



# VM Crucibles

*For determining volatile matter in coal and coke, and for other ignition, ashing and incineration purposes.*

Parr VM Crucibles with insert covers have been developed especially for determining volatile matter in coal and coke according to the standard ASTM test method D3175\*. They meet all requirements of the ASTM method except they are made of a special nickel-chromium alloy instead of platinum. In this test volatile matter is determined by heating a coal sample in a metal crucible with a closely fitting cover for seven minutes at 950 °C. Parr VM Crucibles will withstand the severe conditions imposed by this test, maintaining a remarkably constant tare weight and offering an attractive substitute for the expensive platinum crucibles specified in the ASTM method. The wide acceptance and general use of these special alloy crucibles over the past sixty years will attest to their ability to perform satisfactorily in routine volatile matter determinations. In addition, their superior strength and light weight, combined with uniform thickness and excellent resistance to oxidation, make them equally suitable for other ignition purposes where working temperatures do not exceed 1000 °C.



## Limitations

Parr VM Crucibles will ordinarily withstand the corrosive conditions produced when working with many different materials and precipitates, but it must be emphasized that their corrosion resistance is not equivalent to that of a noble metal such as platinum. Coal samples that have been treated with chlorinated solvents must have all of the solvent removed before they are heated in a VM Crucible, since chlorinated solvents will attack the crucible and cause cracking. These crucibles also are not suitable for procedures involving secondary treatment with acids, as is sometimes practiced with precipitates of lead, iron, magnesium phosphate and the like. They also are not suitable for alkali fusions in silicate analyses, or for the volatilization of silica with hydrofluoric acid, and they are not recommended for ashing flours where calcium acetate is employed.

\*ASTM D3175, "Standard Test Method for Volatile Matter in the Analysis Sample of Coal and Coke", American Society for Testing and Materials, Philadelphia, PA 19103

## VM Crucible Specifications

Diameter, inside top	25.5 mm	25.5 mm
Diameter, inside bottom	17.0 mm	23.0 mm
Height, overall	34.0 mm**	11.0 mm
Weight, average	14.9 g	7.0 mm
Volume, crucible only	13.0 mL	NA
Volume, with insert cover	11.5 mL	NA

\*\* Height w/cover 39.0 mm

In some cases Parr VM Crucibles have been used as sample holders in oxygen combustion bombs, but this practice is not recommended. These thin wall crucibles may ignite under the high temperature and extreme oxidizing conditions developed in an oxygen bomb, causing dangerous pressures and possible serious damage to the bomb. Other metal sample holders with heavier walls are made especially for oxygen bomb tests.

## Specifications

Parr VM Crucibles and insert covers are fabricated from a special nickel-chromium alloy selected for its specific resistance to oxidation when heated repeatedly to 1000 °C. Both crucibles and covers have uniform walls and bottoms approximately 0.5 mm thick with sidewall tapers designed so that the insert cover fits snugly in the top of the crucible as required in the standard test method. Each crucible is electro-polished to obtain a smooth, matte finish which will readily take and hold a passive oxide film.

## Instructions

To establish normal constant weight, each new VM Crucible should be given a preliminary heating. This will produce a hard, dull, grey-green oxide coating which will resist further oxidation. To develop this coating the crucible should be heated for one hour, either in an electric muffle furnace at 950 °C or over the full flame of a Meker type gas burner. This procedure should be repeated during the life of the crucible whenever it has been cleaned or whenever the oxide coating has been destroyed. Do not use coarse or rough abrasives on these crucibles as they will remove the oxide coating which provides resistance to oxidation and produces stability in the tare weight.

## Ordering Guide

*VM Crucibles can be ordered with or without insert covers*

3101	VM Crucible with insert cover
3102	VM Crucible without insert cover
3103	Insert cover for VM Crucible

**Let Us Build One for You.**

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