Lipi

SELEXOL is a physical solvent.

   IT only works well at relatively high pressures.  
   and, it will need to be refrigerated to work well.

    I do modelling for SELEXOL plants, and I’m just going to give you some general information.

1)      I’m assuming you are operating at a pressure of 500 psig at least

2)      The CO2 amount in the gas to be treated is likely 30 vol%. So, the partial pressure is about 145 psia.

3)      For 200 Tonnes per day, that is 440K lbs or 10,000 lbmol/D or 7 lbmol/min.  
   If we assume a rich loading of 1:1, then you’d need 7lbmol/min of SELEXOL to be circulated.  
    at 280 molecular wt, this is 1960 lbs a minute or 228 usg/min.

4)      I’ll assume that you only need to get to about 3% CO2 in the sweetened gas.  
In that case you will need in the flow scheme.  
- a contactor with about 10 theorectical stages. This will contain about 80 ft of IMTP 40 SS packing.  
   My guess is, (and its only a guess), the tower will be about 4 ft diameter.  
- 1st flash tank:  you have to design it to run 50% full, residence time of say 5 minutes.  
       pressure in the flash tank will be about 250 psig.  
       the flash gas will be recycled back to the contactor to save much of the Co and H2 coabsorbed with teh CO2.

-        2nd flash tank:  will run close to atmospheric pressure, again 5 minutes residence time, run half full.  
Flash gas will likely have to go to incineration to ensure burning the remaining little bit of CO (nasty stuff

-        3rd flash tank: Vacuum flash, say about 9 psia. (so you need a vac pump, not big, but you need one)

-        Chiller: You will need a propane chiller in the loop to provide enough chilling to run the SELEXOL into the contactor  
at about 32 F. This won’t be large, but you still need this chiller.

-        Pumps: One small pump to suck off the vac flash and pump to say 50 psig to get through the chiller, then a high  
pressure pump to get SEELXOL to top of the contactor

-        A small “dehydrator” to remove excess water from the feedgas. (5% slipstream, tiny tower, heater at bottom to heat   
to 300 F, little condenser at top to cool to about 220 F so water escapes, but not SELEXOL)

5)      SELEXOL initial fill (you’ll use it at close to 100% (no water). I’d estimate you’ll need minimum 30 minutes of circulating material  
    so, 6840 gallons of solvent. ($150K)

I really can’t help too much with capital estimates. Its not my thing. However, if I was guessing, you’re likely looking at $3 million at least.

I’d suggest that you must have access to something to simulate this. Eg, PROMAX, ASPEN, HYSIS, etc. While those packages aren’t perfect,

     At least they would confirm some of my estimates.

I’m amazed that whatever you are gasifying has no sulphur present. Usually, H2S and COS are issues and more equipment is needed.  
   If you have to get down to < 3% CO2 in the finished gas, you have to go to using a thermal regenerator. (heating it up). This adds lots more expense and equipment.

**Jack McJannett**   
**Dow Oil & Gas**

I am a senior student in Chemical Engineering field at UIC, IL

We are working on a project for Senior Design Expo.

We are using Shell Coal gasifier as our role model to gasify petroleum coke in order to achieve pure synthesis gas.

Our goal is remove 200 t/d Carbon Dioxide from the syn gas using Selexol.

Part of our project is to find out all the equipment required to remove 200 t/d CO2 and the cost of the overall CO2 removal process.

I was wondering if you can help me with my project by giving me an estimate of the equipment required in order to remove CO2 from the syngas and their quantity. Also, I would like to know how much the overall process will cost us. (With or without Selexol)

We value your time and privacy.

We only need an estimate as a part of our project.

We appreciate your response and help.

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