Mercury Flow in a Nozzle Pipe With a Semicircular Weld

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Mesh for the Pipe

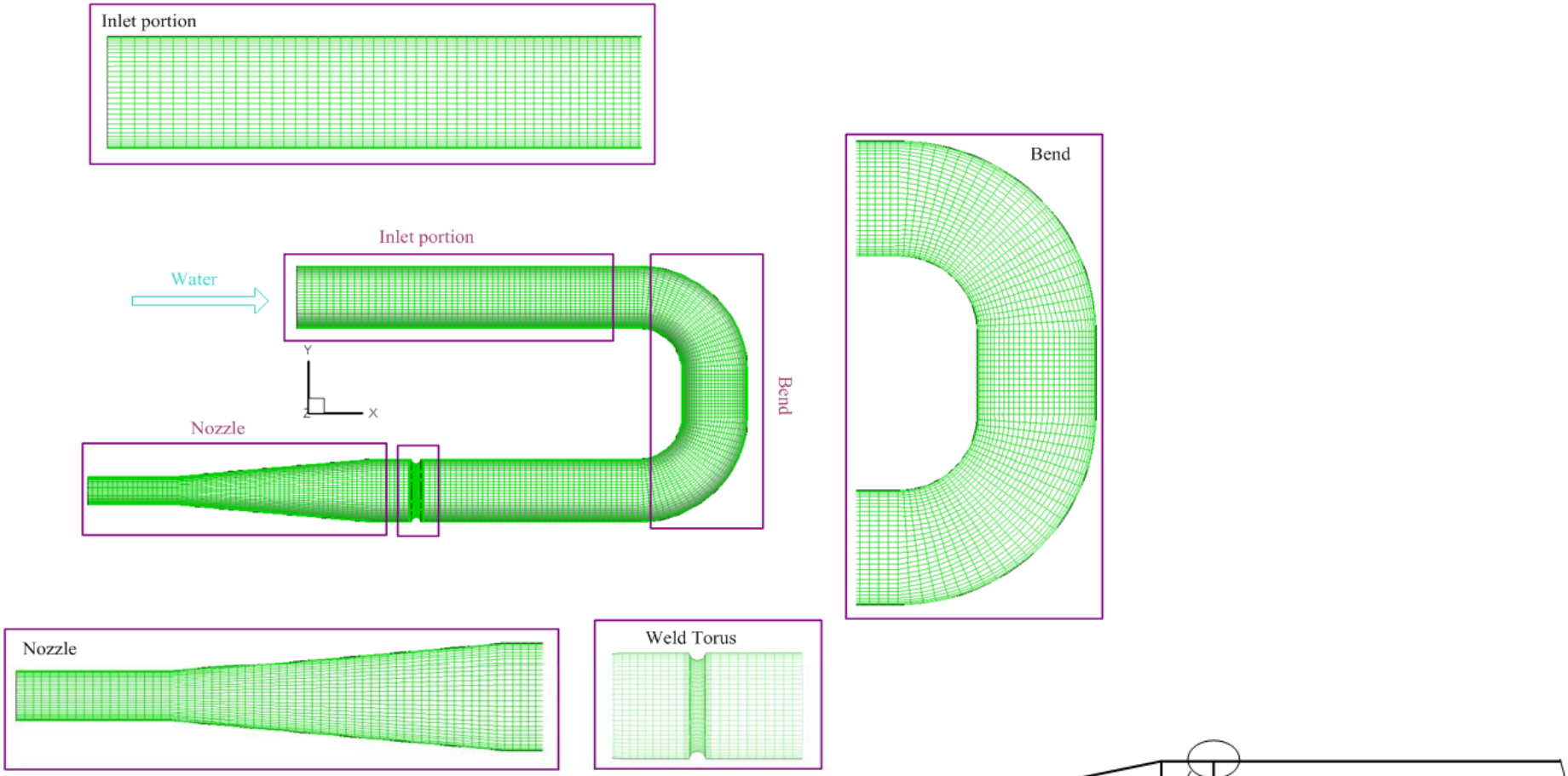
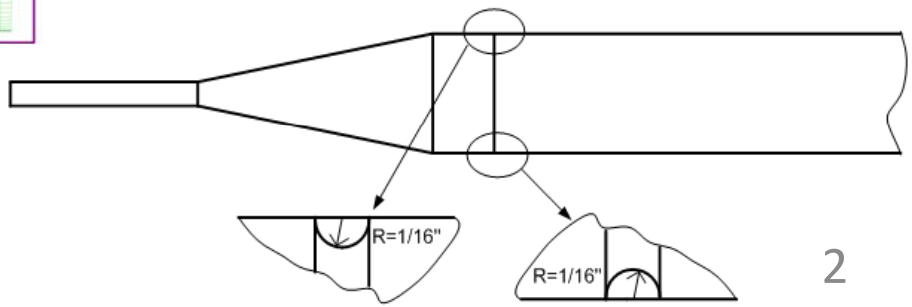


Fig. 1 Mesh instruction for the 90º/90º pipe



Mesh Tables

	n_r	n_θ	$n_{\tilde{z}}$	n_{tot} (million)
Mesh0	65	32	260	0.533
Mesh1	77	40	274	0.833
Mesh2	90	48	294	1.26
Mesh3	**257**	**48**	**623**	**7.655**

	n_r	n_θ	$n_{\tilde{z}}$	n_{tot} (million)
Mesh0	65	32	260	0.533
Mesh1	77	40	274	0.833
Mesh2	90	48	294	1.26
Mesh3	**150**	**48**	**572**	**4.0**

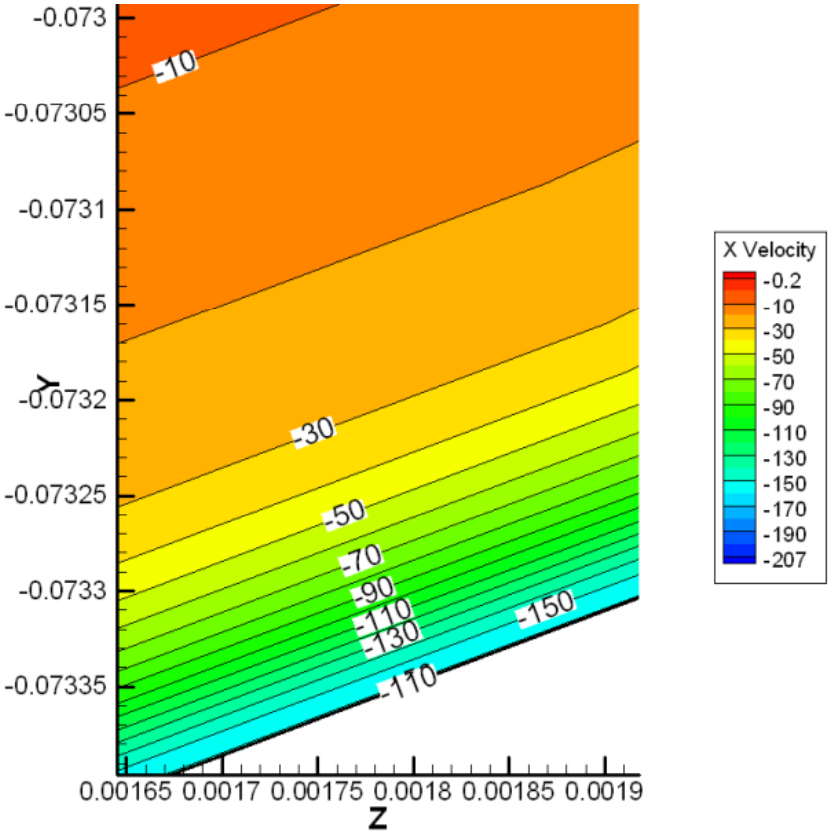
	n_r	n_θ	$n_{\tilde{z}}$	n_{tot} (million)
Mesh0	65	32	260	0.533
Mesh1	77	40	274	0.833
Mesh2	90	48	294	1.26
Mesh3	**177**	**48**	**652**	**5.5**

For mesh3 when total grid number is 5.5 million, the height of first cell near wall is 4.864477×10^{-5}, and more than 20 cells within Re_y = 200.

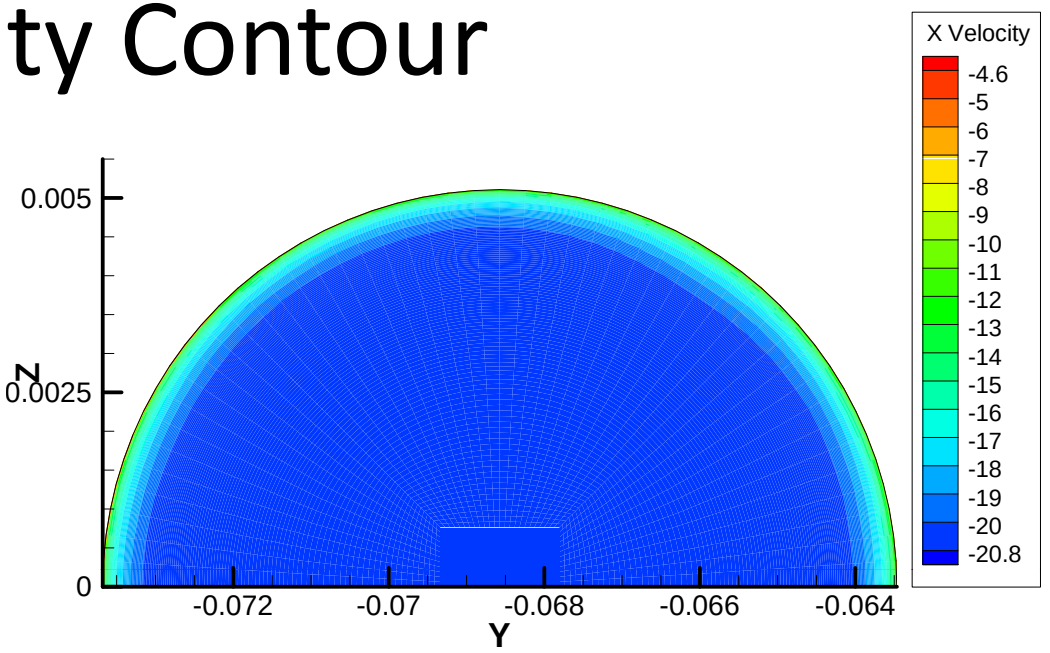
$$\mathrm{Re}_y = \frac{\rho y\sqrt{k}}{\mu}$$

$$\Rightarrow y_{\mathrm{Re}_y=200} = 1.0506\times10^{-4}\ \mathrm{m} = 4.679\times10^{-3}\ \mathrm{D}$$

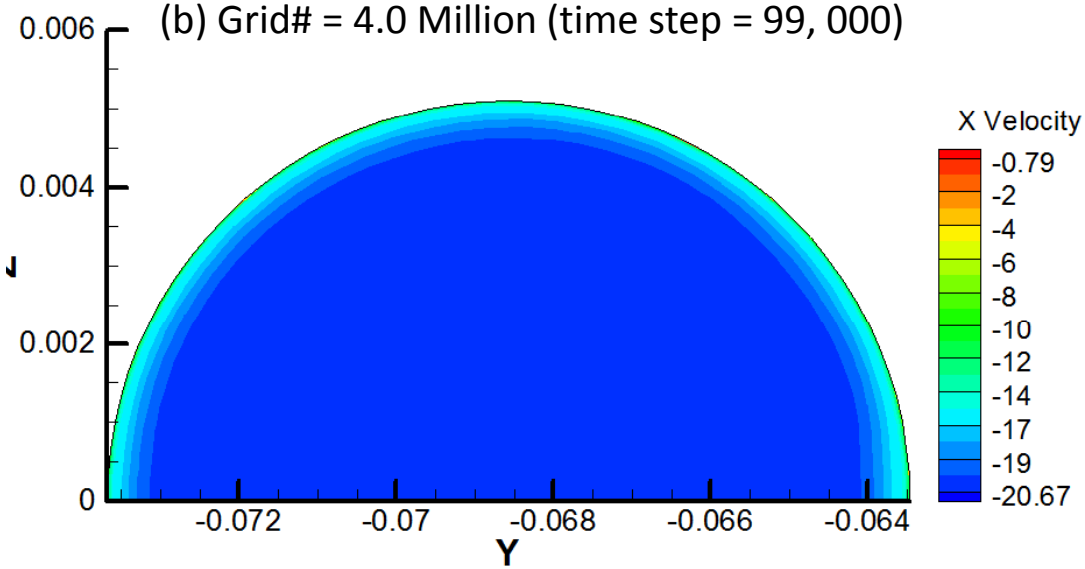
Velocity Contour



(a) Grid# = 7.65 Million (time set = 6000)
Computation crushes even at 1st order solver



(b) Grid# = 4.0 Million (time step = 99, 000)



(c) Grid# = 5.5 Million (time step = 144, 000)
(still running)

Fig. 2 Axial velocity at the exit plane (parallel computation) for different meshes