



**ZINC INDUSTRIAS NACIONALES S.A.**

**ZINC ALLOYS  
TECHNICAL SPECIFICATIONS**

Description Solid ingots  
 CAS No. Zinc 7440 - 66 - 6 Aluminum 7429 - 90 - 5  
 Copper 7440 - 50 - 8 Magnesium 7439 - 95 - 4

| Element               | Zamac 2 |        | Zamac 3 |        | Zamac 5 |        | Zamac 7 |        | Zamac 8 |        | Tonsul  |        |
|-----------------------|---------|--------|---------|--------|---------|--------|---------|--------|---------|--------|---------|--------|
|                       | % Min.  | % Max. | % Min.  | % Max. | % Min.  | % Max. | % Min.  | % Max. | % Min.  | % Max. | % Min.  | % Max. |
| Aluminum - Al         | 3.9     | 4.3    | 3.9     | 4.3    | 3.9     | 4.3    | 3.9     | 4.3    | 8.2     | 8.8    | 3.9     | 4.1    |
| Copper - Cu           | 2.7     | 3.3    |         | 0.1    | 0.7     | 1.1    |         | 0.1    | 0.9     | 1.3    | 2.75    | 3.1    |
| Magnesium - Mg        | 0.025   | 0.05   | 0.03    | 0.06   | 0.03    | 0.06   | 0.01    | 0.02   | 0.02    | 0.03   | 0.5     | 0.6    |
| Nickel - Ni           |         |        |         |        |         |        | 0.005   | 0.035  |         |        |         |        |
| Iron - Fe             |         | 0.035  |         | 0.035  |         | 0.035  |         | 0.035  |         | 0.035  |         | 0.035  |
| Lead - Pb             |         | 0.004  |         | 0.004  |         | 0.004  |         | 0.003  |         | 0.005  |         | 0.004  |
| Cadmium - Cd          |         | 0.003  |         | 0.003  |         | 0.003  |         | 0.002  |         | 0.005  |         | 0.002  |
| Tin - Sn              |         | 0.0015 |         | 0.0015 |         | 0.0015 |         | 0.001  |         | 0.002  |         | 0.001  |
| Zinc - Zn             | Balance |        | Balance |        | Balance |        | Balance |        | Balance |        | Balance |        |
| ASTM Reference Method | B 240   |        | B 240   |        | B 240   |        | B 240   |        | B 240   |        | B 240   |        |



| Element        | Zamac M |        | Zamac + M (331 + Mg) |        | Special Tonsul (4) |        | Special Tonsul (5) |        | Zinc Alloy (3) |        | Zinc Alloy (4) |        | Zinc Alloy (6) |        | Zinc Alloy (11) |        | Zinc Antimony 5% (IB) |        | Zinc Antimony 6% |        | Zn Mg 1% |        |
|----------------|---------|--------|----------------------|--------|--------------------|--------|--------------------|--------|----------------|--------|----------------|--------|----------------|--------|-----------------|--------|-----------------------|--------|------------------|--------|----------|--------|
|                | % Min.  | % Max. | % Min.               | % Max. | % Min.             | % Max. | % Min.             | % Max. | % Min.         | % Max. | % Min.         | % Max. | % Min.         | % Max. | % Min.          | % Max. | % Min.                | % Max. | % Min.           | % Max. | % Min.   | % Max. |
| Aluminum - Al  | 3.2     | 3.6    | 3.2                  | 3.6    | 3.9                | 4.1    | 3.5                | 3.7    | 9.5            | 10.5   |                | 0.0005 | 4.5            | 5.5    | 2.2             | 2.6    |                       |        |                  | 0.05   |          | 0.005  |
| Copper - Cu    | 3       | 3.5    | 2.9                  | 3.3    | 2.9                | 3.1    | 2.5                | 2.6    |                |        | 0.45           | 0.55   |                |        |                 | 0.03   |                       | 0.005  |                  |        |          | 0.005  |
| Magnesium - Mg | 0.1     | 0.15   | 0.32                 | 0.35   | 0.5                | 0.7    | 0.5                | 0.6    |                |        |                |        |                |        |                 | 0.01   |                       |        |                  |        | 0.9      | 1.1    |
| Nickel - Ni    |         |        |                      |        |                    |        |                    |        |                |        |                |        |                |        |                 | 0.001  |                       |        |                  |        |          |        |
| Iron - Fe      |         | 0.02   |                      | 0.05   |                    | 0.03   |                    |        |                | 0.005  |                | 0.005  |                |        |                 | 0.06   |                       | 0.02   |                  | 0.01   |          | 0.005  |
| Lead - Pb      |         | 0.004  |                      | 0.005  |                    | 0.004  |                    |        |                |        |                | 0.003  |                |        |                 | 0.003  |                       | 0.025  |                  | 0.045  |          | 0.005  |
| Cadmium - Cd   |         | 0.002  |                      | 0.004  |                    |        |                    |        |                |        | 0.001          |        |                |        |                 | 0.002  |                       |        |                  |        |          | 0.005  |
| Tin - Sn       |         |        |                      | 0.002  |                    |        |                    |        |                |        |                |        |                |        |                 | 0.001  |                       | 0.001  |                  |        |          | 0.005  |
| Bismuth - Bi   |         |        |                      |        |                    |        |                    |        |                |        |                |        |                |        |                 |        | 0.001                 |        |                  |        |          |        |
| Silver - Ag    |         |        |                      |        |                    |        |                    |        |                |        |                |        |                |        |                 |        | 0.001                 |        |                  |        |          |        |
| Arsenic - As   |         |        |                      |        |                    |        |                    |        |                |        |                |        |                |        |                 |        | 0.001                 |        |                  |        |          |        |
| Antimony - Sb  |         |        |                      |        |                    |        |                    |        |                |        |                |        |                |        |                 |        | 4.5                   | 5.5    | 5.6              | 6.4    |          |        |
| Zinc - Zn      | Balance |        | Balance              |        | Balance            |        | Balance            |        | Balance        |        | Balance        |        | Balance        |        | Balance         |        | Balance               |        | Balance          |        | Balance  |        |

Packaging Ingots of approx. 10 Kg. In packages of approximately 500Kg., 1,000Kg., and 1,200 Kg. (+/- 10%)

Storage He Keep in a dry and warm place indoors. Any ingot that is If it is wet, it must be allowed to dry before casting.