

Fig. 4.1 Steady vortex flow pattern in the chamber with $H = 40.0$ mm for $Re_j = 541$ ($Q_j = 4.0$ slpm) and $Ra = 0$ ($\Delta T = 0^\circ\text{C}$): (a) side view flow photo taken at the vertical plane $\theta = 0^\circ$ & $\theta = 180^\circ$ and (b) the corresponding schematically sketched cross vortex flow.

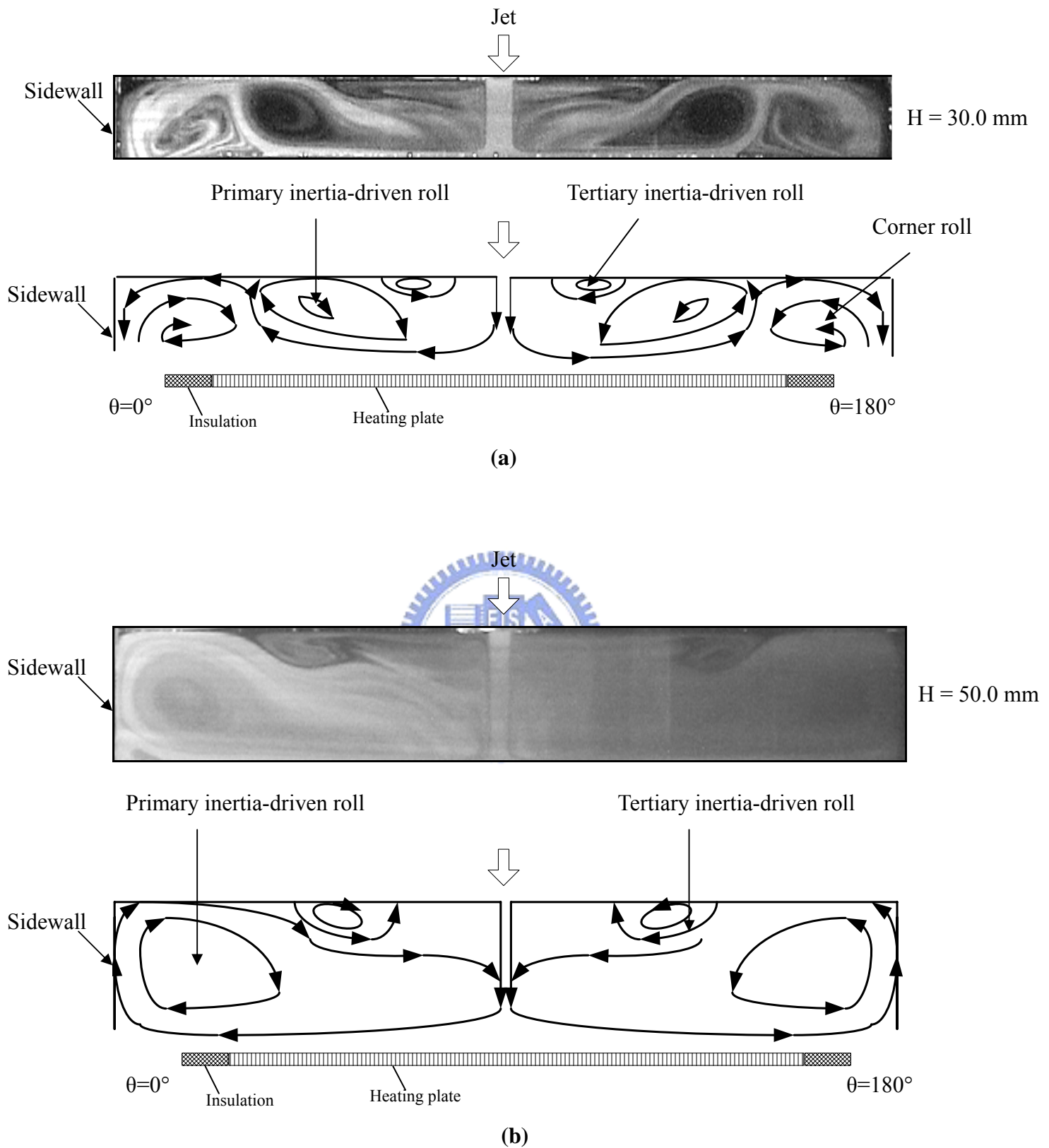


Fig. 4.2 Vortex flow pattern in the chamber with side view flow photo taken at the vertical plane $\theta = 0^\circ$ & $\theta = 180^\circ$ and the corresponding schematically sketched cross vortex flow for $Re_j = 947$ ($Q_j = 7.0 \text{ slpm}$) and $Ra = 0$ ($\Delta T = 0^\circ\text{C}$) : (a) $H = 30.0 \text{ mm}$ (b) $H = 50.0 \text{ mm}$.

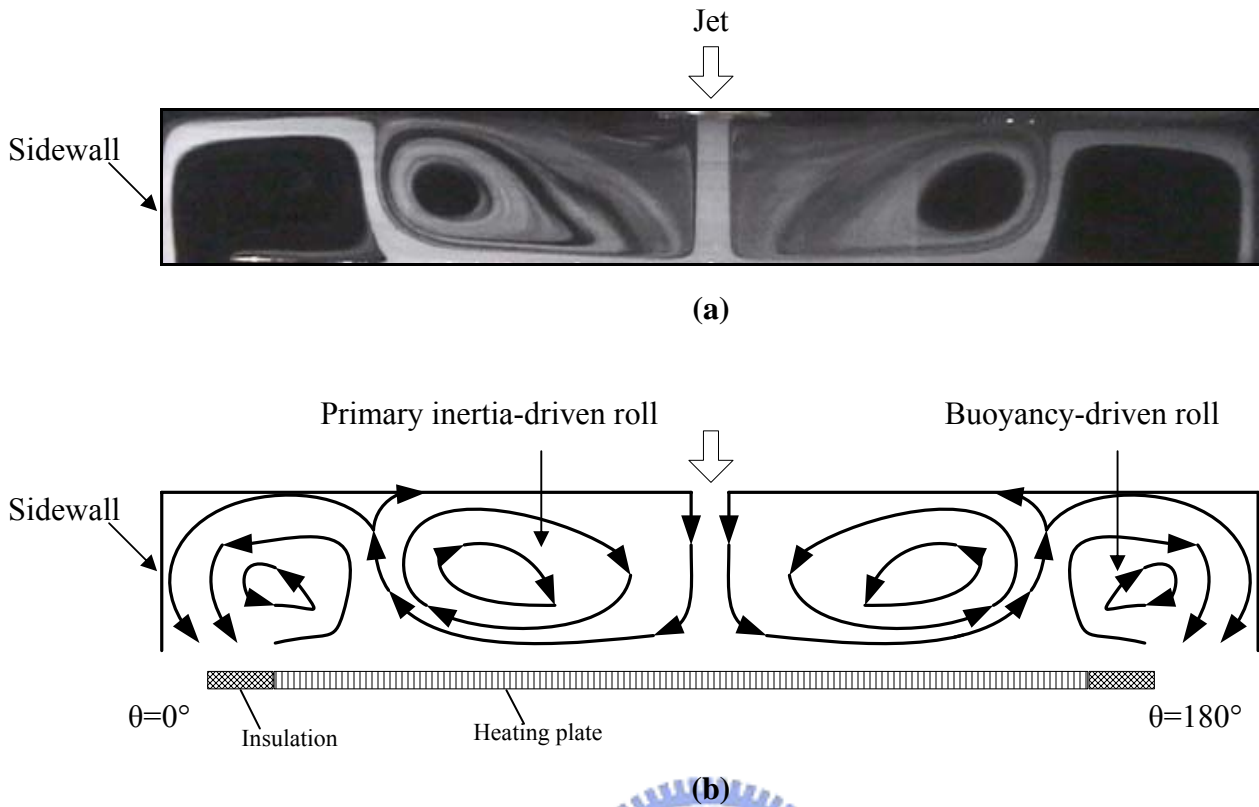


Fig. 4.3 Steady vortex flow pattern in the chamber with $H = 40.0$ mm for $Re_j = 406$ ($Q_j = 3.0$ slpm) and $Ra = 30,065$ ($\Delta T = 5^\circ\text{C}$) for (a) side view flow photo taken at the vertical plane $\theta = 0^\circ$ & $\theta = 180^\circ$ and (b) the corresponding schematically sketched cross vortex flow.

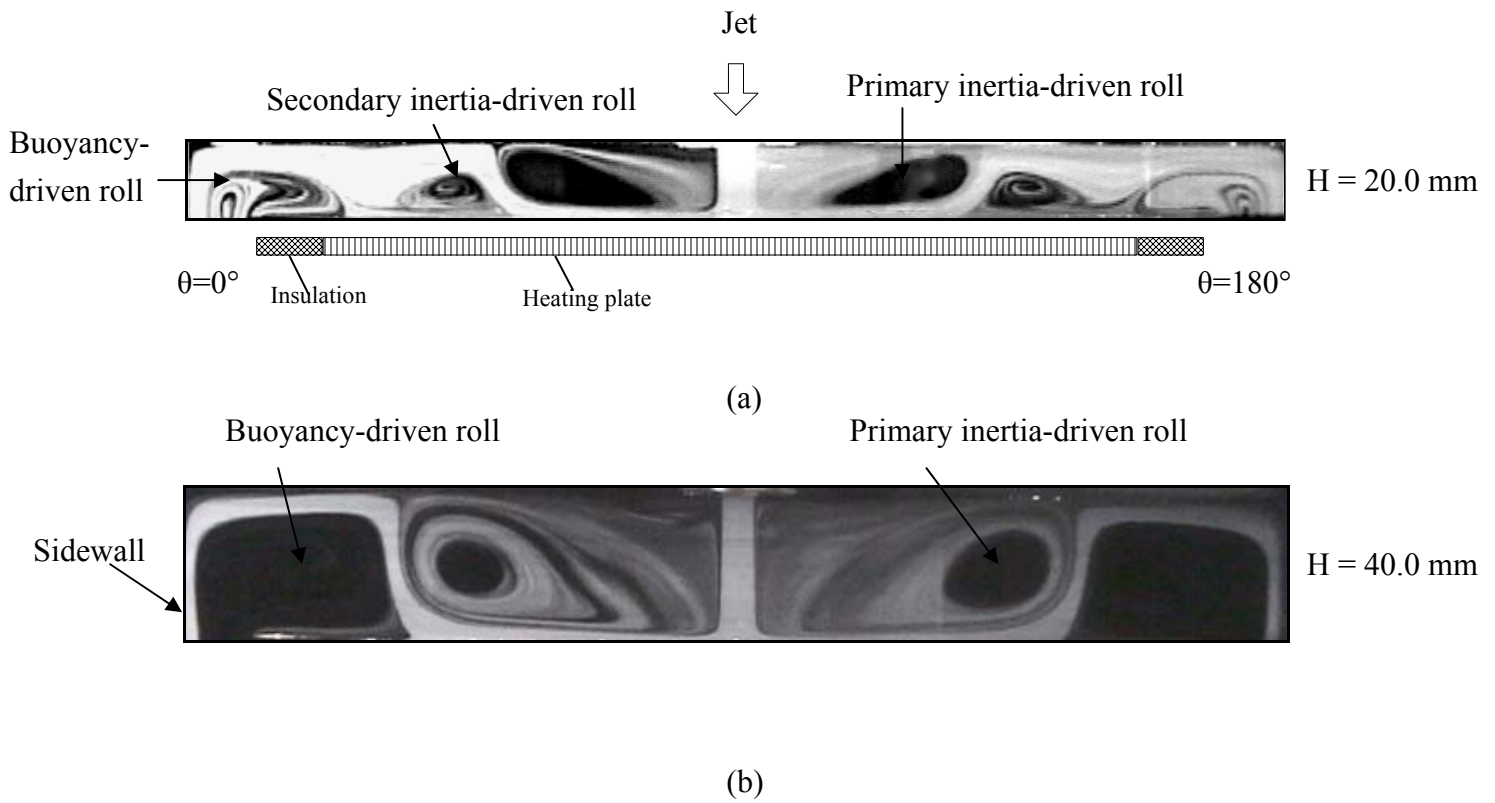


Fig. 4.4 Steady side view flow photos taken at the cross plane $\theta = 0^\circ$ & 180° at $Q_j = 3.0 \text{ slpm}$ ($Re_j = 406$) and $\Delta T = 5^\circ\text{C}$ for (a) $H = 20.0 \text{ mm}$ and (b) $H = 40.0 \text{ mm}$.

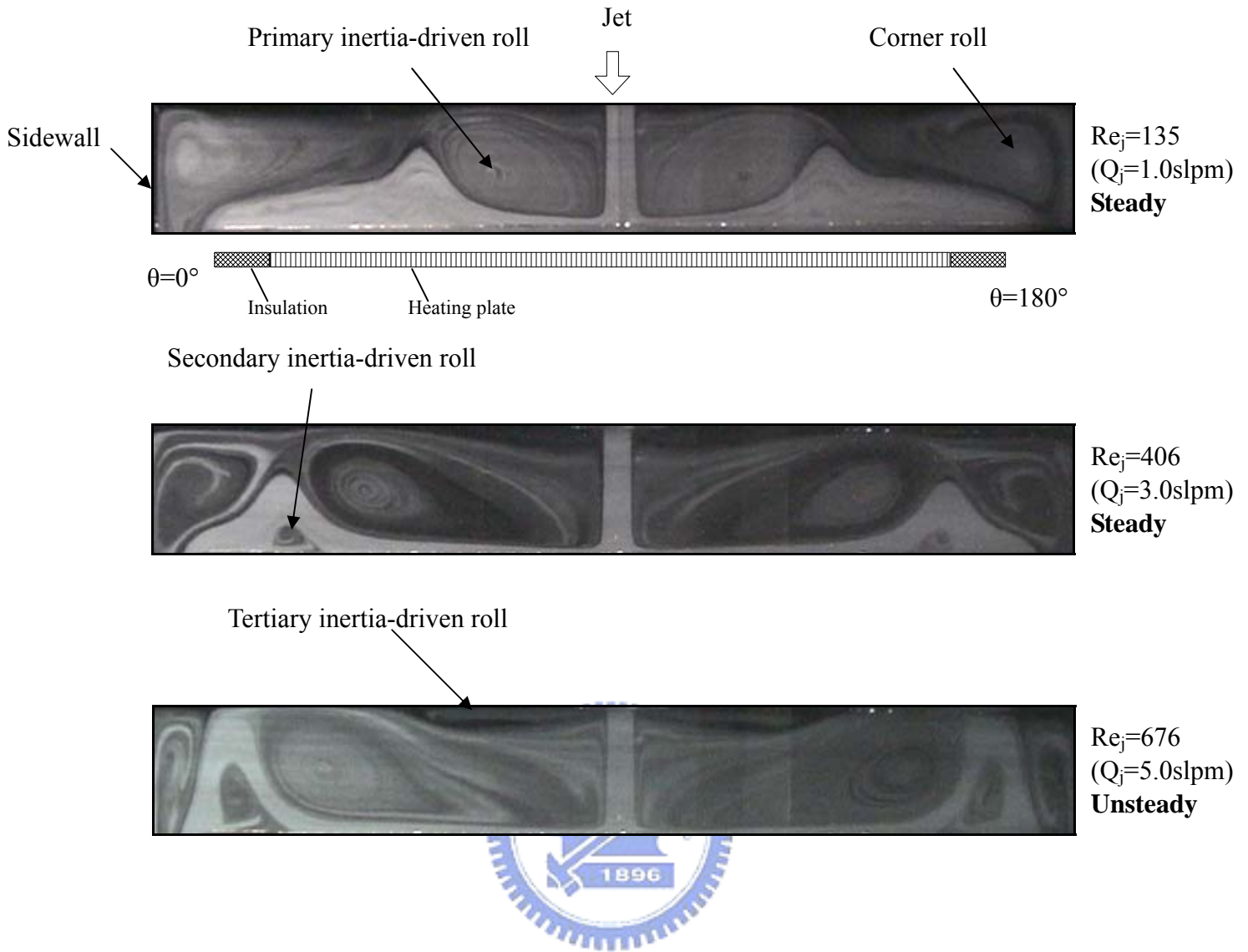


Fig.4.5 Side view flow photos taken at the cross plane $\theta=0^\circ$ & 180° for various jet Reynolds numbers at $Ra=0$ ($\Delta T=0^\circ\text{C}$) for $H = 40.0$ mm.

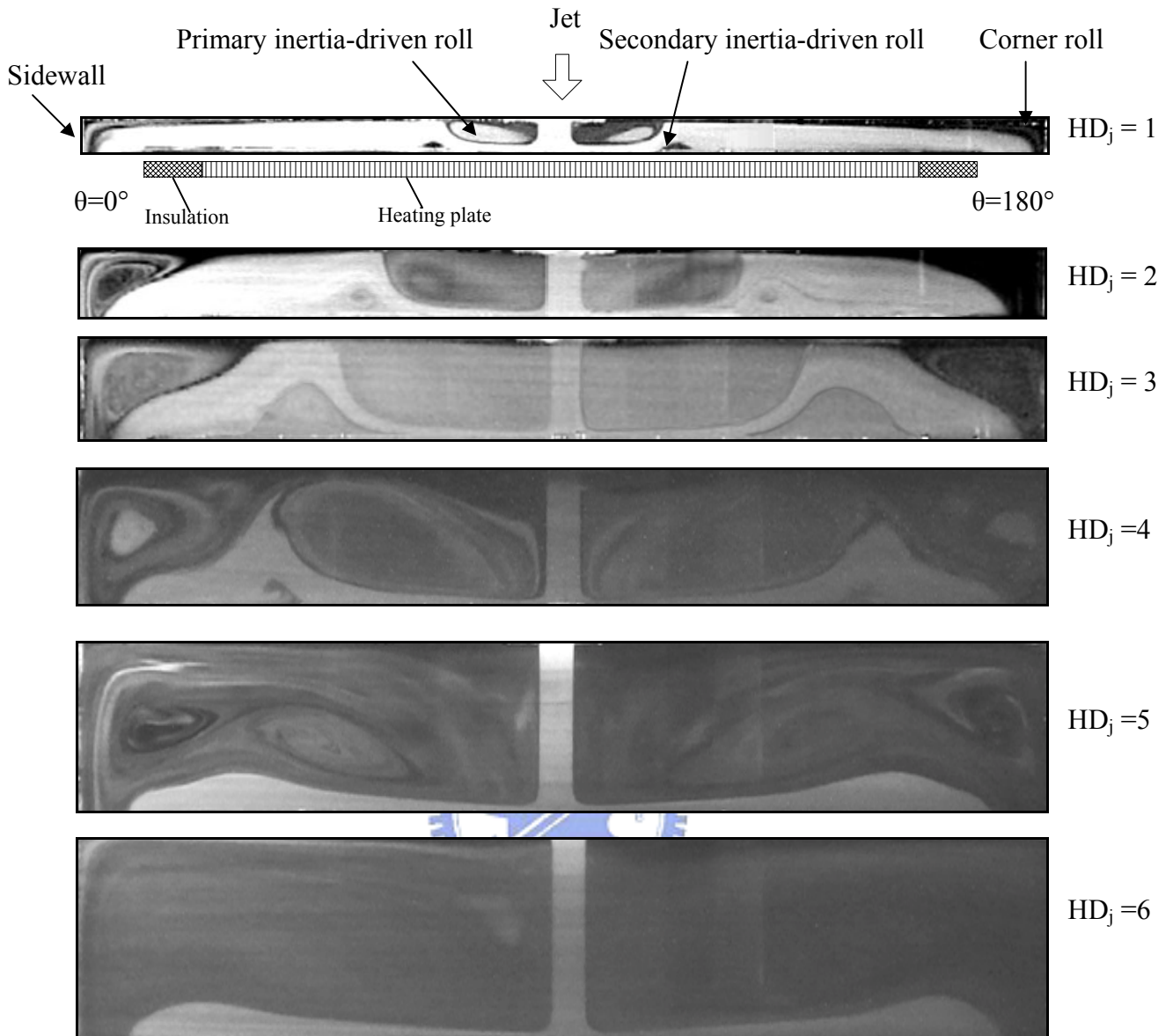


Fig. 4.6 Steady side view flow photos taken at the cross plane $\theta = 0^\circ$ & 180° for various HD_j at $\Delta T = 0^\circ\text{C}$ ($Ra = 0$) and $Q_j = 2.0$ slpm ($Re_j = 270$).

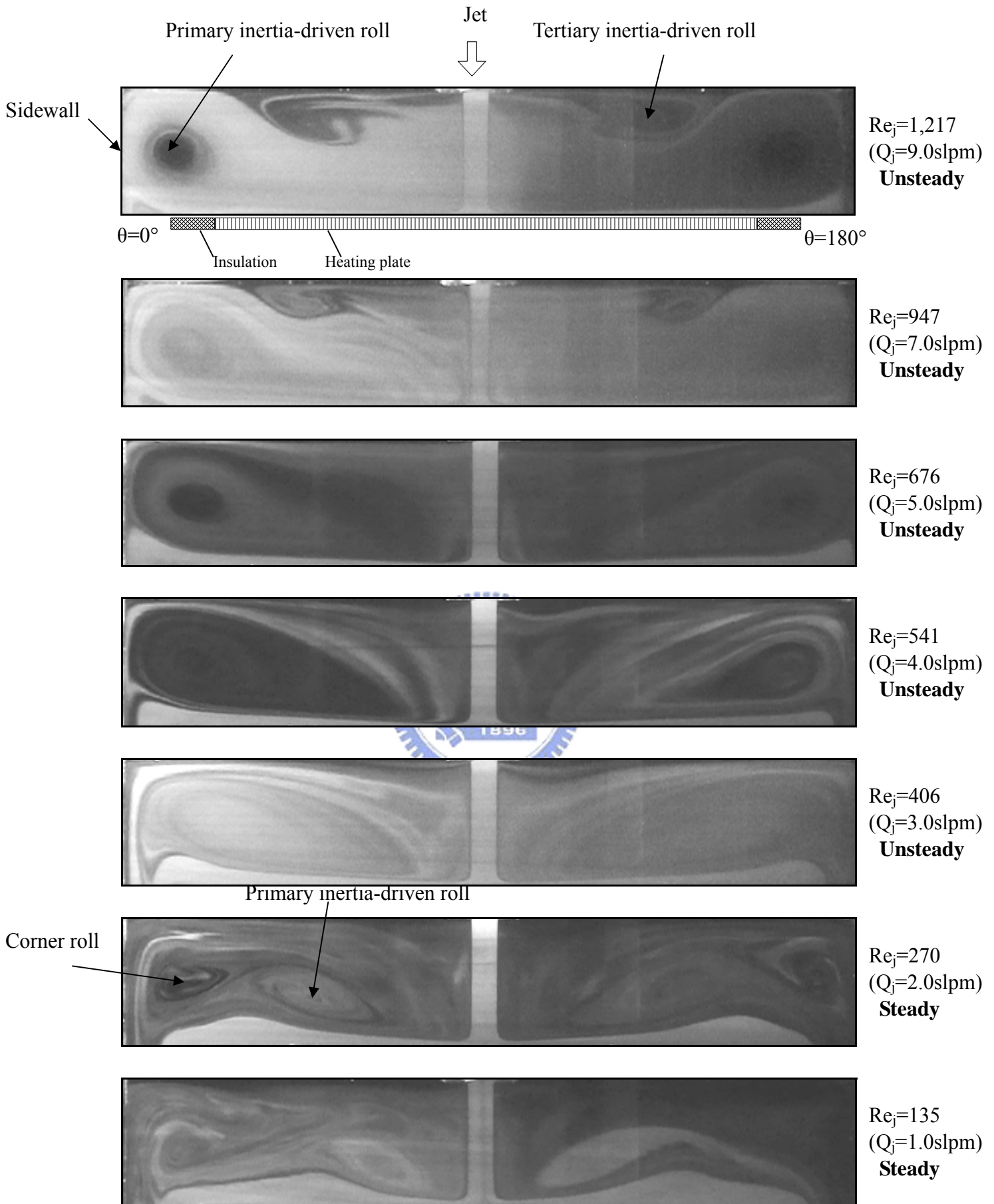


Fig. 4.7 Side view flow photos taken at the cross plane $\theta=0^\circ$ & 180° for various jet Reynolds numbers at $Ra=0$ ($\Delta T=0^\circ\text{C}$) for $H = 50.0$ mm.

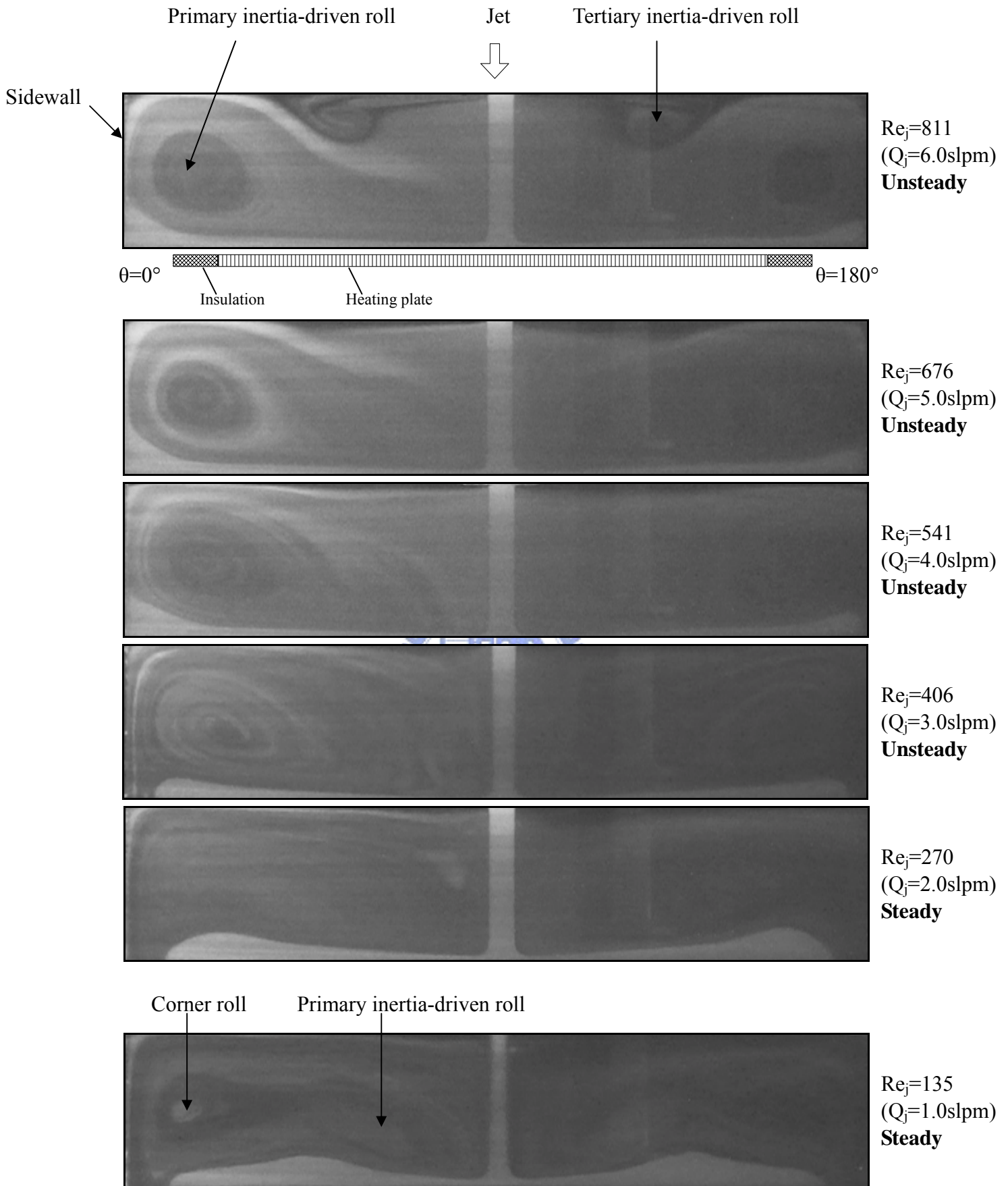


Fig. 4.8 Side view flow photos taken at the cross plane $\theta = 0^\circ$ & 180° for various jet Reynolds numbers at $Ra=0$ ($\Delta T=0^\circ\text{C}$) for $H = 60.0$ mm.

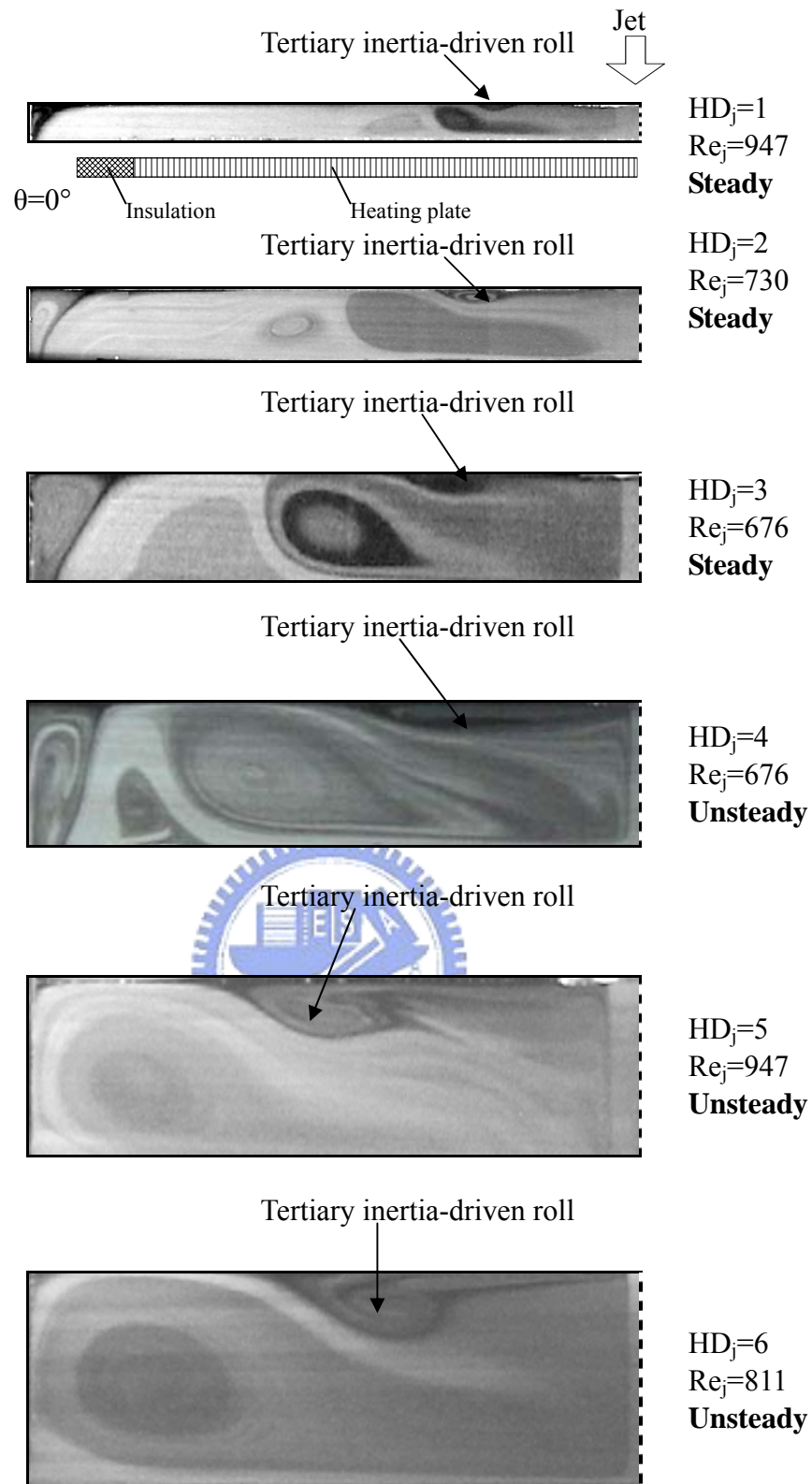
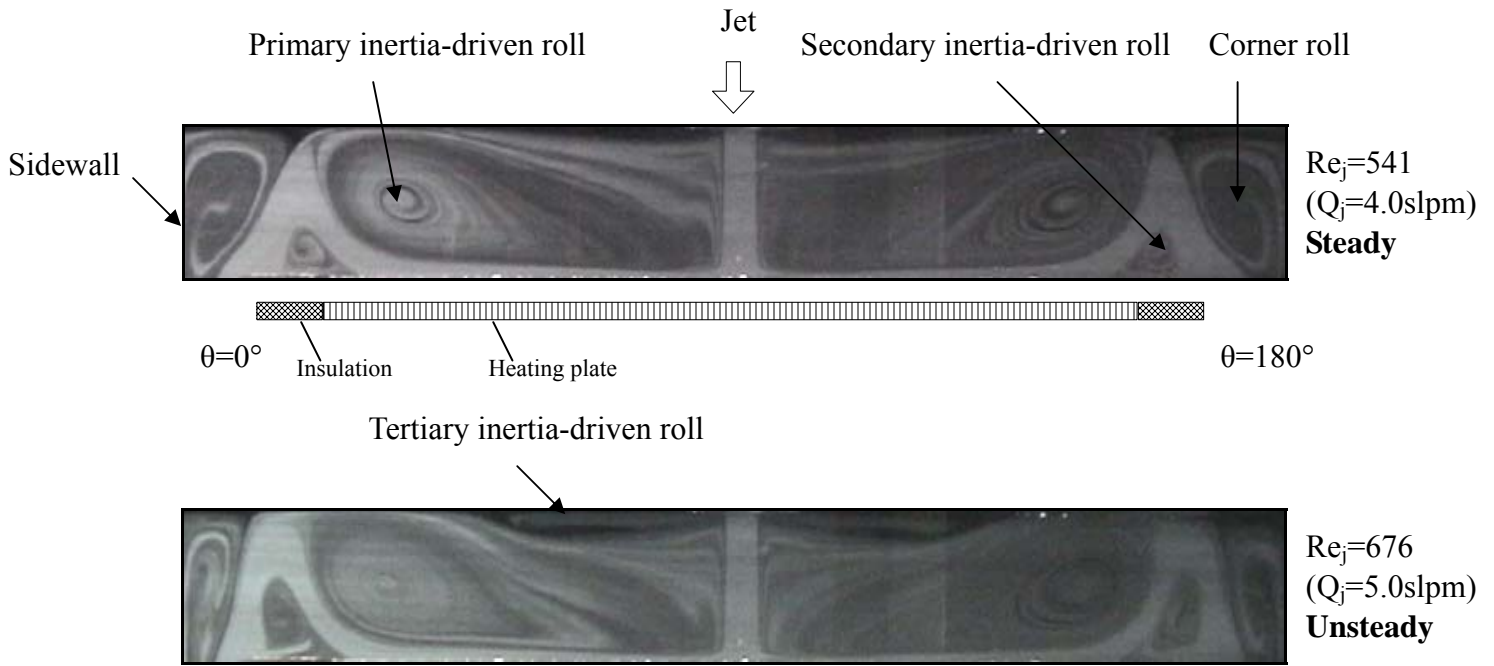
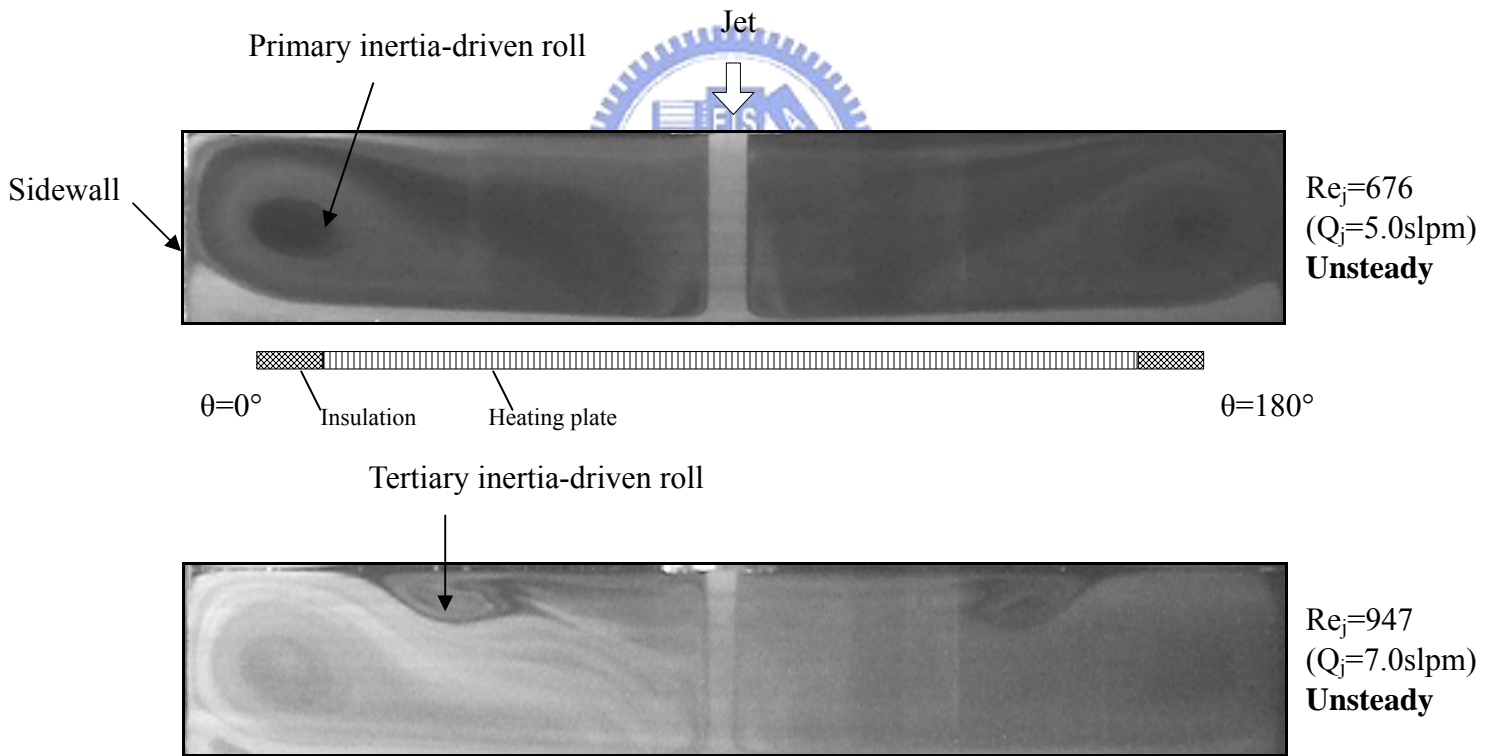


Fig. 4.9 Side view flow photos taken at the cross plane for various HD_j and Re_j with the disk unheated ($\Delta T=0^\circ\text{C}$).



(a) $H = 40.0\text{ mm}$



(b) $H = 50.0\text{ mm}$

Fig. 4.10 Side view flow photos taken at the cross plane $\theta=0^\circ$ & 180° for various jet Reynolds numbers at $Ra=0$ ($\Delta T=0^\circ\text{C}$) for (a) $H = 40.0\text{ mm}$ and (b) $H = 50.0\text{ mm}$.

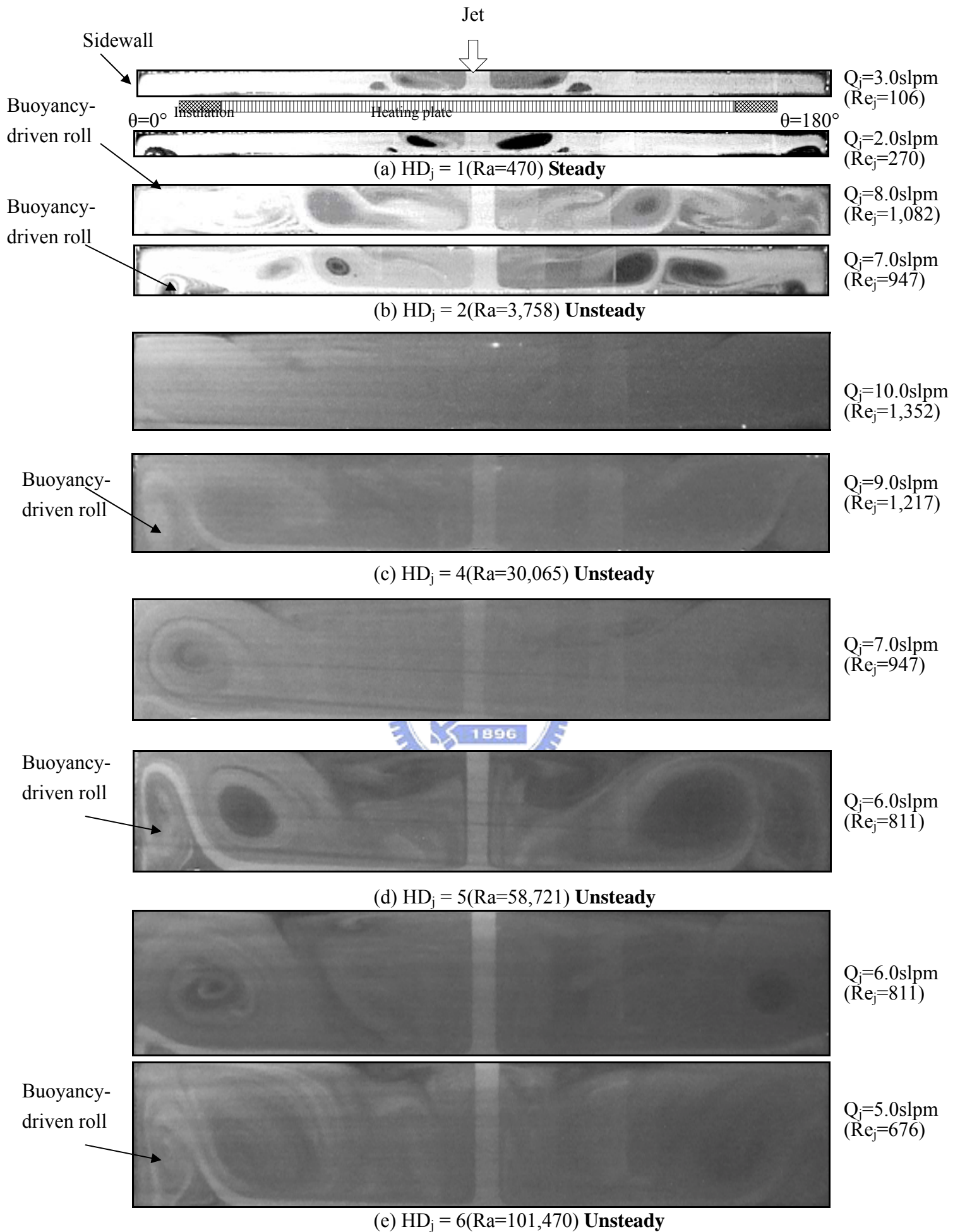


Fig. 4.11 Side view flow photos taken at the cross plane $\theta=0^\circ$ & 180° for various HD_j and Re_j at $\Delta T=5^\circ\text{C}$.

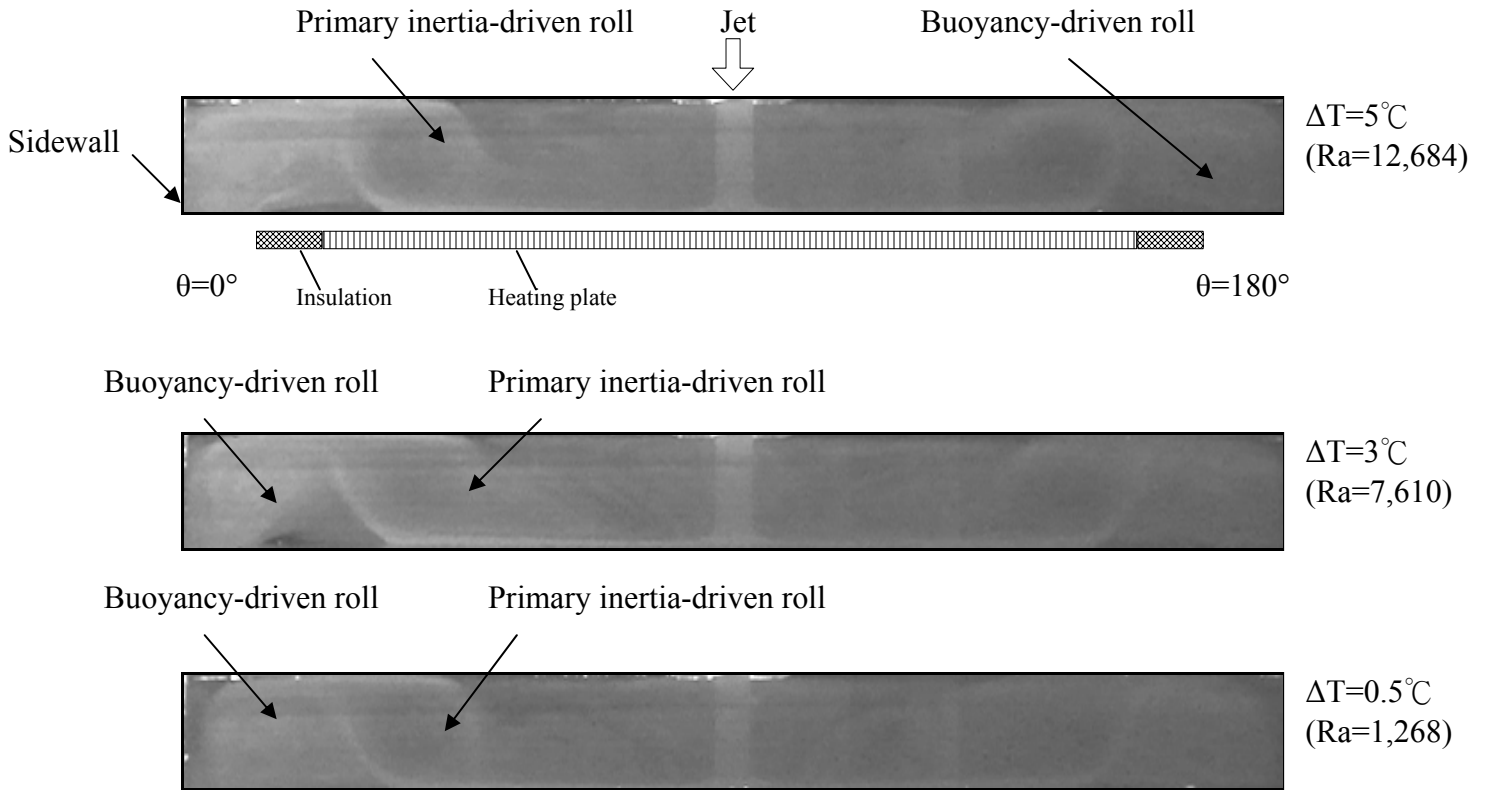


Fig. 4.12 Side view flow photos taken at the cross plane $\theta=0^{\circ}$ & 180° for $Re_j=1,623$ ($Q_j=12.0$ slpm) with various Ra at $H=30.0$ mm.

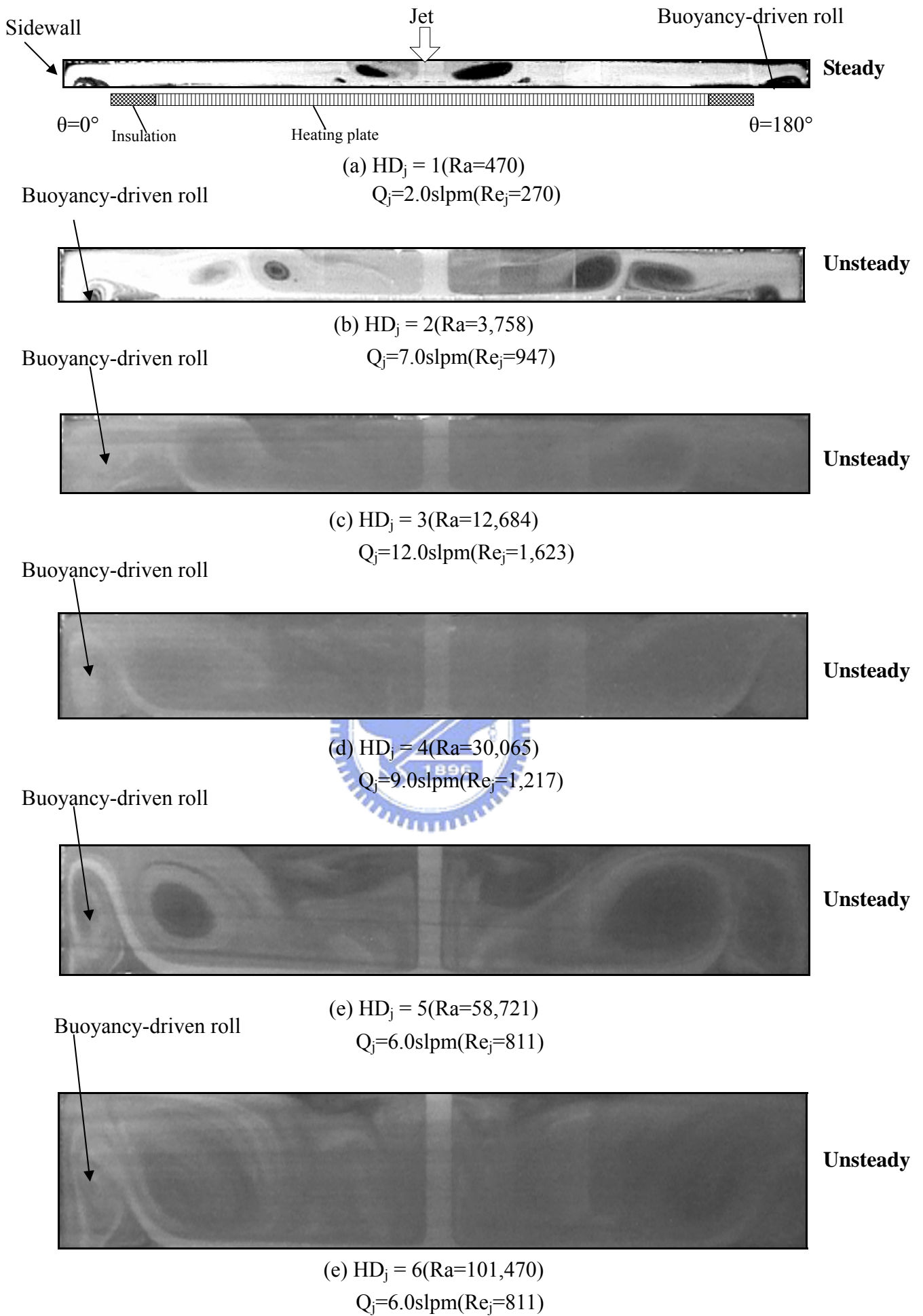


Fig. 4.13 Side view flow photos taken at the cross plane $\theta=0^\circ$ & 180° for various HD_j and Re_j at $\Delta T=5^\circ\text{C}$.

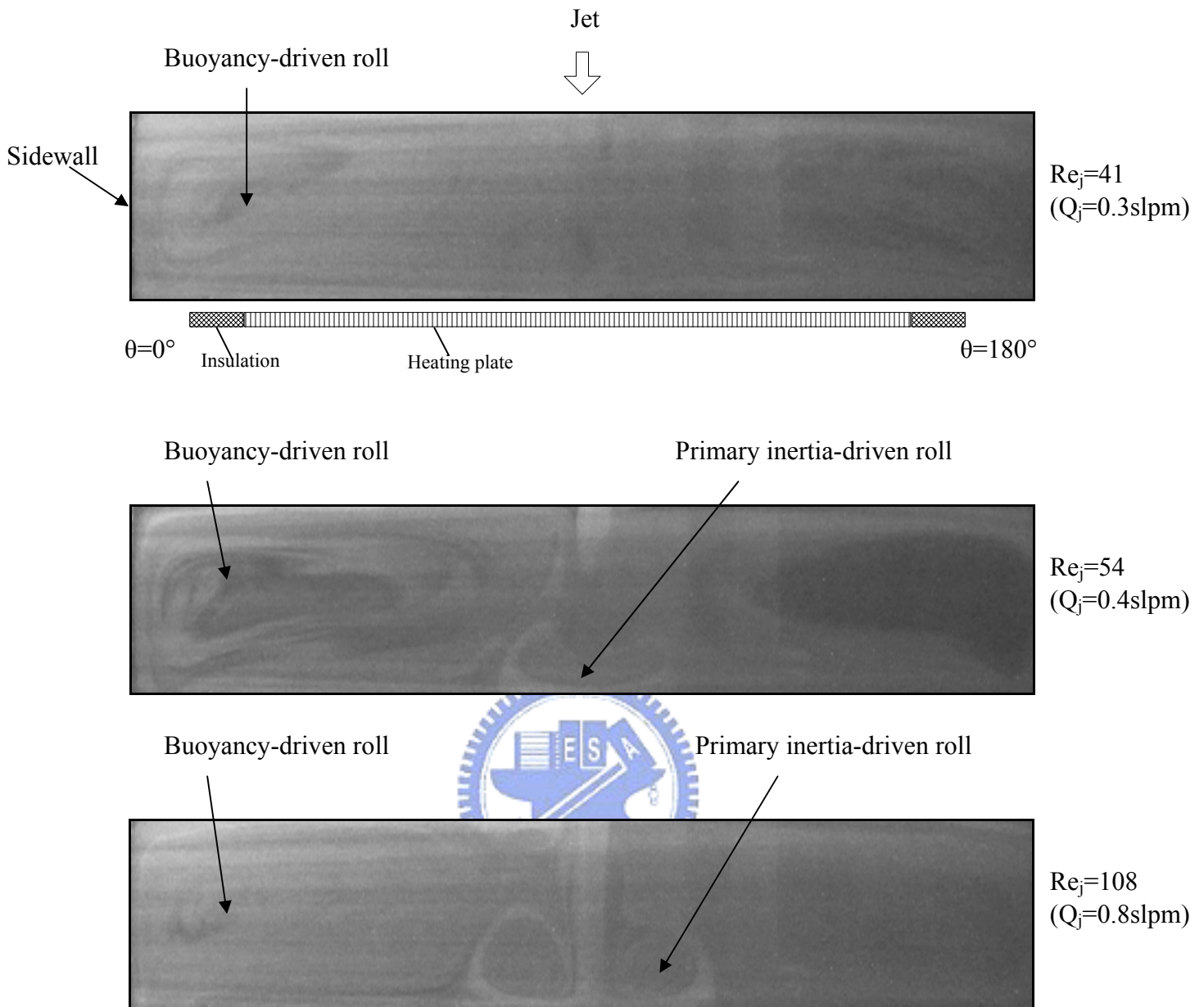


Fig. 4.14 Unsteady side view flow photos taken at the cross plane for various jet Reynolds numbers at $Ra=202,939$ ($\Delta T=10^\circ\text{C}$) for $H = 60.0$ mm.

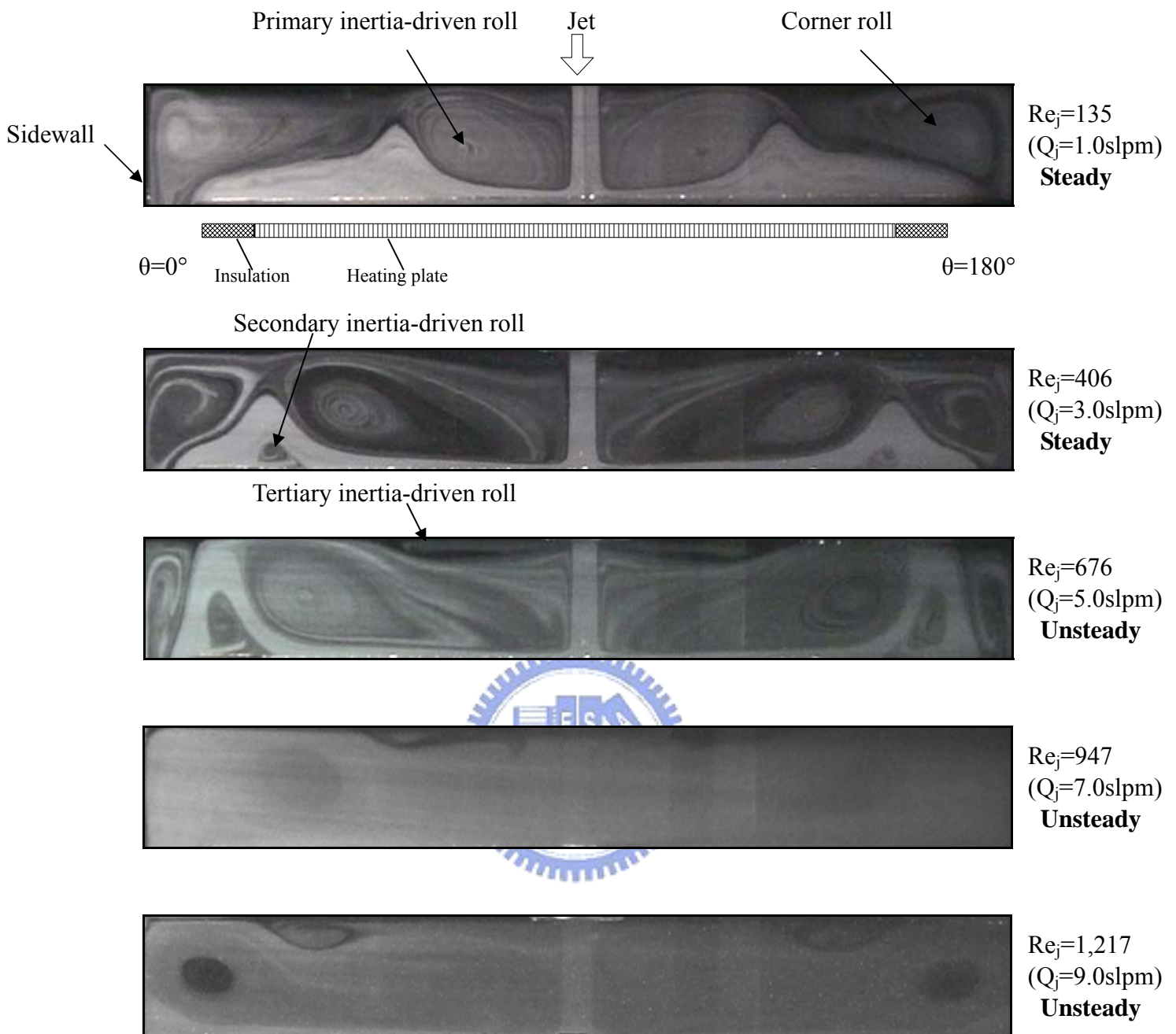


Fig. 4.15 Side view flow photos taken at the cross plane $\theta=0^\circ$ & 180° for various jet Reynolds numbers at $Ra=0$ ($\Delta T=0^\circ\text{C}$) for $H = 40.0$ mm.

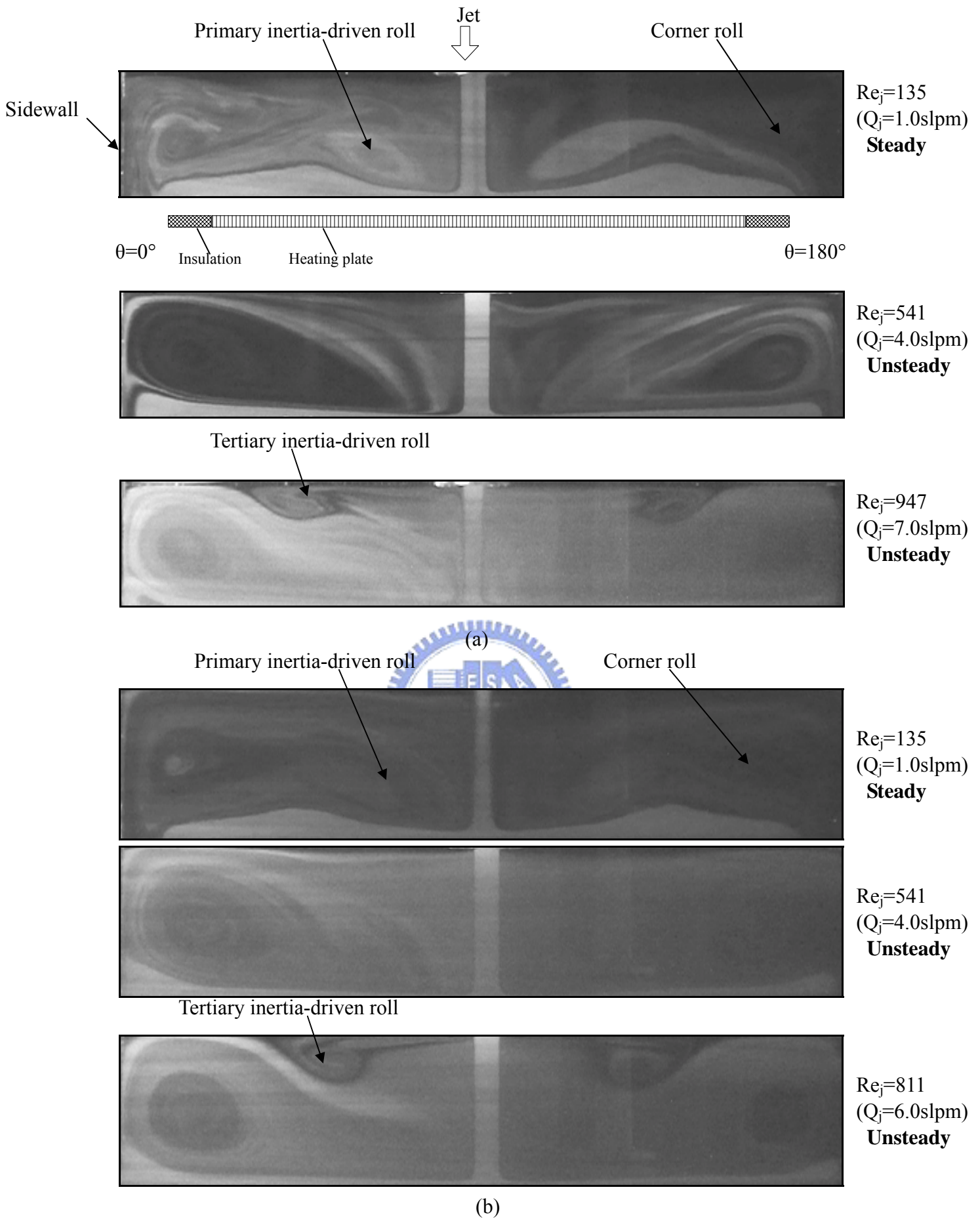


Fig. 4.16 Side view flow photos taken at the cross plane $\theta=0^\circ$ & 180° for various jet Reynolds numbers at $Ra=0$ ($\Delta T=0^\circ\text{C}$) for (a) $H = 50.0$ mm and (b) $H = 60.0$ mm.

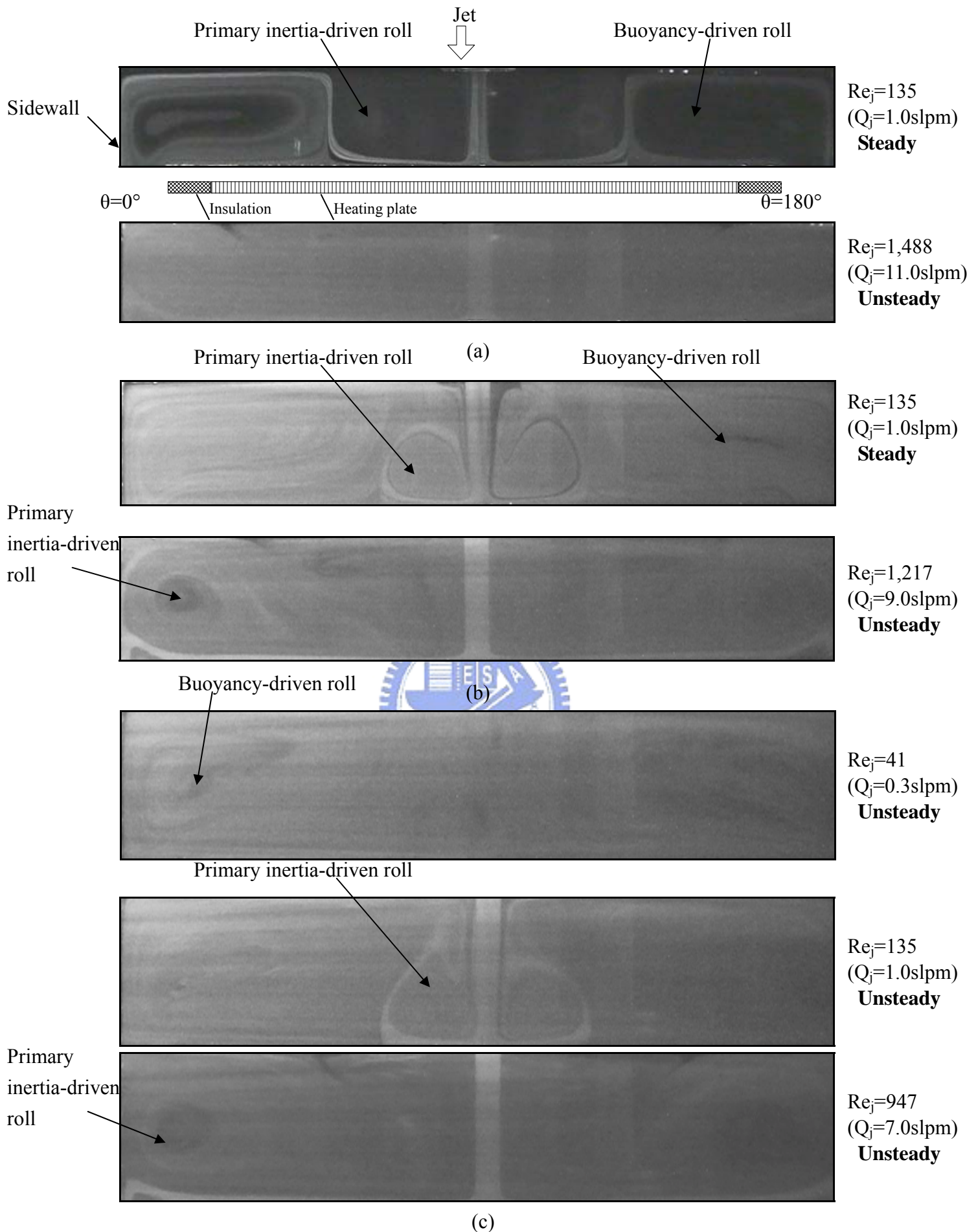


Fig. 4.17 Side view flow photos taken at the cross plane $\theta=0^\circ$ & 180° for various jet Reynolds numbers at $\Delta T=10^\circ\text{C}$ for (a) $H = 40.0$ mm, (b) $H = 50.0$ mm, and (c) $H = 60.0$ mm.

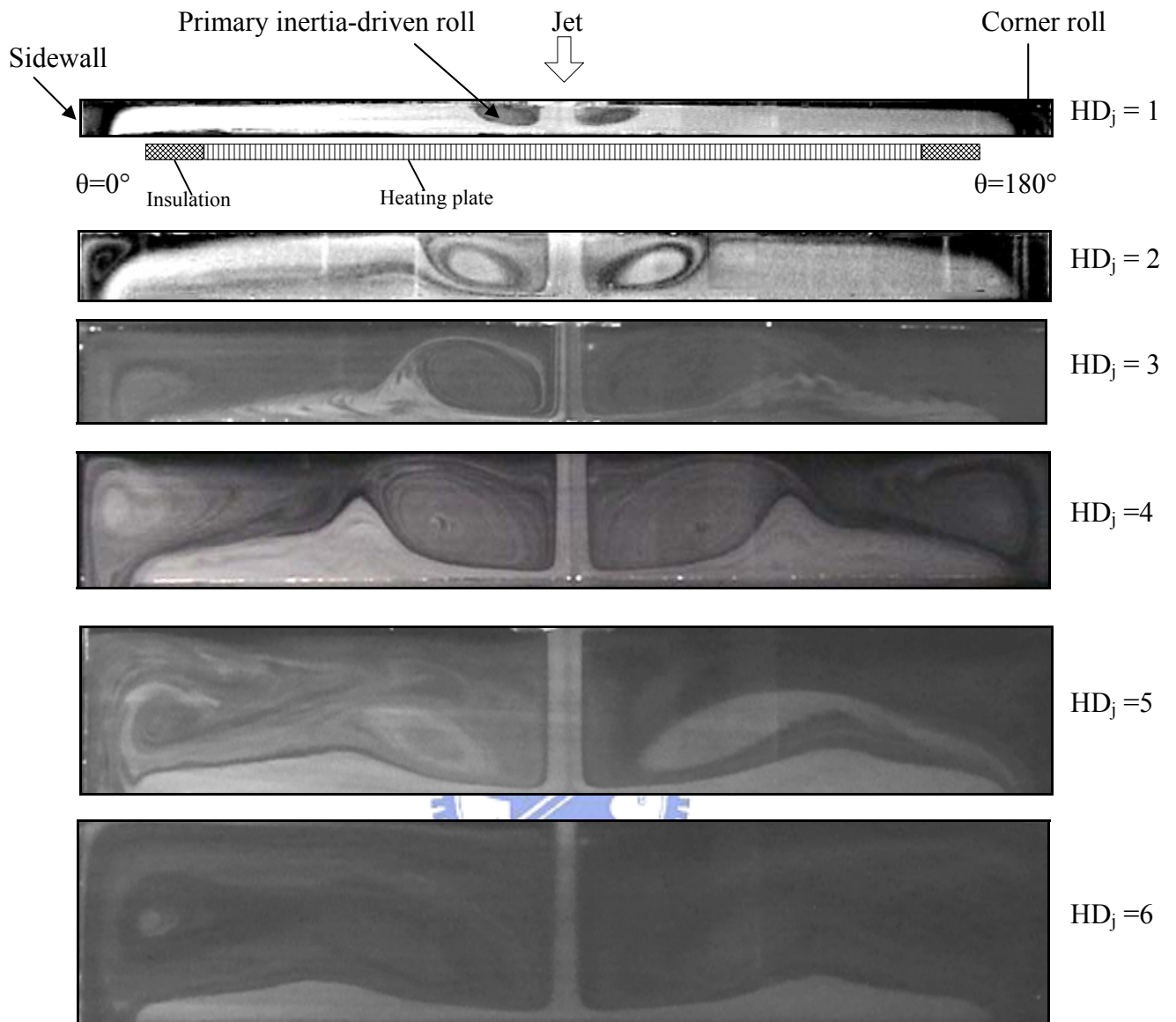


Fig. 4.18 Steady side view flow photos taken at the cross plane $\theta=0^\circ$ & 180° for various HD_j at $\Delta T=0^\circ\text{C}$ ($Ra=0$) and $Q_j=1.0$ slpm ($Re_j=135$).

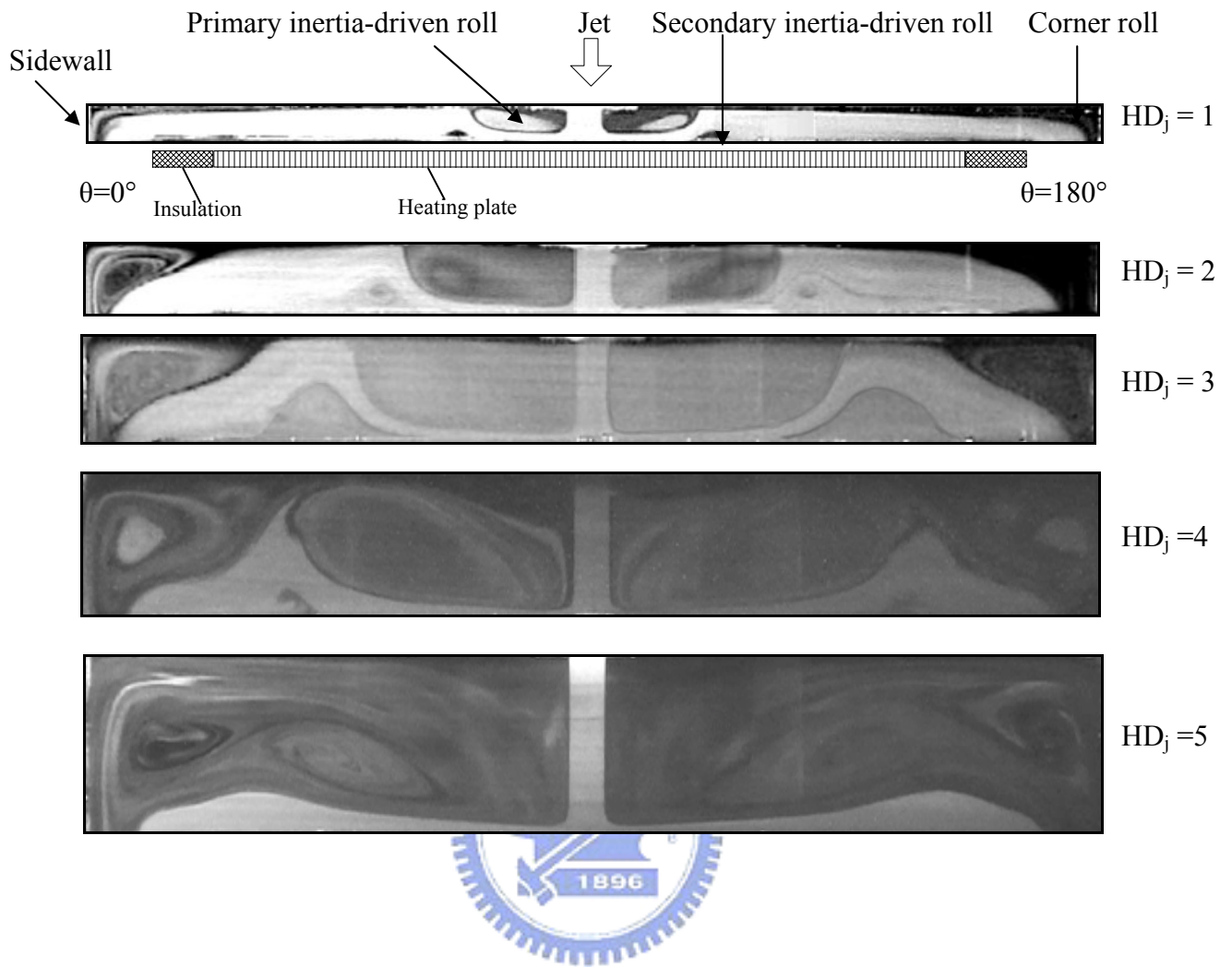


Fig. 4.19 Steady side view flow photos taken at the cross plane $\theta=0^\circ$ & 180° for various HD_j at $\Delta T=0^\circ\text{C}$ ($Ra=0$) and $Q_j=2.0\text{slpm}$ ($Re_j=270$).

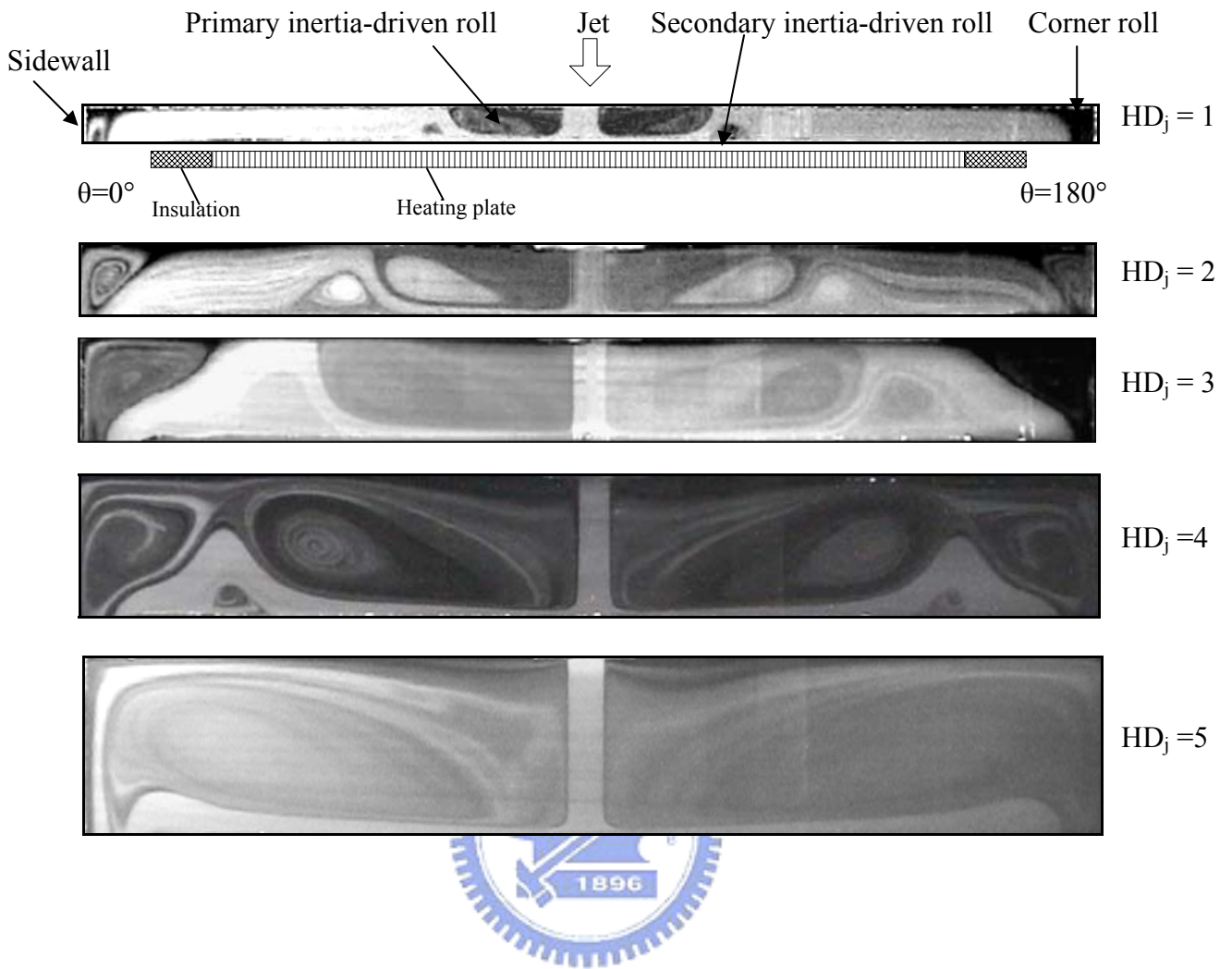


Fig. 4.20 Steady side view flow photos taken at the cross plane $\theta = 0^\circ$ & 180° for various HD_j at $\Delta T = 0^\circ\text{C}$ ($Ra = 0$) and $Q_j = 3.0$ slpm ($Re_j = 406$).