This is obvious since $\psi(U)(\tau)|V_p = \psi(V_p)(\tau|_{V_p}) = \varphi_{V_p}(t(p))$

$$\varphi_{V_p}(t(p)) = \varphi_U(t(U))|V_p.$$

and, by the property of sheaf uniqueness.

$$\psi(U)(\tau) - \varphi_U(t(U))|V_p = 0$$

The uniqueness of $\mathcal{F}^+$ is a formal consequence of the universal property.

Remark: For any p, $\mathcal{F}_p = \mathcal{F}^+_p$.

$$\sigma : U \longrightarrow \bigcup_{p \in U} \mathcal{F}_p$$

$[(U, \sigma)] \in \mathcal{F}_p^+$ (U: equivalence class) $\qquad \mathcal{F}_p \ni [(U, \tau)]$ (U: equivalence class).

$p \in V_p \Rightarrow \exists\ t \in \mathcal{F}(V_p)$.

$[(V_p, \sigma)]$ $\quad V_p \subset U$.

$$\mathcal{F}_p^+ \longrightarrow \mathcal{F}_p$$

$$[(U, \sigma)] \overset{\phi}{\longmapsto} [(V_p, t)], \quad t \in \mathcal{F}(V_p)$$

s,t $t_q = \sigma(q)$. for all $q \in V_p$

$$[(W, \tau)] \overset{\psi}{\longleftarrow} [(W, \tau)]$$

$$\tau : W \longrightarrow \bigcup_{q \in W} \mathcal{F}_q$$

$$q \longmapsto \tau_q \qquad \phi \circ \psi = id \quad \psi \circ \phi = id.$$

Note also that if $\mathcal{F}$ itself was a sheaf, then $\mathcal{F}^+$ is isomorphic to $\mathcal{F}$ via θ.