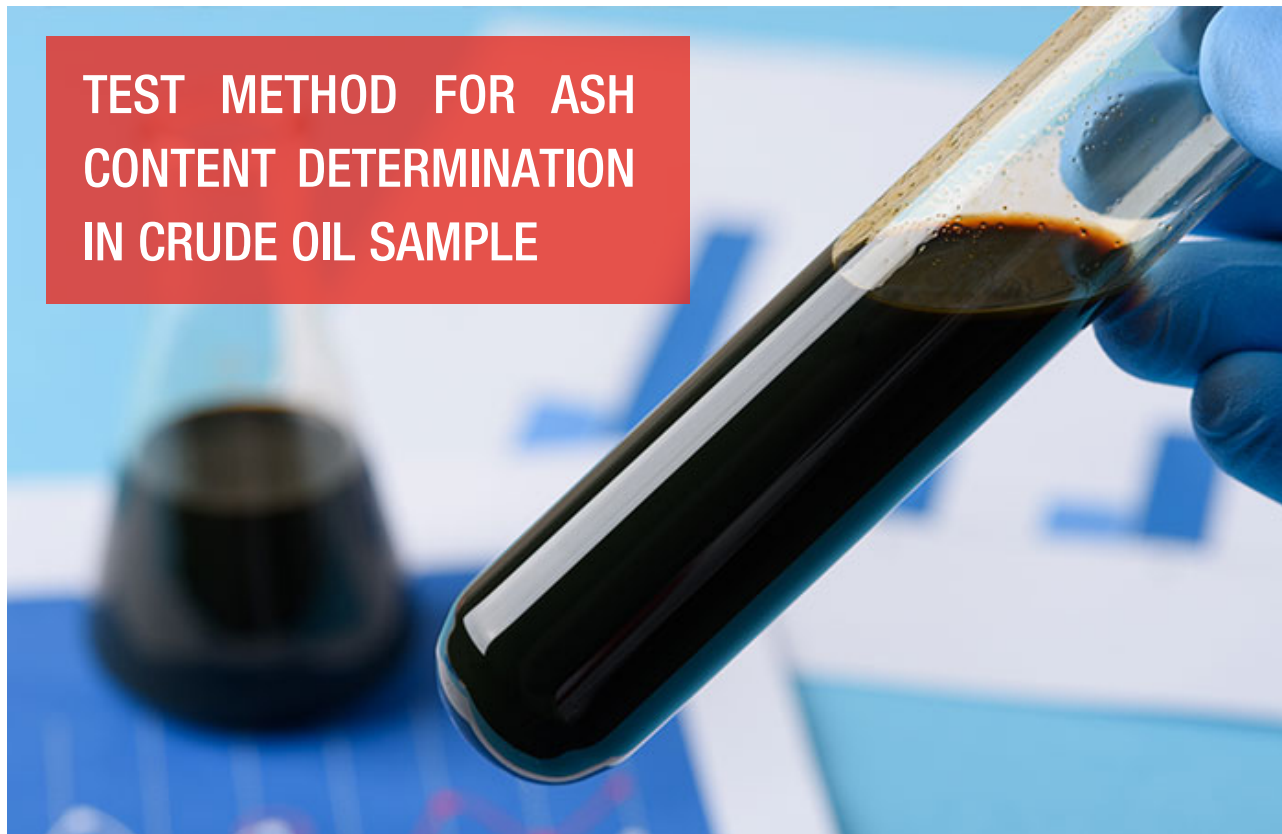




## TEST METHOD FOR ASH CONTENT DETERMINATION IN CRUDE OIL SAMPLE



An alternative and rapid method to provide information about the quality of crude oil products.

### | INTRODUCTION

Knowledge of the amount of ash-forming material present in crude oil product can provide information as to whether or not the product is suitable for use in a given application.

Ash can result from oil or water-soluble metallic compounds that can affect petroleum refining and it can be related directly to particulate emission.

Ash content of crude oil is usually low, for this reason it is important to work with an enough representative amount of sample.

Traditional tools like electrical muffle furnaces, have their own set of limitations –

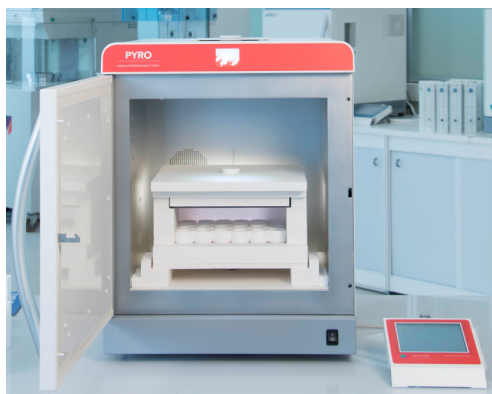
long ashing time, long cooling and high-power consumption.

Furthermore, petrochemical products generate a high amount of fumes during the ashing process. For this reason, it is very important to have the muffle constantly ventilated by an efficient aspiration system.

Milestone PYRO system incorporates all of the benefits of a microwave system working with special fast heating/cooling crucibles while making the ashing application fast, easy, effective, and in complete safety.



## | EXPERIMENTAL INSTRUMENT



Picture 1 - Milestone PYRO Microwave ashing system

The new Milestone PYRO is an advanced microwave muffle furnace, suitable for ashing applications.

It is equipped with a full stainless-steel door and the cavity has a volume in excess of 70 liters, thus allowing the use of a large muffle which in turn enhances the sample throughput.

PYRO system is equipped with two 950 Watt magnetrons for a total of 1900 Watt making it the most powerful microwave muffle furnace system available in the market. The system additionally employs a rotating diffuser that evenly distributes the microwaves throughout the cavity, assuring a uniform temperature improving the reproducibility.



Picture 2 Milestone PYRO High sample throughput muffle system

PYRO enables the analysts to perform the ashing test of a wide variety of samples.

A unique ceramic muffle allows microwave radiation to pass through and rapidly raise the temperature of a silicon carbide plate.

Sample crucibles are placed on a large clean quartz plate and an airflow is induced by a built-in exhaust system.

Any type of crucible (metal, porcelain, quartz, etc.) can be used for this test.

### ANALYTICAL PROCEDURE

We have weighed accurately 10 g of Crude Oil sample in four ceramic crucibles (see details in Table 1).

The crucibles were initially preconditioned at constant weight.

Crucibles were there placed into PYRO microwave ashing unit and ashed with the microwave program described in Table 2 at 800°C.

Crucible	Sample	Weight (g)	Type of Crucible
1	Crude Oil	10.7699	100mL Ceramic
2	Crude Oil	10.3520	100mL Ceramic
3	Crude Oil	9.8054	100mL Ceramic
4	Crude Oil	10.8854	100mL Ceramic

Table 1 – Details about sample type, amount and crucibles.

Step	Time	T1	Power
1	00:40:00	775°C	1800 W
2	00:30:00	775°C	1800 W

Table 2 – PYRO microwave ashing program

## INDUSTRY REPORT

# PYRO | PETROCHEMICAL



### | RESULTS AND DISCUSSION

The samples were completely ashed, obtaining a white residue of inorganic material. The crucibles were weighted and percentage of residue was then recalculated.

Sample	Crucible (g)	Crucible+Residue (g)	Residue %
Crude Oil (1)	49.3568	49,3945	0,35
Crude Oil (2)	49.2256	49,2608	0,34
Crude Oil (3)	51.6369	51,6702	0,34
Crude Oil (4)	49.0354	49,0757	0,37

Table 3- Obtained results, % of residues

### | CONCLUSION

Milestone's PYRO microwave ashing offers the big advantage to run all samples in only one step guaranteeing a complete safety environment for the users.

Due to its higher muffle capacity and faster heating, the sample processing throughput is higher than conventional electrical muffle system, making PYRO the perfect solution for all laboratories with a high working flow.

The results shown in this report are very reproducible thanks to the great temperature homogeneity in the whole muffle and all fumes were completely removed by the strong aspiration system included in the PYRO system.

In addition, the ability to reach high temperatures in short time makes Milestone PYRO the suitable system for petrochemical samples.

### | FURTHER READING

To learn more about ashing and other related topics, feel free to visit these websites.

Milestone PYRO High sample throughput muffle  
<https://www.milestonesrl.com/products/micro-wave-ashing>

Milestone srl  
<http://www.milestonesrl.com>

Milestone worldwide contacts  
<https://www.milestonesrl.com/corporate/worldwide-representatives>

### | ABOUT MILESTONE

*At Milestone we help chemists by providing the most innovative technology for metals analysis, direct mercury analysis and the application of microwave technology to extraction, ashing and synthesis. Since 1988 Milestone has helped chemists in their work to enhance food, pharmaceutical and consumer product safety, and to improve our world by controlling pollutants in the environment.*



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