

Modern Coffee Choc Chip

Ingredient	Standardized Amount (g)	Recipe Quantity (g)	% of Total	Fat (g)	Nonfat Solids (g)	Total Solids (g)	Water (g)	Sugar (g)	Egg (ea)
heavy cream, 40%	342.03	444.64	34.20%	177.86	23.79	201.65	243.00		
whole milk, 3.2%	408.26	530.74	40.83%	17.14	46.65	63.79	466.94		
nonfat dry milk	32.00	41.60	3.20%	0.29	40.06	40.35	1.25		
granulated sugar	134.62	175.00	13.46%	0.00	175.00	175.00	0.00	175.00	
egg yolk	48.83	63.48	4.88%	20.95	11.55	32.50	30.98		4.26
stab-emuls for ice cream	0.66	0.86	0.07%	0.00	0.86	0.86	0.00		
salt	2.83	3.69	0.28%	0.00	3.69	3.69	0.00		
Hershey's syrup	30.77	40.00	3.08%	0.00	24.00	24.00	16.00	20.00	
inst. coffee or extract (equiv to 1 kg of 6 oz cups)	5.88 t	7.64 t							
mini chocolate chips (3 oz/1 kg)	90.00	117.00							
MF & MSNF, g				195.29	110.50				
MF & MSNF, %				15.02%	8.50%				
Non-dairy Fat & NF Solids, g				20.95	215.10				
Non-dairy Fat & NF Solids, %				1.61%	16.55%				
Total, g	1,000.00	1,300.00		216.24	325.60	541.83	758.17	195.00	
Total, %			100.00%	16.63%	25.05%	41.68%	58.32%	15.00%	

Standardized total quantity: 1,000.00 g

Scale to total recipe quantity: 1,300.00 g

salt, recipe amount:	0.65 tsp
stab-emuls, recipe amount:	0.51 tsp

Coffee extract and toasted almonds are not accounted for in the formula.

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Check Formulation

Component	Target %	Recipe %	Min (%)	Max (%)	Pass/Fail
Milk Fat	15.00	15.02%	10.00%	18.00%	Pass
Total Fat		16.63%	10.00%	20.00%	Pass
MSNF	8.50	8.50%			
Milk Fat + MSNF		23.52%	20.00%	41.00%	Pass
Total Sucrose	15.00	15.00%	10.00%	17.00%	Pass
Egg yolk solids*	2.50	4.88%	1.40%	9.00%	Pass
Total Solids		41.68%	25.00%	43.00%	Pass
Stabilizers & Emulsifiers	0.066	0.07%	0.00%	0.60%	Pass
Flavors			2.00%	10.00%	

% egg yolk solids = (g egg yolk) X (g egg yolk solids/g egg yolk) X 100%/(1000 g mix), and
g egg yolk = (% egg yolk solids) X (g egg yolk/g egg yolk solids) X (1000 g mix)/100%

Known Recipe Components	Target %
granulated sugar	13.46
Hershey's syrup	3.08
egg yolk	4.88
stabilizer + emulsifier	0.07
salt	0.28
Total	21.77

Unknowns (% of total)	Variable
nonfat dry milk	X
whole milk, 3.2%	Y
heavy cream, 40%	Z

	Coefficients of			
Equations	X	Y	Z	Result
Mass Balance	1.0000	1.0000	1.0000	78.2292
MSNF	0.9630	0.0879	0.0535	8.5000
Milkfat	0.0000	0.0323	0.4000	15.0000

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Matrix notation: $A \cdot M = B$

so $M = B \cdot A^{-1}$

A	M	B
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A^{-1}

-0.1043	1.1467	0.1073
1.2013	-1.2474	-2.8363
-0.0970	0.1007	2.7290

M

X =	3.20
Y =	40.83
Z =	34.20

Recipe Ingredient	Target (%)	Target (g)
heavy cream, 40%	34.20	342.03
whole milk, 3.2%	40.83	408.26
nonfat dry milk	3.20	32.00
granulated sugar	13.46	134.62
Hershey's syrup	3.08	30.77
egg yolk	4.88	48.83
stab-emuls for ice cream	0.07	0.66
salt	0.28	2.83

Mix Comp. - Saccharide	SE Factor	wt% of mix	SE
sodium chloride	5.90	0.28	1.67
ethanol	7.40	0.00	0.00
vanilla extract	2.50	0.00	0.00
MSNF	0.55	8.50	4.63
whey solids	0.77	0.00	0.00
hexose	1.90	1.54	2.92
sucrose	1.00	13.46	13.46
36 DE CSS	0.64	0.00	0.00
42 DE CSS	0.80	0.00	0.00
62 DE CSS	1.15	0.00	0.00
HFCS	1.80	0.00	0.00
sorbitol	1.90	0.00	0.00
maltitol	1.00	0.00	0.00
Total % of these comp. & Total SE		23.78	22.69

Be sure to zero out unused components.

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Other Mix Components	wt% of mix
Total from Sacch. Table	23.78
Milkfat	0.00
Other Fat	0.00
Other Solids	0.00
Total Solids	0.00
Water	58.32

Be sure to zero out unused components.

If the water % in the mix is stated, enter it directly in the table at left.

If the % water in the mix is *not* stated, calculate it from the total saccharides, above, and the components in the table at left.

Water = given amount OR [100 - (Total Solids)]

Sucrose Equivalent (SE) = 22.69 and SE% = 38.91 %

Apply curve fits from worksheet "Freezing Point Depression (2),"

FPDSE = -2.40 °C

For salts:

FPDSA = $-1 * [(MSNF + WS) \times 2.37] / W$

So FPDSA = -0.35 °C

FPDT = FPDSE + FPDSA

So FPDT = -2.74 °C, the initial freezing point temperature for this ice cream mix.

Calculate the freezing curve for this ice cream:

Water Frzn (% of orig)	W (% liq water)	g Sucrose/ 100 g water	FPDSE (°C)	FPDSA (°C)	FPDT (°C)
0	58.32	38.91	-2.40	-0.35	-2.74
10	52.49	43.23	-2.67	-0.38	-3.05
20	46.66	48.63	-3.03	-0.43	-3.46
30	40.82	55.58	-3.53	-0.49	-4.03
40	34.99	64.84	-4.22	-0.58	-4.80
50	29.16	77.81	-5.25	-0.69	-5.94
60	23.33	97.26	-6.90	-0.86	-7.76
70	17.50	129.68	-9.78	-1.15	-10.93
75	14.58	155.62	-11.87	-1.38	-13.25
80	11.66	194.53	-14.70	-1.73	-16.43
85	8.75	259.37	#NAME?	-2.30	#NAME?

Ice Cream Freezing Curve

