

DALEX

SCHWEISSTECHNIK

ELECTRODES

DALEX WELDING TECHNOLOGY

ELECTRODE CATALOGUE



DALEX Schweißmaschinen GmbH & Co. KG



ERFAHRUNG SCHWEISST ZUKUNFT
EXPERIENCE WELDS FUTURE

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SPOT WELDING ELECTRODES

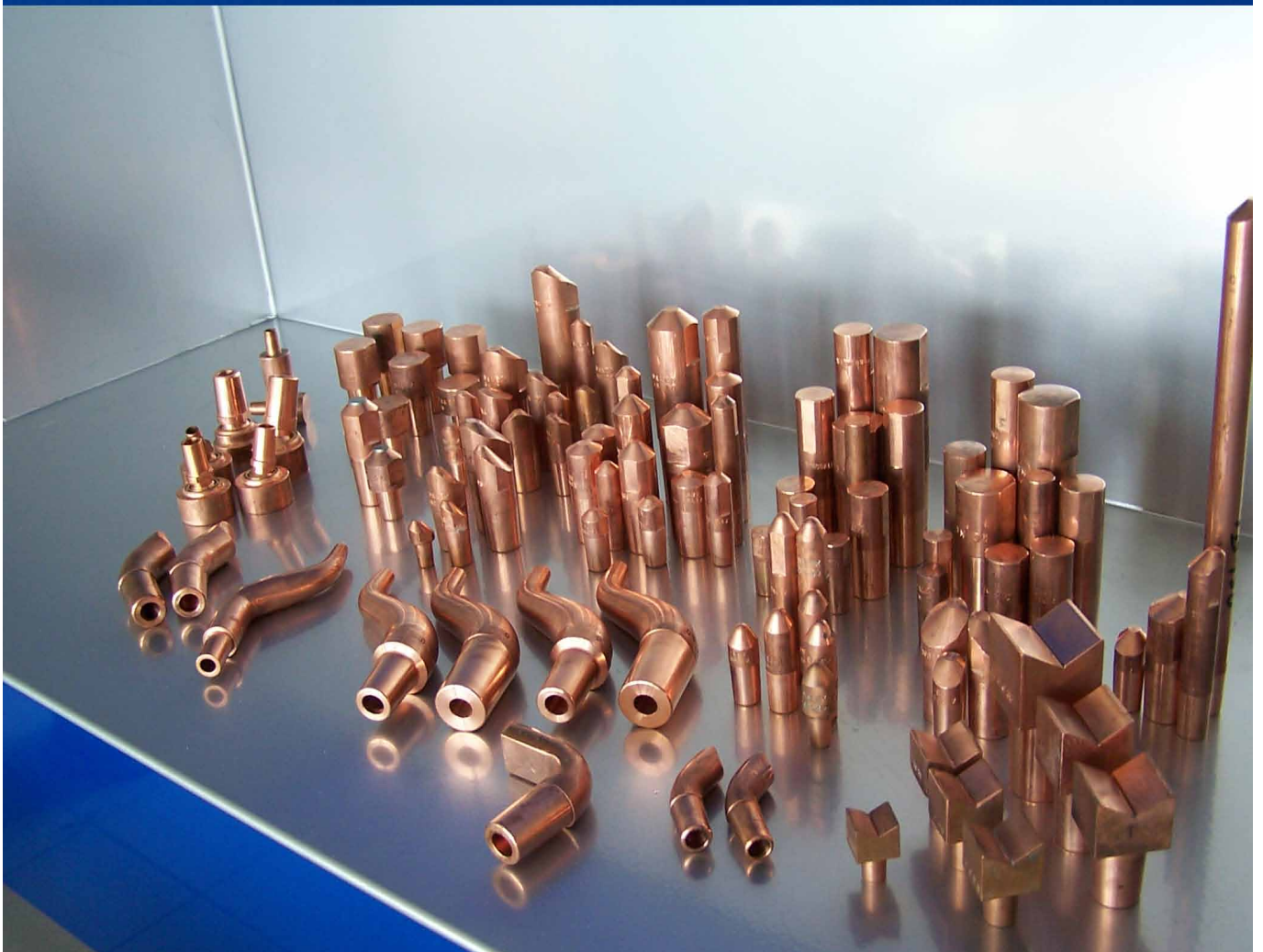
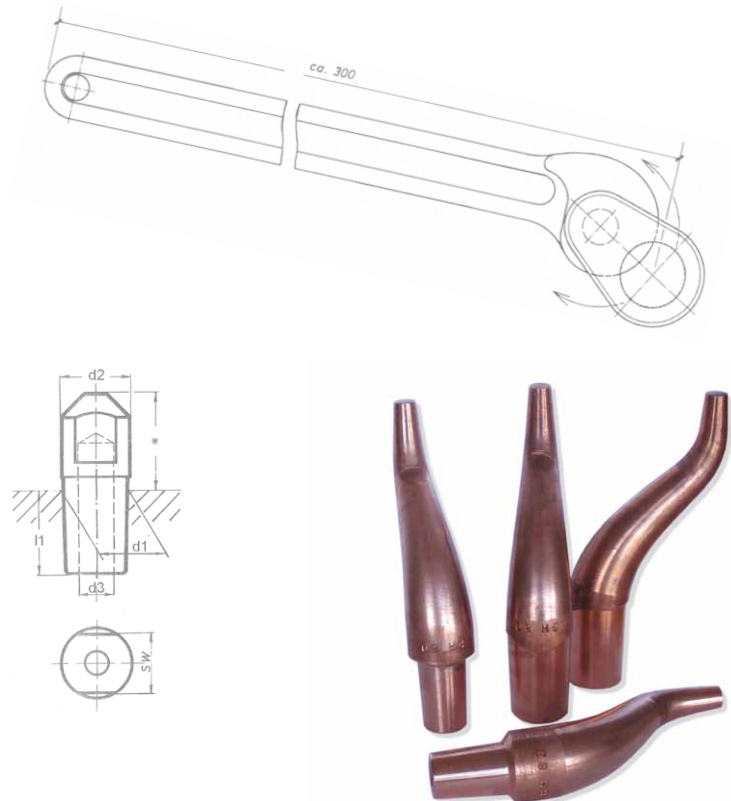


TABLE OF CONTENTS

DELIVERY FORM	4
ASSIGNMENT TO WELDING DEVICES	5
REFERENCE NOTES	6
SPOT WELDING ELECTRODES	8
REDUCING BUSHES	12
ELECTRODE KEY	12
ELECTRODE CAPS	13
ELECTRODE SHAFTS	13
SPECIAL SPOT WELDING ELECTRODES	14
ELECTRODES FOR NUT WELDING	16
ELECTRODE MATERIAL	18

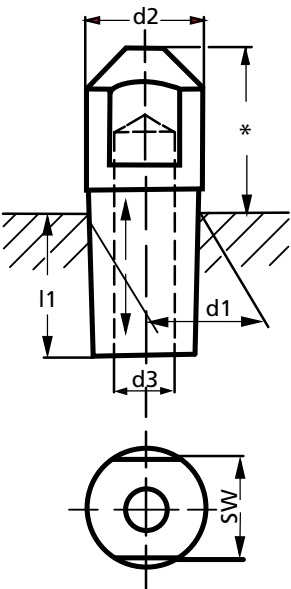


SPOT WELDING ELECTRODES (WATER-COOLED),
IN VARIOUS BASIC MODELS

The seat and key dimensions are listed in the table below (fluctuations are indicated separately). The various electrode shapes with the corresponding electrode type are printed on the following pages.

Type of electrode (example)

2 A 30
2 = seat
A = shape
30 = length - index number*



	seat	d1	d2	d3	l1	sw
1	morse conus 1	12,065	12,5	8	14	11
2	morse conus 2	17,78	18	9,5	22	17
3	morse conus 3	23,825	25	12,5	30	22
6	conus 10% no.0	8,9	12,5	5	10	8
7	conus 10% no.1	11,8	12,5	7	14	11
8	conus 10% no.2	17,8	18	9,5	20	17

SUITABLE ELECTRODES FOR SPOT WELDING DEVICES

DALEX spot welding machines			
food-operated:		pneumatically operated:	
type	seat	type	seat
F 12	1	F 82	1
P21	2 / 1	SL 16 / SL 25	2 / 1
P 31	3 / 2	PL 40 - 100	2
SF 8	1 + 6	PMS 10 T /16	1
SF 16	2 / 1	PMS 10 T / 32	2
SF 25	2 / 1	PMS 10	2
Easyspot 11	1 + 6	PMS 11	2
Easyspot 23/ 35	2 / 1	PMS 12	3
SF 102 / 204	1	PMS 14	3
SF 202/204/206	2 / 1	PMS 16	3
		PMS 22	3
		PMS 34	3
		PMS 36	3
		DW 140	3
		DW 160	3
		DW 260	3
		Easyspot 23 / 35 P	2 / 1
		Midislot 50 - 130	2
		SL 102 / 104	1
		SL 202 / 204 / 206	2 / 1

The spot welding electrodes universal use for most of spot welding devices.

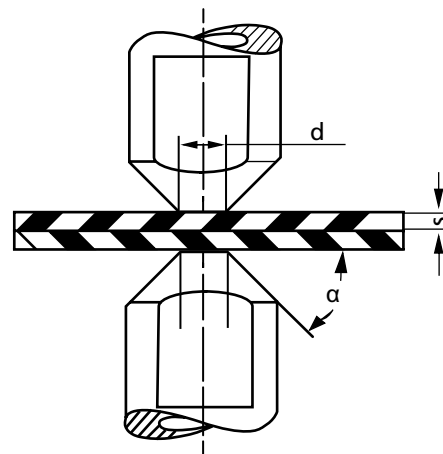
DALEX spot welding guns			
hand-operated:		pneumatically operated:	
type	seat	type	seat
P 293 A	6	205	7
L 298 A	7	207 A	7
3116	6	208	7
3215	1	227 A	7
3216	1	228	7
3218	1	237 A	8
		247 A	8
Double spot welder		425	8
DP 39	6	427 A	8
DP 47	7	437 A	8
DP 60	8	L 407 A	8
3151	7	L 408	8
3156	7	L 410 A	7
		L 413 A	7
		L 414	7
		L 417 A	8
		L 418	8
		L 510 A	8
		S 510 A	8
		3136	6
		3139	6
		3228	1
		3238	1
		3326	2 (1)
		3328	2 (1)
		3328 - 5 / 6	8
		3346	2
		3426	2 (1)
		3427	2 (1)
		3526	2 (1)
		3528	2 (1)

In respect to resistance welding machines the electric energy is forwarded via an electrode and in the same time electrode force is building up. After the current time has come to an end (selected setting at control unit) the weld is finished. For achieving an optimal weld, the choice of electrodes (shape and electrode material) has to be made very carefully.

By using high-grade electrodes top-quality weldings are achievable.

The expectations towards the electrodes for resistance welding do vary, depending on the welding task of the material and the material shape to be welded. When selecting the electrodes, e. g. for spot weldings, besides the electrode material, the shape of electrodes has to be considered in particular. By using the appropriate electrode shape the welding result, the durability and the profitability of the spot welding are positively influenced.

The diameter d of the active surface of one electrode has to be selected regarding bar sheet steels, adequately roughly, accordingly to the formula mentioned below..



$$d = 4 \text{ bis } 6 \sqrt{s} \text{ (mm)}$$

s means thickness of the single sheets. The angle α should be as small as possible, so that the welding heat could be conducted particularly quickly from the heat zone to the intersection electrode / sheet.

The active surface (surface, with which the electrode is hitting the sheet and the welding current is transmitted) has to be maintained planar or slightly convex – ball radius approx. 50-100 mm. In respect to sheets with less proper or oxidised surfaces, a smaller working surface has to be chosen, whereby the achievement is, that the electrode force at the beginning of the weld is destroying the scaling layer. A substantial increased wear of electrodes occurs, when welding oxidised sheets or sheets with bad surface condition.

For hardly accessible welded joints, standard electrodes are often not of advantage. Such weldings are adequately performed by means of differently edged electrodes.

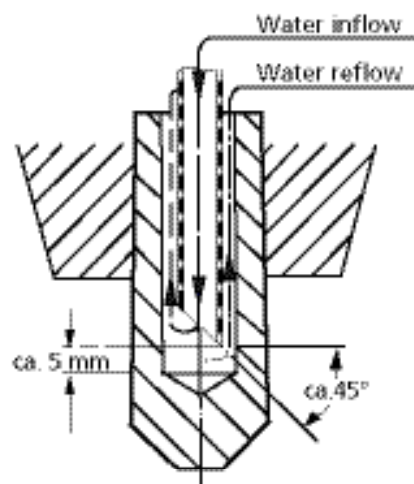
A sufficient and intensive cooling is very significant for the tool life quantity of electrodes.

Electrodes for resistance welding have to be considered as tools and, therefore, have to be maintained exactly like, e.g. turning steels, drillers, etc. in a good and well-kept condition. As soon as the active surface of the electrode has extended, reworking needs to be done, in order to keep the same welding circumstances. As a consequence of the extended active surface the welding tightness is smaller, whereby „missweldings“ can occur. Reworking with a file should be avoided.

The cleaning of electrodes, if necessary, should only be carried out by means of finest emery paper or emery cloths. Worn out electrodes should be replaced.

Consecutively, you will find a great amount of appropriate electrodes for the various application purposes, which prove of value in practice.

Direct electrode cooling



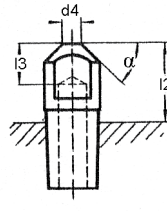
SPOT WELDING ELECTRODES



Form

A

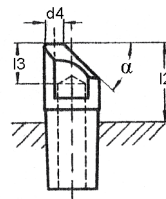
Qualität:
1a



Form

B

Qualität:
1a



spot welding electrodes shape A

a	d4	L3	seat	L2	type	order no.
45°	5	14	1	16	1 A 20	WN.09351.1
45°	5	14	1	31	1 A 30	WN.09352.1
45°	5	14	1	61	1 A 60	WN.09353.1
30°	6,5	18	2	18	2 A 20	WN.09355.1
30°	6,5	18	2	28	2 A 30	WN.09356.1
30°	6,5	18	2	53	2 A 50	WN.09357.1
30°	6,5	18	2	78	2 A 80	WN.09358.1
40°	8	19	3	35	3 A 35	WN.09361.1
40°	8	19	3	70	3 A 70	WN.09362.1
45°	5	12	6	15	6 Av15	WN.09731.1
45°	5	12	6	25	6 Av25	WN.09732.1
45°	5	12	6	40	6 Av40	WN.09733.1
45°	5	14	7	20	7 A 20	WN.09371.1
45°	5	14	7	30	7 A 30	WN.09372.1
45°	5	14	7	60	7 A 60	WN.09373.1
45°	5	18	8	25	8 A 25	WN.09375.1
45°	5	18	8	35	8 A 35	WN.09376.1
45°	5	18	8	50	8 A 50	WN.09377.1

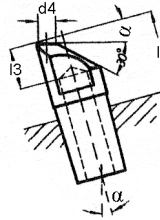
spot welding electrodes shape B

a	d4	L3	seat	L2	type	order-no.
45°	5	14	1	18	1 B 20	WN.09401.1
45°	5	14	1	31	1 B 30	WN.09402.1
45°	5	14	1	61	1 B 60	WN.09403.1
30°	6,5	18	2	28	2 B 30	WN.09406.1
30°	6,5	18	2	53	2 B 50	WN.09407.1
30°	6,5	18	2	78	2 B 80	WN.09408.1
40°	8	19	3	35	3 B 35	WN.09411.1
40°	8	19	3	70	3 B 70	WN.09412.1
45°	5	12	6	15	6 Bv15	WN.09736.1
45°	5	12	6	25	6 Bv25	WN.09737.1
45°	5	14	7	20	7 B 20	WN.09421.1
45°	5	14	7	30	7 B 30	WN.09422.1
45°	5	14	7	60	7 B 60	WN.09423.1
45°	5	18	8	25	8 B 25	WN.09424.1
45°	5	18	8	35	8 B 35	WN.09426.1
45°	5	18	8	50	8 B 50	WN.09427.1



Form

C
Qualität
1a



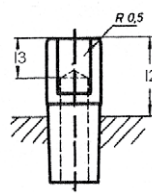
spot welding electrodes shape C

a	d4	L3	seat	L2	type	order-no.
15°	5	14	1	20	1 C 20	WN.09451.1
15°	5	15	2	25	2 C 25	WN.09454.1
15°	8	18	3	30	3 C 30	WN.09457.1
22°30'	5	13	6	15	6 Cv15	WN.09741.1
22°30'	5	16	7	20	7 C 20	WN.09463.1
22°30'	5	21	8	25	8 C 25	WN.09466.1
22°30'	5	21	8	35	8 C 35	WN.09467.1



Form

D
Qualität
1a



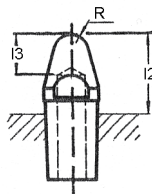
spot welding electrodes shape D

L3	seat	L2	type	order-no.
14	1	16	1 D 20	WN.09551.1
	1	31	1 D 30	WN.09552.1
	1	61	1 D 60	WN.09553.1
18	2	28	2 D 30	WN.09556.1
	2	53	2 D 50	WN.09557.1
	2	78	2 D 80	WN.09558.1
19	3	35	3 D 35	WN.09561.1
14	7	20	7 D 20	WN.09571.1
18	25	25	8 D 25	WN.09575.1



Form

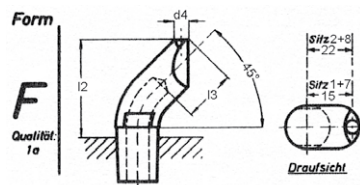
E
Qualität
1a



spot welding electrodes shape E

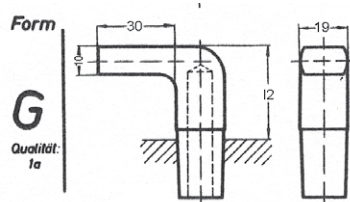
R	L3	seat	L2	type	order-no.
3,5	14	1	20	1 E 20	WN.09601.1
3,5	14	1	30	1 E 30	WN.09602.1
3,5	14	1	60	1 E 60	WN.09603.1
3,5	14	7	20	7 E 20	WN.09621.1
3,5	14	7	30	7 E 30	WN.09622.1
3,5	14	7	60	7 E 60	WN.09623.1

SPOT WELDING ELECTRODES



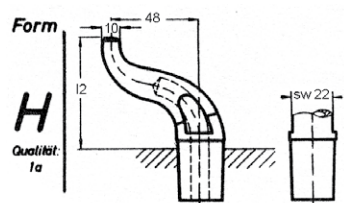
spot welding electrodes shape F

d4	L3	seat	L2	type	order-no.
5	14	1	35	1 F 35	WN.09514.1
5	18	2	50	2 F 50	WN.09511.1
5	14	7	35	7 F 35	WN.09515.1
5	18	8	50	8 F 50	WN.09512.1



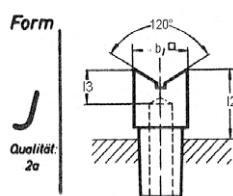
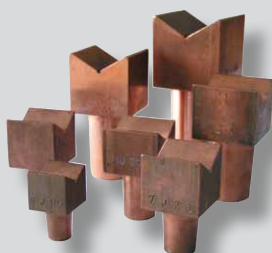
spot welding electrodes shape G

seat	L2	type	order-no.
2	30	2 G 30	WN.09165.1



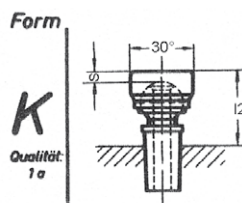
spot welding electrodes shape H

seat	L2	type	order-no.
1		1 H 80	X_1_H_80
2	93	2 H 80	WN.09527.1
3	93	3 H 80	WN.09528.1
8	93	8 H 80	WN.09529.1

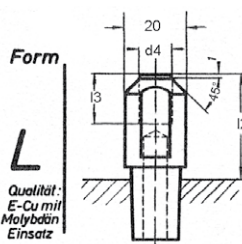


spot welding electrodes shape J

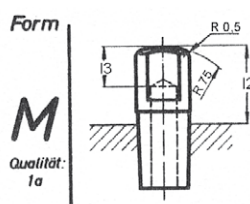
b1	L3	seat	L2	type	order-no.
20	14	1	20	1 J 20	WN.09651.1
25	15	2	30	2 J 30	WN.09652.1
30	18	3	35	3 J 35	WN.09653.1
15	12	6	15	6 J 15	WN.09656.1
20	14	7	20	7 J 20	WN.09657.1
25	18	8	25	8 J 25	WN.09658.1


spot welding electrodes shape K

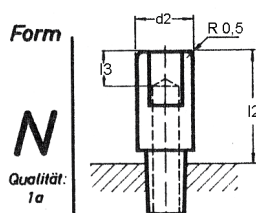
seat	L2	type	order-no.
1	35	1 K 35	WN.09301.1
2	35	2 K 35	WN.09302.1
6	32	6 K 32	WN.09310.1
7	32	7 K 32	WN.09311.1
8	32	8 K 32	WN.09312.1


spot welding electrodes shape L

d4	L3	seat	L2	type	order-no.
8	12	1	25	1 L 25	WN.09676.1
10	15	2	35	2 L 35	WN.09677.1

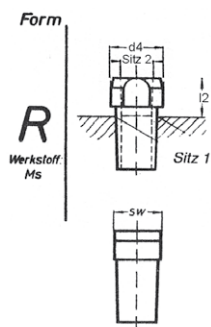

spot welding electrodes shape M

l3	seat	L2	type	order-no.
14	1	20	1 M 20	WN.09701.1
14	1	30	1 M 30	WN.09702.1
14	1	60	1 M 60	WN.09703.1
15	2	30	2 M 30	WN.09706.1
15	2	50	2 M 50	WN.09707.1
15	2	80	2 M 80	WN.09708.1
18	3	35	3 M 35	WN.09711.1
18	3	25	8 M 25	WN.09725.1
18	8	50	8 M 50	WN.09727.1


spot welding electrodes shape N

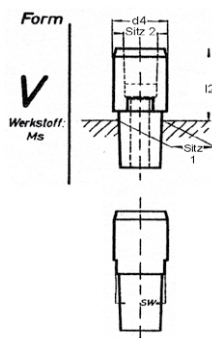
d2	L3	seat	L2	type	order-no.
25	14	1	20	1 N 20	WN.09761.1
25	15	2	30	2 N 30	WN.09766.1
25	18	8	25	8 N 25	WN.09786.1

REDUCING BUSHES



reducing bush shape R

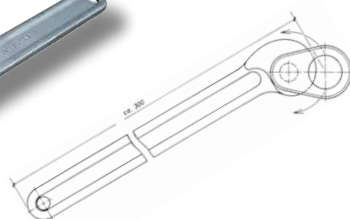
d4	SW	seat 1	seat 2	L2	type	order-no.
22	19	2	1	15	2 R 1	WN.09951.1
30	27	3	2	23	3 R 2	WN.09952.1
22	19	2	7	15	2 R 7	WN.09956.1
30	27	3	8	21	3 R 8	WN.09957.1
22	19	8	1	15	8 R 1	WN.09960.1
18	14	7	6	15	7 R 6	WN.09961.1
22	19	8	7	15	8 R 7	WN.09962.1



reducing bush shape V

d4	SW	seat 1	seat 2	L2	type	order-no.
30	27	2	2	42	2 V2/42	WN.09976.1
30	27	3	2	45	3 V2/45	WN.09977.1
25	22	8	8	35	8 V8/35	WN.09978.1
30	27	2	2	75	2V2/75	WN.09980.1

ELECTRODE KEY



electrode key DALEX special key for loosening electrode tips

Ø mm	order-no.
up to 20 mm	X_SCHLÜSSEL_53

ELECTRODE CAPS



Form

KA

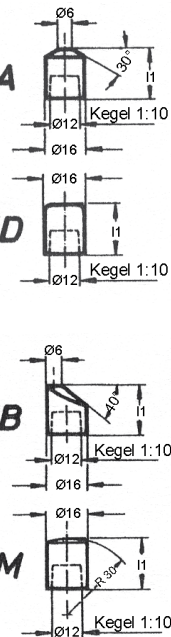
Qualität:
1a

Form

KD

KB

KM



electrode caps shape KA / KD / KB / KM

L1	type	order-no.
20	K 12 A 20	WN.09810.1
20	K 12 B 20	WN.09811.1
20	K 12 D 20	WN.09812.1
20	K 12 M 20	WN.09813.1
21	K 12 L 20*	WN.09800.1

*with tungsten insert

tip dresser are available on request

ELECTRODE SHAFTS



Form

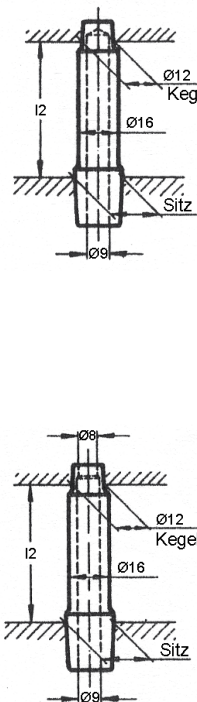
S

Qualität:
1a

Form

SL

Qualität:
1a



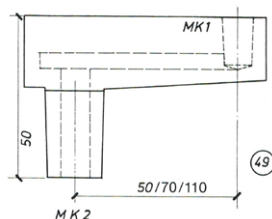
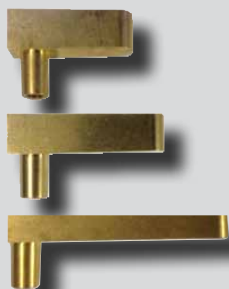
electrode shafts shape S

seat	L2	type	order-no.
2	30	2 S 30	WN.09820.1
2	50	2 S 50	WN.09821.1
2	80	2 S 80	WN.09822.1

electrode shafts shape SL

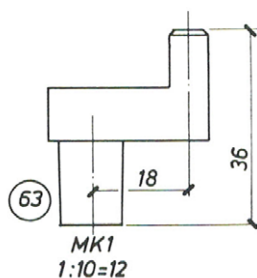
seat	L2	type	order-no.
2	30	2 SL 30	WN.09830.1
2	80	2 SL 80	WN.09831.1

SPECIAL SPOT WELDING ELECTRODES



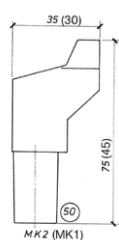
special spot welding electrode

seat	average radius	high total	order-no.
1	50	50	49_MK2.MK1
1	70	50	49_MK2.MK1_70
1	110	50	49_MK2.MK1_110



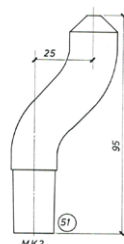
special spot welding electrode

seat	average radius	high total	order-no.
1	18	36	X_MK1_63



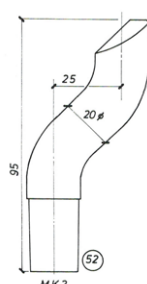
special spot welding electrode

seat	average radius	high total	order-no.
1	30	45	X_MK1_50
2	35	75	X_MK2_50



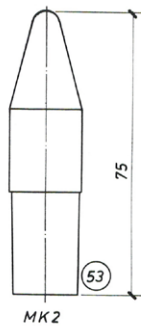
special spot welding electrode

seat	average radius	high total	order-no.
1	25	95	X_MK1_51
2	25	95	X_MK2_51



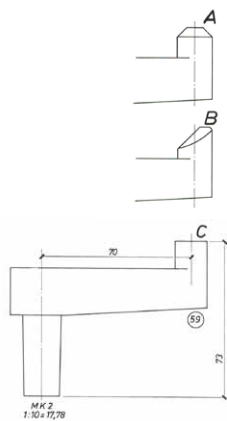
special spot welding electrode

seat	average radius	high total	order-no.
1	25	95	X_MK1_52
2	25	95	X_MK2_52



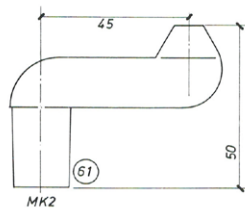
special spot welding electrode

seat	average radius	high total	order-no.
2		75	X_MK2_53



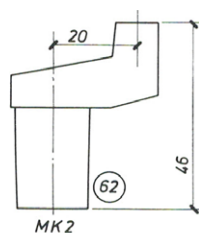
special spot welding electrode

seat	average radius	high total	order-no.
2	70	73	X_MK2_59A
2	70	73	X_MK2_59B
2	70	73	X_MK2_59C



special spot welding electrode

seat	average radius	high total	order-no.
2	45	50	X_MK2_61



special spot welding electrode

seat	average radius	high total	order-no.
2	20	46	X_MK2_62

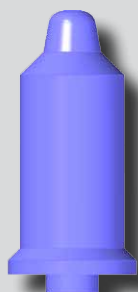
CERAMIC CENTERING PINS FOR WELDING OF WELDING NUTS



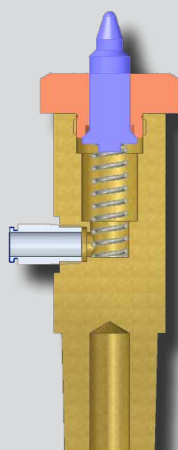
centering pin / long version



centering pin with collar



centering pin / short version

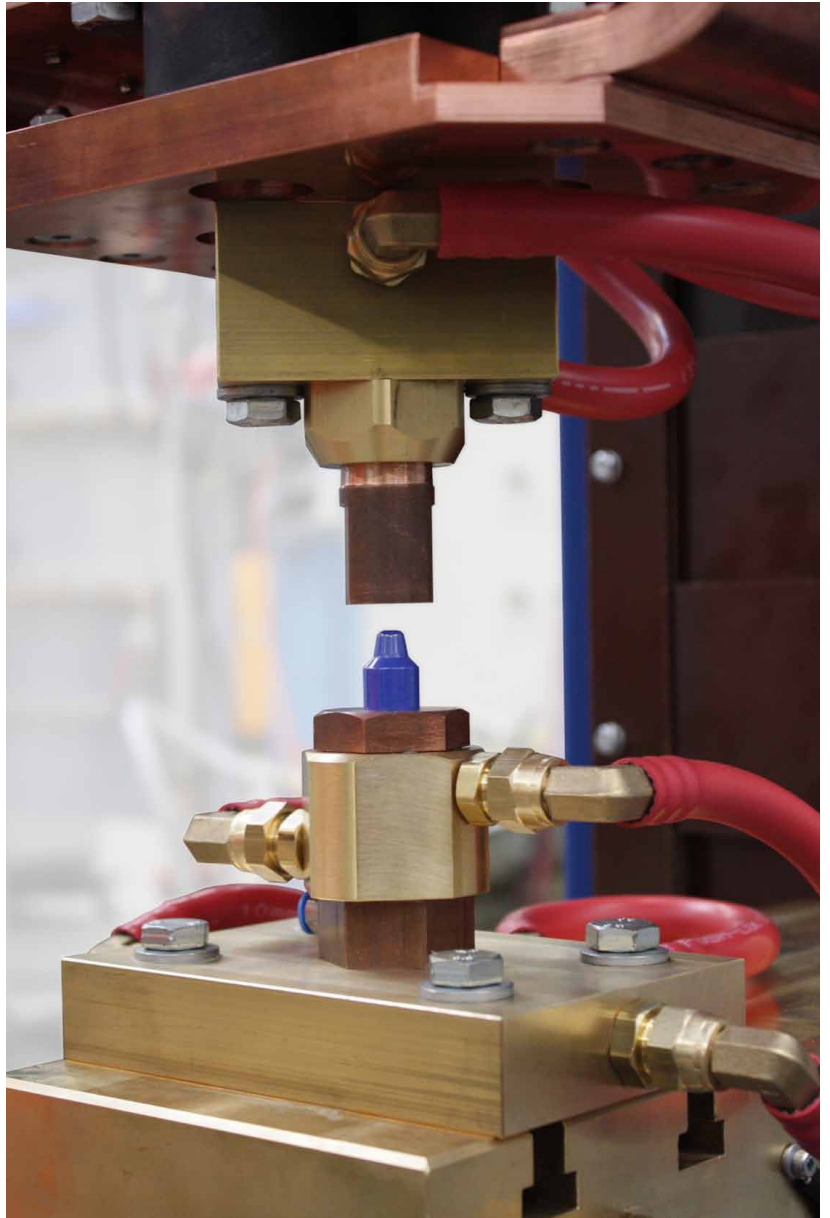


Nut welding electrode, complete
constitig of

- centering pin (pneumatic or mechanical cushioning)
- alternating electrode
- basic electrode (cone seat, screw thread or cylindrical shaft)

The nut welding electrodes are available in many various versions.

In case of need, we need information about the thread size, the diameter of the perforated plate and execution of the centring pin.



**EXPAMPLES OF USE
FOR WELDING OF WELDING NUTS**

Quality 1a

•	■	▬	◼
10,0	15,0		12,0
12,0	20,0		14,0
12,5	30,0		17,0
14,0			27,0
18,0			
19,0			
20,0			
22,0			
25,0			
30,0			

Quality 2a

•	■	▬	◼
40,0	35,0	25x12	
50,0	40,0	30x15	
60,0	50,0	30x20	
	60,0	30x25	
	100,0	35x20	
		40x10	
		40x20	
		40x30	
		40x35	
		45x20	
		50x20	
		50x30	
		60x15	
		60x20	
		60x25	
		60x30	
		60x40	
		80x25	
		80x40	
		90x40	
		100x20	

Quality 5a

•	■	▬	◼
10,0	20,0	20x10	
12,5	60,0	30x10	
14,0	70,0	30x25	
18,0		40x25	
25,0		50x25	
30,0		60x30	
		60x50	
		100x15	

QUALITY INDICATIONS

Bar pulled

in round and square bars (in length of 2 - 3 m)

- alloy: copper-chromium-zircon
- hardness HB at 20°C: 164 - 180
- softening point: 400 - 500° C
- conductivity at 20° C: 50 - 52
- tensile strength: 450 - 550 N / mm²

- alloy: copper-chromium-zircon
- hardness HB at 20°C: 140 - 160
- softening point: 400 - 450° C
- conductivity at 20° C: 50 - 52
- tensile strength: 450-550 N / mm²

- alloy: copper-cobalt-beryllium
- hardness HB at 20°C: 220 - 270
- softening point: 400 - 450° C
- conductivity at 20° C: 26-32
- tensile strength: 700 - 850 N / mm²

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