

### Determine what you need

- ▶ Find basic nutrition requirements at
  - [www.equi-analytical.com](http://www.equi-analytical.com) or
  - <http://nrc88.nas.edu/nrh/>
- ▶ Requirements are based on weight, age, “classification”, level of activity

### Minimum requirements for 1,000 lb horse

<i>Nutrient</i>	<i>Maintenance</i>	<i>Moderate Work</i>
<i>Calories (DE)</i>	<i>16.4 Mcal</i>	<i>24.6 Mcal</i>
<i>Protein (CP)</i>	<i>656 grams</i>	<i>984 grams</i>
<i>Calcium</i>	<i>20 grams</i>	<i>30 grams</i>
<i>Phosphorus</i>	<i>14 grams</i>	<i>21.4 grams</i>
<i>Magnesium</i>	<i>7.5 grams</i>	<i>11.3 grams</i>
<i>Sodium</i>	<i>8.2 grams</i>	<i>27.8 grams</i>
<i>Copper</i>	<i>82 mg</i>	<i>93 mg</i>
<i>Zinc</i>	<i>328 mg</i>	<i>371 mg</i>
<i>Manganese</i>	<i>328 mg</i>	<i>371 mg</i>
<i>Iodine</i>	<i>3.5 mg</i>	<i>3.5 mg</i>
<i>Selenium</i>	<i>1.0 mg</i>	<i>1.0 mg</i>

## Decide if you need

- ▶ *Vitamin-Mineral supplement only*
  - *Your horse maintains condition on forage/hay*
- ▶ *Supplemental feed*
  - *Your horse needs additional calories, energy*
- ▶ *Highly fortified feed*
  - *Your horse needs higher protein for muscle development and maintenance*

## Cost per day

- ▶ *Consider cost per serving, not cost per bag or cost per pound*
- ▶ *Feed at least the minimum the manufacturer suggests on the label*
  - *Feeding too little short changes your horse*
  - *Feeding too much wastes your money*

**Keep your dollars in your pocket - the right feed fed at the right amount.**



## Use copper and zinc as guideline

- ▶ *Daily serving of supplement or feed should supply at least 1 to 1.5 x the minimum requirement for copper*
- ▶ *Zinc should be 2 to 3 x copper*

## Supplement

- ▶ *Copper and zinc will be shown as “ppm” or “mg/kg”*
  - *Divide by 1000 for mg per gram*
  - *Then multiply by 28.4 for mg per ounce (or by grams shown in serving size)*

## Farrier's Formula<sup>®</sup> Double Strength

- ▶ *Serving size = 85 grams*
- ▶ *Zinc 2,940 ppm*
  - $2940 / 1000 = 2.9 \text{ mg/gram}$
  - $2.9 \times 85 = 246.5 \text{ mg per serving}$
- ▶ *Copper 1,080 ppm*
  - $1080 / 1000 = 1.08 \text{ mg/gram}$
  - $1.08 \times 85 = 91.8 \text{ mg per serving}$

## Nutrena Safe Choice

- ▶ *Serving size = .25 to 5 lbs per 100 lbs BW - 2.5 lbs/day*
- ▶ *Zinc 160 ppm*
  - $160 / 1000 = 0.16 \text{ mg/gram}$
  - $0.16 \times 453.6 = 72.5 \text{ mg per pound}$
  - $72.5 \times 2.5 = 145 \text{ mg per serving}$
- ▶ *Copper 50 ppm*
  - $50 / 1000 = 0.05 \text{ mg/gram}$
  - $0.05 \times 453.6 = 22.6 \text{ mg per pound}$
  - $22.6 \times 2.5 = 56.7 \text{ mg per serving}$

## Basic Calculations

*1 gram = 1000 milligrams (mg)*

*1 ounce = 28.4 grams*

*1 kilogram (kg) = 1000 grams*

*1 pound = 453.6 grams*

<i>Major Minerals (and amino acids) are analyzed as percent (%) and calculated as grams</i>			
<i>% (percent)</i>	<i>percent / 100 = grams per gram</i>	<i>x 28.4 = grams/oz</i>	<i>x 453.6 = grams/lb</i>
<i>Trace Minerals are analyzed as ppm (mg/kg) and calculated as milligrams (mg)</i>			
<i>ppm (parts per million) is the same as mg/kg</i>	<i>ppm / 1000 = mg per gram mg/kg / 1000 = mg per gram</i>	<i>x 28.4 = mg/oz</i>	<i>x 453.6 = mg/lb</i>
<i>Alternate calculation for trace minerals: ppm or mg/kg / 2.2 = mg/lb</i>			
<i>Sometimes, Trace Minerals are shown in the analysis as percent (%)</i>			
<i>% (percent)</i>	<i>percent / 100 = grams per gram x 1000 = mg per gram</i>	<i>x 28.4 = mg/oz</i>	<i>x 453.6 = mg/lb</i>
<i>Fat soluble vitamins are analyzed as IU/lb and calculated as IU. Water soluble vitamins are analyzed as mg/lb and calculated as mg.</i>			
<i>IU/lb (international units) Mg/lb</i>	<i>IU/lb / 453.6 = IU/gram Mg/lb / 453.6 = mg/gram</i>	<i>x 28.4 = IU/oz x 28.4 = mg/oz</i>	<i>or IU/lb / 16 = IU/oz or mg/lb / 16 = mg/oz</i>

### Hoof Rite 2X - practice

<http://www.amicusequine.com/products/hoofrite2x/>

*Adult horses 1 scoop per day. 60 gram scoop enclosed (approximately 2 ounces)*

<i>Guaranteed Analysis</i>			<i>Amount per serving</i>
<i>Crude Protein (CP)</i>	<i>19.5%</i>	<i>19.5 / 100 x 60 = 11.7</i>	<i>____ grams</i>
<i>Methionine</i>	<i>7.2%</i>		<i>____ grams</i>
<i>Copper</i>	<i>1460 ppm</i>	<i>1460 / 1000 x 60 = 87.6</i>	<i>____ mg</i>
<i>Zinc</i>	<i>2880 ppm</i>		<i>____ mg</i>
<i>Iodine</i>	<i>16.5 ppm</i>		<i>____ mg</i>
<i>D-Biotin</i>	<i>110 mg/lb</i>	<i>110 / 453.6 x 60 = 14.5</i>	<i>____ mg</i>
<i>Choline</i>	<i>1860 mg/lb</i>		<i>____ mg</i>
<i>Ascorbic Acid</i>	<i>6804 mg/lb</i>		<i>____ mg</i>

## Hoof Rite 2X - answers

<http://www.amicusequine.com/products/hoofrite2x/>

*Adult horses 1 scoop per day. 60 gram scoop enclosed (approximately 2 ounces)*

<i>Guaranteed Analysis</i>			<i>Amount per serving</i>
<i>Crude Protein (CP)</i>	<i>19.5%</i>	<i><math>19.5 / 100 \times 60 = 11.7</math></i>	<i>11.7 grams</i>
<i>Methionine</i>	<i>7.2%</i>	<i><math>7.2 / 100 \times 60 = 4.32</math></i>	<i>4.3 grams</i>
<i>Copper</i>	<i>1460 ppm</i>	<i><math>1460 / 1000 \times 60 = 87.6</math></i>	<i>88 mg</i>
<i>Zinc</i>	<i>2880 ppm</i>	<i><math>2880 / 1000 \times 60 = 72.8</math></i>	<i>73 mg</i>
<i>Iodine</i>	<i>16.5 ppm</i>	<i><math>16.5 / 1000 \times 60 = 0.99</math></i>	<i>1 mg</i>
<i>D-Biotin</i>	<i>110 mg/lb</i>	<i><math>110 / 453.6 \times 60 = 14.5</math></i>	<i>15 mg</i>
<i>Choline</i>	<i>1860 mg/lb</i>	<i><math>1860 / 453.6 \times 60 = 246</math></i>	<i>246 mg</i>
<i>Ascorbic Acid</i>	<i>6804 mg/lb</i>	<i><math>6804 / 453.6 \times 60 = 900</math></i>	<i>900 mg</i>

**Nutrena Safe Choice - practice**

<http://www.nutrenaworld.com/products/horses/safe-choice/safechoice-original-horse-feed/index.jsp>

*Adult horse maintenance - 0.25 to 0.5 lbs per 100 lbs BW per day*

<i>Guaranteed Analysis</i>			<i>Amount per 4 lb serving</i>
<i>Crude Protein (CP)</i>	<i>14%</i>	<i>14/100x453.6x4 = 254</i>	<i>_____ grams</i>
<i>Lysine</i>	<i>0.80%</i>		<i>_____grams</i>
<i>Methionine</i>	<i>0.30%</i>		<i>_____grams</i>
<i>Copper</i>	<i>50 ppm</i>	<i>50 / 2.2 x 4 = 90.9</i>	<i>_____mg</i>
<i>Zinc</i>	<i>160 ppm</i>		<i>_____mg</i>
<i>Selenium</i>	<i>0.60 ppm</i>		<i>_____mg</i>
<i>Biotin</i>	<i>0.45 mg/lb</i>	<i>0.45 x 4 = 1.8</i>	<i>_____mg</i>
<i>Vitamin A</i>	<i>3000 IU/lb</i>	<i>3000 x 4 = 12000</i>	<i>_____ IU</i>
<i>Vitamin E</i>	<i>100 IU/lb</i>		<i>_____ IU</i>

**Nutrena Safe Choice - answers**

<http://www.nutrenaworld.com/products/horses/safe-choice/safechoice-original-horse-feed/index.jsp>

*Adult horse maintenance - 0.25 to 0.5 lbs per 100 lbs BW per day*

<i>Guaranteed Analysis</i>			<i>Amount per 4 lb serving</i>
<i>Crude Protein (CP)</i>	<i>14%</i>	$14 / 100 \times 453.6 \times 4 = 254$	<i>254 grams</i>
<i>Lysine</i>	<i>0.80%</i>	$0.80 / 100 \times 453.6 \times 4 = 14.5$	<i>14.5 grams</i>
<i>Methionine</i>	<i>0.30%</i>	$0.30 / 100 \times 453.6 \times 4 = 5.4$	<i>5.4 grams</i>
<i>Copper</i>	<i>50 ppm</i>	$50 / 1000 \times 453.6 \times 4 = 90.7$	<i>90.7 mg</i>
<i>Zinc</i>	<i>160 ppm</i>	$160 / 1000 \times 453.6 \times 4 = 290$	<i>290 mg</i>
<i>Selenium</i>	<i>0.60 ppm ppm</i>	$0.60 / 1000 \times 453.6 \times 4 = 1.08$	<i>1.08 mg</i>
<i>Biotin</i>	<i>0.45 mg/lb</i>	$0.45 \times 4 = 1.8$	<i>1.8mg</i>
<i>Vitamin A</i>	<i>3000 IU/lb</i>	$3000 \times 4 = 12000$	<i>12,000 IU</i>
<i>Vitamin E</i>	<i>100 IU/lb</i>	$100 \times 4 = 400$	<i>400 IU</i>



## Resources

DESERT EQUINE BALANCE - ARTICLES, SPREADSHEETS

[WWW.DESERTEQUINEBALANCE.COM](http://WWW.DESERTEQUINEBALANCE.COM)

THE FAMOUS SQUIRREL STORY - AND LINKS TO SUSAN GARLINGHOUSE'S OTHER NUTRITION ARTICLES WITH AN ENDURANCE SLANT

[HTTP://WWW.ALLCREATURESANIMALHEALTH.COM/SITE/VIEW/212994\\_EQUINE\\_NUTRITION\\_ARTICLES.PML](http://WWW.ALLCREATURESANIMALHEALTH.COM/SITE/VIEW/212994_EQUINE_NUTRITION_ARTICLES.PML)

EQUI-ANALYTICAL LABORATORIES - HAY, FORAGE AND FEED ANALYSIS. EXTENSIVE INFORMATION ON WEBSITE.

[HTTP://WWW.EQUI-ANALYTICAL.COM/](http://WWW.EQUI-ANALYTICAL.COM/)

DAIRY ONE FEED COMPOSITION LIBRARY - LOOK UP NUTRIENT CONTENT AVERAGES OF VARIOUS FEEDS BY CATEGORY (FORAGE, PROTEIN, ETC). HUGE DATABASE.

[HTTP://WWW.DAIRYONE.COM/FORAGE/FEEDCOMP/DISCLAIMER.ASP](http://WWW.DAIRYONE.COM/FORAGE/FEEDCOMP/DISCLAIMER.ASP)

UNDERSTANDING EQUINE NUTRITION - KAREN BRIGGS. GOOD BASIC NUTRITION INFORMATION BASED ON 2007 NRC

[HTTP://WWW.ECLIPSEPRESS.COM/HEALTH\\_CARE/B11-1117.HTML](http://WWW.ECLIPSEPRESS.COM/HEALTH_CARE/B11-1117.HTML)

NUTRIENT REQUIREMENTS OF HORSES, SIXTH REVISED EDITION 2007

[HTTP://BOOKS.NAP.EDU/CATALOG.PHP?RECORD\\_ID=11653](http://BOOKS.NAP.EDU/CATALOG.PHP?RECORD_ID=11653)

NRC COMPUTER MODEL

[HTTP://NRC88.NAS.EDU/NRH/](http://NRC88.NAS.EDU/NRH/)

HORSETECH FLAX-BASED SUPPLEMENTS

[HTTP://WWW.HORSETECH.COM/](http://WWW.HORSETECH.COM/)