Claims

[Claim 1]

A quality management system for a machining process in the machining process of a machine tool in which a mixed liquid of a water-soluble lubricating stock liquid including alkaline electrolytic water and externally replenishable alkaline electrolytic water is used as a lubricating liquid, wherein the quality management system monitors and manages a quality of the lubricating liquid after mixing by an electric conductivity,

wherein the electric conductivity monitored in the lubricating liquid after mixing is corrected based on a preset correlation of a change in the electric conductivity with respect to an assumed metal ion concentration of the lubricating liquid by a prescribed eluted metal within the lubricating liquid in the machining process of the machine tool.

[Claim 2]

The quality management system for a machining process according to claim 1, wherein

the electric conductivity monitored in the lubricating liquid is corrected by:

measuring the electric conductivity of the lubricating liquid of the mixed liquid and the metal ion concentration of the prescribed eluted metal,

calculating an amount of change in the electric conductivity of the lubricating liquid by the prescribed

eluted metal in the measured metal ion concentration from the preset correlation of a change in the electric conductivity with respect to the metal ion concentration of the lubricating liquid by the prescribed eluted metal, and

subtracting the calculated amount of change in the electric conductivity from a measurement value of the measured electric conductivity.

[Claim 3]

The quality management system for a machining process according to claim 1 or 2, wherein

the machine tool comprises a working liquid storage tank for collecting and storing the lubricating liquid and supplying the lubricating liquid to the machine tool as a working liquid,

the working liquid storage tank is supplied with the lubricating stock liquid from a lubricating stock liquid storage tank or a supply pipe connected to the lubricating stock liquid storage tank, and is supplied with the alkaline electrolytic water from an alkaline electrolytic water generation device, a storage tank of the alkaline electrolytic water generation device, or a supply pipe connected to the storage tank, and the electric conductivity of the mixed liquid within the working liquid storage tank is monitored and managed.

[Claim 4]

The quality management system for a machining process according to claim 3, wherein

the machine tool comprises a mixing portion for mixing the lubricating stock liquid supplied from the lubricating stock liquid storage tank or the supply pipe connected to the lubricating stock liquid storage tank and the alkaline electrolytic water supplied from the alkaline electrolytic water generation device, the storage tank of the alkaline electrolytic water generation device, or the supply pipe connected to the storage tank, and

a mixed liquid of the lubricating stock liquid and the alkaline electrolytic water by the mixing portion is supplied to the working liquid storage tank.

[Claim 5]

The quality management system for a machining process according to claim 1 or claim 2, wherein

the machine tool comprises a mixing portion for mixing the lubricating stock liquid supplied from the lubricating stock liquid storage tank or the supply pipe connected to the lubricating stock liquid storage tank and the alkaline electrolytic water supplied from the alkaline electrolytic water generation device, the storage tank of the alkaline electrolytic water generation device, or the supply pipe connected to the storage tank, and

a mixed liquid of the lubricating stock liquid and the alkaline electrolytic water within the mixing portion is supplied to within the machine tool from a supply pipe connected to the mixing portion, and the electric

conductivity of the mixed liquid within the supply pipe or within the mixing portion is monitored and managed.

[Claim 6]

The quality management system for a machining process according to any one of claims 3 to 5, further comprising:

an electric conductivity meter for monitoring and managing the electric conductivity, wherein

a necessary amount and a discharge amount per time of the lubricating stock liquid and/or the alkaline electrolytic water are set in accordance with whether or not the electric conductivity of the mixed liquid of the alkaline electrolytic water and the lubricating stock liquid measured from measurement information from the electric conductivity meter are within a preset range.

[Claim 7]

The quality management system for a machining process according to claim 6, wherein

a plurality of the machine tools is present, the lubricating stock liquid and the alkaline electrolytic water of each of the plurality of machine tools are collectively supplied to one of the working liquid storage tank and the mixing portion, each of the plurality of machine tools comprises an electric conductivity meter for measuring the electric conductivity of the collected mixed liquid within the working liquid storage tank or within the mixing portion in accordance with each of the machine tools, a wired or

wireless external monitoring device manages measured measurement information of each of the electric conductivity meters, determines whether or not the electric conductivity of the mixed liquid of the alkaline electrolytic water and the lubricating stock liquid is within a preset range in accordance with each of the machine tools, and sets a necessary amount and an automatic drip amount per time of the lubricating stock liquid and/or the alkaline electrolytic water.

[Claim 8]

The quality management system for a machining process according to any one of claims 1 to 7, wherein

the machine tool executes one or more of lathing, milling, grinding, hole drilling, saw cutting, water-jetting, electric discharging, pressing, grinding, and polishing.

[Claim 9]

The quality management system for a machining process according to any one of claims 1 to 8, wherein

a metal ion concentration and one or more of a sugar content, a concentration, and a pH of the lubricating stock liquid, the alkaline electrolytic water, or the mixed liquid are monitored and managed in addition to monitoring and managing the electric conductivity of the mixed liquid of the lubricating stock liquid and the alkaline electrolytic water.

[Claim 10]

The quality management system for a machining process according to any one of claims 3, 4, and 7, wherein

a water level of the mixed liquid within the working liquid storage tank is monitored and managed in addition to monitoring and managing the electric conductivity of the mixed liquid of the lubricating stock liquid and the alkaline electrolytic water.

[Claim 11]

A lubricating liquid for a machine tool used in the quality management system for a machining process according to any one of claims 1 to 10, the lubricating liquid having the alkaline electrolytic water as a main component and not including an oil-soluble material, wherein

the lubricating liquid is blended with a pH buffer that does not contain antiseptic agents

[Claim 12]

The lubricating liquid for a machine tool according to claim 11, wherein

a solute concentration of the lubricating liquid for the machine tool with the alkaline electrolytic water as a main component is set as a practical management concentration within a preset range in accordance with the machine tool and the machining process using the lubricating liquid.

[Claim 13]

An alkaline electrolytic water generation device for lubricating liquid generation that generates externally replenishable alkaline electrolytic water supplied as a lubricating liquid for the machining process of the machine tool according to any one of claims 1 to 12, wherein the alkaline electrolytic water generation device for lubricating liquid generation is configured to:

monitor an electric conductivity of the generated alkaline electrolytic water in which a discharge portion of the generated alkaline electrolytic water is connected to the mixing portion, a working liquid storage tank, and a storage tank of the alkaline electrolytic water, or a supply pipe connected to each of the mixing portion, the working liquid storage tank, and the storage tank of the alkaline electrolytic water, and

enable presetting or resetting of the electric conductivity of the alkaline electrolytic water generated in accordance with the machining process executed in the machine tool.