

SUMMARY AND FURTHER ADDITIONS TO THE INFORMATION ON A NESTLER SLIDE RULE CONTRIBUTED DURING A WORKSHOP HELD BY THE DUTCH CIRCLE OF SLIDE RULE COLLECTORS ON MARCH 1, 2026

ANDREAS FAßBENDER HAD THE FOLLOWING QUESTION:

1. What is its use?

Link to the inquiry/workshop:

<https://www.rekeninstrumenten.nl/workshop/AndreasF/index.htm>

Summary:

Around 1968, Wacker Chemitronic Gesellschaft für Elektronik-Grundstoffe mbH produced hyperpure polysilicon for the electronics industry. With the help of this slide rule, both the size and weight of wafers can be calculated. In addition, it can be used to determine the conductivity of silicon with different doping levels.

The inquiry was based on the following images:



The scales:

Front:

DM [mm] -> (Circle-)Diameter metric / (Kreis-)Durchmesser metrisch

AM [mm²] -> (Circle-)Area metric / (Kreis-)Fläche metrisch

WM [g] -> Weight metric / Gewicht metrisch

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LM [mm] -> Length metric / Länge metrisch

RM [1/mm] -> Reciprocal length metric / Reziproke Länge metrisch

LI [in] -> Length imperial

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WI [pd] -> Weight imperial

AI [sqin] -> (Circle-)Area imperial

DFI [frac. in] -> (Circle-)Diameter imperial

DI [dec. in] -> (Circle-)Diameter imperial

Back:

A [ppb] -> Atoms / Atome

AK [A/cm³] -> Atoms per cubiccentimeter / Atome pro Kubikcentimeter

LI [in] -> Length imperial

LM [mm] -> Length metric / Länge metrisch

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C [A/cm³] -> Atoms per cubiccentimeter / Atome pro Kubikcentimeter

DM [mm] -> (Circle-)Diameter metric / (Kreis-)Durchmesser metrisch

DI [in] -> (Circle-)Diameter imperial

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RN [Ohm cm] -> Resistance cm / Widerstand cm

RP [Ohm cm] -> Resistance cm / Widerstand cm

Relationships / Calculations:

$$A = D^2 * \pi / 4$$

$$W = \rho_{si} * V$$

$$\rho_{si} = 2,336 \text{ g / cm}^3 \text{ (@ } 20 \text{ }^\circ\text{C} \triangleq 68 \text{ }^\circ\text{F)}$$

General:

Both the metric and imperial systems of measurement are included. *M scales refer to metric, *I scales to imperial units.

Scales RN and RP (Ohm cm) refer to n- and p-doped silicon. Resistance R = resistivity * length / cross-sectional area. SI unit ohm metre ($\Omega \cdot m$).

The slide rule bears the embossed date 168. This means it was shipped in January 1968.

The typical diameter of wafers:

- 1967: 38.1 mm (1.5 inch)
- 1971: 50.8 mm (2 inch)
- 1973: 76.2 mm (3 inch)
- 1976: 100 mm (4 inch)

Range of diameters on the front side: 9 to 130 mm

Range of diameters on the back: 1 to 10 mm

Wikipedia on [doping](#):

In semiconductor production, doping is the intentional introduction of impurities into an intrinsic (undoped) semiconductor for the purpose of modulating its electrical, optical and structural properties. The doped material is referred to as an extrinsic semiconductor.

Small numbers of dopant atoms can change the ability of a semiconductor to conduct electricity. When on the order of one dopant atom is added per 100 million intrinsic atoms, the doping is said to be low or light. When many more dopant atoms are added, on the order of one per ten thousand atoms, the doping is referred to as high or heavy. This is often shown as n+ for n-type doping or p+ for p-type doping. (See the article on [semiconductors](#) for a more detailed description of the doping mechanism.)

Further research is needed to identify all the relationships between the scales.

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