**MAGNET\_insulated\_pipes\_SS:**

* MAGNET model from Scott Greenwood with insulated pipes and pipe lengths added
* UA values for the recuperator and heat exchanger were recalculated so that Tout\_vc is 602 C and Tin\_vc is 363 C as specified

**MAGNET\_TEDS\_Boundaries\_1:**

* MAGNET integrated with TEDS boundaries with a steady state flow rate
* Heat exchanger between MAGNET and TEDS are added, along with control valves.
* UA values for the recuperator were recalculated so that Tout\_vc is 602 C and Tin\_vc is 363 as specified
* PID control for MAGNET flow rate and cold-water flow rate
* Valve 1,3 are open. Valve 2 is closed. (All MAGNET flow flows into the heat exchanger between MAGNET and TEDS)
* Works with new values of UA\_rp, however if used with older value of UA\_rp, the cold-water control has to be decoupled as the inlet temperature of the vacuum chamber cannot reach 363 C with the older value of UA\_rp

**MAGNET\_TEDS\_valve\_3:**

* Central control system is added to control the valves from MAGNET to TEDS
* TEDS input values are still steady state
* Works with new values of UA\_rp, however if used with older value of UA\_rp, the cold-water control must be decoupled as the inlet temperature of the vacuum chamber cannot reach 363 C with the older value of UA\_rp

**MAGNET\_TEDS\_valve\_4:**

* TEDS input values ramp down and back up
* Tin from TEDS is ramped down from 225 C to 210 C starting at 2000s until 5000 s and then stays at 210 C
* Mass flow rate from TEDS is ramped down to 0.000001 kg/s (to simulate shut down) starting at 2000 s until 5000 s then back up to nominal flow rate
* Works with new values of UA\_rp but not older values.
* However, as the flow rate from TEDS ramps down to minimal, the inlet temperature into the vacuum chamber increases to about 500 C.

**TEDS\_MAGNET\_integration\_3:**

* Successful integration between MAGNET and TEDS, running through the five modes in 20000 seconds of simulation
* The operating conditions for TEDS were taken from Konor Frick’s base case study.
* Need to use ds\_initial\_TEDS\_MAGNET\_Integration\_2.txt file for initiation with Esdirk45a solver to run.
* Please note that the therminol-66 temperature gets heated above 350 oC (MAGNET\_TEDS\_HX\_exit\_Temp). This is due to the low flow rate in TEDS, as well as the simple model of the heat exchanger (using a constant UA). The heat exchanger model will need to be updated for more accurate representation of the system.