

The reader should take note that this published report reflects a number of changes made to correct and update an unedited prepublication version of this report. Some values, particularly in [Chapter 15](#), have been revised or deleted based on the availability of new information or to correct errors in calculation. These changes were examined by four independent reviewers and have been approved by the authoring committee and the institution. This final published version of the report therefore supersedes the data contained in the prepublication.

TABLE 15-2 Daily Metabolizable Energy Requirements for Growth of Puppies After Weaning^{a,b}

$$\begin{aligned} \text{ME (kcal)} &= \text{maintenance amount} \times 3.2 \times [e^{(-0.87p)} - 0.1] \\ \text{ME (kcal)} &= 130 \times \text{BW}_a^{0.75} \times 3.2 \times [e^{(-0.87p)} - 0.1] \end{aligned}$$

Where:

$$\begin{aligned} p &= \text{BW}_a / \text{BW}_m \\ \text{BW}_a &= \text{actual body weight at time of evaluation (kg)} \\ \text{BW}_m &= \text{expected mature body weight (kg)} \\ e &= \text{base of natural log} \approx 2.718 \end{aligned}$$

Example:

Labrador puppy 16 weeks of age, 17 kg actual body weight, expected mature weight 35 kg
 $\text{ME (kcal)} = 130 \times 17^{0.75} \times 3.2 \times [e^{(-0.87 \times 17/35)} - 0.1] = 1,934 \text{ kcal}$

^aThis table refers to puppies after weaning. Newborn puppies need about 25 kcal per 100 g BW ([Kienzle et al., 1985](#)).

^bMaintenance energy requirements of inactive puppies such as pet puppies without opportunity and/or stimulus to exercise may be lower by 10 to 20 percent, and maintenance energy requirements of very active puppies, such as Great Danes in kennels, may be higher.

TABLE 15-3 Nutrient Requirements for Growth of Puppies After Weaning

Nutrient	Minimal Requirement			Adequate Intake			Recommended Allowance			Safe Upper Limit		
	Amt./ kg DM (=4,000 kcal) ^a	Amt./ 1,000 kcal ME ^b	Amt./ kg BW ^{0.75c}	Amt./ kg DM (=4,000 kcal) ^a	Amt./ 1,000 kcal ME ^b	Amt./ kg BW ^{0.75c}	Amt./ kg DM (=4,000 kcal) ^a	Amt./ 1,000 kcal ME ^b	Amt./ kg BW ^{0.75c}	Amt./ kg DM (=4,000 kcal) ^a	Amt./ 1,000 kcal ME ^b	Amt./ kg BW ^{0.75c}
<i>Growing Puppies 4-14 Weeks Old</i>												
Crude Protein (g)	180	45	12.5				225	56.3	15.7			
Amino Acids												
Arginine (g) ^d	6.3	1.58	0.44				7.9	1.98	0.55			
Histidine (g)	3.1	0.78	0.22				3.9	0.98	0.27			
Isoleucine (g)	5.2	1.30	0.36				6.5	1.63	0.45			
Methionine (g)	2.8	0.70	0.19				3.5	0.88	0.24			
Methionine & Cystine (g)	5.6	1.40	0.39				7.0	1.75	0.49			
Leucine (g)	10.3	2.58	0.72				12.9	3.22	0.90			
Lysine (g)	7.0	1.75	0.49				8.8	2.20	0.61	>20	>5.0	>1.39
Phenylalanine (g)	5.2	1.30	0.36				6.5	1.63	0.45			
Phenylalanine & Tyrosine (g) ^e	10.4	2.60	0.72				13.0	3.25	0.90			
Threonine (g)	6.5	1.63	0.45				8.1	2.03	0.56			
Tryptophan (g)	1.8	0.45	0.13				2.3	0.58	0.16			
Valine (g)	5.4	1.35	0.38				6.8	1.70	0.47			
<i>Growing Puppies 14 Weeks and Older</i>												
Crude Protein (g)	140	35	9.7				175	43.8	12.2			
Amino Acids												
Arginine (g) ^d	5.3	1.33	0.37				6.6	1.65	0.46			
Histidine (g)	2.0	0.50	0.14				2.5	0.63	0.17			
Isoleucine (g)	4.0	1.00	0.28				5.0	1.25	0.35			
Methionine (g)	2.1	0.53	0.15				2.6	0.65	0.18			
Methionine & Cystine (g)	4.2	1.05	0.29				5.3	1.33	0.37			
Leucine (g)	6.5	1.63	0.45				8.2	2.05	0.57			
Lysine (g)	5.6	1.40	0.39				7.0	1.75	0.49	>20	>5.0	>1.39
Phenylalanine (g)	4.0	1.00	0.28				5.0	1.25	0.35			
Phenylalanine & Tyrosine (g) ^e	8.0	2.00	0.56				10.0	2.50	0.70			
Threonine (g)	5.0	1.25	0.35				6.3	1.58	0.44			
Tryptophan	1.4	0.35	0.10				1.8	0.45	0.13			
Valine (g)	4.5	1.13	0.31				5.6	1.40	0.39			
<i>Growing Puppies After Weaning</i>												
Total Fat (g)				85	21.3	5.9	85	21.3	5.9	330 ^a	82.5	23.0
Fatty Acids												
Linoleic Acid (g)				11.8	3.0	0.8	13	3.3	0.8	65 ^a	16.3	4.5
α -Linolenic Acid (g) ^f				0.7	0.18	0.05	0.8	0.2	0.05			
Arachidonic Acid (g)				0.3	0.08	0.022	0.3	0.08	0.022			
Eicosapentaenoic & Docosahexaenoic Acid (g) ^g				0.5	0.13	0.036	0.5	0.13	0.036	11 ^a	2.8	0.77
Minerals												
Calcium (g) ^h	8.0	2.0	0.56				12 ^h	3.0 ^h	0.68 ^h	18	4.5	1.25
Phosphorus (g)				10	2.5	0.68	10	2.5	0.68			
Magnesium (mg)	180	45	12.5				400	100	27.4			
Sodium (mg)				2,200	550	100	2,200	550	100			
Potassium (g)				4.4	1.1	0.30	4.4	1.1	0.30			
Chloride (mg)				2,900	720	200	2,900	720	200			
Iron (mg) ^j	72	18	5.0				88	22	6.1			
Copper (mg) ^j				11	2.7	0.76	11	2.7	0.76			
Zinc (mg)	40	10	2.7				100	25	6.84			
Manganese (mg)				5.6	1.4	0.38	5.6	1.4	0.38			
Selenium (μ g)	210	52.5	13.7				350	87.5	25.1			
Iodine(μ g)				880	220	61.0	880	220	61.0			
Vitamins												
Vitamin A (RE) ^j				1,212	303	84	1,515	379	105	15,000 ^j	3,750 ^j	1,044 ^j
Cholecalciferol (μ g) ^k				11.0	2.75	0.76	13.8	3.4	0.96	80	20	5.6
Vitamin E (α -tocopherol) (mg) ^j				24	6.0	1.7	30	7.5	2.1			
Vitamin K (Menadione) (mg) ^m				1.3	0.33	0.090	1.64	0.41	0.11			
Thiamin (mg)				1.08	0.27	0.075	1.38	0.34	0.096			
Riboflavin (mg)				4.2	1.05	0.27	5.25	1.32	0.37			
Pyridoxine (mg)				1.2	0.3	0.084	1.5	0.375	0.10			
Niacin (mg)				13.6	3.4	0.94	17.0	4.25	1.18			
Pantothenic Acid (mg)				12	3.0	0.84	15.0	3.75	1.04			
Cobalamin (μ g)				28	7	1.95	35	8.75	2.4			
Folic Acid (μ g)				216	54	15.0	270	68	18.8			
Biotin ⁿ												
Choline (mg)				1,360	340	95	1,700	425	118			

^aThe values for Amt/kg DM have been calculated assuming a dietary energy density of 4,000 kcal ME/kg. (The term $\equiv$ signifies equivalence.) If the energy density of the diet is not 4,000 kcal ME/kg, then to calculate the Amt/kg DM for each nutrient, multiply the value for the nutrient in the column labeled Amt/kg DM by the energy density of the pet food (in kcal ME/kg) and divide by 4,000.

^bTo calculate the amount to feed of each nutrient, multiply the value for Amt/1,000 kcal ME for each nutrient by the energy requirement for the puppy in kcal (calculated from [Table 15-2](#)) and divide by 1,000.

^cThe values for Amt/BW^{0.75} apply only to 5.5-kg puppies of expected mature body weight of 35 kg. To calculate the amount of a nutrient for puppies of different current or expected mature