Tweeter crossover frequency

In order to ensure the safe and distortion-free use of a tweeter in active mode, the following „rule of thumb“ is applicable (minimum values):

Crossover frequency at 24dB slope : TW resonance frequency (fo) * 2
Crossover frequency at 18dB slope : TW resonance frequency (fo) * 2
Crossover frequency at 12dB slope : TW resonance frequency (fo) * 3
Crossover frequency at 6dB slope : TW resonance frequency (fo) * 5

If the tweeter is often subjected to higher loads because the listener likes to hear louder, the factor must be increased by 1:

Crossover frequency at 24dB slope : TW resonance frequency * 3
Crossover frequency at 18dB slope : TW resonance frequency * 3
Crossover frequency at 12dB slope : TW resonance frequency * 4
Crossover frequency at 6dB slope : TW resonance frequency * 6

Example:

Tweeter Gladen HG-25PV, resonance frequency 860Hz
Crossover frequency at 24dB slope : 860Hz * 3 = 2580Hz
Crossover frequency at 18dB slope : 860Hz * 3 = 2580Hz
Crossover frequency at 12dB slope : 860Hz * 4 = 3440Hz
Crossover frequency at 6dB slope : 860Hz * 6 = 5160Hz

Individual cases/special cases not considered!

If this is felt not safe enough, a PTC can be inserted into the + line between the amplifier and the tweeter. This "chokes" the tweeter when too much power is applied for a few seconds, as the internal resistance of the PTC increases sharply.

Common PTC value for 25mm heavy duty tweeter : 9W, type SE090
Common PTC value for heavy duty 19mm tweeter : 6W, type SE060

The blocking effect (high resistance) of the PTC neutralizes itself if no signal comes from the amplifier for a few seconds/minutes (amplifier off).

Term : Octave

The term octave describes the distance between two frequencies ("tones") in a ratio of 2:1, i.e. the doubling or halving of any frequency.

Examples:
200Hz <- one octave -> 400Hz <- one octave -> 800Hz <- one octave -> 1600Hz
150Hz <- one octave -> 300Hz <- one octave -> 600Hz <- one octave -> 1200Hz

Term : slope (steepness)

The slope describes the rising or falling edge ("ramp") of a filter.
The definition refers to the "linear" part of this edge.

Examples:
If this "linear" edge, range between 200Hz and 400Hz, rises or falls by 10dB, an slope of 10dB/octave is to be mentioned.
If this "linear" edge, range between 350Hz and 700Hz, rises or falls by 15dB, an slope of 15dB/octave is to be mentioned.