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Operations Manual

DataStream™ Software



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1. Introduction

1.1 Confidentiality Statement

Information supplied is for the use in the operation and/or maintenance of Cee® equipment. Neither this document nor the information it contains shall be disclosed to others for manufacturing or any other purpose without written authorization from, Cost Effective Equipment, LLC.

1.2 Warranty

Cost Effective Equipment, LLC warrants to the original purchaser (Buyer) that equipment is free from defects in material and workmanship under normal use and service in accordance with Cee® instructions and specifications. Buyer shall promptly notify Cee® of any claim against this warranty, and any item to be returned to Cee® shall be sent with transportation charges prepaid by Buyer, clearly marked with a Return Authorization (RMA) number obtained from Cee® Customer Support. Cee's obligation under this warranty is limited to the repair or replacement, at Cee® option, of any equipment, component or part which is determined by Cee® to be defective in material or workmanship. This obligation shall expire one (1) year after the initial shipment of the equipment from Cee®. This warranty shall be void if:

Any failure is due to the misuse, neglect, improper installation of, or accident to the equipment.

Any major repairs or alterations are made to equipment by anyone other than a duly authorized representative of Cee®. Representatives of Buyer will be authorized to make repairs to the equipment without voiding warranty, on completion of the Cee® training program.

Replacement parts are used other than those made or recommended by Cee®.

CEE® MAKES NO OTHER WARRANTIES, EXPRESSED OR IMPLIED, WITH RESPECT TO EQUIPMENT. NO WARRANTY IS MADE AS TO THE MERCHANTABILITY OF THE EQUIPMENT NOR ITS FITNESS FOR ANY PARTICULAR PURPOSE. In no event shall Cee® be liable for consequential loss or damages, however caused. No person or representative of Cee® is authorized to assume for Cee® any liability in connection with equipment nor to make any change to this warranty unless such change or modification is put in writing and approved by an authorized representative of Cee® in writing.

This warranty shall be governed by the laws of the state of Missouri, U.S.A.

2. DataStream™ Software Interface Overview

2.1 User Profiles & Permissions

Apogee™ equipment comes standard with four default user profiles:

<u>Username</u>	<u>Password</u>	<u>Permissions</u>
admin	admin2	<ul style="list-style-type: none"> ▪ Advanced Recipe Editing ▪ Export Log Files ▪ Manual Tool Control ▪ Remote Recipe Preparation ▪ Tool Administrator ▪ User Administrator
eng	eng0	<ul style="list-style-type: none"> ▪ Advanced Recipe Editing ▪ Manual Tool Control ▪ Tool Administrator
tech	tech1	<ul style="list-style-type: none"> ▪ Basic Recipe Editing ▪ Manual Tool Control
op	op6	<ul style="list-style-type: none"> ▪ View Recipe ▪ Manual Tool Control

<u>Permissions</u>	<u>Description of Access</u>
Shared Account	Restricts the ability to update profile information when logging in under a shared profile.
Basic Recipe Editing	Ability to create and edit basic recipes.
Advanced Recipe Editing	Basic recipe editing access + the ability to create and edit advanced recipes.
Export Log Files	Ability to export process and system log files
Manual Tool Control	Access to execute manual tool operations.
Remote Recipe Preparation	Ability to preset temperature without local control.
Tool Administrator	Full access to tool configuration settings.
User Administrator	Ability to add, update, and delete users – including shared accounts.

**Controls for which a user does not have access will not be visible to the user.*

2.2 Logging In

Upon powering up the machine, the user will arrive at the login screen.

Cee® Apogee™ Bake Plate

Username
Username

Password
Password

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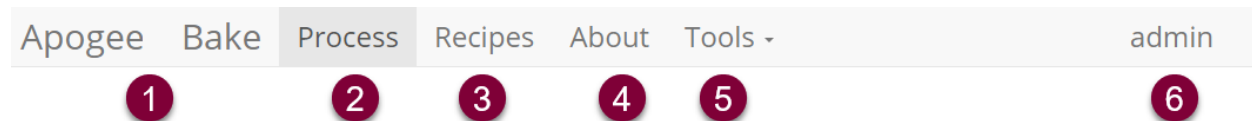
Login

For initial set-up and orientation, the user should log-in with the admin profile credentials.

Demonstrations of processes outlined in the DataStream™ Manual assume that the user has full administrator privileges.

2.3 Navigation Bar

Located along the top of the screen, the navigation bar provides easy access to Apogee™ features and functions.



1. Tool Namedisplays the Apogee™ equipment name
2. Process.....displays process parameter data and progress
3. Recipes.....create, import, or export recipe data
4. About.....system information and equipment specifications
5. Tools.....logs, diagnostics, settings, and manual overrides
6. Usercurrent logged in user or user profile

3. DataStream™ Process Page

Select the Process tab from the navigation bar to run recipes and view real-time equipment operation from within the Process page. The user must be logged in and have local control to run recipes. See section 7.3 on Local Presence for more information.

The screenshot shows the Apogee Process page interface. At the top, there is a navigation bar with tabs for 'Apogee', 'Bake', 'Process' (highlighted), 'Recipes', 'About', and 'Tools'. A user name 'admin' is visible in the top right. Below the navigation bar is a header area with four quick links: 'A. Home', 'B. Graph View', 'C. Recipe Progress', and 'D. Process Summary'. A dropdown menu is open, showing 'Test_Recipe : Table View'. Below this is a table of system parameters. At the bottom, there is a control panel with a progress indicator (100%), an 'Elapsed' timer (00:00:00), a large blue 'START' button, a 'Remaining' timer (00:00:00), and a system parameter state indicator.

Parameter	Actual	Set Point	Status
Plate Temperature	59.9 °C	--	In Range
Lift Pin Height	19.0 mm	19.0 mm	In Range
Bake Method	Contact	Contact	In Range
Ambient Temperature	26.7 °C		In Range
Humidity	44.2 %		In Range

1. Process View Quick Links.....provides easy selection of available process views
 - A. Table View
 - B. Graph View
 - C. Recipe Progress
 - D. Process Summary
2. Process View Dropdown.....tap for an alternative means of accessing process views
3. Recipe Name.....at-a-glance verification of current recipe
4. Process View.....the process view screen currently displayed
5. Omni-Buttondependent on the state of the equipment (e.g., start/abort recipe)
6. Process Progressgraphical display of process progress
7. System Parameter State.....displays status (critical high/low warning high/low, in-range)

3.1 Process View Window – Table View

Visualize real-time system parameters in table form. Each parameter has an **Actual** value depicting current state. Most parameters have a **Set Point**, defined during recipe creation or via manual command. Some parameters, such as temperature controllers, can be manually disabled. When disabled, a **Set Point** of — will be displayed as illustrated for Plate Temperature in the figure above.

All parameters have an associated **Status**; this column mirrors process alerts in warning level and associated color. **Status** ranges are pre-defined for all basic recipes and can be edited within the **Advanced** recipes menu covered in section 4.4.

***Please note, individual parameters vary between equipment types. Refer to your Apogee™ Operations Manual for equipment specific details.**

Apogee Bake **Process** Recipes About Tools - admin

Home | Test Recipe | Table View

Parameter	Actual	Set Point	Status
Plate Temperature	59.4 °C	60.0 °C	In Range
Lift Pin Height	19.0 mm	19.0 mm	In Range
Bake Method	Contact	Contact	In Range
Ambient Temperature	26.5 °C		In Range
Humidity	44.8 %		In Range

100% Elapsed 00:07:04 **START** Remaining 00:00:00

3.2 Process View Window – Recipe Progress View

Recipe Progress view displays steps of the active recipe in advanced recipe format.

Apogee Bake **Process** Recipes About Tools - admin

Home | Test Recipe | Recipe Progress

1	⏸	Start iteration	✓
2	⌘	Enable temperature controller	✓
3	⌘	Set temperature to 60 °C	1 ✓
4	⌘	Set lift pins to 0 mm	✓
5	⌘	Bake using Contact method	✓
6	⏸	Delay 60 seconds	2 □
7	↺	Stop iteration after 1 time(s)	3 □

Step 6 of 7 4

59% Elapsed 00:00:39 **ABORT** Remaining 00:00:24

1. Completedrendered in green with a checkmark
2. In Processrendered in yellow awaiting checkmark
3. Upcomingrendered in white awaiting checkmark
4. Recipe Progressgraphical display of process progression

3.3 Process View Window – Graph View

For graphical representation of data for a given parameter, tap the parameter value in **Table View**.

Graph View will auto-scale based on the data presented and updates in real time to provide immediate feedback. View current and desired values simultaneously or independently using the **Actual** and **Set Point** controls. **Graph-View** features a default lookback period of 30 seconds; however, users can display up to one hour of graph data using **Zoom** controls.

Parameter	Actual	Set Point	Status
Plate Temperature	59.9 °C	--	In Range
Lift Pin Height	19.0 mm	19.0 mm	In Range
Bake Method	Contact	Contact	In Range
Ambient Temperature	26.7 °C		In Range
Humidity	44.2 %		In Range

100% Elapsed 00:00:00 START Remaining 00:00:00

Alternatively, Graph View can be accessed by selecting the desired parameter in **Table View** and then tapping the **Graph View** quick link.

Humidity

Last 30 Seconds

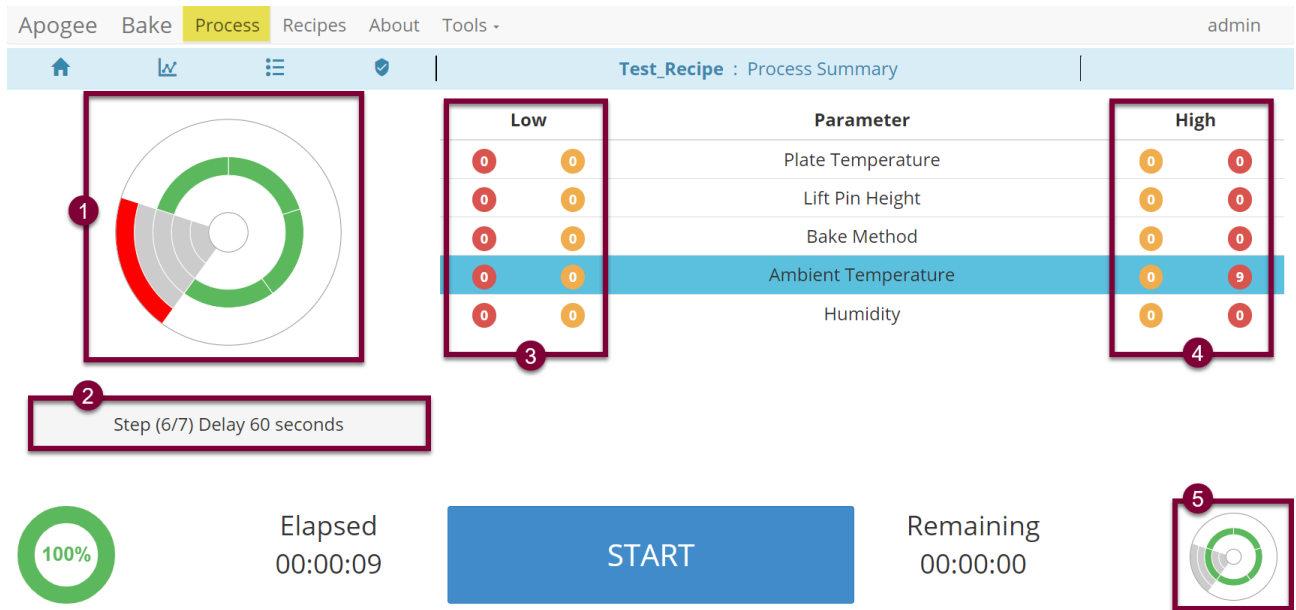
Actual Set Point

100% Elapsed 00:00:00 START Remaining 00:00:00

1. Zoom.....adjust graphical lookback period from 30 sec to one hour
2. Data Selection.....display Actual values, Set Point values, or both

3.4 Process View Window – Summary View

Summarizes the most recent process, including active processes. The *Process View Window* will also appear once an active process is completed.



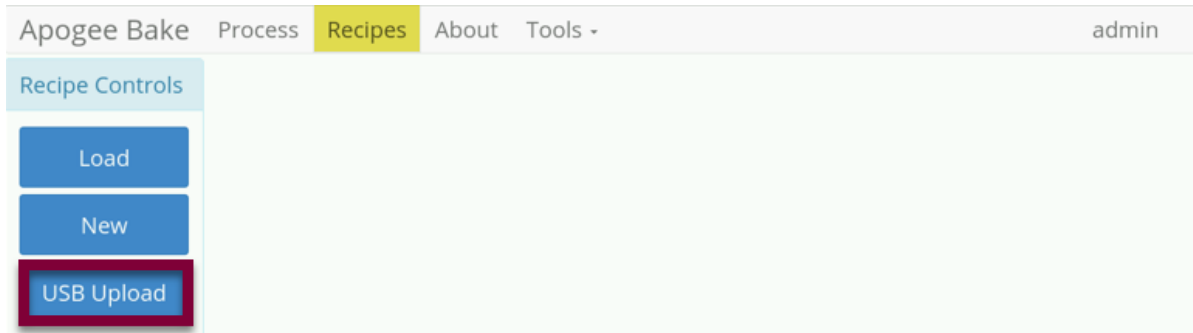
1. Process alert UI depicts parameter status indicators achieved during a given process.
2. Process state message describing most recent action and/or process errors encountered.
3. Seconds spent in critically low and warning low status.
4. Seconds spent in critically high and warning high status.
5. Process alert UI depicts current parameter status indicators (may differ from item 1).

4. DataStream™ Recipes Page

Easily view, edit, and create recipes locally via the DataStream™ graphical user interface or use the DataStream™ Networking feature outlined in section 7 to upload and download recipes remotely.

4.1 Recipe Management

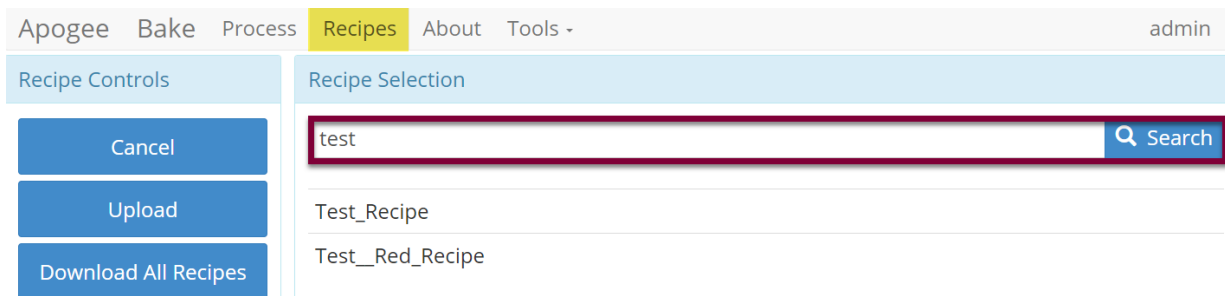
Access to *Recipe Management* is controlled at the user profile level. If a user does not have sufficient privileges for a specific activity, the button for that activity will not be displayed.



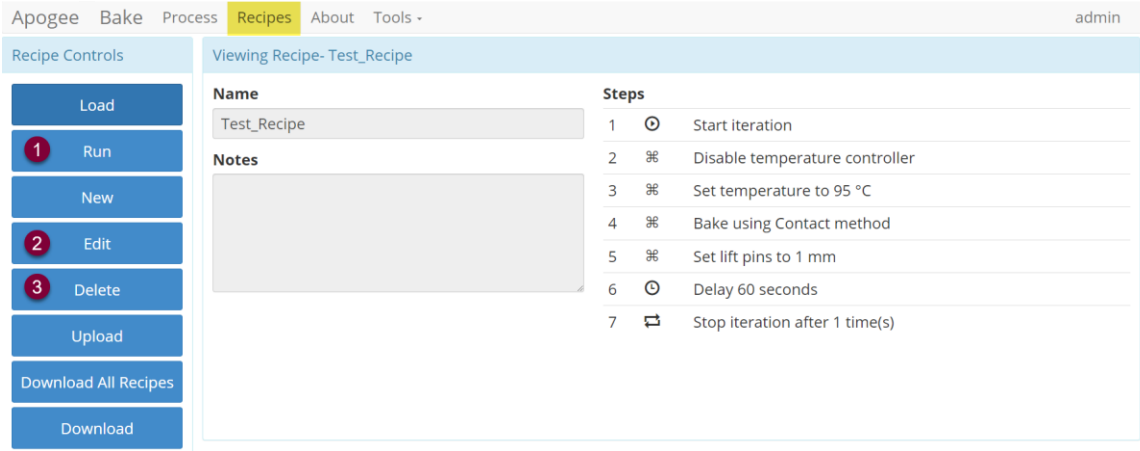
1. Load Select an existing recipe to view, edit, or run.
2. New Initiates creation of a new recipe.
3. USB Upload Facilitates batch import of existing recipes.

4.2 Load the Recipe List

Tap the **Load** button to access the recipe selection list which contains all available recipes by default. Use the search field to refine the list then tap the desired recipe name to load.



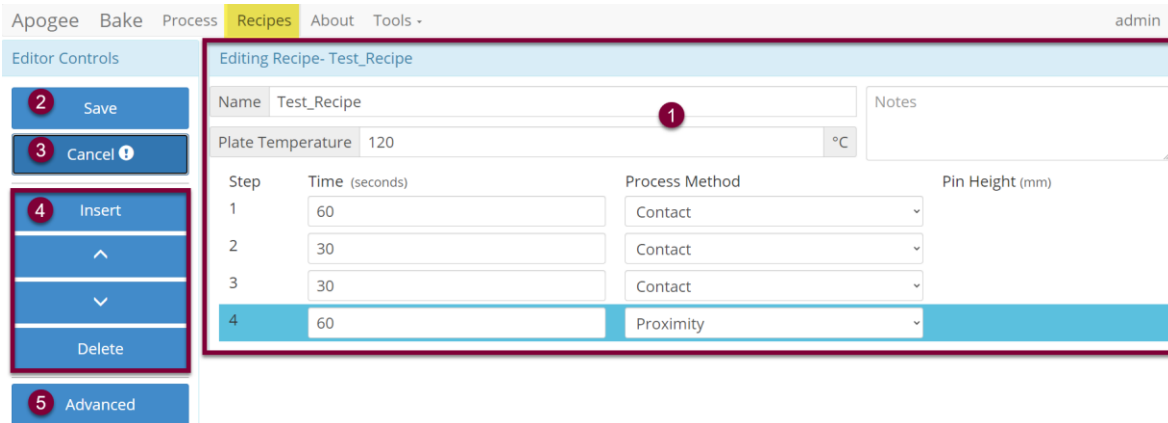
Once loaded, users can perform various actions on the recipe provided they have the necessary permissions and local control of the equipment. Note that recipes vary based on the type of equipment/recipe being loaded. For details on local control, review section 7.3 on Local Presence.



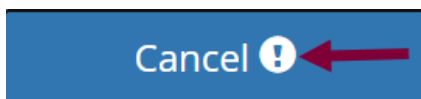
1. RunDirects user to the process page to begin the recipe.
2. Edit.....Allows for modification to existing recipes.
3. Delete.....Irreversible and requires action confirmation (see below).

4.3 Basic Recipe Editor

All DataStream™ equipped tools share the same core recipe-editing platform. Recipes are entered into the editor as a basic recipe, then converted to advanced recipes once executed.



1. Recipe Editor UIParameters and controls vary between equipment types.
2. SaveOverwrites existing recipe.
3. Cancel.....Discard changes to the recipe.
4. Editor ControlsVary with recipe/equipment type/selections in Recipe Editor UI.
 - Insert.....Add a recipe step.
 - Up/DownReorder recipe steps
 - Delete.....Delete the selected recipe. (*irreversible)
5. Advanced¹.....Convert a basic recipe to an advanced recipe.

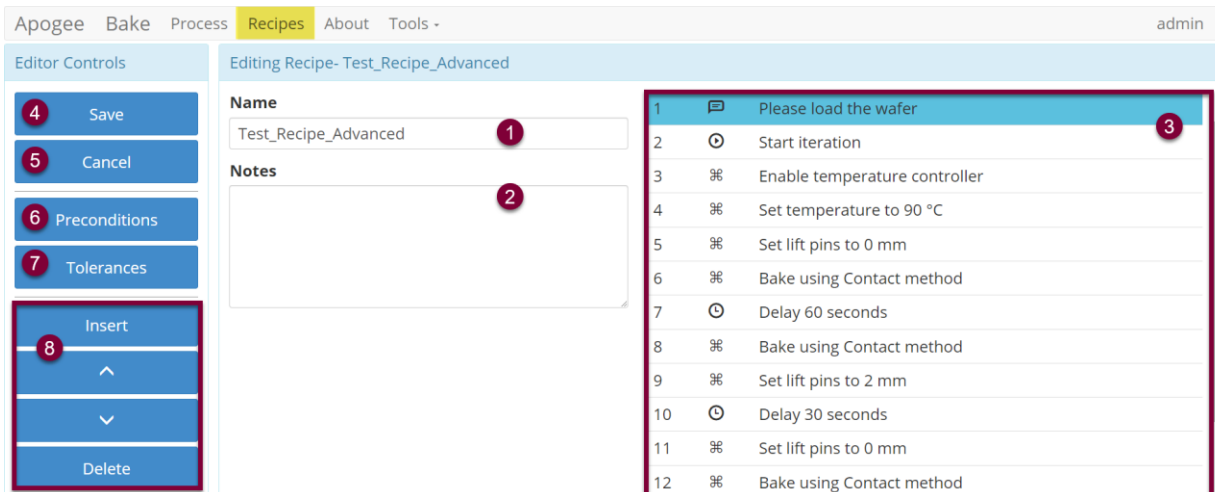


¹ Access to the Advanced Recipe Editor is governed by user permissions. Recipe conversion cannot be reverted. Users without advanced editor access will be unable to interact with the recipe upon conversion.

- Action ConfirmationPresents when data loss is possible and requires a secondary *confirmation* click within 3 seconds to proceed with the action.

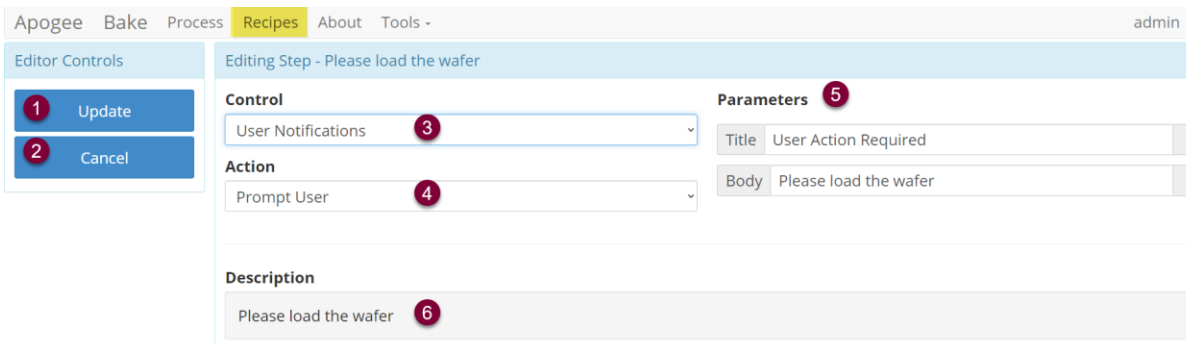
4.4 Advanced Recipe Editor

Advanced Recipe Editor access is reserved for expert users and employed when more detailed control over a process is necessary.



- Recipe NameIdentification of recipe via search and log files.
- NotesField for additional process information, if desired.
- StepsClick the desired row twice to open the Step Editor.
- Save²Overwrites existing recipe.
- Cancel.....Discard changes to the recipe.
- PreconditionsLaunches *Precondition Editor*.
- TolerancesDisplays *Runtime Tolerance Editor*.
 - Editor Controls..*Recipe Editor UI* options vary between equipment.
 - Insert.....Add a recipe step.
 - Up/DownReorder recipe steps.
 - Delete.....Delete the selected recipe. (**irreversible*)

4.5 Recipe Step Editor



- Update Save values of recipe step and return to Advanced Recipe Editor.
- Cancel..... Discard changes and return to the Advanced Recipe Editor.
- Control Dropdown menu selection to define area of control.

² Users should define and employ a unique nomenclature strategy to avoid potential for accidental overwrite of recipes when a duplicate name is entered.

4. Actions..... Specifies the action a control will perform.
5. Parameters Defines instruction for the control/action combination.
6. Description..... Compilation of step details for logs and display during recipe execution.

Examples:

<p>Control</p> <input type="text" value="User Notifications"/>	<p>Parameters</p> <p>Title User Action Required</p> <p>Body *enter prompts for the user here*</p>
<p>Action</p> <input type="text" value="Prompt User"/>	
<p>Description</p> <p>*enter prompts for the user here*</p>	

Control: User Notification
Action: Prompt User
Parameters:
 Title: User Action Required
 Body: *enter prompts for user here*
Description: *enter prompts for user here*

<p>Control</p> <input type="text" value="Plate Temperature"/>	<p>Parameters</p> <p>Value 90 °C</p>
<p>Action</p> <input type="text" value="Set"/>	
<p>Description</p> <p>Set temperature to 90 °C</p>	

Control: Plate Temperature
Action: Set
Parameters:
 Value: 90°C
Description: *Set Temperature to 90°C*

<p>Control</p> <input type="text" value="Lift Pins"/>	<p>Parameters</p> <p>Step Size 2 mm</p> <p>Direction Up</p>
<p>Action</p> <input type="text" value="Step"/>	
<p>Description</p> <p>Step lift pins Up 2 mm</p>	

Control: Lift Pins
Action: Step
Parameters:
 Step Size: 2mm
 Direction: Up

Description: Step lift pins up 2mm

4.6 Preconditions

Preconditions are parameter/condition verifications that run prior to the start of a recipe. When preconditions are acceptable, the recipe will run normally. When preconditions are outside the specified range, the equipment will attempt to bring parameters inside the control range before beginning the process. When parameters cannot be brought into range, the equipment will abort the process.

Apogee Bake Process **Recipes** About Tools - admin

Editor Controls

Editing Preconditions - Test_Recipe_Advanced

Recipe Precondition Checks

- Plate Temperature - Within -5% and +5% of 90 °C **3**
- Lift Pin Height - Disabled
- Ambient Temperature - Disabled
- Humidity - Disabled

Settings

- 4** Enabled
- Target 90 °C
- Min Range 5 %
- Max Range 5 **5** %

1 Update

2 Cancel

1. UpdateSave all preconditions and return to Advanced Recipe Editor.
2. Cancel.....Discard changes and return to the Advanced Recipe Editor.
3. PreconditionThe system parameter and details of requirements.
4. Enabled/Disabled³Toggle switch dictates whether the condition is evaluated.
5. Precondition DetailDefine acceptable range –fields vary by parameter.

Precondition Verification Example:

Apogee Bake **Process** Recipes About Tools - admin

List of all preconditions to be met and their status

- ❌ Plate Temperature(24.4 °C) - Within -5% and +5% of 30 °C
- ✅ Lift Pin Height(10.0 mm) - Within -10% and +10% of 10 mm
- ❌ Ambient Temperature(26.6 °C) - Between 20 and 22 °C

Waiting on preconditions to be in range for recipe ...

ABORT to cancel process

Test_Recipe

0% Elapsed 00:00:04 **ABORT** Remaining 00:01:00

³ When disabled, the description will read *Disabled*.

4.7 Runtime Tolerance Editor

Runtime Tolerances drive *process alerts* on the **Process** and **Manual Control** pages. These are parameter/condition verifications that run during recipe execution.

1. Update Save *all* recipe tolerances and return to the Advanced Recipe Editor.
2. Cancel..... Discard changes and return to the Advanced Recipe Editor.
3. Tolerance..... The system parameter and details of requirements.
4. Enabled/Disabled⁴..... Toggle switch dictates whether the tolerance is evaluated.
5. Tolerance Detail⁵ Define tolerance range - fields vary between parameters.

4.8 Process Alert User Interface

The **Process Alert Element** provides at-a-glance information regarding current system state(s) and leverages innate pattern recognition to facilitate quick identification of non-confirming data points. The design employs both color and position variations ensuring that data is unambiguous to colorblind users.



Alert

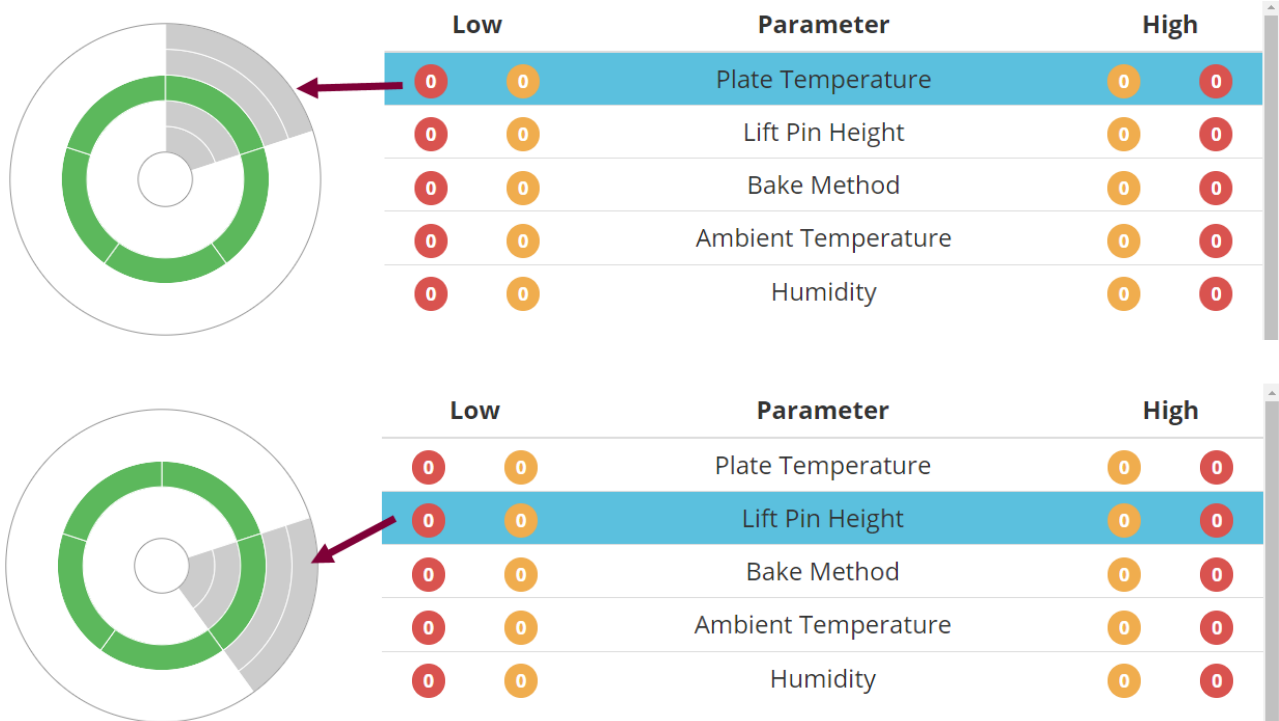
Rendered if the system parameter is...

1. Critically Highabove the allowable upper limit
2. Warning Highabove target range but within allowable limits
3. In Rangewithin the target range
4. Warning Lowbelow target range but within allowable limits
5. Critically Low.....below the allowable lower limit

A complete green circle is rendered when all parameters are within range.

⁴ When disabled, the description will display *Disabled* and Process Alerts will show as *In Range*.

⁵ Run time parameters are considered relative to the current set point (when associated) other parameters are absolute values.



When a value from the parameter list is selected, the associated quadrant of the **Process Alert Element** is shaded in gray.

4.9 Iterations

Recipe iterations are controlled by selecting where the loop starts and how many times it should repeat. When more than one iteration is defined, the recipe will repeat all steps between the *Start Iteration* and *End Iteration* steps.

Editor Controls

Save

Cancel

Preconditions

Tolerances

Insert

^

v

Editing Recipe- Test_Recipe

Name
Test_Recipe

Notes

Steps

- 1 Load Wafer
- 2 Enable temperature controller
- 3 Set temperature to 30 °C
- 4 Start iteration
- 5 Set lift pins to 4 mm
- 6 Bake using Contact method
- 7 Delay 60 seconds
- 8 End iteration after 4 time(s)
- 9 Set lift pins to 2 mm
- 10 Set temperature to 130 °C

The *Start Iteration* step can be moved or reordered within the recipe. The *End Iteration* step can be moved/reordered within the recipe and edited to define the number of desired iterations by double clicking the step.


Apogee Bake Process **Recipes** About Tools - admin

Editor Controls

Update

Cancel

Editing Iteration - End iteration after 4 time(s)

 Iteration Count times

Description

End iteration after 4 time(s)

The **Process Summary > Recipe Progress** page indicates how many iterations have been completed during a process.

Apogee Bake **Process** Recipes About Tools - admin

Test Recipe : Recipe Progress

6	⌘	Bake using Contact method	☑
7	⌚	Delay 60 seconds	☐
8	↻	End iteration after 4 time(s)	☐
9	⌘	Set lift pins to 2 mm	☐
10	⌘	Set temperature to 130 °C	☐

Step 7 of 10

Iteration 1 of 4

1%

Elapsed 00:00:08

ABORT

Remaining 00:04:55

Only advanced recipes support iterations. Steps within an individual iteration cannot be added or deleted.

5. DataStream™ About Page

Cee® Apogee™ Bake Plate



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Tool Info	
Tool Name	Apogee Bake
Serial Number	123456
Local Time	2022-07-29 20:05
System Time (UTC)	2022-07-29 20:05
External Address	10.0.1.114
MAC Address	[REDACTED]

Tool Usage	
Processes Run	7
Manual Operations	8
User Aborts	12
System Aborts	0
Uptime	6 hrs
Last Downtime	0 hrs

DataStream™ System Applications		
Firmware	20220721090612	9c1bea0
Web UI	20220727213957	a91ae4d2
Diego	20220526134543	b6b6084
Manny	20160404142354	51e2e34
Postal	20160404142634	2ebb797

Client Info	
Browser Name	Chrome
Browser Version	103
Browser Size	1485 x 834

[Software Update...](#)

5.1 Tool Info

Tool Name-----equipment identifier displayed in upper left corner, *configured in settings

Serial Number-----unique serial number assigned by Cee® during production

Local Time-----current time as defined by local time zone offset

System Time-----current coordinated universal time based on the equipment's system clock

External Address -----DHCP IP address assigned when connected to a network

MAC Address-----hardware MAC Address for the external Ethernet port

5.2 DataStream™ System Applications

A list of system applications is displayed alongside their respective version number(s).

Firmware-----facilitates real-time process controls and recipe execution

Web UI -----manages all user interactions

Diego-----displays the equipment's graphical user interface

Manny -----controls user management activities

Postal-----used to route emails to a configured SMTP server

5.3 Tool Usage

Processes Run-----Total number of processes completed

Manual Operations----Total number of manual operations run by users

User Aborts -----Total number of processes/commands aborted by users

System Aborts-----Total number of processes/commands aborted by the control system

Uptime-----runtime since the last reboot

Last Downtime -----duration of time the equipment was powered off prior to boot up

5.4 Client Info

Contains browser specific information useful for troubleshooting purposes.

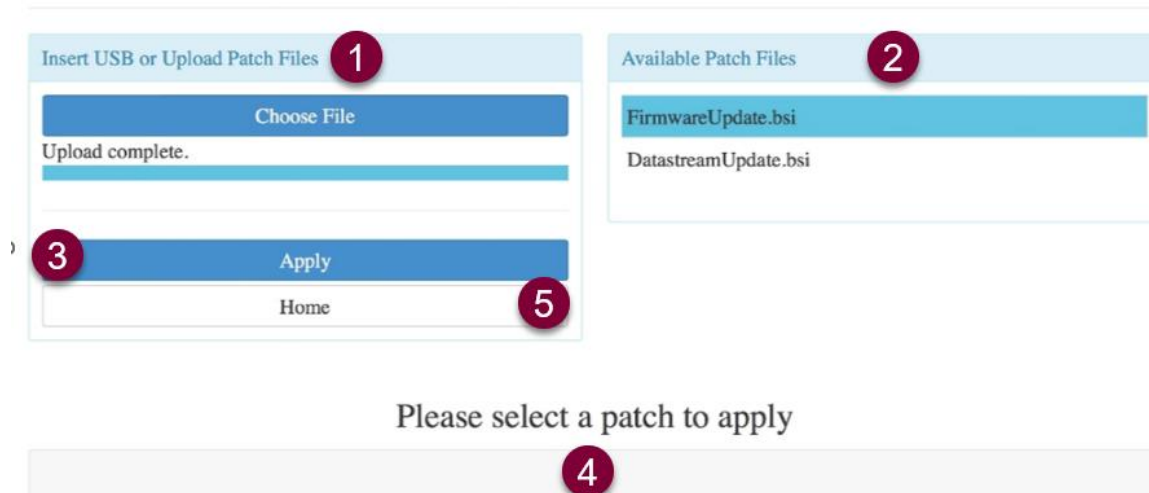
5.5 Software Update Utility

The Software Update Utility is accessible to equipment administrators by clicking the *Software Update* button located at the bottom of the **About** page.

Patch files are supplied to the Apogee™ equipment via upload from a remote computer (requires network connection) or files can be transferred to the root of a *FAT32 formatted* USB flash drive and manually loaded through the USB port on the equipment's rear utility panel.

Visit us [online](#) or contact [customer support](#) for details and to download the latest version of DataStream™.

Software Update Utility



1. When updating from a remote computer, select **Choose File** to browse for patch files and select **Open**. (*If updating via local USB, skip this step.)
2. Patch files identified by the equipment will be displayed under *Available Patch Files*.
3. Tap to highlight the desired patch file and click **Apply**.
4. Installation status and a detailed output of the process is compiled at the bottom of the page.
5. Tap the **Home** button to exit the Software Update Utility and return to the main application.

***Once updates are applied, the equipment must be restarted for changes to take effect.**

5.6 Format USB for Equipment Compatibility

Please follow all organizational policies and procedures related to the use and preparation of portable drives for Apogee™ equipment.

Apogee™ equipment requires an 8GB (max) FAT32 Formatted USB Drive. Please consult with your Information Technology Department for assistance or contact [Cee® Customer Support](#).

Once formatted, add a folder to the USB drive named *DATASTREAM* to complete the process. Your USB is now compatible for use with Apogee™ equipment.

6. DataStream™ Tools

6.1 Manual Control Activity

Tools > Manual Control

The Manual Control page is an advanced feature that allows users to run most operating processes outside of a recipe. This mode is useful for tasks such as prototyping processes, verifying equipment operation, and recovering from aborted processes. If the user has sufficient privileges, the Manual Control selection is available under the Tools menu. See sections 8-11 for details on equipment specific controls.

If using remote feature, the user must have confirmed their local presence to execute manual commands. See section 7.3 for more detail on Local Presence.

6.2 Log Browser Activity

Tools > Log Browser

The **Log Browser** activity is an advanced feature that allows users to download process logs formatted as .xlsx or .json. Logs can be loaded to a USB drive inserted into the rear utility panel of the Apogee™ equipment or accessed via remote connection (see section 7 on DataStream™ Remote Access for more detail.)

Search

Apogee Bake Process Recipes About Tools - admin

Log Exporting 2022-08-11 14:37

Recipe Run Date

08/11/2022

August 2022

Su	Mo	Tu	We	Th	Fr	Sa
31	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	1	2	3
4	5	6	7	8	9	10

Search

Delete All Before Date

Save to USB

Results

2022-08-11T11:23:55
2022-08-11T11:25:15
2022-08-11T11:27:22
2022-08-11T11:28:20
Screenshot 2022-08-11T11:32:49
Data 2022-08-11T11:32:57
2022-08-11T11:43:29
Screenshot 2022-08-11T12:43:00
Apogee Spin_20220811

1. The equipment's local date & time serve as the reference point for all searches.
2. Manually key in the desired date or select one from the calendar widget.
3. Tap search to query the equipment for all records on the specified date.
4. Search results appear in a list format to the right of the screen.

Download

Users with sufficient permissions can export log files from the physical equipment to an appropriately formatted USB drive. Review section 5.6 for details on how to Format USB for Equipment Compatibility.

Apogee Bake Process Recipes About Tools - admin

Log Exporting 2022-08-11 14:37

Recipe Run Date
08/11/2022

August 2022

Su	Mo	Tu	We	Th	Fr	Sa
31	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	1	2	3
4	5	6	7	8	9	10

Search

Delete All Before Date

Save to USB

XLSX
RAW

Results

2022-08-11T11:23:55
2022-08-11T11:25:15
2022-08-11T11:27:22
2022-08-11T11:28:20
Screenshot 2022-08-11T11:32:49
Data 2022-08-11T11:32:57
2022-08-11T11:43:29

1. Select a date from the calendar widget.
2. Click **Search** to query for logs on the desired date.
3. Select the Data log(s) from the list of results.
4. Select **Save to USB** and select the desired file format.
5. Remove USB and manually load files onto an approved local computer for review.

6.3 Settings

User Profile Settings

Users with individual (non-shared) access can edit their personal profiles.

Apogee Bake Process Recipes About **Tools -** Jane

User Profile : admin

1 [Profile Icon]

2 [New Password Field]

3 [Email Field: user@mailserver.tld]

4 [User Notes Field: Administrators may enter notes from the User Management activity.]

5 [Update Button]

1. Profile Settings.....Navigate to **Tools > Settings** then select the **profile icon**.
2. New Password⁶.....Create a password and satisfy the validation prompt.
3. Email.....Used throughout the system to send user defined notifications.
4. User Notes.....Defined by user administrators (covered in the next section).
5. Update.....Saves **all** profile settings defined within the activity.

***Changes are effective upon the user’s next login.**

Tool Settings

Apogee Bake Process Recipes About **Tools -** admin

Tool Settings

1 [Gears Icon]

2 [Tool Name Field: Apogee™ Bake]

3 [Local Time Zone Offset Field: 0]

4 [SSL Encryption (https) Field: Disabled]

5 [Empty Field]

6 [Update Button]

1. Tools SettingsNavigate to **Tools > Settings** then select the **gears icon**.

⁶ Leave the password field blank while updating other settings to ensure the password is **not** changed.

2. Tool Name⁷Identifier displayed in the upper left corner of the screen.
3. Local Time Zone OffsetUsed to set the local time on the tool according to UTC⁸.
4. SSL Encryption⁹ (https)Controls network access to the equipment.
5. Tool Specific SettingsSee individual equipment sections for detail.
6. UpdateSaves all equipment settings defined within the activity.

****Once updates are applied, the equipment must be restarted for changes to take effect.***

Mail Settings

The screenshot shows the 'Postal SMTP Settings' form. The navigation path is: Apogee > Bake > Process > Recipes > About > Tools > Settings > Mail icon. The form fields are: Host (mailhost.tld), Port (465), Username (username@mailhost.tld), Password (masked), and an Update button.

1. Mail Settingsnavigate to **Tools > Settings** then select the **mail icon**
2. Host.....the SMTP server that mail is sent from
3. Port.....server defined - defaults for SMTP are 587 and 465 for SSL
4. Usernamedefined by the mail server's administrator
5. Password.....sent to the server during mail submission
6. Update.....saves all mail settings defined within the activity

****Once updates are applied, the equipment must be restarted for changes to take effect.***

****Cost Effective Equipment, LLC does not provide an SMTP server or access to a server for individual equipment.***

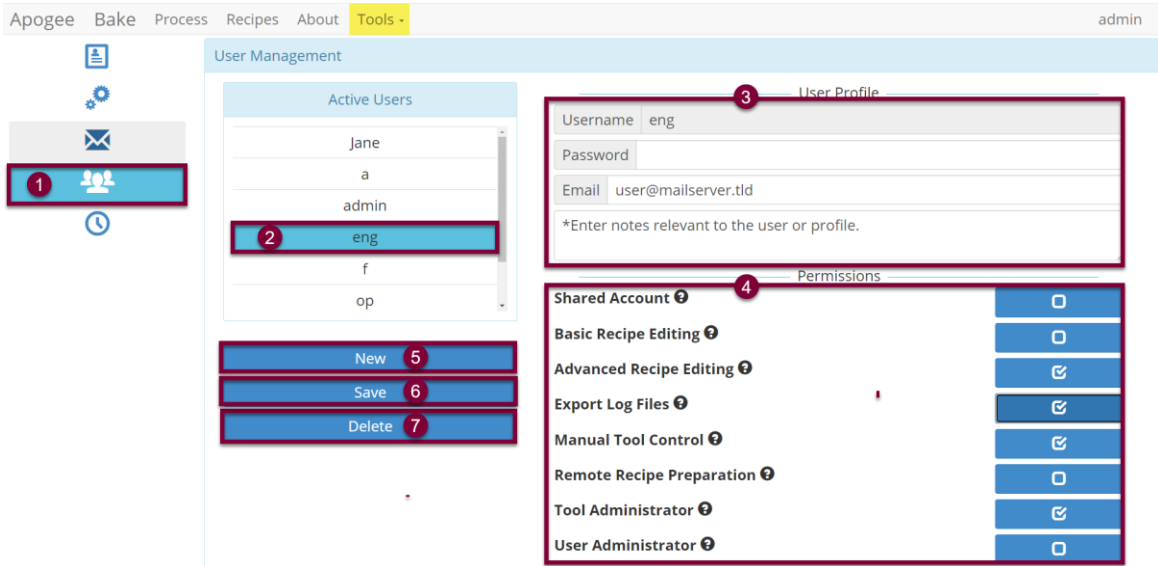
User Management

The User Management activity is a limited access permission that allows for administrative control over all individual and shared user accounts on the equipment.

⁷ If a name is not provided the tool will default to Apogee™.

⁸ Find your [UTC \(Universal Coordinated Time\)](#) offset.

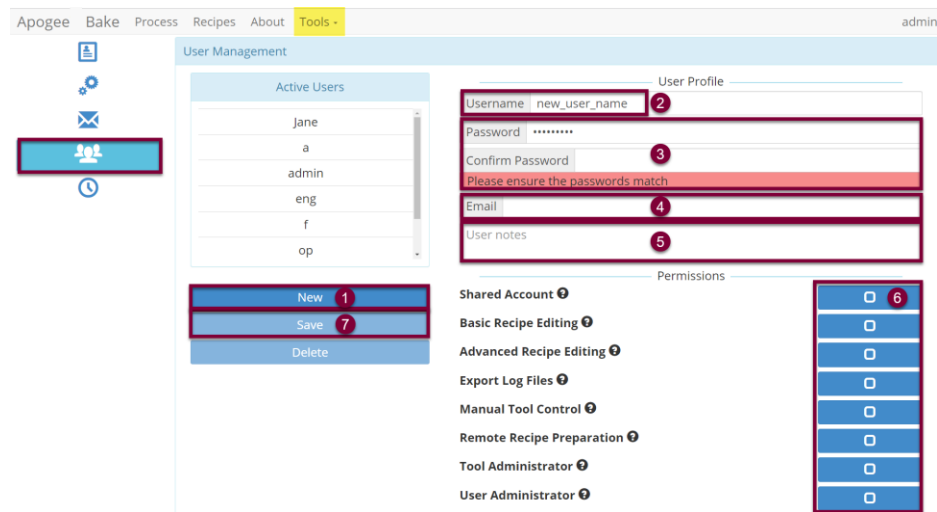
⁹ When enabled, the equipment can be accessed from both https and http.



1. User SettingsNavigate to **Tools > Settings** then select the **users icon**.
2. Active Users.....All system users – select the user profile you wish to edit.
3. User ProfileAdministrator access to edit user information.
4. User Permissions.....Define the activities a user will be able to access and perform.
5. NewCreate a new user.
6. SaveSaves all user settings defined within the activity.
7. DeleteRemove users who no longer require access to the equipment.

***Changes are effective upon the user’s next login.**

Add New User



1. In the User Management activity, tap **New**.
2. Enter a unique username (must be at least one character and contain no spaces).
3. Create the user’s password and then re-enter for verification purposes.
4. Enter the user’s email address (if-applicable).
5. Enter relevant user notes which are displayed to the user within the user profile activity.
6. Assign permissions by checking the box for each access need.
7. Click **Save** to move the user profile into production facilitating access to the equipment.

Edit User Permissions

The screenshot shows the 'User Management' interface. On the left, there is a sidebar with navigation icons. The main area is divided into two sections: 'Active Users' and 'User Profile'. In the 'Active Users' section, a list of users is shown: Jane, a, admin, eng, f, and op. The 'eng' user is highlighted with a red box and a '1' in a red circle. Below the list are buttons for 'New', 'Save', and 'Delete'. The 'Save' button is highlighted with a red box and a '4' in a red circle. In the 'User Profile' section, the 'Username' field is set to 'eng' and is highlighted with a red box and a '2' in a red circle. Below the 'User Profile' section is the 'Permissions' section, which lists various roles with checkboxes. The 'Shared Account' checkbox is checked and highlighted with a red box and a '3' in a red circle. Other roles include 'Basic Recipe Editing', 'Advanced Recipe Editing', 'Export Log Files', 'Manual Tool Control', 'Remote Recipe Preparation', 'Tool Administrator', and 'User Administrator'.

1. Select a user from the *Active Users* list.
2. Edit User Profile Data as needed.
 - usernames cannot be modified.
 - leave password field blank to avoid changes to current password
3. Enable or disable permissions as needed.
4. Click **Save** to move changes into production.

***Changes are effective upon the user's next login.**

Delete a User

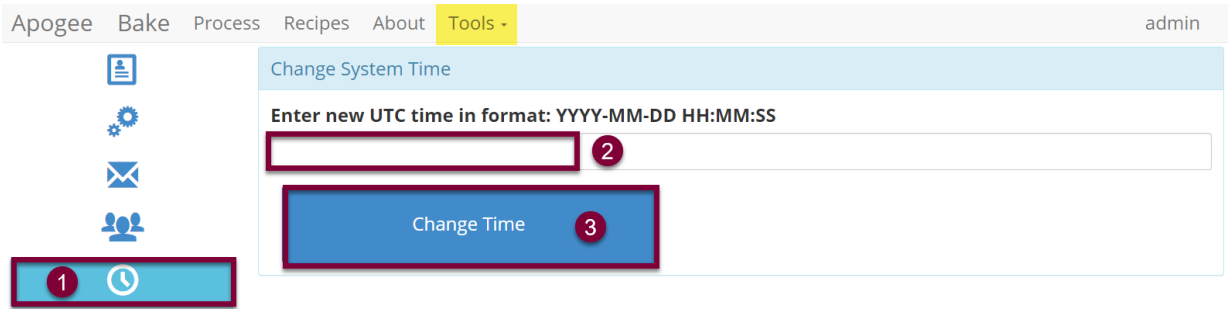
When deleting users, it's important to note that this change is irreversible. Users are unable to delete their own account. Before deleting an administrator's account, the administrator permissions must be removed.

The screenshot shows the 'User Management' interface. On the left, there is a sidebar with navigation icons. The main area is divided into two sections: 'Active Users' and 'User Profile'. In the 'Active Users' section, a list of users is shown: Jane, a, admin, eng, f, and op. The 'Jane' user is highlighted with a red box and a '1' in a red circle. Below the list are buttons for 'New', 'Save', and 'Delete'. The 'Delete' button is highlighted with a red box and a '1' in a red circle. A yellow dialog box is open over the 'Delete' button, containing the text 'Confirm permanent deletion of user Jane'. In the 'User Profile' section, the 'Username' field is set to 'Jane'. Below the 'User Profile' section is the 'Permissions' section, which lists various roles with checkboxes. The 'Shared Account' checkbox is checked and highlighted with a red box and a '3' in a red circle. Other roles include 'Basic Recipe Editing', 'Advanced Recipe Editing', 'Export Log Files', 'Manual Tool Control', 'Remote Recipe Preparation', 'Tool Administrator', and 'User Administrator'.

1. Select a user from the Active Users list.
2. Click Delete.
 - Action Confirmation is required.

Change System Time

Under ordinary conditions the UTC timestamp would be established automatically upon network connection. When network connection is not possible, the **Change System Time** activity provides a simple and straightforward method for accomplishing this task.



1. Time Settings.....Navigate to **Tools > Settings** then select the **time icon**.
2. UTC FieldEnter the local time in the format defined.
3. Change TimeUpdates system time and moves entry into production.

6.4 Diagnostics

Apogee™ equipment features a read-only diagnostic interface to aid equipment administrators in troubleshooting potential malfunctions. To access diagnostics, navigate to **Tools > Diagnostics**.

The data output within the Diagnostic Interface varies by equipment and it is normal for some fields to indicate *null* or *undefined*. Please contact [Cee® Customer Support](#) with questions.

7. DataStream™ Remote Access

A key feature of the DataStream™ system is the ability to remotely view and control the equipment. Remotely connected users can view real-time parameters, create & edit recipes, view equipment information, and download log files. Every function available from the local user console is available via remote network connection. Additionally, there are some functions only available by remote connection.

7.1 Connecting to DataStream™

In this section, *host* refers to the Apogee™ Equipment and *client* refers to the remote workstation.

Setting up a DataStream™ network connection is a relatively straightforward process, however those inexperienced with configuring network assets or lacking necessary privileges, should contact their local system administrator for assistance.

To utilize the DataStream™ network feature, the host must be connected to an active network via the Ethernet port on the rear of the equipment. The host and client must be on the same subnet. If the network has a firewall, a port must be opened to allow the host and client to communicate.

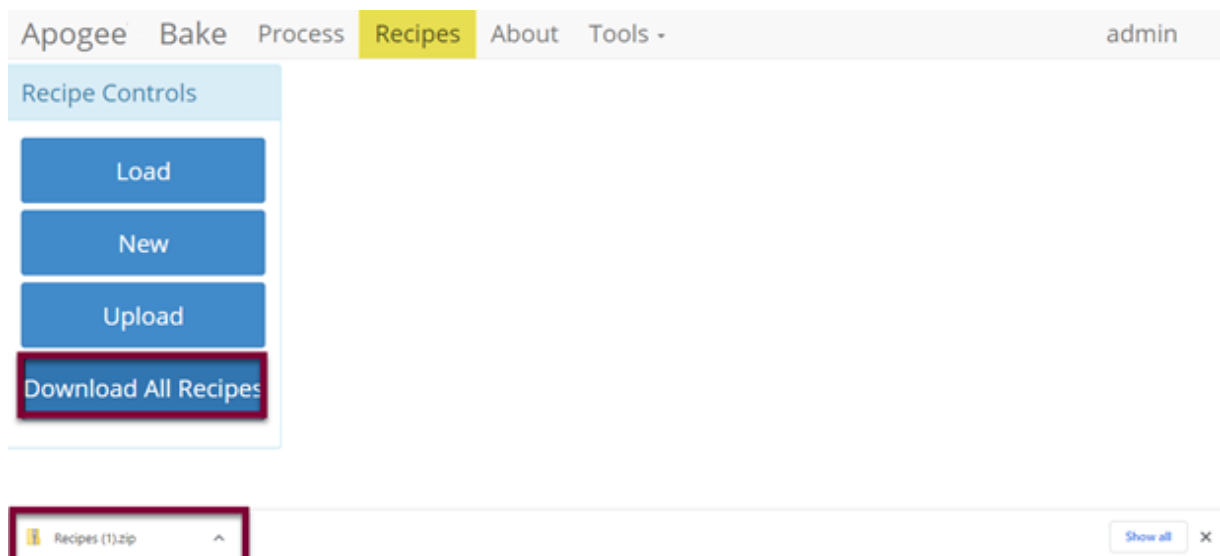
Equipment is configured as DHCP by default meaning the network will assign the host an IP address once connected. The IP address can be found under the **About** tab on the DataStream™ GUI. Once connected to the network, the DataStream™ network can be accessed by opening a browser window and entering the host IP address. The user will be required to enter their login credentials to access host functions.

7.2 Remote Recipe Editing

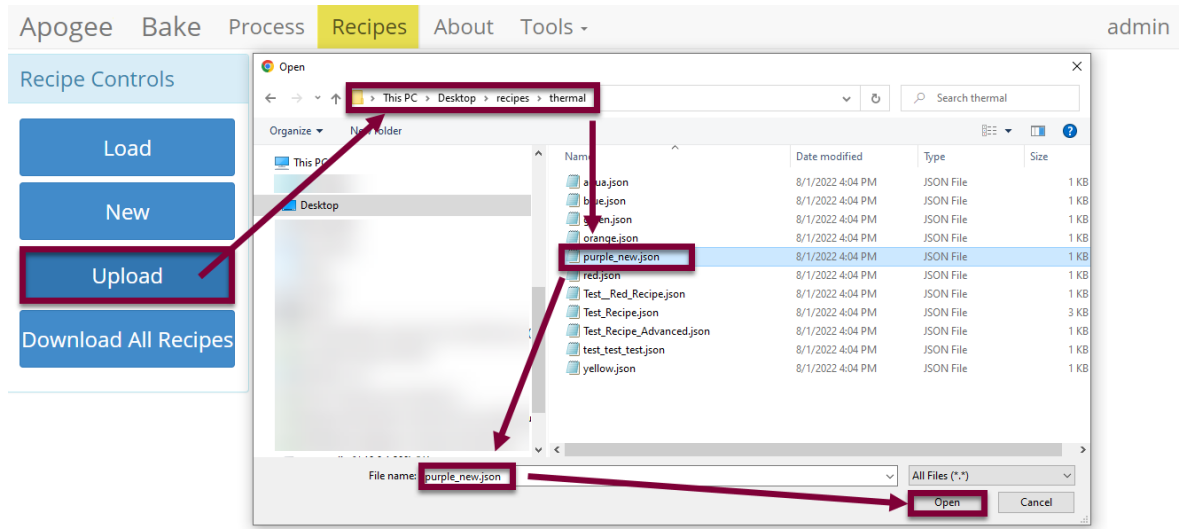
Remote users retain their local recipe editing capabilities. In addition, they are able to download recipes from the host equipment to their local client and upload recipes from their local client to the host machine. This provides an effective method of ensuring recipes are available and consistent across all equipment.

Download Recipes

From the Recipes tab select **Download All Recipes** to extract a zip file of all recipes on the equipment or select **Load** to select individual recipes for download.

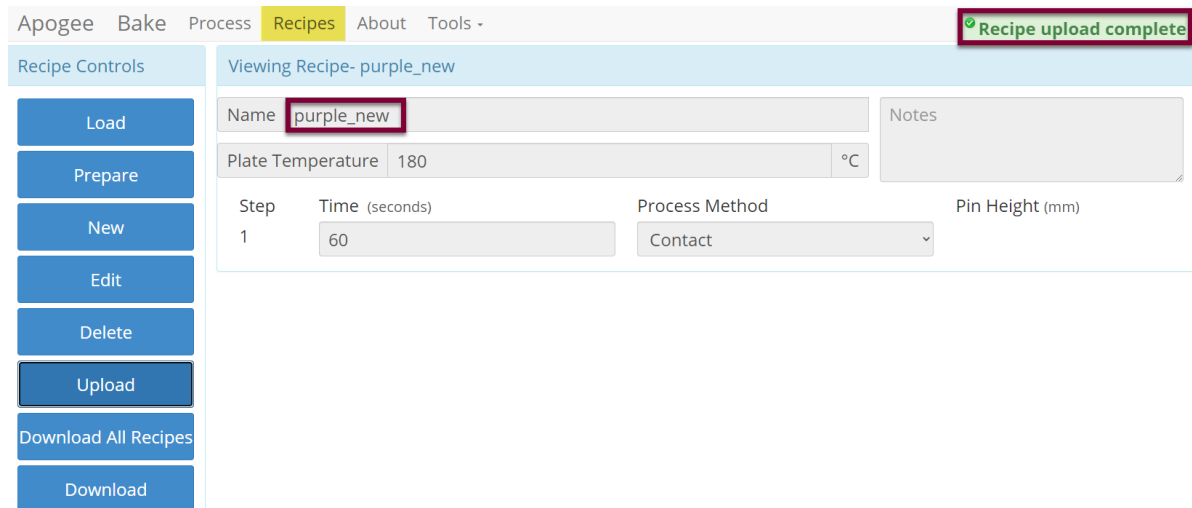


Upload Recipes

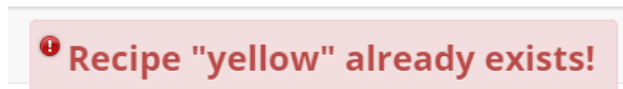


1. Navigate to the Recipes Tab.
2. Select upload and navigate to the desired folder or files.
3. Select the recipes to upload and click **Open**.

Upon successful import, the *Basic Recipe Editor* activity for the imported recipe will open and a *Recipe Upload Complete!* message is displayed.



If the imported recipe already exists on the equipment, the import will fail, and the following message will display:



7.3 Local Presence

For safety reasons, users must verify their presence locally before running recipes or executing manual commands. Only one user can have control of the equipment at a given time.

When using the equipment without a verified local presence, the omni-button will be locked. All actions that impact equipment conditions are disabled. Blocked actions include recipe preparation, running recipes, aborting recipes, and executing manual commands.

Local Presence Unverified – The orange *locked* omni-button indicates that the user does not have control of the machine.

Parameter	Actual	Set Point	Status
Plate Temperature	150.8 °C	--	In Range
Lift Pin Height	19.0 mm	19.0 mm	In Range
Bake Method	Contact	Contact	In Range
Ambient Temperature	27.8 °C		In Range

Verifying Local Presence – Click the omni-button to initiate the request for control of the equipment. The red *unlocked* omni indicates that a request is in process and triggers the blue local presence button on the Apogee™ machine to flash. Press the flashing Local Presence button to finalize the control request.

When multiple users are seeking simultaneous local control of a single device, the user who most recently requested control will receive access when the local presence button is pressed.

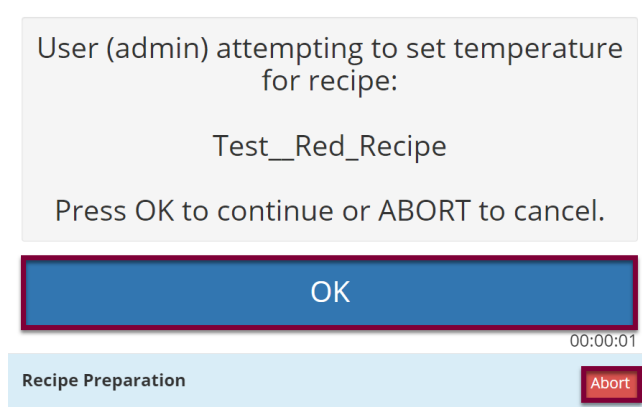
7.4 Remote Preparation

Users with sufficient privileges can remotely prepare equipment to run a recipe. This feature is useful for preconditions and parameters that take a significant amount of time such as bake plate and platen temperatures. To initiate this feature, navigate to the **Recipes** tab, click **Load** to access the recipes list, and select the desired recipe, then click **Prepare**.

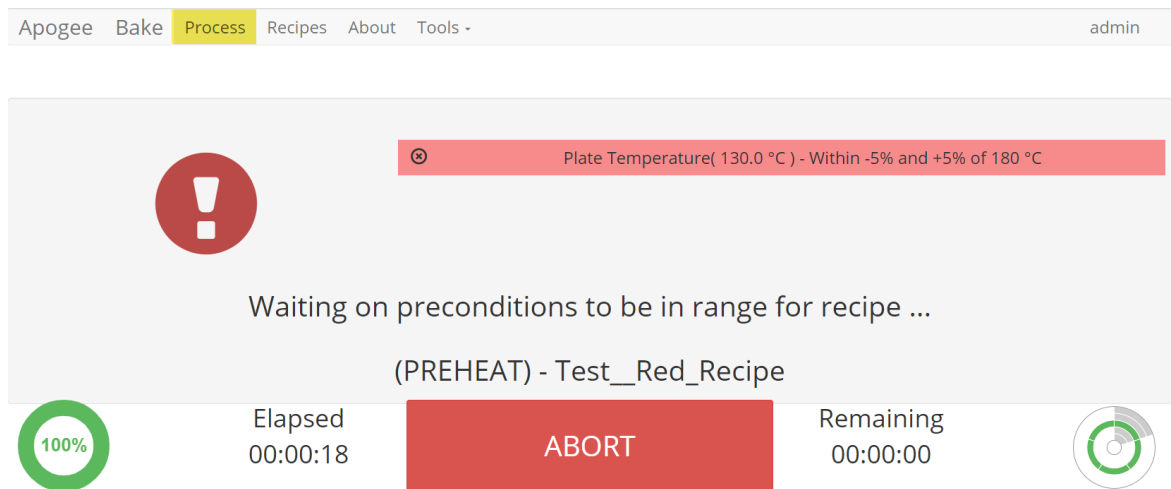
***Preparation processes cannot be initiated when the equipment is already in use.**

Local Display – When a *Prepare* command is entered, the user or device with active control of the machine receives an alert. This prompt includes the user and recipe to be prepared. The user with active control of the machine can refuse the request by selecting **Abort** or accept the request by tapping **OK**.

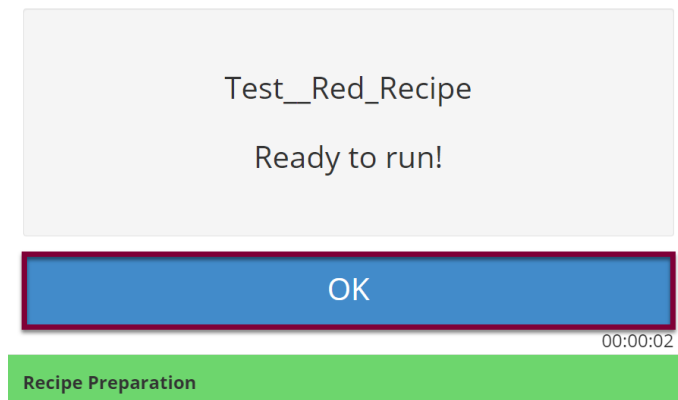
In the absence of a response, the equipment will auto-accept the request after two minutes.



Preparation In Progress – progress toward the specified precondition(s) is displayed to the user with verified local presence.



Preparation Complete – indicates that the equipment has reached all specified preconditions and the recipe can be initiated. Upon clicking **OK** the user is directed to the *Process* screen to begin the recipe.



****During recipe preparation the Prepare and Run commands are disabled to ensure no interruption to precondition processes.***

7.5 Remotely Running a Recipe

For safety reasons, users must verify their presence locally before running recipes or executing manual commands. Only one user can have control of the equipment at a given time. Please review section 7.3 on Local Presence to familiarize with the local presence feature.

Following completion of recipe preparation, the user will be directed to the *Process* page to initiate the recipe by clicking **Start**.

The screenshot shows a web interface for the 'Process' page of a recipe named 'Test_Red_Recipe'. The page title is 'Test_Red_Recipe : Recipe Progress'. The interface includes a navigation bar with 'Apogee', 'Bake', 'Process' (highlighted), 'Recipes', 'About', and 'Tools'. A user profile 'admin' is visible in the top right. Below the navigation bar is a list of 7 steps, each with a status icon and a checkmark:

Step	Status	Action	Checkmark
1	⏸	Start iteration	✓
2	⌘	Enable temperature controller	✓
3	⌘	Set temperature to 180 °C	✓
4	⌘	Set lift pins to 0 mm	✓
5	⌘	Bake using Contact method	✓
6	⏸	Delay 60 seconds	✓
7	↺	Stop iteration after 1 time(s)	✓

Below the list is a progress bar labeled 'Step 1 of 7'. At the bottom, there is a '100%' progress indicator, an 'Elapsed' timer showing '00:01:16', a large blue 'START' button, a 'Remaining' timer showing '00:00:00', and a circular progress indicator.

When recipe preparation is unnecessary, the user will navigate to the Recipes tab, click **Load** to access the recipe list, select the desired recipe, and click **Run**. From here, they are directed to the *Process* page pictured above to initiate the recipe by clicking **Start**.

****When a recipe is initiated Prepare and Run commands are disabled to prevent interruption to the process.***

8. Apogee™ Spin Coater

8.1 System Parameters

Parameter	Actual	Set Point	Status
Spin Speed	0 rpm	0 rpm	In Range
Spin Acceleration	500 rpm/s	500 rpm/s	In Range
Active Dispenses	None	None	In Range
Dispense Source Empty	None		In Range
Chuck Vac	98.8 kPa	101.3 kPa	In Range
Waste Bottle Full	False		In Range
Ambient Temperature	27.9 °C		In Range
Humidity	44.4 %		In Range
Vibration	3		In Range

- Spin Speed**----- measured rotational speed of the spin chuck in revolutions per minute (rpm)
- Spin Acceleration**¹⁰----- dictates how fast the spin chuck will accelerate in revolutions per minute per second (rpm/s)
-
- Percent Exhaust**----- displays the valve opening percentage of the optionally equipped programmable exhaust module
- Active Dispenses**----- indicates which dispenses are enabled
- Dispense Source Empty**--- indicates when dispense sources are low or empty
- Chuck Vac**----- measurement of the vacuum pressure holding the substrate against the spin chuck in kPa
- Waste Bottle Full**----- indicates whether the sensors detect a full waste bottle
- Ambient Temperature**----- the air temperature of the environment where the equipment is housed
- Humidity**¹¹----- the ambient relative humidity in the environment where the equipment is housed
- Vibration**----- unitless measurement of g-forces at the spindle block; can be used to detect off-center substrates at high speeds

¹⁰ **Spin Acceleration** settings are dependent on the presence of a **Spin Speed** set point.

¹¹ Both Ambient Temperature and Humidity are measured via a custom sensor board mounted next to a ventilation inlet inside the tool. If sensor is disconnected, default of -1.1 is displayed.

8.2 Manual Controls – Apogee™ Spin Coater

The Manual Control activity is an advanced feature that allows users to run most operating processes outside of a recipe. This mode is useful for tasks such as prototyping processes, verifying equipment operation, and recovering from aborted processes. To access the activity, navigate to **Tools > Manual Control**. Actual and set point parameter values are displayed on the left. A drop-down menu of available controls is located on the right.

If using remote feature, the user must have confirmed their local presence to execute manual commands. See section 7.3 for more detail on Local Presence.

The screenshot shows the Apogee Manual Control interface. The top navigation bar includes 'Apogee', 'Process', 'Recipes', 'About', and 'Tools -' (highlighted in yellow). The user is logged in as 'admin'. The interface is divided into two main sections: 'System Values' on the left and 'System Controls' on the right.

System Values Table:

Parameter	Actual	Set Point
Spin Speed	0 rpm	0 rpm
Spin Acceleration	500 rpm/s	500 rpm/s
Active Dispenses	None	None
Dispense Source Empty	None	
Chuck Vac	98.8 kPa	99.0 kPa
Waste Bottle Full	False	
Ambient Temperature	29.1 °C	
Humidity	37.8 %	
Vibration	3	

System Controls:

- Control:** A dropdown menu is open, showing options: 'What do you want to control?' (selected), 'Centering Routine', 'Spin Speed', 'Dispense', and 'Chuck Vac'.
- Action:** A dropdown menu is closed, showing the text 'Please check change.'
- APPLY:** A large blue button at the bottom right.

Centering Routine

The screenshot shows the Apogee Manual Control interface with the 'Centering Routine' selected. The top navigation bar is the same as in the previous screenshot. The 'System Values' table is updated with the following data:

Parameter	Actual	Set Point
Spin Speed	0 rpm	0 rpm
Spin Acceleration	100 rpm/s	100 rpm/s
Active Dispenses	None	None
Dispense Source Empty	None	
Chuck Vac	98.7 kPa	64.0 kPa
Waste Bottle Full	False	
Ambient Temperature	28.7 °C	
Humidity	38.9 %	
Vibration	3	

System Controls:

- Control:** 'Centering Routine' (highlighted with a red box).
- Action:** 'Center Wafer' (highlighted with a red box).
- Title:** 'Press OK or close the lid to continue.' (highlighted with a red box).
- Body:** 'Please center the wafer' (highlighted with a red box).
- Message:** 'Please center the wafer' (displayed below the body text).
- APPLY:** A large blue button at the bottom right (highlighted with a red box).

Select a Control of *Centering Routine* and the Action will default to *Center Wafer*.

Select an option from the Title dropdown menu.

Select an option from the Body dropdown menu.

Click APPLY

Allows users to test and view configuration of the Centering Routine Display window outside of the Advanced Recipe Editor Activity.

Spin Speed:

Apogee Process Recipes About Tools - admin

Parameter	Actual	Set Point
Spin Speed	2000 rpm	2000 rpm
Spin Acceleration	10000 rpm/s	10000 rpm/s
Active Dispenses	None	None
Dispense Source Empty	None	
Chuck Vac	98.3 kPa	101.3 kPa
Waste Bottle Full	False	
Ambient Temperature	27.9 °C	
Humidity	43.8 %	
Vibration	74	

System Controls

Control: Spin Speed

Action: Set

Speed: 2000 rpm

Accel: 10000 rpm/s

Osc: 0 seconds

Set Spin Speed to 2000 rpm (0 sec oscillation)

APPLY

Select a Control of *Spin Speed*.

The Action will default to *Set*.

Close the spinner lid and enter desired values for spin speed, acceleration, and oscillation within the supported range for each setting:

Speed	1-12,000 rpm (standard spinner) 1-6,000 rpm (450 spinner)
Acceleration	1-30,000 rpm/s
Oscillation¹²	0-99 seconds

Click APPLY

Note that the actual and set point values have populated on the system values list.

¹² Reverses spin direction for the period specified.

Dispense (*if equipped)

System Values		
Parameter	Actual	Set Point
Spin Speed	0 rpm	0 rpm
Spin Acceleration	16000 rpm/s	16000 rpm/s
Active Disperses	1	1
Dispense Source Empty	None	
Chuck Vac	98.8 kPa	64.0 kPa
Waste Bottle Full	False	
Ambient Temperature	29.2 °C	
Humidity	37.8 %	
Vibration	4	

System Controls		
Control	Dispense	
Action	Enable Disperses	
Value		
1	Dispense 1	<input checked="" type="checkbox"/>
2	Dispense 2	<input type="checkbox"/>
3	Dispense 3	<input type="checkbox"/>
4	Dispense 4	<input type="checkbox"/>
Disperses ON: 1		
APPLY		

Select a Control of *Dispense*.
The Action will default to *Enable Disperses*.
Check the box for the desired dispenses - selections are rendered in green.
Click APPLY
Note that the actual and set point values for enabled dispenses have populated on the system values list.

Chuck Vac *ensure source vacuum is on

Apogee Process Recipes About Tools - admin

System Values		
Parameter	Actual	Set Point
Spin Speed	0 rpm	0 rpm
Spin Acceleration	16000 rpm/s	16000 rpm/s
Active Disperses	None	None
Dispense Source Empty	None	
Chuck Vac	33.9 kPa	64.0 kPa
Waste Bottle Full	False	
Ambient Temperature	29.0 °C	
Humidity	38.6 %	
Vibration	3	

System Controls		
Control	Chuck Vac	
Action	Set	
Vacuum	On	
Threshold	64	kPa
Chuck Vac On (64 kPa)		
APPLY		

Select a Control of *Chuck Vac*.
The Action will default to *Set*.

Set Vacuum to *On* or *Off*.

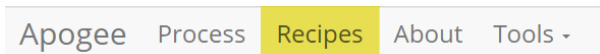
Set Threshold to the desired value in kPa.

Click APPLY

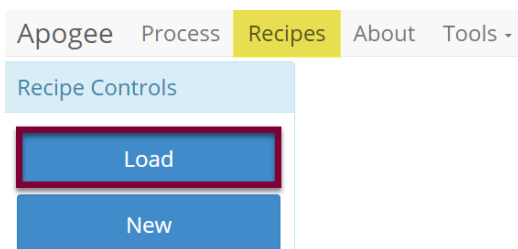
Note that the actual and set point values have populated on the system values list.

8.3 Running Recipes

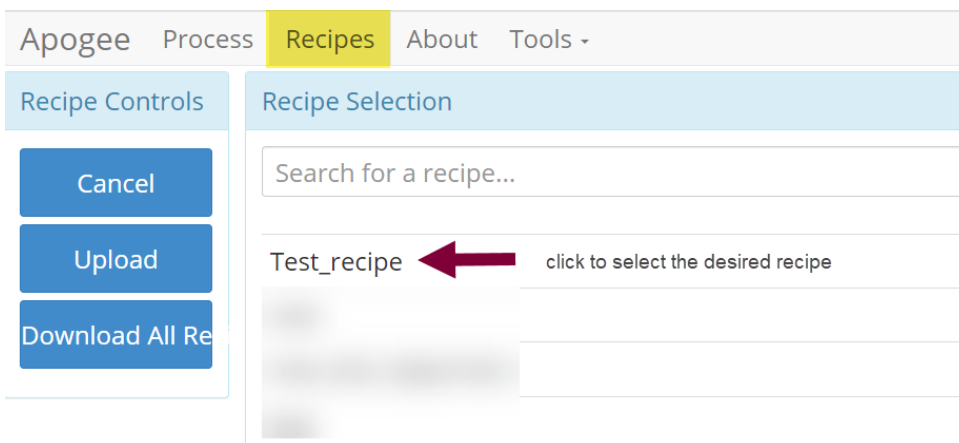
1. Navigate to the *Recipes* page.



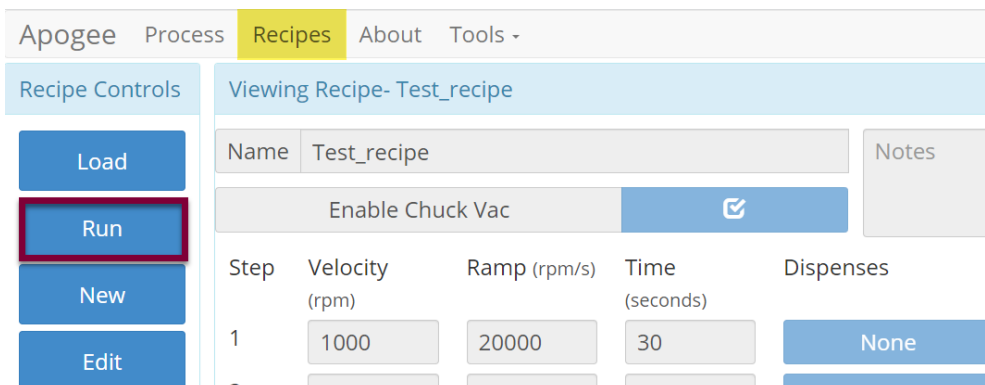
2. Click **Load** to access the recipes list.



3. Search for, identify, & select the preferred recipe.



4. Click **Run**.



5. Click **Start** to initiate the recipe process.

Apogee Process Recipes About Tools - admin

Test_recipe : Recipe Progress

- 1 Please center the wafer
- 2 Start iteration
- 3 Set Spin Speed to 1000 rpm (0 sec oscillation)
- 4 Dispenses ON: None
- 5 Delay 30 seconds

Step 1 of 18

100% Elapsed 00:00:00 **START** Remaining 00:00:00

6. Use the centering activity to center the substrate.

Please center the wafer

- 1 Center
- 2 Vac ON
- 3 Vac OFF
- 4 OK

00:00:02

Press OK or close the lid to continue. Abort

1. spin chuck rotates slowly with vacuum on for a prescribed amount of time then stops rotation & vents vacuum
2. toggle chuck vacuum on
3. toggle chuck vacuum off
4. resume recipe

7. Recipe execution.

Step 5 of 6

10% Elapsed 00:00:05 **ABORT** Remaining 00:00:26

*Users may be required to follow prompts on the screen during recipe execution.

8.4 Editing Recipes

Spin coater recipes may enlist an unlimited number of steps, each capable of defining spin speed, acceleration, spin time, percent exhaust opening, and dispense triggers. Users can easily insert new steps, reorder existing steps, and/or delete a selected step via the *Step Context Menu*.

Step	Velocity (rpm)	Ramp (rpm/s)	Time (seconds)	Dispenses
1	1000	20000	30	1
2	2000	10000	15	None
3	1000	20000	30	2
4	100	500	60	None
5	1000	20000	30	3

- Name**----- recorded in log files/used as criteria when searching for recipes
- Enable Chuck Vac**¹³----- used when substrate requires vacuum to remain on the spin chuck; user must center substrate prior to spinning
- Step Velocity**¹⁴----- speed in rpm spin chuck will achieve on a given step
- Step Ramp**----- rate in rpm/s spin chuck will ramp on a given step
- Step Time**----- duration in seconds for a given step
- Exhaust**¹⁵----- percent of exhaust opening
- Dispense**----- dispense triggered during a given step

8.5 Editing Dispense Selection

Enabled dispenses are rendered in green and display a checkmark. Multiple dispenses may be selected within the same step.

1	Dispense 1	<input checked="" type="checkbox"/>
2	Dispense 2	<input type="checkbox"/>
3	Dispense 3	<input type="checkbox"/>
4	Dispense 4	<input type="checkbox"/>

¹³ Only available to users with ARE permissions.

¹⁴ Preconditions default to $\pm 5\%$ of the target speed.

¹⁵ Field is only present on tools equipped with optional programmable exhaust.

8.6 Tool Specific Settings - Apogee™ Spin Coater

Vac Threshold (kPa) -----	minimum vacuum threshold reached before spinning a substrate
Centering Speed (rpm) -----	how fast substrate spins during centering routine
Centering Time (milliseconds) -----	how long substrate spins during centering routine
Idle Exhaust (%) ¹⁶ -----	default exhaust position when not running process
Chuck Home ¹⁷ -----	facilitates loading/removal of substrates from a single position (0 to disable, 1 to enable)

¹⁶ Idle Exhaust does not apply to tools not equipped with Programmable Exhaust.

¹⁷ When enabled, position is static.

9. Apogee™ Bake Plate

9.1 System Parameters

Parameter	Actual	Set Point	Status
Plate Temperature	59.4 °C	60.0 °C	In Range
Lift Pin Height	19.0 mm	19.0 mm	In Range
Bake Method	Contact	Contact	In Range
Ambient Temperature	26.5 °C		In Range
Humidity	44.8 %		In Range

- Plate Temperature¹⁸**----- current temperature of hot chuck displayed against target set point in degrees Celsius
- Lift Pin Height**----- height of exposed lift pins in relation to chuck in millimeters; precision control settings range from 0.0-19.0
- Bake Method**----- dictates the manner in which substrate is heated; vacuum, contact, proximity, lift pins; refer to [Apogee™ Bake Plate Operations Manual](#) for more information
- Ambient Temperature**----- air temperature of environment where equipment is housed
- Humidity¹⁹**----- ambient relative humidity of environment where equipment is housed

9.2 Manual Controls – Apogee™ Bake Plate

The Manual Control activity is an advanced feature that allows users to run most operating processes outside of a recipe. This mode is useful for tasks such as prototyping processes, verifying equipment operation, and recovering from aborted processes. To access the activity, navigate to **Tools > Manual Control**. Actual and set point parameter values are displayed on the left. Available controls will be selected from the dropdown menu on the right.

If using remote feature, the user must have confirmed their local presence to execute manual commands. See section 7.3 for more detail on Local Presence.

¹⁸ A process will not wait to achieve desired temperatures before moving onto the next step. Utilize preconditions or manual controls to ensure platen temperatures are in range before a process is initiated.

¹⁹ Both Ambient Temperature and Humidity are measured via a custom sensor board mounted next to a ventilation inlet inside the tool. If sensor is disconnected, default of -1.1 is displayed.

Apogee Bake Process Recipes About **Tools -** admin

System Values

Parameter	Actual	Set Point
Plate Temperature	24.5 °C	--
Lift Pin Height	19.0 mm	19.0 mm
Bake Method	Contact	Contact
Ambient Temperature	26.7 °C	
Humidity	41.4 %	

System Controls

Control What do you want to control?
What do you want to control?
Plate Temperature
Lift Pins
Bake Method

Please check your values before applying the change.

APPLY

Plate Temperature

System Values

Parameter	Actual	Set Point
Plate Temperature	41.5 °C	--
Lift Pin Height	-1.0 mm	5.0 mm
Bake Method	Contact	Contact
Ambient Temperature	25.1 °C	
Humidity	45.5 %	

System Controls

Control Plate Temperature

Action Set

Value 45 °C

Please check your values before applying the change.

Select a Control of *Plate Temperature*.
 Select an Action of *Set*.
 Enter the desired value in °C.

Click APPLY

The Temperature Controller must be enabled to initiate the heating process. See next step.

System Values

Parameter	Actual	Set Point
Plate Temperature	41.9 °C	45.0 °C
Lift Pin Height	-1.0 mm	5.0 mm
Bake Method	Contact	Contact
Ambient Temperature	25.0 °C	
Humidity	44.4 %	

System Controls

Control Plate Temperature

Action Enable

Value Enable

Enable temperature controller

Select an Action of *Enable*.
 Select a Value of *Enable* or *Disable* to activate or deactivate the temperature controller.

Click APPLY

Note that the heating process has been initiated and a plate temperature set point has populated on the system values list. When a value of *Disabled* is selected, a Set Point of - - is displayed and the heating process is terminated.

System Controls

Control

Action

Select an Action of *AutoTune*

Click APPLY

User must first define the set point and enable temperature controller.

Useful for refining the temperature control for a given setting – note that this may take a significant amount of time.

System Controls

Control

Action

Target °C

Rate °C / Minute

Select an Action of *Ramp*.

Enter the Target temperature.

Enter the desired ramp Rate²⁰ (between 1-6°C per minute).

Click APPLY

²⁰ Cee® does not offer active cooling on bake plates however, the ramp feature can be used to reduce the rate of cooling beyond what ambient conditions allow.

Lift Pins

System Values		
Parameter	Actual	Set Point
Plate Temperature	42.9 °C	45.0 °C
Lift Pin Height	10.0 mm	10.0 mm
Bake Method	Contact	Contact
Ambient Temperature	25.0 °C	
Humidity	44.7 %	

System Controls	
Control	Lift Pins
Action	Set
Height	10 mm
Set lift pins to 10 mm	

Select a Control of *Lift Pins*.
Select an Action of *Set*.
Enter the target height (between 0-19mm).

Click APPLY

Note that the lift pin height set point has populated on the system values list.

System Controls	
Control	Lift Pins
Action	Go Home

Select an Action of *Go Home*

Click APPLY

Lift pins recede beneath the surface of the hot plate until they contact the homing flag for recalibration of position.

System Controls	
Control	Lift Pins
Action	Step
Step Size	19 mm
Direction	Up

Select an Action of *Step*.

Enter the desired Step Size (between 0-19mm).
Select the preferred Direction.

Click APPLY

System Controls

Control

Action

Select an Action of *Raise Lift Pins*.

Click APPLY

Set pins to the Lift Pin Idle Position specified in section 6.3 **Settings**. Review the [Apogee™ Bake Plate Operations Manual](#) for more information.

System Controls

Control

Action

Select an Action of *Lower Lift Pins*.

Click APPLY

Lift pins recede just beneath the surface of the hot plate to facilitate contact with the substrate.

System Controls

Control

Action

Target mm

Rate mm/min

Select an Action of *Ramp*.
Enter the Target (between 0-19mm).
Select the preferred ramp Rate (between 0-200mm/min).

Click APPLY

Bake Method

System Values		
Parameter	Actual	Set Point
Plate Temperature	45.3 °C	45.0 °C
Lift Pin Height	10.0 mm	10.0 mm
Bake Method	Contact	Contact
Ambient Temperature	25.1 °C	
Humidity	44.7 %	

System Controls	
Control	Bake Method
Action	Select Method
Method	Contact
Bake using Contact method	

Select a Control of Bake Method.
Select the desired Method (Vacuum, Proximity, or Contact).

Click APPLY

Review the [Apogee™ Bake Plate Operations Manual](#) for more information on Bake Methods.

9.3 Preparation

Users with sufficient privileges can **Prepare** equipment to run a recipe. This feature is useful for preconditions and parameters that take a significant amount of time such as hot chuck and platen temperatures. To initiate this feature, navigate to the **Recipes** tab, click **Load** to access the recipes list and select the desired recipe, then click **Prepare**.

Apogee Bake Process **Recipes** About Tools - admin

Recipe Controls

Viewing Recipe- Test_Red_Recipe

Name Test_Red_Recipe Notes

Plate Temperature 180 °C

Step	Time (seconds)	Process Method	Pin Height (mm)
1	60	Contact	

***Preparation processes cannot be initiated when the equipment is already in use.**

Local Display – When a **Prepare** command is entered, the user or device with active control of the machine receives an alert. This prompt includes the user and recipe to be prepared. The user with control of the machine can refuse the request by selecting **Abort** or accept the request by tapping **OK**.

In the absence of a response, the request is auto accepted after two minutes.

User (admin) attempting to set temperature for recipe:

Test_Red_Recipe

Press OK to continue or ABORT to cancel.


OK

00:00:01

Recipe Preparation **Abort**



Preparation In Process – progress toward specified precondition(s) displayed to user with verified local presence

Apogee Bake **Process** Recipes About Tools - admin

 Plate Temperature(130.0 °C) - Within -5% and +5% of 180 °C

Waiting on preconditions to be in range for recipe ...

(PREHEAT) - Test_Red_Recipe

 Elapsed 00:00:18 **ABORT** Remaining 00:00:00 

Preparation Complete – indicates that equipment has reached all specified preconditions and recipe can be initiated; on clicking **OK** user is directed to *Process* screen to begin recipe

Test_Red_Recipe

Ready to run!

OK

00:00:02

Recipe Preparation

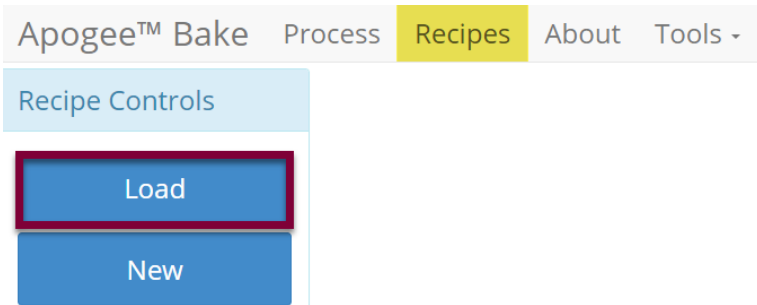
**During recipe preparation the Prepare and Run commands are disabled to ensure no interruption to precondition processes.*

9.4 Running Recipes

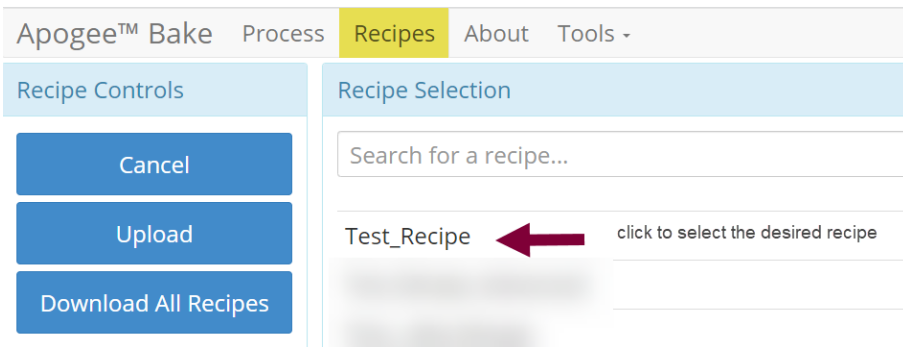
1. Select Recipe Page.

Apogee™ Bake Process **Recipes** About Tools -

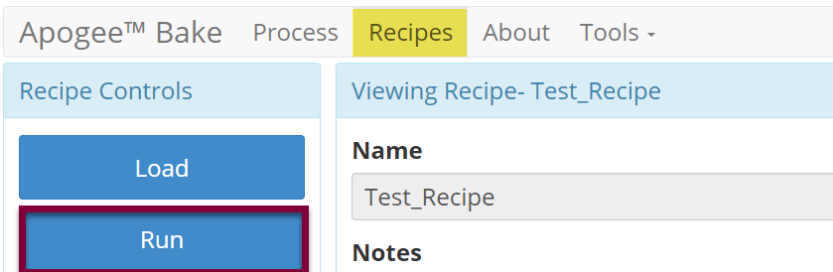
2. Load Recipe.



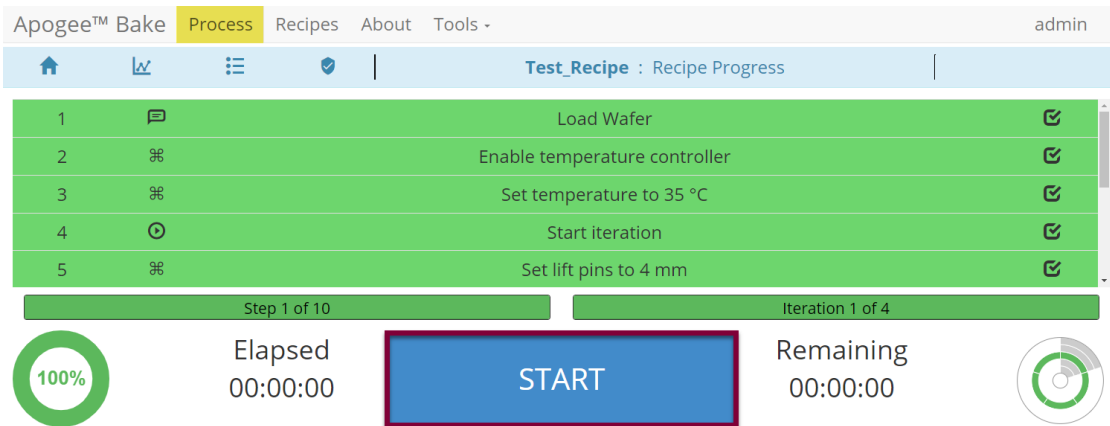
3. Search For, Identify, & Select Recipe.



4. Run Recipe.



5. Start Recipe.



6. Recipe Progression.

Step 7 of 10
Iteration 1 of 4

0%
Elapsed 00:00:05
ABORT
Remaining 00:05:00

*Users may be required to follow prompts on the screen during recipe execution.

9.5 Editing Recipes

Apogee™ Bake Process **Recipes** About Tools - admin

Editor Controls

Editing Recipe- Test_Recipe

Name Test_Recipe Notes

Plate Temperature 120 °C

Step	Time (seconds)	Process Method	Pin Height (mm)
1	60	Contact	
2	30	Contact	
3	30	Contact	
4	60	Proximity	

Save
Cancel
Insert
^
v
Delete
Advanced

9.6 Equipment Specific Settings – Apogee™ Bake Plate

Temperature Offset Calibration (°C)----- offset used by temperature controller to calibrate reported chuck temperature

10. Apogee™ Bonder

10.1 System Parameters

Parameter	Actual	Set Point	Status
Lower Platen Temp	25.0 °C	25.0 °C	In Range
Upper Platen Temp	25.0 °C	25.0 °C	In Range
Chamber Pressure	97.5 kPA	97.5 kPA	In Range
Bond Force	0.0 N	0.0 N	In Range
Position	Load Top	Load Top	In Range
Ambient Temperature	32.7 °C		In Range
Humidity	73.9 %		In Range

- Lower Platen Temperature**--- current temperature of lower platen displayed against target set point in degrees Celsius
- Upper Platen Temperature**--- current temperature of upper platen displayed against target set point in degrees Celsius
- Chamber Pressure**----- absolute pressure measured inside the bond chamber in kPa
- Bond Force**²¹----- calculated force between upper and lower platens measured in newtons
- Position**----- refers to physical location and state of lower platen assembly; see Apogee™ Bonder Operations Manual for further detail
- Ambient Temperature**----- air temperature of environment where equipment is housed
- Humidity**²²----- ambient relative humidity of environment where equipment is housed

10.2 Manual Controls – Apogee™ Bonder

The Manual Control activity is an advanced feature that allows users to run most operating processes outside of a recipe. This mode is useful for tasks such as prototyping processes, verifying equipment operation, and recovering from aborted processes. To access the activity, navigate to **Tools > Manual Control**. Actual and set point parameter values are displayed on the left. Available controls will be selected from the dropdown menu on the right.

If using remote feature, the user must have confirmed their local presence to execute manual commands. See section 7.3 for more detail on Local Presence.

²¹ Does not take substrate size into account.

²² Both Ambient Temperature and Humidity are measured via a custom sensor board mounted next to a ventilation inlet inside the tool. If sensor is disconnected, default of -1.1 is displayed.

System Values		
Parameter	Actual	Set Point
Lower Platen Temp	3277.1 °C	--
Upper Platen Temp	3277.1 °C	--
Chamber Pressure	120.0 kPA	-1.0 kPA
Bond Force	0 N	0 N
Position	Unload	Unload
Ambient Temperature	-1.1 °C	
Humidity	-1.1 %	

System Controls

Control

Action

Value

Enable lower temperature controller

APPLY

Platen Temperature

System Values		
Parameter	Actual	Set Point
Lower Platen Temp	3277.1 °C	180.0 °C
Upper Platen Temp	3277.1 °C	--
Chamber Pressure	120.0 kPA	-1.0 kPA
Bond Force	0 N	0 N
Position	Unload	Unload
Ambient Temperature	-1.1 °C	
Humidity	-1.1 %	

System Controls

Control

Action

Value

Enable lower temperature controller

APPLY

Select a Control of *Upper* or *Lower Platen Temp*.
 Select an Action of *Enable*.
 Select a Value of *Enable* or *Disable* to activate or deactivate the temperature controller.

Click APPLY

System Values		
Parameter	Actual	Set Point
Lower Platen Temp	20.0 °C	30.0 °C
Upper Platen Temp	20.0 °C	--
Chamber Pressure	120.0 kPA	-1.0 kPA
Bond Force	0 N	0 N
Position	Unload	Unload
Ambient Temperature	-1.1 °C	
Humidity	-1.1 %	

System Controls

Control

Action

Value °C

Set lower temperature to 30 °C

APPLY

Select a Control of *Upper* or *Lower Platen Temp*

Select an Action of Set.
Enter the desired Value in °C.

Click APPLY

Note that the heating process has been initiated and a platen temperature set point has populated on the system values list. When a value of *Disabled* is selected, a Set Point of - - is displayed and the heating process is terminated.

Chamber Pressure

System Values		
Parameter	Actual	Set Point
Lower Platen Temp	20.0 °C	30.0 °C
Upper Platen Temp	20.0 °C	--
Chamber Pressure	120.0 kPA	60.0 kPA
Bond Force	0 N	0 N
Position	Unload	Unload
Ambient Temperature	-1.1 °C	
Humidity	-1.1 %	

System Controls	
Control	Chamber Pressure
Action	Evacuate to
Value	60 kPA
Wait for Chamber Pressure to reach 60 kPA	
APPLY	

Select a Control of Chamber Pressure.
Select an Action of Evacuate To.
Enter the desired threshold Value in KPa.

Click APPLY

Note that the evacuation process has been initiated and a Chamber Pressure set point has populated on the system values list.

Vacuum Transfer

System Values		
Parameter	Actual	Set Point
Lower Platen Temp	20.0 °C	30.0 °C
Upper Platen Temp	20.0 °C	--
Chamber Pressure	120.0 kPA	60.0 kPA
Bond Force	0 N	0 N
Position	Unload	Unload
Ambient Temperature	-1.1 °C	
Humidity	-1.1 %	

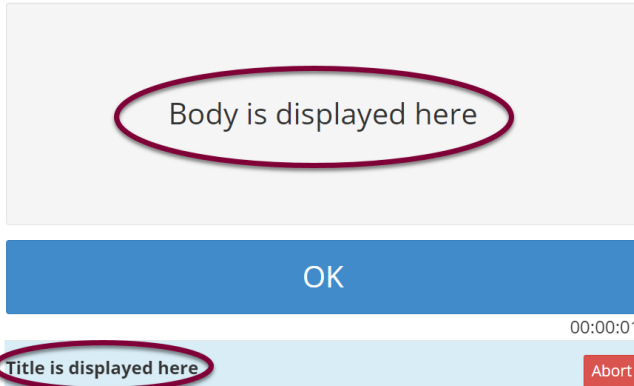
System Controls	
Control	Vacuum Transfer
Action	Detect transfer
Title	Title is displayed here
Body	Body is displayed here
Use vacuum wand to transfer substrate	
APPLY	

Select a Control of *Vacuum Transfer* and the Action will default to *Detect Transfer*.

Enter the desired value in the Title field.

Enter the desired value in the Body field.

Click APPLY



Allows users to test and view configuration of the Vacuum Transfer Display window outside of the Advanced Recipe Editor activity.

Bond Force

System Values		
Parameter	Actual	Set Point
Lower Platen Temp	20.0 °C	30.0 °C
Upper Platen Temp	20.0 °C	--
Chamber Pressure	120.0 kPA	60.0 kPA
Bond Force	2720 N	4000 N
Position	Unload	Unload
Ambient Temperature	-1.1 °C	
Humidity	-1.1 %	

System Controls	
Control	Bond Force
Action	Set
Value	4000 N
Set the Bond Force to 4000 N	
APPLY	

Select a Control of *Bond Force*.
Select an Action of *Set*.
Enter the desired Value between 1-12,000 N.

Click APPLY

Note that the process has initiated, and a Bond Force set point has populated on the system values list.

System Values		
Parameter	Actual	Set Point
Lower Platen Temp	20.0 °C	30.0 °C
Upper Platen Temp	20.0 °C	--
Chamber Pressure	120.0 kPA	60.0 kPA
Bond Force	2720 N	4000 N
Position	Unload	Unload
Ambient Temperature	-1.1 °C	
Humidity	-1.1 %	

System Controls	
Control	Bond Force
Action	Ramp
Target	4000 N
Rate	500 N / Second
Ramp Bond Force to 4000 @ 500 N / Second	
APPLY	

Select an Action of *Ramp*.
 Enter the desired Target value in N.
 Enter the desired Rate value between 1-1000N/second.

Click APPLY

Position

System Values		
Parameter	Actual	Set Point
Lower Platen Temp	20.0 °C	30.0 °C
Upper Platen Temp	20.0 °C	--
Chamber Pressure	120.0 kPA	60.0 kPA
Bond Force	2720 N	4000 N
Position	Load Top	Load Top
Ambient Temperature	-1.1 °C	
Humidity	-1.1 %	

System Controls	
Control	Position
Action	Move To
Value	Load Top
Move to Load Top position	
APPLY	

Select a Control of *Position*.
 Select an Action of *Move To*.
 Select the desired Value from the dropdown menu (Load Top, Load Bottom, Process, or Unload).

Click APPLY

Note that the position process has initiated, and the desired position set point is reflected on the system values list.

10.3 Preparation

Apogee Bond Process **Recipes** About Tools - admin

Recipe Controls

Viewing Recipe- Test_Red_Recipe

Name Test_Red_Recipe Notes

Plate Temperature 180 °C

Step	Time (seconds)	Process Method	Pin Height (mm)
1	60	Contact	

Buttons: Load, Prepare, Run, New

***Preparation processes cannot be initiated when equipment is already in use.**

Local Display – When a **Prepare** command is entered, the user or device with active control of the machine receives an alert. This prompt includes the user and recipe to be prepared. The user with active control of the machine can refuse the request by selecting **Abort** or accept the request by tapping **OK**.

In the absence of a response, the request is auto accepted after two minutes.

User (admin) attempting to set temperature for recipe:

Test_Red_Recipe

Press OK to continue or ABORT to cancel.

OK

00:00:01

Recipe Preparation Abort

Preparation In Process – progress toward specified precondition(s) is displayed to user with verified local presence

Apogee Bond **Process** Recipes About Tools - admin

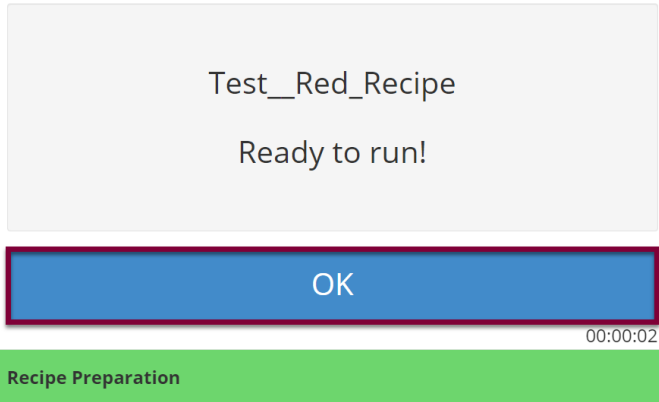
⊗ Plate Temperature(130.0 °C) - Within -5% and +5% of 180 °C

Waiting on preconditions to be in range for recipe ...

(PREHEAT) - Test_Red_Recipe

100% Elapsed 00:00:18 ABORT Remaining 00:00:00

Preparation Complete – indicates that equipment has reached all specified preconditions and recipe can be initiated; on clicking **OK** user is directed to *Process* screen to begin recipe



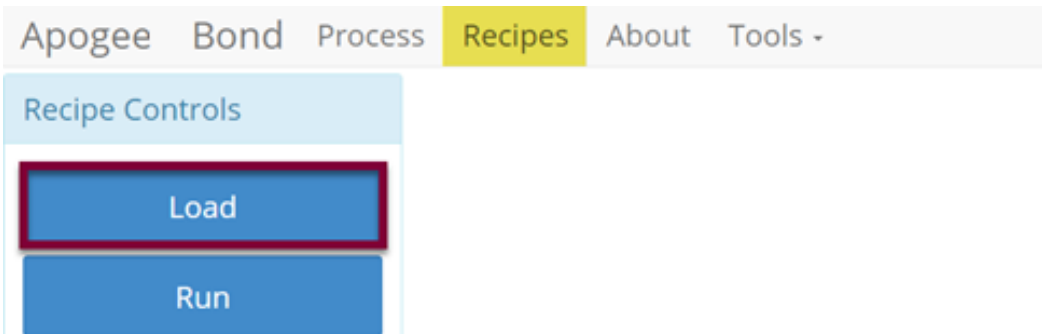
**During recipe preparation the Prepare and Run commands are disabled to ensure no interruption to precondition processes.*

10.4 Running Recipes

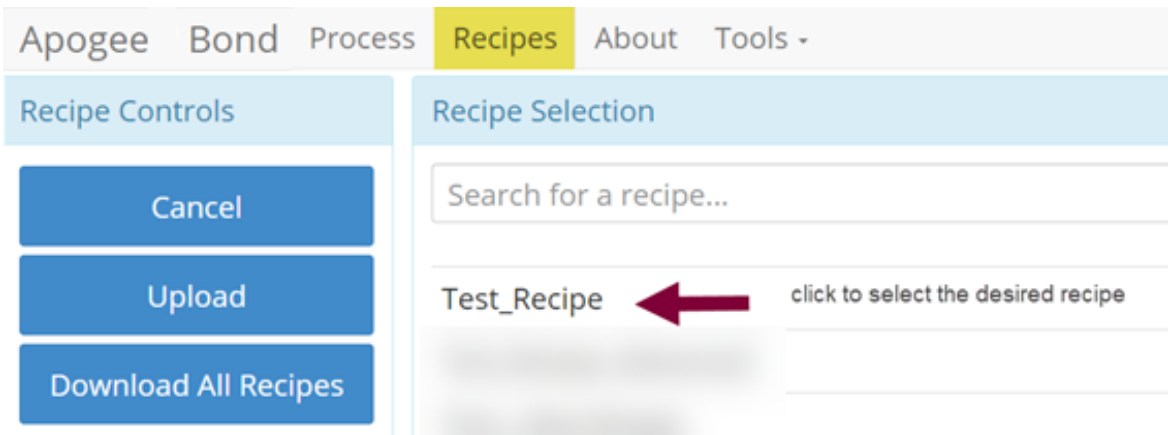
1. Select Recipes Page



2. Load Recipe



3. Search For, Identify, & Select Recipe



4. Run Recipe

The screenshot shows the 'Apogee Bond' interface with the 'Recipes' tab selected. On the left, under 'Recipe Controls', the 'Run' button is highlighted with a red border. The main area shows 'Viewing Recipe- Test_Recipe' with fields for 'Name' (Test_Recipe) and 'Notes'.

5. Start Recipe

The screenshot shows the 'Apogee Bond' interface with the 'Process' tab selected. A list of five steps is shown: 1. Load Wafer, 2. Enable temperature controller, 3. Set temperature to 35 °C, 4. Start iteration, 5. Set lift pins to 4 mm. Below the list, a progress bar shows 'Step 1 of 10' and 'Iteration 1 of 4'. A green circular progress indicator shows '100%'. The 'Elapsed' time is '00:00:00' and 'Remaining' is '00:00:00'. The 'START' button is highlighted with a red border.

6. Recipe Progression

The screenshot shows the 'Apogee Bond' interface with the 'Process' tab selected. The progress bar shows 'Step 7 of 10' and 'Iteration 1 of 4'. A green circular progress indicator shows '0%'. The 'Elapsed' time is '00:00:05' and 'Remaining' is '00:05:00'. The 'ABORT' button is highlighted with a red border.

10.5 Editing Recipes

Bonder recipes may enlist an unlimited number of steps, each capable of defining a bake time and method. Users can easily insert new steps, reorder existing steps, and/or delete a selected step.

The screenshot shows the 'Apogee Bond' interface with the 'Recipes' tab selected. The 'Editor Controls' panel on the left has 'Save', 'Cancel', and 'Advanced' buttons. The main area shows 'Editing Recipe- hello3' with fields for 'Name' (hello3), 'Notes', 'Use Separator Flags' (checkbox), 'Temperature' (25 °C), 'Force' (1200 N), 'Time' (30 Seconds), 'Evacuate Chamber To' (0.5 kPA), and 'Pre-bond Delay' (15 Seconds).

Name -----	recorded in log files and used as criteria when searching for recipes
Use Separator Flags -----	enable to prevent contact between substrates pending evacuation of chamber
Temperature -----	target temperature or <i>set point</i> of platens for a given process
Force -----	target force between upper and lower platens measured in newtons
Time -----	time for which bond force should be applied in seconds with precision to one tenth of a second
Evacuate Temperature To ----	defines minimum chamber pressure required before a bond process can continue
Pre-Bond Delay -----	duration of delay following placement of the bottom substrate

10.6 Tool Specific Settings – Apogee™ Bonder

Lower Platen Temperature Calibration Offset (°C) -----	offset used by temperature controller to calibrate reported chuck temperature of lower platen
Upper Platen Temperature Calibration Offset (°C) -----	offset used by temperature controller to calibrate reported chuck temperature of upper platen

11. Apogee™ Mechanical Debonder

11.1 System Parameters

Parameter	Actual	Set Point	Status
Position	Idle	Idle	In Range
Peel Force	12.0 N	12.0 N	In Range
Carrier Size	Unknown		Critically High
Film Frame Size	200 mm		In Range
Ambient Temperature	30.6 °C		In Range
Humidity	-1.1 %		In Range
Chuck Vac	95.8 kPa		In Range

Position----- operational position of debond process

Peel Force----- force in newtons imparted on substrate by way of gripper

Carrier Size----- detected gripper size

Film Frame Size----- detected vacuum chuck size

Ambient Temperature----- air temperature of environment where equipment is housed

Humidity²³----- ambient relative humidity of environment where equipment is housed

Chuck Vac----- measurement of vacuum pressure securing film frame against vacuum chuck in kPa

11.1 Manual Controls – Apogee™ Mechanical Debonder

The Manual Control activity is an advanced feature that allows users to run most operating processes outside of a recipe. This mode is useful for tasks such as prototyping processes, verifying equipment operation, and recovering from aborted processes. To access the activity, navigate to **Tools > Manual Control**. Actual and set point parameter values are displayed on the left. Available controls will be selected from the dropdown menu on the right.

If using remote feature, the user must have confirmed their local presence to execute manual commands. See section 7.3 for more detail on Local Presence.

²³ Both Ambient Temperature and Humidity are measured via a custom sensor board mounted next to a ventilation inlet inside the tool. If sensor is disconnected, default of -1.1 is displayed.

System Values		
Parameter	Actual	Set Point
Position		
Peel Force	-1.1 N	100.0 N
Carrier Size	Unknown	
Film Frame Size	200 mm	
Ambient Temperature	29.4 °C	
Humidity	-1.1 %	
Chuck Vac	95.3 kPa	

System Controls

Control

Please check change.

APPLY

Peel Mechanism

System Values		
Parameter	Actual	Set Point
Position		
Peel Force	-1.1 N	100.0 N
Carrier Size	Unknown	
Film Frame Size	200 mm	
Ambient Temperature	29.4 °C	
Humidity	-1.1 %	
Chuck Vac	95.4 kPa	

System Controls

Control

Action

Force

Separate wafers at 100 N

APPLY

Select a Control of *Peel Mechanism*.

Select an Action of *Peel*.

Enter the desired threshold Force between 1-150N.

Click APPLY

Note that the actual and set point values have populated on the system values list.

Position

System Values		
Parameter	Actual	Set Point
Position	Moving	Load Stack
Peel Force	12.0 N	12.0 N
Carrier Size	Unknown	
Film Frame Size	200 mm	
Ambient Temperature	29.4 °C	
Humidity	-1.1 %	
Chuck Vac	95.3 kPa	

System Controls	
Control	Position
Action	Move To
Value	Load Stack
Move to position Load Stack	
APPLY	

Select a Control of *Position*.
Select an Action of *Move To*.
Select the desired Value from the dropdown menu (Load Stack, Centering, Process, Unload Carrier, Unload Device).

Click APPLY

Note that the position process has initiated, and the desired position set point is reflected on the system values list.

Chuck Vac

System Values		
Parameter	Actual	Set Point
Position	Moving	Load Stack
Peel Force	12.0 N	12.0 N
Carrier Size	Unknown	
Film Frame Size	200 mm	
Ambient Temperature	29.4 °C	
Humidity	-1.1 %	
Chuck Vac	95.3 kPa	

System Controls	
Control	Chuck Vac
Action	Set
Vacuum	On
Chuck Vac	
APPLY	

Select a Control of *Chuck Vac*.
The Action will default to *Set*.
Set Vacuum to *On* or *Off*.

Click APPLY

Note that the Mechanical Debonder's vacuum threshold is hard coded at <12 kPa and cannot be altered.

Gripper

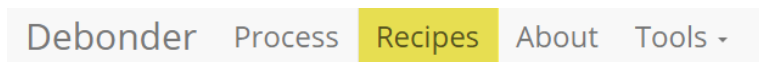
System Values		
Parameter	Actual	Set Point
Position	Moving	Load Stack
Peel Force	12.0 N	12.0 N
Carrier Size	Unknown	
Film Frame Size	200 mm	
Ambient Temperature	29.7 °C	
Humidity	-1.1 %	
Chuck Vac	95.3 kPa	

System Controls	
Control	Gripper
Action	Set
Grip	Open
Gripper	
APPLY	

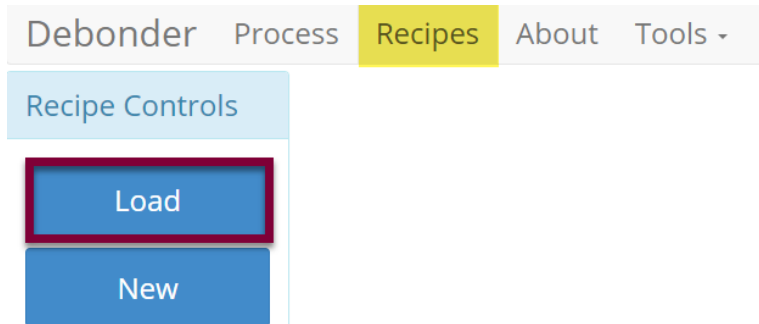
Select a Control of *Gripper*.
The Action will default to *Set*.
Set Grip to *Open* or *Closed*.
Click APPLY

11.2 Running Recipes

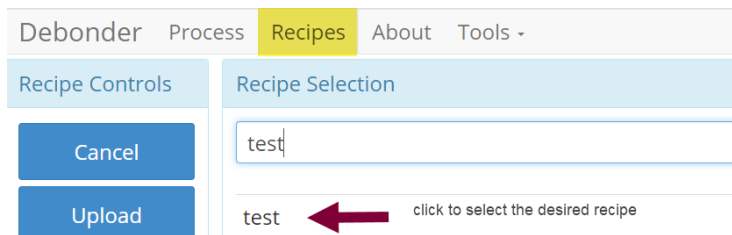
1. Select Recipes Page



2. Load Recipe



3. Search For, Identify, & Select Recipe



4. Run Recipe

The screenshot shows the 'Recipes' tab in the software. On the left, under 'Recipe Controls', there are four buttons: 'Load', 'Run', 'New', and 'Edit'. The 'Run' button is highlighted with a red border. On the right, under 'Viewing Recipe- test', there are four input fields: 'Name' (test), 'Force' (15), 'Film Frame Size' (150 mm), and 'Carrier Size' (100 mm).

5. Start Recipe

The screenshot shows the 'Process' tab in the software. At the top right, a green notification says 'Recipe loaded!'. Below the navigation bar, there is a table with 8 steps:

Step	Icon	Description	Checkmark
1	Play	Start iteration	✓
2	⌘	Move to position Load Stack	✓
3	💬	Please load the bonded pair.	✓
4	⌘	Move to position Centering	✓
5	⌘	Move to position Process	✓
6	⌘	Separate wafers at 15 N	✓
7	⌘	Move to position Unload Carrier	✓
8	💬	Please unload the carrier wafer.	✓

Below the table, a green progress bar indicates 'Step 2 of 11'. At the bottom, there is a '100%' progress indicator, 'Elapsed 00:00:23', a blue 'START' button highlighted with a red border, 'Remaining 00:00:00', and a circular progress indicator.

*Press the two flashing buttons on the front of the Apogee™ Mechanical Debonder and follow the prompts on the screen during recipe execution.

6. Recipe Progression

The screenshot shows the software interface during recipe progression. A progress bar at the top indicates 'Step 2 of 10'. Below it, there is a '3%' progress indicator, 'Elapsed 00:00:02', a red 'ABORT' button highlighted with a red border, 'Remaining 00:01:23', and a circular progress indicator.

11.3 Editing Recipes

The screenshot shows the 'Editing Recipe- test' window. At the top, there is a navigation bar with 'Recipes' highlighted. Below it, the 'Editor Controls' sidebar contains three buttons: 'Save', 'Cancel', and 'Advanced'. The main editing area has the following fields:

- Name:** test
- Force:** 15 N
- Film Frame Size:** 150 mm
- Carrier Size:** 100 mm
- Notes:** (empty text area)

Name----- recorded in log files and used as search criteria when searching for recipes

Force----- maximum force in newtons allowed on substrate by way of gripper

Film Frame Size----- specify diameter of film frame

Carrier Size----- specify diameter of carrier substrate

11.4 Equipment Specific Settings – Apogee™ Mechanical Debonder

Wafer Sensor Enabled----- sensor can be disabled/enabled to detect presence of carrier substrate in gripper and verification of debond

12. Table of Revisions

Doc Rev #	Author	Description of Change(s)	Reviewed/Approved By	Date
2.0	J. Adams	<ul style="list-style-type: none"> - Update format - Section 3 details updated Process View and Graph View features - Add Section 5.6 - Format USB for Equipment Compatibility - add sections 8.2, 9.2, and 10.2 outlining tool specific manual controls - Add Section 11 - Apogee™ Mechanical Debonder - Add Section 12 Table of Revisions 	<p>B. Waterworth J. Strothmann</p>	<p>8/18/2022</p>