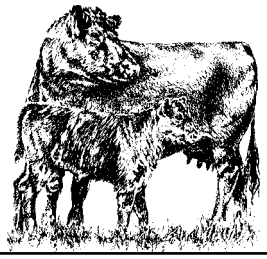

Western Beef Resource Committee

Fourth Edition

Cattle Producer's Handbook

Nutrition Section 300

Nutrient Requirements of Beef Cattle

Table 1. Nutrient requirements for growing and finishing cattle (nutrient concentration in diet dry matter, avoirdupois system).[a,b,c]

Weight (lb)	Daily Gain (lb)	Dry Matter Intake (lb)	Protein Intake (lb)	Protein (%)	ME (Mcal/lb)	NE_m (Mcal/lb)	NE_g (Mcal/lb)	TDN (%)	Ca (%)	P (%)
Medium-frame steer calves										
300	0.5	7.8	0.75	9.6	0.89	0.50	0.25	54.0	0.31	0.20
	1.0	8.4	0.95	11.4	0.96	0.57	0.31	58.5	0.45	0.24
	1.5	8.7	1.14	13.2	1.04	0.64	0.38	63.0	0.58	0.28
	2.0	8.9	1.32	14.8	1.11	0.70	0.44	67.5	0.72	0.32
	2.5	8.9	1.48	16.7	1.21	0.79	0.51	73.5	0.87	0.37
	3.0	8.0	1.60	19.9	1.39	0.95	0.64	85.0	1.13	0.47
400	0.5	9.7	0.87	8.9	0.89	0.50	0.25	54.0	0.27	0.18
	1.0	10.4	1.06	10.3	0.96	0.57	0.31	58.5	0.38	0.21
	1.5	10.8	1.24	11.5	1.04	0.64	0.38	63.0	0.47	0.25
	2.0	11.0	1.41	12.7	1.11	0.70	0.44	67.5	0.56	0.26
	2.5	11.0	1.56	14.2	1.21	0.79	0.51	73.5	0.68	0.30
	3.0	10.0	1.65	16.6	1.39	0.95	0.64	85.0	0.86	0.37
500	0.5	11.5	0.98	8.5	0.89	0.50	0.25	54.0	0.25	0.17
	1.0	12.3	1.16	9.5	0.96	0.57	0.31	58.5	0.32	0.20
	1.5	12.8	1.33	10.5	1.04	0.64	0.38	63.0	0.40	0.22
	2.0	13.1	1.49	11.4	1.11	0.70	0.44	67.5	0.47	0.24
	2.5	13.0	1.63	12.5	1.21	0.79	0.51	73.5	0.56	0.27
	3.0	11.8	1.69	14.4	1.39	0.95	0.64	85.0	0.69	0.32
600	0.5	13.2	1.08	8.2	0.89	0.50	0.25	54.0	0.23	0.18
	1.0	14.1	1.26	9.0	0.96	0.57	0.31	58.5	0.28	0.19
	1.5	14.7	1.42	9.8	1.04	0.64	0.38	63.0	0.35	0.21
	2.0	15.0	1.57	10.5	1.11	0.70	0.44	67.5	0.40	0.22
	2.5	14.9	1.69	11.4	1.21	0.79	0.51	73.5	0.46	0.24
	3.0	13.5	1.73	12.9	1.39	0.95	0.64	85.0	0.57	0.29
700	0.5	14.8	1.18	7.9	0.89	0.50	0.25	54.0	0.22	0.18
	1.0	15.8	1.35	8.6	0.96	0.57	0.31	58.5	0.27	0.18
	1.5	16.5	1.50	9.2	1.04	0.64	0.38	63.0	0.31	0.20
	2.0	16.8	1.65	9.8	1.11	0.70	0.44	67.5	0.34	0.21
	2.5	16.7	1.75	10.5	1.21	0.79	0.51	73.5	0.40	0.22
	3.0	15.2	1.77	11.7	1.39	0.95	0.64	85.0	0.49	0.26

[a] Shrunk liveweight basis, see text.

[b] Vitamin A requirements are 1,000 IU per pound of diet.

[c] This table gives reasonable examples of nutrient concentrations that should be suitable to formulate diets for specific management goals. It does not imply that diets with other nutrient concentrations when consumed in sufficient amounts would be inadequate to meet nutrient requirements.

Table 1. (cont'd)

Weight (lb)	Daily Gain (lb)	Dry Matter Intake (lb)	Protein Intake (lb)	Protein (%)	ME (Mcal/lb)	NE_m (Mcal/lb)	NE_g (Mcal/lb)	TDN (%)	Ca (%)	P (%)
800	0.5	16.4	1.27	7.7	0.89	0.50	0.25	54.0	0.22	0.17
	1.0	17.5	1.44	8.3	0.96	0.57	0.31	58.5	0.24	0.19
	1.5	18.2	1.58	8.8	1.04	0.64	0.38	63.0	0.28	0.19
	2.0	18.6	1.72	9.2	1.11	0.70	0.44	67.5	0.31	0.20
	2.5	18.5	1.81	9.8	1.21	0.79	0.51	73.5	0.35	0.21
	3.0	16.8	1.81	10.8	1.39	0.95	0.64	85.0	0.42	0.25
900	0.5	17.9	1.36	7.6	0.89	0.50	0.25	54.0	0.21	0.18
	1.0	19.1	1.52	8.0	0.96	0.57	0.31	58.5	0.23	0.18
	1.5	19.9	1.66	8.4	1.04	0.64	0.38	63.0	0.25	0.19
	2.0	20.3	1.79	8.8	1.11	0.70	0.44	67.5	0.28	0.20
	2.5	20.2	1.87	9.3	1.21	0.79	0.51	73.5	0.31	0.20
	3.0	18.3	1.85	10.1	1.39	0.95	0.64	85.0	0.37	0.23
1,000	0.5	19.3	1.45	7.5	0.89	0.50	0.25	54.0	0.21	0.18
	1.0	20.7	1.60	7.8	0.96	0.57	0.31	58.5	0.21	0.18
	1.5	21.5	1.74	8.1	1.04	0.64	0.38	63.0	0.24	0.18
	2.0	22.0	1.85	8.4	1.11	0.70	0.44	67.5	0.25	0.19
	2.5	21.9	1.92	8.8	1.21	0.79	0.51	73.5	0.27	0.19
	3.0	19.8	1.88	9.5	1.39	0.95	0.64	85.0	0.32	0.22
Large-frame steer calves and compensating medium-frame yearling steers										
300	0.5	8.2	0.77	9.5	0.86	0.48	0.23	52.5	0.30	0.19
	1.0	8.7	0.99	11.3	0.92	0.54	0.28	56.0	0.46	0.23
	1.5	9.1	1.19	12.9	0.98	0.59	0.33	59.5	0.58	0.27
	2.0	9.4	1.37	14.6	1.04	0.64	0.38	63.5	0.70	0.30
	2.5	9.6	1.55	16.3	1.11	0.70	0.44	67.5	0.85	0.34
	3.0	9.6	1.73	18.0	1.18	0.77	0.49	72.0	0.99	0.39
	3.5	9.3	1.88	20.3	1.29	0.86	0.57	78.5	1.16	0.45
400	0.5	10.1	0.89	8.9	0.86	0.48	0.23	52.5	0.26	0.17
	1.0	10.8	1.10	10.2	0.92	0.54	0.28	56.0	0.37	0.20
	1.5	11.3	1.30	11.4	0.98	0.59	0.33	59.5	0.47	0.23
	2.0	11.7	1.47	12.7	1.04	0.64	0.38	63.5	0.57	0.26
	2.5	11.9	1.64	13.9	1.11	0.70	0.44	67.5	0.65	0.30
	3.0	11.9	1.81	15.2	1.18	0.77	0.49	72.0	0.76	0.33
	3.5	11.5	1.94	16.9	1.29	0.86	0.57	78.5	0.90	0.36
500	0.5	12.0	1.00	8.5	0.86	0.48	0.23	52.5	0.24	0.17
	1.0	12.8	1.21	9.5	0.92	0.54	0.28	56.0	0.33	0.19
	1.5	13.4	1.40	10.4	0.98	0.59	0.33	59.5	0.39	0.21
	2.0	13.8	1.57	11.4	1.04	0.64	0.38	63.5	0.46	0.24
	2.5	14.0	1.73	12.4	1.11	0.70	0.44	67.5	0.55	0.25
	3.0	14.0	1.88	13.4	1.18	0.77	0.49	72.0	0.63	0.28
	3.5	13.6	2.00	14.7	1.29	0.86	0.57	78.5	0.73	0.32
600	0.5	13.8	1.11	8.2	0.86	0.48	0.23	52.5	0.22	0.18
	1.0	14.6	1.31	9.0	0.92	0.54	0.28	56.0	0.29	0.18
	1.5	15.3	1.50	9.7	0.98	0.59	0.33	59.5	0.35	0.20
	2.0	15.8	1.66	10.5	1.04	0.64	0.38	63.5	0.40	0.22
	2.5	16.1	1.81	11.3	1.11	0.70	0.44	67.5	0.47	0.23
	3.0	16.1	1.95	12.1	1.18	0.77	0.49	72.0	0.52	0.26
	3.5	15.6	2.05	13.2	1.29	0.89	0.57	78.5	0.61	0.28
700	0.5	15.4	1.21	7.9	0.86	0.48	0.23	52.5	0.21	0.17
	1.0	16.4	1.41	8.6	0.92	0.54	0.28	56.0	0.27	0.19
	1.5	17.2	1.59	9.2	0.98	0.59	0.33	59.5	0.31	0.19
	2.0	17.8	1.74	9.8	1.04	0.64	0.38	63.5	0.36	0.21
	2.5	18.0	1.88	10.5	1.11	0.70	0.44	67.5	0.40	0.22
	3.0	18.0	2.01	11.1	1.18	0.77	0.49	72.0	0.45	0.23
	3.5	17.5	2.10	12.0	1.29	0.86	0.57	78.5	0.52	0.26

Table 1. (cont'd)

Weight (lb)	Daily Gain (lb)	Dry Matter Intake (lb)	Protein Intake (lb)	Protein (%)	ME (Mcal/lb)	NE_m (Mcal/lb)	NE_g (Mcal/lb)	TDN (%)	Ca (%)	P (%)
800	0.5	17.1	1.31	7.7	0.86	0.48	0.23	52.5	0.21	0.18
	1.0	18.2	1.51	8.3	0.92	0.54	0.28	56.0	0.24	0.18
	1.5	19.0	1.68	8.8	0.98	0.59	0.33	59.5	0.28	0.19
	2.0	19.6	1.82	9.3	1.04	0.64	0.38	63.5	0.32	0.20
	2.5	19.9	1.96	9.8	1.11	0.70	0.44	67.5	0.35	0.21
	3.0	19.9	2.07	10.4	1.18	0.77	0.49	72.0	0.40	0.22
	3.5	19.3	2.15	11.1	1.29	0.86	0.57	78.5	0.45	0.24
900	0.5	18.6	1.40	7.6	0.86	0.48	0.23	52.5	0.20	0.18
	1.0	19.8	1.60	8.0	0.92	0.54	0.28	56.0	0.23	0.18
	1.5	20.8	1.77	8.5	0.98	0.59	0.33	59.5	0.27	0.18
	2.0	21.4	1.90	8.9	1.04	0.64	0.38	63.5	0.29	0.20
	2.5	21.8	2.03	9.3	1.11	0.70	0.44	67.5	0.31	0.20
	3.0	21.7	2.13	9.8	1.18	0.77	0.49	72.0	0.36	0.21
	3.5	21.1	2.19	10.4	1.29	0.86	0.57	78.5	0.40	0.23
1,000	0.5	20.2	1.49	7.5	0.86	0.48	0.23	52.5	0.20	0.17
	1.0	21.5	1.69	7.8	0.92	0.54	0.28	56.0	0.23	0.17
	1.5	22.5	1.85	8.2	0.98	0.59	0.33	59.5	0.25	0.18
	2.0	23.2	1.98	8.6	1.04	0.64	0.38	63.5	0.27	0.18
	2.5	23.6	2.09	8.9	1.11	0.70	0.44	67.5	0.29	0.19
	3.0	23.6	2.19	9.3	1.18	0.77	0.49	72.0	0.32	0.20
	3.5	22.8	2.24	9.8	1.29	0.86	0.57	78.5	0.35	0.21
1,100	0.5	21.7	1.58	7.4	0.86	0.48	0.23	52.5	0.19	0.18
	1.0	23.1	1.77	7.7	0.92	0.54	0.28	56.0	0.21	0.18
	1.5	24.1	1.93	8.0	0.98	0.59	0.33	59.5	0.23	0.18
	2.0	24.9	2.05	8.3	1.04	0.64	0.38	63.5	0.25	0.18
	2.5	25.3	2.16	8.5	1.11	0.70	0.44	67.5	0.26	0.18
	3.0	25.3	2.25	8.9	1.18	0.77	0.49	72.0	0.29	0.19
	3.5	24.5	2.28	9.3	1.29	0.86	0.57	78.5	0.32	0.21
Medium-frame bulls										
300	0.5	7.8	0.76	9.7	0.88	0.49	0.24	53.5	0.31	0.20
	1.0	8.3	0.96	11.6	0.94	0.56	0.30	57.5	0.48	0.24
	1.5	8.6	1.15	13.4	1.01	0.63	0.35	61.5	0.62	0.28
	2.0	8.8	1.34	15.2	1.08	0.68	0.41	65.5	0.75	0.33
	2.5	8.9	1.52	17.0	1.15	0.74	0.47	70.0	0.92	0.37
	3.0	8.7	1.68	19.3	1.26	0.84	0.54	76.5	1.09	0.43
400	0.5	9.6	0.87	9.0	0.88	0.49	0.24	53.5	0.28	0.18
	1.0	10.3	1.07	10.4	0.94	0.56	0.30	57.5	0.39	0.21
	1.5	10.7	1.26	11.8	1.01	0.62	0.35	61.5	0.49	0.25
	2.0	11.0	1.44	13.1	1.08	0.68	0.41	65.5	0.60	0.28
	2.5	11.1	1.60	14.1	1.15	0.74	0.47	70.0	0.70	0.32
	3.0	10.8	1.74	16.1	1.26	0.84	0.54	76.5	0.84	0.37
500	0.5	11.4	0.98	8.6	0.88	0.49	0.24	53.5	0.25	0.17
	1.0	12.1	1.17	9.7	0.94	0.56	0.30	57.5	0.35	0.20
	1.5	12.7	1.35	10.7	1.01	0.62	0.35	61.5	0.42	0.23
	2.0	13.0	1.52	11.7	1.08	0.68	0.41	65.5	0.49	0.25
	2.5	13.1	1.68	12.8	1.15	0.74	0.47	70.0	0.59	0.27
	3.0	12.8	1.81	14.1	1.26	0.84	0.54	76.5	0.69	0.31
600	0.5	13.1	1.08	8.3	0.88	0.49	0.24	53.5	0.24	0.19
	1.0	13.9	1.27	9.2	0.94	0.56	0.30	57.5	0.30	0.19
	1.5	14.5	1.44	10.0	1.01	0.62	0.35	61.5	0.36	0.21
	2.0	14.9	1.61	10.8	1.08	0.68	0.41	65.5	0.43	0.24
	2.5	15.0	1.75	11.6	1.15	0.74	0.47	70.0	0.50	0.25
	3.0	14.7	1.86	12.7	1.26	0.84	0.54	76.5	0.57	0.29

Table 1. (cont'd)

Weight (lb)	Daily Gain (lb)	Dry Matter Intake (lb)	Protein Intake (lb)	Protein (%)	ME (Mcal/lb)	NE_m (Mcal/lb)	NE_g (Mcal/lb)	TDN (%)	Ca (%)	P (%)
700	0.5	14.7	1.18	8.0	0.88	0.49	0.24	53.5	0.23	0.18
	1.0	15.6	1.37	8.8	0.94	0.56	0.30	57.5	0.28	0.20
	1.5	16.3	1.53	9.4	1.01	0.62	0.35	61.5	0.32	0.20
	2.0	16.7	1.69	10.1	1.08	0.68	0.41	65.5	0.38	0.22
	2.5	16.8	1.82	10.8	1.15	0.74	0.47	70.0	0.43	0.24
	3.0	16.5	1.92	11.7	1.26	0.84	0.54	76.5	0.49	0.25
800	0.5	16.2	1.27	7.8	0.88	0.49	0.24	53.5	0.22	0.19
	1.0	17.3	1.45	8.4	0.94	0.56	0.30	57.5	0.25	0.19
	1.5	18.0	1.61	9.0	1.01	0.62	0.35	61.5	0.29	0.20
	2.0	18.5	1.76	9.5	1.08	0.68	0.41	65.5	0.33	0.21
	2.5	18.6	1.89	10.1	1.15	0.74	0.47	70.0	0.38	0.23
	3.0	18.2	1.97	10.8	1.26	0.84	0.54	76.5	0.44	0.24
900	0.5	17.7	1.36	7.7	0.88	0.49	0.24	53.5	0.21	0.19
	1.0	18.9	1.54	8.2	0.94	0.56	0.30	57.5	0.25	0.19
	1.5	19.7	1.69	8.6	1.01	0.62	0.35	61.5	0.28	0.19
	2.0	20.2	1.83	9.1	1.08	0.68	0.41	65.5	0.31	0.21
	2.5	20.3	1.95	9.6	1.15	0.74	0.47	70.0	0.34	0.22
	3.0	19.9	2.02	10.2	1.26	0.84	0.54	76.5	0.39	0.23
1,000	0.5	19.2	1.45	7.5	0.88	0.49	0.24	53.5	0.21	0.18
	1.0	20.4	1.62	8.0	0.94	0.56	0.30	57.5	0.24	0.18
	1.5	21.3	1.77	8.4	1.01	0.62	0.35	61.5	0.26	0.19
	2.0	21.8	1.90	8.7	1.08	0.68	0.41	65.5	0.28	0.19
	2.5	22.0	2.01	9.1	1.15	0.74	0.47	70.0	0.31	0.20
	3.0	21.5	2.07	9.6	1.26	0.84	0.54	76.5	0.35	0.22
1,100	0.5	20.6	1.54	7.4	0.88	0.49	0.24	53.5	0.20	0.19
	1.0	21.9	1.70	7.8	0.94	0.56	0.30	57.5	0.22	0.19
	1.5	22.9	1.85	8.1	1.01	0.62	0.35	61.5	0.24	0.19
	2.0	23.4	1.97	8.4	1.08	0.68	0.41	65.5	0.26	0.19
	2.5	23.6	2.07	8.7	1.15	0.74	0.47	70.0	0.28	0.20
	3.0	23.1	2.11	9.2	1.26	0.84	0.54	76.5	0.32	0.21
Large-frame bull calves and compensating large-frame yearling steers										
300	0.5	7.9	0.77	9.7	0.86	0.48	0.23	52.5	0.31	0.20
	1.0	8.4	0.98	11.7	0.92	0.54	0.28	56.0	0.47	0.24
	1.5	8.8	1.18	13.5	0.98	0.59	0.33	59.5	0.63	0.28
	2.0	9.0	1.38	15.1	1.03	0.63	0.37	62.5	0.76	0.32
	2.5	9.2	1.56	17.0	1.09	0.69	0.42	66.5	0.91	0.36
	3.0	9.2	1.74	18.8	1.16	0.75	0.47	70.5	1.08	0.43
	3.5	9.1	1.91	20.9	1.24	0.82	0.53	75.5	1.24	0.48
	4.0	8.2	2.04	24.7	1.41	0.96	0.66	86.0	1.53	0.59
400	0.5	9.8	0.89	9.0	0.86	0.48	0.23	52.5	0.27	0.18
	1.0	10.4	1.09	10.5	0.92	0.54	0.28	56.0	0.40	0.21
	1.5	10.9	1.29	11.9	0.98	0.59	0.33	59.5	0.51	0.24
	2.0	11.2	1.48	13.1	1.03	0.63	0.37	62.5	0.61	0.28
	2.5	11.4	1.65	14.5	1.09	0.69	0.42	66.5	0.72	0.31
	3.0	11.5	1.82	15.9	1.16	0.75	0.47	70.5	0.82	0.35
	3.5	11.3	1.98	17.5	1.24	0.82	0.53	75.5	0.96	0.39
	4.0	10.2	2.08	20.3	1.41	0.96	0.66	86.0	1.19	0.48
500	0.5	11.6	1.00	8.6	0.86	0.48	0.23	52.5	0.25	0.19
	1.0	12.3	1.20	9.8	0.92	0.54	0.28	56.0	0.36	0.21
	1.5	12.9	1.39	10.9	0.98	0.59	0.33	59.5	0.43	0.22
	2.0	13.2	1.58	11.8	1.03	0.63	0.37	62.5	0.52	0.25

Table 1. (cont'd)

Weight (lb)	Daily Gain (lb)	Dry Matter Intake (lb)	Protein Intake (lb)	Protein (%)	ME (Mcal/lb)	NE_m (Mcal/lb)	NE_g (Mcal/lb)	TDN (%)	Ca (%)	P (%)
500	2.5	13.5	1.74	12.9	1.09	0.69	0.42	66.5	0.59	0.28
	3.0	13.6	1.90	14.0	1.16	0.75	0.47	70.5	0.68	0.31
	3.5	13.4	2.05	15.3	1.24	0.82	0.53	75.5	0.77	0.35
	4.0	12.0	2.13	17.5	1.41	0.96	0.66	86.0	0.97	0.40
600	0.5	13.3	1.10	8.3	0.86	0.48	0.23	52.5	0.23	0.18
	1.0	14.1	1.30	9.2	0.92	0.54	0.28	56.0	0.31	0.20
	1.5	14.8	1.48	10.1	0.98	0.59	0.33	59.5	0.37	0.21
	2.0	15.2	1.67	10.9	1.03	0.63	0.37	62.5	0.44	0.23
	2.5	15.5	1.82	11.8	1.09	0.69	0.42	66.5	0.51	0.26
	3.0	15.5	1.97	12.7	1.16	0.75	0.47	70.5	0.58	0.27
	3.5	15.3	2.11	13.7	1.24	0.82	0.53	75.5	0.66	0.30
	4.0	13.8	2.16	15.6	1.41	0.96	0.66	86.0	0.81	0.37
700	0.5	14.9	1.20	8.0	0.86	0.48	0.23	52.5	0.22	0.18
	1.0	15.9	1.40	8.8	0.92	0.54	0.28	56.0	0.29	0.19
	1.5	16.6	1.57	9.6	0.98	0.59	0.33	59.5	0.35	0.21
	2.0	17.0	1.75	10.2	1.03	0.63	0.37	62.5	0.39	0.22
	2.5	17.4	1.90	11.0	1.09	0.69	0.42	66.5	0.44	0.24
	3.0	17.5	2.04	11.7	1.16	0.75	0.47	70.5	0.50	0.25
	3.5	17.2	2.16	12.5	1.24	0.82	0.53	75.5	0.56	0.28
	4.0	15.5	2.20	14.1	1.41	0.96	0.66	86.0	0.70	0.33
800	0.5	16.5	1.30	7.9	0.86	0.48	0.23	52.5	0.21	0.19
	1.0	17.5	1.49	8.5	0.92	0.54	0.28	56.0	0.26	0.19
	1.5	18.3	1.66	9.1	0.98	0.59	0.33	59.5	0.31	0.20
	2.0	18.8	1.84	9.7	1.03	0.63	0.37	62.5	0.35	0.21
	2.5	19.2	1.97	10.3	1.09	0.69	0.42	66.5	0.40	0.23
	3.0	19.3	2.11	10.9	1.16	0.75	0.47	70.5	0.45	0.24
	3.5	19.0	2.22	11.6	1.24	0.82	0.53	75.5	0.50	0.26
	4.0	17.1	2.24	13.0	1.41	0.96	0.66	86.0	0.61	0.31
900	0.5	18.0	1.39	7.7	0.86	0.48	0.23	52.5	0.22	0.18
	1.0	19.2	1.58	8.3	0.92	0.54	0.28	56.0	0.25	0.18
	1.5	20.0	1.74	8.8	0.98	0.59	0.33	59.5	0.29	0.20
	2.0	20.6	1.92	9.2	1.03	0.63	0.37	62.5	0.32	0.20
	2.5	21.0	2.04	9.8	1.09	0.69	0.42	66.5	0.36	0.21
	3.0	21.1	2.17	10.3	1.16	0.75	0.47	70.5	0.40	0.23
	3.5	20.8	2.27	10.9	1.24	0.82	0.53	75.5	0.45	0.24
	4.0	18.7	2.27	12.1	1.41	0.96	0.66	86.0	0.53	0.28
1,000	0.5	19.5	1.48	7.6	0.86	0.48	0.23	52.5	0.21	0.18
	1.0	20.7	1.66	8.1	0.92	0.54	0.28	56.0	0.25	0.19
	1.5	21.7	1.83	8.5	0.98	0.59	0.33	59.5	0.27	0.19
	2.0	22.3	1.99	8.9	1.03	0.63	0.37	62.5	0.30	0.20
	2.5	22.7	2.11	9.3	1.09	0.69	0.42	66.5	0.33	0.20
	3.0	22.8	2.23	9.7	1.16	0.75	0.47	70.5	0.36	0.21
	3.5	22.5	2.32	10.3	1.24	0.82	0.53	75.5	0.40	0.24
	4.0	20.2	2.30	11.3	1.41	0.96	0.66	86.0	0.48	0.27
1,100	0.5	20.9	1.57	7.5	0.86	0.48	0.23	52.5	0.21	0.19
	1.0	22.3	1.75	7.9	0.92	0.54	0.28	56.0	0.23	0.19
	1.5	23.3	1.91	8.3	0.98	0.59	0.33	59.5	0.26	0.19
	2.0	23.9	2.07	8.6	1.03	0.63	0.37	62.5	0.28	0.19
	2.5	24.2	2.18	9.0	1.09	0.69	0.42	66.5	0.30	0.20
	3.0	24.5	2.29	9.3	1.16	0.75	0.47	70.5	0.32	0.21
	3.5	24.1	2.37	9.8	1.24	0.82	0.53	75.5	0.36	0.22
	4.0	21.7	2.33	10.7	1.41	0.96	0.66	86.0	0.43	0.25

Table 1. (cont'd)

Weight (lb)	Daily Gain (lb)	Dry Matter Intake (lb)	Protein Intake (lb)	Protein (%)	ME (Mcal/lb)	NE_m (Mcal/lb)	NE_g (Mcal/lb)	TDN (%)	Ca (%)	P (%)
Medium-frame heifer calves										
300	0.5	7.5	0.73	9.6	0.92	0.54	0.28	56.0	0.29	0.21
	1.0	8.0	0.91	11.4	1.02	0.63	0.36	62.0	0.44	0.22
	1.5	8.2	1.08	13.1	1.13	0.72	0.44	68.5	0.59	0.27
	2.0	8.0	1.22	15.1	1.26	0.84	0.55	77.0	0.74	0.33
400	0.5	9.3	0.84	8.9	0.92	0.54	0.28	56.0	0.26	0.19
	1.0	9.9	1.01	10.2	1.02	0.63	0.36	62.0	0.36	0.20
	1.5	10.2	1.17	11.4	1.13	0.72	0.44	68.5	0.45	0.24
	2.0	10.0	1.29	12.9	1.26	0.84	0.55	77.0	0.57	0.29
500	0.5	11.0	0.94	8.5	0.92	0.54	0.28	56.0	0.24	0.18
	1.0	11.8	1.11	9.4	1.02	0.63	0.36	62.0	0.30	0.21
	1.5	12.1	1.25	10.3	1.13	0.72	0.44	68.5	0.38	0.22
	2.0	11.8	1.35	11.4	1.26	0.84	0.55	77.0	0.45	0.24
600	0.5	12.6	1.04	8.1	0.92	0.54	0.28	56.0	0.23	0.18
	1.0	13.5	1.19	8.8	1.02	0.63	0.36	62.0	0.28	0.20
	1.5	13.8	1.32	9.5	1.13	0.72	0.44	68.5	0.32	0.21
	2.0	13.5	1.41	10.4	1.26	0.84	0.55	77.0	0.38	0.23
700	0.5	14.1	1.13	7.9	0.92	0.54	0.28	56.0	0.22	0.19
	1.0	15.1	1.28	8.4	1.02	0.63	0.36	62.0	0.25	0.19
	1.5	15.5	1.39	9.0	1.13	0.72	0.44	68.5	0.28	0.20
	2.0	15.2	1.46	9.6	1.26	0.84	0.55	77.0	0.32	0.22
800	0.5	15.6	1.22	7.7	0.92	0.54	0.28	56.0	0.21	0.18
	1.0	16.7	1.36	8.1	1.02	0.63	0.36	62.0	0.22	0.18
	1.5	17.2	1.46	8.5	1.13	0.72	0.44	68.5	0.24	0.19
	2.0	16.8	1.51	9.0	1.26	0.84	0.55	77.0	0.28	0.20
900	0.5	17.1	1.31	7.5	0.92	0.54	0.28	56.0	0.21	0.18
	1.0	18.3	1.44	7.8	1.02	0.63	0.36	62.0	0.22	0.18
	1.5	18.8	1.53	8.1	1.13	0.72	0.44	68.5	0.22	0.19
	2.0	18.3	1.56	8.5	1.26	0.84	0.55	77.0	0.25	0.19
1,000	0.5	18.5	1.39	7.4	0.92	0.54	0.28	56.0	0.20	0.19
	1.0	19.8	1.51	7.6	1.02	0.63	0.36	62.0	0.20	0.18
	1.5	20.3	1.59	7.8	1.13	0.72	0.44	68.5	0.21	0.18
	2.0	19.8	1.61	8.1	1.26	0.84	0.55	77.0	0.22	0.19
Large-frame heifer calves and compensating medium-frame yearling heifers										
300	0.5	7.8	0.76	9.5	0.89	0.50	0.25	54.0	0.31	0.20
	1.0	8.4	0.95	11.3	0.98	0.58	0.32	59.0	0.45	0.24
	1.5	8.8	1.13	13.0	1.05	0.65	0.39	64.0	0.58	0.25
	2.0	8.9	1.30	14.6	1.14	0.74	0.46	69.5	0.69	0.30
	2.5	8.7	1.45	16.7	1.26	0.84	0.55	77.0	0.86	0.35
400	0.5	9.7	0.87	8.9	0.89	0.50	0.25	54.0	0.27	0.18
	1.0	10.5	1.06	10.1	0.98	0.58	0.32	59.0	0.36	0.21
	1.5	10.9	1.23	11.3	1.05	0.65	0.39	64.0	0.45	0.22
	2.0	11.1	1.38	12.6	1.14	0.74	0.46	69.5	0.54	0.26
	2.5	10.8	1.51	14.1	1.26	0.84	0.55	77.0	0.65	0.31
500	0.5	11.5	0.98	8.4	0.89	0.50	0.25	54.0	0.23	0.17
	1.0	12.4	1.16	9.4	0.98	0.58	0.32	59.0	0.30	0.20
	1.5	12.9	1.32	10.3	1.05	0.65	0.39	64.0	0.38	0.20
	2.0	13.1	1.46	11.2	1.14	0.74	0.46	69.5	0.44	0.24
	2.5	12.8	1.57	12.4	1.26	0.84	0.55	77.0	0.53	0.26

Table 1. (cont'd)

Weight (lb)	Daily Gain (lb)	Dry Matter Intake (lb)	Protein Intake (lb)	Protein (%)	ME (Mcal/lb)	NE_m (Mcal/lb)	NE_g (Mcal/lb)	TDN (%)	Ca (%)	P (%)
600	0.5	13.2	1.08	8.1	0.89	0.50	0.25	54.0	0.22	0.18
	1.0	14.1	1.25	8.9	0.98	0.58	0.32	59.0	0.28	0.19
	1.5	14.8	1.41	9.6	1.05	0.65	0.39	64.0	0.33	0.19
	2.0	15.0	1.54	10.3	1.14	0.74	0.46	69.5	0.38	0.22
	2.5	14.6	1.63	11.2	1.26	0.84	0.55	77.0	0.44	0.24
700	0.5	14.8	1.18	7.9	0.89	0.50	0.25	54.0	0.21	0.18
	1.0	15.9	1.34	8.5	0.98	0.58	0.32	59.0	0.25	0.18
	1.5	16.6	1.49	9.0	1.05	0.65	0.39	64.0	0.29	0.19
	2.0	16.8	1.61	9.6	1.14	0.74	0.46	69.5	0.33	0.20
	2.5	16.4	1.68	10.3	1.26	0.84	0.55	77.0	0.38	0.22
800	0.5	16.4	1.27	7.7	0.89	0.50	0.25	54.0	0.20	0.17
	1.0	17.6	1.43	8.2	0.98	0.58	0.32	59.0	0.24	0.18
	1.5	18.3	1.57	8.6	1.05	0.65	0.39	64.0	0.25	0.18
	2.0	18.6	1.67	9.0	1.14	0.74	0.46	69.5	0.28	0.19
	2.5	18.1	1.74	9.6	1.26	0.84	0.55	77.0	0.33	0.21
900	0.5	17.8	1.36	7.5	0.89	0.50	0.25	54.0	0.20	0.18
	1.0	19.2	1.52	7.9	0.98	0.58	0.32	59.0	0.22	0.18
	1.5	20.0	1.64	8.2	1.05	0.65	0.39	64.0	0.23	0.18
	2.0	20.3	1.74	8.6	1.14	0.74	0.46	69.5	0.26	0.18
	2.5	19.8	1.78	9.0	1.26	0.84	0.55	77.0	0.29	0.20
1,000	0.5	19.3	1.45	7.4	0.89	0.50	0.25	54.0	0.19	0.18
	1.0	20.8	1.60	7.7	0.98	0.58	0.32	59.0	0.21	0.18
	1.5	21.7	1.71	8.0	1.05	0.65	0.39	64.0	0.21	0.18
	2.0	22.0	1.80	8.2	1.14	0.74	0.46	69.5	0.23	0.18
	2.5	21.5	1.83	8.6	1.26	0.84	0.55	77.0	0.25	0.18
1,100	0.5	20.8	1.54	7.3	0.89	0.50	0.25	54.0	0.19	0.18
	1.0	22.3	1.68	7.5	0.98	0.58	0.32	59.0	0.20	0.18
	1.5	23.3	1.78	7.7	1.05	0.65	0.39	64.0	0.20	0.18
	2.0	23.6	1.86	7.9	1.14	0.74	0.46	69.5	0.21	0.18
	2.5	23.1	1.88	8.2	1.26	0.84	0.55	77.0	0.22	0.18

Table 2. Nutrient requirements of breeding cattle (avoirdupois system).

			Energy														
			Daily				In Diet DM				Total Protein		Calcium		Phosphorus		Vitamin A[d]
Weight[a] (lb)	Gain[b] (lb)	Daily DM[c] (lb)	ME (Mcal)	TDN (lb)	NE_m (Mcal)	NE_g (Mcal)	ME (Mcal/lb)	TDN (%)	NE_m (Mcal/lb)	NE_g (Mcal/lb)	Daily (lb)	In Diet DM (%)	Daily (g)	In Diet DM (%)	Daily (g)	In Diet DM (%)	Daily (1,000s IU)
Pregnant yearling heifers—Last third of pregnancy																	
700	0.9	15.3	13.9	8.5	7.95	NA[e]	0.91	55.4	0.52	NA[e]	1.3	8.4	19	0.27	14	0.20	19
700	1.4	15.8	15.7	9.6	7.95	0.87	0.99	60.3	0.60	0.34	1.4	9.0	24	0.33	15	0.21	20
700	1.9	15.8	17.4	10.6	7.95	1.89	1.10	67.0	0.70	0.43	1.5	9.8	27	0.33	16	0.21	20
750	0.9	16.1	14.6	8.9	8.25	NA	0.90	55.1	0.52	NA	1.3	8.3	20	0.27	14	0.19	20
750	1.4	16.6	16.4	10.0	8.25	0.92	0.98	59.9	0.60	0.33	1.5	8.9	24	0.32	16	0.21	21
750	1.9	16.6	18.2	11.1	8.25	1.99	1.09	66.5	0.69	0.42	1.6	9.5	28	0.37	17	0.23	21
800	0.9	16.8	15.2	9.2	8.56	NA	0.90	54.8	0.51	NA	1.4	8.2	21	0.28	15	0.20	21
800	1.4	17.4	17.1	10.4	8.56	0.96	0.98	59.6	0.59	0.33	1.5	8.8	25	0.33	16	0.21	22
800	1.9	17.5	19.0	11.6	8.56	2.09	1.08	66.1	0.69	0.42	1.6	9.3	28	0.35	17	0.21	22
850	0.9	17.6	15.7	9.6	8.85	NA	0.89	54.5	0.51	NA	1.4	8.2	21	0.26	16	0.20	22
850	1.4	18.2	17.8	10.8	8.85	1.01	0.97	59.3	0.59	0.32	1.6	8.6	25	0.30	17	0.21	23
850	1.9	18.3	19.8	12.1	8.85	2.19	1.08	65.7	0.68	0.41	1.7	9.1	28	0.34	18	0.22	23
900	0.9	18.3	16.3	9.9	9.15	NA	0.89	54.3	0.51	NA	1.5	8.1	22	0.26	17	0.20	23
900	1.4	19.0	18.5	11.3	9.15	1.05	0.97	59.1	0.58	0.32	1.6	8.5	26	0.30	18	0.21	24
900	1.9	19.2	20.6	12.5	9.15	2.28	1.07	65.4	0.68	0.41	1.7	9.0	28	0.32	19	0.21	24
950	0.9	19.0	16.9	10.3	9.44	NA	0.89	54.1	0.50	NA	1.5	8.0	23	0.27	17	0.20	24
950	1.4	19.8	19.1	11.7	9.44	1.09	0.97	58.9	0.58	0.32	1.7	8.4	26	0.29	19	0.21	25
950	1.9	20.0	21.3	13.0	9.44	2.38	1.07	65.1	0.67	0.40	1.8	8.8	29	0.32	19	0.21	25
Dry pregnant mature cows—Middle third of pregnancy																	
800	0.0	15.3	12.3	7.5	6.41	NA	0.80	48.8	0.42	NA	1.1	7.1	12	0.17	12	0.17	19
900	0.0	16.7	13.4	8.2	7.00	NA	0.80	48.8	0.42	NA	1.2	7.0	14	0.18	14	0.18	21
1,000	0.0	18.1	14.5	8.8	7.57	NA	0.80	48.8	0.42	NA	1.3	7.0	15	0.18	15	0.18	23
1,100	0.0	19.5	15.6	9.5	8.13	NA	0.80	48.8	0.42	NA	1.4	7.0	17	0.19	17	0.19	25
1,200	0.0	20.8	16.6	10.1	8.68	NA	0.80	48.8	0.42	NA	1.4	6.9	18	0.19	18	0.19	26
1,300	0.0	22.0	17.7	10.8	9.22	NA	0.80	48.8	0.42	NA	1.5	6.9	20	0.20	20	0.20	28
1,400	0.0	23.3	18.7	11.4	9.75	NA	0.80	48.8	0.42	NA	1.6	6.9	21	0.20	21	0.20	30

[a] Average weight for a feeding period.

[b] Approximately 0.9 ± 0.2 lb of weight gain/day over the last third of pregnancy is accounted for by the products of conception. Daily 2.15 Mcal of NE_m and 0.1 lb of protein are provided for this requirement for a calf with a birth weight of 80 lb.

[c] Dry matter consumption should vary depending on the energy concentration of the diet and environmental conditions. These intakes are based on the energy concentration shown in the table and assuming a thermoneutral environment without snow or mud conditions. If the energy concentrations of the diet to be fed exceed the tabular value, limited feeding may be required.

[d] Vitamin A requirements per pound of diet are 1,273 IU for pregnant heifers and cows and 1,773 for lactating cows and breeding bulls.

Table 2. (cont'd)

			Energy								Total Protein		Calcium		Phosphorus		Vitamin A[d]
			Daily				In Diet DM										
Weight[a] (lb)	Gain[b] (lb)	Daily DM[c] (lb)	ME (Mcal)	TDN (lb)	NE_m (Mcal)	NE_g (Mcal)	ME (Mcal/lb)	TDN (%)	NE_m (Mcal/lb)	NE_g (Mcal/lb)	Daily (lb)	In Diet DM (%)	Daily (g)	In Diet DM (%)	Daily (g)	In Diet DM (%)	Daily (1,000s IU)
Dry pregnant mature cows—Last third of pregnancy																	
800	0.9	16.8	15.0	9.2	8.56	NA	0.89	54.5	0.51	NA	1.4	8.2	20	0.26	15	0.20	21
900	0.9	18.2	16.2	9.8	9.15	NA	0.89	54.0	0.50	NA	1.5	8.0	22	0.27	17	0.21	23
1,000	0.9	19.6	17.3	10.5	9.72	NA	0.88	53.6	0.50	NA	1.6	7.9	23	0.26	18	0.20	25
1,100	0.9	21.0	18.3	11.2	10.28	NA	0.87	53.2	0.49	NA	1.6	7.8	25	0.26	20	0.21	26
1,200	0.9	22.3	19.4	11.8	10.83	NA	0.87	52.9	0.49	NA	1.7	7.8	26	0.26	21	0.21	28
1,300	0.9	23.6	20.4	12.5	11.37	NA	0.87	52.7	0.48	NA	1.8	7.7	28	0.26	23	0.21	30
1,400	0.9	24.9	21.5	13.1	11.90	NA	0.86	52.5	0.48	NA	1.9	7.6	29	0.26	24	0.21	32
Two-year-old heifers nursing calves—First 3-4 months postpartum—10 lb milk/day																	
700	0.5	15.9	17.0	10.3	9.20[f]	0.87	1.07	65.1	0.67	0.40	1.8[g]	11.3	26	0.36	17	0.24	28
750	0.5	16.7	17.7	10.8	9.51[f]	0.92	1.06	64.4	0.66	0.40	1.8[g]	11.0	26	0.34	18	0.24	30
800	0.5	17.6	18.4	11.2	9.81[f]	0.96	1.05	63.8	0.66	0.39	1.9[g]	10.8	27	0.34	19	0.24	31
850	0.5	18.4	19.1	11.6	10.11[f]	1.01	1.04	63.2	0.65	0.38	1.9[g]	10.6	27	0.33	19	0.23	33
900	0.5	19.2	19.8	12.0	10.40[f]	1.05	1.03	62.7	0.64	0.37	2.0[g]	10.4	28	0.32	20	0.23	34
950	0.5	20.0	20.5	12.5	10.69[f]	1.09	1.02	62.3	0.63	0.37	2.0[g]	10.2	28	0.31	21	0.23	35
1,000	0.5	20.8	21.1	12.9	10.98[f]	1.14	1.02	61.9	0.62	0.36	2.1[g]	10.0	29	0.31	22	0.23	37
Cows nursing calves—Average milking ability—First 3-4 months postpartum—10 lb milk/day																	
800	0.0	17.3	16.6	10.1	9.81[f]	NA	0.96	58.2	0.57	NA	1.8[g]	10.2	23	0.30	17	0.22	31
900	0.0	18.8	17.7	10.8	10.40[f]	NA	0.94	57.3	0.55	NA	1.9[g]	9.9	24	0.28	19	0.22	33
1,000	0.0	20.2	18.8	11.5	10.98[f]	NA	0.93	56.6	0.55	NA	2.0[g]	9.6	25	0.28	20	0.22	36
1,100	0.0	21.6	19.9	12.1	11.54[f]	NA	0.92	56.0	0.54	NA	2.0[g]	9.4	27	0.27	22	0.22	38
1,200	0.0	23.0	21.0	12.8	12.09[f]	NA	0.91	55.5	0.53	NA	2.1[g]	9.3	28	0.27	23	0.22	41
1,300	0.0	24.3	22.0	13.4	12.63[f]	NA	0.90	55.1	0.52	NA	2.2[g]	9.1	30	0.27	25	0.22	43
1,400	0.0	25.6	23.0	14.0	13.15[f]	NA	0.90	54.7	0.51	NA	2.3[g]	9.0	31	0.27	26	0.22	46
Cows nursing calves—Superior milking ability—First 3-4 months postpartum—20 lb milk/day																	
800	0.0	15.7	19.9	12.1	13.22[f]	NA	1.27	77.3	0.85	NA	2.2[g]	14.2	34	0.48	22	0.31	28
900	0.0	18.7	21.5	13.1	13.81[f]	NA	1.15	69.8	0.74	NA	2.4[g]	12.9	35	0.41	24	0.28	33
1,000	0.0	20.6	22.7	13.8	14.38[f]	NA	1.10	67.0	0.70	NA	2.5[g]	12.3	36	0.39	25	0.27	37
1,100	0.0	22.3	23.8	14.5	14.94[f]	NA	1.07	65.2	0.67	NA	2.6[g]	11.9	38	0.38	27	0.27	40
1,200	0.0	23.8	24.9	15.2	15.49[f]	NA	1.05	63.7	0.65	NA	2.7[g]	11.5	39	0.36	28	0.26	42
1,300	0.0	25.3	26.0	15.9	16.03[f]	NA	1.03	62.6	0.64	NA	2.8[g]	11.2	41	0.36	30	0.26	45
1,400	0.0	26.7	27.1	16.5	16.56[f]	NA	1.01	61.7	0.62	NA	2.9[g]	11.0	42	0.35	31	0.26	47

[f] Includes 0.34 Mcal NE_m/lb of milk produced.

[g] Includes 0.03 lb protein/lb of milk produced.

Table 2. (cont'd)

			Energy								Total Protein		Calcium		Phosphorus		Vitamin A[d]
			Daily				In Diet DM										
Weight[a] (lb)	Gain[b] (lb)	Daily DM[c] (lb)	ME (Mcal)	TDN (lb)	NE_m (Mcal)	NE_g (Mcal)	ME (Mcal/lb)	TDN (%)	NE_m (Mcal/lb)	NE_g (Mcal/lb)	Daily (lb)	In Diet DM (%)	Daily (g)	In Diet DM (%)	Daily (g)	In Diet DM (%)	Daily (1,000s IU)
Bulls, maintenance, and slow rate of growth (regain body condition)																	
<1,300	For growth and development use requirements for bulls in Tables 1, 2, 3, and 10.																
1,300	1.0	25.4	23.3	14.2	9.22	2.20	0.92	55.8	0.53	0.28	1.9	7.6	25	0.22	22	0.19	45
1,300	1.5	26.1	25.5	15.6	9.22	3.43	0.98	59.7	0.59	0.33	2.0	7.9	28	0.24	23	0.19	46
1,300	2.0	26.2	27.6	16.8	9.22	4.71	1.05	64.0	0.65	0.39	2.2	8.2	31	0.26	24	0.20	46
1,400	1.0	26.8	24.6	15.0	9.75	2.33	0.92	55.8	0.53	0.28	2.0	7.5	26	0.21	23	0.19	48
1,400	1.5	27.6	27.0	16.5	9.75	3.63	0.98	59.7	0.59	0.33	2.1	7.7	29	0.23	24	0.19	49
1,400	2.0	27.7	29.1	17.8	9.75	4.98	1.05	64.0	0.65	0.39	2.2	8.0	31	0.25	25	0.20	49
1,500	0.0	25.2	20.0	12.2	10.26	NA	0.79	48.4	0.41	NA	1.7	6.9	23	0.20	23	0.20	45
1,500	1.0	28.3	25.9	15.8	10.26	2.45	0.92	55.8	0.53	0.28	2.1	7.4	27	0.21	24	0.19	50
1,500	1.5	29.0	28.4	17.3	10.26	3.82	0.98	59.7	0.59	0.33	2.2	7.6	29	0.22	25	0.19	51
1,600	0.0	26.5	21.0	12.8	10.77	NA	0.79	48.4	0.41	NA	1.8	6.9	23	0.19	24	0.20	47
1,600	1.0	29.7	27.2	16.6	10.77	2.57	0.92	55.8	0.53	0.28	2.2	7.3	29	0.22	26	0.19	53
1,600	1.5	30.4	29.8	18.2	10.77	4.01	0.98	59.7	0.59	0.33	2.3	7.4	31	0.22	27	0.20	54
1,700	0.0	27.7	22.0	13.4	11.28	NA	0.79	48.4	0.41	NA	1.9	6.8	26	0.21	26	0.21	49
1,700	0.5	29.6	25.3	15.4	11.28	1.26	0.85	52.0	0.47	0.22	2.1	7.0	27	0.20	26	0.19	52
1,800	0.0	28.9	23.0	14.0	11.77	NA	0.79	48.4	0.41	NA	2.0	6.8	27	0.21	27	0.21	51
1,800	0.5	30.9	26.4	16.1	11.77	1.31	0.85	52.0	0.47	0.22	2.2	7.0	28	0.20	28	0.20	55
1,900	0.0	30.1	23.9	14.6	12.26	NA	0.79	48.4	0.41	NA	2.0	6.8	29	0.21	29	0.21	53
1,900	0.5	32.2	27.5	16.8	12.26	1.37	0.85	52.0	0.47	0.22	2.2	6.9	29	0.20	29	0.20	57
2,000	0.0	31.3	24.9	15.2	12.74	NA	0.79	48.4	0.41	NA	2.1	6.8	30	0.21	30	0.21	55
2,100	0.0	32.5	25.8	15.7	13.21	NA	0.79	48.4	0.41	NA	2.2	6.8	32	0.22	32	0.22	58
2,200	0.0	33.6	26.7	16.3	13.68	NA	0.79	48.4	0.41	NA	2.3	6.8	33	0.22	33	0.22	60

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