```
clear
% U5.1
% A is acetone
% B is H2 gas
% C is water
p = 456e3;      % Pa
t = 20+273.15;  % K
yield = 0.9;    % of A removed from gas
S = 1.6;        % m2
vGin = 0.61;    % m/s
nCratio = 3;    % nC/nCmin
Xeq  = [0 0.0059 0.0083 0.0123 0.0277 0.0475 0.0737 0.1109];
Yeq  = [0 0.0143 0.0189 0.0241 0.0339 0.0399 0.0434 0.0468];
XeqL = linspace(0,max(Xeq),100);
YeqL = spline(Xeq,Yeq,XeqL);
```

The gas composition and amount

```
psat = 24.64e3; % kPa - saturated pressure acetone @20C
Yin = psat / (p-psat) % mol-A / mol-B
```

```
Yin = 0.0571
```

```
Yout = (1-yield)*Yin
```

```
Yout = 0.0057
```

```
Xin = 0;
VGin = S*vGin % m3/s
```

```
VGin = 0.9760
```

```
nGin = p*VGin/(8.314*t) % mol/s
```

```
nGin = 182.6059
```

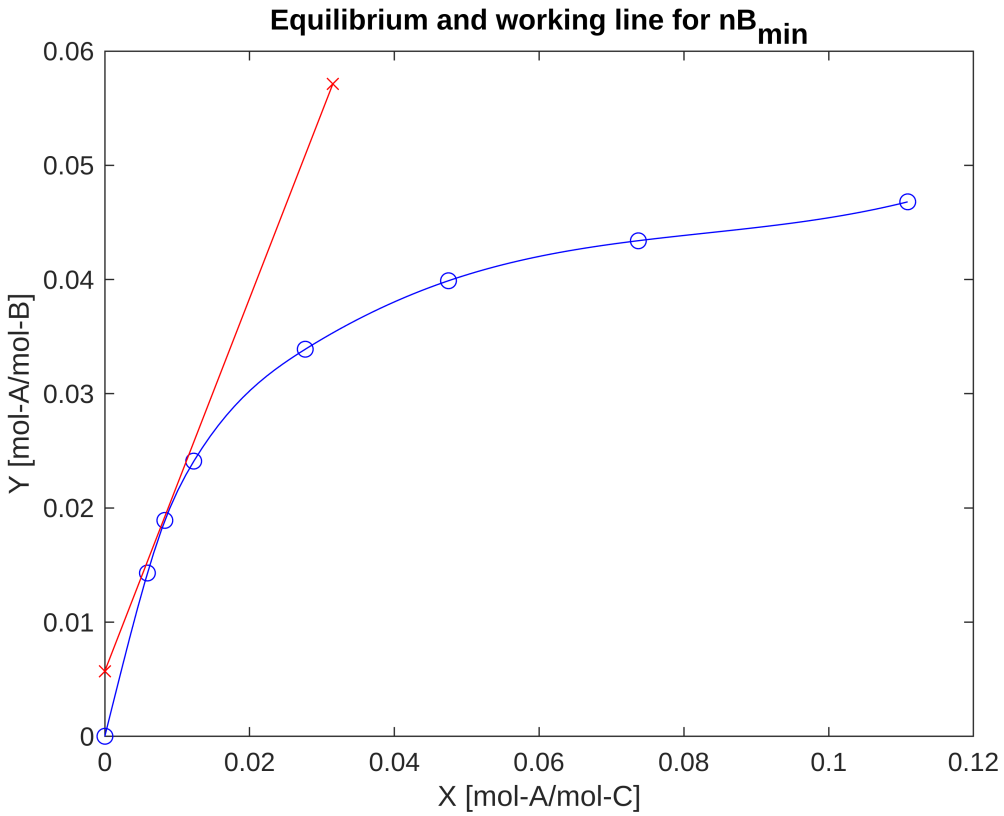
```
nB = nGin/(Yin+1) % mol/s
```

```
nB = 172.7387
```

Equilibrium and working lines for "nCmin"

```
EXout = 0.0315; % value set visually so working line touches equilibrium

plot(XeqL,YeqL,'b-', Xeq, Yeq, 'bo', ... % equilibrium line+data points
     [Xin EXout],[Yout Yin],'rx-')       % working line
xlabel('X [mol-A/mol-C]')
ylabel('Y [mol-A/mol-B]')
title('Equilibrium and working line for nB_{min}')
```




```
nCmin = nB*(Yin-Yout)/(EXout-Xin) % mol/s
```

```
nCmin = 281.9178
```

```
nC = nCratio*nCmin % mol/s
```

```
nC = 845.7535
```

```
Xout = Xin + nB*(Yin-Yout)/nC % mol-A/mol-C
```

```
Xout = 0.0105
```

Conversion to kg/h and kg/kg

```
MC = 18e-3; % kg/mol
rhoC = 1000; % kg/m3
mC = nC*MC/rhoC * 3600 % kg/h [expected 54.6 kg/h]
```

```
mC = 54.8048
```

```
xout = Xout/(1+Xout) % mol-A/mol
```

```
xout = 0.0104
```

```
MA = 58.08e-3;       % kg/mol
wout1 = xout*MA/(xout*MA+(1-xout)*MC) % kg-A/kg [expected 3.3%]
```

```
wout1 = 0.0328
```