Useful Information

Trade Association

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Various Codes of Practice, especially:
No. 3 on fire with LPG
No. 4 on various propane appliances
No. 7 on storage of cylinders
No. 22 on piping systems
No. 24 on use of LPG cylinders
These publications are available from www.uklpg.org

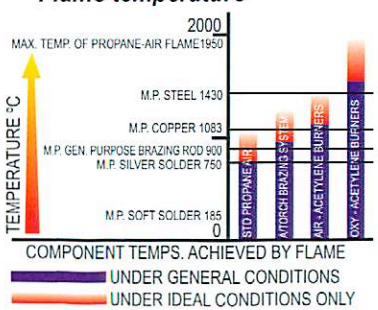
BS.5482 Pts. 1 and 2 for Domestic Butane and Propane Gas Burning Installations
Available from British Standards Institution, 389 Chiswick High Rd., London W4 4AL. Tel: 0208-996 9000.

HSE Gas Safety Leaflets
Chemical Sheet No. 4
– Use of LPG in Small Bulk Tanks.
Chemical Sheet No. 5
– Small scale use of LPG in cylinders
Gas Safety (Installation and Use) **Regulations 1998, as amended.**
Available from HMSO.

Some useful conversions

1 ft =	0.305 m	1 Btu/h =	0.000293 kW
1 m =	3.28 ft	1 lb =	0.454 kg
1 in =	25.4 mm	1 kg =	2.2 lb
1 mm =	0.039 in	1 bar =	14.5 psi
1 dm^3 =	1 litre	1 psi =	0.0689 bar
1 ft^3 =	28.32 dm^3 = 0.028 m^3	1 bar =	1000 mbar
1 m^3 =	1000 dm^3 = 35.31 ft^3	1 in wg =	2.491 mbar
1 kW =	3412 Btu/h = 1kJ/s = 3.6 MJ/h	1 mbar =	0.401 in wg

Flame temperature



The flame temperature of an LPG-air burner at the hottest point is 1900°C although a heated component will attain a much lower temperature than this. The Autotorch brazing burners can give temperatures up to 950°C under general conditions and 1200°C in ideal conditions. The Autotorch 2300 and standard torch burners will give temperatures up to 800°C

Safety Information

Properties of Gases

These are given for commercial propane and butane

	Butane	Propane
Chemical symbol	C_4H_{10}	C_3H_8
Relative density of gas to air	Heavier than air	Heavier than air
(at 15°C, at atmospheric pressure)	2.0	1.5
Boiling point at atmospheric pressure	-2°C	-42°C
Pressure of gas at 0°C	Nil	4-5bar
20°C	1-3bar	7-9bar
50°C	3-7bar	15-19bar
Ratio: Gas volume to liquid volume	238	279
(at 15°C, at atmospheric pressure)		
Volume of gas to weight of liquid	420dm³/kg	540dm³/kg
(at 15°C, at atmospheric pressure)	6.6ft³/lb	8.6ft³/lb
Calorific value	49.5 MJ/kg	50.4 MJ/kg
(at 15°C, at atmospheric pressure)	21,200 Btu/lb	21,500 Btu/lb
	121.5 MJ/m³	93 MJ/m³
	3,200 Btu/ft³	2,500 Btu/ft³
	13.7 kWh/kg	14.0 kWh/kg
Air required for combustion:		
Ratio: Vol of air to vol of gas	30	24
Minimum ignition temperature air	410°C	460°C
Relative flame speed (hydrogen = 100)	16	16
Flame speed	0.36-0.40m/s	0.36-0.40m/s

Recommended maximum offtakes from cylinders

When gas is drawn off a cylinder it causes the liquid to cool and the pressure to drop. If gas is taken too quickly the pressure drops below an acceptable level and in some cases water vapour in the air will freeze on the outside of the cylinder. If the cylinder will not give enough gas for the appliances either a larger cylinder must be used or cylinders must be coupled together using pigtails and manifolds. Therefore maximum permitted offtakes are laid down for given sizes as follows:

Cylinder size	Maximum offtake				
Butane	kW	kg/h	lb/h	ft³/h	dm³/h
4.5kg	5.73	0.418	0.92	6	175
14.5kg	9.50	0.696	1.53	10	280
Propane					
4kg	7.3	0.528	1.16	10	280
13kg	14.6	1.054	2.32	20	570
19kg	18.3	1.319	2.90	25	710
47kg	32.9	2.373	5.22	45	1270

These offtakes can be exceeded for the intermittent use of appliances