

# Comparison of Casting Alloys and other materials

## Alloys

| Alloy Group | Zinc             |                  | Zinc-Aluminum   |       | Aluminum |     |
|-------------|------------------|------------------|-----------------|-------|----------|-----|
| Common Name | Zamak 3<br>AG40A | Zamak 5<br>AG41A | ZA-8<br>B669-84 | ZA-27 | 380/383  | 360 |

## Mechanical Properties

|                                       |       |       |          |           |       |       |
|---------------------------------------|-------|-------|----------|-----------|-------|-------|
| Tensile Strength<br>P.S.I.            | 41000 | 47600 | 54200    | 62        | 47000 | 46000 |
| Yield Strength<br>P.S.I. (0.2%Offset) | -     | -     | 42000    | 52-55     | 23000 | 24000 |
| Compressive Strength<br>P.S.I.        | 60000 | 87000 | >87000   | 52        | -     | -     |
| Shear Strength<br>P.S.I.              | 31000 | 38000 | 40000    | 47        | 27000 | 26000 |
| Elongation<br>% Inch Per Inch         | 10    | 7     | 8        | 2.0 – 3.5 | 3.5   | 3.5   |
| Hardness<br>BHN.                      | 82    | 91    | 103      | 116-122   | 80-85 | 80    |
| Impact Strength<br>Ft. Lb. (Charpy)   | 43    | 48    | 31       | 7-12      | 3     | 3     |
| Youngs Modulus<br>P.S.I. X 10-6       | N.A.  | N.A.  | 12.4     | 11.3      | 10.3  | 10.3  |
| Creep Strength-1<br>P.S.I.            | ~3000 | N.A.  | ~10000-2 | -         | -     | -     |
| Poisson's Ratio                       | -     | -     | 0.295    | 0.030     | -     | -     |

N.A. – Not Available 1 – Stress To Produce A Steady Creep Rate Of 1% Strain Per 100,000 Hours At 68°F; Design Stress As Per ASME Boiler Code, 2 – Estimated Value – Test In Progress 3/0.5% Yield.

## Physical Properties

|  |            |            |            |            |              |              |
|--|------------|------------|------------|------------|--------------|--------------|
| Density<br>Lb./Cubic Inch                            | 0.24       | 0.24       | 0.227      | 0.181      | 0.099        | 0.095        |
| Melting Range<br>Degree F                            | 718<br>728 | 717<br>727 | 707<br>759 | 708<br>903 | 1000<br>1100 | 1035<br>1105 |
| Coefficient of Thermal<br>Expansion u in/in Degree F | 15.2       | 15.2       | 12.9       | 14.4       | 12.1         | 12.2         |
| Thermal Conductivity<br>BTU/Ft. Hr. Degree F         | 65.3       | 62.9       | 66.3       | 72.5       | 55.6         | 65.3         |
| Electrical Conductivity<br>% IACS                    | 27         | 26         | 27.7       | 29.7       | 23           | 30           |

4 – Melting Point 2600°F

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