

## LIQUID SUCTION CAPACITY CORRECTIONS FOR MAZZEI<sup>®</sup> INJECTORS

### Specific Gravity

The Mazzei Injector Performance Tables for Liquid Suction (*shown on the Mazzei website ([www.mazzei.net](http://www.mazzei.net)) in the "Performance Data & Drawings – Injectors" section*) are based on the assumption that the injected liquid has the same properties as water. If the particular liquid being injected has a different specific gravity than water ( $1g / cm^3$ ), the injector's actual suction capacity can be determined based on the following equation:

$A$  is the actual (adjusted) suction capacity  
 $L$  is the listed suction capacity found in the Performance Tables  
 $\gamma$  is the specific gravity, in  $g / cm^3$ , of the material being injected

**EXAMPLE 1:** The Model 1078 Injector at 50 PSIG inlet pressure and 20 PSIG outlet pressure has a listed suction capacity ( $L$ ) of 92.4 GPH. If the specific gravity ( $\gamma$ ) of the chemical being injected is 1.5, then the actual suction capacity of the injector will be 61.6 GPH:

$$A = \frac{L}{\gamma} = \frac{92.4}{1.5} = 61.6$$

### Suction Height

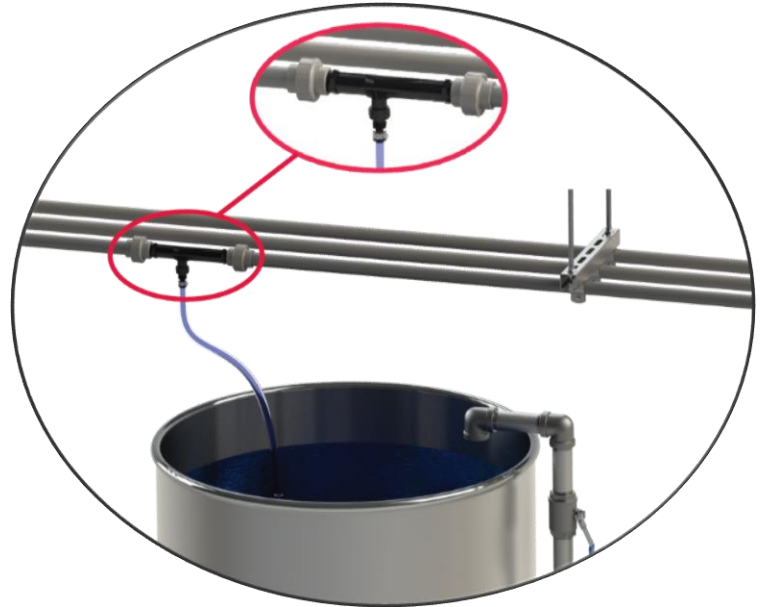
The Mazzei Injector Performance Tables for Liquid Suction are based on the assumption that the injector and injected liquid are at the same height. If this is not the case, the difference in height ( $h_l - h_m$ ) will cause the Injector's suction capacity to change, based on the following equation:

$$A = L \cdot \frac{(34 + h_l - h_m)}{34}$$

$A$  is the actual (adjusted) suction capacity  
 $L$  is the listed suction capacity found in the Performance Tables  
 $h_l$  is the height, in *feet*, of the liquid being injected  
 $h_m$  is the height, in *feet*, of the Mazzei<sup>®</sup> Injector

**EXAMPLE 2:**

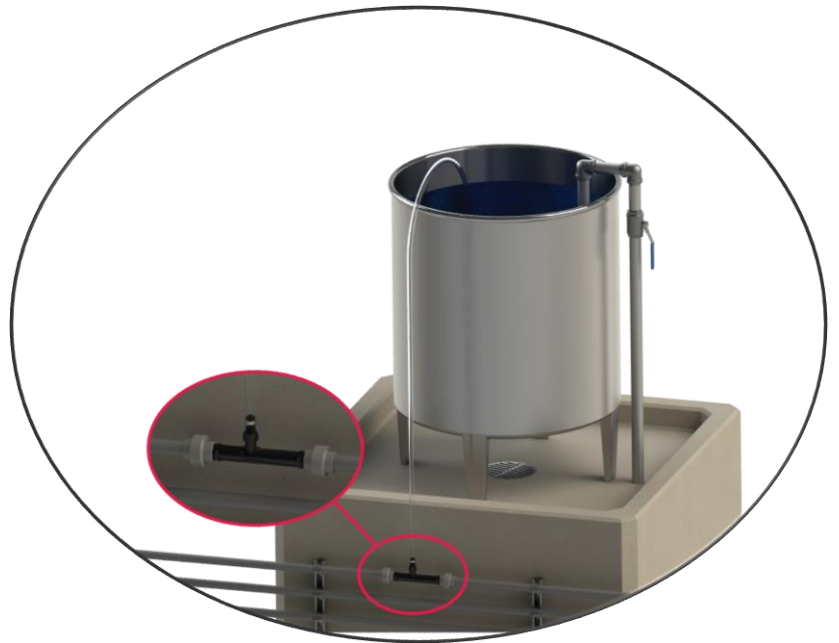
The Model 2081 Injector at 40 PSIG inlet pressure and 15 PSIG outlet pressure has a listed suction capacity ( $L$ ) of 630 GPH. If the liquid to be injected is located 2 feet above the ground ( $h_l$ ) and the injector is located 5 feet above the ground ( $h_m$ ) then the actual suction capacity of the injector will be 575 GPH:



$$A = L \cdot \frac{(34 + h_l - h_m)}{34} = 630 \cdot \frac{(34 + 2 - 5)}{34} = 575$$

**EXAMPLE 3:**

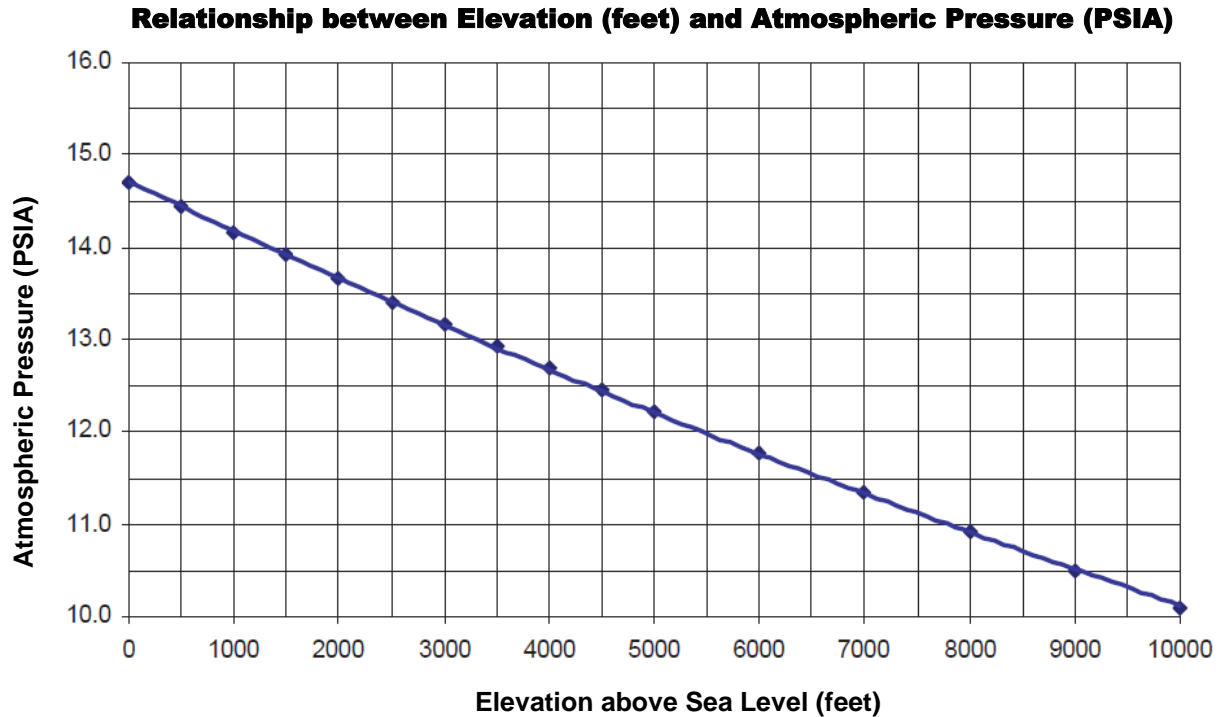
The Model 584 Injector at 50 PSIG inlet pressure and 25 PSIG outlet pressure has a listed suction capacity ( $L$ ) of 24.4 GPH. If the liquid to be injected is located 8 feet above the ground ( $h_l$ ) and the injector is located 1 foot above the ground ( $h_m$ ) then the actual suction capacity of the injector will be 29.5 GPH:



$$A = L \cdot \frac{(34 + h_l - h_m)}{34} = 24.4 \cdot \frac{(34 + 8 - 1)}{34} = 29.5$$

## Elevation

The Mazzei Injector Performance Tables for Liquid Suction are based on the assumption that the application is at sea level. Use the following graph and then the equation to determine the reduction in suction capacity if the application is at an elevation higher than sea level:



$$A = L \cdot \frac{p}{14.7}$$

$A$  is the actual (adjusted) suction capacity

$L$  is the listed suction capacity found in the Performance Tables

$p$  is the atmospheric pressure, in PSIA (pounds per square inch absolute)

### EXAMPLE 4:

The Model 1078 Injector at 30 PSIG inlet pressure and 20 PSIG outlet pressure has a listed suction capacity ( $L$ ) of 55.4 GPH. If the injector is being used in Idaho Falls at an elevation of 4700 feet, the graph shows the atmospheric pressure ( $p$ ) would be near 12.3 PSIA, therefore the actual suction capacity of the injector will be 46.4 GPH:

$$A = L \cdot \frac{p}{14.7} = 55.4 \cdot \frac{12.3}{14.7} = 46.4$$

## Specific Gravity, Suction Height and Elevation

All three factors, specific gravity of the injected liquid ( $\gamma$ ), difference in height between the injector and the injected liquid ( $h_l - h_m$ ), and the atmospheric pressure ( $p$ ) due to elevation, will affect the injector's suction capacity:

$$A = \frac{L}{\gamma} \cdot \frac{(34 + h_l - h_m)}{34} \cdot \frac{p}{14.7}$$

$A$  is the actual (adjusted) suction capacity

$L$  is the listed suction capacity found in the Performance Tables

$\gamma$  is the specific gravity, in  $g/cm^3$ , of the material being injected

$h_l$  is the height, in *feet*, of the liquid being injected

$h_m$  is the height, in *feet*, of the Mazzei® Injector

$p$  is the atmospheric pressure, in PSIA (pounds per square inch absolute)

## Viscosity

The Mazzei Injector Performance Tables for Liquid Suction are based on the assumption that the injected liquid has the same properties as water. If the liquid being injected has a different viscosity than water (1 cP), there is no simple formula to determine the change in suction capacity. However, in general, if the injected liquid has a higher viscosity than water, the injector's suction capacity will be decreased.

## Suction Line Tubing

In order to obtain maximum suction from any Mazzei Injector, it is critical to use the correct size suction line. Suction line tubing that is too small will decrease the suction capacity of the injector. Use the following guide:

Mazzei® Injector Models	Minimum Suction Line Tubing Size (ID)
0283, 0287, 0384, 0384-X, 0484, 0484-A, 0484-X, 0584, 0584-C, 0588, 0684, 0784	¼ inch
0878, 0885X, 0978, 1078, 1583-A, 1583-TC, 1584-A, 1584-TC, 1585-X, 1587	½ inch

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