EFFECT OF TWO DIFFUSER TYPES OF VOLUTE ON PRESSURE FLUCTUATION IN CENTRIFUGAL PUMP UNDER PART-LOAD CONDITION

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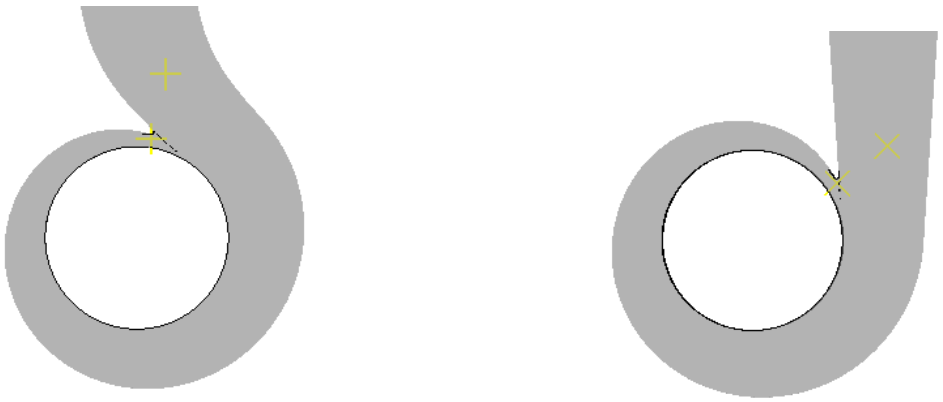
Long Abstract

Introduction

In order to adapt various installation positions of pipeline, the volute of centrifugal pump needs to be designed into different types, the volute with tangential diffuser and the volute with radial diffuser. Different diffuser types of volute have a strong influence on flow characteristic in pump and piping system. Especially under part-load condition, pressure fluctuation will be affected more obviously. In this study, two diffuser types of volute were designed to study the effect on pressure fluctuation features of centrifugal pump under part-load condition, with the same volute design parameters and impeller parameters.

1. Methods

Computational domains are created by using the grid generation tool ANSYS ICEM-CFD, and the unsteady, three dimensional turbulent flow in the pump was simulated by using ANSYS CFX 14.5 in this paper. Then the distribution of pressure fluctuation intensity in the centrifugal pump is achieved and analyzed comparatively under part-load condition. To study pressure fluctuation in the centrifugal pump for two diffuser types of volute, the point c1 are set near the tongue and the point c2 are set in the diffuser. The position of monitor points will be shown in figure 1.It shows that the periodic features in pressure fluctuation near its tongue are the same for two diffuser types of volute, however in the diffuser of the volute, the values of the pressure fluctuation in radial diffuser is greater than that in tangential diffuser.



(A) THE VOLUTE WITH RADIAL DIFFUSER

(B) THE VOLUTE WITH TANGENTIAL DIFFUSER

Figure1. The Cross Section of Two Diffuser Types of Volute

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