

(12) PATENT APPLICATION PUBLICATION

(21) Application No.202511093623 A

(19) INDIA

(22) Date of filing of Application :29/09/2025

(43) Publication Date : 14/11/2025

(54) Title of the invention : MICRO-PARTICLE DETECTION SYSTEM TO DETECT MICRO-PARTICLES IN A LIQUID

(51) International classification	:G01N0015140000, G01S0007480000, G05B0015020000, G01S0007539000, H04R0001100000	(71)Name of Applicant : 1)Chitkara University Address of Applicant :Chandigarh-Patiala National Highway, Village Jhansla, Rajpura, Punjab - 140401, India. Rajpura Punjab India 2)Chitkara Innovation Incubator Foundation
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(61) Patent of Addition to Application Number	:NA	
Filing Date	:NA	
(62) Divisional to Application Number	:NA	
Filing Date	:NA	

(57) Abstract :

A micro-particle detection system to detect micro-particles in a liquid, comprising a detachable conduit 101 having pair of segments 101a, 101b to receive a liquid, a transceiver module integrated within the conduit 101 to emit pulsed acoustic waves across the conduit 101 and receive echoes from an inner surface of the conduit 101, a signal processing unit configured with the transceiver module to convert analog echo signals into digital signals, and process the signals using an artificial intelligence-based classification module to analyse echo patterns from both flow directions to classify each detection as plastic, air bubble, or other particles, and accumulate counts and generate a size histogram irrespective of flow direction, a user interface to wirelessly receive the output of the signal processing unit and present it as a dashboard, and a communication unit configured as a BLE module to transmit real-time JSON data packets for remote monitoring.

No. of Pages : 25 No. of Claims : 10