4. Conclusions

Based on the analysis, it concludes that:

(1) Slip factor correlations of centrifugal impeller can be used to mixed-flow impeller while no proper mixed-flow slip factor models exist. It's no need to correct by exit inclination angle while exit inclination angle $\alpha \geq 45$

(2) Qiu's, Wiesner's, Paeng's and Backstrom's correlation agree well with test data than others while without inclination angle correction. Under the situation of inclination angle correction, the Qiu's, Backstrom's and Stodola's have better results.

(3) There is a control variable named equivalent blade number of mixed-flow impeller and it has critical value. Only little differences between results calculated by various slip factor correlations while equivalent blade number beyond the critical value. Otherwise it has to choose proper slip factor correlations to find the slip factor needed while the equivalent blade number is less than the critical value. This value may be 11 in this case.

(4) Blade number, impeller exit inclination angle and exit blade angle of mixed-flow impeller are dominated over slip factor, but blade turning rate and flow coefficient have to be taken into account for more exact solution.

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Nomenclature

β_{2b} = exit blade metal angle
$d\beta/dm$ = blade turning rate
σ = slip factor
φ_2 = exit flow coefficient
α = meridional inclination angle
ρ = density
F = shape factor defined in equation (8)
m = meridional distance on the Z-R plane
s_2 = pitch at the blade exit; $s_2 = 2\pi R_2/Z$
t = thickness at the blade trailing edge
Z = number of blades
Z_{ep} = equivalent blade number
M = blade number by Lewis

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