CLAIMS

1. An electronically controllable mixing valve cartridge (11), the valve cartridge having;
    - at least two fluid inlets (13) and at least one fluid outlet (15),
    - at least one temperature sensor (17),
    - at least one movable valve member (19) and at least one actuator (21) configured to move the or each movable valve member, and
    - an electronic control system (23) configured for receiving inputs from an input device (24) and adapted to receive inputs from the or each temperature sensor and to control the operation of the or each actuator~~.~~, and

    the valve cartridge is characterised in that the valve cartridge has a single substantially flat mating face (323) that includes the at least two fluid inlets and the at least one fluid outlet, and the valve cartridge is configured such that a mechanical fastening system is used to hold the mating face of the valve cartridge securely to a complimentary fixable valve fitting (325) to form a leak resistant seal between the mating face and the fixable valve fitting.

2. A valve cartridge as claimed in claim 1, wherein the or each actuator includes an electric motor (42).

3. A valve cartridge as claimed in claim 2, wherein a direction of flow of a fluid through the fluid inlets and through the or each fluid outlet is a direction of flow that is substantially aligned with a rotational axis of the or each electric motor.

4. A valve cartridge as claimed in any one of claims 1 to 3, wherein the or each actuator includes a linear actuator (44).

5. A valve cartridge as claimed in claim 4, wherein a direction of flow of a fluid through the fluid inlets and through the or each fluid outlet is a direction of flow that is substantially aligned with a direction of movement of the or each movable valve member.

6. A valve cartridge as claimed in any one of claims 1 to 5, wherein the ~~valve cartridge is configured for engagement with a~~ complimentary fixable valve fitting ~~that~~ is a fitting that is connectable to the pipework of a plumbing installation and that has complimentary fluid outlets (27) and a fluid inlet or fluid inlets (29).

7. A valve cartridge as claimed in claim 6, wherein the mating face of the valve cartridge ~~includes one or more mating features~~is configured for establishing a sealed connection between each fluid inlet and the or each fluid outlet of the valve cartridge and the fixable valve fitting.

8. A valve cartridge as claimed in any one of claims 1 to 7, wherein the valve cartridge includes a mixing chamber (63) that is configured to mix two or more fluid flows and which is situated downstream of the or each movable valve member and upstream of the at least one temperature sensor.

9. A valve cartridge as claimed in claim 8, wherein the valve cartridge includes transfer passages (383) through which fluid flows as the fluid approaches the mixing chamber, and the transfer passages are configured to create a swirling motion within the mixing chamber.

10. A valve cartridge as claimed in claim 9, wherein the mixing chamber is substantially cylindrical in shape and the transfer passages are each configured to direct the fluid in a direction that is substantially tangential to a circle defining a perimeter of the cylindrical mixing chamber.

11. A valve cartridge as claimed in claim 9 or claim 10, wherein the cross-sectional area of the transfer passages reduces in a direction of flow towards the mixing chamber.

12. A valve cartridge as claimed in any one of claims 1 to 11, wherein the valve cartridge also includes a flow sensing means (333).

~~13. A valve cartridge as claimed in claim 12, wherein the flow sensing means includes a rotatable element that is rotated by swirling fluid within the mixing chamber.~~

~~14.~~13. A valve cartridge as claimed in claim 12 ~~or claim 13~~, wherein a temperature sensing element (385) of the temperature sensor is supported on a probe or shaft (389), and ~~the~~a rotatable element (387) of the flow sensing means rotates about an axis that is coaxial with the shaft or probe.

~~15. A valve cartridge as claimed in any one of claims 4 to 14, wherein the or each linear actuator includes a lead screw assembly.~~

~~16. A valve cartridge as claimed in any one of claims 1 to 15, wherein the or each movable valve member is a ceramic valve member.~~

~~17. A valve cartridge as claimed in any one of claims 1 to 16, wherein the or each movable valve member is elongate in shape, and a linear movement of the movable valve member is aligned with a length of the elongate shape.~~

~~18. A valve cartridge as claimed in any one of claims 1 to 17, wherein the at least two fluid inlets and the at least one fluid outlet are all situated on a single substantially flat face.~~

~~19. A valve cartridge as claimed in any one of claims 1 to 18, wherein the valve cartridge is configured to enable a mechanical fastening system to hold the valve cartridge securely to the fixable valve fitting.~~

~~20.~~14. An electronically controllable mixing valve assembly including an electronically controllable mixing valve cartridge as claimed in any one of claims 1 to ~~19~~13 and a fixable valve fitting, the electronically controllable mixing valve cartridge being connectable to the fixable valve fitting using a mechanical fastening system, and the fixable valve fitting being connectable to a plumbing system of a building and configured to direct fluid to the at least two fluid inlets of the valve cartridge and to receive fluid from the at least one fluid outlet of the valve cartridge, and being

configured to allow leak resistant seals to be established between the ~~or each~~ mating face ~~feature~~ of the electronically controllable mixing valve cartridge and a complimentary mating ~~features~~face of the fixable valve fitting.