

7.3 ScienceLine Electrodes

The proven high-end laboratory electrodes

In research and development, manufacturing and quality control, our ScienceLine electrodes have become standard for the most demanding measurement tasks. Each electrode has an individual serial number and pH- and metal combination electrodes are supplied with a quality certificate, better making documentation simple and better traceable.

We have kept on improving the glass membrane shapes and types to make the electrodes even more robust, durable and easier to clean. Furthermore, they achieve stable measurement values even faster.

Our ScienceLine electrodes ensure high measurement accuracy and stability and long service life, but are highly adaptable to your measurement tasks. We can offer you a range of electrodes with unmatched versatility and quality.

A perfect all-rounder for basically any application is the platinum diaphragm. A plurality of platinum wires are twisted and fused together. The outflow channels between the wires have constant dimensions. This provides, e.g. compared to the ceramic diaphragm, a pulsation-free discharge and therefore reliable measured values as well as even better self-cleaning.



Platinum diaphragm



- Proven high-end electrodes for demanding measurement tasks
- Double junction Silamid® reference system for fast and stable acquiring of measured values and for longer electrode life.
- Utmost versatility of pH electrodes is achieved by a large selection of junctions, membrane glass types and shapes, shaft lengths and diameters, ground joints, plug connections and integrated temperature sensors.
- Each pH and metal combination electrode comes with individual serial number and quality certificate.
- Large selection of separate glass and reference electrodes, metal combination electrodes, conductivity sensors, ion selective electrodes and ammonia, sodium and oxygen sensors.

Benefits
ScienceLine



Typical examples:

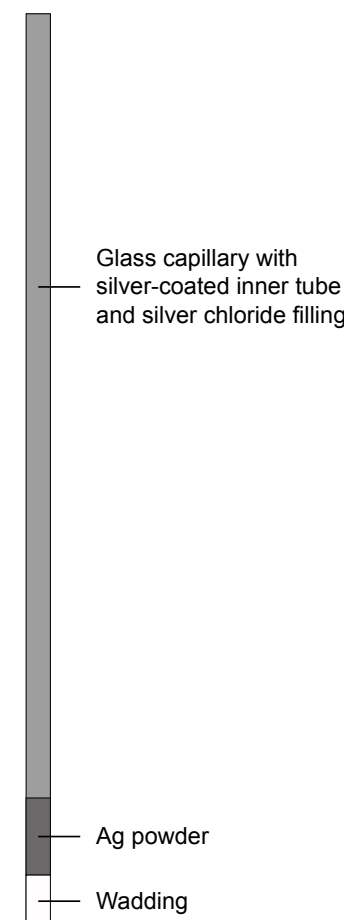
- pH electrodes with a length of up to 600 mm for measurements in very deep vessels
- The N 6003 electrode allows pH measurements even in NMR tubes or other small sample vessels. The A 157 is a micro electrode with an integrated temperature sensor with a 5 mm in diameter.
- For more demanding media, choose among different junctions and membrane glasses. For measurements in samples of low ionic strength there is a choice between e.g. the N 64 and the types A 164. Those feature a ground joint junction, and the A 164 offers a temperature sensor.
- A wide selection of separate reference and glass electrodes completes the offering.

The more stable display of the measured value with Science Line electrodes, as well as their longer life are due to their Silamid reference system. In contrast to the silver/silver chloride reference system of the BlueLine series, the ScienceLine employs. The ScienceLine employs a double junction design where the inner tube is coated with silver which provides for a very stable electrode. Hence, the stability of the potential is much higher.

Silamid derivation

- The silamid reference is a closed dissipating element in which a glass tube is coated with silver and filled with silver.
- Compared to a silver chlorinated silver wire, the potential setting area is significantly increased.
- The watt plug is an inner second diaphragm.
- Electrodes with a silamide reference therefore have an even longer lifetime compared to electrodes with Ag / AgCl wire as well as an even more stable and reliable measurement.

Benefits
Silamid



Glass capillary with silver-coated inner tube and silver chloride filling

Ag powder

Wadding

7.3.1 ScienceLine pH combination electrodes

pH combination electrodes
with plug head and fixed cable

Reference system: Silamid®
Shaft material: glass
Zero point: pH = 7.0 ± 0.3
Electrolyte: KCl 3 mol/l
(except
N 6250: KCl
4.2 mol/l,
A 7780 and
L 7780: gel
electrolyte,
L 8280:
Referid®
electrolyte)
Membrane shape: sphere
pH range: 0 to 14
Connection cable
for plug head: e.g. L 1 A
(See also page
with connec-
tion cables)
fixed cable: 1 m long, with
plug A acc. to
DIN 19262 or
with BNC plug



N 61
N 52 A
N 52 BNC
N 61 eis
N 62
N 6180
N 6280

N 64
H 6480 eis
H 6480 eth
N 6480 eth 2 M
-DIN ID

N 65
H 65
N 6580

N 6980

A 7780

Order No.	Type No.	Length L [mm]	Ø [mm]	Junction	pH- glass	Temp. range [°C]	Connection	Remarks
285101260	A 7780	120	12	3 x ceramic	A	- 5 to + 80	plug head	gel electrolyte
285100494	N 52 A	120	12	platinum	A	- 5 to + 100	DIN plug ²⁾	
285105451	N 52 BNC	120	12	platinum	A	- 5 to + 100	BNC plug ²⁾	
285100001	N 61	170	12	platinum	A	- 5 to + 100	plug head	
285100018	N 6180	170	12	ceramic	A	- 5 to + 100	plug head	
285092661	N 61eis	170	12	3 x platinum	A	+ 10 to + 40	plug head	electrolyte L 5014, Ag / AgCl ref.
285100034	N 62	120	12	platinum	A	- 5 to + 100	plug head	
285100042	N 6280	120	12	ceramic	A	- 5 to + 100	plug head	
285100059	N 64	170	12	ground joint	A	- 5 to + 100	plug head	
285092337	N 6480 eis	170	12	ground joint	A	+ 10 to + 40	plug head	electrolyte L 5014, Ag / AgCl ref.
285092329	N 6480 eth	170	12	ground joint	A	0 to + 40	plug head	electrolyte L 5014, Ag / AgCl ref.
285092340	N 6480 eth 2 M-DIN ID	170	12	ground joint	A	1 to + 40	DIN plug	ID function
285100067	N 65	103 ¹⁾	10	platinum	A	- 5 to + 100	plug head	standard taper NS 14.5
285102516	N 6580	103 ¹⁾	10	ceramic	A	- 5 to + 100	plug head	standard taper NS 14.5
285101709	N 6980	103 ¹⁾	10	ground joint	A	- 5 to + 100	plug head	standard taper NS 14.5

¹⁾ Length from upper end of standard taper
²⁾ with 1 m fixed cable

7.3.2 ScienceLine pH combination electrodes with temperature sensor

pH combination electrodes with temperature sensor

Reference system: Silamid®
Shaft material: glass
Diameter: 12 mm
Zero point: pH = 7.0 ± 0.3
Electrolyte: KCl 3 mol/l
Temperature sensor: Pt 1000
Membrane shape: sphere
pH range: 0 to 14
Connection cable: e.g. LS 1 ANN
for SMEK-plug head: (See also page with connection cables)
fixed cable: 1 m long, with plug A acc. to DIN 19262 or with BNC plug, as well as plug for temperature sensor



N 1051 A
N 1051 BNC
N 1052 A
N 1052 BNC

A 161 1M DIN ID
A 161 1M BNC ID
A 161 IDS
A 162 2M DIN ID
A 162 IDS

A 164 1M DIN ID
A 164 1M BNC ID

A 7780 NTC30
A 7780 1M DIN ID
A 7780 1M BNC ID
A 7780 IDS

Order No.	Type No.	Length L [mm]	Junction	pH-glass	Temp.-range [°C]	Connection	Remarks
285130250	A 161 1M-BNC-ID	170	platinum	A	-5 to +100	BNC ¹⁾ + 4-mm plug	ID function
285130240	A 161 1M-DIN-ID	170	platinum	A	-5 to +100	DIN ¹⁾ + 4-mm plug	ID function
285100090	A 161 IDS	170	platinum	A	-5 to +100	IDS plug	IDS function
285130275	A 162 2M-DIN-ID	120	platinum	A	-5 to +100	DIN ¹⁾ + 4-mm plug	DS function
285100120	A 162 IDS	120	platinum	A	-5 to +100	IDS plug	IDS function
285130290	A 164 1M-BNC-ID	170	ground joint	A	-5 to +100	BNC ¹⁾ + 4-mm plug	ID function
285130280	A 164 1M-DIN-ID	170	ground joint	A	-5 to +100	DIN ¹⁾ + 4-mm plug	ID function
285130210	A 7780 1M-BNC-ID	120	3 x ceramic	A	-5 to +80	BNC ¹⁾ + 4-mm plug	ID function
285130200	A 7780 1M-DIN-ID	120	3 x ceramic	A	-5 to +80	DIN ¹⁾ + 4-mm plug	ID function
285101080	A 7780 IDS	120	3 x ceramic	A	-5 to +80	IDS plug	IDS function
285130290	A 7780 NTC30 DIN-N	120	3 x ceramic	A	-5 to +80	DIN ¹⁾ + 4-mm plug	for portable Knick pH Meter
285100510	N 1051 A	170	platinum	A	-5 to +100	IDS plug	IDS function
285100500	N 1051 BNC	170	platinum	A	-5 to +100	BNC ¹⁾ + 4-mm plug	
1054512	N 1052 A	120	platinum	A	-5 to +100	DIN ¹⁾ + 4-mm plug	
285100380	N 1052 BNC	120	platinum	A	-5 to +100	BNC ¹⁾ + 4-mm plug	

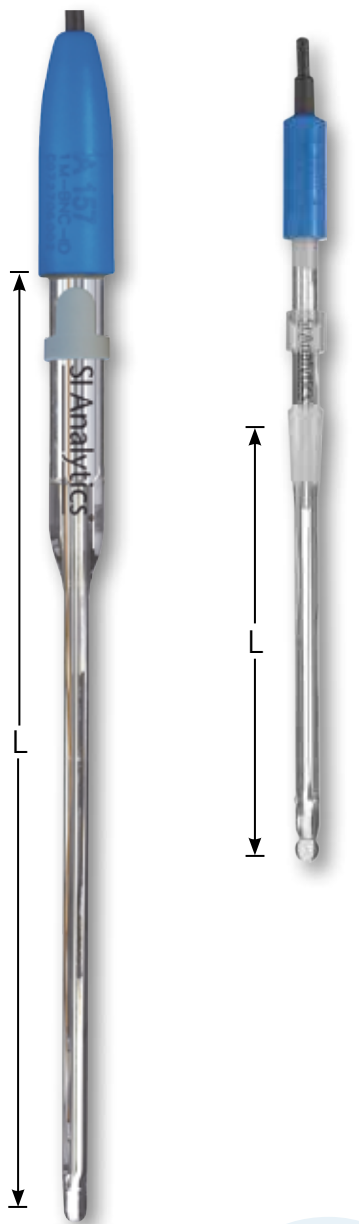
ScienceLine

¹⁾ with 1 m fixed cable

7.3.3 ScienceLine micro combination electrodes

pH combination electrodes with temperature sensor

Reference system: Silamid®
Shaft material: glass
Diameter: 12 mm
Zero point: pH = 7.0 ± 0.3
Electrolyte: KCl 3 mol/l
Temperature sensor: Pt 1000
Membrane shape: sphere
pH range: 0 to 14
Connection cable:
for SMEK-plug head: e.g. LS 1 ANN
(See also page with connection cables)
fixed cable: 1 m long, with plug A acc. to DIN 19262 or with BNC plug, as well as plug for temperature sensor



A 157 1M BNC ID
A 157 1M DIN ID
A 157 IDS

N 5900 A
N 5901
N 5904

Order No.	Type No.	Length L [mm]	Ø [mm]	Junction	pH- glass	Membrane shape	Temp.- range [°C]	Range [pH]	Connection	Remarks
Micro										
285100080	A 157 IDS	70 / 130	12 / 5	platinum	A	cylindrical	- 5 to + 100	0 to 14	IDS plug	IDS function
285130160	A 157 1M-DIN-ID ¹⁾	70 / 130	12 / 5	platinum	A	cylindrical	- 5 to + 100	0 to 14	DIN plug ³⁾	ID function
285130170	A 157 1M-BNC-ID ¹⁾	70 / 130	12 / 5	platinum	A	cylindrical	- 5 to + 100	0 to 14	BNC plug ³⁾	ID function
285105135	N 5900 A	96 ²⁾	5	platinum	A	sphere	- 5 to + 100	0 to 14	DIN plug ³⁾	Ag/AgCl ref.
285105846	N 5901	160 ²⁾	6	platinum	A	sphere	- 5 to + 100	0 to 14	plug head	Ag/AgCl ref.
285105879	N 5904	200 ²⁾	6	platinum	A	sphere	- 5 to + 100	0 to 14	plug head	Ag/AgCl ref.

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¹⁾ with integrated temperature sensor Pt 1000
²⁾ Length from upper end of standard taper (Standard taper NS 7.5)
³⁾ with 1 m fixed cable

7.3.4 ScienceLine Metal combination electrodes

Metal combination electrodes with Silver/Silverchloride reference system, plug head and connection cable

Temperature range: -5 to +100 °C (except Pt 6140: +10 to +40 °C)
Reference system: Silamid®
Shaft material: glass
Electrolyte: KCl 3 mol/l (See also remarks)
Connection cable: for plug head: e.g. L 1 A (See also page with connection cables)
fixed cable: 1 m long, with plug A acc. to DIN 19262 or with BNC plug



Metal-Reference electrodes with pH glass membrane reference system and plug head for titrations

Temperature range: -5 to +100 °C
Reference system: pH glass membrane Type A
Shaft material: glass
Length: 120 mm
Diameter: 12 mm
Connection cable for plug head: z.B. L 1 A (please refer to the page "connection cables")

AgCl 62
AgCl 6280
AgCl 65
Ag 42 A
Ag 6180
Ag 62 IDS
Ag 6280
Ag 6580
Au 6280

Pt 61
Pt 6180
Pt 62
Pt 6280
Pt 6580

Pt 6880
Pt 6980

Pt 62 RG
Ag 62 RG
AgCl 62 RG
AgS 62 RG
Pt 62 RG IDS

Pt 8280

Pt 5900 A
Pt 5900 BNC
Pt 5901

Order No.	Type No.	Length L [mm]	Junction	Ø [mm]	Sensor Metal, shape	Connection	Remarks
285102208	Ag 6180	170	ceramic	12	Ag, cap, 5 mm Ø	plug head	electrolyte L 2114, Ag/AgCl ref.
285102150	Ag 62 IDS	120	platinum	12	Ag, cap, 5 mm Ø	plug head	IDS
285102090	Ag 62 RG	120	-	12	Pt bearing - silver coated,		
285102343	Ag 6280	120	ceramic	12	Ag, cap, 5 mm Ø	plug head	electrolyte L 2114, Ag/AgCl ref.
285102216	Ag 6580	1031)	ceramic	10	Ag, cap, 5 mm Ø	plug head	electrolyte L 2114, Ag/AgCl ref.
285102100	AgCl 62 RG	120	-	12	Pt-bearing - silver coated, chlorinated, ring, 6 mm Ø	plug head	
285102413	AgCl 62 ³⁾	120	platinum	12	Ag, cap, 5 mm Ø	plug head	electrolyte L 2114, Ag/AgCl ref.
285102351	AgCl 6280 ³⁾	120	ceramic	12	Ag, cap, 5 mm Ø	plug head	electrolyte L 2114, Ag/AgCl ref.
1061051	AgCl 65 ³⁾	1031)	platinum	12	Ag, cap, 5 mm Ø	plug head	electrolyte L 2114, Ag/AgCl ref.
285102110	AgS 62 RG	120	-	12	Pt bearing - silver coated, sulfidized, ring, 6 mm Ø	plug head	
285102121	Au 6280	120	ceramic	12	Au, pole, 2 mm Ø	plug head	
285105192	Pt 5900 A	⁹⁶²⁾	platinum	5	Pt, pole, 1 mm Ø	DIN plug ⁴⁾	Ag/AgCl ref.
285105702	Pt 5900 BNC	⁹⁶²⁾	platinum	5	Pt, pole, 1 mm Ø	BNC plug ⁴⁾	Ag/AgCl ref.
285105065	Pt 5901	1602)	platinum	5	Pt, pole, 1 mm Ø	plug head	
285102002	Pt 61	170	platinum	12	Pt, pole, 1 mm Ø	plug head	
285102232	Pt 6180	170	ceramic	12	Pt, pole, 1 mm Ø	plug head	
285102019	Pt 62	120	platinum	12	Pt, pole, 1 mm Ø	plug head	
285102070	Pt 62 RG	120	-	12	Pt, ring, 6 mm Ø	plug head	
285102140	Pt 62 RG IDS	120	-	12	Pt, ring, 6 mm Ø	plug head	IDS
285102249	Pt 6280	120	ceramic	12	Pt, pole, 1 mm Ø	plug head	
285102257	Pt 6580	1031)	ceramic	10	Pt, pole, 1 mm Ø	plug head	
285100075	Pt 6880	120	ceramic	12	Pt, ring, 6 mm Ø	plug head	
285102265	Pt 6980	170	ceramic	12	Pt, ring, 6 mm Ø	plug head	
285102281	Pt 8280	120	KPG®	12	Pt, round, 6 mm Ø	plug head	electrolyte Referid®
285102110	AgS 62 RG	120	-	12	Pt bearing - silver coated, sulfidized, ring, 6 mm Ø	plug head	
285102070	Pt 62 RG	120	-	12	Pt, ring, 6 mm Ø	plug head	

¹⁾ Length from upper end of standard taper; standard taper NS 14.5
²⁾ Length from upper end of standard taper; standard taper NS 7.5
³⁾ Sensor coated with AgCl
⁴⁾ with 1 m fixed cable

7.3.5 ScienceLine Single electrodes: pH glass and metal electrodes

ScienceLine single electrodes

pH glass electrodes

Reference system: Silamid®
Shaft material: glass, 12 mm Ø
Zero point: pH = 7.0 ± 0.3
Membrane shape: sphere
Connection cable: e.g. L 1 A

Metal electrodes

Shaft material: glass, 12 mm Ø
(See remarks)



Order No.	Type No.	Length L [mm]	pH Glass	Range [pH]	Temp.- range [°C]	Remarks
1057997	A 1180 ¹⁾	120	H	0 to 14	0 to +80	plug head
285103212	H 1180	120	H	0 to 14	10 to +100	plug head

Order No.	Type No.	Length L [mm]	Sensor Metal	Sensor shape	Temp. range [°C]	Remarks
285103607	Ag 1100	120	Ag	cap, 4 mm Ø	-5 to +100	plug head, cable e.g. L 1 A
285102030	KF 1100	96 ¹⁾	Pt ²⁾	2 pole, 1 mm Ø	-30 to +135	shaft 5 mm Ø, standard taper NS 7.5, fixed cable, 2 x 4-mm plug
285103512	Pt 1200	120	Pt ²⁾	2 pole, 1 mm Ø	-30 to +135	plug head, cable e.g. L 1 NN
285103537	Pt 1400	103 ¹⁾	Pt ²⁾	2 pole, 1 mm Ø	-30 to +135	shaft 10 mm Ø, standard taper NS 14.5, cable e.g. L 1 NN
285103553	Pt 1800	120	Pt	ring, 6 mm Ø	-30 to +135	plug head, cable e.g. L 1 A

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¹⁾ Length from upper end of standard taper
²⁾ Double platinum electrode

7.3.6 ScienceLine Single electrodes: Reference electrodes

Reference electrodes

Shaft material: glass
Electrolyte depending on reference system:
Ag/AgCl: KCl 3 mol/l, e.g. L 300
Calomel: KCl 4.2 mol/l, e.g. L 420
Hg/Hg₂SO₄: K₂SO₄ 0.6 mol/l, e.g. L 1254
pH range: 0 to 14
Connection cable: e.g. L 1 N



Order No.	Type No.	Length L [mm]	Ø [mm]	Temp. range [°C]	Junction	Reference system	Remarks
1069994	B 2220 +	120	12	- 5 to + 100	platinum	Ag / AgCl	double electrolyte system
1070028	B 2420 +	120	12	- 5 to + 100	ground joint	Ag / AgCl	
1070044	B 2820 +	120	12	- 5 to + 100	ceramic	Ag / AgCl	
1070046	B 2920 +	120	12	- 5 to + 100	platinum	Ag / AgCl	
1070070	B 3420 +	103 ¹⁾	10	- 5 to + 100	ceramic	Ag / AgCl	standard taper NS 14.5
1070073	B 3520 +	103 ¹⁾	10	- 5 to + 100	platinum	Ag / AgCl	standard taper NS 14.5
1070074	B 3610 +	103 ¹⁾	10	+ 15 to + 40	ceramic	Hg / Hg ₂ SO ₄	standard taper NS 14.5
1070075	B 3920 +	103 ¹⁾	10	- 5 to + 100	ground joint	Ag / AgCl	double electrolyte system, standard taper NS 14.5

ScienceLine

Electrodes

¹⁾ Length from upper end of standard taper

7.3.7 ScienceLine conductivity cells with cable

Conductivity measuring cells with fixed cable and 8-pole plug

Temperature sensor: NTC 30 kΩ



LF 313 T IDS

LF 413 T IDS
LF 413 T 3M IDS

LF 413 T 3M Fork IDS

Order No.	Type No.	Length L [mm]	Ø [mm]	Sensor	Cell const. ~ [cm ⁻¹]	Temp. range [°C]	Meas. range ¹⁾ [µS/cm]...[mS/cm]	Remarks
285202430	LF 313 T IDS	120	12	Stainless steel	0.1	-5 to +100	0 to 0.2	Ultrapure water conductivity cell with flow-through vessel, stainless steel shaft, cable 1.5 m, IDS function
285202410	LF 413 T-IDS	120	15.3	4 x Graphite	0.475	-5 to +80	1 to 2,000	Plastic shaft, 1.5 m cable, IDS function
285202420	LF 435 T 3M IDS	120	15.3	4 x Graphite	0.475	-5 to +80	1 to 2000	Plastic shaft, 3 m cable, IDS function
285106290	LF 413 T 3M FORK IDS	120	15.3	4 x Graphite	0.47	-5 to +80	1 to 2000	Plastic shaft, 3 m cable, IDS function

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¹⁾ Outside the recommended ranges measuring errors > 10% can occur with these conductivity measuring cells.

7.3.8 ScienceLine Sensors for ammonia, sodium, oxygen

Ammonia combination electrode with plug head

Shaft material: plastic, 12 mm Ø
Connection cable: e.g. L 1 A

Sodium combination electrode with plug head

Reference system: Silamid®
Shaft material: glass, 12 mm Ø
Zero point: pNa = 2.0
Membrane shape: sphere
Connection cable: e.g. L 1 A

ISE measuring cells

Shaft material: plastic
Length: 120 mm
Fixed cable: 1 m long, with DIN plug

ISE combination electrodes with plug head

Shaft material: plastic
Length: 120 mm



NH 1100

Na 61

TEN 1100 PLH

Cu 1100 PLH
Ca 1100 PLH
F 1100 PLH
PB 1100 PLH

F 60
Cl 60
NO 60
K 60
CA 60
CN 60
AG-S 60
I 60
BR 60
CU 60
PB 60

and ion-selective indicator electrodes

Order No.	Type No.	Length L [mm]	Temp. range [°C]	Meas. range [mg/l]	Remarks
285102808	NH 1100	120	0 to +50	0.1 to 1,000	membrane module replaceable

Order No.	Type No.	Length L [mm]	Junction	Membrane Glass	Temp. range [°C]	Meas. range [pNa]	Remarks
285100026	Na 61	170	platinum	Na	-10 to +80	0 to 6	electrolyte KCl 3 mol/l, aqueous solution NaCl 0.1 mol/l

Order No.	Type No.	Parameter	Temp. range [°C]	pH-range	Measuring range [mg/l]
285216268	Ca 1100 PLH	Calcium	0 to +40	2.5 to 11	0.02 to 40,000
285216273	Cu 1100 PLH	Copper	0 to +80	2 to 6	0.0006 to 6,400
285216295	F 1100 PLH	Fluoride	0 to +80	5 to 7	0.02 to saturated
285216287	Pb 1100 PLH	Lead	0 to +80	4 to 7	0.1 to 20,000
285096980	TEN 1100 PLH	Lead	0 to +80	2 to 11	

Order No.	Type No.	Parameter	Temp. range [°C]	pH-range	Measuring range [mg/l]
285130400	AG-S 60	Sulfide/silver	0 to +80	2 to 12	0.003 to 32,000/ 0.1 to 108,000
285130420	BR 60	Bromide	0 to +80	1 to 12	0.4 to 79,000
285130380	CA 60	Calcium	0 to +40	2.5 to 11	0.02 to 40,000
285130350	Cl 60	Chloride	0 to +80	2 to 12	2 to 35,000
285130390	CN 60	Cyanide	0 to +80	0 to 14	0.2 to 260
285130430	CU 60	Copper	0 to +80	2 to 6	0.0006 to 6400
285130340	F 60	Fluoride	0 to +80	5 to 7	0.02 to saturated
285130410	I 60	Iodide	0 to +80	0 to 14	0.006 to 127,000
285130370	K 60	Potassium	0 to +40	2 to 12	0.04 to 39,000
285130360	NO 60	Nitrate	0 to +40	2.5 to 11	0.4 to 62,000
285130440	PB 60	Lead	0 to +80	4 to 7	0.2 to 20,000

1) Other cable lengths available on request