

What is Combining Weight?

Combining weight is the apparent equivalent weight of a sulfonic acid such as Calsoft LAS-99. The units of combining weight are grams per equivalent.

How is Combining Weight Determined?

Quite simply: acid-base titration using standard sodium hydroxide to a phenolphthalein endpoint. Actually, our analytical method calls for the addition of excess sodium hydroxide, followed by titration with hydrochloric acid to the endpoint. This technique ensures that the small quantity of sulfur dioxide in our product, which contributes to the combining weight, doesn't escape during the titration.

What's the Combining Weight used for?

The primary purpose of the combining weight is for calculation of the amount of base needed for neutralization of the sulfonic acid. For example, a typical Calsoft LAS-99 combining weight is 295 (g/eq). This means that 295 grams of Calsoft LAS-99 is neutralized by one equivalent of base. This base could be 50% NaOH (80 grams), diethanolamine (105 grams) or any other desired base.

Pilot's Product Bulletin, "Neutralization Factors for Calsoft LAS-99", shows how combining weights are used for neutralization using a wide variety of bases.

Combining weight is also an important process control tool used by Pilot when manufacturing Calsoft LAS-99 and other sulfonic acids.

Is Combining Weight the same as Active Content?

NO! It is a common but serious mistake to assume that combining weight must have a direct correlation to the active content of a sulfonic acid. There are typically three acidic species in sulfonic acids: the sulfonic acid itself (i.e., the "active"), sulfuric acid, and sulfur dioxide. All three compounds contribute to the combining weight. For any given combining weight, there are an infinite number of combinations of the three components that will yield the same combining weight. For example, consider the following two sets of inspections for sulfonic acid:

Inspection	Sample A	Sample B
% Active	97.5	80.0
% H ₂ SO ₄	1.46	4.2
% SO ₂	0.10	0.10
Combining weight (calculated)	295.0	295.0

Both acids will require exactly the same amount of base for neutralization, but Sample A contains almost 25% more active than Sample B.