Dal 1932
Officine Giudici
Eiettori a misura di futuro

LIQUID JET LIQUID EJECTORS

Suction and compression of liquid — GEM type

Liquid jet ejectors are static vacuum pumps, which simply require a pressurized liquid for their operation.

They are devices of sturdy construction and simple concept, which consist of only three parts: the nozzle, the head and a diffuser.

Liquid jet ejectors are simple and versatile devices which, using a jet of water or other pressurized liquid, generate a vacuum, sucking up liquids and any solids in suspension, compressing them at an intermediate pressure between the driving pressure and the suction pressure.

Without moving mechanical parts, if used correctly, they guarantee a reliable and long-lasting operation.

They have small dimensions in relation to the services provided; they are easy to install, have low initial costs, and are also ideal for discontinuous operations as they are self-priming.

Although simple in construction, in order to guarantee the performance required of them, they need an adequate design that corresponds to the operating conditions

Operating principle — GEM type

Ejectors operate in accordance with the Bernoulli theorem - kinetic energy of one liquid can be used to produce a flow of another. The operation of the liquid jet ejector is based on the high speed of the liquid jet that comes out of the motive nozzle; the pressure simultaneously is reduced to the suction conditions.

Suction liquid, mixing with motive, absorbs part of the kinetic energy, obtaining a constant speed in the throat portion of the diffuser.

The mixture then enters the conically shaped diffuser where velocity is converted into pressure.

Due to the optimal design combinations of the nozzle and diffuser geometries it is possible to achieve the maximum efficiency under the required conditions.

They are self-priming and can handle liquids and solid mixtures.

Dal 1932
Officine Giudici
Eiettori a misura di futuro

Applications GEM type

Liquid jet ejectors are used for pumping, lifting, dosing and mixing liquids, even those containing suspended particles.

They are used in waste-water treatment, agricultural and processing industries, and any other chemical dosing applications.

A common application of using a liquid jet ejector is in the maritime field for both military and commercial ships. (Cargo)

They are suitable for pumping liquids in the engine room, from ballast compartments, chain lockers, peak tanks, cofferdams and sewage tanks.

They can also be used for priming centrifugal pumps using water or often air as the motive fluid.

Construction GEM type

Liquid jet ejectors can be made of any plastic or metal material that can be manipulated by machinery.

Thanks to the variety of construction options, they guarantee high resistance to the fluids used and the environment in which they are installed.

We are able to produce ejectors of any size, ensuring interchangeability with existing devices.

For the naval sector, typical constructions are made of ductile iron, bronze or stainless steel.

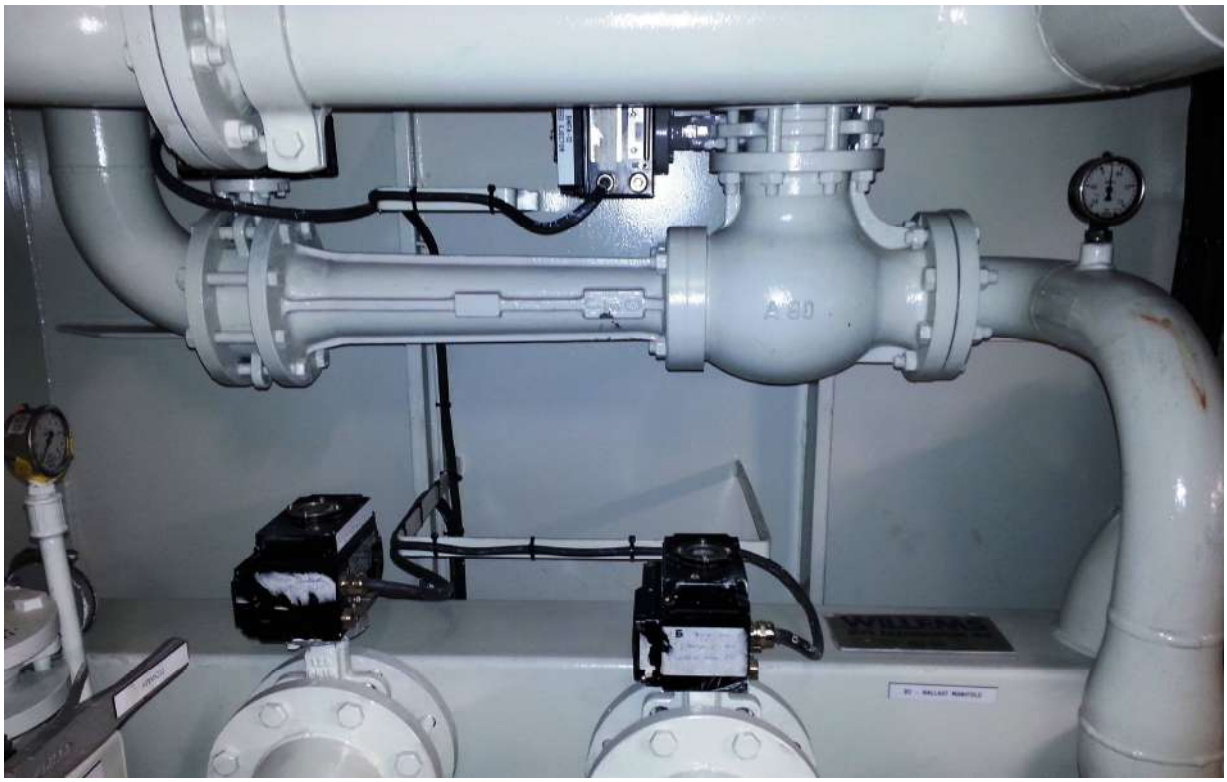
For the treatment of water and the chemical sector they are made of PVC, PP, PTFE, PVDF etc.

Connections

Standard connections are:

- flanged (according to EN o ANSI)
- Threaded
- Union connection
- Butt weld
- Special constructions on request

Installation **GEM type**



The installation can be placed in any position, as the positioning of the connections does not affect the operation.

Operating conditions must correspond to those for which it was designed, because the liquid jet ejectors perform as expected.

All pipelines are dimensioned so sufficiently that they are at least of the same nominal width as that of the connecting pipelines to the ejector and when longer in length, then the next size up.

In general, very sharp bends should be avoided and gaskets must not narrow at the flow sections of the liquid jet ejector.

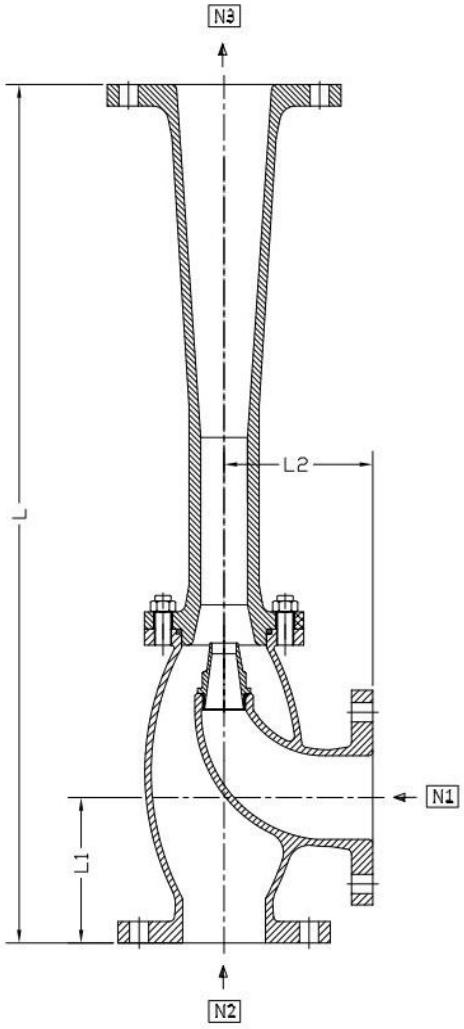
Suction pipe connected to ejector is recommended to have straight length prior to the suction flange.

If possible, at the side that the matter discharges, a straight pipe of no shorter in length than three times the diameter should be mounted, in order to avoid pitting problems at the bend.

Dal 1932
Officine Giudici
Eiettori a misura di futuro

Type A ejectors (suction inline to discharge) GEM type

table A	Suction capacity	N1 Motive	N2 Suction	N3 Discharge	L	L1	L2	Kg
40-50-65	14 m³/h	40	50	65	520	100	120	20
50-65-65	20 m³/h	50	65	65	575	125	130	33
65-65-80	25 m³/h	65	65	80	575	125	130	33
80-80-100	36 m³/h	80	80	100	805	170	170	52
100-100-125	56 m³/h	100	100	125	980	128	158	60
125-125-150	90 m³/h	125	125	150	1125	160	179	72
150-150-200	135 m³/h	150	150	200	1500	175	188	100
200-200-250	250 m³/h	200	200	250	1800	228	240	120



Ejectors A type (motive and suction liquid : water at 20°C)
Coefficient value K: Ms/Mm = suction flow rate/motive flow rate
Table 1

Suction lift (mt.W.C.)	Motive pressure (bar)	Delivery head (mt. W.C.)					
		5	10	15	20	25	30
2 mt W.C.	1.5	0.55					
	2	0.6	0.2				
	3	1.1	0.5	0.24			
	4	1.45	0.8	0.48	0.25		
	5	1.8	1.05	0.72	0.4	0.25	
	6	2.15	1.3	0.95	0.55	0.38	0.25
	7	2.5	1.5	1.06	0.7	0.5	0.35
	8	2.8	1.7	1.17	0.85	0.6	0.45
	9	3.1	1.9	1.3	0.95	0.7	0.55
	10	3.4	2.1	1.45	1.05	0.8	0.65
	11	3.6	2.3	1.6	1.15	0.9	0.75
	12	3.8	2.5	1.75	1.25	1	0.85

Ejectors A type (motive and suction liquid : water at 20°C)
Coefficient value K: Ms/Mm = suction flow rate/motive flow rate
Table 2

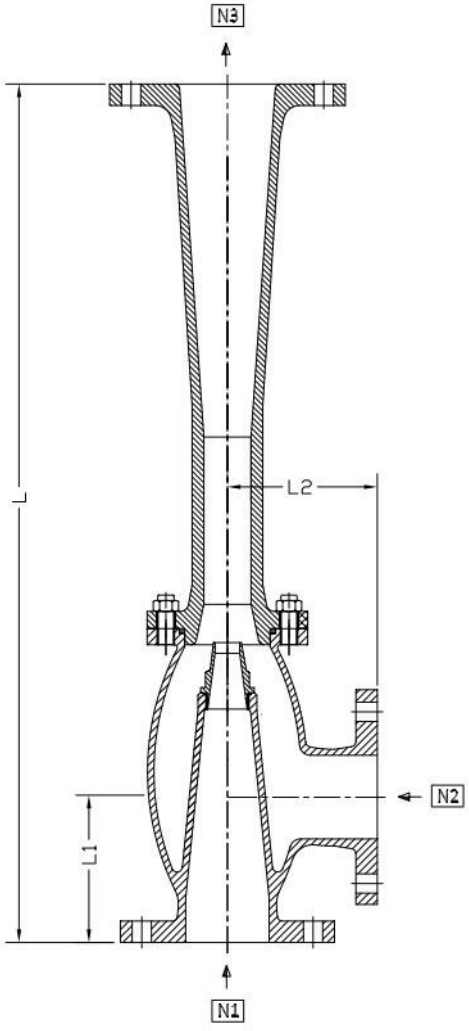
Suction lift (mt.W.C.)	Motive pressure (bar)	Delivery head (mt. W.C.)					
		5	10	15	20	25	30
5 mt W.C.	1.5	0.27					
	2	0.54	0.17				
	3	0.81	0.39	0.18			
	4	1.08	0.61	0.35	0.18		
	5	1.35	0.8	0.5	0.32	0.18	
	6	1.62	0.98	0.65	0.44	0.31	0.19
	7	1.81	1.12	0.8	0.55	0.41	0.3
	8	2	1.26	0.92	0.65	0.5	0.38
	9	2.18	1.39	1	0.75	0.58	0.45
	10	2.34	1.53	1.1	0.85	066	0.52
	11	2.5	1.67	1.2	0.93	0.72	0.59
	12	2.65	1.8	1.3	1	0.8	0.65

Example. Required capacity: 33 m³/h – Delivery head: 10 mt. W.C
Motive pressure: 7 bar - Suction lift.: 2 mt W.C.
From table 1: K=1.5 (this ratio indicates the ejector will have a suction capacity equal to 1.5 m³ for every m³ of motive water)
Motive flow rate is 22 m³/h. From table A, the size 80-80-100 is chosen.

Dal 1932
Officine Giudici
Eiettori a misura di futuro

Type “E” EJECTORS (Motive inline to discharge) GEM type

Type E	Suction capacity	N1 Motive	N2 Suction	N3 Discharge	L	L1	L2	Kg
32-40-40	7 m³/h	32	40	40	400	90	107	16
40-40-50	9 m³/h	40	40	50	400	90	107	17
50-50-65	14 m³/h	50	50	65	575	125	130	33
65-65-80	25 m³/h	65	65	80	575	125	130	34
80-80-100	36 m³/h	80	80	100	805	135	140	38
100-100-125	56 m³/h	100	100	125	980	128	158	60
125-125-150	90 m³/h	125	125	150	1125	160	179	72
150-150-200	135 m³/h	150	150	200	1500	175	188	100
200-200-250	250 m³/h	200	200	250	1800	228	240	120



Ejectors “E” type (motive and suction liquid: water @ 20°C)
Coefficient values K: Qs/Qm = suction flow rate/motive flow rate
Table 3

Suction lift (mt. WC)	Motive pressure (bar)	Delivery head (mt. WC)					
		5	10	15	20	25	30
2 mt.	1.5	0.55					
	2	0.6	0.2				
	3	1.1	0.5	0.24			
	4	1.45	0.8	0.48	0.25		
	5	1.8	1.05	0.72	0.4	0.25	
	6	2.15	1.3	0.95	0.55	0.38	0.25
	7	2.5	1.5	1.06	0.7	0.5	0.35
	8	2.8	1.7	1.17	0.85	0.6	0.45
	9	3.1	1.9	1.3	0.95	0.7	0.55
	10	3.4	2.1	1.45	1.05	0.8	0.65
	11	3.6	2.3	1.6	1.15	0.9	0.75
	12	3.8	2.5	1.75	1.25	1	0.85

Ejectors “E” type (motive and suction liquid: water at 20°C)
Coefficient values K: Qs/Qm = suction flow rate/motive flow rate
Table 4

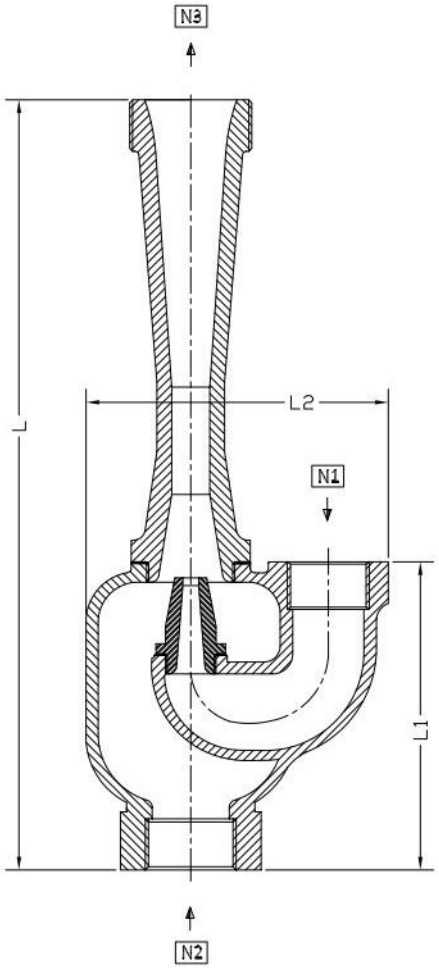
Suction lift (mt. WC)	Motive pressure (bar)	Delivery head (mt. WC)					
		5	10	15	20	25	30
5 mt.	1.5	0.27					
	2	0.54	0.17				
	3	0.81	0.39	0.18			
	4	1.08	0.61	0.35	0.18		
	5	1.35	0.8	0.5	0.32	0.18	
	6	1.62	0.98	0.65	0.44	0.31	0.19
	7	1.81	1.12	0.8	0.55	0.41	0.3
	8	2	1.26	0.92	0.65	0.5	0.38
	9	2.18	1.39	1	0.75	0.58	0.45
	10	2.34	1.53	1.1	0.85	066	0.52
	11	2.5	1.67	1.2	0.93	0.72	0.59
	12	2.65	1.8	1.3	1	0.8	0.65

Example. Required capacity: 50 m3/h – delivery head: 20 mt W.C.
Motive pressure: 10 bar g - Suction lift 5 mt W.C.
From table 4: K=0.85
This ratio indicates the ejector will have a suction capacity equal to 0.85 m3 for every m3 of inlet liquid.
Motive flow rate: 59 m3/h
From table E the size 100-100-125 is chosen

Dal 1932
Officine Giudici
Eiettori a misura di futuro

Type B-G (portable ejectors) GEM type

B/G table	Suction capacity	N1 Motive	N2 Suction	N3 Discharge	L	L1	L2	Kg
B0	2 m³/h	3/4"	3/4"	3/4"	223	92	93	2
B1	3.5 m³/h	1"	1"	1"1/4	285	110	115	4
B2	6 m³/h	1"1/4	1"1/4	1"1/2	305	120	128	5
G1	9 m³/h	1"1/2	1"1/2	2"	393	152	150	8
G2	14 m³/h	2"	2"	2"1/2	490	182	180	14
G3	25 m³/h	2"1/2	2"1/2	3"	635	215	200	25



Ejectors "E" type (motive and suction liquid: water @ 20°C)
Coefficient values K: Qs/Qm = suction flow rate/motive flow rate
Table 5

Suction lift (mt.W.C.)	Motive pressure (bar)	Delivery head (mt. W.C.)			
		5	10	15	20
2 mt	2.0	0.57	0.17		
	3	1.05	0.42	0.18	
	4	1.39	0.68	0.36	0.17
	5	1.7	0.89	0.54	0.26
	6	2.05	1.1	0.71	0.36
	7	2.4	1.28	0.8	0.45
	8	2.7	1.45	0.88	0.55
	9	2.98	1.6	0.97	0.62
	10	3.25	1.78	1.08	0.68
	11	3.42	1.96	1.2	0.78
	12	3.65	2.13	1.31	1.06

Ejectors "E" type (motive and suction liquid: water @ 20°C)
Coefficient values K: Qs/Qm = suction flow rate/motive flow rate
Table 6

Suction lift (mt.W.C.)	Motive pressure (bar)	Delivery head (mt. W.C.)			
		5	10	15	20
5 mt	2.0	0.5	0.14		
	3	0.75	0.32	0.14	
	4	1	0.5	0.25	0.14
	5	1.25	0.65	0.36	0.2
	6	1.5	0.8	0.47	0.25
	7	1.68	0.92	0.57	0.31
	8	1.85	1.03	0.66	0.4
	9	2	1.14	0.72	0.75
	10	2.15	1.25	0.8	0.53
	11	2.38	1.37	0.98	0.59
	12	2.5	1.48	1	0.63

Example. Required capacity: 7 m3/h – delivery head: 5 mt W.C.
Motive pressure: 5 bar -- Suction lift 2 mt W.C.
From table 5: K=1.7
This ratio indicates the ejector will have a suction capacity equal to 1.7 m3 for every m3 of inlet liquid.
Motive flow rate: : 4.1 m3/h
From table B/G the size G1 is chosen