

One technique for visualizing fluid flow over a surface is to attach short, lightweight pieces of thread or “tufts” to the surface. A photograph of the tufts on the surface of an automobile is shown in the figure below. Do tufts trace out the streamlines, streaklines, pathlines, or some other type of flow line? What if the flow is unsteady? Explain your answers.



SOLUTION:

The tufts show the local direction of the fluid velocity and, hence, are indicators of the local streamline slope.

If the flow is steady, then the streamlines, streaklines, and pathlines are all the same. If the flow is unsteady, then the tufts will, in general, only indicate the local slope of the streamlines.