

Claims

1. A sensor system for detecting particles within a fluid, the sensor system comprising:
a gauge body having a working surface for receiving a particle containing fluid;
an impactor spaced apart from the working surface of the gauge body defining a spacing between the impactor and the working surface of the gauge body through which particle containing fluid can pass, wherein the sensor system is configured such that as the particle containing fluid passes through the spacing between the impactor and the working surface of the gauge body, particles disposed over the working surface are impacted by the impactor generating a signal which is dependent on one or both of the size and concentration of particles in the fluid; and
a sensor configured to detect the signal generated by the particles impacting the impactor and provide an output signal.
2. A sensor system according to claim 1,
wherein the sensor is configured to detect elastic waves generated by particles impacting the impactor.
3. A sensor system according to claim 1 or 2,
wherein the sensor is one of an acoustic emission sensor, an accelerometer, and an ultrasonic sensor.
4. A sensor system according to any preceding claim,
wherein the sensor is mounted on, or embedded within, the gauge body.
5. A sensor system according to any one of claims 1 to 3,
wherein sensor is mounted on, or embedded within, the impactor.
6. A sensor system according to any preceding claim,
wherein the sensor is calibrated to provide an output signal which indicates one or both of particle size and particle concentration.
7. A sensor system according to any preceding claim,

wherein the impactor is configured to be movable across the working surface of the gauge body whereby particles disposed over the working surface are impacted by the impactor to generate the signal.

8. A sensor system according to any preceding claim,

wherein the impactor is configured to be movable across the working surface of the gauge body in such a manner that the spacing between the impactor and the working surface decreases on moving the impactor across the working surface.

9. A sensor system according to claim 8,

wherein the working surface of the gauge body is sloped or stepped such that the spacing between the impactor and the working surface decreases on moving the impactor across the working surface.

10. A sensor system according to any preceding claim,

wherein the gauge body comprises a channel, the channel having a first end, a second end, and a base forming the working surface for receiving the particle containing fluid, the impactor being configured to be movable along the channel in a direction from the first end to the second end whereby particles within the channel are impacted by the impactor generating the signal.

11. A sensor system according to any preceding claim,

wherein the gauge body has more than one channel.

12. A sensor system according to any preceding claim,

wherein the gauge body has one or more channels having a depth between 0 and 100 micrometres, 0 and 50 micrometres, 0 and 25 micrometres, 0 and 15 micrometres, or 0 and 10 micrometres.

13. A sensor system according to any preceding claim,

wherein the impactor is supported over the working surface of the gauge body by a guide rail which is sloped relative to the working surface such that the spacing between the impactor and the base decreases on moving the impactor across the working surface.

14. A sensor system according to any preceding claim,

wherein the impactor is in the form of a slider which slides over the working surface of the gauge body.

15. A sensor system according to any one of claims 1 to 13,

wherein the impactor is in the form of a roller which rolls over the working surface of the gauge body.

16. A sensor system according to any preceding claim,

wherein the sensor system is configured such that the particle containing fluid is forcibly flowed through the spacing between the impactor and the working surface of the gauge body to cause particles to be impacted by the impactor thereby generating the signal.

17. A sensor system according to claim 16,

wherein the spacing is in the form of an aperture which can be varied in size in order to detect particles of differing size.

18. A method of sensing particles in a particle containing fluid, the method comprising:

loading a particle containing fluid onto a working surface of a gauge body;

providing an impactor spaced apart from the working surface of the gauge body defining a spacing between the impactor and the working surface of the gauge body through which particle containing fluid can pass, wherein as the particle containing fluid passes through the spacing between the impactor and the working surface of the gauge body, particles disposed over the working surface are impacted by the impactor generating a signal which is dependent on one or both of the size and concentration of particles in the fluid; and

detecting the signal generated by the particles impacting the impactor and providing an output signal.

19. A method according to claim 18,

wherein the particle containing fluid is fuel oil containing catalytic fines.

20. A method according to claim 18 or 19, utilizing the sensor system according to any one of claims 1 to 17.