Pye Unicam Atomic Absorption Spectrophotometry
Flame Analysis, Fuel-oxidant mixtures

Atomic number, Element

13	Aluminium	Al	N_2O/C_2H_2	fuel rich
51	Antimony	Sb	Air/C_2H_2	stoichiometric
33	Arsenic	As	N_2O/C_2H_2, Ar/H_2	fuel lean
56	Barium	Ba	N_2O/C_2H_2	stoichiometric
4	Beryllium	Be	N_2O/C_2H_2	fuel rich
83	Bismuth	Bi	Air/C_2H_2	fuel lean
5	Boron	B	N_2O/C_2H_2	fuel rich
48	Cadmium	Cd	Air/C_2H_2	fuel lean
55	Caesium	Cs	Air/C_2H_2	fuel lean
20	Calcium	Ca	N_2O/C_2H_2, Air/C_2H_2	stoichiometric/ fuel rich
24	Chromium	Cr	N_2O/C_2H_2, Air/C_2H_2	fuel rich
27	Cobalt	Co	Air/C_2H_2	fuel lean
29	Copper	Cu	Air/C_2H_2	fuel lean
66	Dysprosium	Dy	N_2O/C_2H_2	fuel rich
68	Erbium	Er	N_2O/C_2H_2	fuel rich
63	Europium	Eu	N_2O/C_2H_2	fuel rich
31	Gallium	Ga	Air/C_2H_2	fuel lean
32	Germanium	Ge	N_2O/C_2H_2, Air/C_2H_2	fuel rich
79	Gold	Au	Air/C_2H_2	fuel lean
72	Hafnium	Hf	N_2O/C_2H_2	fuel rich
67	Holmium	Ho	N_2O/C_2H_2	fuel rich
49	Indium	In	Air/C_2H_2	fuel lean
77	Iridium	Ir	Air/C_2H_2	stoichiometric
26	Iron	Fe	Air/C_2H_2	fuel lean
57	Lanthanium	La	N_2O/C_2H_2	fuel rich
82	Lead	Pb	Air/C_2H_2	fuel lean
3	Lithium	Li	Air/C_2H_2	fuel lean
12	Magnesium	Mg	N_2O/C_2H_2, Air/C_2H_2	stoichiometric
25	Manganese	Mn	Air/C_2H_2	fuel lean
80	Mercury	Hg	Air/C_2H_2	fuel lean
42	Molybdenum	Mo	N_2O/C_2H_2, Air/C_2H_2	fuel rich
60	Neodymium	Nd	N_2O/C_2H_2	fuel rich
28	Nickel	Ni	Air/C_2H_2	fuel lean
46	Palladium	Pd	Air/C_2H_2	fuel lean
15	Phosphorus	P	N_2O/C_2H_2	fuel rich
78	Platinum	Pt	Air/C_2H_2	fuel lean
19	Potassium	K	Air/C_2H_2	fuel lean
75	Rhenium	Re	N_2O/C_2H_2	fuel rich
45	Rhodium	Rh	N_2O/C_2H_2, Air/C_2H_2	fuel lean
37	Rubidium	Rb	Air/C_2H_2	fuel lean
44	Ruthenium	Ru	Air/C_2H_2	fuel lean
62	Samarium	Sm	N_2O/C_2H_2	fuel rich
34	Selenium	Se	N_2O/C_2H_2, Ar/H_2	fuel lean
14	Silicon	Si	N_2O/C_2H_2	fuel rich
47	Silver	Ag	Air/C_2H_2	fuel lean
11	Sodium	Na	Air/C_2H_2	fuel lean
38	Strontium	Sr	N_2O/C_2H_2, Air/C_2H_2	stoichiometric
52	Tellurium	Te	Air/C_2H_2	fuel lean
81	Thallium	Tl	Air/C_2H_2	stoichiometric
50	Tin	Sn	N_2O/C_2H_2, Air/C_2H_2	fuel rich
22	Titanium	Ti	N_2O/C_2H_2	fuel rich
23	Vanadium	V	N_2O/C_2H_2	fuel rich
39	Ytterbium	Yb	N_2O/C_2H_2	fuel rich
30	Zinc	Zn	Air/C_2H_2	fuel lean

The two most commonly used flames are the air/acetylene flame and the nitrous oxide/acetylene flame. The nitrous oxide flame is much hotter than the air-based flame, and is essential for the determination of refractory elements such as Al and Si. The flame temperature of any flame will be affected by the fuel/oxidant ratio, which will also change the oxidising/reducing nature of the flame.

A fuel rich nitrous oxide/acetylene flame has a red cone, the higher the red cone, the richer (= more reducing) the flame. The required height of the red cone is usually specified in the handbooks of standard conditions.
A fuel rich nitrous oxide/acetylene flame has a tendency to form a deposit on the burner. Such a deposit can clog up the burner. It is therefore necessary to work as short a time as possible while using such a flame.

The argon/hydrogen/entrained air flame is transparent.