

Pressurized oxyfuel supercritical steam plant modeled entirely in Thermoflex.

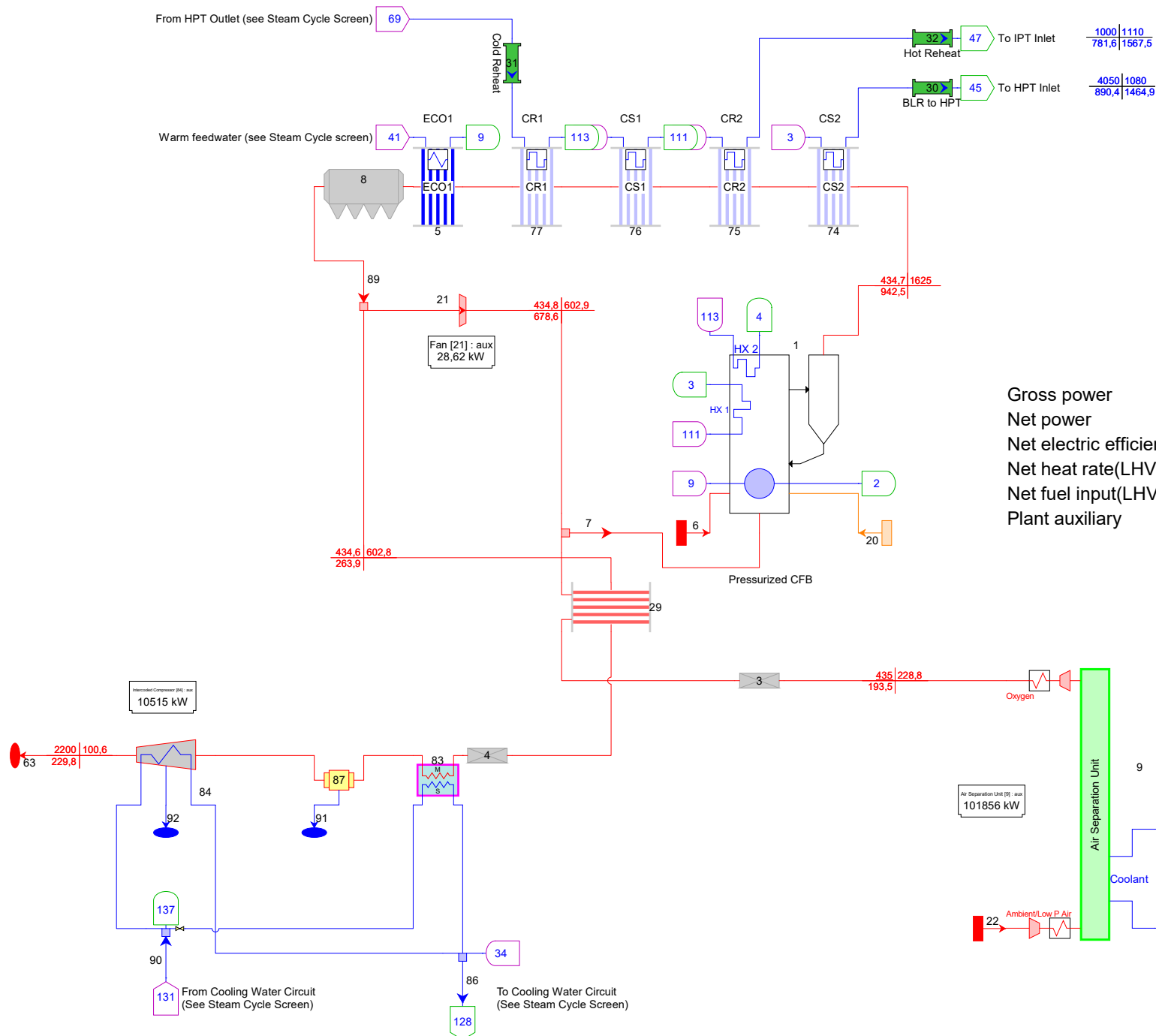
An ASU provides 99% pure oxygen at a pressure of 435 psi (30 bar), which is diluted by recirculating approximately 70% of the flue gas then supplied to the circulating fluidized bed. Flue gas treatment includes an ESP for particulate removal. Final flue gas is cooled to condense water then compressed to deliver 97% CO₂ at 2200 psi (152 bar).

A single reheat supercritical steam cycle with nine feedwater heaters is shown on the Steam Cycle screen. HP conditions 4050 psia/1080°F (279 bar/582°C), reheat 1000 psia/1110°F (69 bar/598°C); condenser pressure of 0.7 psia (48 mbar).

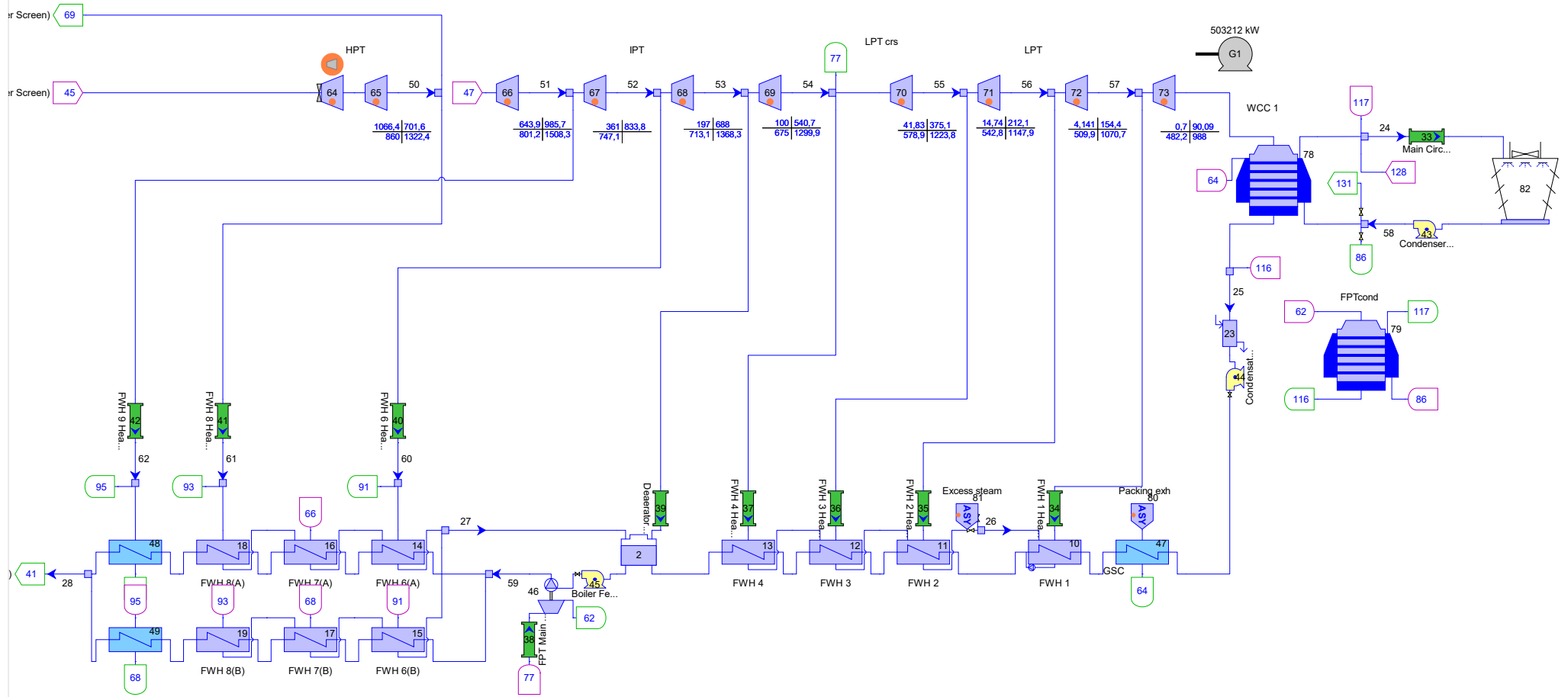
Plant output is 503 MWe gross, 372 MWe net, with a net LHV efficiency of 33.7%.

For comparison, a similar conventional power plant without CO₂ capture and a gross output of 500 MWe would have a net output of 475 MWe and net LHV efficiency of 41.4%. When equipped with post-combustion CO₂ capture using proven MEA technology, such a plant would have a net LHV efficiency of 30.5%. A similar plant utilizing oxyfuel combustion at atmospheric pressure with a gross output 500 MWe would have a net output of 338 MWe and a net LHV efficiency of 30.7%.

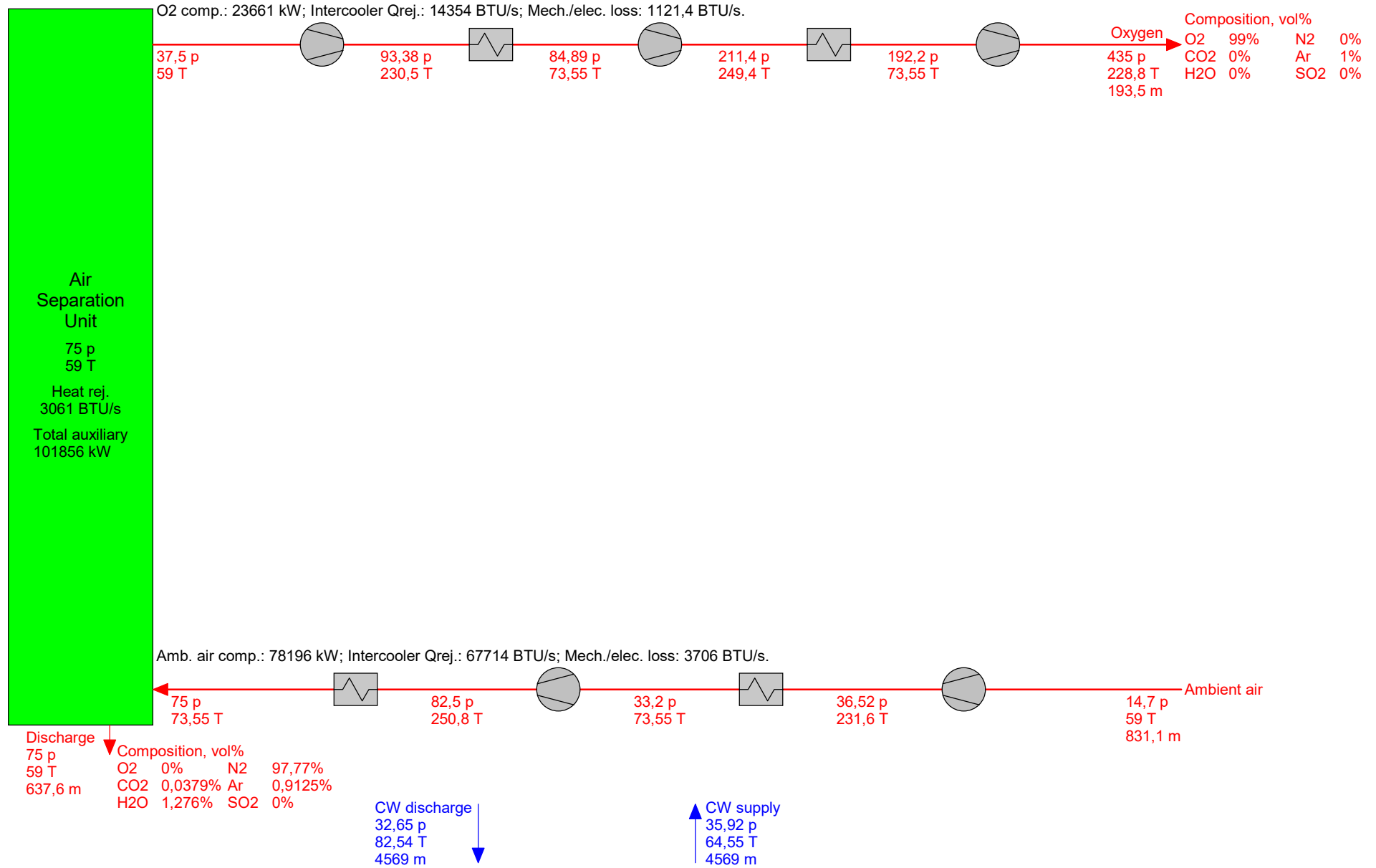
Note that the ESP and CFB are modeled after equipment built to function at atmospheric pressure. The effects of a pressurized cycle on equipment size and cost are not known at this time.



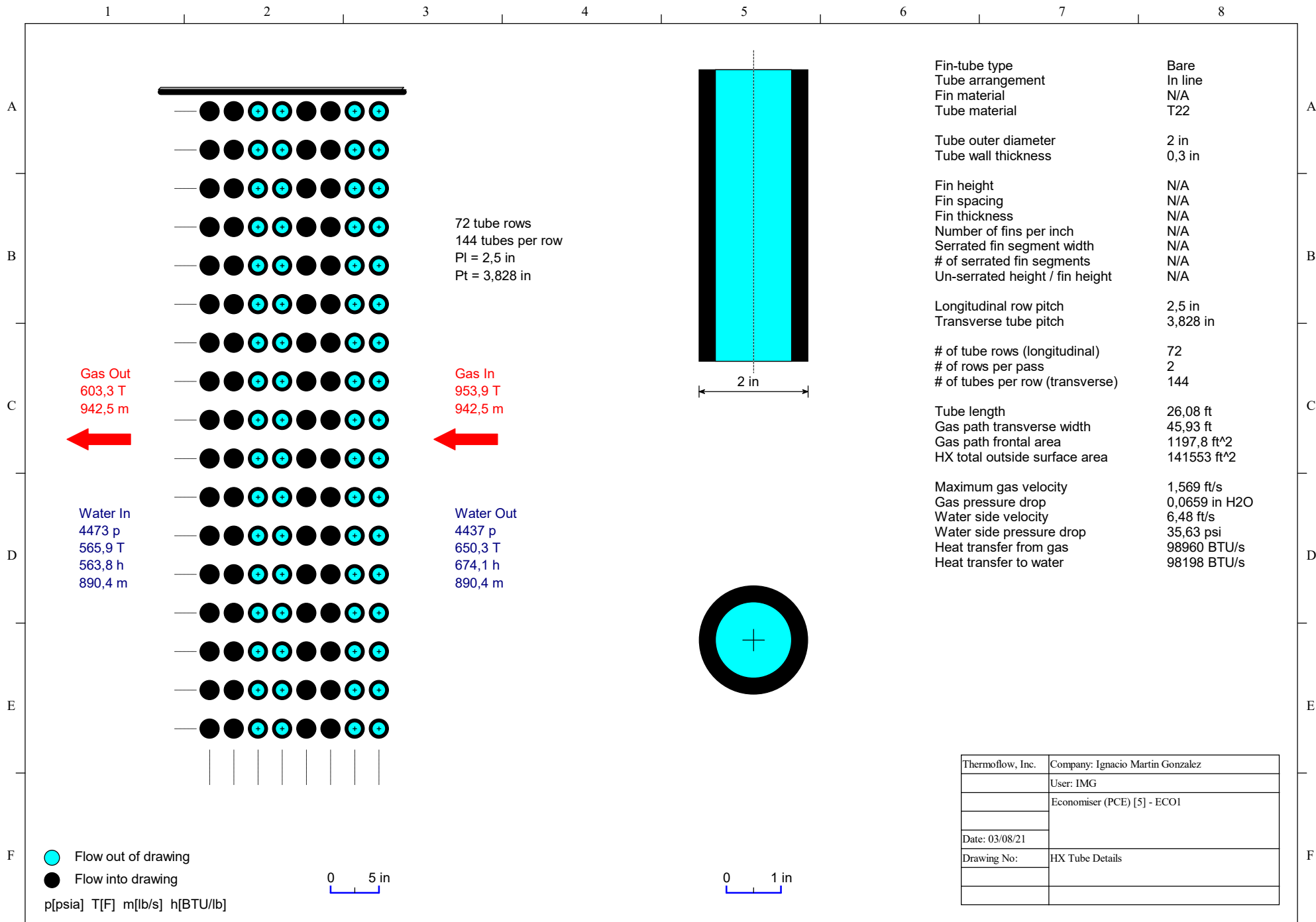
Gross power	503212 kW
Net power	372715 kW
Net electric efficiency(LHV)	33,66 %
Net heat rate(LHV)	10136 BTU/kWh
Net fuel input(LHV)	3777870 kBtu/hr
Plant auxiliary	130497 kW



Air Separation Unit (ASU) - One Unit



p[psia] T[F] h[BTU/lb] m[lb/s]



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Date: 03/08/21	
Drawing No:	HX Tube Details