

CuproBraze[®] Cost Comparison

John Hipchen

Outokumpu Copper (U.S.A.), Inc.

CuproBraze[®]

Investment Costs

Buildings

Capital Equipment

Tooling

Utilities

Manufacturing Costs

Materials

Labor

Energy

Hazardous Waste

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Investment and manufacturing costs are affected by:

- **Production Volumes**
 - OEM
 - Aftermarket
- **Product Designs**
 - Flat fins vs. serpentine fins
 - Number of tube rows

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Capital Equipment Costs

- Furnace – batch, semi-continuous, continuous
- Tube Coating or Fin-tip Coating Machine
- Header Slurry Machine
- Fin Machine – new or modification to existing machine
- New Header Tools
- Core Assembly Machines or Tables

Cost Models

- Cost items are identified
- Nominal costs allow comparisons but maintain confidentiality
- Actual costs can be inserted by customers for detailed confidential cost analysis

Manufacturing Cost Comparison Model

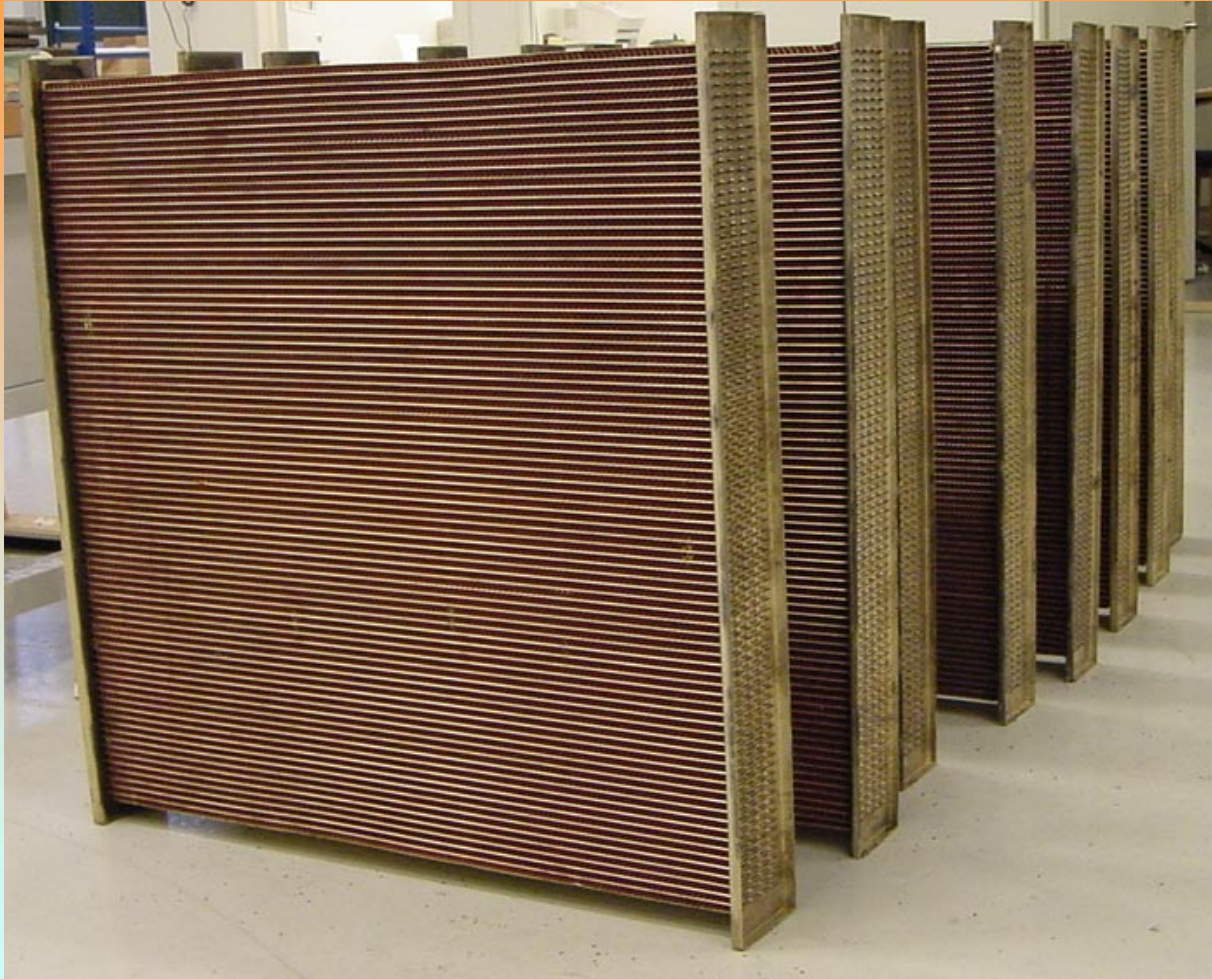
Solder vs. CuproBraze

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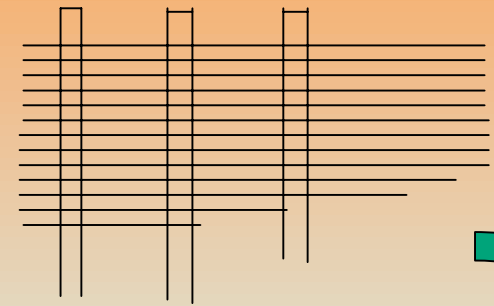
Cost Comparison Model - Details

- Soldered Flat Fin vs. Brazed Serpentine Fins
- Single-Pass Water Flow
- 3 Rows
- 18 Fins per Inch

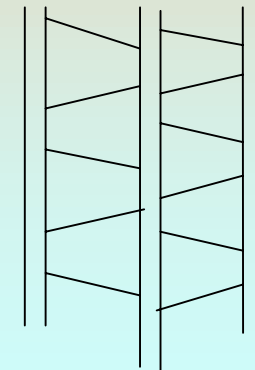
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Flat fin



Corrugated fin



Cost Comparison Model – Material and Part Costs

Part	Cost (\$/kg)	Application	Mass (kg)
Terne plates	0.77	Soldered Core	0.600
Flat Fin	3.37	Soldered Core	8.79
Serp. Fin	3.37	Brazed Core	7.62
Pig (header solder)	1.99	Soldered Core	0.60
Foil (solder)	9.00	Soldered Core	0.050
Tube Solder	1.70	Soldered Core	2.768
Welded Tube	7.56	Soldered/Brazed	13.84
Braze Paste (tubes)	13.00	Brazed Core	0.95
Braze Paste T/H	16.40	Brazed Core	0.80
Brass Side Plates	3.09	Brazed Core	0.420
Header Brass	3.09	Soldered/Brazed	0.372

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Cost Comparison Model - Process

Process	Soldered \$	Brazed \$
Tubes (welded)	104.63	104.63
Tube Coating	4.71 (labor included)	12.35 + \$1.31 labor
Fin	29.62	25.68
Header Brass	1.96	1.96
Side Plates	0.62	1.68
Foil (solder)	0.45	0.00
Assembly	28.00 (labor)	7.58 (labor)
Header Coating	2.39 + \$8.33 labor	13.12 + \$5.83 labor
Header Fluxing	0.50	0.00
Core Fluxing	1.00 + \$1.75 labor	0.00
Core Drying	1.00 + \$1.75 labor	0.00
Furnace/Oven Bake	1.66 (20 min./core)	3.74
Rinsing	8.52 + \$1.00 labor	0.00

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Cost Comparison Model- Results

Soldered Flat Fin Core:

Total Material Cost = \$157.06

Total Labor Cost = \$40.83

Total Core Cost = \$197.89

Brazed Serpentine Core:

Total Material Cost = \$163.16

Total Labor Cost = \$14.72

Total Core Cost = \$177.88

Brazed Core Differential: - 10.1%

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Summary

- Many factors affect investment and production costs of *CuproBraze*[®] products.
- Cost models help identify cost items and establish budgets.
- Contact Outokumpu for assistance.

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