

FORCE STANDARDS COMPARISON AT 100 KN AMONG NATIONAL LABORATORIES FROM INTER AMERICAN METROLOGY SYSTEM SIM

Juan Christian Villarroel Poblete¹ - Hernán Oliva C.¹ – Luis Rubén Soto Pinto¹ - Alejandro Cárdenas² – Jorge C. Torres Guzmán² - Arístides Dajes³ - Alejandro Savarín⁴

¹ Instituto de Investigaciones y Control del Ejército (IDIC), Santiago, Chile

² Centro Nacional de Metrología (CENAM), Querétaro, México

³ Instituto Nacional de Metrología (INM), Bogotá, Colombia

⁴ Instituto Nacional de Tecnología Industrial, (INTI), Buenos Aires, Argentina

Abstract—A force comparison was carried out among various laboratories from Inter American System (SIM), in order to estimate the level of agreement for the realization of the quantity and the uncertainty associated to its measurement. The comparison was carried out in the ranges of 50 and 100 kN in compression. In order to achieve best accuracy of the force transducer the measurement range started in 50% of the maximum transducer range.

The results obtained, the deviations graphs that include the uncertainty for each laboratory are presented in this document.

Keywords: Force, international comparison, SIM.

1. INTRODUCTION

A force comparison in two ranges (50 and 100 kN) was carried out in order to estimate the level of agreement for the realization of the quantity, and the uncertainty associated to its measurement. This constitutes the third comparison between the metrological laboratories in the region.

4. CONCLUSIONS

Three laboratories from SURAMET, one for ANDIMET and one for NORAMET compared their force standards by means one force transducer. The relative deviations for the range (points compared) including the uncertainty for each force measured point show good agreement.

The results among all laboratories for the range demonstrated agreement.

The normalized error equation and graph is shown in this work.

The comparison was performed with the great willingness from the laboratories.

REFERENCES

- 1) International Vocabulary of Basic and General Terms in Metrology, BIPM, IEC, IFCC, ISO, IUPAC, IUPAP, OIML; 1993.
- 2) The International System of Units (SI); Bureau International des Poids et Mesures. BIPM; 1998.

- 3) Guide to The Expression of Uncertainty In Measurement; ISO TAG 4 WG 3. BIPM, IEC, IFCC, ISO, IUPAC, IUPAP, OIML; 1995.
- 4) ISO 7500 part 1 and 2, Metallic materials – Verification of static uniaxial testing machines.
- 5) ISO 376, Calibration of force-proving instruments used for the verification of uniaxial testing machines.
- 6) Villarroel J.C., Torres-Guzmán J.C. Giobergia L.R., General Guidelines for the Force National standards comparison within the Interamerican Metrology System (SIM), 1 kN and 50 kN. 2003.
- 7) Villarroel J.C., Robles Carbonel J., Haucke G., Force Transducers Calibration Comparison between PTB (Germany), CEM (Spain) and Laboratorio Custodio de Patrones Nacionales - Fuerza (Chile) up to 100 kN.
- 8) Torres Guzmán J.C., Ramirez Aedo D., Santo Claudia, Villarroel J.C., Non Primary Standards SIM Force Comparison up to 10 kN

Authors:

Name : Ing. Juan Christian Villarroel Poblete
: Ing. Hernán Oliva Carrasco
: Tec. Luis Rubén Soto Pinto
Company : Instituto de Investigaciones y Control del Ejército (IDIC)
: www.idic.cl
E-mail address : idic@idic.cl
Address : Avda. Pedro Montt N° 2136, Santiago-Chile
Phone number : + 56 2 520 7762
Fax number : + 56 2 555 0945
E-mail : juan.villarroel@idic.cl
: luis.soto@idic.cl
: hernan.oliva@idic.cl