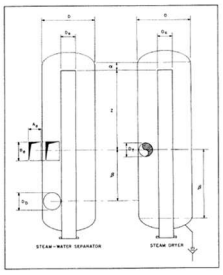
6 Calculation sheet

			Checked	
Separator Design	Friday, 25 July 2025			Notes
Lazalde-Crabtree				1. ( ) refer to Lazalde formula numbers
Separator #	ML02 SS3 LP Low h GNDC		30"	inlet size NPS in
Design steam flow (mass)	140	t/h	750.00	
	39	kg/s	39.00	steam kg/s
h	832	kJ/kg		
Design mass flow	1,526	t/h	9.20%	Steam Faction
Design mass flow	423.90	kg/s		
Operating pressure	4.90	bar.a	9%	Steam Faction
T	150.70	C		
Steam fraction Xi	9%			
total mas flow Wv	423.90	kg/s		
Brine	384.90	kg/s	1385.638	t/h
Nominal inlet Pipe Size Dt	768.4	mm	30.00	inlet size
Ae	603			
Be	788			
Dt Equivalent	768.4	mm		
Vessel ID	2,500	mm		
Z	5,400.00	mm		inlet to top of steam tube
α	0.30	m		Top of Steam tube to head weld
De (steam out)	0.76	m	30.00"	Steam tube
D	2.50	m	0	
Spiral throat Inlet area	0.46	m2		
vessel area	4.45	m2		
D/Dt	3.25			
β	2,500.00			
β/Dt	3.25			
Z/Dt	7.03			
fluid properties				
Vg	1.09	(m^3/t)		
Vf	382.41	(m^3/t)		
pw	915.73	kg/m^3		
pv	2.61	kg/m^3		
Dynamic Viscosity				
Ul	1.79E-04	kg/m.s		
	1.79E-03	poise		
Uv	1.40E-05	kg/m.s		
Nominal inlet Velocity	32.16	m/s		
Spiral throat Inlet steam velocit	32.16	m/s		
Velocity in vessel	3.35	m/s		
Qvs	14.91	m3/s		
QL	0.46	m3/s		
Ao	0.464	m2		
u	32.16		(9)	
VT		m/s		
Centrifugal Efficiency				
n1	0.76		(6)	
(294.3/T+273.2)^ 0.3	0.90		(7)	
n	0.73		(7)	
z	5.40	m		
Vos	24.04	m3	(15)	
tmi	1.61	s		
vo1	1.4726	m3		
vo2	1.2656	m3		
vo3	0.3295	m3		
Voh	2.41	m3		
tma	0.162	s		
tr	1.69	s		
Kc	1.62			
C	174.25			
Droplet Size				
Flow	**Annular**	Slug	Annular	dispersed
a	0.81	0.54	0.81	0.81
e	-0.22	0.03	-0.22	-0.22
B	104.87	37.01	104.87	36.15
A	66.29			
K	1,357.35			
a	0.807			
b	0.225			
c	0.55			
e	-0.22			
Vt	32.16			
sL	48.48	dynes/cm	surface tension	
pL	0.92	g/cm3		
ul	0.00179	poise		
QL	0.46	m3/s		
Qvs	14.91	m3/s		
dw	**272.75**	microns	(21)	
W	6.03		(8)	
C	174.25		(10)	
nm	**99.99997%**		(5)	
Van	3.35	m/s		
j	-6.91E-07			
nA	**99.99984%**			
Total Efficiency (% Brine Removed)	**99.9998%**			
Brine in steam	0.0021%			
Steam Quality	99.9979%			
Carry over	0.0029	t/h		
Pressure drop				
NH	16.3		(28)	
DP	22.01	kPa	(27)	
Pressure Drop	**0.22**	bar		



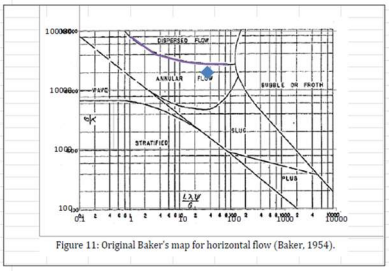
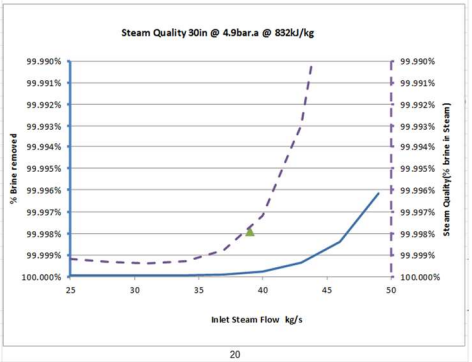


Figure 11: Original Baker's map for horizontal flow (Baker, 1954).



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