Notations for Gaussian beams

The Gaussian beam theory is taken from the 1966 article of Kogelnik and Li. In the original article, they use as notation:

$$\rho = \frac{\pi w^2}{\lambda}$$

which lead to expressions that are simple to memorize. The complex "q" parameter is defined as:

$$\frac{1}{q} = \frac{1}{R} - \frac{i}{\rho}$$

$$\rho = \rho_0(1 + \frac{z^2}{\rho_0})$$

where ρ_0 is the value of ρ at the beam waist, hence the Rayleigh range.

In their attempts to "add" something to that original paper and not being accused of plagiarism (which it is), the intellectually challenged authors of laser book changed ρ_0 in z_R. To follow their misguided logic, the definition of the complex "q" parameter is defined as:

$$\frac{1}{q} = \frac{1}{R} - \frac{i}{z}$$

which of course does not make sense. Also the expression for the evolution of the beam waist cannot be written

$$z = z_R(1 + \frac{z^2}{z_R^2})$$

. As a result, all students of lasers classes have to carry the factor $\pi w^2/\lambda$ in all their calculations, and as a result they mess up quite often.