

# CERTIFICATE OF ANALYSIS

**44X ZSN15 (batch A)**

## Reference Material Information

Type: ZINC-TIN BINARY ALLOY (CAST)  
Form and Size: Disc ~40mm diameter  
Manufactured by: MBH Analytical Ltd  
Certified and supplied by: MBH Analytical Ltd

## Composition

### Percentage element by weight


Element	Sn	Zn
Value <sup>1</sup>	15.92	(balance)
Uncertainty <sup>2</sup>	0.09	-

## Definitions

- <sup>1</sup> The stated value for tin is the present best estimate of the true tin content. The value is based on the averaged results of an in-laboratory testing programme performed by four analysts.
- <sup>2</sup> The uncertainty value stated is the standard deviation of the wet analysis results. This value is only meaningful when a large sample is taken, at least one gram of material.

## Certified by:

MBH ANALYTICAL LIMITED

  
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C Eveleighon 29<sup>th</sup> November 2011

## Method of Preparation

This reference material was produced from zinc and tin, both of commercial purity, gas-melted in a graphite crucible. The metal was cast by sequential transfer of aliquots from the holding pot into individual heavy iron moulds. Approximately 1mm has been machined from the chill-cast surface of each disc, to minimise surface effects.

## Homogeneity

The discs were checked for sample and batch uniformity using an optical emission spectrometer. Using the meaned data from each surface, standard deviation values were derived for each element as an indicator of any non-homogeneity (as determined for the specific sample size taken by the spectrometer). This test showed that there is substantial segregation in terms of local and through-thickness variation, and hence the stated values are only applicable to the first 6 mm of the disc from the chilled surface. The remaining 9mm of material is probably not in conformance, and should be discarded.

## Chemical Analysis

Analysis was carried out on millings taken from the relatively-homogeneous portion of the discs. All work was carried out within a single laboratory operating within the terms of ISO/IEC 17025: 2005, using standard methods of analysis. Tin was analysed by a panel of four analysts. The individual values are listed below. The matrix was not analysed.

## Traceability

The analytical work performed to assess this material has been carried out by a laboratory with proven competence, as indicated by its accreditation to ISO 17025. It is an implicit requirement for this accreditation that analytical work should be performed with due traceability, via an unbroken chain of comparisons, each with stated uncertainty, to primary standards such as the mole, or to nationally- or internationally-recognised reference materials.

## Analytical Data

Sample	Sn Analyst 1	Sn Analyst 2	Sn Analyst 3	Sn Analyst 4
1	15.99	15.90	15.77	15.88
2	16.02	16.02	15.84	15.97
Mean, %	<b>16.01</b>	<b>15.96</b>	<b>15.81</b>	<b>15.93</b>
Gross Mean, %	<b>15.92</b>	<b>SD:</b>	<b>0.09</b>	

## Participating Laboratories

Universal Scientific Laboratory Pty

Milperra, NSW, Australia

NATA accreditation 0492

## Analysis Methods Used

Tin was analysed by nickel reduction followed by titration with potassium iodate.

## Notes

This material will remain stable indefinitely, provided adequate precautions are taken to protect it from cross-contamination, extremes of temperature and atmospheric moisture. All production records will be retained for a period of 20 years from the date of original analysis. This certification will therefore expire in November 2031, although we reserve the right to make changes as issue revisions, in the intervening period.

The material to which this certificate of analysis refers is supplied subject to our general conditions of sale.