

## Environmentally Friendly Light Weight Heat Sink

Case Study for Mizutani Electric Ind. Co., Ltd.

Use of HeatDesigner to Help Design an Environmentally Friendly Heat Sink Also Reduces Prototype Production Tests

### More Accurate Thermal Fluid Analysis to Reduce the Number of Prototype Tests

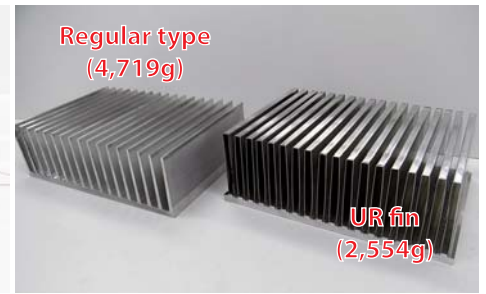
E.g. 1 Harry Sink: Ultra-thin heat sink



#### Purposes for developing ecological heat sink

1. Save resources by reducing amount of materials used
2. Reduce environmental load for logistics by reducing total weight
3. Minimize size and space for surrounding parts through minituarization
4. Eliminate environmentally threatening substances from manufacturing process
5. Eliminate CO<sub>2</sub> emissions during manufacturing
6. Eliminate RoHS substances from products

E.g. 2 UR fin: Ultra-thin convection cooled heat sink

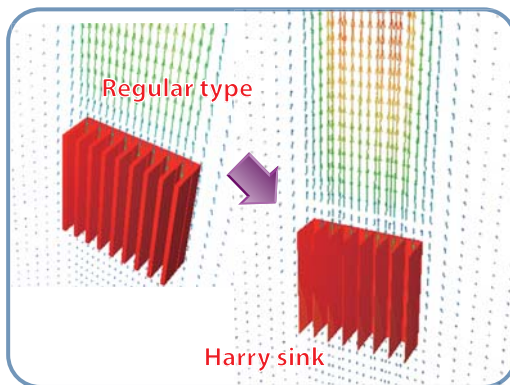


	Width	Length	Total height	Base thickness	Fin thickness	Number of fins
Regular type	50	50	17	4	1.8	9
Harry sink	50	50	15	0.3	0.2	8

	Width	Length	Total height	Base thickness	Fin thickness	Number of fins
Regular type	294	200	90	10	4.8	17
Harry sink	294	200	90	8	0.6	36

Patent reference: 3130026

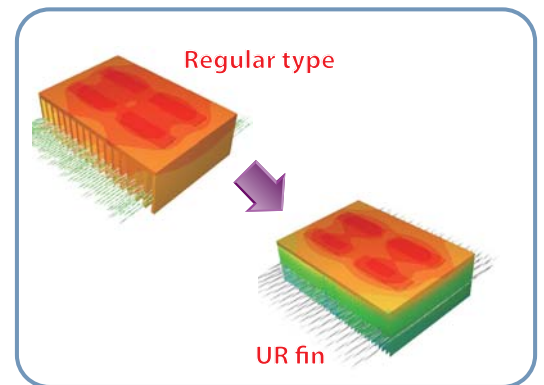
### CFD Analysis Results



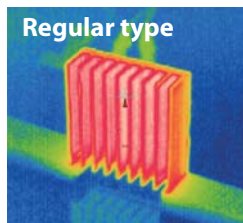
Use simulation to develop the design until the required performance is achieved

- Reduces prototype and production tests
- Shorten development time

Test final design model in an actual production environment



### Test Results



#### Natural cooling

Thermal resistance	Regular type	Harry sink
Tested value	8.4	7.7
Analyzed value	8.4	7.5

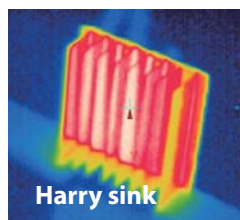
(Units: °C/W)

Thermal characteristic equivalent to the regular type can be achieved by:

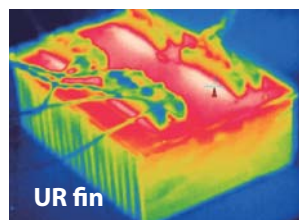
- Harry Sink with mass below its one-sixth value
- UR fin with mass below its half value

This successfully reduces environmental load.

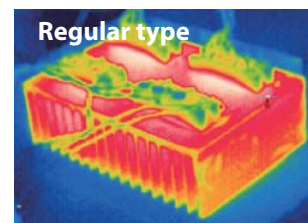
Ultimately saves energy resources



Harry sink



UR fin



#### Forced cooling (front velocity 2 m/s)

Thermal resistance	Regular type	UR fin
Tested value	0.091	0.090
Analyzed value	0.092	0.091

(Units: °C/W)

### Customer Comments

We used HeatDesigner to develop highly accurate models during the design phase. This resulted in better designs and shortened the development time, two essential factors for success in industry today where engineers are asked to produce high quality products in shorter amounts of time.

