

METHOD FOR DETERMINING THE MAGNETIC CONTAMINATION OF SURFACES

In the manufacture of magnetic data carriers or data carrier systems (for example, hard-disk storages), any and all magnetic contamination as can occur, for example, due to superfine magnetic or magnetizable particles on construction parts or on work equipment that are used for manufacturing the data carriers must be avoided. In particular, magnetizable contaminants on, for example, a hard disk modify the magnetic behavior of this hard disk, so that a correct registration of data is not possible or recorded data can no longer be read and are thus destroyed.

A dependable measuring method for to quickly and exactly determining the degree of contamination of surfaces is required in order to acquire the degree of contamination on component parts, assembly devices or surfaces.

To this end, it is standard to acquire the particles contaminating the surface such that an adhesive tape is glued to the surface and then removed, so that particles that contaminate the surface cling to the adhesive tape.

The invention is directed to such a measuring method for determining the magnetic contamination of surfaces upon employment of an adhesive tape that is to be applied to the surface under examination and then examined for adhering magnetic particles.

The adhesive tape is usually examined for magnetic particles in that the adhesive tape is metallized to make it electrically conductive, and the particles

can thus be recognized in a scanning electron microscope. The particles adhering to a defined area can then be counted with the scanning electron microscope. This method is extremely exact and acquires all particles; however, a reliable distinction can not always be made between magnetizable particles and paramagnetic particles. Moreover, this method requires very long measuring times since a number of hours are usually required for the analysis. A further disadvantage of this method is comprised therein that the measuring equipment is extremely complicated and expensive.

Using a significantly more cost-beneficial measuring apparatus, an object of the present invention is to specify a method that allows a reliable measurement in a short time without involved specimen preparation.

What is new for determining magnetic contaminants adhering to the adhesive tape is inventively comprised therein that a magnetized measuring substrate composed of soft magnetic material is provided; that at least one surface of the measuring substrate is provided with a parting agent; that the adhesive tape under examination is conducted once or repeatedly over the surface of the measuring substrate provided with parting agent; and that the remanent magnetization of the measuring substrate is subsequently identified and is compared to that following the magnetization and preceding the treatment with the adhesive tape for determining the magnetic contamination of the adhesive tape.

Advantageous developments are described in the subclaims.

In the present method, a measuring substrate of soft magnetic material is first magnetized. This measuring substrate is advantageously composed of a disk-shaped or strip-shaped piece that, for example, can be the piece of a hard disk. The magnetization preferably ensues perpendicular to the surface to be brought into contact with the adhesive tape, even though an effect would also occur given other magnetization directions. The adhesive tape with the adhering contaminants, which derive from the surface under examination, is then pressed against the surface provided with parting agent and is moved back and forth thereon several times as a rule. A liquid or a mixture of a plurality of liquids that wet the surface of the measuring substrate and prevent an adhesion of the adhesive tape provided with contaminants can preferably be employed as parting agent.

Magnetic and magnetizable particles are thereby magnetized by the magnetic field emerging from the measuring substrate. Given movement across the surface, the magnetized particles influence the magnetic field of the measuring substrate. Since the measuring substrate is an adequately soft-magnetic material that has a low coercivity, the remanent magnetization of the measuring substrate is reduced by the presence of magnetic particles on the adhesive strip.

After the movement of the adhesive tape on the measuring substrate, then adhesive tape is then removed and the measuring substrate is measured in the same measuring apparatus, for example a measurement unit with Flux

gate magnetometers (magnetoscope), and the remanence is identified. The difference between the remanence immediately after the magnetization and that after the treatment with the adhesive tape then represents a criterion for the contamination of the adhesive tape and, thus, of the surface under examination.

Since low magnetic fields are involved, disturbing magnetic fields from electromagnetic equipment in the proximity or from passing vehicles as well (etc.) could act on the measuring substrate and thus falsify the measured result. It is therefore especially advantageous to provide the measuring station with a shielding that is at least partially composed of soft-magnetic material, for example mu metal. As a result thereof, the measuring precision is additionally enhanced by a multiple compared to the measurement without shielding.



Patent Claims

1. Measuring method for determining the magnetic contamination of surfaces upon employment of an adhesive tape to be applied to the surface under examination and to be then examined for adhering magnetic particles, characterized in that a magnetized measuring substrate composed of soft magnetic material is provided; that at least one surface of the measuring substrate is provided with a parting agent; that the adhesive tape under examination is conducted once or repeatedly over the surface of the measuring substrate provided with parting agent; and that the remanent magnetization of the measuring substrate is subsequently identified and is compared to that following the magnetization and preceding the treatment with the adhesive tape for determining the magnetic contamination of the adhesive tape.

2. Method according to claim 1, characterized in that a liquid or a mixture of a plurality of liquids is employed as parting agent.

3. Method according to claim 1, characterized in that a measuring substrate that is fashioned essentially disk-shaped or strip-shaped is employed.

4. Method according to claim 1 or 3, characterized in that a piece of a hard disk usually employed for the data storage is employed as measuring substrate.

5. Method according to claim 1 or 3, characterized in that a measuring apparatus that works with Flux gate magnetometers is employed for determining



the magnetization of the measuring substrate before and after the treatment with the adhesive tape.

6. Method according to claim 5, characterized in that the measuring station is surrounded by a shield housing for eliminating disturbing magnetic fields from the surroundings.

7. Method according to claim 5, characterized in that the shielding is entirely or partly composed of highly permeable soft-magnetic material and thus contributes to the measuring precision.

Abstract

Method for Determining the Magnetic Contamination of Surfaces

It must be assured in the manufacture of magnetic data carriers such as, for example, hard-disk storages that neither the data carrier itself nor component parts of the data carrier system situated in the proximity comprise magnetic contaminants. The inventive measuring method allows the determination of magnetic contaminants on the basis of a magnetized soft-magnetic measuring substrate that is brought into close contact via a parting agent with magnetic contaminants of a surface under examination that adhere to an adhesive tape. The reduction of the remanent field thereby produced represents a criterion for the magnetic contamination of the surface under examination.