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KMI Zeolite

ZEOLITE CLUMPING LITTER (ZCL) CLAIMS' SUBSTANTIATION

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Preamble

KMI has filed a patent on the Zeolite Clumping Litter (ZCL) Technology.

Background of the Invention

In recent years, sodium bentonite "clumping" cat litters that "capture" the urine in a "ball" or "clump" of litter which can then be scooped from the non-moistened litter for easy removal, have become very popular with consumers who purchase pet care supplies. When both types of waste are regularly removed from the litter and waste smells are reduced, cats are more likely to consistently use the litter, and are less likely to practice inappropriate elimination outside the litter area (e.g., a litter box). Regular removal of both types of liquid and solid waste also greatly reduces the unpleasant odors associated with cat waste.

While bentonite clumping litters (BCL) have made a vast improvement in eliminating animal waste before it generates objectionable odors and inappropriate elimination behaviors by cats, these BCLs still possess one or more properties or characteristics resulting in microbial activity and resultant odors, depending upon the purity of the bentonite.

KMI conducted a substantial research and product development program with its zeolite, resulting in an innovative and creative new product, ZCL.

ZCL Claims' Substantiation

The physical and chemical properties of zeolite and bentonite determine their performance.

Bentonite Properties:

Specific Gravity: Bentonites have a Specific Gravity of 2.4 to 2.6, depending upon purity.

Bulk Density: Bentonites have a Bulk Density of 60lb/cu ft. depending upon purity.

Other Physio/Chemical Properties: Sodium bentonite will expand up to 16 times its mass as it absorbs liquids. The ability of the bentonite to expand is classified as its Swelling Index. This fundamental property of bentonite is the reason original clumping litters were made with bentonite.

Zeolite Properties:

Specific Gravity: KMI zeolites have a Specific Gravity of 1.89.

Bulk Density: KMI zeolites have a Bulk Density of 50lb/cu ft.

Other Physio/Chemical Properties: KMI zeolites will absorb up to 50% of their weight in liquids with no expansion. The KMI ZCL swells to a design amount (Patent) that is sufficient only to bind the individual wet grains of zeolite into a clump.

The odor absorption properties of zeolite are well documented and easily exceed those of bentonite. In this trial relative odor of each clump was assessed using the 'sniff" test.

KMI zeolite has the distinction of having an extremely high purity (97% zeolite) and the framework structure contains linked cages, cavities and channels which are the correct size to allow small molecules (i.e. water) to enter and be bound in the cages.

Five truckloads of BCL can be replaced with four truckloads of ZCL with all of the attendant cost savings and positive environmental advantages.

Dust in the product is a quality control issue and is created in the production of litters or as a result of the transportation of the product. It is also dependent upon the types of material used and their physical properties. KMI goes to great lengths to ensure a low dust product.

Zeolites are often added to existing bentonite litters and non-bentonite litters for odor control.

Claims Verification

Based on a bentonite Specific Gravity of 2.4 and a bulk density of 60lb/cu ft., KMI's zeolite has a 21% lower Specific Gravity and a 17% lower Bulk Density than bentonite, therefore substantiating the claim that KMI's ZCL is approximately 20% lighter than BCL.

ZCL provides 20% more volume by unit weight than BCL - 8lb of zeolite equals 10lb of bentonite (Bulk Density). ZCL uses 20% less material, by weight, to form a clump, than BCL (the clump is

smaller and uses less material, therefore, combined with less weight used in cat box initially, there is a 40% net advantage to using ZCL).

Throughout the trial of 50 ZCL clumps and 50 BCL clumps the data represents the fundamental physio/chemical differences between BCL and ZCL. The applied tests verified the physio/chemical characteristics of BCL compared to KMI's ZCL. All of the trial data is objective and all results were measured according to generally accepted analytical protocols for analyzing comparative product performance.

Conclusions

- The claims for ZCL, as stated in the Zeolite Clumping Litter (ZCL) and Bentonite Clumping Litter (BCL) Comparison, Prepared for KMI Zeolite Inc. Executive Summary of Results, dated July 25, 2013, are substantiated.

Glossary of Terms

Specific Gravity: The ratio of the density of a substance to the density of water.

Bulk Density: Is the mass of many particles of a material divided by the total volume they occupy.

Bentonite: Is a naturally occurring material composed predominantly of the clay mineral smectite. Sodium bentonite expands when wet, absorbing as much as several times its dry mass in water, depending upon its purity. All references to "bentonite" in this report refer exclusively to sodium bentonite.

Zeolite: A group of minerals consisting of hydrated aluminosilicates of sodium, potassium, and calcium. They can be readily dehydrated and rehydrated, and are used as cation exchangers and molecular sieves.