



Thermostatic Radiator Valve

Our Client

A new player aiming to penetrate the European Heat Exchanger market in the least amount of time.

Why they needed us

They had a lot on their plate and were looking to outsource the design and testing of Thermostatic Radiator Valves (TRVs). They had to optimise their spending and hence were looking for Companies/Businesses who offer great design and testing service for a reasonable cost.

What we did

We did an extensive study of current technology trends in the design and manufacturing of Thermostatic Radiator Valves (TRVs) and the features offered by their competitors. Based on the study we gave our client multiple design alternatives and their corresponding production cost, ease and effectiveness of market penetration.

The list of features and corresponding benefits for the designs that were chosen by our client are as follows:

Reversible Body

Designed to provide nominal flow rates with either the flow (forward) or return (reverse) pipe.

Bidirectional

Designed to be fit in either vertical or horizontal direction with minimum impact on performance.

Frost Protection

Designed to open below a configurable temperature so as to prevent frosting.

Positive Off Position / Zero Setting

Designed to be easily removable for radiator maintenance.

Anti-Tamper

Designed to be resilient against intentional or accidental tampering of the settings.

Custom Modes

Designed with custom settings for night mode, economy mode and multiple temperature setting options etc.

Liquid Filled Element

Designed to have rapid response time to temperature fluctuations, greater accuracy, long life and low hysteresis.

Multiple Fitting Options

Designed to suit a variety of pipes by enabling Compression, Adaptor (Elbow & Straight) and Integral Push-Fits.

Leak Proof

Double O-Ring Seal Protection.

Corrosion Resistant

Nickel-Chromium Plating to ensure corrosion resistance.

The list of design procedures and methodologies followed are as follows:

- CAD modelling using SolidWorks and Simulations using Ansys.
- Transient Thermal Analysis to calculate Thermal Stress due to flow of hot water, frosting due to extreme weather conditions etc.
- Static and Dynamic Structural Analysis by factoring in the Thermal Stresses previously calculated while also accounting for Impact and Static Loading.
- Material selection by iterating simulations and cost analysis on different material choices.
- Working prototypes built using 3D Printing to get feedback about various physical aspects such as ease of handling the device in terms of installation by using the different fit options, assembly and disassembly for repair and maintenance etc.
- User Experience Prototypes built using 3D Printing to get feedback about various functional aspects such as response time, hysteresis, frost prevention, anti-tamper, leakage prevention etc.
- Generating Configurable Bill of Materials for Engineering, Manufacturing and Assembly and 2D Engineering Drawings to help our client in manufacturing and assembling the product.
- Comprehensive testing of manufactured product through Destructive and Non Destructive Testing Methods to check if the product meets the designed response time, hysteresis etc.
- Technical documentation of Operation, Installation and Service Manual for the Product.

How they benefited

Our Client was able to utilize their in-house, state of the art, manufacturing and assembly capabilities to produce the TRV while focusing their attention on other products which enabled them to emerge as a leading competitor in the European Heat Exchanger market in a short span of time.

About Redeem Systems

Redeem Systems is a pure-play Engineering and Digital Services Company with focus on mission critical highly engineered + high availability systems. Our global presence spans Asia-Pacific, Middle-east, Europe and North-America.

Our focus verticals include – Tele-communications, Medical Electronics and Aerospace & Strategic Electronics.

Our Product Engineering competencies include Product Design and Development, Verification & Validation, Emerging Markets Strategy and Product Life-Cycle Extension through Value Analysis and Value Engineering

Our Digital competencies are focused on Industrial Internet-of-Things (IIoT), Engineering Big Data Analytics and Software Defined Networking (SDN)/ Network Functions Virtualization (NFV).