principium

Evaluating G-Code and Programs

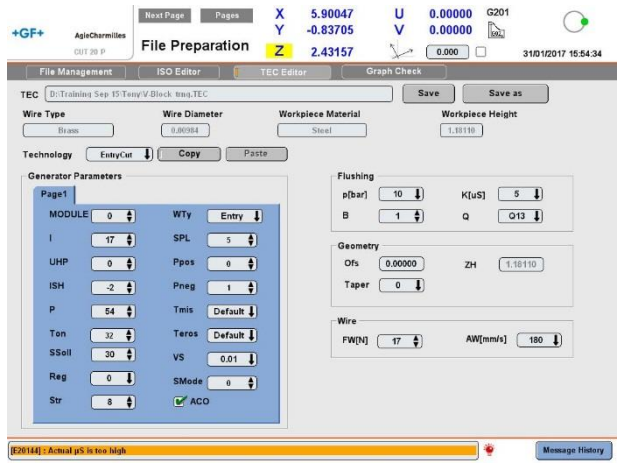
The Erosion process

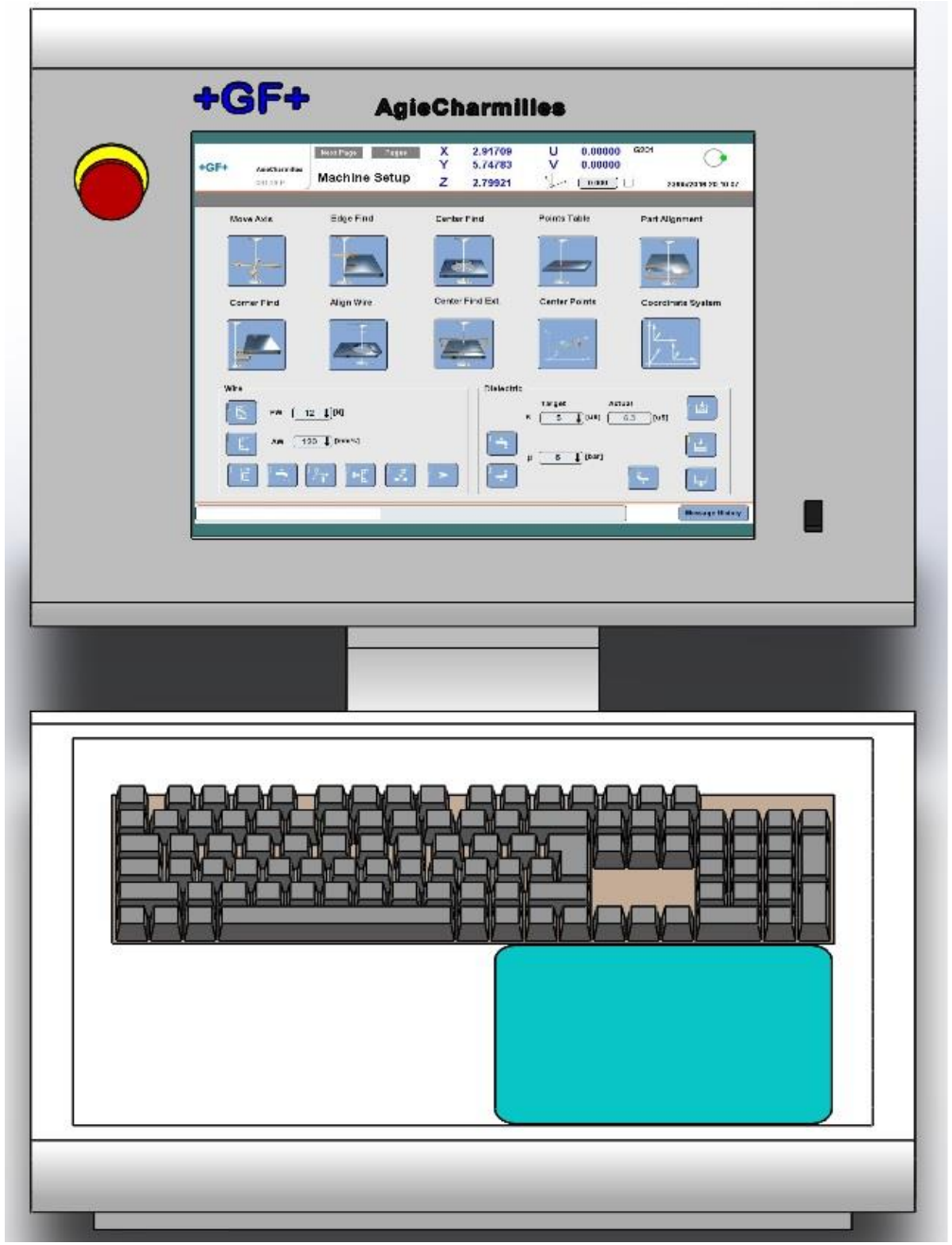
Items in this presentation can be referenced in the AgieCharmilles operator training manual

Section: user interface

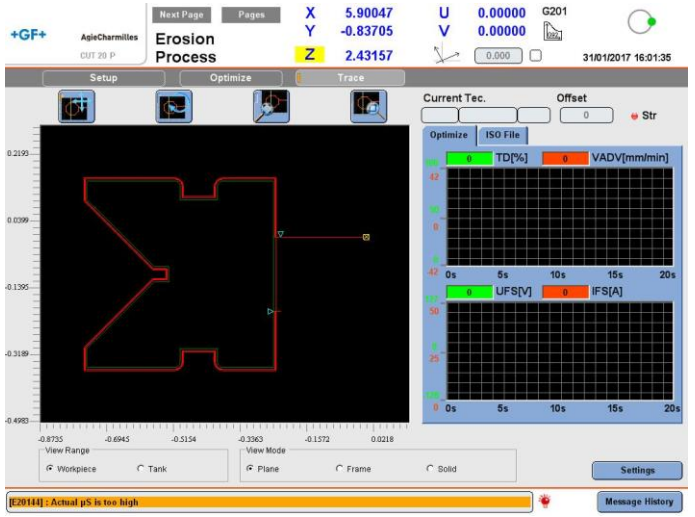
Pages 5 and 6

Erosion Process



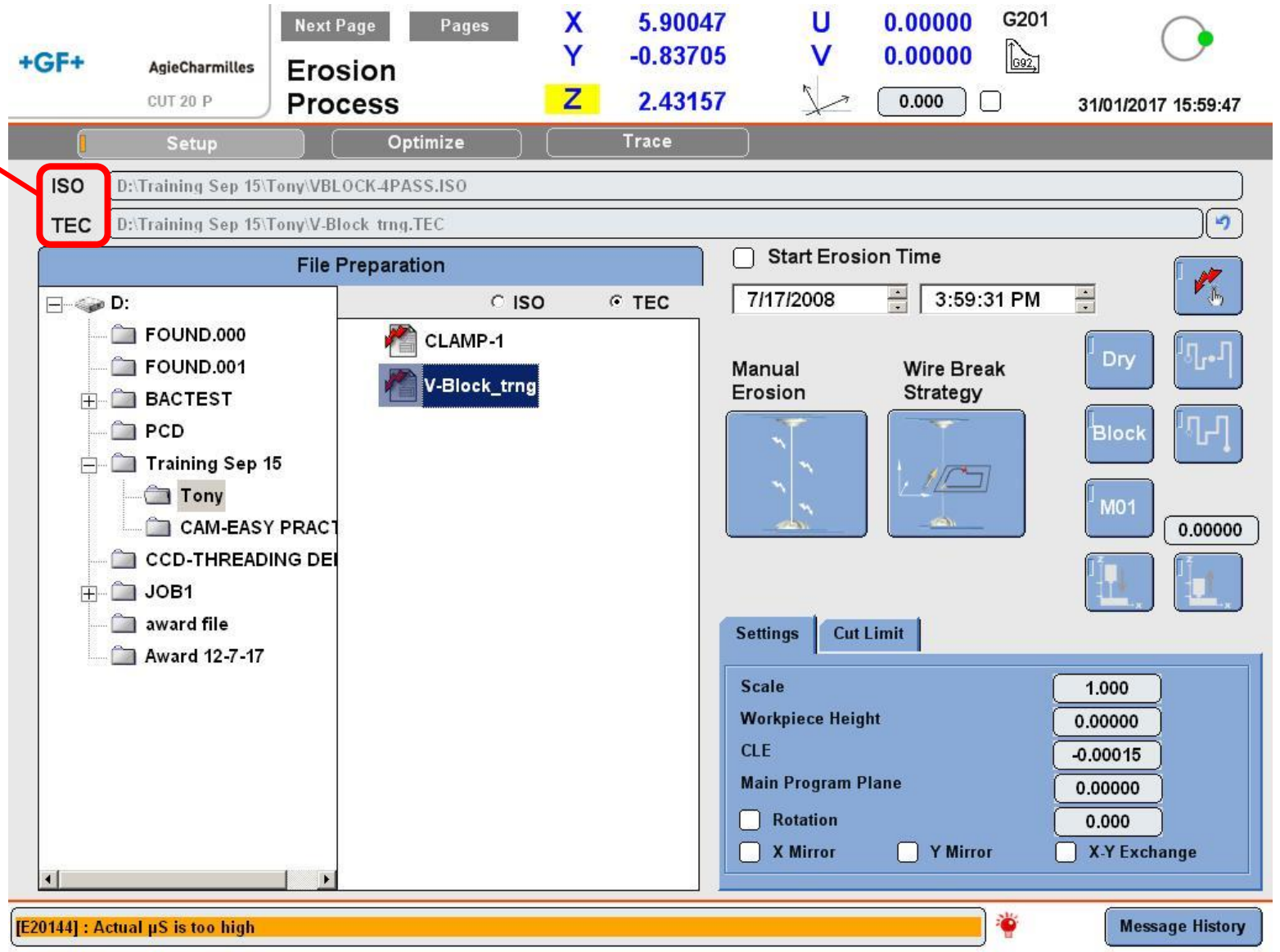


Wire EDM
Module 4.11
Evaluating G-Code



Once an ISO program and a TEC program have been created, the user can evaluate and test the code before running the program

ISO and TEC files selected



This presentation will address some areas of G-Code in an ISO program to evaluate against the TEC file

- The evaluation of the G-Code should be performed methodically
- The CNC controller of the Agie Charmille Wire EDM will help with some of the evaluation
- Dry run should be utilized when possible
- The user should also be aware of the fixtures in the machine as well as the Z axis location

* For this section of the Power Point Presentation the students should have the ISO file for the V-block open on the computer or printed out to read

* Evaluate offsets

Look at the first eight (8) lines of the ISO program for the V-block below. Take note of how many offset callouts there are and the value of each offset

What the code reads	What the code means
1) G20;	1) Program in inches
2) H000 = 0;	2) Offset of zero inches
3) H001 = 0.00872;	3) This offset = 0.00872;
4) H002 = 0.00642;	4) This offset = 0.00642;
5) H003 = 0.00527;	5) This offset = 0.00527;
6) H004 = 0.00508;	6) This offset = 0.00508;
7) ( ) (VBLOCK 4PASS);	7) Readable block;
8) G90 G92 X0 Y0;	8) Absolute movement, set as zero point;

Action – compare the number of offsets in the program:

- The number of offsets
- The value of the offsets

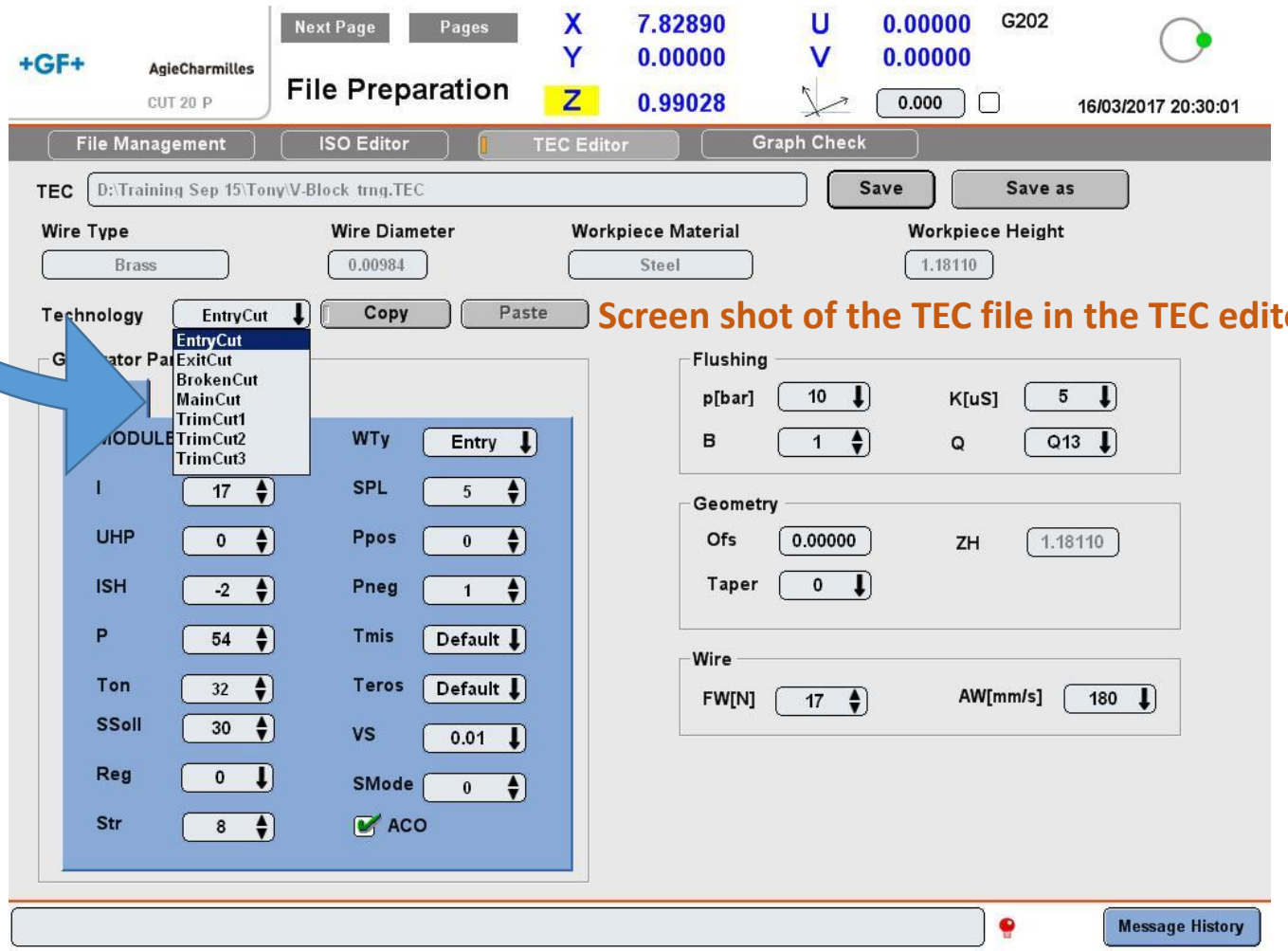
* Evaluate offsets

How many offsets are in the ISO program

How many Cuts are in the TEC file

What the code reads

1) G20;
2) H000 = 0;
3) H001 = 0.00872;
4) H002 = 0.00642;
5) H003 = 0.00527;
6) H004 = 0.00508;
7) ( ) (VBLOCK 4PASS);
8) G90 G92 X0 Y0;



Screen shot of the TEC file in the TEC editor

Look at a truncated version of the ISO G-Code
Are the Offsets utilized?


```
M60;
(ROUGH PRIMARY CUT VBLOCK 4PASS);
G90 G92 X0 Y0;
C096;
G01 X-.1 Y0;
C001;
G42 H000;
G01 X-.25 Y0;
G42 H001;
G01 X-.25 Y.15;
G01 X-.385 Y.15;
G03 X-.4 Y.135 I0 J-.015;
G01 X-.4 Y.1;
G01 X-.5 Y.1;
G01 X-.5 Y.135;
.
.
.
C097;
G40 H000 G50 A0 G01 X-.23 Y-.2; . . .
```

Offset 1

Offset (0) is used to cancel the offsets

```
(SKIM PRIMARY CUT [ 1] VBLOCK 4PASS);
G90 G92 X-.23 Y-.2;
C002;
G41 H000;
G01 X-.25 Y-.2;
G41 H002;
G01 X-.25 Y-.35;
G01 X-.385 Y-.35;
G02 X-.4 Y-.335 I0 J.015;
G01 X-.4 Y-.3;
G01 X-.5 Y-.3;
G01 X-.5 Y-.335;
G02 X-.515 Y-.35 I-.015 J0;
.
.
.
G40 H000 G50 A0 G01 X-.23 Y0; . . .
```

Offset 2

```
(SKIM PRIMARY CUT [ 2] VBLOCK 4PASS);
G90 G92 X-.23 Y0;
C003;
G42 H000;
G01 X-.25 Y0;
G42 H003;
G01 X-.25 Y.15;
G01 X-.385 Y.15;
G03 X-.4 Y.135 I0 J-.015;
G01 X-.4 Y.1;
G01 X-.5 Y.1;
G01 X-.5 Y.135;
.
.
.
G40 H000 G50 A0 G01 X-.23 Y-.2; . . .
```

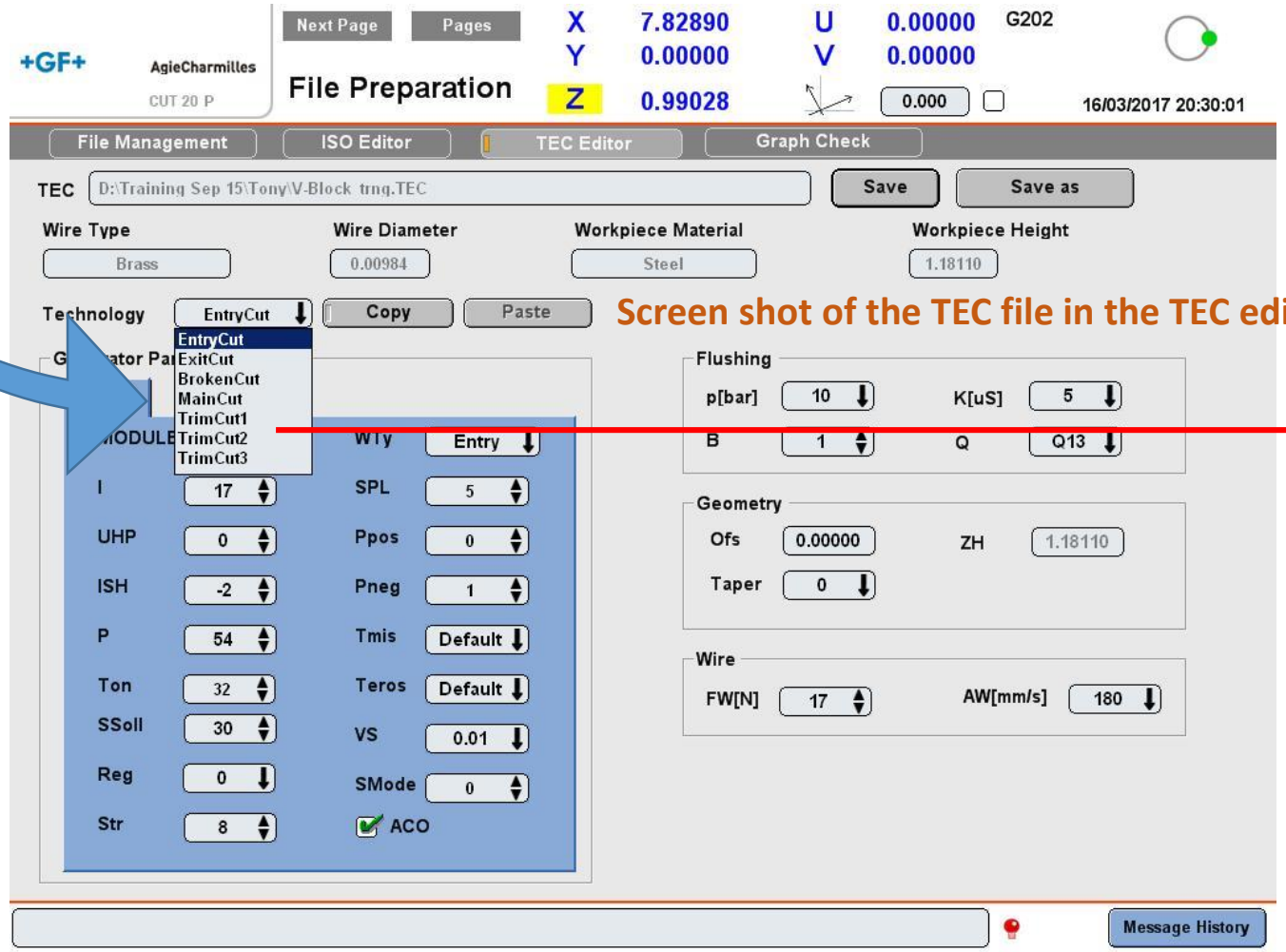
Offset 3

```
(SKIM PRIMARY CUT [ 3] VBLOCK 4PASS);
G90 G92 X-.23 Y-.2;
C004;
G41 H000;
G01 X-.25 Y-.2;
G41 H004;
G01 X-.25 Y-.35;
G01 X-.385 Y-.35;
G02 X-.4 Y-.335 I0 J.015;
G01 X-.4 Y-.3;
G01 X-.5 Y-.3;
.
.
G40 H000 G50 A0 G01 X-.23 Y0; . . .
```

Offset 4

* Evaluate cuts

How many Cuts are in the TEC file



Screen shot of the TEC file in the TEC editor

How many Cuts are in the ISO G-Code

Look at a truncated version of the ISO G-Code
How many cuts are in the program?


```
M60;
(ROUGH PRIMARY CUT VBLOCK 4PASS);
G90 G92 X0 Y0;
C096;
G01 X-.1 Y0;
C001;
G42 H000;
G01 X-.25 Y0;
G42 H001;
G01 X-.25 Y.15;
G01 X-.385 Y.15;
G03 X-.4 Y.135 I0 J-.015;
G01 X-.4 Y.1;
G01 X-.5 Y.1;
G01 X-.5 Y.135;
.
.
.
C097;
G40 H000 G50 A0 G01 X-.23 Y-.2; . . .
```

Cut 1

```
(SKIM PRIMARY CUT [ 1] VBLOCK 4PASS);
G90 G92 X-.23 Y-.2;
C002;
G41 H000;
G01 X-.25 Y-.2;
G41 H002;
G01 X-.25 Y-.35;
G01 X-.385 Y-.35;
G02 X-.4 Y-.335 I0 J.015;
G01 X-.4 Y-.3;
G01 X-.5 Y-.3;
G01 X-.5 Y-.335;
G02 X-.515 Y-.35 I-.015 J0;
.
.
.
G40 H000 G50 A0 G01 X-.23 Y0; . . .
```

Cut 2

```
(SKIM PRIMARY CUT [ 2] VBLOCK 4PASS);
G90 G92 X-.23 Y0;
C003;
G42 H000;
G01 X-.25 Y0;
G42 H003;
G01 X-.25 Y.15;
G01 X-.385 Y.15;
G03 X-.4 Y.135 I0 J-.015;
G01 X-.4 Y.1;
G01 X-.5 Y.1;
G01 X-.5 Y.135;
.
.
.
G40 H000 G50 A0 G01 X-.23 Y-.2; . . .
```

Cut 3

```
(SKIM PRIMARY CUT [ 3] VBLOCK 4PASS);
G90 G92 X-.23 Y-.2;
C004;
G41 H000;
G01 X-.25 Y-.2;
G41 H004;
G01 X-.25 Y-.35;
G01 X-.385 Y-.35;
G02 X-.4 Y-.335 I0 J.015;
G01 X-.4 Y-.3;
G01 X-.5 Y-.3;
.
.
G40 H000 G50 A0 G01 X-.23 Y0; . . .
```

Cut 4

Each cut corresponds with the TEC file:

Cut 1 = Main cut

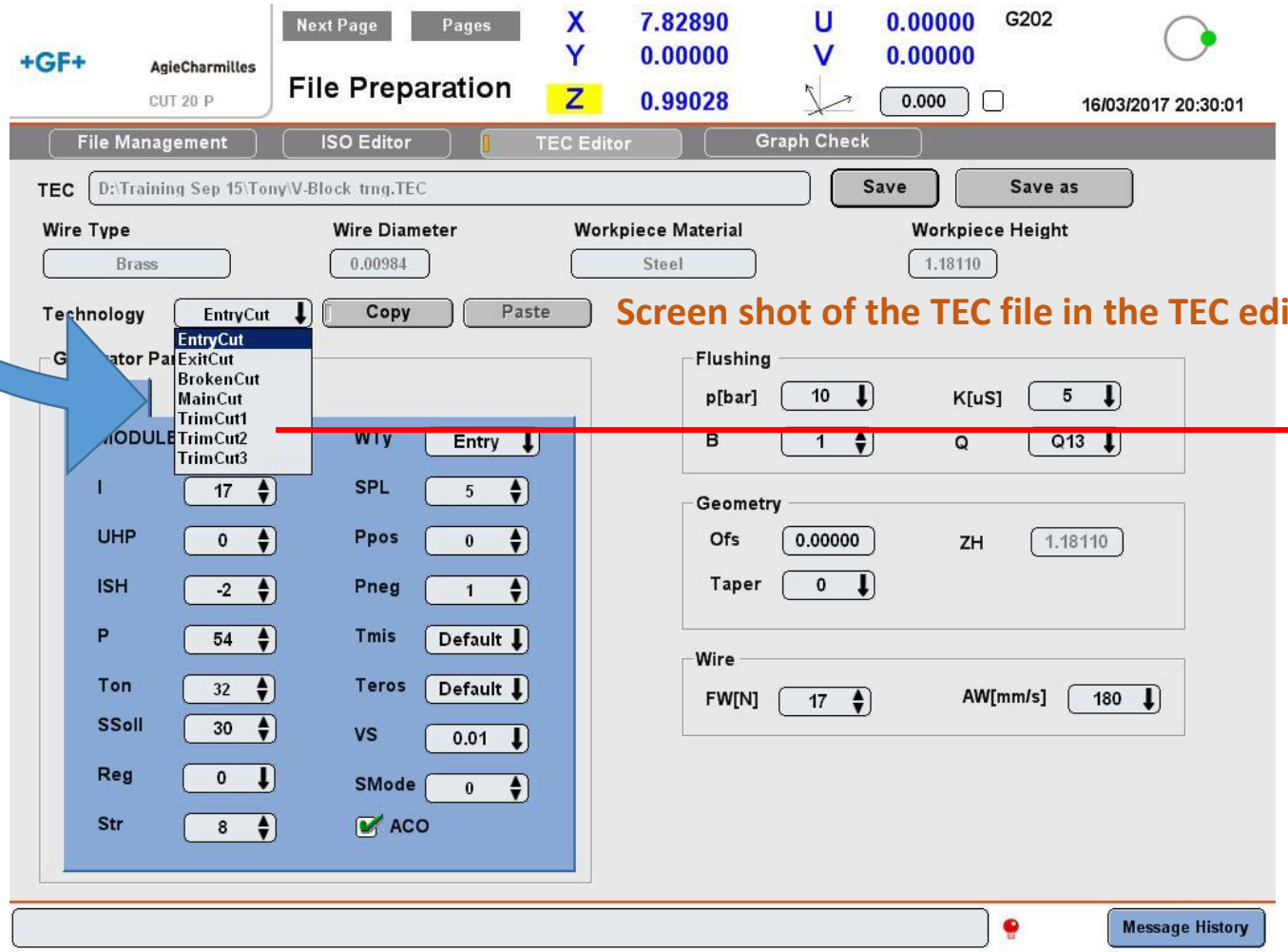
Cut 2 = Trim cut 1

Cut 3 = Trim cut 2

Cut 4 = Trim cut 3

* Evaluate cuts

How many Cuts are in the TEC file



Screen shot of the TEC file in the TEC editor

Cut 1 = Main cut

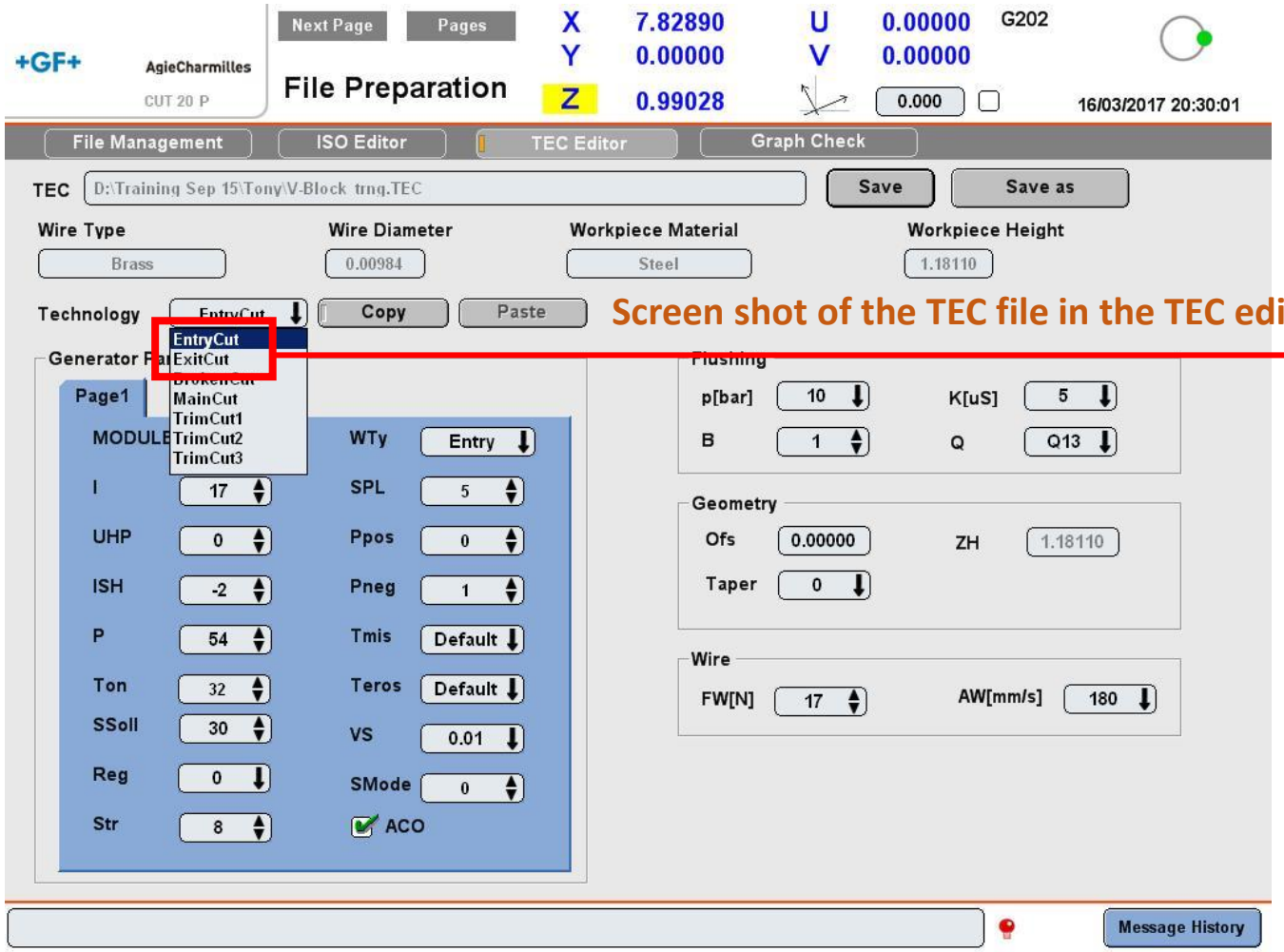
Cut 2 = Trim cut 1

Cut 3 = Trim cut 2

Cut 4 = Trim cut 3

* Evaluate cuts

In addition to the Main cut and trims cuts, this G-code program also contains the cut condition for the ‘entry cuts’ and ‘exit cuts’



Screen shot of the TEC file in the TEC editor

Entry Cut = C096

Exit Cut = C097

* Evaluate G- codes


```
G20;
H000 = 0;
H001 = 0.00872;
H002 = 0.00642;
H003 = 0.00527;
H004 = 0.00508;
( ) (VBLOCK 4PASS);
G90 G92 X0 Y0;
M60;
(ROUGH PRIMARY CUT VBLOCK 4PASS);
G90 G92 X0 Y0;
C096;
G01 X-.1 Y0;
C001;
.
.
.
```

G20

G90 / G92

```
.
.
.
M01;
(CUT-OFF PRIMARY CUT VBLOCK 4PASS);
G90 G92 X-.23 Y0;
C097;
G41 H000;
G01 X-.25 Y0;
G41 H001;
G01 X-.25 Y-.2;
M01;
G40 H000 G50 A0 G01 X-.23 Y-.2;
M50;
M02; . . . .
```

G90 / G92

Know your important G-code and what these codes produce in the program:

- G20 – program in inches
- G90 or G91 Absolute or incremental programming
- G92 Set coordinate value for current point

* Evaluate Special codes / M - codes


```
G20;
H000 = 0;
H001 = 0.00872;
H002 = 0.00642;
H003 = 0.00527;
H004 = 0.00508;
( ) (VBLOCK 4PASS);
G90 G92 X0 Y0;
M60;
(ROUGH PRIMARY CUT VBLOCK 4PASS);
G90 G92 X0 Y0;
C096;
G01 X-.1 Y0;
C001;
.
.
.
```

Auto thread wire

```
.
.
.
M01;
(CUT-OFF PRIMARY CUT VBLOCK 4PASS);
G90 G92 X-.23 Y0;
C097;
G41 H000;
G01 X-.25 Y0;
G41 H001;
G01 X-.25 Y-.2;
M01;
G40 H000 G50 A0 G01 X-.23 Y-.2;
M50;
M02; . . .
```

Optional stop

Auto cut wire

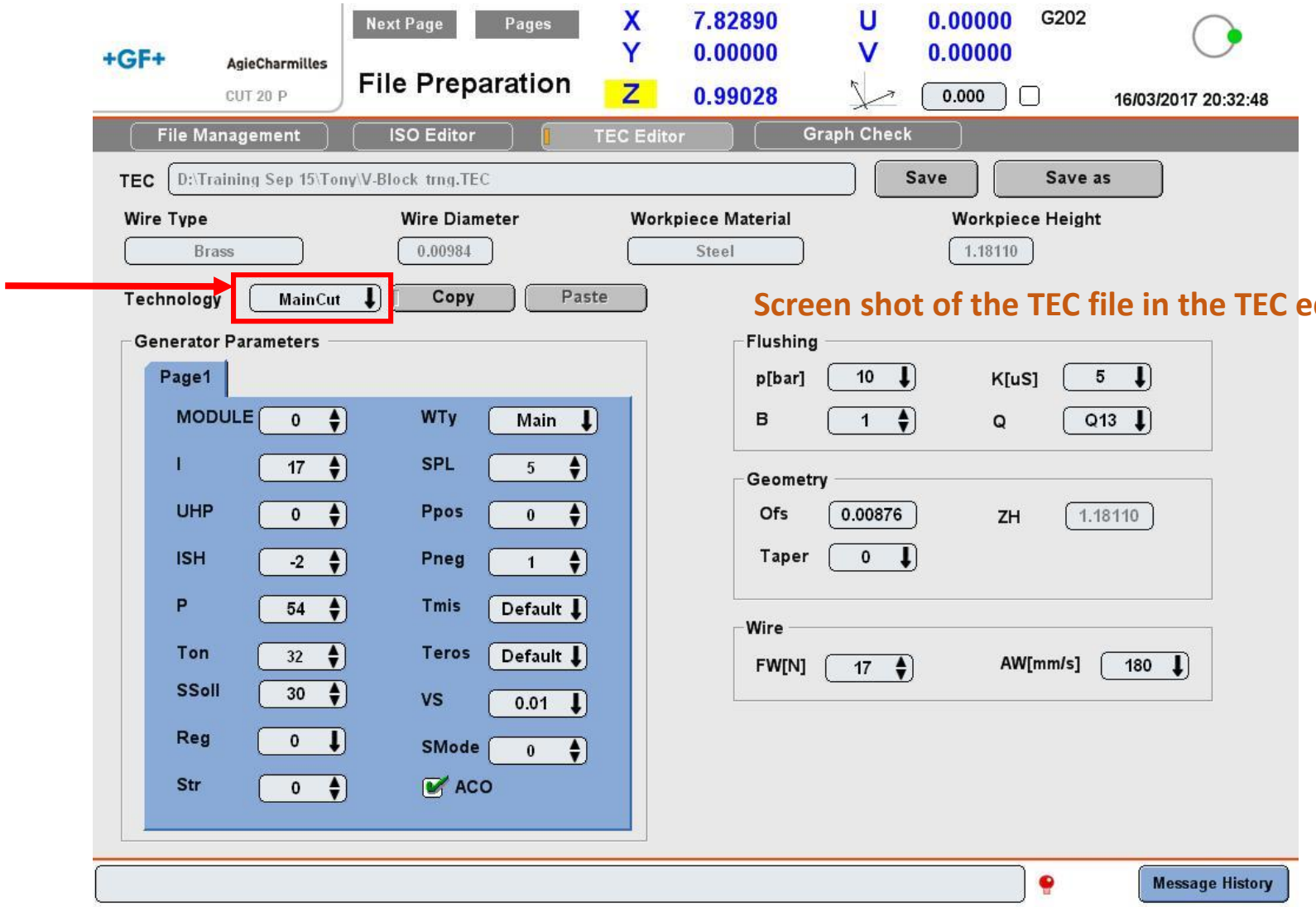
End program

Systematically search for any special codes or M code functions. These may include:

- Program stop
- Optional program stop
- Auto thread wire
- Auto cut wire
- Program end

* Evaluate cut parameters

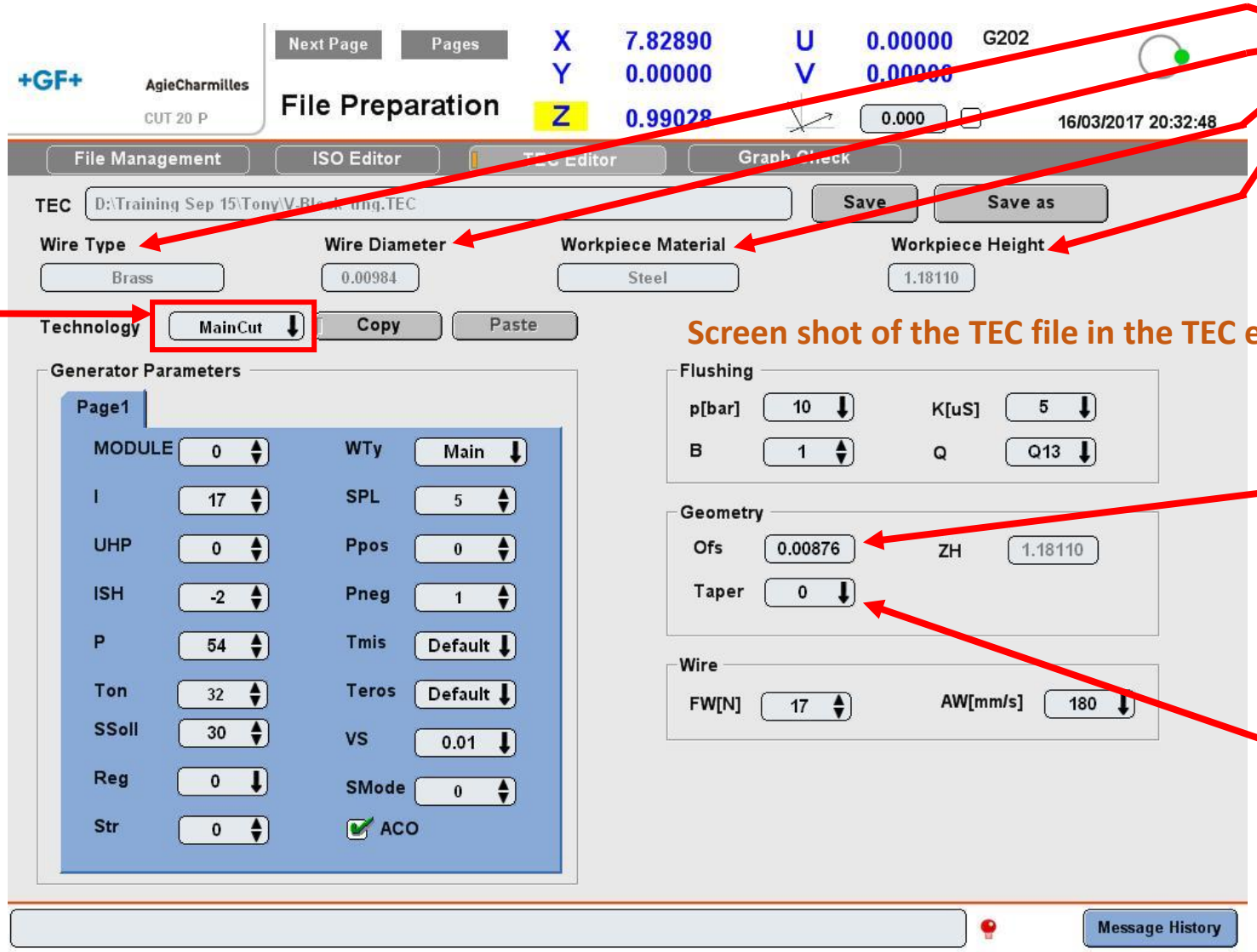
In addition to the ISO file, compare the parameters for each cut in the TEC file



Screen shot of the TEC file in the TEC editor

* Evaluate cut parameters

Look at what can be found in the TEC file and compared to the G-code



Wire type

Wire diameter

Workpiece material

Workpiece height

Which Cut (Main)

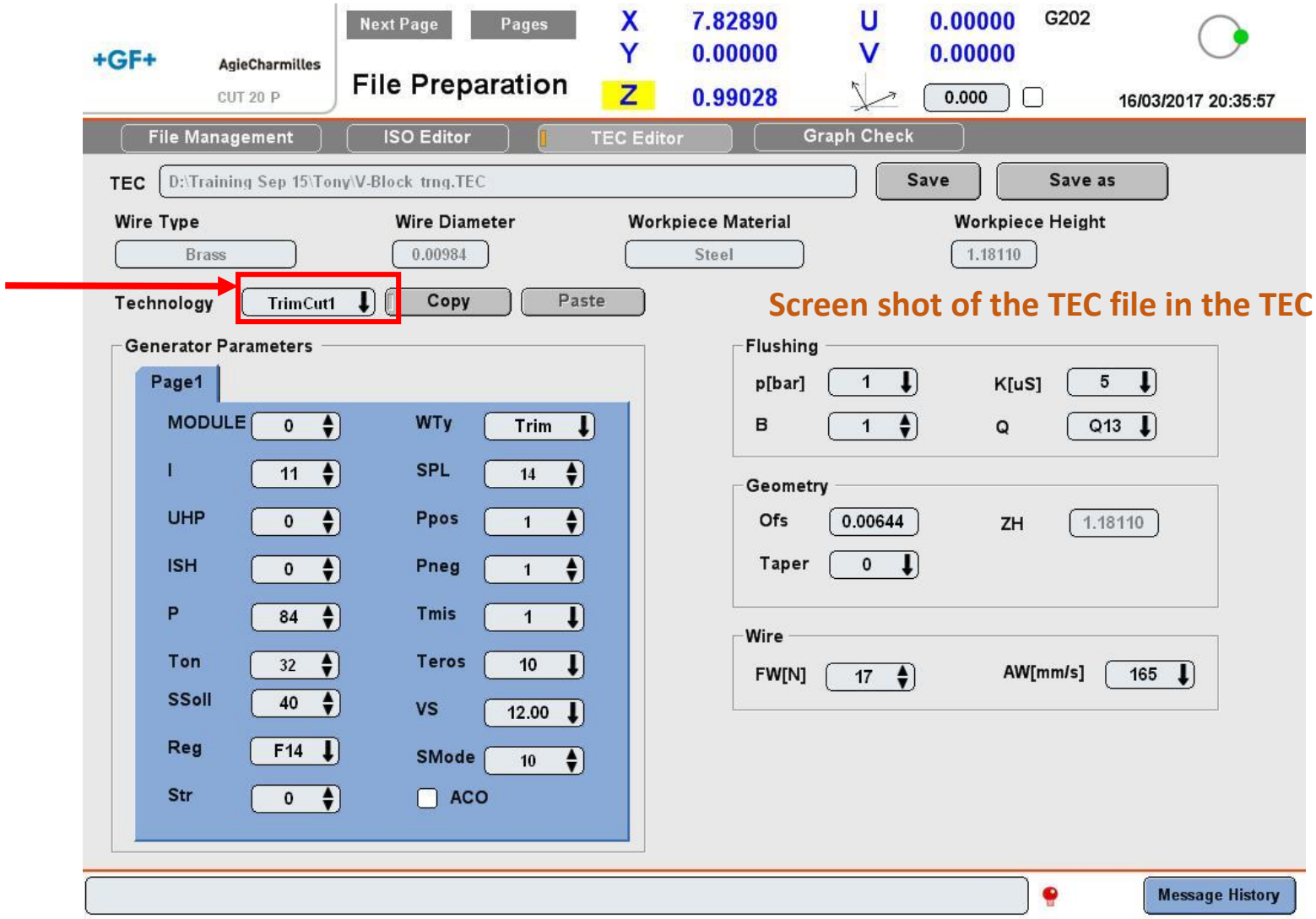
Screen shot of the TEC file in the TEC editor

Offset value

Taper value

* Evaluate cuts

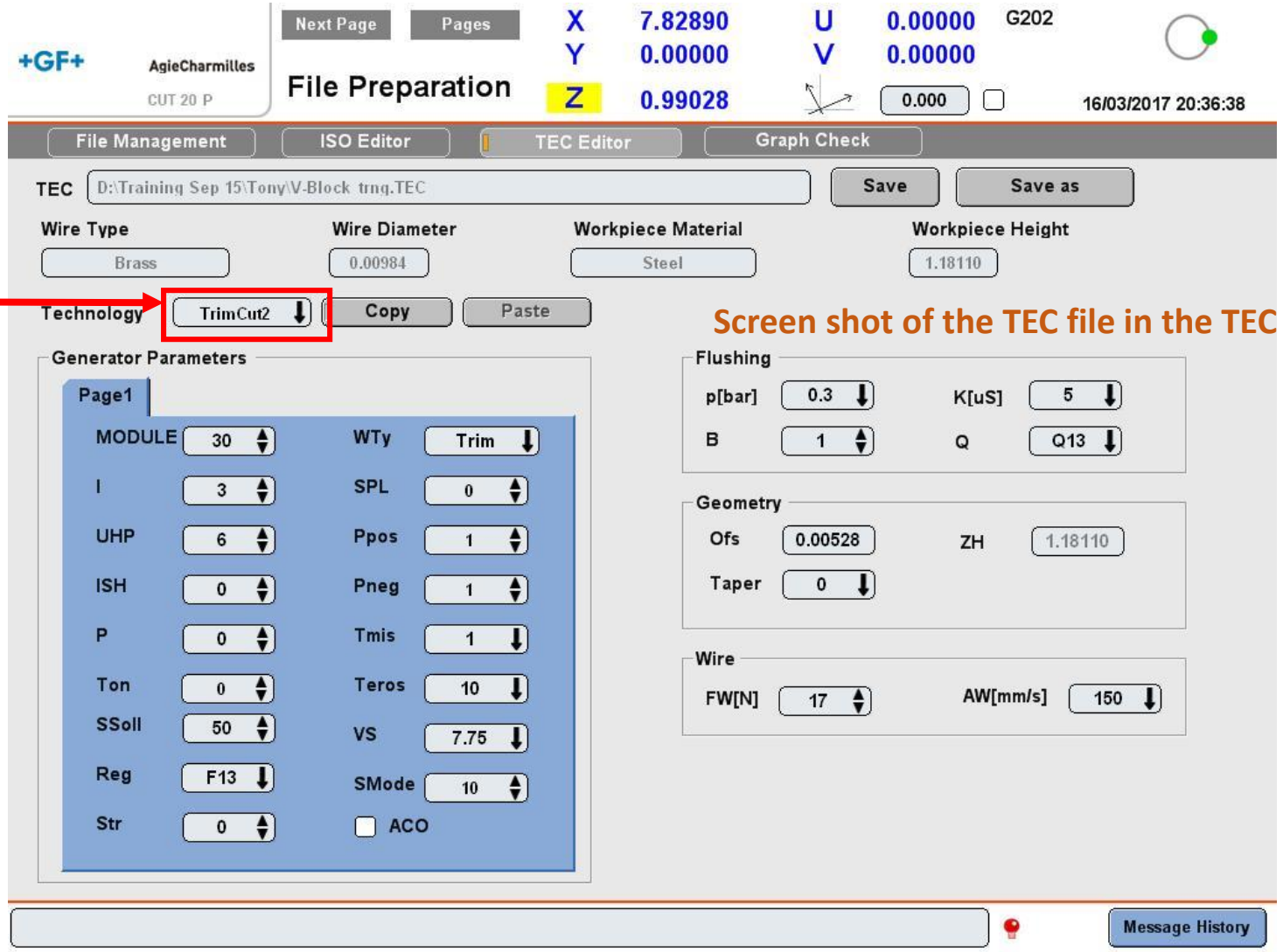
In addition to the ISO file, compare the parameters for each cut in the TEC file



Screen shot of the TEC file in the TEC editor

* Evaluate cuts

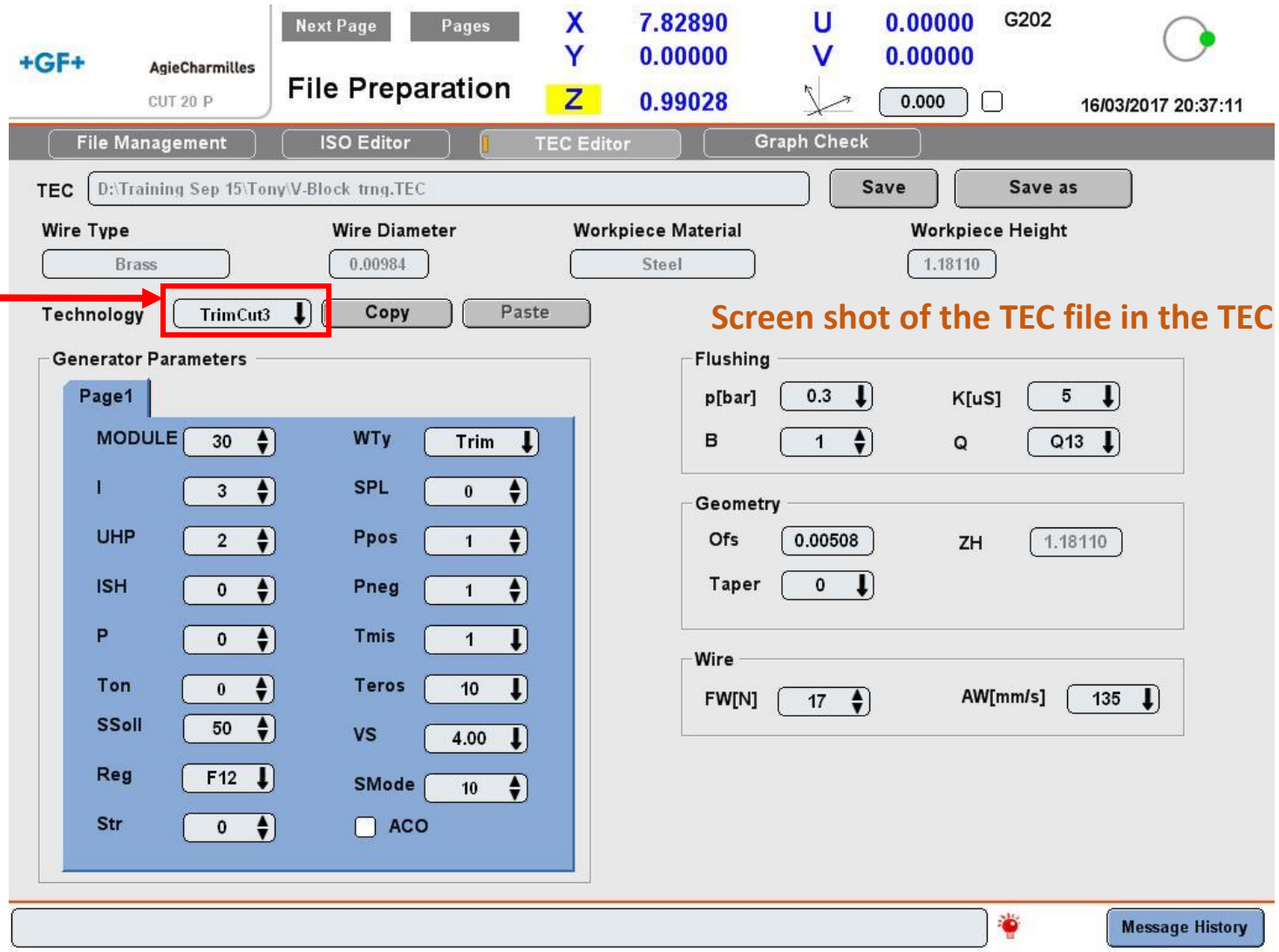
In addition to the ISO file, compare the parameters for each cut in the TEC file



Screen shot of the TEC file in the TEC editor

* Evaluate cuts

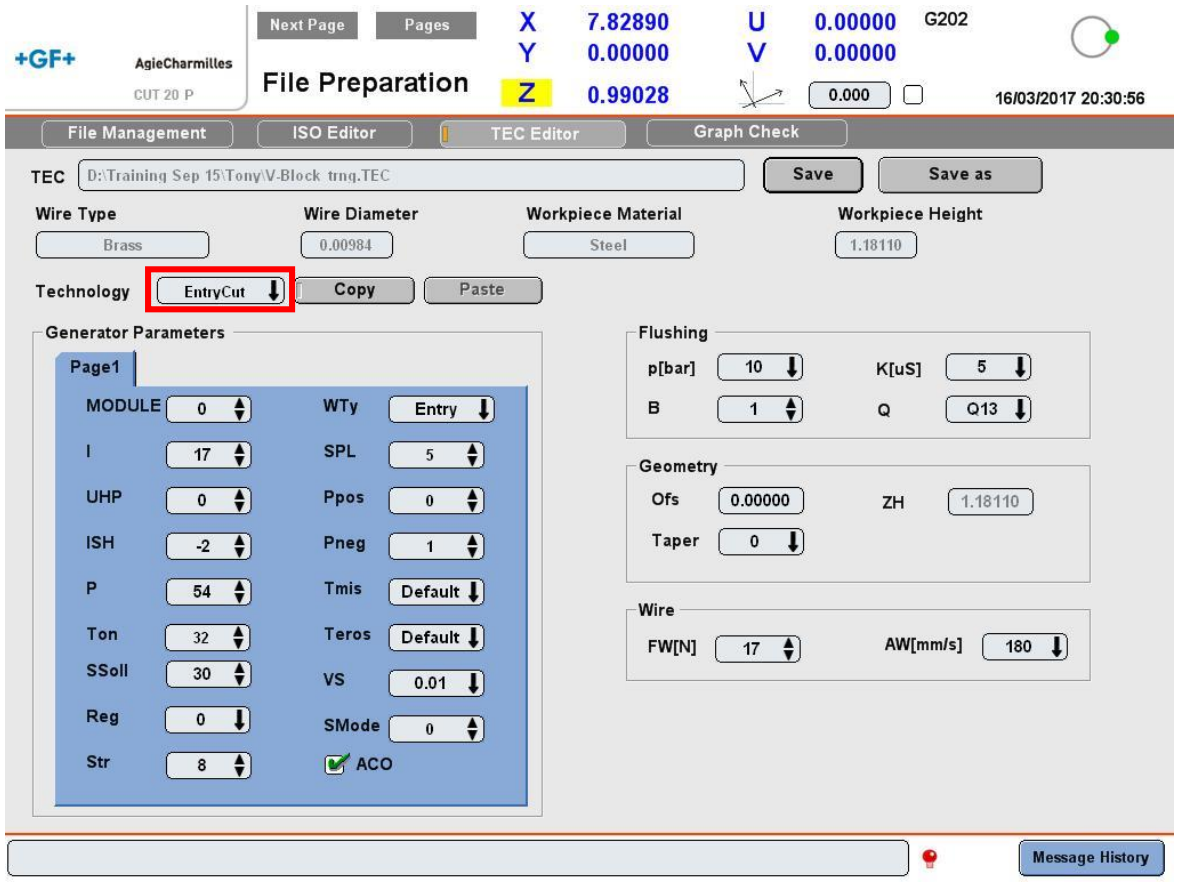
In addition to the ISO file, compare the parameters for each cut in the TEC file

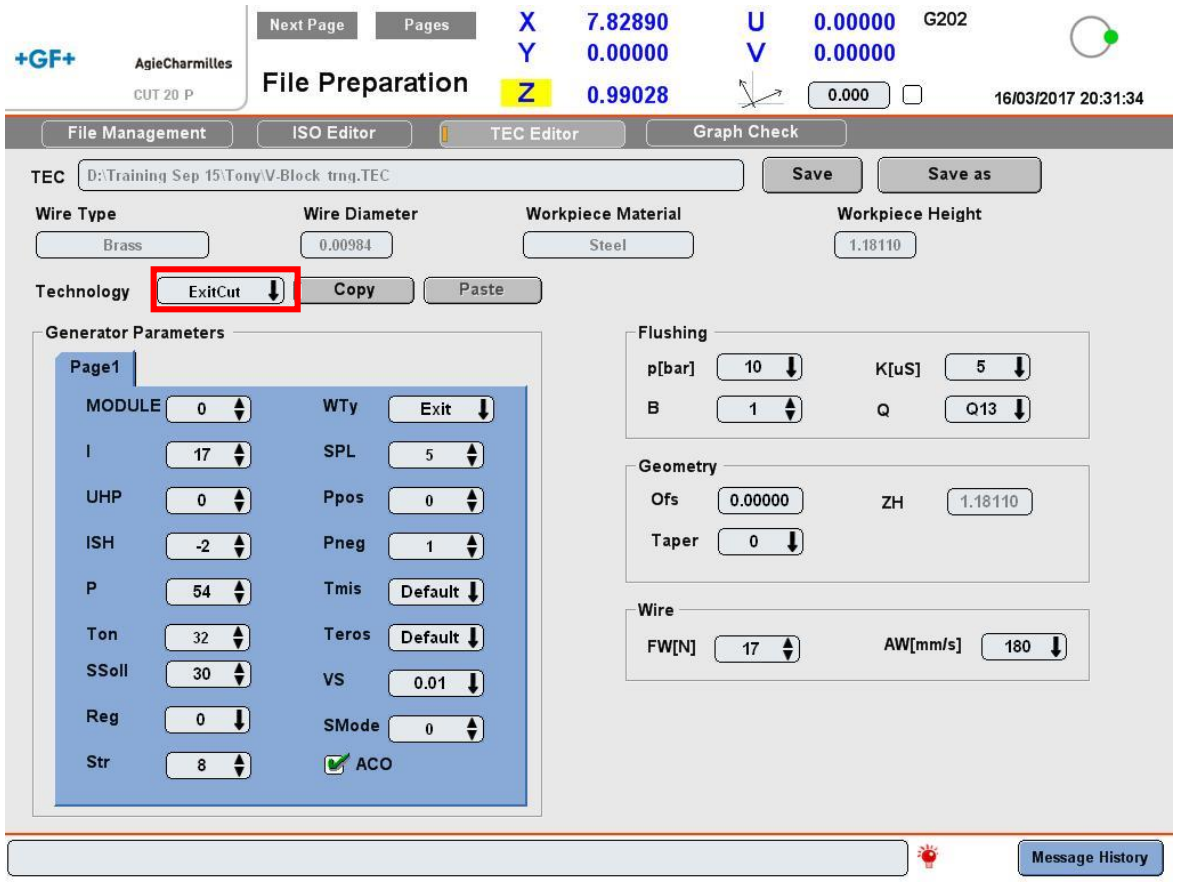


Screen shot of the TEC file in the TEC editor

* Evaluate cut parameters

Compare side by side the Entry and Exit cut parameters

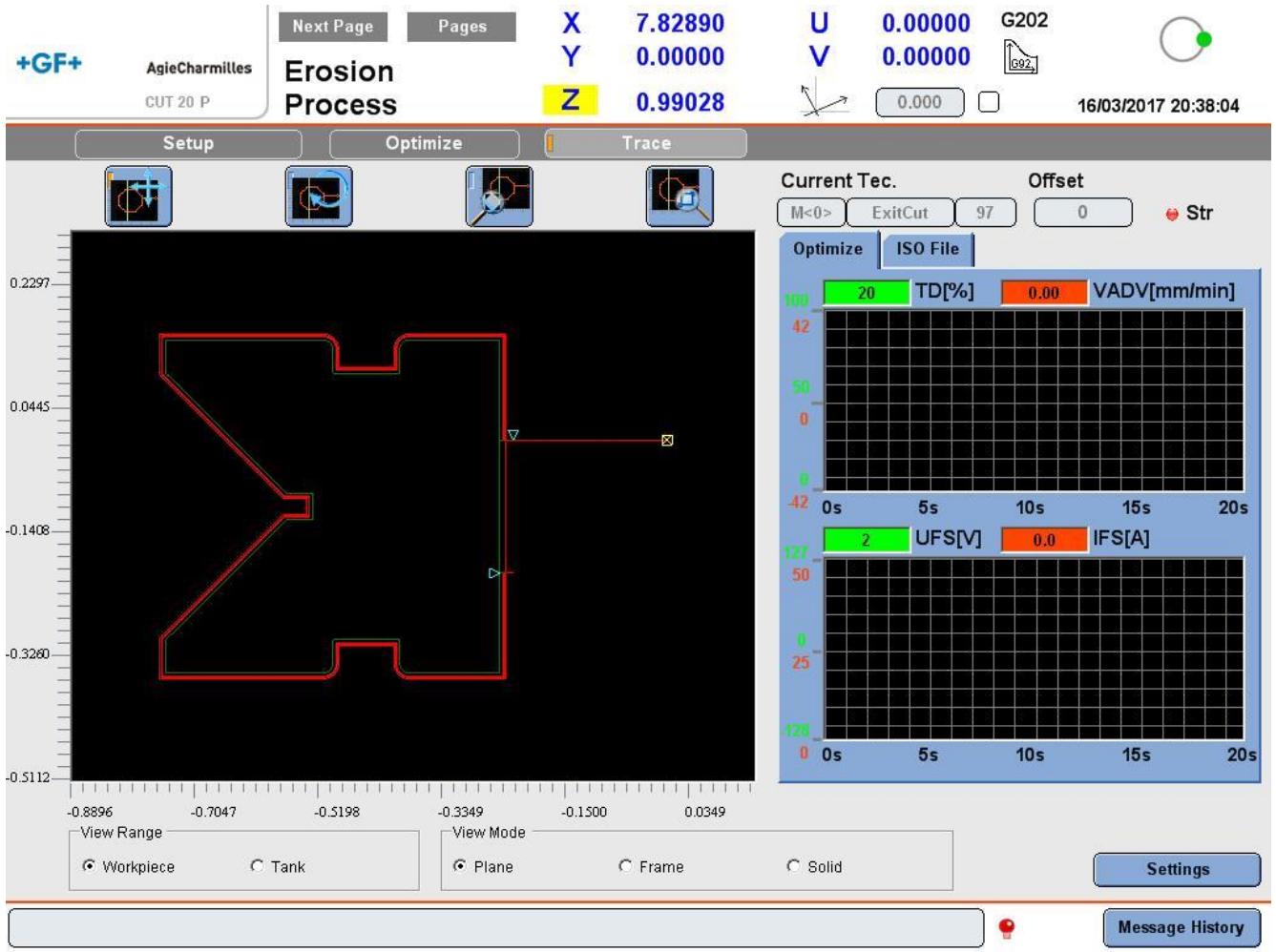




Screen shot of the TEC file in the TEC editor

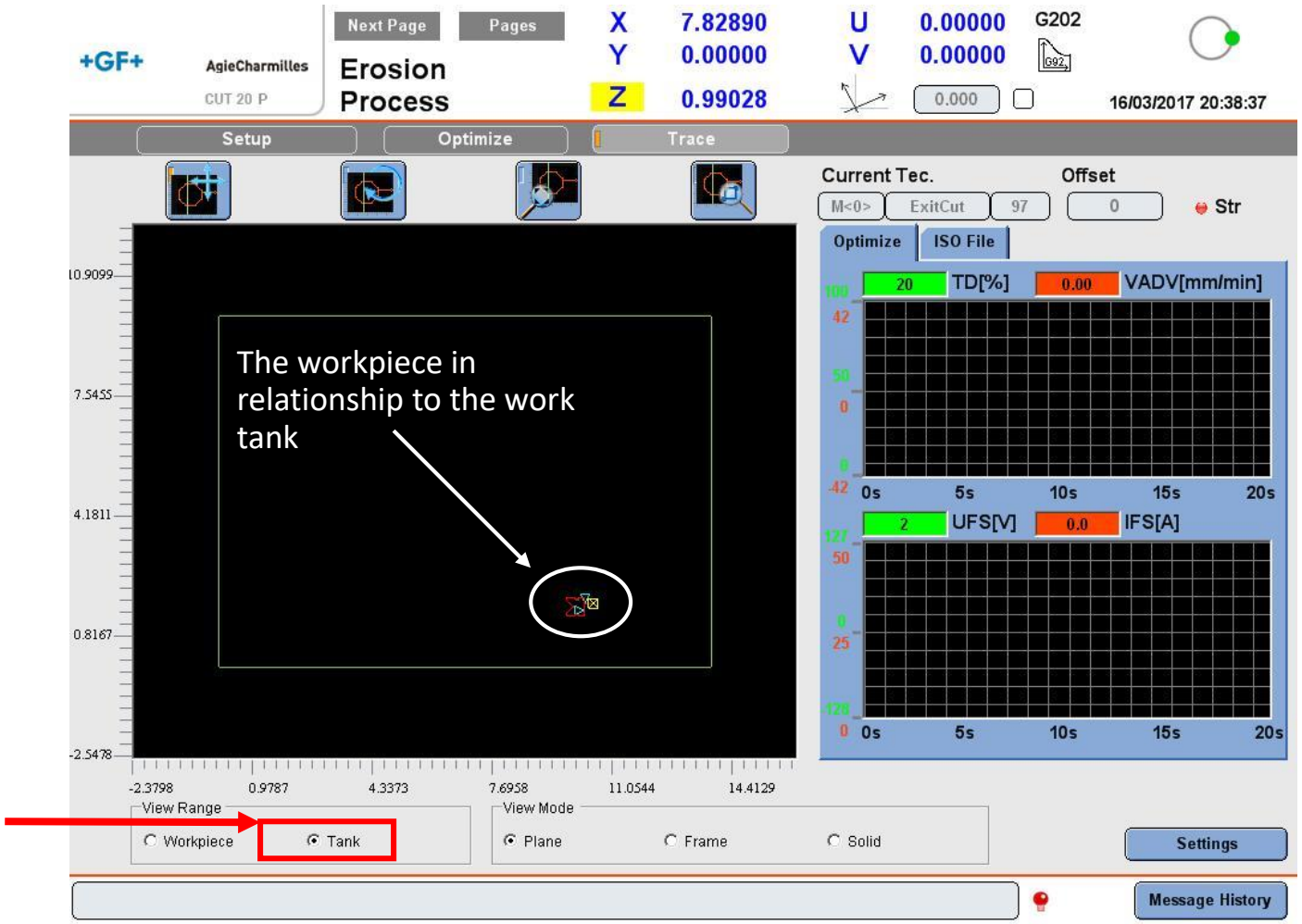
* Evaluate part and code

As noted in previous presentations, the trace function will show the part cut with all of the passes



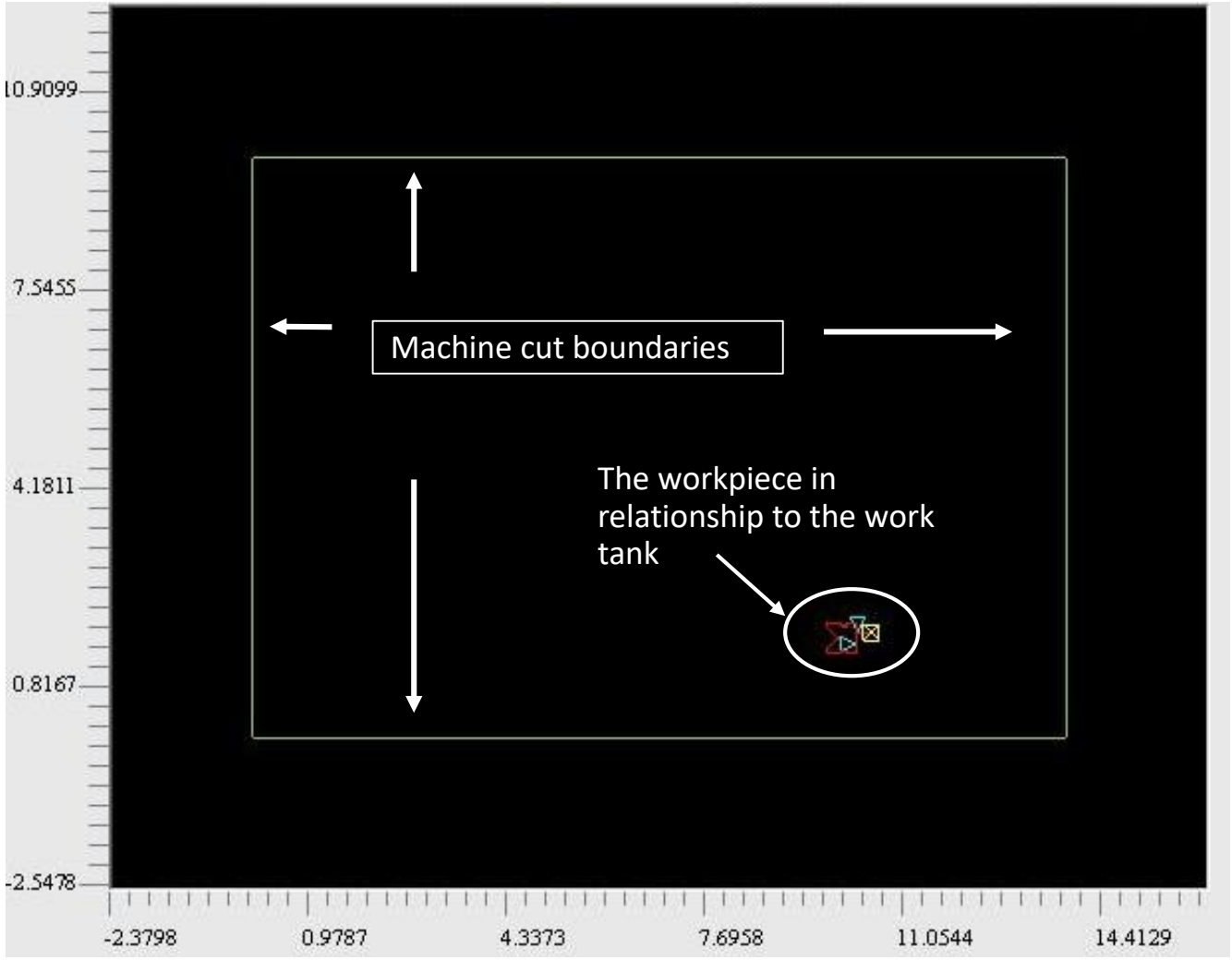
* Evaluate part and code

By selecting the ‘tank’ view, the user can determine if the part program is within the bounds of the work tank and table of the machine



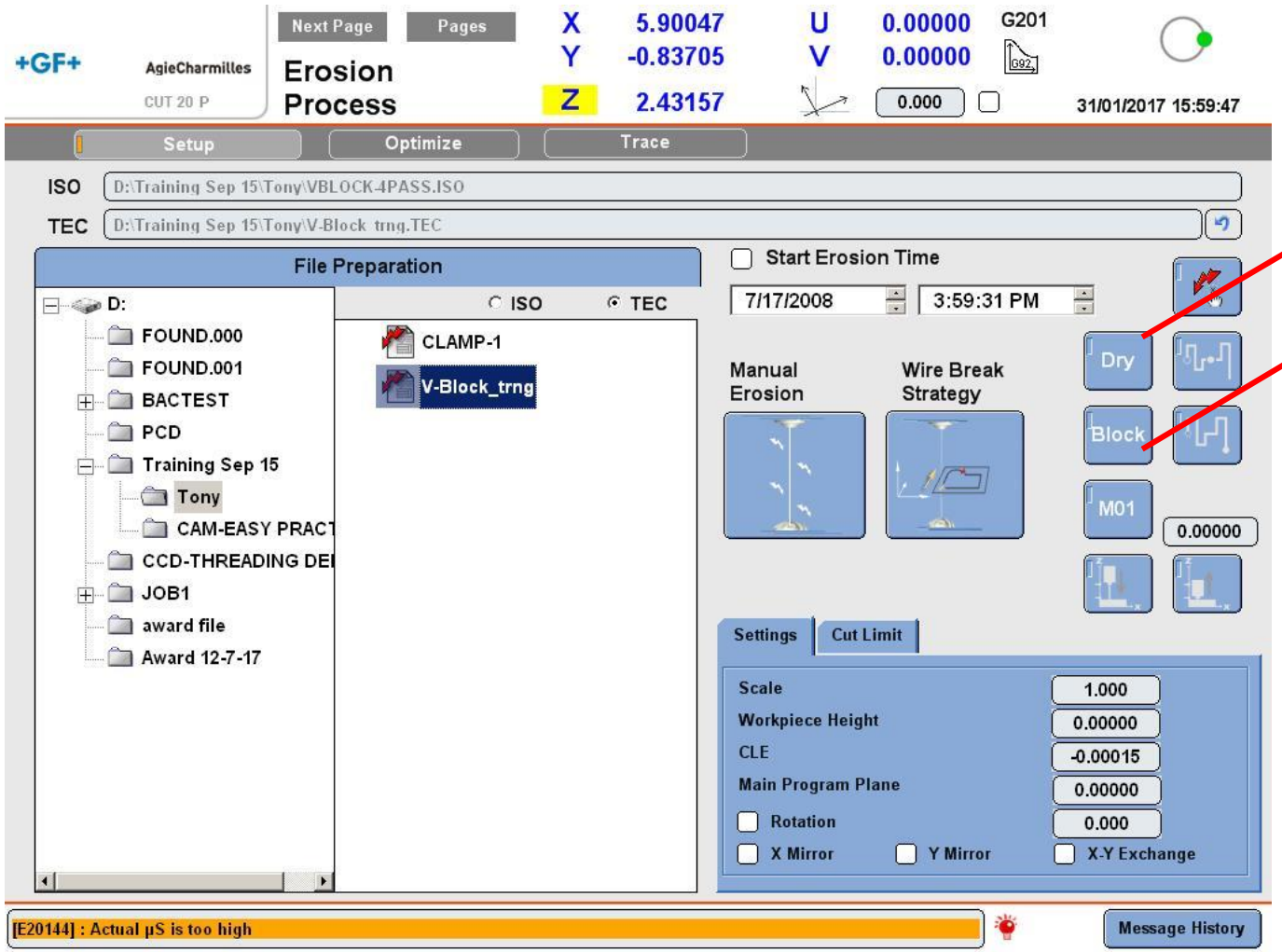
* Evaluate part and code

By selecting the ‘tank’ view, the user can determine if the part program is within the bounds of the work tank and table of the machine



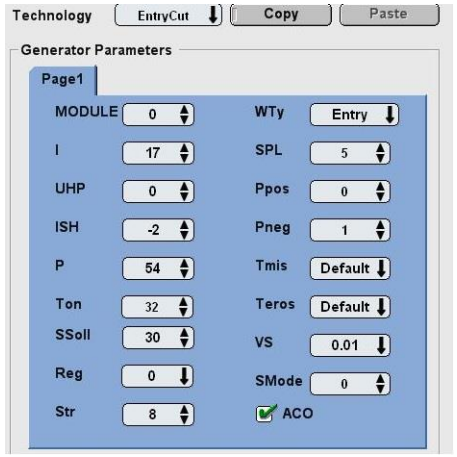
* Evaluate part and code

The dry run and single block functions can be utilized to allow the user to run the program and test the movements



DRY RUN: press to start the dry run function

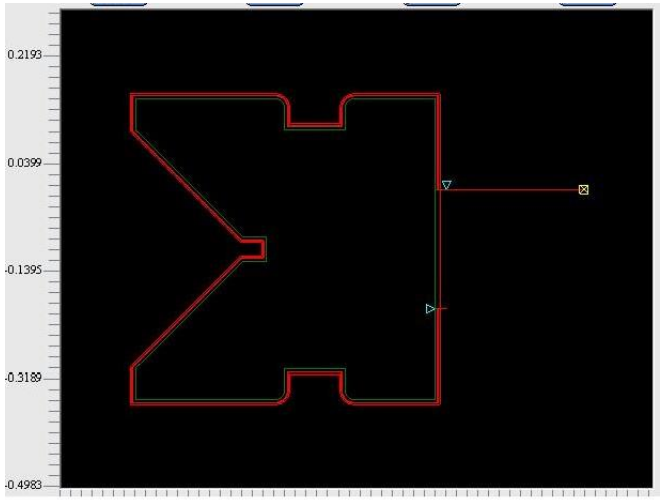
SINGLE BLOCK: will run the program block by block each time the START button is depressed



Use caution when modifying and resaving files

Use preferred file management skills

Always back up a file before modifying and resaving



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