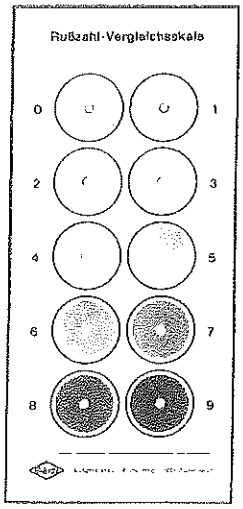
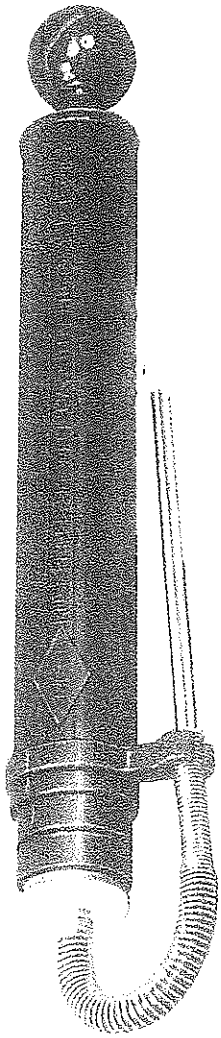
BRIGON-Smoke-Tester NAW

to determine Smoke Number

The best indicator of incomplete combustion for oil burners is smoke, as heavy smoking will usually occur before high CO concentrations are present.





Aside from bringing on the possibility of air pollution, smoking also causes soot deposition on heat exchange surfaces and thus results in considerable fuel waste due to decrease of combustion efficiency. Soot is an excellent insulator and even a relatively thin layer can greatly reduce the thermal conductivity of the heat exchanger.

Heavy smoking beyond BRIGON No. 1 spot for light oils is an obvious symptom of significant incomplete combustion. A variety of reasons, not seldom also a combination of factors, can be responsible for this: Too little excess air, insufficient draft or overfiring, mismatched oil and spray patterns or poorly designed combustion equipment, dirty or fouled nozzle, improper or lopsided oil spray pattern, misadjusted oil pressure or combustion chamber problems.

Testing Device

BRIGON-Smoke Tester NAW
BRIGON-Filter-Paper
BRIGON-Smoke-Scale

Principle of Operation

A certain amount of flue gas is drawn from the measuring point in the flue pipe by drawing and pushing the piston rod ten times. On its way from the metal sampling tube to the pump cylinder the gas sample is passed through the BRIGON-Filter-Paper. The resulting smoke stain on the BRIGON-Filter-Papier is then compared with the BRIGON-Smoke-Scale to determine Smoke-Number.

Measurement

BRIGON-Smoke-Tester NAW should be at or close to room temperature to ensure a high degree of accuracy. Insert BRIGON-Filter-Paper in head of BRIGON-Smoke-Tester and screw firm gently. Insert metal tube of BRIGON-Smoke-Tester into the flue by using the same point for sampling as described in other chapters. The gas sample to be tested is drawn through BRIGON-Filter-Paper by pumping steadily ten times. A check valve fitted in the Smoke-Tester prevents the gas flow from being reversed and hence any loss of soot already deposited on BRIGON-Filter-Paper. Also for this smoke test a cone is recommended.

After 10th stroke take out Filter-Paper, place BRIGON-Filter-Paper under holes of BRIGON-Smoke-Scale and over the white background. Compare the soot stain on BRIGON-Filter-Paper with the different shades of black on BRIGON-Smoke-Scale to determine the matching Smoke-Number. Determined Smoke-Number must not be grater than No. 1.

Maintenance

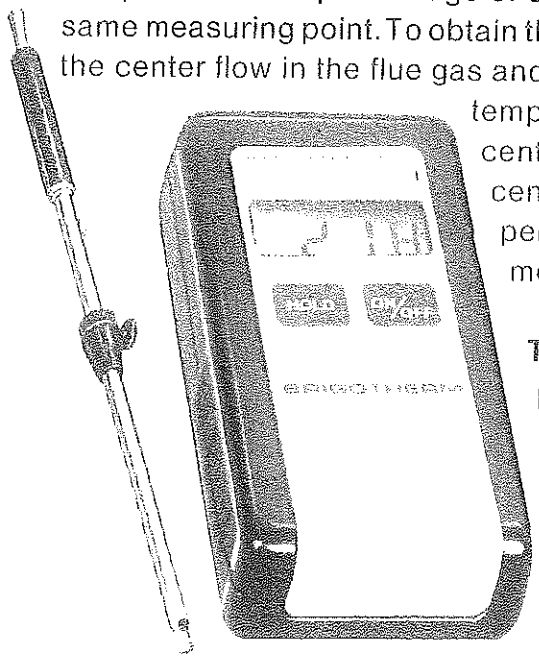
The high degree of accuracy guaranteed for BRIGON-Smoke-Tester NAW can only be achieved if all manufacturer's instructions are observed and maintenance is carried out as follows:

1. Clean Cylinder, Piston, Piston Rod, and complete Sampling Tube after approximately 30 tests; if necessary lubricate Piston slightly with BRIGON-Lubricant-Oil.
2. Clean Valve and Valve seat with alcohol if leakage has been detected. Also clean Nylon Insert.
3. Check air-tightness by sealing hole of Metal Sampling Tube with finger and pulling Piston Rod back. An air-teight Valve does not give way more than 50 mm (2 inches).
4. Use only BRIGON-Filter-Paper and BRIGON-Smoke-Scale for Tests.

BRIGON-Digital-Thermometer BRIGOTHERM

to locate center flow of flue gas
and to measure room temperature instantly

Temperature and percentage of CO_2 in the flue gas vary over a wide range even at the same measuring point. To obtain the highest degree of accuracy it is necessary to locate the center flow in the flue gas and to take the gas analyses there, because the highest temperature in the flue gas corresponds to the highest percentage of CO_2 in the flue gas and both are located in the center flow. Simultanious measuring of temperature and percentage of CO_2 at the same location is possible by means of a bypass in the sampling tube.



Testing Device

Range:
−50°C to +800°C (−58°F to + 1474°F)
Accuracy: ±1% of reading
Power Supply: 9-Volt battery

BRIGON-Electronic-Digital-Thermometer LCD with battery, segment testing feature and charge control. Probe with bypass FeCuNi-thermocouple with integrated cold junction 300 mm (12 inches)

Measurement

Disconnect the metal tube of Aspirator Assembly and connect remaining rubber sampling line to bypass of thermocouple. Insert probe into flue gas and locate center flow with BRIGON-Electronic-Digital-Thermometer. Fix probe in this location by means of cone. Take gas analysis as discribed in chapter "Measurment with BRIGON-CO_2-Indicator-TESTORYT" while watching the reading of BRIGON-Electronic-Digital-Thermometer to make sure probe is still in main current. After 18th squeeze read temperature and proceed with next steps of gas analysis.

Maintenance

BRIGON-Electronic-Digital-Thermometer needs no maintenance. Low battey or lack of power supply is indicated on LCD display. Supplied 9-Volt battery will power the unit for about 150 hours. If power supply is too low, recharge battery.