

## Method of calculating fatty acid content of tall oil

### Scope

This method is used to calculate the fatty acid content of crude tall oil using results from other tests previously performed.

Two procedures are available for calculating the fatty acid content of crude tall oil and other related products. If the fatty acid content is  $\geq 5\%$ , the first procedure is used. For products with fatty acid contents  $< 5\%$  (e.g. rosin), the second procedure is used.

The fatty acid content is calculated by subtracting rosin, unsaponifiables, and water from 100% or using the acid number and rosin acid content in a calculation to obtain the fatty acid content.

### Calculations

#### Procedure 1 (FA $\geq 5\%$ ):

1. From other PCA or ASTM test procedures, obtain the rosin acid, unsaponifiable, and water content.
2. Calculate the fatty acid content and report the value to the nearest 0.1%.

Fatty acid, % =  $100 - (IRA + UNS + Water)$

where:

RA = % rosin acids  
UNS = % unsaponifiable matter

#### Procedure 2 (FA $< 5\%$ ):

1. From other PCA or ASTM test procedures, obtain the percent rosin acid and acid number.
2. Calculate the fatty acid as oleic acid and report the value to the nearest 0.1 %.

$$\text{Fatty acid, \%} = \frac{AN - (RA \times 1.855)}{1.986}$$

where:

AN = acid number (as oleic acid)  
RA = rosin acids, %  
1.855 = conversion factor for converting rosin acid percentage to acid number  
1.986 = conversion factor for converting acid number to oleic acid

### Precision statement

Based on an ASTM round-robin study, the within laboratory (repeatability) standard deviation for this test is 0.2% and the between laboratory (reproducibility) standard deviation for this test is 0.7%.

### References

- ASTM D1585 "Fatty Acid Content of Naval Stores, Including Rosin, Tall Oil and Related Products."  
ASTM D465 "Acid Number of Naval Stores Products Including Tall Oil and Other Related Products."  
ASTM D1065 "Unsaponifiable Matter in Naval Stores, Including Rosin, Tall Oil and Related Products."  
ASTM D1240 "Rosin Acids Content of Naval Stores Including Rosin, Tall Oil, and Related Products"  
ASTM D803 "Standard Test Methods for Testing Tall Oil: □