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**Calculation of the 1.582 (fat) and the 1.405 (protein) factors in the current system.**

Page 183 of the Final Rule. "Both the 1.405 and the 1.582 factors are determined by calculating the change in cheese yield if an additional tenth of a pound of protein or butterfat is contained in the milk, holding everything else constant. The proposed rule used a 1.32 factor time the cheese for use in computing the protein price. The change to a factor of 1.405 reflects the use of true protein as the basis for payments rather than using a measurement of "total nitrogen" for the protein content of milk. The resulting protein price will be for a pound of "true protein"."

Component	percent	Example Calculations:
Milk fat	3.50	
Milk crude protein	3.20	
Milk true protein	3.01	
Cheese Moisture	38.00	

**Calculation of the Protein Factor (Assuming 75% of crude protein as casein):**

$$\frac{[(3.5 \times 0.9) + ((0.75 \times 3.20) - 0.1)]1.09}{1 - (38.00/100)} = \frac{(3.15 + (2.40 - 0.1))1.09}{0.62} = \frac{5.9405}{0.62} = 9.5815$$

$$\frac{[(3.5 \times 0.9) + ((0.75 \times 3.30) - 0.1)]1.09}{1 - (38.00/100)} = \frac{(3.15 + (2.475 - 0.1))1.09}{0.62} = \frac{6.0223}{0.62} = 9.7133$$

Difference in Yield (9.7133 - 9.5815) = 0.1318 lbs of cheese per 0.1 pound crude protein or 1.318 lbs of cheese produced for one more pound of crude protein. (Rounds to 1.32)

**Calculation of the Protein Factor (Assuming 78% of crude protein as casein):**

$$\frac{[(3.5 \times 0.9) + ((0.78 \times 3.20) - 0.1)]1.09}{1 - (38.00/100)} = \frac{(3.15 + (2.496 - 0.1))1.09}{0.62} = \frac{6.0451}{0.62} = 9.7502$$

$$\frac{[(3.5 \times 0.9) + ((0.78 \times 3.30) - 0.1)]1.09}{1 - (38.00/100)} = \frac{(3.15 + (2.574 - 0.1))1.09}{0.62} = \frac{6.1302}{0.62} = 9.8874$$

Difference in Yield (9.8874 - 9.7502) = 0.1371 lbs of cheese per 0.1 pound crude protein or 1.371 lbs of cheese produced for one more pound of crude protein. (Rounds to 1.37)

**Adjustment of 1.32 to protein factor from a crude to a true protein basis:**

Ratio of Crude to True Protein :  $(3.20/3.01) = 1.0631$

Adjusted Protein Factor :  $1.32 \times 1.0631 = 1.403$

**Adjustment of 1.37 to protein factor from a crude to a true protein basis:**

Ratio of Crude to True Protein :  $(3.20/3.01) = 1.0631$

Adjusted Protein Factor :  $1.37 \times 1.0631 = 1.456$

**Calculation of the Fat Factor (Assuming 90% fat recovery in the cheese):**

$$\frac{[(3.5 \times 0.9) + ((0.75 \times 3.20) - 0.1)]1.09}{1 - (38.00/100)} = \frac{(3.15 + (2.40 - 0.1))1.09}{0.62} = \frac{5.9405}{0.62} = 9.5815$$

$$\frac{[(3.6 \times 0.9) + ((0.75 \times 3.20) - 0.1)]1.09}{1 - (38.00/100)} = \frac{(3.24 + (2.40 - 0.1))1.09}{0.62} = \frac{6.0386}{0.62} = 9.7397$$

Difference in Yield  $(9.7397 - 9.5815) = 0.1582$  lbs of cheese per 0.1 pound of fat or  
1.582 lbs of cheese produced for one more pound of milk fat.