Injector data and specifications

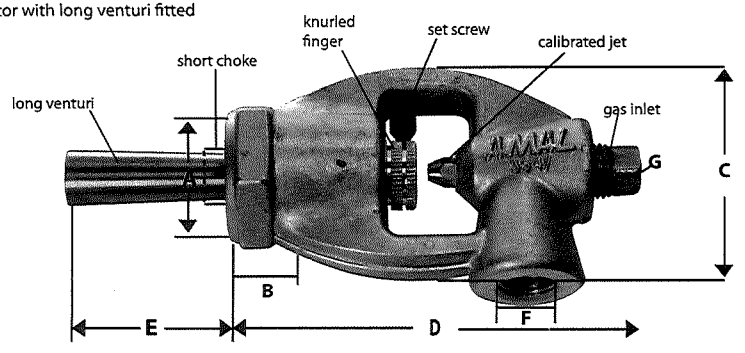
Drilled Rail Burners - Short Choke (SC)

Gas Type	Injector Size inc.BSP	Part No.	Venturi dia. inches	No. of Burner Holes 1/8" dia.	Gas Jet Amal No.	Heat Input BTU/hr	Gas Consumption ft³/hr
Natural	1/2	354/12NSC	0.35	24	120	5,500	5.4
Propane	1/2	354/12PSC	0.35	30	65	6,200	2.58
Butane	1/2	354/12BSC	0.35	10	22	2,300	0.77
Natural	3/4	35427NSC	0.52	55	280	13,000	12.7
Propane	3/4	354/27PSC	0.52	69	150	14,600	5.9
Butane	3/4	354/27BSC	0.52	25	55	5,400	1.83
Natural	1	354/37NSC	0.67	88	450	20,900	20.5
Propane	1	354/37PSC	0.67	116	250	24,400	9.8
Butane	1	354/37BSC	0.67	41	90	9,000	3.0
Natural	1 1/4	354/44NSC	0.85	143	740	34,400	33.7
Propane	1 1/4	354/44PSC	0.85	186	400	39,100	15.6
Butane	1 1/4	354/44BSC	0.85	64	140	14,000	4.7
Natural	1 1/2	354/54NSC	1.06	255	1220	59,800	58.7
Propane	1 1/2	354/54PSC	1.06	288	640	61,500	24.6
Butane	1 1/2	354/54BSC	1.06	100	220	22,000	7.33
Natural	2	354/612NSC	1.43	400	1900	93,200	91.4
Propane	2	354/612PSC	1.43	540	1150	113,000	45.3
Butane	2	354/612BSC	1.43	183	400	40,000	13.33

Assumes: Natural Gas pressure at 8 ins Wg
: Propane Gas supply at 11 ins Wg
: Butane Gas supply at 1 1 ins Wg

Dimensions of injectors

Below shows injector with long venturi fitted



Type Reference		A		B*		C		D		E		F&G	
Long Venturi	Short Choke	Injector Size BSP		Injector Size BSP		Injector Size BSP		Injector Size BSP		Long V enturi		Gas Inlet BSP	
		mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
354/2-LV	354/2-SC	19	3/4"	17	21/32"	68	2.69"	106	4.19"	65	2.55"	10	3/8"
354/3-LV	354/3-SC	25	1"	17	21/32"	68	2.69"	106	4.19"	76	3.00"	10	3/8"
354/4-LV	354/4-SC	32	1 1/4"	19	3/4"	85	3.34"	131	5.16"	102	4.00"	13	1/2"
354/5-LV	354/5-SC	38	1 1/12"	19	3/4"	85	3.34"	152	5.97"	127	5.00"	19	3/4"
354/6-LV	354/6-SC	51	2"	24	15/16"	117	4.62"	214	8.40"	171	6.75"	25	1"

*B dimension is the pipe length accommodated by the injector body.
The injector bodies are interchangeable and the alternate gas inlets, F and G, have the same threads.
All metric dimensions are approximations.

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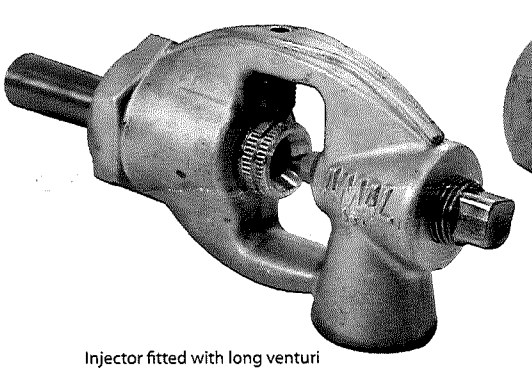
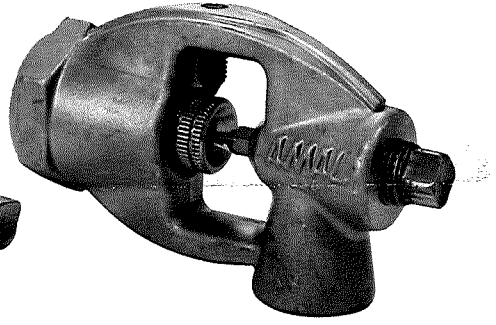
AMAL

AMAL Atmospheric Injectors for Propane, Butane and Natural Gases



Injector fitted with long venturi



Injector fitted with short choke

Amal atmospheric injectors combine robust construction with high performance in providing an ideal gas/air mix for a wide range of burner applications.

Manufactured from aluminium alloy the injectors come fitted with calibrated jets and either short chokes or long venturis depending on the specified application.

Amal calibrated jets enable the injectors to meet a specified consumption of gas at a given pressure. Accurate regulation of the primary air supply is provided by fine adjustment of the venturi or choke, giving a good 'turn down' and a range of flames from sharp to soft.

The design of the injector also allows an alternative position for the gas inlet.

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Amal gas injectors

Gas injectors are a precise means of mixing specific volumes of gas with a required air supply to provide a flammable gas/air mixture.

They allow the gas flow to be accurately controlled by means of a calibrated jet so that the rate of flow is known at any gas pressure. To accommodate different applications an adjustable choke or venturi controls the amount of air mixing with the gas.

Burner Systems

Various burner systems can be made by attaching Amal gas injectors to customers' own burner bars or rings.

To ensure correct mixing of the gas and primary air the distance between the injector and the flame nozzle, or the nearest burner port in a drilled bar or ring, should be approximately:

Long venturi
twelve times the bore of the pipe.
Short choke
six times the bore of the pipe.

It is recommended that short choke injectors be used with drilled burner bars or rings, and that long venturis be used with open ended burners.

Propane and butane injectors

When burning liquid gas the suppliers should be consulted as to the maximum take off limit from the cylinder.

If too much is taken off, the liquid gas in the cylinder will fall below its boiling point and no further evaporation of the gas will occur. The gas flow will then cease.
When using ordinary drilled burner bars, to burn propane or butane, the pressure at the injector's calibrated jet must not exceed 14in water gauge (35 m bars) otherwise the flames will 'blow off'.

On open ended pipes, where the flame burns on a single nozzle and the gas pressure exceeds 14in water gauge (35 m bars), a flame retention cup should be used to give flame stability (see diagram).

Setting short chokes or long venturis

Depending on the application, Amal injectors have either a short choke or long venturi to control the supply of air.

Adjustment is best carried out as follows:
Aeration is usually at its maximum when the end face of the knurled finger portion of the choke or venturi is level with the point of the set pin (see diagram on back page).

To reduce primary aeration, the throat should be screwed towards the calibrated jet. The same procedure is necessary to stabilise the flame should it tend to lift, particularly when the burner is cold.

It is impossible to predict the resistance of various burner ports making it necessary to adjust the choke position according to circumstances. Once set it can be fixed in position by the set screw.

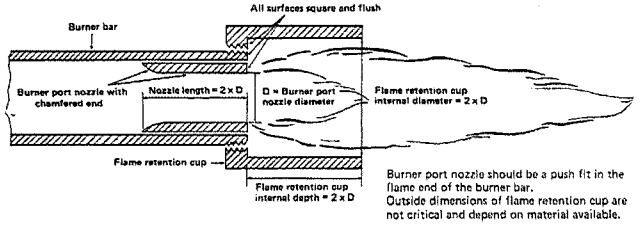
Information in this leaflet gives a practical guide to liberating specified volumes of gas and promoting primary air mixtures. The burner port areas suggested, however, must only be regarded as a starting point. Amal cannot take any responsibility for their design and final adoption.

Prevention of 'blow off' from open ended burners

When the pressure of propane or butane passing through an injector exceeds 14in water gauge (35 m bars) there is the possibility of the flame being 'blown off' and extinguished.

To prevent this from occuring a flame retention cup can be attached to the open ended burner as shown in the diagram below.

BURNER PORT NOZZLE AND FLAME RETENTION CUP



BSP Size	Part No
1"	354/72
1 1/4"	354/73
1 1/2"	354/74

Injector Selection

To supply the correct injector for a particular application specify the BTU's/hr required and, referring to the adjacent tables, the injector type number (dependent on the diameter of pipe for the burner head), the jet number and whether a long venturi or short choke is required.

Alternatively, supply the following details direct to Amal:
1. Gas type
2. Specific gravity
3. Gas pressure
4. Heat input – BTU's/hr or kW
5. Type of burner
6. Size of burner

Injector data and specifications

Naturally Aspirated Open Ended Burners - Long Venturi (LV) type

Gas Type	Injector Size inc.BSP	Part No.	Venturi dia. inches	Burner Nozzle dia. inches (use a burner cup)	Gas Jet Amal No.	Heat Input BTU/hr	Gas Consumption ft³/hr
Natural	1/2	354/12NLV	0.35	0.49	220	10,100	9.9
Propane	1/2	354/12PLV	0.35	0.49	70	6,800	2.73
Butane	1/2	354/12BLV	0.35	0.49	60	6,000	2.0
Natural	3/4	35427NLV	0.52	0.73	490	22,500	22.0
Propane	3/4	354/27PLV	0.52	0.63	110	10,700	4.3
Butane	3/4	354/27BLV	0.52	0.60	90	9,000	3.0
Natural	1	354/37NLV	0.67	095	820	37,600	36.9
Propane	1	354/37PLV	0.67	0.80	180	17,600	7.03
Butane	1	354/37BLV	0.67	0.77	150	15,000	5.0
Natural	1 1/4	354/44NLV	0.85	1.20	1220	59,500	58.3
Propane	1 1/4	354/44PL V	0.85	1.00	280	27,300	10.94
Butane	1 1/4	354/44BLV	0.85	0.97	240	24,000	8.0
Natural	1 1/2	354/54NL V	1.06	1.45	1900	92,700	90.9
Propane	1 1/2	354/54PLV	1.06	1.25	440	43,000	17.2
Butane	1 1/2	354/54BLV	1.06	1.22	380	38,000	12.67
Natural	2	354/612NL V	1.43	1.95	3560	173,600	170.2
Propane	2	354/612PLV	1.43	1.70	800	78,100	31.3
Butane	2	354/612BL V	1.43	1.66	700	70,000	23.3

The above data is empirically derived and assumes:

Natural Gas with SG 0.600, CV 1020 BTU/ft ^{3}, Pressure 8 inch Wg
Propane - SG 1.56 CV 2500 BTU/ft ^{3}, Pressure 11 inch Wg
Butane - SG 2.06, CV 3000 BTU/ft ^{3}, Pressure 11 inch Wg

It is also assumed that flame retention cups (burner cups) will be used. If they are not, then larger burner nozzles will be required to reduce gas velocity at the flame.

Compressed Air Air Assisted Open Ended Burner (type CA354/–LV)

IMPORTANT - use non-return valves on air and gas supply lines.

Natural Gas Only
Compressed Air supply assumed to be at pressure of 10 psig

Injector Size inc.BSP	Part No.	Venturi dia. inches	Burner Nozzle dia. inches (use a burner cup)	Air Jet Amal No.	Mixture Jet No.	Heat Input BTU/hr	Gas Consumption ft³/hr
1/2	CA354/12L V	0.35	0.281	160	470	18,900	17.5
3/4	CA354/23LV	0.52	0.625	660	1690	72,500	67
1 1/4	CA354/44LV	0.85	0.875	1520	3300	141,000	131
1 1/2	CA354/54LV	1.06	1.25	2890	6580	242,500	224
2	CA354/65LV	1.43	2.65	6140	16,000	465,000	430