

## Vitamins & Minerals

Our philosophy at Scotthorn Nutrition is that a healthy cow is your ultimate goal as she will be your most productive, efficient and long-lasting. A major component in a cow's health is her vitamin and mineral requirements. All our clients use DS12 or DS13 as their vitamin and mineral pack in their premix. While the National Research Council's [Nutrient Requirement of Dairy Cattle](#) (NRC) has outlined baseline requirements for cattle in their 2001 edition, we wanted to share with you where your levels are and the reason why. DS12 and DS13 provides supplemental Cobalt, Copper, Iodine, Manganese, Selenium and Zinc as well as vitamins A, D and E.

### *Cobalt (Co)*

- It is a component of B12 and ruminal microbes can produce all their B12 requirements provided adequate Cobalt is available. Deficient animals may experience growth failure. Severe cases may experience fatty degeneration of the liver, anemia and a reduced resistance to infection as a result of impaired neutrophil function.
- Requirement 0.11mg/kg of dietary DM. Diets where Cobalt is fed at higher rates may enhance ruminal digestion of feedstuff, especially when lower quality forages are used.

### *Copper (Cu)*

- It is essential forming collagen and elastin necessary for strong bone and connective tissue.
- Signs of deficiency in cattle is the loss of hair pigmentation and reduced immune function.

### *Iodine (I)*

- It is necessary for thyroid hormones that regulate energy metabolism. The requirements are increased during colder weather as the basal metabolic rate increases as the animal attempts to remain warm. Deficient animals can exhibit enlarged thyroid glands and reduced fertility.

### *Manganese (Mn)*

- It is very poorly absorbed from the diet (approx. 1%) with the majority of it being excreted in the bile. There is no precise data on maintenance requirements however deficient animals are slower to exhibit estrus and are more likely to have "silent heats."

### *Selenium (Se)*

- It is an antioxidant. White muscle disease and nutritional muscular dystrophy are caused by selenium deficiency. Regulations limit selenium supplementation to 0.3mg/kg of diet.
- Selenium and Vitamin E are interdependent.

### *Zinc (Zn)*

- Affects the metabolism of carbohydrates, proteins, lipids and nucleic acid. Zinc deficiency alters prostaglandin synthesis.

### *Vitamin A (Carotene)*

- Vital for the normal growth and development, improves cell immunity, reduces the incidence of mastitis. Abortions, retained placenta, and increased calf mortality are indicators of Vitamin A deficiency.
- Minimum NRC requirement is 110 IU/kg of body weight (BW). Feeding higher levels of Vitamin A has shown to aid production. (+200 IU/kg of BW)

## Vitamin D

- It is necessary for regulating calcium and aids normal calcification of growing bones. Requirements increase as exposure to sunlight decreases.
- Minimum NRC requirement is 30 IU/kg of BW. Milk production, reproductive and health benefits have been improved when diets are supplemented with higher levels of Vitamin D. (+70 IU/kg of BW)

## Vitamin E

- It is a lipid soluble cellular antioxidant that aids the maintenance of cellular membranes, metabolism, immunity and reproductive function.
- Minimum NRC is 0.8 IU/kg of BW, however it has a low absorption rate and new data suggests targets should be closer to 2.6 IU/kg of BW.

The NRC guidelines were last updated in 2001 and based on a cow eating 18kgs of DM/day. As production has increased, the animal's needs have also. An updated 8<sup>th</sup> Edition of the Nutrient Requirements of Dairy Cattle is currently under works. Scothorn Nutrition's targets were developed considering the latest information and research.

The table below will highlight our targets. "Added" comes from your premix or supplement. Under "Absorbed", you can see what your diet supplies compared to 2001 NRC's required "Rqd".



## Min/Vit Report

FBW: 703 kg	DIM: 120	Inputted DMI: 34.49 kg
BCS (1-5): 3.00	Milk: 55.0 kg/day	Predicted DMI: 30.76 kg
ADG: 0.095 kg/day	Milk Fat: 4.30%	
	Milk Prt: 3.16% (True) / 3.40% (Crude)	

Nutrient	Diet Concentration	Diet Intake	Added	Water Intake	Absorbed			%Rqd	Organic (% Total)	
					Supplied	Rqd	Balance			
Zn	95.57 ppm	3296.16	2414.37	0.00	502.60	263.90	238.70	mg/day	190	0.00
Cu	26.95 ppm	929.37	689.82	0.00	37.17	14.23	22.95	mg/day	261	0.00
Mn	79.67 ppm	2747.77	1387.14	0.00	30.24	3.20	27.04	mg/day	945	0.00
Se	0.33 ppm	11.32	10.35	-	11.32	10.35	0.97	mg/day	109	0.00
Co	0.42 ppm	14.44	8.69	-	14.44	3.79	10.64	mg/day	380	0.00
I	0.50 ppm	17.34	17.25	-	14.74	10.55	4.20	mg/day	140	-
Vit-A	6.00 KIU/kg	206.95	206.95	-	206.95	77.33	129.62	KIU/day	268	-
Vit-D	2.00 KIU/kg	69.12	68.98	-	69.12	21.09	48.03	KIU/day	328	-
Vit-E	50.00 IU/kg	1724.55	1724.55	-	1724.55	562.40	1162.15	IU/day	307	-