$$\int_{\partial\Omega_{i}}\mathbf{\Psi}\left(\mathbf{W}\right)\cdot\mathbf{n}\mathrm{d}S=\sum_{j=1}^{M}\int_{A_{ij}}\mathbf{\Psi}\left(\mathbf{W}\right)\cdot\mathbf{n}\mathrm{d}S=\sum_{j=1}^{M}\mathbf{F}_{ij}\,A_{ij}$$