

ELECTROCHEMICAL SENSOR

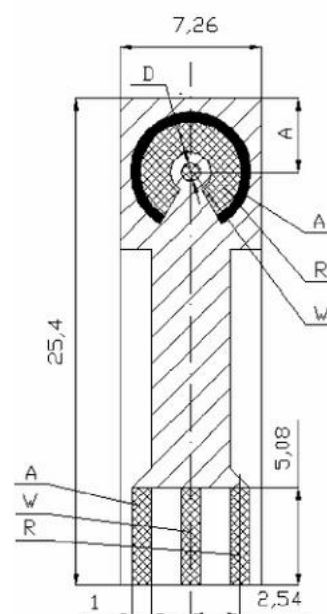
Type: AC1.W*.R* (*) $D_{WE} = 1 \text{ mm}$ or $D_{WE} = 2 \text{ mm}$

DESCRIPTION

Substrate material	corundum ceramic
CE + WE material	Au + Pt alloy, Au, Pt, Ag, carbon* (graphite)
Amounts of WEs	1
RE material	Ag, Ag-AgCl (65% Ag + 35% AgCl in polymeric binder), Ag covered by AgCl electrolytically
Final dielectric protection layer	ceramic, polymeric
Electrode system	CE + RE + WE
Ø of the disc WE	$1.00 \pm 0.05 \text{ mm}$ $2.00 \pm 0.05 \text{ mm}$
WE geometric area	$3.14 \pm 0.1 \text{ mm}^2$ $12.56 \pm 0.1 \text{ mm}^2$
Surface modification	blank, (*sensors with carbon WE can be activated on customer request)

Possible applications

Detection of redox active species, electrolysis, modification with biomolecules



PHYSICAL PARAMETERS

Weight:	0.50	g	Width:	7.26	mm
Length:	25.40	mm	Thickness:	0.63	mm

TOPOLOGY

Electrode materials are defined by: **AC1.W*.R* (*) D_{WE} = 1 mm or 2 mm**

The asterisk is replaced by appropriate number or letter.

AC1 – sensor group reference number

W – working electrode material

S - alloy of gold and platinum

1 – pure gold

2 – pure platinum

3 – pure silver

4 – carbon (graphite)

5 – manually microdispensed carbon (graphite),
auxiliary electrode from different material
(Au + Pt alloy)

R – reference electrode material

S – silver

1 - 65% Ag + 35% AgCl (in polymeric binder)

2 - Ag covered by AgCl electrolytically

(*) – additional technical specification

H, Pt1000, T – sensor sensing elements

MAC – integrated microreactor

Hydrophobic ring on WE

RECOMMENDED ACCESSORIES

Connector for electrochemical sensor

Connector KA1.* <https://bvt.cz/produkt/ka1/>

Connector KA1.C.* <https://bvt.cz/produkt/ka1-c/>

Connector KA1.S.* <https://bvt.cz/produkt/ka1-s/>

EVALUATION UNITS

Recommended potentiostats

PalmSens <https://bvt.cz/kategorie-produktu/potentiostats/palmsens-potentiostats/>

BVT <https://bvt.cz/produkt/gx102-potentiostat/>

eDAQ <https://bvt.cz/kategorie-produktu/potentiostats/edaq-potentiostats/>

MATERIAL RESISTANCE

Sensor is (in final step of production) covered by a polymeric or ceramic dielectric protection layer.

Please note, polymeric dielectric protection layer (and also polymeric binder in graphite paste) has limited resistance to organic solvents.

Ceramic protection layer has limited resistance to strong acids.

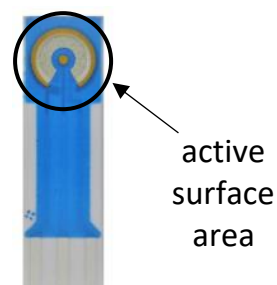
Sensors can be dried in an oven up to 150 °C (max. 2 hours) or left to dry freely.

For detailed information see: <https://bvt.cz/wp-content/uploads/2024/01/AC1.-senzory-materials-handling-letak-V.6-aktualizace-2023.pdf>

HANDLING

The active surface of the sensor should not be wiped mechanically or with a cloth with an organic solvent.

The active surfaces of the sensor should not be touched by fingers during handling.

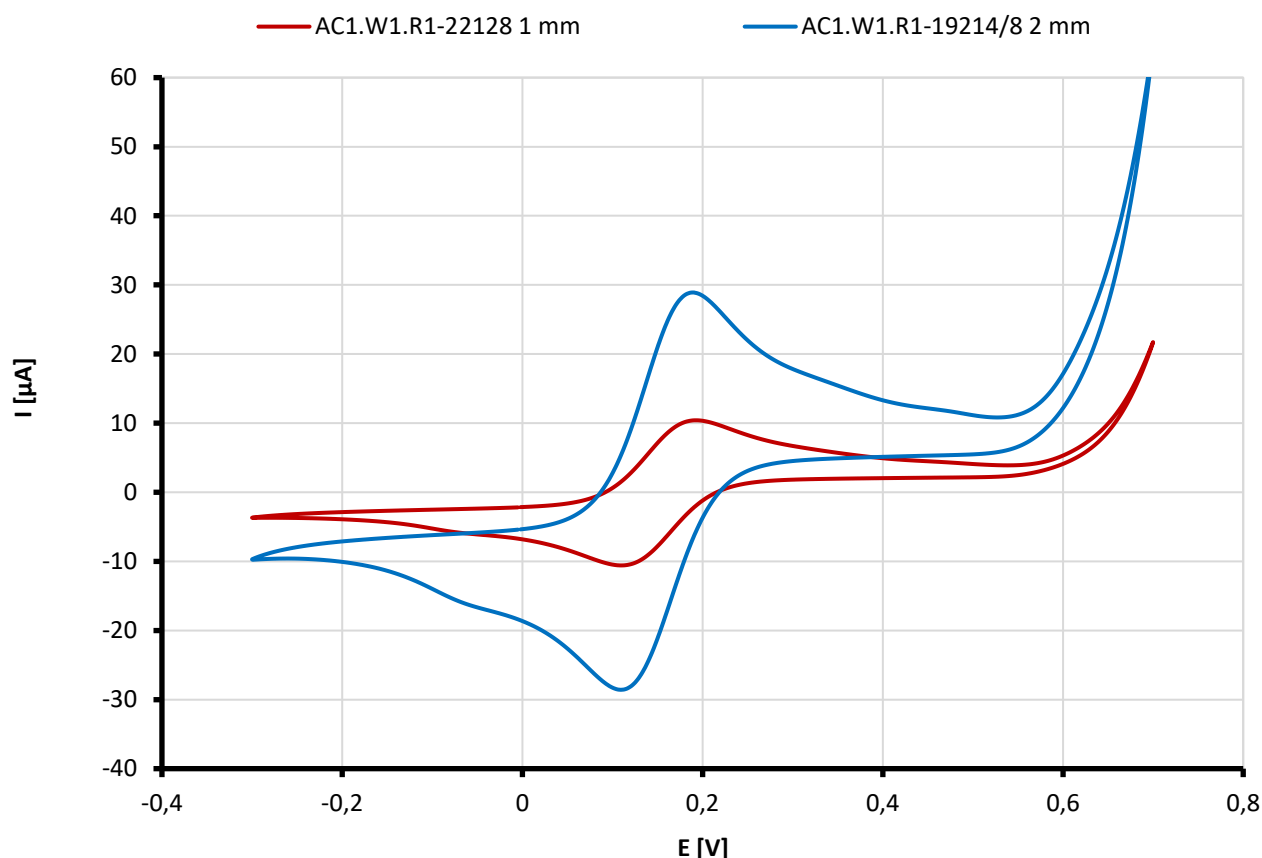


STORAGE

Sensors should be stored in a closed box with silica gel away from light.

EXAMPLE OF MEASUREMENT

Comparison of sensor response with working electrode 1 mm and 2 mm.



Measurement specification

Cyclic voltammetry (3 scans – 3rd scans are used for graph), scan rate: 50 mV/s, potential range: -0,3 to +0,7 V
 Temperature: 20 °C

Used equipment

Potentiostat eDAQ, electrochemical glass cell TC6, stand for TC*, connector KA1.C.*

Sensor AC1.W1.R1, $D_{WE} = 1 \text{ mm}$

Sensor AC1.W1.R1, $D_{WE} = 2 \text{ mm}$

Used chemicals

FeFe: 0.005M $K_3[Fe(CN)_6]$ + 0.005M $K_4[Fe(CN)_6]$ in 0.2M KOH

RELATED LITERATURE

Patents

PV 1994-864 (13.04.1994) utility design no. 6113/94

References

Jan Krejčí, Jan Prášek, Lukáš Fajcik, Sameh Khatib, Edita Hejátková, Luboš Jakubka, Louisa Giannoudi, Screen-printed sensors with graphite electrodes – comparison of properties and physical method of sensitivity enhancement, *Microelectronics International*, 2004, Vol. 21 Issue: 3, pp.20-24,
<https://doi.org/10.1108/13565360410549684>

Andrew C. Barton, Stuart D. Collyer, Frank Davis, Davinia D. Gornall, Karen A. Law, Emma C.D. Lawrence, Daniel W. Mills, Suzy Myler, Jeanette A. Pritchard, Mark Thompson, Seamus P.J. Higson, Sonochemically fabricated microelectrode arrays for biosensors offering widespread applicability: Part I, *Biosensors and Bioelectronics*, Volume 20, Issue 2, 2004, Pages 328-337, ISSN 0956-5663, <https://doi.org/10.1016/j.bios.2004.02.002>.

ORDERING INFORMATION

The order is specified by whole sensor description formula.

Minimum order quantity – **20** sensors (= 1 box).

All order quantities are to be in multiples of 20 e.g. 20, 40, 60, etc.

Example of order

80 pcs – AC1.W2.R1 $D_{WE} = 1 \text{ mm}$

100 pcs – AC1.W1.RS (H) $D_{WE} = 2 \text{ mm}$

DELIVERY TIME

Delivery time for standard AC1 sensors is a maximum 4 weeks from receipt of order.

Delivery time for non-standard AC1 sensors depends on final technical specification of order.