site to help during the installation.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| ANCHORING        | <input type="checkbox"/> Spinner                                    | Anchor the Spinner and control panel 3.75" deep into the floor on the day of installation. The floor depth must be at least 5" to accommodate this.<br>The customer (not Carbon) is responsible for providing the required tools and anchoring the spinner on the day of the installation. A qualified employee or technician (contractor/technician) must install the spinner to ensure that it is safe and functional. <a href="#">This anchor</a> ships by default so customers need to provide an associated drill bit: <ul style="list-style-type: none"> <li>Masonry Drill Bit for Hammer Drills, Hex Shank, 3/4" Size, 13-1/2" Overall Length (recommended <a href="#">McMaster PN 8897A55</a>)</li> </ul> If a compatible drill bit is not available, the customer will purchase an alternative metric-equivalent anchor (Hilti HST3-R PN 2105900) with the associated drill bit. |
|                  | <input type="checkbox"/> Drill + Drill Operator                     | Minimum 8-amp hammer drill                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                  | <input type="checkbox"/> Printer (optional)                         | Carbon does not require anchoring your printer. Please check with your EH&S/facilities team regarding local regulations to see if the printer requires anchoring. An anchoring quote can be obtained through your Sales Manager. Please refer to <a href="#">Site Prep Document Lab General</a> for more details on Anchoring Requirements.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| IT EQUIPMENT     | <input type="checkbox"/> Network Connection                         | The network connection needs to be configured based on the requirements of the <a href="#">Product Connectivity Architecture guide</a> . Once it is configured, Carbon will send the <a href="#">Network Configuration Device (NCD)</a> to check the network connection. We require screenshots from the NCD test to confirm the network connection.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|                  | <input type="checkbox"/> A Laptop or Desktop to Operate the Printer | See hardware & operating system specifications in the <a href="#">Site Prep Accessories List</a> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| MOVING EQUIPMENT | <input type="checkbox"/> Forklift + Forklift Operator               | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|                  | <input type="checkbox"/> Pallet Jack                                | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| SOLVENTS         | <input type="checkbox"/> 99% IPA                                    | 3-4 gallons                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                  | <input type="checkbox"/> Acetone                                    | 3-4 gallons or 4-5 pre-saturated wipe packs                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| SAFETY           | <input type="checkbox"/> PPE                                        | PPE for all employees                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|                  | <input type="checkbox"/> Waste Disposal                             | Hazardous waste disposal bins available                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|                  | <input type="checkbox"/> Fume Extractor                             | If using a portable fume extractor as your ventilation source, please purchase 4" flexible hoses & any additional hardware needed, such as vent clamps to secure the hose                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|                  | <input type="checkbox"/> Carbon Academy/SDS Access                  | Submit to the Onboarding Team ( <a href="mailto:onboarding@carbon3d.com">onboarding@carbon3d.com</a> ) the names and email addresses of people needing access to Carbon Academy including SDSs.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| CURING           | <input type="checkbox"/> Dreve PCU 90                               | Install the Dreve PCU 90 curing unit by the day of installation. Refer to manual for install requirements. NOTE: Do not discard the foam displacer in the box.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|                  | <input type="checkbox"/> Nitrogen                                   | The customer will supply an adequate source of >99% nitrogen based on the number of PCU 90 units installed (Dewar, bottle, generator, etc. as listed on the <a href="#">Site Prep Accessories List</a> ).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|                  | <input type="checkbox"/> Curing Tray                                | Carbon provides 1 tray with the PCU 90. Purchase curing trays for each additional PCU 90 ( <a href="#">Carbon Accessories Shop</a> ) to place on foam displacer - helps avoid the reflective coating/liner from degrading after multiple cycles.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| CHILLER COOLANT  | <input type="checkbox"/> Min 3 gallons coolant purchased            | <ul style="list-style-type: none"> <li>25% Propylene Glycol + 75% distilled water mix</li> <li>Coolant Sourcing <ul style="list-style-type: none"> <li>Premixed coolant solution: <a href="#">DOWFROST HD</a> (North America)</li> <li>Concentrated coolant that must be mixed with distilled water to form a 25% solution: <ul style="list-style-type: none"> <li><a href="#">DOWCAL 200</a> (North America/International)</li> <li><a href="#">PEKASOL-L</a> (International)</li> </ul> </li> </ul> </li> <li>Each L1 uses less than half a gallon; the chiller reservoir uses about 1 gallon, the filter uses about half a gallon, and the rest of the quantity needed will depend on the length of the tubing (ex. the further the chiller is from the printer, the more volume of coolant needed).</li> </ul>                                                                        |