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**ARP 060:2004**

Edition 1

# **SOUTH AFRICAN BUREAU OF STANDARDS**

Recommended practice

## **Guidance on the use and application of hot-dip galvanized steel piping for the transportation of potable water in South Africa**

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### Table of changes

Change No.	Date	Scope

### Foreword

This recommended practice is a sectoral technical agreement developed in accordance with SANS 1-1, and agreed to by the following parties:

Association of Steel Tube and Pipe Manufacturers of South Africa  
CSIR – Water, Environment and Forestry Technology  
DSB Consulting Engineers  
Hot-Dip Galvanizers' Association of Southern Africa  
Institute of Plumbing South Africa  
Joint Acceptance Scheme for Water Installation Components  
Rand Water Board  
South African Institute of Civil Engineers

**Reaffirmed and reprinted in June 2012.  
This standard will be reviewed every five years and  
either be reaffirmed, amended, revised or withdrawn.**

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## Guidance on the use and application of hot-dip galvanized steel piping for the transportation of potable water in South Africa

### 1 Scope

This recommended practice gives guidance on water parameters for satisfactory usage of hot-dip galvanized steel piping for the transportation of potable water.

### 2 Terms and definitions

For the purposes of this recommended practice, the following definitions apply:

#### 2.1

##### **eta layer**

outer surface of the galvanized coating

#### 2.2

##### **galvanic couple**

electrical coupling of dissimilar metals (including carbon) in an electrolyte

#### 2.3

##### **hot-dip galvanized coating**

coating of zinc or zinc-iron alloys (or both) produced by dipping prepared steel in molten zinc

NOTE Adapted from SANS 32 and SANS 121.

#### 2.4

##### **solubility product**

maximum concentration of the anionic and cationic species of a compound before which precipitation will occur

### 3 Hot-dip galvanized coating

#### 3.1 General

**3.1.1** Hot-dip galvanized steel piping is an established common means of transporting domestic drinking water. Unlike organic coatings, a hot-dip galvanized coating is metallurgically bonded to the steel substrate, owing to reaction between the steel and the molten zinc during immersion in the galvanizing bath at approximately 450 °C. The hot-dip galvanized zinc coating produced is not pure zinc, but consists of alloys of zinc and iron with only the eta layer being of relatively pure zinc composition. Notwithstanding the beneficial corrosion properties of a hot-dip galvanized coating, the zinc-iron alloy layers referred to also impart wear resistance, as they are in fact often harder than the steel substrate itself. Typically, the hot-dip galvanized coating thickness is approximately 55 µm (SANS 32). This relatively thick coating (compared to electroplated zinc, which is sometimes