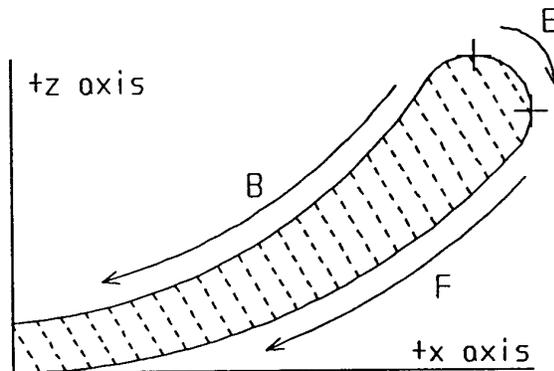


## Optoform (Variform) Job File Format

Optoform 50 job files consist of four sections of ASCII text. The first section contains information relating to file, lens and lathe information. The second section contains a sequential list of surface coordinates (x and z values) that describe the front (convex) lens surface. The third section contains a sequential list of surface coordinate that describe the back (concave) lens surface. And the last section contains a sequential list of surface coordinates that describe the lens edge.

The job file sections are separated by a single line that contains one text character. The beginning of the second section which contains the points for the front surface begins with a line containing the letter "F". The third section of data that describes the back surface begins with a line containing the letter "B". The fourth section of data that describes the edge surface begins with a line containing the letter "E". And the job file concludes with the line containing the letter "Q".

The sketch at the right shows how the points that describe the front, back and edge surfaces can be divided. All points reside in the first or fourth quadrant of a global coordinate system (positive x and positive or negative z coordinates) with the vertex of the front surface at the origin. The front points are enumerated starting at a user defined coordinate (usually the maximum x point) and continue sequentially to the vertex. The back points begin at a user defined coordinate (usually the maximum z point) and continue sequentially to the vertex of the back surface which has an x value of zero and a positive z value equal to the lens center thickness. The edge points start with the first back surface point and continue to the first front surface point (usually with increasing x values).



Each surface coordinate for the rotationally symmetrical section of the file, is represented in a signed two decimal five format (i.e. "X±xx.xxxxxZ±zz.zzzzz"). Spaces may be substituted for positive signs but leading zero's are required (see example next page). The spacing of data points is at the user's discretion, however a uniform ten micron x spacing is often employed. It should be noted that at least five sets of data points leading up to the non rotationally symmetrical section of the file should ideally have a similar x spacing as the non rotationally symmetrical section, to prevent apparent tool path jumps.

At the point in the file where a non rotationally symmetrical surface begins, a command similar to the following should be inserted \*S15A000 this command supplies the machine with two distinct values. \*S15 sets the data spacing at every 15° which is the minimum and most accurate surface definition. 30°, 45°, 60°, 90°, 120°, and 180° may also be used, however a loss

of definition in the surface will be found at the larger angles. The A000 section sets the axis at which the surface is to be machine, relative to the lathe spindle. This may be entered as an integer from 0° to 180°, but must always be expressed as three digits, for example \*S15A025 would be used if the axis was to be 25°.

It should be noted that when the Variform tool reaches the \*S command in the surface file, the tool will pause for a couple of seconds, while the machine obtains synchronization with the spindle encoder. JFL file design should take this into account, as a small ring will be seen, if the tool is on the lens surface during the dwell.

The Variform adds a third set of data points for the W axis (i.e. "X±xx.xxxxxxxZ±zz.zzzzzzzW±ww.wwwww"), typically the W data points need only be a signed two decimal five format, while the x and z data points should be a minimum of a signed two decimal seven format. The x and z coordinates should describe the average of the three dimensional surface, while z + w would describe the actual required surface. It is of the utmost importance, that the x and z points describe a "smooth" and "continuous" surface, and any concave or convex corners should be suitably blended.

The spacing of the x data points must be carefully selected, as they must define a spiral that the Variform tool will follow, and therefore define the cutting feed rate relative to the spindle speed. For example if 15° data spacing at an x spacing of 0.00025mm is used, and the spindle speed is 5000RPM, then the feed rate will be 30mm/min. This could be expressed as:

$$Spindle\_RPM \times \frac{360}{Angular\_Spacing} \times X\_Spacing$$

At the end of the non rotationally symmetrical surface, the command \*R may be inserted, this is optional, and the non-rotational surface is typically continued to the center (x=0). If the \*R command is used, and the surface is continued with regular x and z data points, the first five data points after the \*R must be at the same x increment as the non-rotational surface x increments, after this the nominal 10µm x spacing may be used.

Data points that describe a non rotational (off axis) surface may be contained in either front, back, or both front and back surface sections of the JFL file.

Line 12 of the header section of the file, contains the JFL file name or number of the second surface file. This file may be used to define a slab off type of cut in the front surface, or toric type of cut in the back surface, where defined junctions are required, and a continuous blended surface is not. This is cut directly after the first JFL file finish pass or passes.

The format of the second surface JFL file, contains the same four types of section as a normal first JFL file, however, unused surface sections can be omitted, as long as the "F", "B", "E", and "Q" lines are in the correct order. Unlike the normal first JFL file, the surface data points need not reach center (x=0) if the surface does not require it.

An example of the lens data job file format is shown on the next page.

Example	Description
RGPJD	job file sub-directory
102	job number and/or name
5/13/92	origination date
MCG	originator
50	number of lens in process run active
C:	disk drive
1000	convex lathe number
2000	concave lathe number
RGPASPH	lens design file
machine	name of machine data file
fixture	name of fixture data file
102-2	name for second surface JFL file
TO BE DEFINED	reserved for future use
-1.00 8.210.226 9.5 RGPASPH	convex surface description
8.00 9.5 RGPASPH	concave surface description
F	start of front surface description
X 04.75164Z 01.52259	first front surface point
X 04.75052Z 01.50927	second front surface point
*S15A000	start of off axis section
X 04.7302500Z 01.4568441W 0.00020	first off axis point
X 04.7300000Z 01.4563365W 0.00030	second off axis point
X 01.5102500Z 00.1234567W-0.00030	next to last off axis point
X 01.5100000Z 01.1234321W-0.00020	last off axis point
*R	return to on axis format (optional)
X 00.01000Z 00.00001	next to last front surface point
X 00.00000Z 00.00000	vertex of front surface
B	start of back surface description first
X 04.72963Z 01.54527	back surface point
X 04.71200Z 01.54515	second back surface point
X 00.01000Z 00.22599	next to last back surface point vertex
X 00.00000Z 00.22598	of back surface
E	start of edge surface description first
X 04.72963Z 01.54527	back surface point
X 04.74174Z 01.53964	next edge surface point
X 04.74989Z 01.53170	next to last edge surface point first
X 04.75164Z 01.52259	front surface point
Q	end of job file description