



SAG10 Version 3.10 and the 2012 NESC Tension Limit Changes

I. 2012 NESC New Tension Limits

Prior versions of the National Electric Safety Code (NESC) require unloaded tension limits of 35% RBS initial and 25% RBS final. Both limits apply at a conductor temperature of 60.0°F (15.0°C). The 2012 National Electric Safety Code, Paragraph 261 H(1)b keeps the same tension limits but lowers the temperature requirement to values listed in Table 251-1. Table 251-1 temperatures applicable to the tension limits are the following:

NESC "Heavy": 0.0°F (-20.0°C)
NESC "Medium": 15.0°F (-10.0°C)
NESC "Light": 30.0°F (-1.0°C)

The intent of the unloaded tension limits is control of Aeolian (wind-induced) vibration. Internal damping of an overhead conductor decreases as the tension increases, which means that lines at higher tension are more prone to vibration problems. The 2012 NESC provides for three (3) exceptions to the new tension limits:

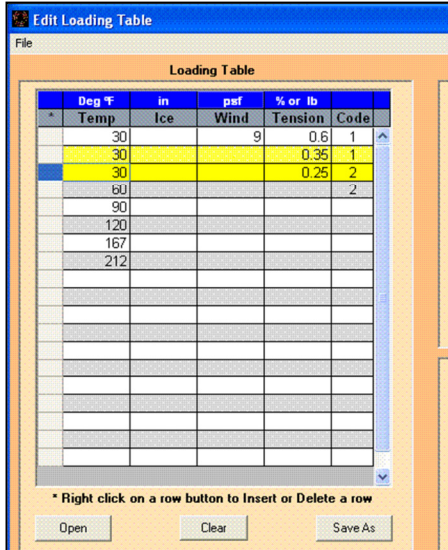
- 1) Lines employing vibration dampers,
- 2) Lines employing self-damping conductor, or;
- 3) When "a qualified engineering study, manufacturer's recommendation, or experience indicates Aeolian vibration damage is not likely to occur".

Attention is directed to the cautionary note at the end of Paragraph H(1)b: "The above limitations may not protect the conductor or facilities from damage due to Aeolian vibration". Southwire strongly recommends against relying on tension alone for vibration control, as there are other important factors that should be considered.

II. Implications for SAG10 Version 3.10

For convenience, the SAG10 software is pre-programmed with loading tables including NESC. In accordance with the exceptions stated above, there is no change in the NESC values in the SAG10 program for any line if vibration protection is addressed during line design. In most cases, there is no change required.

For the purpose of showing NESC compliance for lines with no dampers and no record of an engineering analysis, the default NESC loading tables in the SAG10 program may be easily revised as shown in the screen shots below. The temperatures in the highlighted rows are the only changes:



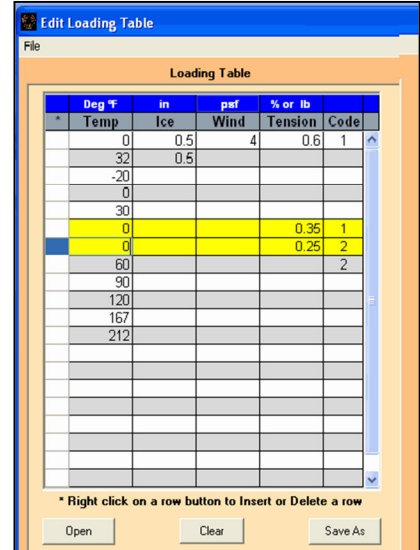
Deg °F	in	psf	% or lb	Code
Temp	Ice	Wind	Tension	
30	9	0.6	1	
30	0.35	1		
30	0.25	2		
60				2
90				
120				
167				
212				

2012 NESC "Light"



Deg °F	in	psf	% or lb	Code
Temp	Ice	Wind	Tension	
15	0.25	4	0.6	1
32	0.25			1
0				2
15			0.35	1
15			0.25	2
60				2
90				
120				
167				
212				

2012 NESC "Medium"



Deg °F	in	psf	% or lb	Code
Temp	Ice	Wind	Tension	
0	0.5	4	0.6	1
32	0.5			2
0			0.35	1
0			0.25	2
60				2
90				
120				
167				
212				

2012 NESC "Heavy"

Old tension limits (all at 60.0°F) comply with the 2012 NESC provided vibration protection has been addressed by use of dampers, self-damping conductor, engineering analysis, manufacturer’s recommendation, or “experience”.

To accommodate the changes made in the 2012 version of NESC, three new load tables (2012 NESC Light, Medium, and Heavy) have been created. These load tables can be found at <http://test.sag10.com/support/Downloads.htm>. The procedure for use of these load tables is as follows:

The load tables can be copied and pasted into the *SAG10\LoadFiles* directory. To make use of these files while running the SAG10 program, check *Use Existing Load Table* within the Load Selection panel. Next, locate the appropriate load table file in your *SAG10\LoadFiles* directory. Incorporating the load tables in this manner allows for use of either the old or new NESC load tables when necessary.