Superior Products International

- Founded in 1989
- Headquartered in Shawnee, Kansas, U.S.A.
- Global Operations
  - Middle East, Asia, Canada, Europe, South America, Central America, and Africa.
Traditional Pipe Insulation

How it works:
• Contains small pockets of air that only slow conductive heat transfer
• Heat will be absorbed and transferred.
Why it’s not effective

• Designed to absorb and transfer heat

• Insulation cannot hold heat inside the pipe

• Air space allows heat to dissipate
Disadvantages

1. Inefficient. Allows heat to escape

2. Always loads moisture
   - Kills ability to insulate
   - Leads to Corrosion Under Insulation [CUI]
   - Deterioration

Rockwool, fiberglass, or other traditional types of insulation promote corrosion, and also act as a carrier and spread the corrosion to other areas of the pipeline.
Disadvantages

3. Removed during repair and inspection
   - Costly!
   - Moisture entry

4. Cannot conform to valves and elbows well
Introduction

NASA Technology Transfer Agreement
- Reference # 2617 [1995]

• Low density ceramics developed in cooperation with NASA.

• To date, 3,200 ceramic compounds researched
Steel Factory

TRAPS HEAT

Original Surface Temp: 500F
HPC® Surface Temp: 160F - 315F

Original Surface Temp: 500F
Surface Temp After HPC®: 838F
Surface Temp after HPC® = +1000F
### Русские научные лабораторные результаты

<table>
<thead>
<tr>
<th>Название объекта</th>
<th>Предмет изоляции</th>
<th>Материал</th>
<th>Ду, мм</th>
<th>Токр.ср.</th>
<th>Толщина стенок, мм</th>
<th>Толщина изоляции, мм</th>
<th>Темп.наружу, °C</th>
<th>Темп.внутрь, °C</th>
<th>λ, (Вт/(м·°C))</th>
<th>ΔТ, °C</th>
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</thead>
<tbody>
<tr>
<td>Магнитогорск, МП &quot;Трест Теплофикация&quot;, котельная</td>
<td>Трубопровод / pipe</td>
<td>HSC</td>
<td>500</td>
<td>20</td>
<td>97.3</td>
<td>54.1</td>
<td>3</td>
<td>0.0234</td>
<td>43.2</td>
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<td>Трубопровод / pipe</td>
<td>HSC</td>
<td>114</td>
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<td>164</td>
<td>64</td>
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<td>0.0234</td>
<td>100</td>
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<td>Трубопровод / pipe</td>
<td>HSC</td>
<td>32(50)</td>
<td>26.9</td>
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<td>0.0254</td>
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<td>100</td>
<td>0</td>
<td>59</td>
<td>15</td>
<td>4</td>
<td>0.033</td>
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<td>Газпром добыча Ямбург</td>
<td>Фасонные части</td>
<td>HPC</td>
<td>-</td>
<td>25</td>
<td>151</td>
<td>71</td>
<td>7.5</td>
<td>0.0376</td>
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<td>Газпром Трансгаз Самара</td>
<td>Фасонные части</td>
<td>HPC</td>
<td>-</td>
<td>98</td>
<td>394.4</td>
<td>140</td>
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<td>Газпром Трансгаз Самара</td>
<td>Фасонные части</td>
<td>HPC</td>
<td>-</td>
<td>98</td>
<td>394.4</td>
<td>110</td>
<td>20</td>
<td>0.0075</td>
<td>284.4</td>
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<tr>
<td>Астрахань</td>
<td>Трубопровод / pipe</td>
<td>HSC</td>
<td>159(5)</td>
<td>3</td>
<td>68</td>
<td>27</td>
<td>5</td>
<td>0.057</td>
<td>41</td>
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</table>
Without coating, the heat loss touches 3409 W/m. With Hot Pipe Coating it diminishes to 776 W/m, i.e. a decrease with 77.3%. The average thermal conductivity in the coating then reaches 0.088 W/(m.K).

<table>
<thead>
<tr>
<th>Mean temperature °C</th>
<th>Thermal conductivity W/(m.K)</th>
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<tr>
<td>-10</td>
<td>0.059</td>
</tr>
<tr>
<td>0</td>
<td>0.060</td>
</tr>
<tr>
<td>10</td>
<td>0.061</td>
</tr>
<tr>
<td>20</td>
<td>0.062</td>
</tr>
<tr>
<td>30</td>
<td>0.063</td>
</tr>
<tr>
<td>50</td>
<td>0.066</td>
</tr>
<tr>
<td>100</td>
<td>0.071</td>
</tr>
<tr>
<td>200</td>
<td>0.083</td>
</tr>
<tr>
<td>300</td>
<td>0.094</td>
</tr>
<tr>
<td>400</td>
<td>0.106</td>
</tr>
<tr>
<td>500</td>
<td>0.117</td>
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</tbody>
</table>

Figure 4: Relation between the thermal conductivity of Hot Pipe Coating and its average temperature.
Cold Testing

84 F – 1 P.M.

60 F – 3 P.M.

41 F – 5 P.M.
Cold Testing

34 F – 7 P.M.

33 F – 9 P.M.

33 F – 12 A.M.
Gazprom

30MM Thickness
Flange Before coating: 185°C

Flange After coating: 55°C
Tank Terminal, Belgium
La Defense Office, France
Advantages

• NO Shutdown Required

• Applied directly on hot pipes
Advantages

• Applied directly on valves and elbows
<table>
<thead>
<tr>
<th></th>
<th>Rockwool / Fiberglass</th>
<th>HPC®</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>INSTALLATION</strong></td>
<td>Shutdown during install and repair</td>
<td>SIMOPS</td>
</tr>
<tr>
<td><strong>INSULATION EFFECT</strong></td>
<td>Deteriorates when wet. Valves and elbows not wrapped</td>
<td>Insulates permanently. Insulates Valves and Elbows</td>
</tr>
<tr>
<td></td>
<td>effectively</td>
<td></td>
</tr>
<tr>
<td><strong>CRACK DETECTION</strong></td>
<td>Entire jacket must be removed</td>
<td>Inspected directly on spot. Easily repaired</td>
</tr>
<tr>
<td><strong>CONDENSATION</strong></td>
<td>High due to wetting of Fiberglass / Rockwool</td>
<td>No condensation for HPC®</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>CORROSION</strong></td>
<td>High due to condensation problem</td>
<td>No condensation = no corrosion</td>
</tr>
<tr>
<td><strong>REPAIR AND MAINTENANCE</strong></td>
<td>High maintenance. Must shut down. High cost</td>
<td>Low. Sprayed without shut down. Low cost</td>
</tr>
</tbody>
</table>
Return on Investment

**ASHRAE formula:** \((\text{Org. Temp } \times \text{ Difference/24 = tons of energy} \times 12,000 \text{ BTU per ton = BTU savings})\)

1. **Readings:**
   - **Surface of metal**
     - A. 500F(260C)
     - B. 838F(448C)
     - C. 1000F(538C)
   - **Surface of HPC**
     - 160F (71C)
     - 315F (157C)
   - **BTU savings (Use formula above)/hr.**
     - A. 85,000,000/hr.
     - B. 219,137,000/hr.
     - C. 342,500,000/hr.

Change BTU into KW to find **COST SAVINGS** per hour / day/week/month/year. (1 BTU = .293 WATT)

- **A. 85,000,000 BTU/hr.**
  - \( \times .293 \text{ Watt = 24,905,000 Watts divide 1000 = 24,905 KW/hr} \)
  - In Kansas City (0.08cents/KW) or 24,905 \( \times .08 = $1992.40$/hour
  - $47,817/day --- $1,434,528/month --- $17,214,336/year.

- **B. 219,137,000 BTU/hr**
  - \( \times .293 \text{ Watt = 64,207,141 divide 1000 = 64,207 KW/hr} \)
  - (0.08cents/KW) or 64,207 \( \times .08 = $5136.57/\text{ hour} \)
  - $123,278/day --- $3,698,331/month --- $44,379,976/year.

- **C. 342,500,000 BTU/hr**
  - \( \times .293 \text{ Watt = 100,352,500 divide 1000 = 100,352 KW/hr} \)
  - (0.08cents/KW) or 100,352 \( \times .08 = $8028.16$/hour
  - $192,675.84/day --- $5,780,275/month --- $69,363,302/year.

**SUMMARY Savings per year:**

- A. $17,214,336
- B. $44,379,976
- C. $69,363,302
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“Painting the World One Gallon at a Time”