Technologies to Remove or Prevent Scale Formed Inside Electric Water Heater Tanks

A Chinese multinational company seeks technologies or approaches to remove or prevent the build-up of scale within electric water heater tanks. Of specific interest are technologies to remove scale attached to the heating pipes.

Key Success Criteria:

Successful responses will:

- Remove or prevent formation of scale from heating pipes inside the water heater tank
- Have no impact on quality or safety of the water delivered from the heater
- Not require user intervention or replacement for a period of at least 2 months
- Not increase the operating complexity of the water heater
- Have a device cost at production volume (eg 5 million units per year) of less than RMB100/ USD16.
- Have a maximum device volume of 500 cm3 eg 20 cm long x 5 cm wide x 5 cm high
- Have any components housed inside a waterproof unit of grade IPX4

Background:

Electric water heaters can develop a build-up of scale on the heating pipes and sediment within the tank. It is difficult for consumers to clean the storage tanks. Tank cleaning only occurs when the sacrificial anode (eg a magnesium rod) protecting against tank corrosion is replaced.

Our multinational partner company is a major manufacturer of hot water systems and seeks to develop electric water heaters with a functionality that prevents or removes scale build-up on the heating pipes.

The company invites proposals for new designs, technologies, materials or approaches for removal or prevention of scale.

We welcome responses from companies (large or small and medium enterprises), technical experts and academic or industrial researchers, inventors and venture capitalists.

Possible Approaches

Possible approaches could be based on

- Addition of physical or chemical modules within the hot water unit
- Use of technologies such as ultrasound

Approaches Not of Interest:

The following technologies or approaches are not of interest:

- Approaches that require regular consumer intervention
- Technologies that reduce the thermal efficiency of the water heater
- Technologies or approaches that use hazardous materials

Additional Information

Operating environment inside the water tank:

- Operating temperature range: 5-97°C
- Pressure range: 0-1.7MPa
- Typical inner tank dimensions are: 310mm diameter x 770 mm length; and 382mm diameter x 938mm length

Our partner company's preference is to install any device on the magnesium rod (mounting recess diameter of 2.25 cm) or on the inlet or outlet pipelines (diameter of 1.5 cm). The company does not wish to install any device on the heating pipe.

The power of an electric water heater is 1500-3000 W with 10A and 16A power cables. Any device must not overload these cables.

Preferred Collaboration Type:

Our multinational partner company prefers to work with partners that have existing technologies or approaches that can be applied to this specific application. Collaboration can involve technology licensing, product sourcing, proof of concept leading to joint development agreements and assistance with scale-up to manufacturing. Preference will be given to technologies or approaches that currently have working prototypes that can undergo feasibility, validation or proof of concept over a 1-3 month period. Financial support for the proof of concept phase will be negotiated based on specific performance targets agreed between both parties. For selected collaborators our partner company may provide access to samples, test equipment and testing facilities. Technologies will need to satisfy manufacturability, material cost and ease of use assessments to progress from the concept stage.

How to Respond:

We are looking for concise non-confidential proposals, statements of expertise or other enquiries if your expertise fits our needs. Please note that only nonconfidential information can be accepted. The proposal should also provide us with appropriate contact information in order to help us keep update with solution providers. For all responses please indicate your preferred collaboration approach (eg supply, joint development, research) and capabilities (eg research, concepts, prototype, small scale manufacture, large scale manufacture).

If you are interested, please respond to:

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