



**Cost Analysis**  
**Clinching vs. Spot Welding and Riveting.**

NORLOK Clinching machines are clean, inexpensive, and reliable equipment for fastening sheet metal. This revolutionary process is rapidly becoming an industry standard in the HVAC, automotive, housing, and manufacturing industries. Clinching offers versatility, flexibility, and repeatability, which earns great respect in the field of sheet metal fastening.

A NORLOK clinching machine uses no rivets, bolts or fasteners, and fastens prepainted, dissimilar and other coated materials with very low operating costs compared to resistance spot welders and riveting type machines



**This report explores consumable and maintenance costs associated with these three fastening processes.**

Cost to operate a NORLOK machine for 100,000 joints:

**\$ 936.43**

Cost to operate a Rivet machine for 100,000 joints:

**\$1273.58**

Cost to operate a Spot welder for 100,000 joints:

**\$1517.83**



## **COST ANALYSIS OF CLINCHING VS. RIVETING AND SPOT WELDING**

- For the purpose of this report an assumption of 0.05 cents per kilowatt hour (kW-hr) has been made for machine electricity consumption.
- Material fastened is assumed to be 0.048" plain mild steel.
- Labor burden has been calculated at \$35.00 / hr for maintenance employees and \$17.50 / hr machine operators
- For this report the cost of clinching was calculated using Norlok's pneumatic powered Surelok machine @ 0.6 cu ft / joint [60 cycles/ min]. RSW was calculated using a 50kVA transgun welder with simple controller [30 cycles/ min]. For Riveting, a stand alone automatic feed riveter with a ½ hp drive motor [120 cycles/ min].

### **Clinching Machine**

- Machine cycle at approx. 60 cycles/ min.
- Clinching machine, tooling lasts from 250,000 – 1,000,000 hits.
- At 250,000 life, tooling cost is approx. \$180.00 per 100,000 Joints.
- Electricity requirement to produce 100,000 joints is 106.30kW-hr (approx. (\$5.32).
- Machine costs range between \$9,000.00 - \$10,000.00 (approx. \$US).
- Labor of maintenance personnel to replace tooling every 250,000 joints is estimated at 0.5 hr (assume 0.2 hr every 100,000).
- 1 hr associated to maintenance of machine labor per 100,000 joints.

### **Riveting Machine**

- Machine operating at approx.120 cycles/min.
- Cost of replacing tooling every 5000 hits (estimated avg.). @ \$35.00 per driver replacement (\$700.00 per 100,000 hits).
- Assuming a cost of \$ 0.005 per rivet avg. (\$500.00 per 100,000).
- Electricity requirements for Riveting machine for 100,000 hits is 10.63kW-hr (approx. \$0.532).
- Machine cost range between \$9,000.00 -\$10,000.00 (approx. \$US).
- Labor of maintenance personnel to replace tooling every 100,000 joints is estimated at 2 hrs (.1 hr to replace driver. Every 5000 joints).
- 2 hrs associated to maintenance of machine labor per 100,000 joints.

### **RSW (Resistance Spot Welding)**

- Machine operating at approx. 30 cycles/min.
- Welding tips must be dressed approximately every 1000 joints to a maximum of 5 dressings per tip. At \$2.00 / tip, cost for 100,000 joints is \$80.00.
- Electricity requirements to produce 100,000 joints is 155.55 kW-hr (approx. \$7.785).
- Cooling water cost is approx. \$2.822 per 100,000 joints.
- Costs associated to compressed air use / 100,000 is 1.26 kW-hr (approx. \$0.06)
- Machine costs range between \$9,000.00 -\$10,000.00 (approx. \$US).
- Labor of maintenance personnel to replace and dress tooling every 100,000 joints is estimated at 10 hrs (.08 hr to replace tip + .02 hr to dress tip. Every 1000 joints).
- 3 hrs associated to maintenance of machine labor per 100,000 joints.

## Cost Comparison Table

	<u>Clinching</u>	<u>Riveting</u>	<u>RSW</u>
<b>Cost of Machine \$US <sup>1</sup></b>	<b>\$10,000.00</b>	<b>\$10,000.00</b>	<b>\$10,000.00</b>

<b>Electricity requirements for 100,000 joints</b>			
<b>Direct Electricity kW-hr <sup>2</sup></b>	<b>Nil</b>	<b>10.63 kW-hr</b>	<b>155.55 kW-hr</b>
<b>Indirect Electricity kW-hr <sup>3</sup></b>	<b>106.30 kW-hr</b>	<b>Nil</b>	<b>1.26 kW-hr</b>

<b>Operating cost for 100,000 joints</b>			
<b>Depreciation of machine <sup>4</sup></b>	<b>\$20.00</b>	<b>\$20.00</b>	<b>\$20.00</b>
<b>Cost of Electricity <sup>5</sup></b>	<b>\$5.32</b>	<b>\$0.53</b>	<b>\$7.79</b>
<b>Cooling Water <sup>6</sup></b>	<b>Nil</b>	<b>Nil</b>	<b>\$2.82</b>
<b>Cost of tooling Maintenance <sup>7</sup></b>	<b>\$10.00</b>	<b>\$70.00</b>	<b>\$350.00</b>
<b>Tool Cost <sup>8</sup></b>	<b>\$360.00</b>	<b>\$350.00</b>	<b>\$40.00</b>
<b>Maintenance of Machine <sup>9</sup></b>	<b>\$55.00</b>	<b>\$90.00</b>	<b>\$125.00</b>
<b>Cost of Fastener</b>	<b>Nil</b>	<b>\$500.00</b>	<b>Nil</b>
<b>Labor <sup>10</sup></b>	<b>\$486.11</b>	<b>\$243.05</b>	<b>\$972.22</b>
<b>Total cost</b>	<b>\$936.43</b>	<b>\$1273.58</b>	<b>\$1517.83</b>

<sup>1</sup> Average machine cost of equivalent capacity.

<sup>2</sup> Not including premiums for peak demands (a consideration for RSW)

<sup>3</sup> Cost to run air compressor disregarding any loss due to inefficiencies, or cost to install/maintain pipes.

<sup>4</sup> Estimating a machine life expectancy of 50 million cycles

<sup>5</sup> Calculated at 0.05 kW-hr, assumption for average electricity services not including costs to install/maintain service.

<sup>6</sup> Costs not including install/maintain of piping or environmental concerns.

<sup>7</sup> Calculated at \$35.00 / hr including labor to replace and/or dress tooling.

<sup>8</sup> Cost of tooling replacement (punch, die, weld tips, drivers)

<sup>9</sup> Including cost of parts and maintenance labor.

<sup>10</sup> Calculated at \$17.50 / hr average machine operator wage (skilled operator).



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