

DICEFLOW

Recipe Automation for DISCO Dicing Saws

User Manual

Table of Contents

1 Introduction	3
2 Getting Started	4
3 Input Data Tab	5
4 Dicing Sequence Tab.....	8
5 Dicing Details Tab.....	9
6. Outputs.....	10
7 Demo Version.....	10
8 Troubleshooting.....	11
9 Appendix A: File Column Reference (CSV / Excel).....	13

1 Introduction

DICEFLOW is a software application designed to automate recipe creation and cutting plan generation for DISCO dicing saws, streamlining the definition of blade heights, feed speeds, and cut positions for wafer dicing operations.

Key Features:

- Excel-like input table for easy data entry
- Import input data from CSV or Excel files.
- Automatic calculation of dicing sequences
- Optimization of cutting parameters
- Export to DFD format for machine compatibility
- Export position data to CSV for traceability.
- Visualization of dicing details and sequences

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2 Getting Started

2.1 System Requirements

- DICEFLOW requires Windows operating system

2.2 User interface at a glance

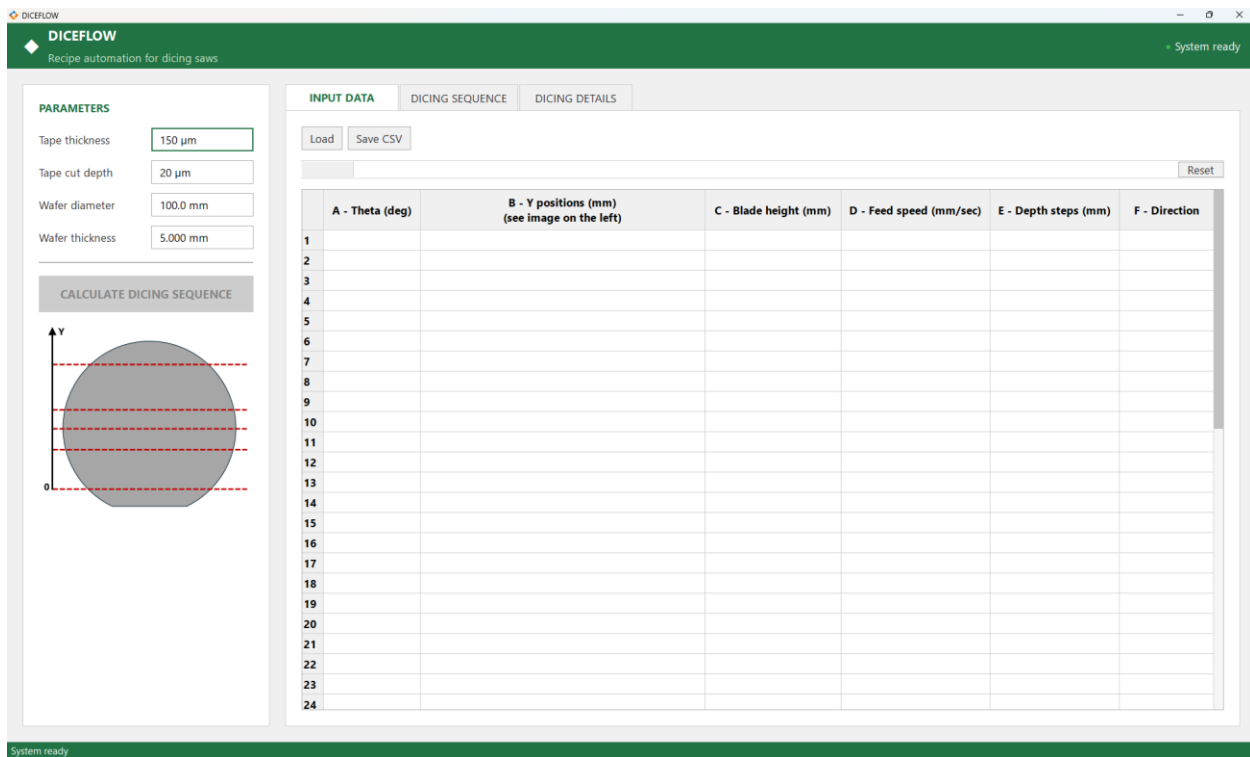


Figure 1 — Main window overview.

The DICEFLOW main window is organized into a left-hand control panel and a main workspace on the right. The layout is designed to guide the operator from a small set of global wafer parameters to a complete, machine-ready dicing recipe.

- Top bar: application name and global status indicator (e.g., “System ready”).
- Left panel (Parameters): global inputs that apply to the whole wafer
- Action button: “Calculate Dicing Sequence” becomes available once the required information is provided and triggers sequence computation.
- Preview diagram: a simplified wafer sketch that provides immediate feedback on the planned cut locations (for example, the Y positions shown as dashed lines).
- Main workspace: a tabbed area that provides access to the Input Data, Dicing Sequence, and Dicing Details tabs.

- Input Data toolbar: quick actions such as Load, Save CSV, and Reset for managing the recipe table.
- Status bar: a persistent indicator at the bottom of the window reporting readiness or warnings.

3 Input Data Tab

The Input Data tab is the main spreadsheet-like editor used to define the dicing recipe. Each row represents one dice line (or one cut group, depending on the exported format), and each column stores a parameter required to compute positions, ordering, and machine-ready exports.

3.1 Column definitions

The following columns are present in the Input Data table. They may prefix the headers with letters (A, B, C, etc.) to match the on-screen layout; both forms refer to the same fields.

Column	Meaning	Unit	Notes / validation
Theta (deg)	Chuck rotation angle associated with the cut row. Used to group cuts and to compute the final sequence.	degrees	Should be numeric.
Center cuts (mm)	Cut center position along the working axis for the current direction/channel.	mm	Should be numeric. Positions are required to be strictly increasing within a channel.
Blade height (mm)	Target blade height for the cut. This represents the blade height above the tape/chuck reference.	mm	Should be numeric. Use a consistent convention across rows; do not mix reference frames within the same recipe.
Feed speed (mm/s)	Cutting feed rate.	mm/s	Should be numeric and positive. Extremely high values may reduce cut quality; use values compatible with your blade/material process window.
Max depth step (mm)	Maximum allowed depth increment between consecutive cutting passes (step-cut).	mm	Should be numeric and positive. If set to 0, some workflows interpret this as a single-pass cut (depending on the export logic).
Direction	Cutting side selector for the row.	—	Typically a drop-down with values: empty, FRONT, REAR.

Important note:

Formulas in the Input Data Table

DICEFLOW supports Excel-style formulas in numeric cells of the Input Data table. This is useful to derive parameters from other inputs (e.g., margins, offsets, unit conversions) and to keep the recipe consistent when base values change.

Entering a formula

- Click the target numeric cell and type a formula starting with “=”.
- Use other cells as references (e.g., B2, C5). Use \$ to lock a reference (e.g., \$B\$2).
- Press Enter to apply. The cell shows the evaluated numeric value; copy/paste works as expected.

Supported operators and functions

Operation / Function	Syntax	Example
Addition	a + b	=B2 + 0.20
Subtraction	a - b	=B2 - 0.20
Multiplication	a * b	=B2 * 1000
Division	a / b	=B2 / 2
Parentheses (precedence)	(...)	=(B2 + B3) / 2

3.2 Populating the Input Data Table

You can populate the Input Data table either by importing a file (CSV or Excel) or by entering values manually.

1. Import from file (CSV or Excel): Use the Load button to import a prepared table.
2. Click "Load".
3. Select a .csv, .xlsx, or .xls file.
4. The table is populated with the imported data.
5. Edit values directly in the table, if needed.

Supported file formats:

1. CSV files (*.csv), Excel files (*.xlsx, *.xls)
2. The file must contain a header row with the column names listed in Section 3.3.
3. Column order is not important; DICEFLOW matches columns by header name.
4. Empty cells are allowed for optional fields and will be treated as blank values.
5. If the headers include an additional prefix (e.g., “A - Theta (deg)” instead of “Theta (deg)”), the import will still recognize the column.

Column headers are matched case-insensitively. If the exported template includes leading letters (e.g., “A - Theta (deg)”), they are accepted as well.

Manual entry: You can also enter values directly in the table without importing a file.

The table behaves similarly to a spreadsheet and supports copy/paste as well as formulas.

- Click a cell to select it.

- Type to enter or edit the value.
- Press Enter or Tab to move to the next cell.
- Use arrow keys to navigate between cells.
- Right-click to access context menu options.

3.3 Formula Bar

The formula bar (above the table) shows the selected cell reference and its current value. You can edit the selected cell directly from the formula bar.

1. Select a cell in the table
2. The cell reference and value appear in the formula bar
3. Click in the formula bar to edit
4. Press Enter to apply the change

3.4 Reset Button

The Reset button clears all data currently loaded in the application (parameters, input table, and calculated outputs). Use this to start a new configuration.

3.5 Saving CSV or Excel Files

To save your input data to a CSV or Excel file:

1. Click the "Export dataset" button
2. Choose a location and filename in the save dialog
3. Click "Save" to export the data

3.6 Parameters Panel

The Parameters panel is located on the left side of the application window. Here you configure the physical parameters for your dicing operation.

Row	Meaning	Unit	Notes / validation
Tape Thickness	Enter the thickness of the dicing tape in millimeters.	mm	This parameter affects the calculation of blade heights relative to the wafer surface.
Tape Cut Depth	Set the depth to which the blade cuts into the tape.	mm	This value must be between 0 and the tape thickness. The software will validate this range.
Wafer Thickness	Thickness of substrate to be processed	mm	This value is used to calculate blade heights and cutting depths

Wafer Diameter	Diameter of the substrate to be processed	mm	
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4 Dicing Sequence Tab

Once you have entered your input data and configured the parameters, you can calculate the dicing sequence.

4.1 Running the Calculation

To calculate the dicing sequence:

1. Ensure all required input data is entered in the INPUT DATA tab
2. Verify that parameters in the left panel are correctly set
3. Click the "CALCULATE DICING SEQUENCE" button (or press Ctrl+R)
4. The application will automatically switch to the DICING SEQUENCE tab

4.2 Validation

Before calculation, the software validates:

1. Required columns, checking for their presence
2. Parameter values are within acceptable ranges
3. Direction values are consistent for each theta angle

After calculation, the DICING SEQUENCE tab displays the optimized cutting sequences. This tab shows consolidated sequences for each channel which is detected.

4.3 Sequence Data Table

The sequence data table displays:

1. Parameter: The parameter name
2. Blade height: Calculated blade height
3. Feed speed: Feed speed for the cut
4. Y-index: Y index values
5. Repeat: Number of times this sequence repeats. This row is present only if needed by the dicing sequence.
6. Depth step: Depth increment information. This row is present only if corresponding value is input in the tab "INPUT DATA".

A sequence of data table is calculated for each channel detected at the tab "INPUT DATA".

4.4 Exporting DFD

To export the dicing sequence to a DFD file, which you can later load to your dicing machine:

1. Right-click anywhere in the sequence table
2. Select "Export DFD..." from the context menu
3. Choose a save location and filename
4. Click "Save"

Note: DFD export is disabled in demo version.

5 Dicing Details Tab

The DICING DETAILS tab provides comprehensive information about all cutting lines, including detailed coordinates and parameters for each cut.

5.1 Details Table

The details table shows:

- Channel: The cutting channel
- Cut line: The cut line number for a specified channel
- Index: The cut line number with respect to the all the cutting lines to be performed
- Theta: The cutting angle
- Y Position: The Y coordinate for a specific cut line
- Blade Height: Blade height for this cut line
- Feed Speed: Feed speed for this cut line
- Direction: direction of Y movement with respect to the operator (FRONT or REAR)
- Notes: User-editable notes for each position. Those notes are saved as the table is exported as CSV file.

5.2 Channel Filtering

You can filter the details by channel:

1. Use the channel buttons at the top of the details table
2. Click on a specific channel to view only that channel's data
3. Click "ALL" to view all channels

5.3 Editing Notes

You can add or edit notes for each position:

1. Click on a cell in the "Notes" column
2. Type your note
3. Press Enter or click elsewhere to save
4. To clear a note, select the cell and press Delete or Backspace

5.4 Exporting Data

Right-click in the details table to access export options:

- "Export dataset": Exports all position data to a CSV or Excel file
- "Export DFD...": Exports the DFD file (disabled in demo version)

6. Outputs

After a dicing plan has been defined and validated, DICEFLOW generates the files required to run DISCO dicing saws and to keep a traceable record of the recipe. Exported files are produced from the calculated sequence and the user-provided parameters; they should always be reviewed on the machine side before executing a cut.

The following outputs are available:

Output	Format	What it contains	Typical use
DISCO recipe export	DFD	Machine-ready dicing sequence and settings derived from the Input Data table and global parameters.	Load on the DISCO system to execute the dicing program.
Input data export	CSV/Excel	A copy of the Input Data table as entered by the user (including angles, positions, and per-line parameters).	Traceability, sharing, and quick editing in external tools.
Sequence summary	CSV/Excel	Ordered list of cuts as computed by DICEFLOW (including channel ordering and direction) together with the key per-cut parameters.	Documentation and verification of the generated sequence.

When exporting, DICEFLOW prompts for an output location and file name. If a DISCO DFD template is used, ensure the template matches the target machine configuration.

7 Demo Version

The demo version of DICEFLOW is a fully functional 30-day trial. It includes all features except DFD export.

7.1 Demo Indicators

When running in demo mode, you will see:

- "DEMO" text and expiration date in the application title bar
- "DEMO" text and expiration date in the application header
- Grayed-out DFD export options in context menus with "(disabled in demo version)" text

7.2 Trial Expiration

When the 30-day trial expires:

- The application will still launch and display the interface
- A dark overlay will appear with the expiration message
- All functionality will be disabled
- You will need a full license to continue using the software

8 Troubleshooting

8.1 Common Issues

8.1.1 File Import Not Working (CSV / Excel)

Possible causes and solutions:

- Missing required columns: ensure your file includes the required headers (theta, y_positions, blade_height, feed_speed, depth_steps, direction).
- Invalid file format: ensure you are using a supported file type (.csv, .xlsx, .xls).
- File path issues: Ensure the file path does not contain special characters or is not too long

8.1.2 Calculation Errors

If calculation fails:

- Check that all required input data is present
- Verify parameter values are within acceptable ranges
- Ensure Direction values are consistent (all rows with the same theta must have the same Direction)
- Check the status bar for specific error messages

8.1.3 DFD Export Not Available

If DFD export is grayed out:

- You are using the demo version (DFD export is disabled in demo)

- No calculation has been run yet (run calculation first)
- The calculation did not complete successfully

8.2 Keyboard Shortcuts

Available keyboard shortcuts:

- Ctrl+R: Calculate dicing sequence (same as clicking the Execute button)
- Delete/Backspace: Clear selected cell content (in Notes column of DICING DETAILS tab)
- Enter/Tab: Move to next cell after editing
- Arrow keys: Navigate between cells

8.3 Getting Help

If you encounter issues not covered in this manual:

- Check the status bar for error messages
- Review the input data format requirements
- Verify all parameters are set correctly
- Contact technical support with error details

9 Appendix A: File Column Reference (CSV / Excel)

Complete reference of supported columns:

Column Name	Description
theta	Cutting angle in degrees
center_cuts	Number of center cuts
blade_height	Blade height parameter (mm)
feed_speed	Feed speed (mm/sec)
max_depth_step	Maximum depth step
Direction	Cutting direction: "FRONT" or "REAR"