Physically, just as the complex scalar electrical ***impedance*** $\tilde{Z}_e$ is a measure of an electrical device to ***impede*** the ***flow*** of a complex scalar *AC* electrical current $\tilde{I} = \vec{\tilde{J}}_e \bullet \vec{S}_\perp \left(C/s\right)$ when a complex scalar *AC* voltage $\tilde{V}$ is applied across the terminals of the electrical device, the complex 3-D vector acoustic impedance $\vec{\tilde{\mathbb{Z}}}_a\left(\vec{r},\omega\right)$ is a measure of the acoustical medium's ability to ***impede*** the ***flow*** of a complex acoustic mass current $\tilde{I}_a\left(\vec{r},\omega\right) = \vec{\tilde{J}}_a\left(\vec{r},\omega\right)\bullet\vec{S}_\perp = \rho_o \vec{\tilde{u}}\left(\vec{r},\omega\right)\bullet\vec{S}_\perp \left(kg/s\right)$ for a complex over-pressure $\tilde{p}\left(\vec{r},\omega\right)$ at point $\vec{r}$.

Similarly, just as complex scalar electrical ***admittance*** $\tilde{Y}_e = 1/\tilde{Z}_e$ is a measure of the ***ease*** with which an electrical device ***admits*** the ***flow*** of a complex scalar *AC* electrical current $\tilde{I}_e$ when a complex scalar *AC* voltage $\tilde{V}$ is applied across the terminals of the electrical device, the complex 3-D vector acoustic admittance $\vec{\tilde{Y}}_a\left(\vec{r},\omega\right) = 1/\vec{\tilde{\mathbb{Z}}}_a\left(\vec{r},\omega\right)$ is a measure of the ***ease*** with which an acoustical medium's ***admits*** the ***flow*** of a complex scalar acoustic mass current $\tilde{I}_a\left(\vec{r},\omega\right) = \vec{\tilde{J}}_a\left(\vec{r},\omega\right)\bullet\vec{S}_\perp = \rho_o \vec{\tilde{u}}\left(\vec{r},\omega\right)\bullet\vec{S}_\perp \ \left(kg/s\right)$ in the presence of a complex over-pressure $\tilde{p}\left(\vec{r},\omega\right)$ at the point $\vec{r}$.

Another way to gain some physical insight into the nature of complex 3-D vector ***specific*** acoustic impedance $\vec{\tilde{z}}_a\left(\vec{r},\omega\right) = \tilde{p}\left(\vec{r},\omega\right)/\vec{\tilde{u}}\left(\vec{r},\omega\right)$ and complex 3-D vector ***specific*** acoustic admittance $\vec{\tilde{y}}_a\left(\vec{r},\omega\right) = \vec{\tilde{u}}\left(\vec{r},\omega\right)/\tilde{p}\left(\vec{r},\omega\right) = 1/\vec{\tilde{z}}_a\left(\vec{r},\omega\right)$ of a medium associated with a harmonic sound field is to imagine a physical situation where we set the {magnitude} of the complex scalar over-pressure $\tilde{p}\left(\vec{r},\omega\right)$ to be a constant/fixed value, *e.g.* $\left|\tilde{p}\left(\vec{r},\omega\right)\right| = 1.0\ Pascal$.

Then, for a harmonic sound field, if the complex 3-D vector ***specific*** acoustic impedance $\vec{\tilde{z}}_a\left(\vec{r},\omega\right) = \tilde{p}\left(\vec{r},\omega\right)/\vec{\tilde{u}}\left(\vec{r},\omega\right)$ at the point $\vec{r}$ happens to be very ***high***, for a fixed complex scalar over-pressure $\tilde{p}\left(\vec{r},\omega\right)$, this tells us that the complex 3-D vector particle velocity $\vec{\tilde{u}}\left(\vec{r},\omega\right)$ at that point must therefore be very ***small***, and hence the corresponding complex 3-D vector acoustic mass current density $\vec{\tilde{J}}_a\left(\vec{r},\omega\right) = \rho_o \vec{\tilde{u}}\left(\vec{r},\omega\right)$ at that point must also be very ***small***.

Conversely, if for a harmonic sound field the complex 3-D vector ***specific*** acoustic impedance $\vec{\tilde{z}}_a\left(\vec{r},\omega\right) = \tilde{p}\left(\vec{r},\omega\right)/\vec{\tilde{u}}\left(\vec{r},\omega\right)$ at the point $\vec{r}$ happens to be very ***low***, for a fixed complex scalar over-pressure $\tilde{p}\left(\vec{r},\omega\right)$, this tells us that the complex 3-D vector particle velocity $\vec{\tilde{u}}\left(\vec{r},\omega\right)$ at that point must therefore be very ***large***, and hence the corresponding complex 3-D vector acoustic mass current density $\vec{\tilde{J}}_a\left(\vec{r},\omega\right) = \rho_o \vec{\tilde{u}}\left(\vec{r},\omega\right)$ at that point must also be very ***large***.