8 If f were not injective, then there would be some distinct $x, y \in V$ such that $f(x) = f(y)$. Note that since $\phi : V \to \phi(V)$ is a homeomorphism, it is a bijection, so there are $a, b \in \phi(V)$ such that $\phi^{-1}(a) = x, \phi^{-1}(b) = y$. Then

$$(a, 0) = (\psi \circ f \circ \phi^{-1})(a) = (\psi \circ f)(x) = (\psi \circ f)(y) = (\psi \circ f \circ \phi^{-1})(b) = (b, 0)$$

but clearly $a \neq b$, a contradiction, so f is injective.
Let $U \subseteq V$ be an open set. Note that $\phi(U)$ is open in $\phi(V)$ (homeomorphism), with $\Phi(\phi(U))$ open in $\Phi(\phi(V))$ (the set $U \times \{0\}$ is open in $V \times \{0\}$). Then $\Phi(\phi(U)) = \psi(f(U))$ is open in $\Phi(\phi(V))$ if and only if $f(U)$ is open in $f(V)$ under the induced topology on $f(V)$ from Z since ψ is a diffeomorphism.