

## Instructions for Filling out the Cavity Data Spreadsheet

There are two sections to the data: “cavity information” which is specific to the cavity and only occurs once per cavity, and “process/test information” which occurs possibly multiple times per cavity – once for each process/test cycle. Most input boxes have only a few permitted answers. If you have to make a new permitted answer for your lab’s data, please go ahead, but try to select answers with well-defined and not-rapidly-changing meaning. Free-text boxes must contain  $\leq 250$  characters.

### **Cavity Information**

#### Cavity name

Use the serial number etched on the cavity, if available, or follow your lab’s established practice. This will be the unique driver for the database.

#### Aliases

Insert any other names the cavity might be called in talks, plots, etc. Use text strings separated by commas. Eventually these individual strings will also be searchable.

#### Cavity owner

Lab which owns the cavity

#### Cavity vendor

In principle, this is probably encoded in the serial number, but let’s put it separate to make the selection easier.

#### Date cavity received from vendor

Useful for tracking the vendor progress.

#### #cells

Only include 9-cells for now.

#### Cell shape

Choices are TESLA (EU and US), TESLA (KEK), LL (low-loss), and Ichiro.

#### Material

Fine-grain or large-grain

#### Material vendor

List the material vendor’s name.

### Bulk surface removal technique

These are EP, BCP or tumbling for now. Please specify and also send me a text description of the definition for your lab which I will link to the data. Note that the amount of material removed by the bulk removal technique shows up in the first RF test after the final surface treatment.

### High temperature heat treatment

I think there will be only one or possibly two such (modern) treatments per lab. Please specify and also send me a text description of the definition which I will link to the data.

### Cavity Remarks

Describe anything special about the cavity or your plans for using it in the future. This is a free-text area which is limited to  $\leq 250$  characters.

### RF test #

This is the test number. Please include all tests, even those which should not be included in plots. There is a flag further down to specify that you don't want the test included in global analysis.

### latest surface treatment

This is a well-defined procedure for your lab. Please send me a text description of the definition which I will link to the data. Minor variations to the technique should be described in the Process/Test result comment field below.

### total material removed [um]

This is the total integrated material removed up to the time of the RF test on this row.

### RF test date

This is an important item because it will be used to time-order the tests. For tests which carry over multiple days, please use the last test day. The important part is to separate sequential tests, and to be able to recall additional data from your lab records if requested, so base your date accuracy level on your test turnaround rate.

### max gradient

Give the maximum gradient achieved at the test limitation. If you do more than one pi-mode test, give the maximum gradient measured in the final power rise of the cooldown.

### Q0 at max gradient

Q0 at maximum gradient described above.

### Field emission observed?

Yes or no, did you measure field emission above your lab's threshold for significance. I think we will define this better in the future but at the moment we do not have a single way to describe FE consistently across the labs more accurately than this.

### Limitation

*Quench:* Cavity breakdown without significant measured field emission: “hard” quench. There might actually be field emission present which you don’t measure.

*FE/Quench:* Test ends in quench, accompanied by significant field emission. You may or may not think that field emission caused the quench.

*Field emission:* Plenty of field emission is measured and the test ends before the cavity quenches, possibly because Q0 gets so bad you have to end the test because your RF amplifier can’t keep up, or there’s no point in torturing your cavity any longer because you just have to clean it. The maximum gradient and Q0 at that gradient may not well represent the cavity limitation.

*Q-slope:* Q0 drops off precipitously without significant measured field emission without ever quenching, and possibly Q0 gets so bad that you have to end the test because your RF amplifier can’t keep up. The maximum gradient and Q0 at that gradient may not well represent the cavity limitation.

*System:* Test is limited by a system failure not related to the cavity performance, such as RF components failing, cryogenic capacity being insufficient, getting a cold helium leak into the cavity vacuum space, etc. This implies that you could not determine the cavity limitation from this test and will have to re-do the test.

### *Other*

Please use only if you’re very desperate and you’re sure that cavity limitation will only occur once. If it could happen more than once and it’s distinct from the other allowed answers, we may want to instead invent another allowed answer or re-examine the definition of one of the existing ones. Describe thoroughly any “other” limitations in the comment field below.

### Process/Test Result Comment

Include here any additional information known about cavity limitation and the diagnostic tools used during the process/test cycle which contributed to this understanding. Also include any minor modifications to your standard final cavity processing here. This is a free-text area which is limited to <=250 characters.

### Additional information known about cavity limitation and source of understanding

Put here any brief summary of results from optical inspection or other diagnostic tools which are used outside of the process/test procedures. Put your information on the process/test row which occurs immediately before obtaining the information. This is a free-text area which is limited to <=250 characters.

### Should this cavity test be included in data analysis?

Yes or no, depending on your lab’s preference (which will be strictly followed). If no, please explain why not below.

### if no, please explain

Explain why this cavity test should not be included in global data analysis. This is a free-text area which is limited to <=250 characters.