



MAKMAL STANDARD PENGUKURAN KEBANGSAAN  
(NATIONAL MEASUREMENT STANDARDS LABORATORY)  
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## JADUAL

AKTA TIMBANG DAN SUKAT 1972  
PERATURAN – PERATURAN TIMBANG DAN SUKAT  
(KEWAJIPAN DAN KUASA PENYIMPAN) 1981  
(Peraturan 11)

No. Kelulusan: ATS 09/11

### PERAKUAN KELULUSAN TIMBANG/SUKAT/ALAT TIMBANG/ALAT SUKAT


Perihal	:	Tolok Aras Automatik
Pembuat	:	Emerson Process Management Rosemount Tank Radar AB Box 13045, 402 51 Goteborg Sweden
Jenama	:	ROSEMOUNT
Model	:	Raptor Tank Gauging System, 5900S
Penentuan Teknikal:		Lihat Lampiran 1 (Spesifikasi Teknikal)
Catatan	:	Lihat Nota ( Muka surat 2)

Adalah diperakukan bahawa Tolok Aras Automatik jenama Rosemount (Model 5900S) telah diluluskan sebagai sesuai bagi kegunaan perdagangan tertakluk kepada syarat-syarat yang berikut:

#### Syarat-Syarat kelulusan:

- (i) Sebarang pengubahsuaian alat hendaklah dimaklumkan dan mendapat kelulusan Penyimpan Timbang dan Sukat.

Tarikh : 12/4/2012

  
Penyimpan Timbang Dan Sukat  
Makmal Standard Pengukuran Kebangsaan





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**Nota:**

1. Perakuan ini adalah berkaitan dengan kesesuaian alat bagi kegunaan perdagangan yang tertakluk kepada ciri-ciri metrologinya sahaja. Ia tidak boleh dijadikan atau membayangkan apa-apa jaminan dari segi keselamatan penggunaannya bagi perdagangan atau selainnya.
2. Kelulusan ini adalah sah bagi tempoh 10 tahun.

## NATIONAL METROLOGY LABORATORY

SIRIM Berhad (Company No. 367474-V)  
Lot PT 4803, Bandar Baru Salak Tinggi,  
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### TECHNICAL SPECIFICATION

<b>INSTRUMENT</b>	:	Automatic Level Gauge
<b>MANUFACTURER</b>	:	Emerson Process Management Rosemount Tank Radar AB Box 13045, 402 51 Goteborg Sweden
<b>APPLICANT</b>	:	Ampmech Industries Sdn Bhd 46, Jalan SS22/21 Damansara Jaya 47400 Petaling Jaya Selangor D. E.
<b>MODEL</b>	:	Raptor Tank Gauging System, 5900S

## 1.0 Description of the Pattern

### 1.1 General Information

The Rosemount Raptor Tank Gauging system measures and calculated tank data for various applications such as custody transfer and inventory calculations.

The Automatic Level Gauge (ALG) comprises a liquid level sensor, a transmitter, field communication, computing and indicating devices. The Rosemount Level Gauge 5900S and 2240S are used for level and average temperature measurements.

A field communication, computing and indicating system for indication of level, temperature, volume and calculated mass of products in storage tanks, typically includes:

- one or more Level Gauges 5900S
- one or more Multi Input Temperature Transmitter 2240S
- one or more 2410 Tank Hub
- one or more 2230 Graphical Field Display



- one or more Field Communication Unit (FCU) 2160 or other communication units
- one or more Smart Wireless THUM adapter
- one or more Field Bus Modem (FBM) 2180
- Smart Wireless Gateway
- PC with Tankmaster or other host system

The Rosemount Tank Hub 2410 is handling communication between the field devices and the control room. The Field Communication Unit (FCU) is a data concentrator that continuously polls data from the Tank Hub 2410. It acts as a master on the field bus and as slave on the group bus and sends the measured data further to the Rosemount Tankmaster PC software or other host systems. To transmit measured values from field devices to Tankmaster PC software or other host systems, a wireless network typically including Smart Wireless THUM adapters and Smart Wireless Gateway can also be used.

The Rosemount 5900S radar level gauge is an instrument for measuring the product level inside a tank. The 5900S can measure the level of almost any product, including bitumen, crude oil, refined products, aggressive chemicals, LPG and LNG. The Rosemount 5900S sends microwaves towards the surface of the product in the tank. The level is calculated based on the echo from the surface. No part of the 5900S is in contact with the product in the tank, and the antenna is the only part of the gauge that is exposed to the tank atmosphere.

The Tankmaster PC software is a Windows-based Human-Machine Interface (HMI) for complete tank inventory management. It provides configuration, service and setup, inventory and custody transfer functions.

## 1.2 Measuring Principles of automatic level gauge

The Rosemount 5900S uses non-contact radar measurement with no moving parts and only the antenna inside the tank atmosphere. The radar transmits microwaves towards the surface of the liquid. When the signal has travelled down to the liquid surface and back to the antenna, it is mixed with the signal that is being transmitted at that moment. The frequency of the transmitted signal has changed slightly during the time it takes for the echo signal to travel down to the surface and back again. When mixing the transmitted and the received signal the result is a signal with a low frequency proportional to the distance to the surface. This method is called the FMCW-method (Frequency Modulated Continuous Wave) and it provides a measured value with high accuracy.

