

directly. While there is no well-know and matured slip factor correlation for mixed-flow impeller exist, then the

two way should be validate by experiments data to find a proper method for mixed-flow machine.

Table 1
Test data of slip factors of mixed-flow impellers.

ID	Name of mixed-flow Impellers	α	β_{2b}	Z_2	R_2	RR	ϵ_{im}	φ_2	Slip factor test data
1	R1-2AX	45	80.9	4	0.084	0.523	0.724	0.1	0.864
2	R1-6A	45	64.5	4	0.082	0.54	0.415	0.2	0.721
3	R1-5A	45	64.5	5	0.082	0.54	0.495	0.21	0.768
4	R1-1	45	64.5	6	0.082	0.54	0.556	0.2	0.829
5	R1-4A	45	20.7	16	0.085	0.523	0.62	0.455	0.832
6	MFI-1	60	5.5	17	0.112	0.532	0.62	-	0.862
7	MFI-2	60	5.5	18	0.112	0.532	0.636	-	0.858
8	RD-100	75	5	18	0.167	0.529	0.636	-	0.87
9	Compbel	77	0	22	0.165	0.475	0.69	-	0.89

3. Experiments validation

The mixed-flow impellers test data are reproduced from Wiesner's work in (Carter and Hughes, 1946). Table 1 contains the various important dimensions and parameters for mixed-flow impellers, as well as the slip factor test value. Wiesner have pointed out that the slip correction

by α made the correlations between empirical and test slip factors poorer in almost all of the mixed-flow impeller. So Table 2 contains the results of Paeng, Qiu and Backstrom equations both under correction and not. Figures 2 and 3 show the comparison of slip factor test data and equations results of Table 2.

In Figure 2, Qiu's and Wiesner's correlations

Table 2
List of slip factors by different SF correlations.

Name	Without α Correction						With α Correction					
	Wiesner	Stodola	Staniz	Paeng	Backstrom	Qiu	Wiesner	Stodola	Staniz	Paeng	Backstrom	Qiu
R1-2AX	0.849	0.876	0.505	0.903	0.792	0.845	0.893	0.912	0.650	0.931	0.844	0.889
R1-6A	0.743	0.660	0.505	0.769	0.691	0.719	0.818	0.76	0.650	0.832	0.759	0.790
R1-5A	0.786	0.730	0.604	0.813	0.736	0.764	0.849	0.809	0.720	0.862	0.798	0.824
R1-1	0.812	0.775	0.67	0.843	0.770	0.801	0.867	0.841	0.767	0.882	0.826	0.852
R1-4A	0.861	0.816	0.877	0.868	0.863	0.916	0.902	0.87	0.913	0.902	0.899	0.939
MFI-1	0.862	0.816	0.884	0.868	0.864	0.848	0.880	0.841	0.9	0.883	0.880	0.867
MFI-2	0.868	0.827	0.89	0.874	0.870	0.856	0.886	0.85	0.905	0.888	0.886	0.874
RD-100	0.868	0.827	0.89	0.874	0.871	0.839	0.872	0.833	0.894	0.877	0.875	0.844
Compbel	0.885	0.857	0.91	0.893	0.897	0.864	0.888	0.861	0.912	0.896	0.900	0.867