Pulsar® VS Liquid Bleach competitive analysis
**COMPOSITION**

**Pulsar® Plus Briquettes** are made of calcium hypochlorite.
- Solid white, pillow-shaped briquette
- 65% available chlorine (minimum)

**Liquid bleach** is a solution of sodium hypochlorite.
- Greenish yellow, pungent liquid
- 3%-15% chlorine

**PERFORMANCE**

**Pulsar® Plus Briquettes** reduce the need for adding calcium chloride because calcium is a by-product.
- Contains a patented scale inhibitor designed to reduce maintenance and improve reliability of the Pulsar® Chlorinator Systems
- Contributes less TDS, requiring less draining of some pool volume annually
- Pillow-shaped design allows for compact filling of the feeder, evening the spray surface area, for consistent and accurate chlorination

**Liquid bleach** adds almost 2 lbs. of salt per gallon of bleach, making pool surfaces and equipment susceptible to damage, and increases TDS.
- The lack of calcium means pools may require calcium chloride applications to protect grout from dissolving and plaster from etching
- Sodium chlorate is a by-product as the bleach degrades
- High pH contributes to scaling and cloudiness in hard water
- Wide variety of raw material (caustic soda) quality can lead to impurities (i.e., the presence of metal ions) which cause quicker degradation, affect product stability

**PACKAGING**

**Pulsar® Plus Briquettes** are 6-8 times more concentrated than liquid bleach.
- Averages a 1-2 yr shelf life - suffers only 3-4% loss of strength after 1 year storage

**Liquid bleach** suffers a continuous loss of chemical strength making dosing more challenging.
- 90 day shelf life at room temperature - a strong 15% solution will suffer 30% loss of strength after 21 days of storage at 85°F (see graph on opposite page)
**STABILITY COMPARISON**
Between Pulsar® Plus Briquettes and Liquid Bleach at 85°F

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**THE SPLASH-FREE WAY**

*Pulsar® Plus Briquettes* are dry product = no spills, no splashing, product stays dry until water enters feeder

- Store off the ground in cool, dry, well-ventilated area
- Stackable pallets of product reduce space requirements compared to storing bulk tanks of liquid bleach
- Wear chemical-resistant gloves when handling, goggles when applying, along with long pants, sleeves, shoes and socks

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**MAKING THE BLEACH TO PULSAR® SWITCH**

*Case Study: Fullerton, California*

The City of Fullerton, California switched from using sodium hypochlorite (bleach), and now operates all three of its pools on *Pulsar®* systems. (Including a heated, outdoor 50-meter pool, plus a smaller adjacent unheated summer pool, as well as a 25-meter indoor pool.)

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**BLEACH DECOMPOSITION**

<table>
<thead>
<tr>
<th>Percentage of Original Strength</th>
<th>Age (Days)</th>
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<tbody>
<tr>
<td>105%</td>
<td>0</td>
</tr>
<tr>
<td>100%</td>
<td>5</td>
</tr>
<tr>
<td>95%</td>
<td>10</td>
</tr>
<tr>
<td>90%</td>
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<td>85%</td>
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<td>70%</td>
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<tr>
<td>65%</td>
<td>40</td>
</tr>
<tr>
<td>60%</td>
<td>45</td>
</tr>
</tbody>
</table>

**THE SPLIT-FREE WAY**

- Linear (Calcium Hypochlorite)
- Expon. (15 tr. %, initial)
- Expon. (12 tr. %, initial)
- Expon. (10 tr. %, initial)
- Linear (5 tr. %, initial)
**Model 45 Specifications**
- Chlorinator height ..................... 31” [78.7cm]
- Chlorinator weight (full) .......... 55 lbs [24.9kg]
- Chlorinator weight (empty) ...... 30 lbs [13.6kg]

**Capacity:**
- 25 lbs [11.3kg] Pulsar® Plus Dry Chlorinator Briquettes (equivalent to 17 lbs [7.7kg] available chlorine)

**Feed Rate:**
- Pulsar® Plus Briquettes: 2-58 lbs
  [1.5-22.7kg] of Available Chlorine per day
  (Pool)
  [3-66kg] of Available Chlorine per day (Spa)

**Recommended Pool Size:**
- 5,000-100,000 gallon [18,927-378,541 liter] un-stabilized*
- 50,000-150,000 gallon [189,271-567,812 liter] stabilized*

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**Model 140 Specifications**
- Chlorinator height ..................... 35” [88.9cm]
- Chlorinator weight (full) .......... 150 lbs [68.0kg]
- Chlorinator weight (empty) ...... 50 lbs [22.7kg]

**Capacity:**
- 100 lbs [45.4kg] Pulsar® Plus Dry Chlorinator Briquettes (equivalent to 68 lbs [30.8kg] available chlorine)

**Feed Rate:**
- Pulsar® Plus Briquettes: 5-163 lbs
  [2.3-63.5kg] of Available Chlorine per day

**Recommended Pool Size:**
- 15,000-200,000 gallon [56,781-757,082 liter] un-stabilized*
- 50,000-600,000 gallon [189,271-2,271,247 liter] stabilized*

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**Model 500 Specifications**
- Chlorinator height ..................... 40” [101.6cm]
- Chlorinator weight (full) .......... 465 lbs [210.9kg]
- Chlorinator weight (empty) ...... 165 lbs [74.8kg]

**Capacity:**
- 300 lbs [136.1kg] Pulsar® Plus Dry Chlorinator Briquettes (equivalent to 204 lbs [92.5kg] available chlorine)

**Feed Rate:**
- Pulsar® Plus Briquettes: 25-486 lbs
  [11.4-266.8kg] of Available Chlorine per day

**Recommended Pool Size:**
- 50,000-600,000 gallon [189,250-2,271,000 liter] un-stabilized*
- 100,000-1,600,000 gallon [378,500-6,056,000 liter] stabilized*

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*Subject to local health codes