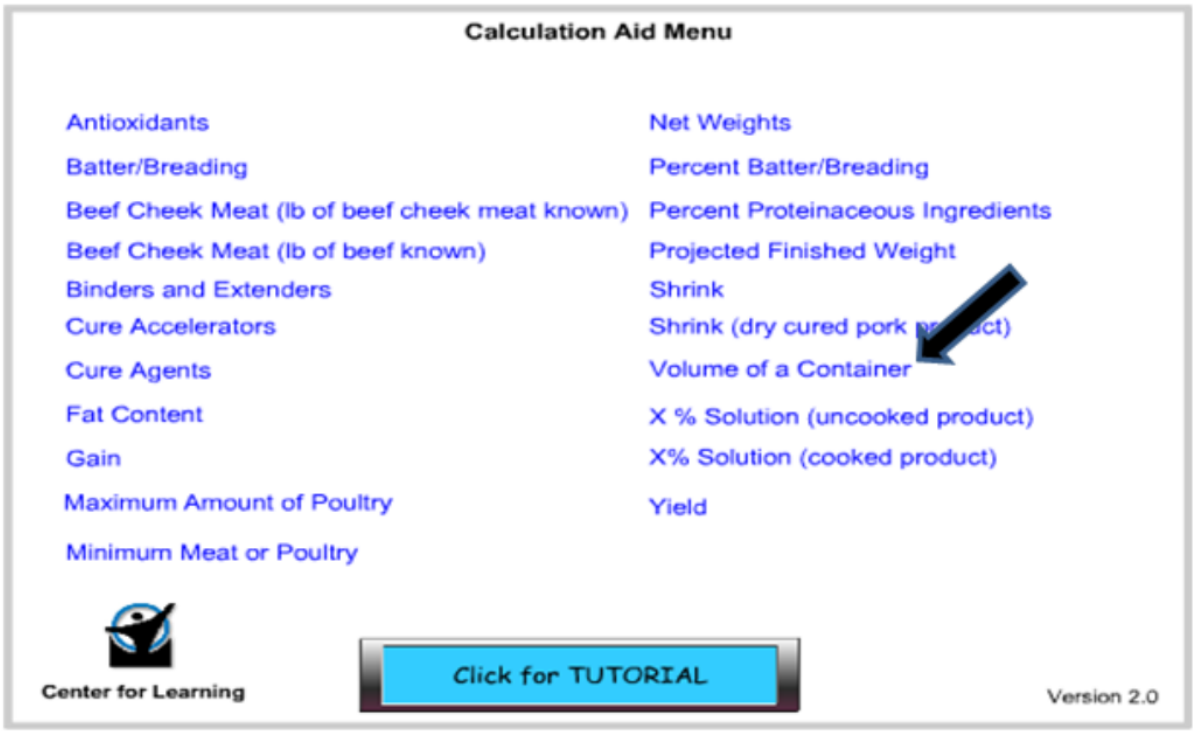
How to Use the Calculation Aid in FSIS Applications



Menu

Volume of a Container

- Square/Rectangle Tank
- Cylinder
- Cone
- Trapezoid
- Container Not Completely Full - Rectangle
- Container Not Completely Full - Cylinder
- Combination of Container Types

Back

Container Not Completely Full
(Rectangle)

	30	height	
-	3	distance from top	
	27	adjusted height	
	40	length	
X	40	width	
X	27	adjusted height	
	43200	cubic inches	

43200	cubic inches	=	187.01
231			gallons
conversion constant for cubic inches to gallons			

Calculate

Reset

Calculate the ingoing parts per million (PPM) for each restricted ingredient based on 200 gallons of pickle.

$$ppm = \frac{\text{lb RI} \bullet \text{percent pump} \bullet 1{,}000{,}000}{\text{lb pickle}}$$

Phosphate

$$ppm = \frac{72 \bullet .14 \bullet 1{,}000{,}000}{2000}$$

ppm = 5040

Nitrate

$$ppm = \frac{8 \bullet .14 \bullet 1{,}000{,}000}{2000}$$

ppm = 560

Nitrite

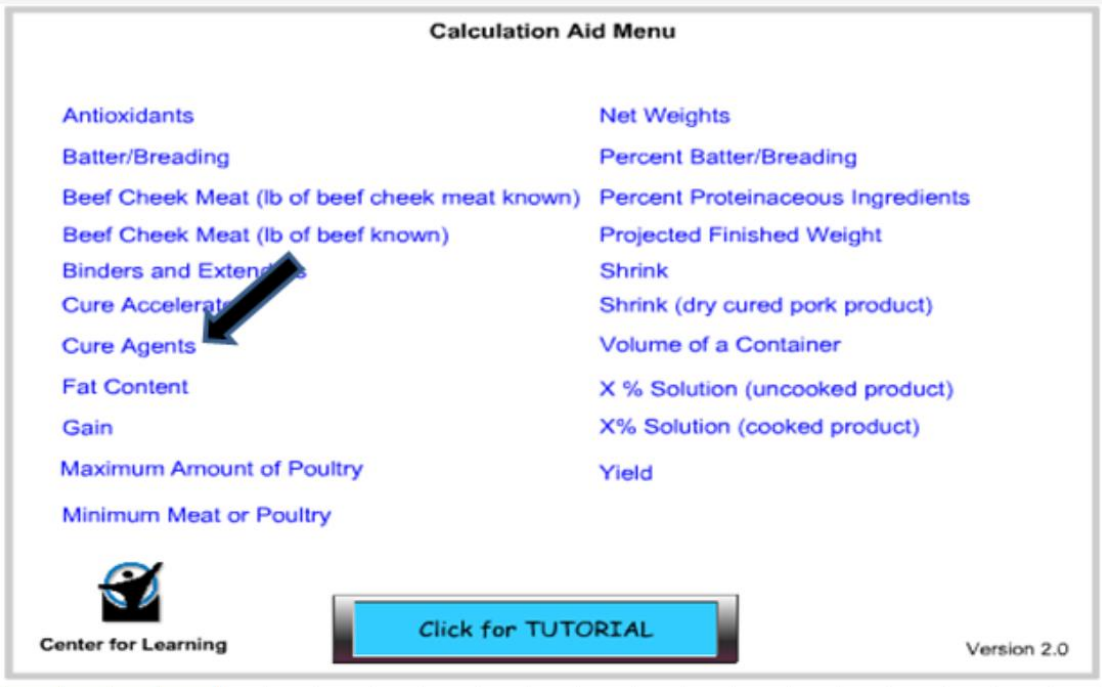
$$ppm = \frac{2.625 \bullet .14 \bullet 1{,}000{,}000}{2000}$$

ppm = 183.75

Ascorbate

$$ppm = \frac{5 \bullet .14 \bullet 1{,}000{,}000}{2000}$$

ppm = 350



Menu

Curing Agents

Maximum Amount of Nitrite - Comminuted Product (ppm formula)

PPM of Ingoing Nitrite - Comminuted Product

Maximum Amount of Nitrite - Communited Prod (.25 oz per 100 lb. of meat block)

PPM of Ingoing Nitrite - Pickle Cured Product

Maximum Amount of Nitrite - Pickle Cured Product

Maximum Amount of Nitrate - Communited Product (2.75 oz per 100 lb. of meat block)

Back

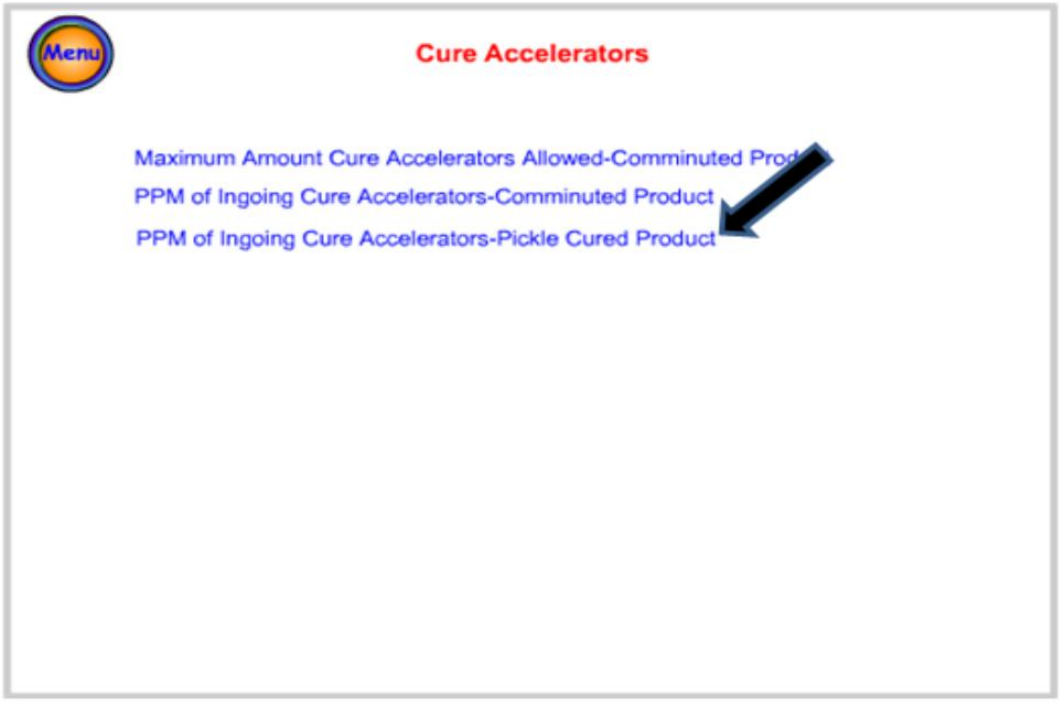
04B04 - In-going Nitrite

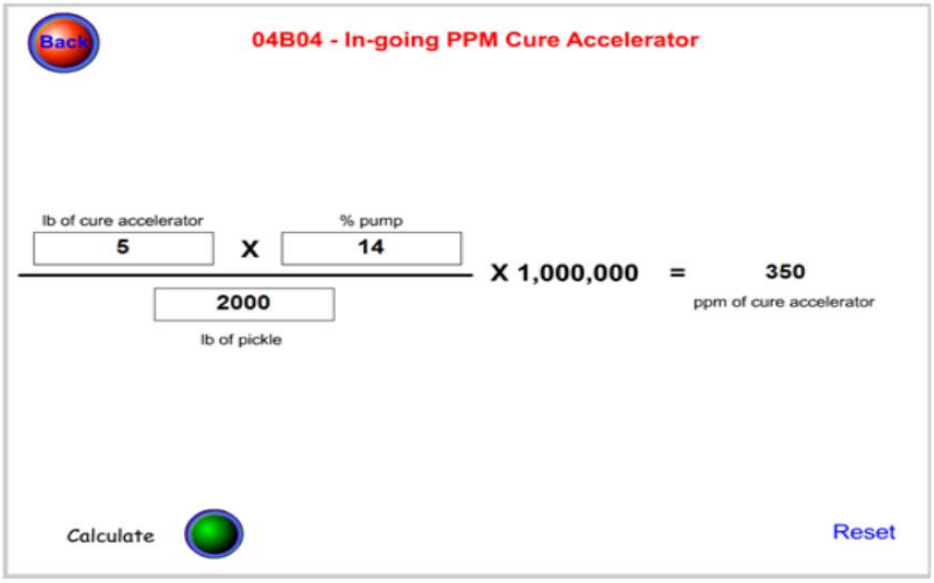
$$\frac{\text{lb of sodium nitrite}: 2.625 \times \text{\% pump}: 14 \times 1{,}000{,}000}{\text{lb pickle solution}: 2000} = 183.75 \text{ ppm nitrite}$$

Calculate

Reset


Calculation Aid Menu
Antioxidants
Batter/Breading
Beef Cheek Meat (lb of beef cheek meat known)
Beef Cheek Meat (lb of
ef known)
Binders and Exten
Cure Accelerators
Cure Agents
Fat Content
Gain
Maximum Amount of Poultry
Minimum Meat or Poultry
Net Weights
Percent Batter/Breading
Percent Proteinaceous Ingredients
Projected Finished Weight
Shrink
Shrink (dry cured pork product)
Volume of a Container
X % Solution (uncooked product)
X% Solution (cooked product)
Yield
Center for Learning
Click for TUTORIAL
Version 2.0


Menu
Cure Accelerators
Maximum Amount Cure Accelerators Allowed-Comminuted Prod
PPM of Ingoing Cure Accelerators-Comminuted Product
PPM of Ingoing Cure Accelerators-Pickle Cured Product



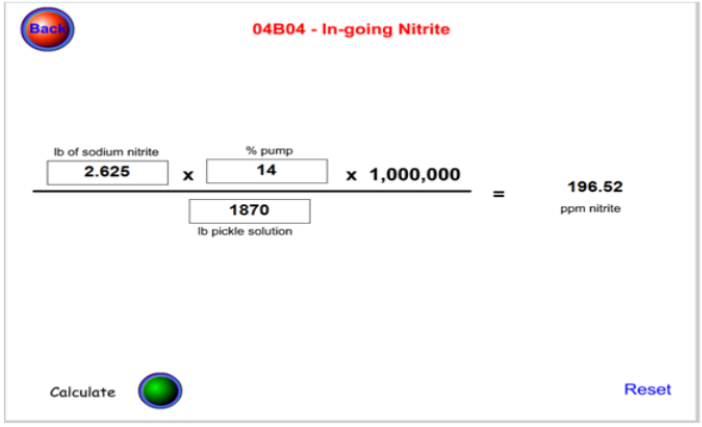
Note: The calculation aid does not address phosphates and nitrate in a pickled cured product, but IPP use the same equation used for nitrite and ascorbate.

Calculate the ingoing PPM for nitrite based on the gallons of pickle from question 1.

Nitrite

$$ppm = \frac{2.625 \bullet .14 \bullet 1,000,000}{1870}$$

ppm = 196.52 ppm (higher than with the written pickle formula using 200 gallons)



The General Labeling task is on the task calendar today. The establishment's written procedure states that the beef brisket pickle solution is prepared in an 860-gallon curing vat. The total ingredients (including water) weigh 8,586 lb. The pump target is 12%.

(**Note:** The cure ingredients are combined in a curing compound.)

The cure compound label states:

Sodium nitrite	23%
Sodium erythorbate	25%
Salt carrier	52%
Total	100%

What is the maximum amount of curing compound permitted in this pickle formula?

Did these calculations support your concern(s) from question 1? **Yes**

The amount of ingoing nitrite was higher using the actual weight of the pickle (1,870 lb). 183.75 ppm vs 196.52 ppm

- Based on the A03 pickle formula (200 gallons), was the regulatory limit exceeded for any of the restricted ingredients? **Yes**

The phosphate regulatory limit was exceeded. Only 5000 ppm are permitted ingoing.

62.21 lb **[Amount allowed ÷ percent in compound = lb restricted]**

Nitrite

$$200 = \frac{X \bullet 0.12 \bullet 1{,}000{,}000}{8586}$$

$$X = \frac{200 \bullet 8586}{.12 \bullet 1{,}000{,}000}$$

$$X = \frac{1{,}717{,}200}{120{,}000}$$

X = 14.31 lb

X = 14.31 ÷ .23 (23%) = **62.21 lb**

Erythorbate

$$547 = \frac{X \bullet 0.12 \bullet 1{,}000{,}000}{8586}$$

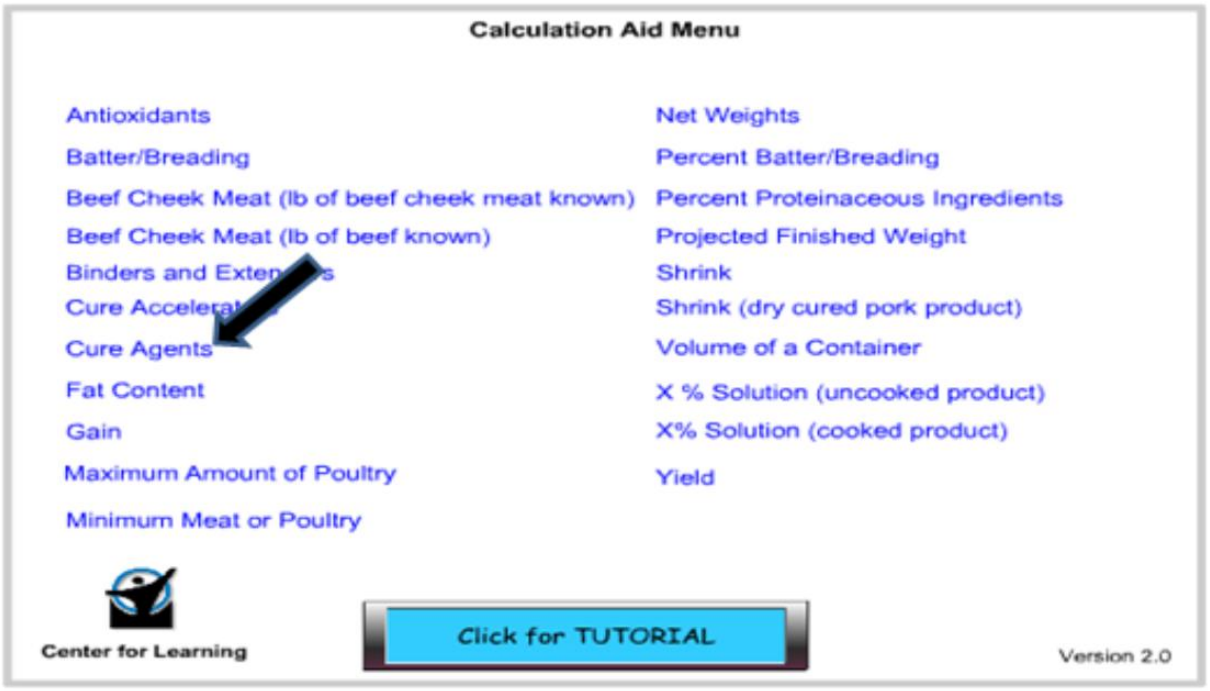
$$X = \frac{547 \bullet 8586}{.12 \bullet 1{,}000{,}000}$$

$$X = \frac{4{,}696{,}542}{120{,}000}$$

X = 39.13 lb

X = 39.13 ÷ .25 (25%) = **156.5 lb**

The calculation aid can be used to determine the maximum amount of nitrite but then you must divide the maximum amount of nitrite by the % in the cure compound. Determining the maximum amount of erythorbate is not demonstrated by calculation aid.



Menu

Curing Agents

Maximum Amount of Nitrite - Comminuted Product (ppm formula)

PPM of Ingoing Nitrite - Comminuted Product

Maximum Amount of Nitrite - Communited Product (.25 oz per 100 lb. of meat block)

PPM of Ingoing Nitrite - Pickle Cured Product

Maximum Amount of Nitrite - Pickle Cured Product

Maximum Amount of Nitrate - Communited Product (2.75 oz per 100 lb. of meat block)

Back

04B04 - Maximum Nitrite

$$\frac{200 \times \underset{\text{lb pickle solution}}{\boxed{8586}}}{\underset{\text{\% pump}}{\boxed{12}} \times 1{,}000{,}000} = \underset{\text{lb of sodium nitrite}}{14.31}$$

Calculate

Reset

How many gallons are contained in a cylindrical drum filled to within two inches of the top with pickle if the drum dimensions are 24" (diameter) X 30" (height)?

Note: $V = \pi r^2 h$ $\pi = 3.14$ r = radius h = height V= volume

There are 231 cubic inches in a gallon

54.8 gallons

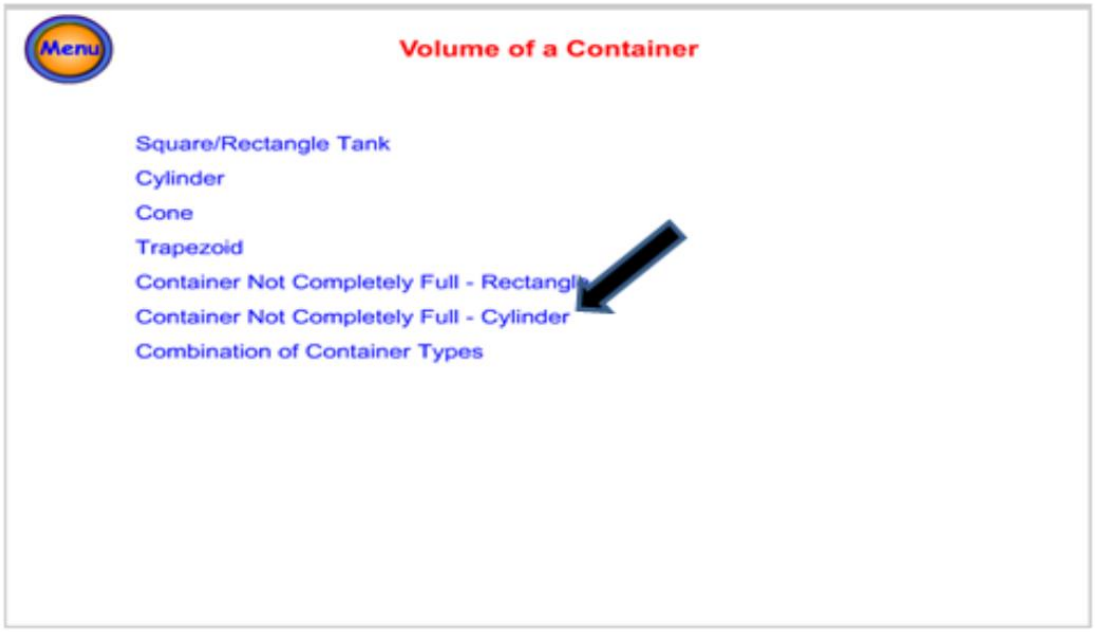
$$V = \pi R^2 [H - 2]$$

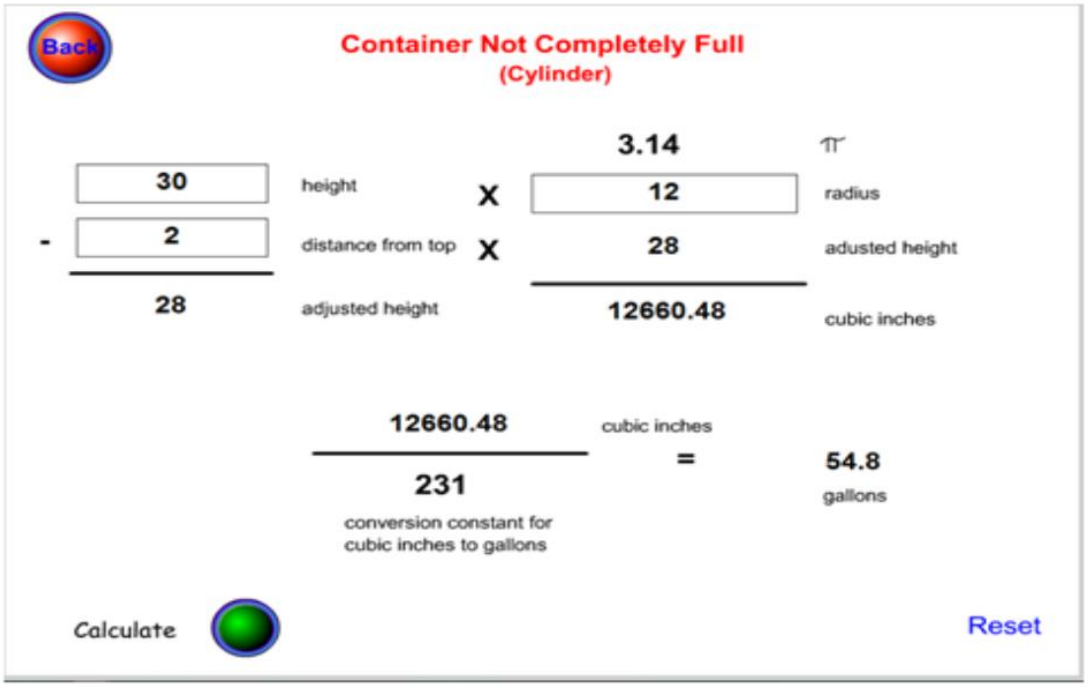
$$V = \frac{3.14 \bullet 12^2 \bullet [30 - 2]}{231}$$

$$V = \frac{3.14 \bullet 144 \bullet 28}{231}$$

$$V = \frac{12660.48}{231}$$

V = 54.8 gallons





How much nitrite, nitrate, and ascorbic acid could be used if the establishment wants to pump 15%? (A gallon of pickle weighs 9.68 pounds.)

Nitrite 0.70 lb **The Calculation aid doesn't demonstrate max. nitrate or ascorbic acid**

Nitrate 2.47 lb

Ascorbic Acid 1.65 lb

Nitrite

$$200 = \frac{X \bullet 0.15 \bullet 1{,}000{,}000}{54.8 \times 9.68 \text{ lb}}$$

$$X = \frac{200 \bullet 530.46}{.15 \bullet 1{,}000{,}000}$$

X = .70 lb

Nitrate

$$700 = \frac{X \bullet 0.15 \bullet 1{,}000{,}000}{530.46}$$

$$X = \frac{700 \bullet 530.46}{.15 \bullet 1{,}000{,}000}$$

X = 2.47 lb

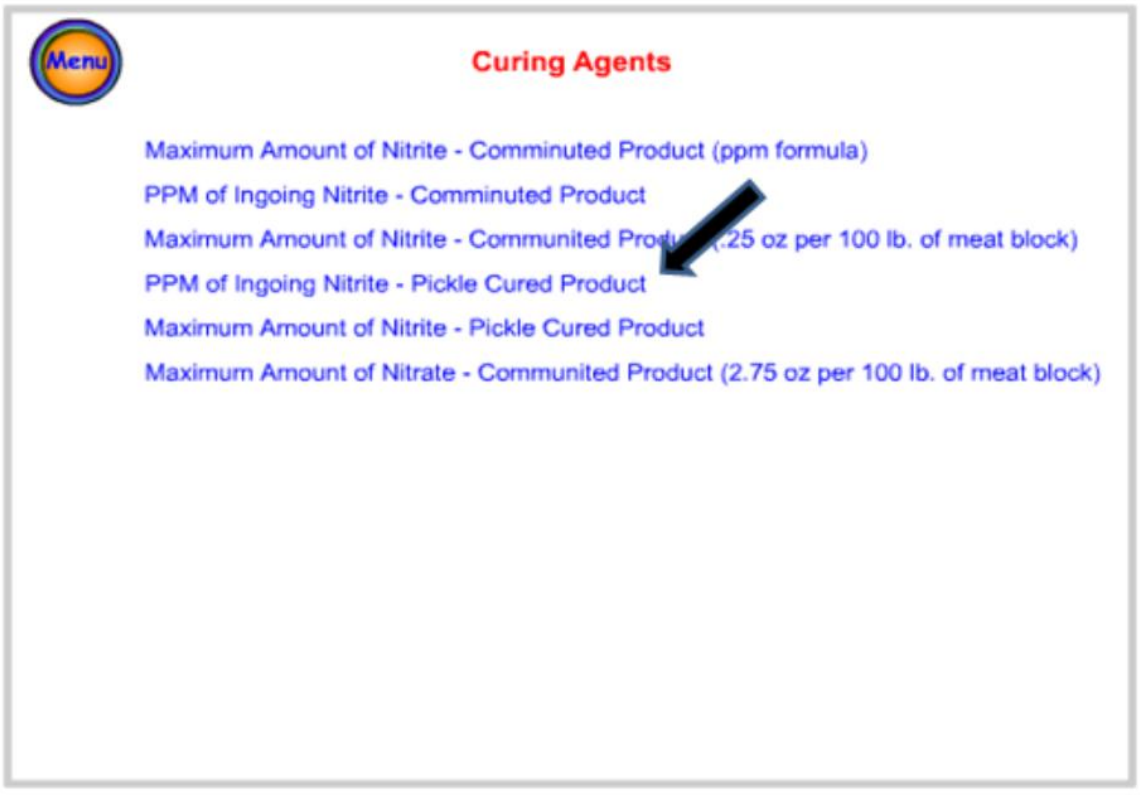
Ascorbic Acid

$$469 = \frac{X \bullet 0.15 \bullet 1{,}000{,}000}{530.46}$$

$$X = \frac{469 \bullet 530.46}{.15 \bullet 1{,}000{,}000}$$

X = 1.65 lb


Calculation Aid Menu
Antioxidants
Batter/Breading
Beef Cheek Meat (lb of beef cheek meat known)
Beef Cheek Meat (lb of beef known)
Binders and Exte
Cure Accelera
Cure Agents
Fat Content
Gain
Maximum Amount of Poultry
Minimum Meat or Poultry
Net Weights
Percent Batter/Breading
Percent Proteinaceous Ingredients
Projected Finished Weight
Shrink
Shrink (dry cured pork product)
Volume of a Container
X % Solution (uncooked product)
X% Solution (cooked product)
Yield
Center for Learning
Click for TUTORIAL
Version 2.0


Menu
Curing Agents
Maximum Amount of Nitrite - Comminuted Product (ppm formula)
PPM of Ingoing Nitrite - Comminuted Product
Maximum Amount of Nitrite - Communited Prod
.25 oz per 100 lb. of meat block)
PPM of Ingoing Nitrite - Pickle Cured Product
Maximum Amount of Nitrite - Pickle Cured Product
Maximum Amount of Nitrate - Communited Product (2.75 oz per 100 lb. of meat block)

Back

04B04 - Maximum Nitrite

$$\frac{200 \times \underset{\text{lb pickle solution}}{530.46}}{\underset{\text{\% pump}}{15} \times 1{,}000{,}000} = \underset{\text{lb of sodium nitrite}}{0.7}$$

Calculate

Reset