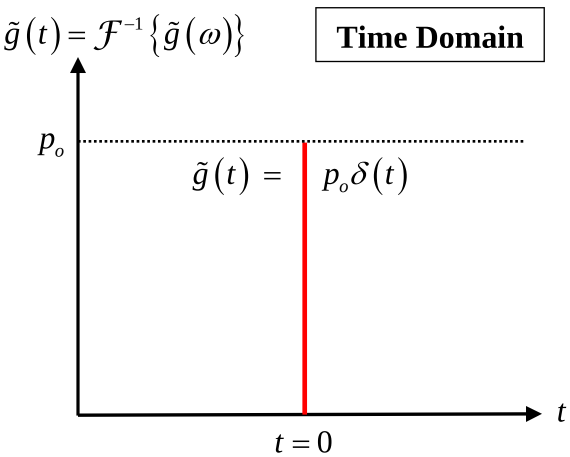
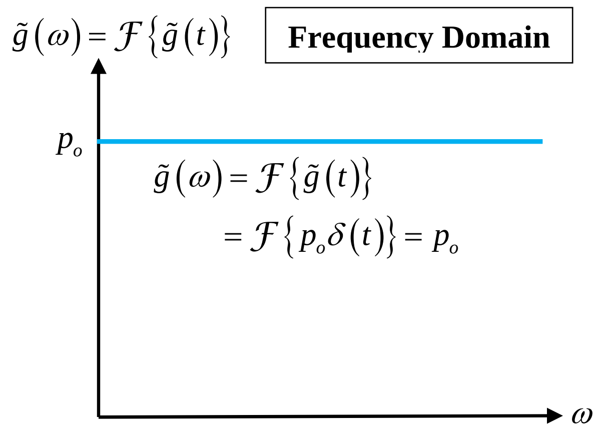
Conversely, an infinitely sharp/narrow ***time*** ***domain*** sound "spike" $\tilde{g}_1(t) = p_o\delta(t)$ $(Pascals/sec)$ produces a ***flat*** frequency ***spectrum*** (a ***continuum*** of frequencies with ***equal*** amplitudes) $\tilde{g}(f) = \tilde{g}(\omega) = \mathcal{F}\{\tilde{g}(t)\} = p_o$ $(Pascals)$, as shown graphically in the two figures below:





There are many useful relations associated with Fourier transforms, which we summarize below, for the most commonly used ones:

	Time-Domain:		**Frequency Domain:**
Linearity:	$\tilde{h}(t) = a\tilde{f}(t) + b\tilde{g}(t)$	$\Rightarrow$	$\tilde{h}(\omega) = a\tilde{f}(\omega) + b\tilde{g}(\omega)$
Translation:	$\tilde{h}(t) = \tilde{f}(t - t_o)$	$\Rightarrow$	$\tilde{h}(\omega) = \tilde{f}(\omega)e^{i\omega t_o}$
Modulation:	$\tilde{h}(t) = \tilde{f}(t)e^{i\omega_o t}$	$\Rightarrow$	$\tilde{h}(\omega) = \tilde{f}(\omega - \omega_o)$
Scaling:	$\tilde{h}(t) = \tilde{f}(at)$	$\Rightarrow$	$\tilde{h}(\omega) = \frac{1}{\lvert a\rvert}\tilde{f}\left(\frac{\omega}{a}\right)$
Conjugation:	$\tilde{h}(t) = \tilde{f}^*(t)$	$\Rightarrow$	$\tilde{h}(\omega) = \tilde{f}^*(-\omega)$