

## FOR INTERMEDIATE DISCHARGE HEADS

ELMRIDGE 'TLLM Series' Liqui-Jet Eductors use water or other liquids as the motive fluid, and operate on the Venturi principle to pump other liquids or slurries. The principle of operation for the TLLM Series is the same as for the TLL Series shown previously, however, the TLLM Series eductor has higher Motive Nozzle flowrates for the same Motive Pressure, providing for higher Discharge heads with somewhat lower Suction Flowrates. The TLLM Series eductor has Motive liquid flowrates intermediate to those of the TLL Series and the TLLT Series. This may be appropriate when diluting acids or bases, or for dosing chemicals in moderate ratios where somewhat higher discharge pressures may be required and the nozzle flowrates provide appropriate flow ratios. Operating characteristics (Water Motive / Water Suction), for standard models are shown below, and special units are also available to meet your specifications. Standard materials of construction are PVC, CPVC, Polypropylene, PVDF, Bronze/ Brass, Cast Iron/Steel, 316L Stainless Steel, Alloy 20, and Hastelloy C®. Other materials are available upon request. Threaded, flanged, sanitary, buttweld, or socket weld connections (except Cast Iron).

**Table 1** Suction Capacity (usgpm water) for a TLLM5 Liqui-Jet Eductor using 70 deg. F Water

Suction Lift (feet water)	Discharge Head (feet water)	Operating Water Pressure (psig)							
		10	20	30	40	50	60	80	100
0	0	7.0*	26.6	30.3	31.3	31.7	32.3	33.0	34.3
	10		21.7	29.0	31.3	31.7	32.3	33.0	34.3
	20		4.3	17.9	26.3	31.7	32.3	33.0	34.3
	30				15.6	25.0	28.5	33.0	34.3
	40				4.1	15.6	21.9	33.0	34.3
	50					4.2	14.5	29.6	34.3
	60							23.2	33.7
	80							8.8	21.8
	100								5.6
5	0		22.2	27.0	28.6	29.1	30.0	31.0	32.4
	10		16.3	23.5	28.6	29.1	30.0	31.0	32.4
	20			13.1	22.2	29.1	29.9	31.0	32.4
	30				11.8	22.0	26.5	31.0	32.4
	40					12.1	20.2	31.0	32.4
	50						11.2	27.8	32.4
	60							21.9	32.3
	80							5.2	20.6
	10	0		18.7	24.2	25.8	26.5	27.7	28.8
10			12.8	20.8	25.8	26.5	27.7	28.8	30.0
20				8.2	19.5	26.1	27.6	28.8	30.0
30					8.1	18.7	24.7	28.8	30.0
40						7.5	18.5	28.8	30.0
50							8.5	25.3	30.0
60								19.5	30.0
80									18.1
15		0		15.0	21.9	23.0	24.2	25.1	26.3
	10		6.7	17.9	23.0	24.2	25.1	26.3	26.8
	20			3.8	16.3	24.0	25.1	26.3	26.8
	30					15.4	23.3	26.3	26.8
	40						14.4	26.3	26.8
	50						3.7	23.3	26.7
	60							16.0	26.7
	80								15.6
	20	0		11.3	18.8	20.0	20.8	21.4	21.4
10				13.5	20.0	20.8	21.4	21.4	21.4
20					12.3	20.8	21.4	21.4	21.4
30						12.6	20.8	21.4	21.4
40							13.3	21.4	21.4
50								21.1	21.4
60								13.6	21.4
80									13.2
25		0		7.8	11.4	11.6	12.5	13.8	13.6
	10			10.1	11.4	11.5	13.8	13.6	13.7
	20				9.3	11.4	13.5	13.6	13.5
	30					8.4	13.1	13.6	13.5
	40						11.8	13.4	12.9
	50							12.3	12.2
	60							11.0	12.5
	80								12.6
	Power Water Consumption (USGPM)		14.6	20.7	25.3	29.2	32.6	35.6	41.3

\*unstable

**Table 2** Capacity Factors

Model	TLLM00	TLLM0	TLLM1	TLLM2	TLLM3	TLLM4	TLLM5	TLLM6	TLLM7	TLLM8	TLLM9	TLLM10	TLLM11	TLLM12	TLLM13	TLLM14	TLLM15	TLLM16
Capacity Factor	0.027	0.050	0.091	0.165	0.30	0.55	1.00	1.80	3.24	4.30	5.71	7.57	10.1	13.3	17.7	23.5	31.2	41.4



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## APPLICATION EXAMPLES

### EXAMPLE 1:

It is required that a resin slurry (SG = 1.25), be pumped from a barrel at the rate of 15.0 USGPM. The maximum suction lift is 4 feet and the maximum discharge head is 40 feet. Water is available at 80 psig pressure for operating the eductor.

1. The suction lift in feet of water is calculated by multiplying the vertical distance by the Specific Gravity of the suction liquid.

$$\text{Lift in feet of water} = 4 \times 1.25 = 5 \text{ feet}$$

2. From Table 1, the TLLM5 eductor has a suction capacity of 31.0 USGPM of water under the conditions given.

3. The required Capacity Factor is:

$$15.0 / 31.0 = 0.48$$

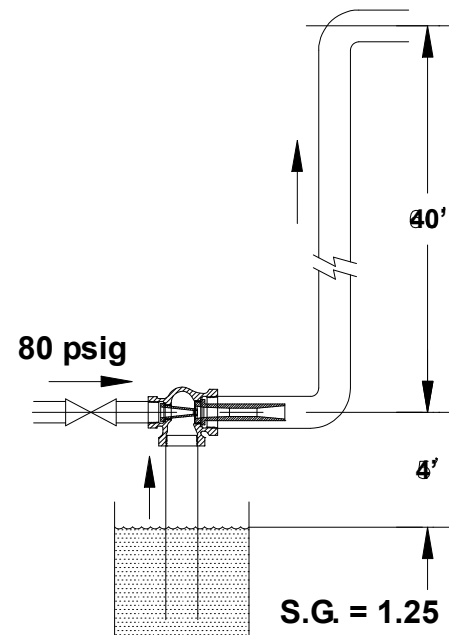
4. From the Capacity Factor Table 2, the Capacity Factor of the TLLM4 Eductor is 0.55, ie. the suction capacity of the TLLM4 at the given operating conditions is:

$$0.55 \times 31.0 = 17.1 \text{ USGPM}$$

The capacity can be reduced, if necessary, by throttling the power water supply.

5. Power Water Consumption of the TLLM4 at 80 psig is:

$$41.3 \times 0.55 = 22.7 \text{ USGPM}$$



### EXAMPLE 2:

It is required that a brine solution (S.G. = 1.11), be pumped from a tank in a specific ratio to the power water (1:5 [Vol.] brine to water). Total mixture flowrate required is 35 usgpm. The maximum suction lift is 4.5 feet and the maximum discharge head is 28 feet. Water is available at 60 psig pressure for operating the eductor.

1. The actual suction lift corrected for the Specific Gravity of the brine solution is:

$$4.5 \times 1.11 = 5.0 \text{ feet of water}$$

2. The brine flowrate (Suction Flow) required is:

$$35 / (1 + 5) = 5.8 \text{ usgpm}$$

3. Power Water flowrate is therefore:

$$35 - 5.8 = 29.2 \text{ usgpm}$$

4. From Table 1, the TLLM5 eductor has a Motive Water flowrate of 29.2 usgpm at 40 psig, and a suction capacity of 11.8 USGPM under the balance of the conditions noted.

5. The TLLM5 eductor should be used with the Motive Water throttled back to produce the required 29.2 usgpm of flow at a developed pressure of 40 psig.

6. The Suction Flow created by the eductor should be throttled back to the required flow of 5.8 usgpm.

