



**Kipp & Zonen B.V.**

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Canada, France, Germany, United Kingdom, USA

CALIBRATION CERTIFICATE

CALIBRATION DATE : 07 sep 1999

CALIBRATED BY : F.de Wit

PYRANOMETER TYPE : CM11

SERIAL NUMBER : 996980

SENSITIVITY (+/- 0.5%) 5.19 x 10<sup>-4</sup> V per W/m<sup>2</sup> (with no load)  
at 20°C and 500 W/m<sup>2</sup>

RADIATION SCALE World Radiometric Reference (WRR)

CALIBRATION PROCEDURE : By comparison with an outdoors  
calibrated reference pyranometer :  
CM11 913550  
Pyranometers were mounted horizontally,  
side by side.  
Source : 1000 W tungsten-halogen lamp  
Color temperature : 3300° K  
Angle of incidence : normal incidence

KIPP & ZONEN DELFT B.V.  
DELFT/HOLLAND



Radiometer    type            :    **CM 11**  
                  name            :    **ISO 9060 secondary standard pyranometer**  
                  serial no.        :    \_\_\_\_\_ *996980* \_\_\_\_\_

	<i>description</i>	<i>remarks</i>
Specials :	temperature sensor <input type="checkbox"/>	type pt100 / YSI 44031
	extended cable <input type="checkbox"/>	_____ mtr.
	connector <input type="checkbox"/>	type _____ _____
	outer dome <input type="checkbox"/>	type _____
	inner dome <input type="checkbox"/>	type _____
	extended temperature range (specify range, and thermistors) <input type="checkbox"/>	_____ _____
	other <input type="checkbox"/>	_____ _____

resistance of elements (in serie) :	RE	<u>1747</u>	$\Omega$
mounted resistors	RV	<u>3k</u>	$\Omega$
occasionally	RS	_____	$\Omega$
occasionally	RP	_____	$\Omega$
occasionally	R2	_____	$\Omega$



special measurements :

cosine error for eight azimuth directions  
temperature dependence of sensitivity

special angles?: \_\_\_\_\_  
 range \_\_\_\_\_ °C to \_\_\_\_\_ °C

azimuth error at 70° zenithangle  
(if pyranometer is levelled with spirit level)

2,2 % (peak - peak)

mean cosine error at zenithangle 40°

0,1 %

mean cosine error at zenithangle 60°

0,7 %

mean cosine error at zenithangle 70°

0,6 %

mean cosine error at zenithangle 80°

3 %

(if pyranometer is radiometrically levelled, expressed as percentage deviation from the ideal proportionality to the cosine).

Impedance of CM11 :

1308 Ω

### IN-PROCESS INSPECTION

approved by:

of serial no. : 996980

date : 7-9-99

\_\_\_\_\_  
*F. de Wst*  
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