

# AP-0 Target Management Plan

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## Target Systems Department – January 15, 2019

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This plan documents the present state of targets for AP-0 (presently servicing the Muon g-2 experiment), including the operational target, ready spares, and targets in production and to be procured.

### Present Status

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The **T18** target in operation needs replacement due to a target rotation gear drive transmission failure. The Muon g-2 experiment will not request beam until mid-February at the earliest, though the Muon Department is ready to perform studies with muons produced from the target.

### Operating Target

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**T18** is a solid Inconel target with a Beryllium cover. It was installed on May 12, 2011, had integrated  $3 \times 10^{19}$  protons prior to the Tevatron shutdown, and had been in operation for muon g-2 experiment since April 2017. The visual appearance of the target itself suggests that it is in excellent condition.

**T19** is the same target type as T18 but is being prepared with a Carbon-Carbon cover as an emergency replacement, as there is no Beryllium cover on hand (note that lead time on procuring a Be cover is a minimum of 20 weeks). T19 assembly is complete and it is under test. Installation is planned for Jan. 22.

In case T19 is not ready for the start of experimental operations, a control system is being readied that can provide a modified target rotation jog pattern to T18 to allow for a limited operational period.

### Ready Spare Target

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**T15** is a ready spare disk-style target which utilizes no protective cover. It is a less desirable style target in terms of the performance and operation, and it will reside in a cabinet as a last-resort spare. A frame needs to be fabricated for this target.

### Targets to be Fabricated

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T18-type target has proved to be a “robust” target through operation. T20 and T21 will be the next spares of this style target. Two Beryllium covers will be procured for cost considerations. Two sets of frame parts will be procured for T21 and T15 (T20 frame parts are already on -hand).

**T20:** has most parts of a frame, and some small parts of the target. Major components to be procured include the target and Beryllium cover. Lead time for the Be cover has been quoted at 20 weeks delivery upon receipt of PO.

**T21:** needs all new parts. Parts will be procured in parallel with T20 and with an expected completion date that lags T20 by 2 to 4 months.

### **Notes, Pending Issues, and Short-term Development**

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Beryllium covers are preferred over no cover or a Carbon-Carbon cover as its effectiveness has been proven through operation and it provides protection for the Lithium Lens from target spalling / sputtering. The T19 graphite cover should receive a periodic visual inspection while in service.

Rotation is required to maintain target integrity at full power and should be integrated into the Machine Protection System.