CLAIMS

1. A substrate for a magnetic disk having a disk shape,

wherein the substrate has a diameter D of 85 mm or more and a thickness T of 0.6 mm or less,

a material of the substrate has a Young's modulus E of 90 GPa or more,

and

when an impact is applied to the substrate under conditions of 70 (G) and 2 (msec) in a normal direction of main surfaces of the substrate in a state in which an inner circumferential end portion of the substrate is fixed, the maximum amplitude of vibration in a thickness direction of an outer circumferential end portion of the substrate is 0.25 mm or less.

2. A substrate for a magnetic disk having a disk shape, wherein the substrate has a diameter D of 85 mm or more and a thickness T of 0.6 mm or less, a material of the substrate has a Young's modulus E of 90 GPa or more, and the material of the substrate has a Q-value of 1500 or less under conditions of 3000 Hz and room temperature.

3. A substrate for a magnetic disk having a disk shape, wherein the substrate has a diameter D of 85 mm or more and a thickness T of 0.6 mm or less, a material of the substrate has a Young's modulus E of 90 GPa or more, and the material of the substrate has a $\rho \cdot (1-\nu)^2 \cdot Q/E$ value of less than 25 ($g/cm^3/GPa$), where ρ represents a density (g/cm^3) of the material at room temperature, Q represents a Q-value of the material of the substrate under the conditions of 3000 Hz and room temperature, E represents a Young's modulus (GPa) of the material of the substrate at room temperature, and ν represents a Poisson's ratio of the material at room temperature.

4. The substrate for a magnetic disk according to any one of claims 1 to 3,

wherein, the diameter D is 90 mm or more.

5. The substrate for a magnetic disk according to any one of claims 1 to 4, wherein the substrate is a glass substrate made of glass with a glass transition point of 650°C or higher.

6. The substrate for a magnetic disk according to any one of claims 1 to 5, wherein a difference between flatness of the substrate after heating at 730°C and flatness of the substrate before heating is 4 μm or less.

7. The substrate for a magnetic disk according to any one of claims 1 to 6, wherein the substrate is made of a material with a linear expansion coefficient of 70×10^{-7} (1/K) or less.

8. The substrate for a magnetic disk according to any one of claims 1 to 7, wherein the substrate has a Vickers hardness Hv of 650 (kgf/mm^2) or more.

9. The substrate for a magnetic disk according to any one of claims 1 to 8, wherein the substrate has a Knoop hardness Hk of 600 (kgf/mm^2) or more.

10. The substrate for a magnetic disk according to any one of claims 1 to 9, wherein a chamfered face is formed on at least an outer circumferential end face of the substrate, and a width W_1 of the chamfered face in a radial direction of the substrate is 120 μm or less.

11. The substrate for a magnetic disk according to any one of claims 1 to 10, wherein a ratio of a value obtained by multiplying, by 2, a width W_2 of the chamfered face in a thickness direction of the substrate to the thickness T, namely $(2\cdot W_2) / T$ is 0.4 or less.

12. The substrate for a magnetic disk according to any one of claims 1 to 11, wherein, regarding the Young's modulus E and the thickness T of the substrate, a value of $E \cdot T^3$ is 3 to 18 ($GPa \cdot mm^3$).

13. The substrate for a magnetic disk according to any one of claims 1 to 12, wherein the material of the substrate has a Q-value of 1500 or less under conditions of 3000 Hz and room temperature.

14. The substrate for a magnetic disk according to any one of claims 1 to 13, wherein the material of the substrate has a $\rho \cdot (1-\nu)^2 \cdot Q/E$ value of less than 25 ($g/cm^3/GPa$), where ρ represents a density (g/cm^3) of the material at room temperature, Q represents a Q-value of the material of the substrate under conditions of 3000 Hz and room temperature, E represents a Young's modulus (GPa) of the material of the substrate at room temperature, and ν represents a Poisson's ratio of the material at room temperature.

15. A magnetic disk,

wherein a surface of the substrate for a magnetic disk according to any one of claims 1 to 14 is provided with at least a magnetic film.

16. A hard disk drive apparatus comprising the magnetic disk according to claim 15.