Lampiran 1. Data hasil pengujian pertama pada *elbow* dengan D = 1¼” (31.75 mm) dan 2” (50,8 mm).

D (mm)	Bukaan Katup	Q (L/min)	h (m.hg)														
			Daerah I					Daerah II					Daerah III				
			1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
31,75	100%	2000	0.056	0.057	0.059	0.058	0.055	0.051	0.053	0.054	0.052	0.050	0.040	0.032	0.029	0.031	0.041
	80%	1800	0.058	0.061	0.064	0.063	0.056	0.052	0.054	0.055	0.053	0.051	0.042	0.035	0.030	0.033	0.043
	60%	1600	0.059	0.063	0.065	0.064	0.058	0.053	0.055	0.057	0.054	0.052	0.043	0.038	0.031	0.035	0.044
	40%	1400	0.060	0.064	0.066	0.065	0.059	0.054	0.056	0.058	0.055	0.053	0.044	0.039	0.033	0.036	0.045
	20%	1200	0.062	0.066	0.068	0.067	0.060	0.055	0.057	0.059	0.057	0.054	0.045	0.041	0.035	0.038	0.046
50,8	100%	2000	0.071	0.073	0.076	0.075	0.072	0.064	0.066	0.067	0.064	0.062	0.059	0.050	0.047	0.048	0.053
	80%	1800	0.073	0.075	0.078	0.076	0.074	0.068	0.070	0.072	0.068	0.066	0.061	0.052	0.049	0.050	0.059
	60%	1600	0.076	0.078	0.085	0.079	0.077	0.071	0.073	0.074	0.071	0.070	0.068	0.062	0.053	0.060	0.063
	40%	1400	0.077	0.079	0.086	0.081	0.078	0.075	0.076	0.077	0.075	0.073	0.071	0.069	0.056	0.068	0.070
	20%	1200	0.082	0.085	0.096	0.086	0.083	0.077	0.079	0.080	0.077	0.076	0.075	0.073	0.071	0.072	0.074

Lampiran 2. Data hasil pengujian kedua pada *elbow* dengan D = 1¼" (31.75 mm) dan 2" (50,8 mm).

D (mm)	Bukaan Katup	Q (L/min)	h (m.hg)														
			Daerah I					Daerah II					Daerah III				
			1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
31,75	100%	2000	0.054	0.058	0.061	0.060	0.054	0.050	0.052	0.053	0.052	0.049	0.037	0.036	0.033	0.034	0.049
	80%	1800	0.056	0.059	0.062	0.061	0.055	0.051	0.053	0.054	0.053	0.050	0.039	0.037	0.034	0.035	0.050
	60%	1600	0.057	0.060	0.063	0.062	0.056	0.052	0.054	0.055	0.054	0.051	0.040	0.038	0.035	0.036	0.051
	40%	1400	0.058	0.062	0.064	0.063	0.057	0.053	0.055	0.057	0.055	0.052	0.042	0.039	0.036	0.037	0.052
	20%	1200	0.059	0.063	0.065	0.064	0.058	0.054	0.056	0.058	0.056	0.053	0.043	0.040	0.037	0.039	0.053
50,8	100%	2000	0.076	0.077	0.079	0.078	0.075	0.066	0.069	0.071	0.069	0.064	0.059	0.056	0.049	0.051	0.058
	80%	1800	0.077	0.079	0.082	0.080	0.078	0.071	0.072	0.073	0.071	0.069	0.063	0.061	0.053	0.054	0.062
	60%	1600	0.081	0.083	0.085	0.084	0.082	0.073	0.077	0.078	0.074	0.071	0.065	0.063	0.056	0.062	0.064
	40%	1400	0.083	0.085	0.090	0.086	0.084	0.078	0.079	0.080	0.077	0.076	0.074	0.072	0.065	0.068	0.073
	20%	1200	0.084	0.086	0.091	0.087	0.085	0.079	0.080	0.081	0.078	0.077	0.077	0.073	0.071	0.072	0.075

Lampiran 3. Data distribusi tekanan hasil pengujian I pada *elbow* dengan D = 1¼” (31.75 mm) dan 2” (50,8 mm).

D (mm)	Bukaan Katup	Q (L/min)	Tekanan (Pa)														
			Daerah I					Daerah II					Daerah III				
			1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
31,75	100%	2000	7471.296	7604.712	7871.544	7738.128	7337.880	6737.508	7004.340	7204.464	6937.632	6604.092	5336.640	4269.312	3869.064	4135.896	5470.056
	80%	1800	7738.128	8138.376	8538.624	8405.208	7471.296	6870.924	7137.756	7337.880	7071.048	6737.508	5603.472	4669.560	4002.480	4402.728	5736.888
	60%	1600	7871.544	8405.208	8672.040	8538.624	7738.128	7004.340	7271.172	7538.004	7204.464	6870.924	5736.888	5069.808	4135.896	4669.560	5870.304
	40%	1400	8004.960	8538.624	8805.456	8672.040	7871.544	7137.756	7404.588	7671.420	7337.880	7071.048	5870.304	5203.224	4402.728	4802.976	6003.720
	20%	1200	8271.792	8805.456	9072.288	8938.872	8004.960	7271.172	7538.004	7871.544	7604.712	7204.464	6003.720	5470.056	4669.560	5069.808	6137.136
50,8	100%	2000	9472.536	9739.368	10139.616	10006.200	9605.952	8471.916	8738.748	8938.872	8471.916	8271.792	7871.544	6670.800	6270.552	6403.968	7071.048
	80%	1800	9739.368	10006.200	10406.448	10139.616	9872.784	9072.288	9272.412	9539.244	9072.288	8738.748	8138.376	6937.632	6537.384	6670.800	7871.544
	60%	1600	10139.616	10406.448	11340.360	10539.864	10273.032	9472.536	9672.660	9806.076	9472.536	9272.412	9072.288	8271.792	7071.048	8004.960	8405.208
	40%	1400	10273.032	10539.864	11473.776	10806.696	10406.448	9939.492	10139.616	10273.032	9939.492	9739.368	9472.536	9205.704	7471.296	9072.288	9339.120
	20%	1200	10940.112	11340.360	12807.936	11473.776	11073.528	10273.032	10473.156	10606.572	10273.032	10072.908	10006.200	9739.368	9472.536	9605.952	9872.784

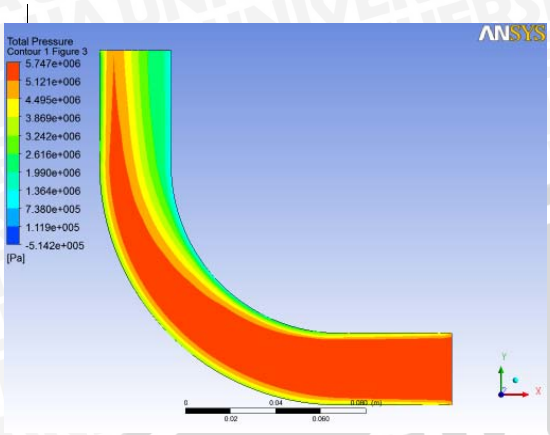
Lampiran 4. Data distribusi tekanan hasil pengujian II pada *elbow* dengan D = 1¼" (31.75 mm) dan 2" (50,8 mm).

D (mm)	Bukaan Katup	Q (L/min)	Tekanan (Pa)														
			Daerah I					Daerah II					Daerah III				
			1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
31,75	100%	2000	7204.464	7738.128	8138.376	8004.960	7204.464	6670.800	6870.924	7071.048	6870.924	6537.384	4936.392	4802.976	4402.728	4536.144	6537.384
	80%	1800	7471.296	7871.544	8271.792	8138.376	7337.880	6804.216	7004.340	7204.464	7004.340	6670.800	5203.224	4936.392	4536.144	4669.560	6670.800
	60%	1600	7604.712	8004.960	8405.208	8271.792	7471.296	6937.632	7137.756	7337.880	7137.756	6804.216	5336.640	5069.808	4669.560	4802.976	6804.216
	40%	1400	7738.128	8271.792	8538.624	8405.208	7604.712	7071.048	7271.172	7538.004	7271.172	6937.632	5603.472	5203.224	4802.976	4936.392	6937.632
	20%	1200	7871.544	8405.208	8672.040	8538.624	7738.128	7204.464	7404.588	7671.420	7404.588	7071.048	5736.888	5336.640	4936.392	5203.224	7071.048
50,8	100%	2000	10139.616	10273.032	10539.864	10406.448	10006.200	8738.748	9205.704	9405.828	9138.996	8538.624	7871.544	7471.296	6537.384	6804.216	7738.128
	80%	1800	10273.032	10539.864	10940.112	10673.280	10406.448	9405.828	9605.952	9739.368	9405.828	9205.704	8405.208	8138.376	7071.048	7204.464	8271.792
	60%	1600	10806.696	11073.528	11340.360	11206.944	10940.112	9739.368	10206.324	10406.448	9872.784	9472.536	8672.040	8405.208	7471.296	8271.792	8538.624
	40%	1400	11073.528	11340.360	12007.440	11473.776	11206.944	10339.740	10539.864	10673.280	10273.032	10072.908	9872.784	9605.952	8672.040	9072.288	9739.368
	20%	1200	11206.944	11473.776	12140.856	11607.192	11340.360	10473.156	10673.280	10806.696	10406.448	10206.324	10273.032	9739.368	9472.536	9605.952	10006.200

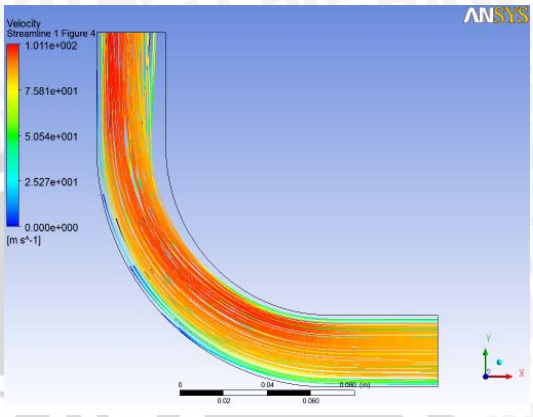
Lampiran 5. Viskositas dan densitas air pada 1 atm.

T, °C	ρ, kg/m^3	μ, N · s/m^2	ν, m^2/s	T, °F	ρ, slug/ft^3	μ, lb · s/ft^2	ν, ft^2/s
0	1000	1.788 E-3	1.788 E-6	32	1.940	3.73 E-5	1.925 E-5
10	1000	1.307 E-3	1.307 E-6	50	1.940	2.73 E-5	1.407 E-5
20	998	1.003 E-3	1.005 E-6	68	1.937	2.09 E-5	1.082 E-5
30	996	0.799 E-3	0.802 E-6	86	1.932	1.67 E-5	0.864 E-5
40	992	0.657 E-3	0.662 E-6	104	1.925	1.37 E-5	0.713 E-5
50	988	0.548 E-3	0.555 E-6	122	1.917	1.14 E-5	0.597 E-5
60	983	0.467 E-3	0.475 E-6	140	1.908	0.975 E-5	0.511 E-5
70	978	0.405 E-3	0.414 E-6	158	1.897	0.846 E-5	0.446 E-5
80	972	0.355 E-3	0.365 E-6	176	1.886	0.741 E-5	0.393 E-5
90	965	0.316 E-3	0.327 E-6	194	1.873	0.660 E-5	0.352 E-5
100	958	0.283 E-3	0.295 E-6	212	1.859	0.591 E-5	0.318 E-5

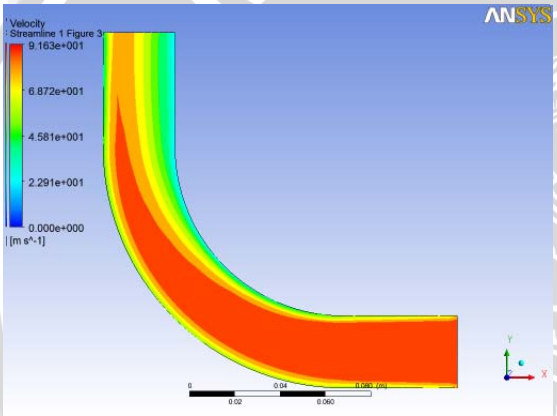
Lampiran 6. Simulasi *contur pressure* dan *streamline* pada variasi diameter 31,75 mm.



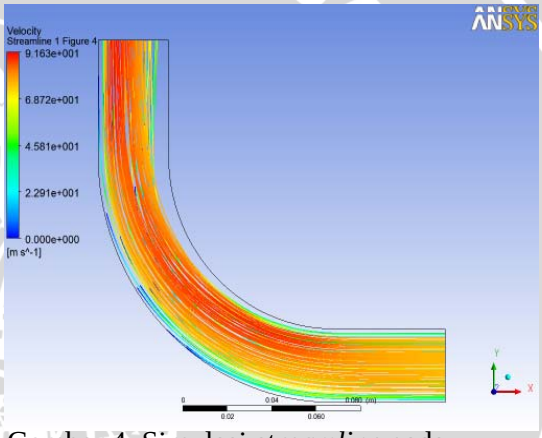
Gambar 1. Simulasi *contur pressure* pada pada debit 2000 L/ min .



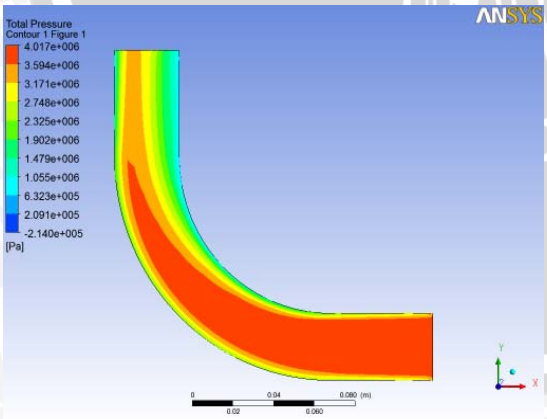
Gambar 2. Simulasi *streamline* pada debit 2000 L/ min.



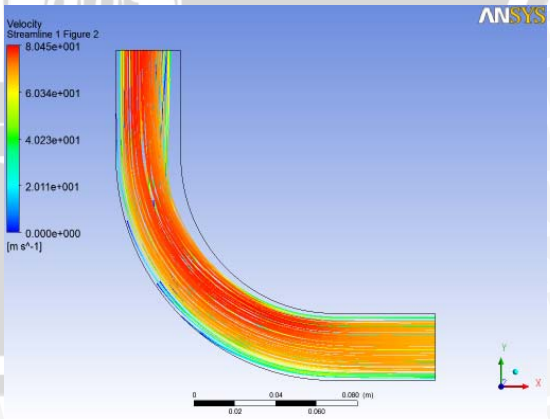
Gambar 3. Simulasi *contur pressure* pada pada debit 1800 L/ min.



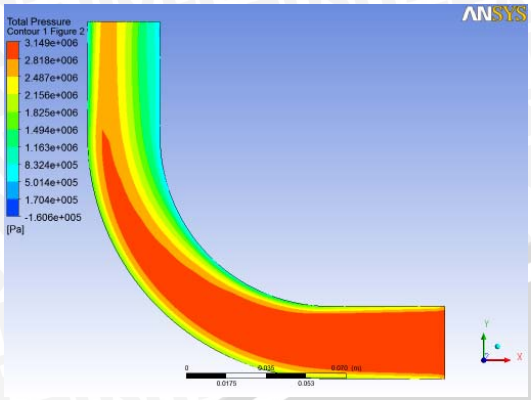
Gambar 4. Simulasi *streamline* pada debit 1800 L/ min.



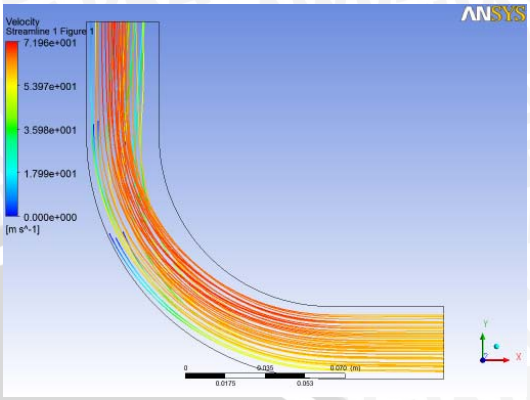
Gambar 5. Simulasi *contur pressure* pada pada debit 1600 L/ min.



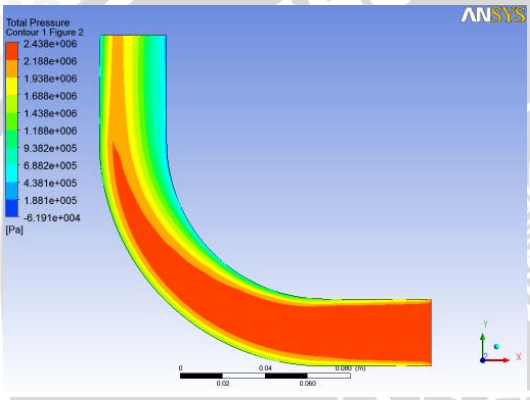
Gambar 6. Simulasi *streamline* pada debit 1600 L/ min.



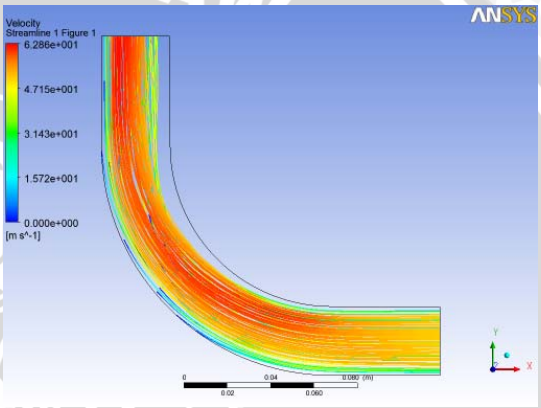
Gambar 7. Simulasi *contur pressure* pada pada debit 1400 L/ min.



Gambar 8. Simulasi *streamline* pada debit 1400 L/ min.

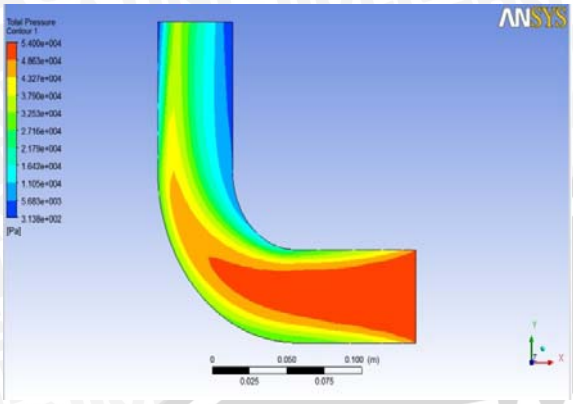


Gambar 9. Simulasi *contur pressure* pada pada debit 1200 L/ min.

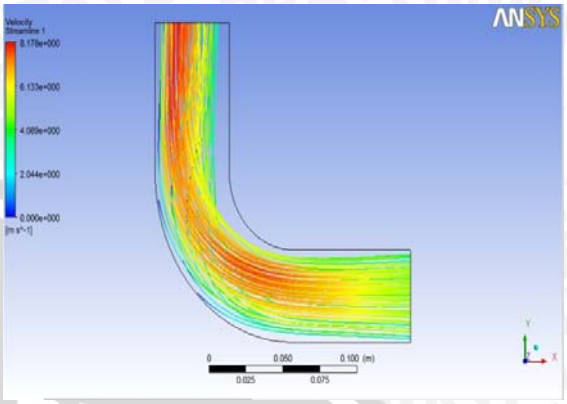


Gambar 10. Simulasi *streamline* pada debit 1200 L/ min.

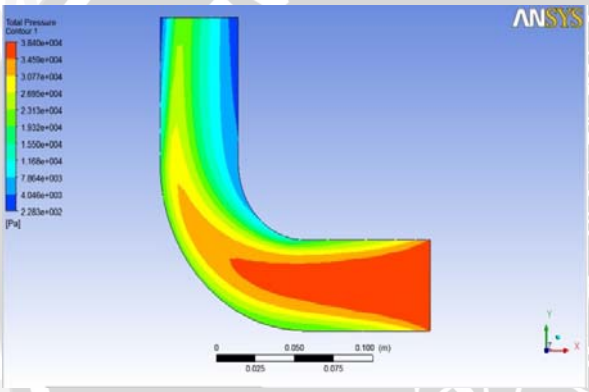
Lampiran 7. Simulasi *contur pressure* dan *streamline* pada variasi diameter 50,8 mm.



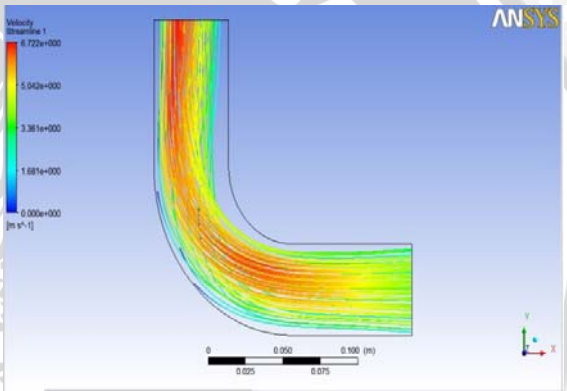
Gambar 11. Simulasi *contur pressure* pada pada debit 2000 L/ min.



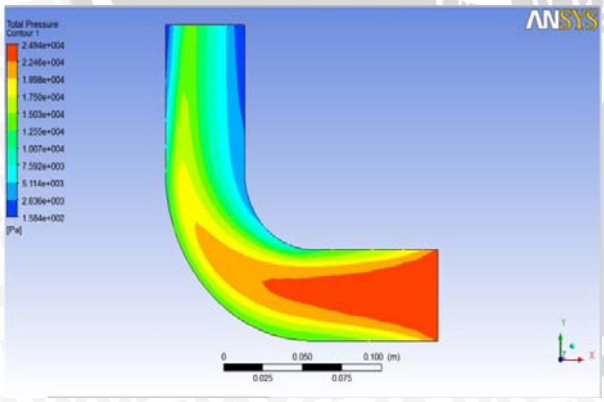
Gambar l2. Simulasi *streamline* pada debit 2000 L/ min.



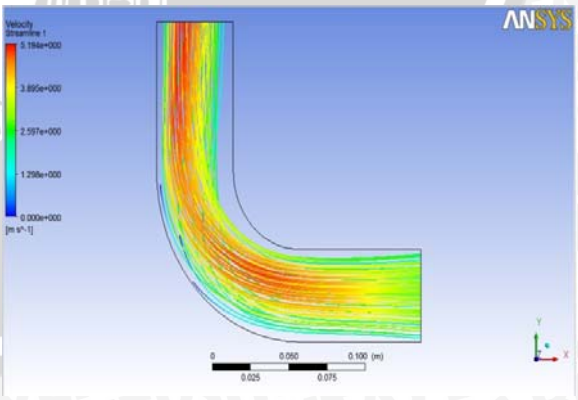
Gambar 13. Simulasi *contur pressure* pada pada debit 1800 L/ min.



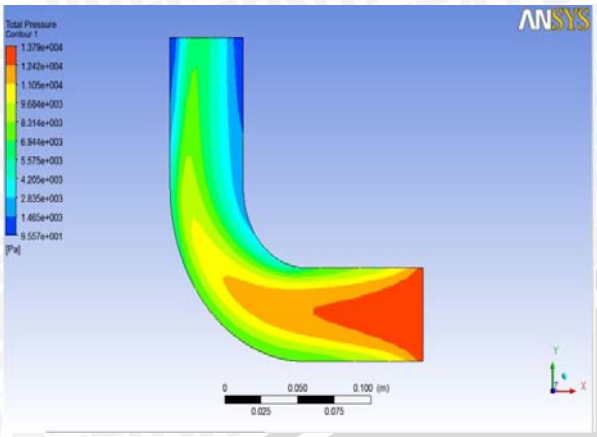
Gambar l4. Simulasi *streamline* pada debit 1800 L/ min.



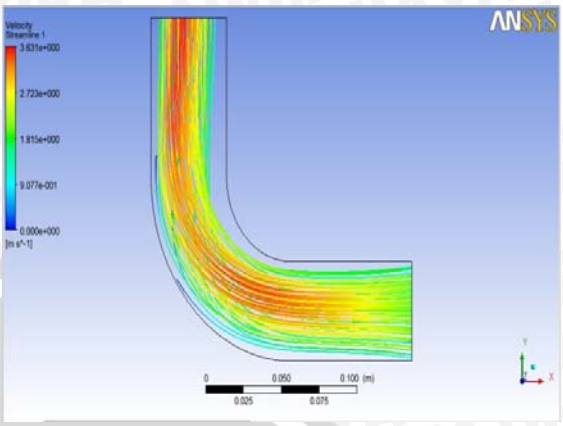
Gambar 15. Simulasi *contur pressure* pada pada debit 1600 L/ min.



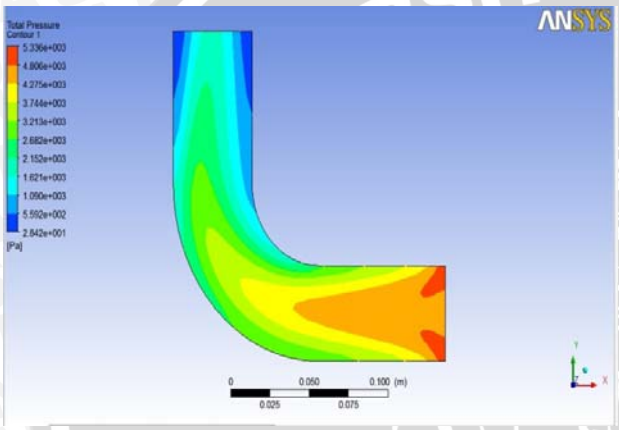
Gambar l6. Simulasi *streamline* pada debit 1600 L/ min.



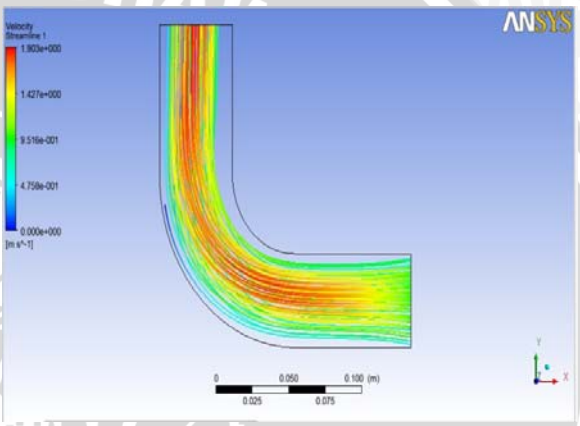
Gambar 17. Simulasi *contur pressure* pada pada debit 1400 L/ min.



Gambar l8. Simulasi *streamline* pada debit 1400 L/ min.



Gambar 19. Simulasi *contur pressure* pada pada debit 1200 L/ min.



Gambar 20. Simulasi *streamline* pada debit 1200 L/ min.