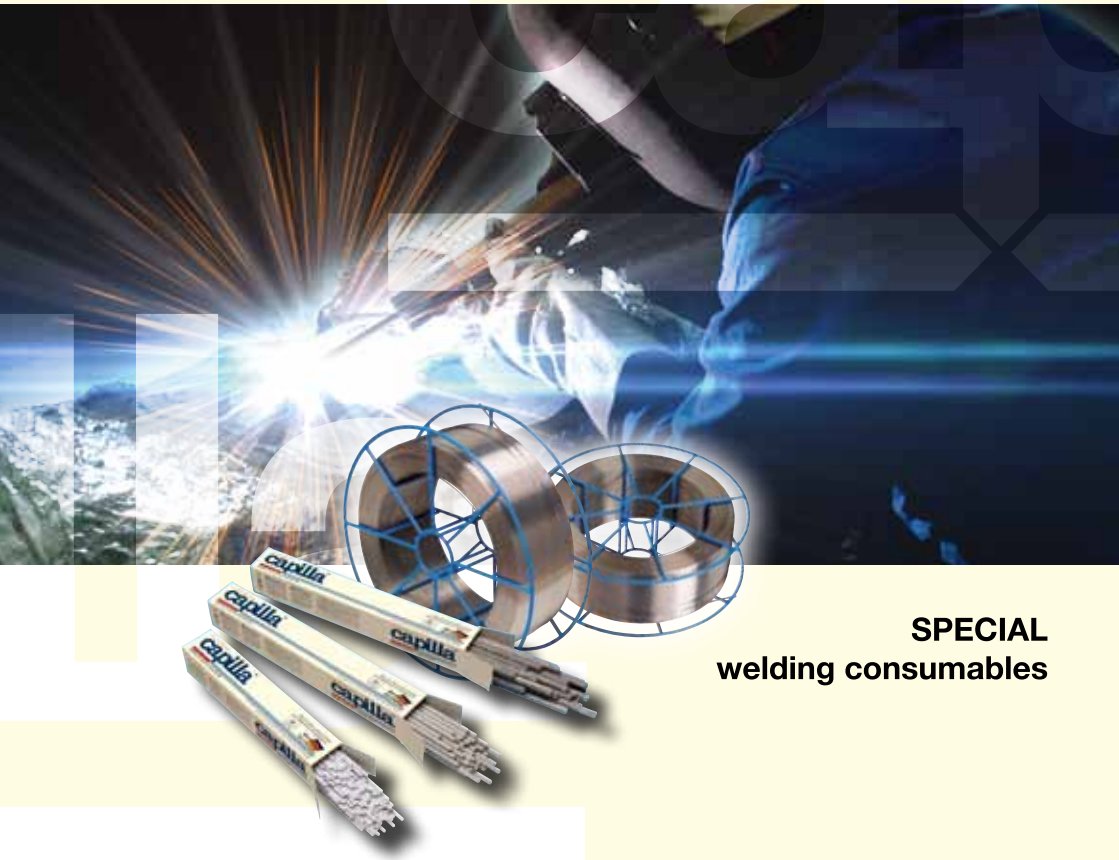
capilla®

Catalogue



SPECIAL
welding consumables

More than half a century of professional competence in welding

Capilla® special welding consumables

„Made in Germany“

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This catalogue replaces all previous issues.

Given information about properties and use of our products are informative only. Values of mechanical properties refer to pure weld metal acc. actual international standards.
In practice the properties of the weld metal are influenced by a lot of constraints such as the kind of base material, the welding technique, the welding parameters and the heat input. Therefore real determined values can deviate elementary from the values mentioned in this catalogue.

It is up to the user of our products to make sure the product he choses is appropriate for the intended application.

Technical modifications and advancements are subject to change without prior notice.

Issue: 09.2017

capilla® – the best connection

In more than half a century on the market, we have been able to steadily increase our presence through our welding expertise and the understanding of the complex tasks of our partners. Numerous enthusiastic partners around the world already use the **capilla®**-know-how in development, production and use of a wide range of welding consumables. They also benefit from the central element of our corporate philosophy: the consistent implementation of absolute customer proximity. Our customer-oriented approach expresses itself daily, thanks in particular to the professional technical advice, qualified service of the **capilla®**-competence team and an economically balanced price / performance ratio.

In the current catalogue, you will find an overview of coated electrodes, MIG / MAG wire electrodes, TIG welding rods, flux-cored electrodes for open-arc and shielding gas processes, as well as solders. Innovations and improvements to **capilla®**- products, which have already been used with great success, have been introduced compared to the older editions of our catalogue.

If you do not find the welding filler you need, please contact your local application support or the well-trained in-house staff at **capilla®**. Recipes for many already successfully used qualities - whose listing in this catalogue would be too extensive - are also available in our range.

The shortest reaction times of the **capilla®**-team in the case of technical problem solutions guarantee you high process and planning reliability in your welding applications. The fastest delivery of our welding consumables in exceptionally moderately designed minimum order quantities also ensures tremendous flexibility in your own stockholding.

capilla®'s production and delivery program is constantly being further developed on the basis of close cooperation with globally active partners in research, development and practice. Experienced **capilla®**-application consultants usually solve specific requirements directly on the spot.

The **capilla®**-R & D team also gladly develops tailor-made new welding additives for your special requirements. We see challenging welding problems and their solution as our daily main task.

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TÜV NORD

CERTIFICATE

Management system as per
DIN EN ISO 9001 : 2008

Capilla Schweißmaterialien GmbH
Westring 48 - 50
33818 Leopoldshöhe
Germany

capilla®
Internationale Schweißkompetenz
Made in Germany

applies a management system in line with the above standard for the following scope

Development, Manufacture and Sale of Welding Consumables

Certificate Registration No. 04 100 960464
Audit Report No. 3514 8136

Valid from 2015-02-20
Valid until 2018-02-19
Initial certification 1996

Certification Body
at TÜV NORD CERT GmbH

Essen, 2015-02-05

This certification was conducted in accordance with the TÜV NORD CERT auditing and certification procedures and is subject to regular surveillance audits.

TÜV NORD CERT GmbH Langemarckstraße 20 45141 Essen www.tuev-nord-cert.com

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Deutsche Akkreditierungsstelle
D-ZM-12007-01-01

1 Welding consumables for welding of structural and constructional steels

1.1 Coated stick electrodes for welding of structural and constructional steels

capilla®	DIN EN ISO 2560-A DIN EN ISO 3580-A*	(EN 499) (EN 1599)*	AWS A 5.1 AWS A 5.5*	Page
30 S	E 42 0 RC 11	E 42 0 RC 11	E 6013	**9**
30 W	E 38 2 RB 12	E 38 2 RB 12	E 6013	**10**
30-170	E 42 0 RR 53	E 42 0 RR 53	E 7024-1	**11**
49	E 42 0 RR 12	E 42 0 RR 12	E 6013	**12**
49 KBS	E 42 4 B 12 H10	E 42 4 B 12 H10	E 7016	**13**
KB Mo	E Mo B 22*	E Mo B 22*	E 7018-A1*	**14**
CrMo B	E Cr Mo 1 B 42*	E Cr Mo 1 B 42*	E 8018-B2*	**15**
CrMo 1Ti	E Cr Mo 1 R 42*	E Cr Mo 1 R 42*	~E 8018-B2*	**16**
CrMo 2 B	E Cr Mo 2 B 42*	E Cr Mo 2 B 42*	~E 9018-B3*	**17**
CrMoV 3	EZ CrMo 3 V B 42*	E CrMo 3 V B 42*	-	**18**
CrMo 5 B	E CrMo 5 B 42*	E CrMo 5 B 42*	E 8015-B6*	**19**

1.2 Wire electrodes for welding of structural and constructional steels

1.2.1 Solid wires for gas shielded arc welding of structural and constructional steels

capilla®	EN ISO 14341-A EN ISO 21952-A* EN ISO 16834-A**	AWS A5.18 AWS A5.28*	Page
30 MAG	G3Si1	ER 70S-6	**20**
49 MAG	G4Si1	ER 70S-6	**20**
SG Mo MAG	G Mo Si*	ER 80S-6	**20**
SG CrMo 1 MAG	G CrMo 1 Si*	ER 80S-6	**20**
SG CrMo 2 MAG	G CrMo 2 Si*	ER 90S-6	**20**
SG CrMo 5 MAG	G CrMo 5 Si*	-	**20**
SG Ni Mo MAG	-	ER90S-G*	**20**
SG NiMoCr MAG	-	ER100S-G*	**20**
690 F MAG	G 69 6 M Mn4Ni1,5CrMo **		**20**

1.2.2 Welding rods for tungsten inert gas welding of structural and constructional steels

capilla®	EN ISO 636-A EN ISO 21952-A*	AWS A5.18 AWS A5.28*	Page
30 WIG	W 42 5 W3Si1	ER 70S-6	**21**
49 WIG	W 46 4 W4Si1	ER 70S-6	**21**
SG Mo WIG	W Mo Si*	ER 80S-6	**21**
SG Ni Mo WIG	-	ER 90S-G*	**21**
SG CrMo 1 WIG	W CrMo 1 Si*	ER 80S-6	**21**
SG CrMo 2 WIG	W CrMo 2 Si*	ER 90S-6	**21**
SG CrMo 5 WIG	W CrMo 5 Si*	-	**21**
SG NiMoCr WIG	-	ER 100S-G*	**21**
690 F WIG	W 69 6 M Mn4Ni1,5CrMo **	-	**21**

1.2.3 Tubular wires for gas shielded arc welding of structural and constructional steels

capilla®	EN ISO 17632-A	AWS A5.20	Page
30 K RLD	T 38 Z W 3	E 70T-4	**21**
G 460 MM	T 46 2 MM 2	E 71T-6M	**21**
G 460 BM	T 46 6 BM 1	E 71T-5M	**21**
G 460 PM	T 46 4 PM 1	E 71T-1M	**21**
G 690 BM	T 69 5 Mn2NiCrMo BM 3	E 110T5-K4	**21**

Standards:		**capilla® 30 S**
DIN EN ISO 2560-A:	E 42 0 RC 11	
(EN 499):	E 42 0 RC 11	
AWS SFA-5.1:	E 6013	
Approvals:	**TUV, DB**	

Product description:

Medium-thick rutile-cellulose coated stick electrode for assembly and maintenance welding in all positions, especially suitable for vertical down welding. Good bridging over of gaps. Using recommended welding parameters leads to self-removing slag.

Applications:

Fusion welding of general purpose constructional steel, boiler plates, pipe steel, ship structural steel, high tensile steel and cast steel such as:

S 185 - S 355 JOC,
P 235 GH, P 265 GH, P 295 GH,
P 210 N - P 360 N,
S 255 NH - S 355 NH,
P 255 NH - P 355 NH,
GS 38 - GS 52.

Typical weld metal composition:

[wt. - %]

	C	Mn	Si	Fe
Min.				
Max.	**0,08**	**0,5**	**0,3**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Tensile strength R_m:	510	[MPa]
Yield strength $R_{p0,2}$:	380	[MPa]
Yield strength $R_{p1,0}$:	-	[MPa]
Elongation (L=5d):	20	[%]
Impact strength (ISO-V):	50	[J]

Positions: all

Redrying: -

Dimension:

Ø [mm]	Length [mm]	Welding current [A]	**Polarity**
2,0	250	50 – 60	=(-)~
2,5	350	60 – 85	
3,25	350	90 – 130	
4,0	350	140 – 180	
5,0	350	180 – 240	

also available:
find in table of content

Capilla 30 MAG
Capilla 30 WIG
Capilla 30 K RLD (tubular wire)

Standards:

DIN EN ISO 2560-A: E 38 2 RB 12
(EN 499): E 38 2 RB 12
AWS SFA-5.1: E 6013

capilla® 30 W

Product description:

Rutile-basic coated stick electrode especially suitable for welding of pipe roots as well as in pipeline and boiler construction in constrained position. Due to the low Si-content of the weld metal the weld seams can be galvanised without any problems.

Applications:

Fusion welding of general purpose constructional steel, boiler plates, pipe steel, ship structural steel, high tensile steel and cast steel such as:

S 185 - S 355 JOC,
P 235 GH, P 265 GH, P 295 GH,
P 210 N - P 360 N,
S 255 NH - S 355 NH,
P 255 NH - P 355 NH,
GS 38 - GS 52

Typical weld metal composition:

[wt. - %]

	C	Mn	Si	Fe
Min.				
Max.	**0,08**	**0,5**	**0,3**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Tensile strength R_m:	520	[MPa]
Yield strength $R_{p0,2}$:	400	[MPa]
Yield strength $R_{p1,0}$:	-	[MPa]
Elongation (L=5d):	20	[%]
Impact strength (ISO-V):	80	[J]

Positions: all

Redrying: -

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,5	300	60 – 85
3,25	350	90 – 130
4,0	350	140 – 180
5,0	450	180 – 240

Polarity =(-)~

also available:
find in table of content

Capilla 30 MAG
Capilla 30 WIG
Capilla 30 K RLD (tubular wire)

Standards:

EN ISO 2560-A:	E 42 0 RR 53
(EN 499):	E 42 0 RR 53
(DIN 1913):	E 51 22 RR 11 160
AWS A 5.1:	E 7024-1
Recovery:	**165%**

capilla® 30-170

Product description:

Rutile coated stick electrode with very high recovery. The high deposition rate of this consumable grant economical welding of fillets. Concave shape of fillet welds. Good bridging over of gaps. The slag is easy to remove.

Applications:

Fusion welding of general purpose constructional steel, boiler plates, pipe steel, ship structural steel, high tensile steel and cast steel such as:

S 185 - S 355 JOC,
P 235 GH, P 265 GH, P 295 GH,
P 210 N - P 360 N,
S 255 NH - S 355 NH,
P 255 NH - P 355 NH,
GS 38 - GS 52.

Typical weld metal composition:

[wt. - %]

	C	Mn	Si	Fe
Min.				
Max.	**0,08**	**0,6**	**0,3**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Tensile strength R_m:	520	[MPa]
Yield strength $R_{p0,2}$:	420	[MPa]
Yield strength $R_{p1,0}$:	-	[MPa]
Elongation (L=5d):	22	[%]
Impact strength (ISO-V):	80	[J]

Positions: PA, PB, PC

Redrying: -

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
3,25	350	90 – 130
4,0	350	140 – 180
5,0	450	180 – 240

Polarity =(-)~

also available:
find in table of content

Capilla 30 MAG
Capilla 30 WIG
Capilla 30 K RLD (tubular wire)

Standards:

EN ISO 2560-A: E 42 0 RR 12
(EN 499): E 42 0 RR 12
AWS A 5.1: E 6013

Approvals: **TÜV, DB**

capilla® 49

Product description:

Thick rutile coated stick electrode usable in all position (except vertical down). Weld deposit is very smooth and slag is self-removing.

Applications:

For fusion welding of structural steels such as:

S 185 - S 355 JOC,
P 235 GH, P 265 GH, P 295 GH,
P 210 N - P 360 N,
P 255 NH - P 355 NH,
S 255 NH - S 355 NH,
GS 38 - GS 52.

Typical weld metal composition:

[wt. - %]

	C	Mn	Si	Fe
Min.				
Max.	**0,08**	**0,6**	**0,45**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Tensile strength R_m:	510	[MPa]
Yield strength $R_{p0,2}$:	420	[MPa]
Yield strength $R_{p1,0}$:	-	[MPa]
Elongation (L=5d):	20	[%]
Impact strength (ISO-V):	60	[J]

Positions: All except PG

Redrying: -

Dimension:

Ø [mm]	Length [mm]	Welding current [A]	**Polarity**
2,0	250	50 – 75	=(-)~
2,5	350	70 – 105	
3,25	350/450	100 – 140	
4,0	350/450	140 – 180	
5,0	450	180 – 260	

also available:
find in table of content

Capilla 49 MAG
Capilla 49 WIG
Capilla G 460 MM (tubular wire)
Capilla G 460 PM (tubular wire)
Capilla G 460 RM (tubular wire)
Capilla G 460 BM (tubular wire)

Standards:

EN ISO 2560-A:	E 42 4 B 12 H10
(EN 499):	E 42 4 B 12 H10
AWS A 5.1:	E 7016
Approvals:	**TÜV, DB**

capilla® 49 KBS

Product description:

Special (double coated) stick electrode suitable especially for crack-free welding at service temperatures in the range of -40°C up to 450°C in all positions; suitable as well on AC.

Applications:

For fusion welding of C- and C-Mn-steels such as:

S 185 - S 355 JOC,
P 235 GH, P 265 GH, P 295 GH,
P 120 N - P 360 N,
P 255 NH - P 355 NH,
GS 38 - GS 52.

Typical weld metal compositon:

[wt. - %]

	C	Mn	Si	Fe
Min.				
Max.	**0,06**	**0,9**	**0,7**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Tensile strength R_m:	550	[MPa]
Yield strength $R_{p0,2}$:	440	[MPa]
Yield strength $R_{p1,0}$:	-	[MPa]
Elongation (L=5d):	20	[%]
Impact strength (ISO-V):	80 50 (-30°C)	[J] [J]

Positions: all except PG

Redrying: 250 - 350°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,0	300	50 – 70
2,5	350	70 – 90
3,25	350/450	115 – 135
4,0	450	150 – 175
5,0	450	190 – 240

Polarity =(+)~

also available:
find in table of content

Capilla 49 MAG
Capilla 49 WIG
Capilla G 460 BM (tubular wire)
Capilla G 460 MM (tubular wire)
Capilla G 460 PM (tubular wire)
Capilla G 460 RM (tubular wire)

Standards:

EN ISO 3580-A:	E Mo B 22
(EN 1599):	E Mo B 22
AWS A 5.5:	E 7018-A1
Mat.-No.:	1.5424

capilla® KB Mo

Product description:

Basic coated stick electrode suitable for welding of boiler and tube steels. Mo-alloyed weld metal for service temperatures up to 550°C.

Applications:

For fusion welding of steel grades as follows:

16 Mo 3, GS-22 Mo4,
17 Mn 4, 19 Mn 6, GS-C 25.

Typical weld metal compositon:

[wt. - %]

	C	Mn	Si	Mo	Fe
Min.					
Max.	**0,06**	**0,9**	**0,7**	**0,5**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Tensile strength R_m:	560	[MPa]
Yield strength $R_{p0,2}$:	480	[MPa]
Yield strength $R_{p1,0}$:	-	[MPa]
Elongation (L=5d):	20	[%]
Impact strength (ISO-V):	100	[J]

Positions: all except PG

Redrying: 300°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]	Polarity
2,0	300	50 – 70	=(+)
2,5	350	70 – 90	
3,25	350/450	115 – 135	
4,0	450	150 – 175	
5,0	450	190 – 240	

also available:
find in table of content

Capilla SG Mo MAG
Capilla SG Mo WIG

Standards:

EN ISO 3580-A:	E Cr Mo 1 B 42
(EN 1599):	E Cr Mo 1 B 42
AWS A 5.5:	~E 8018-B 2
Mat.-No.:	1.7339

capilla® CrMo B

Product description:

Basic coated stick electrode suitable for fusion welding of boiler and tube steels as well as similar CrMo-alloyed, hydrogen pressure resistant steels at service temperatures up to 550°C.
Additionally suitable for fusion and overlay welding of similar alloyed hardened and tempered steels.

Applications:

For fusion welding of steel grades as follows:

13 CrMo 4 4, GS-17 CrMo 5 5,
16 CrMo 4 4, 25 CrMo 4,
GS-25 CrMo 4, 22 CrMo 4 4,
GS-22 CrMo 5 4, 42 CrMo 4

Typical weld metal composition:

[wt. - %]

	C	Mn	Si	Cr	Mo	Fe
Min.						
Max.	**0,07**	**0,9**	**0,6**	**1,0**	**0,5**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Tensile strength R_m:	580	[MPa]
Yield strength $R_{p0,2}$:	490	[MPa]
Yield strength $R_{p1,0}$:	-	[MPa]
Elongation (L=5d):	22	[%]
Impact strength (ISO-V):	100	[J]

Positions: all except PG

Redrying: 300°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,0	300	50 – 70
2,5	350	70 – 90
3,25	350/450	115 – 135
4,0	450	150 – 175
5,0	450	190 – 240

Polarity =(+)

also available:
find in table of content

Capilla CrMo 1 Ti
Capilla SG CrMo 1 MAG
Capilla SG CrMo 1 WIG

Standards:

EN ISO 3580-A:	E Cr Mo 1 R 42
(EN 1599):	E Cr Mo 1 R 42
AWS A 5.5:	~E 8018-B 2
Mat.-No.:	1.7339

capilla® CrMo 1 Ti

Product description:

Rutile coated stick electrode suitable for fusion welding of boiler and tube steels as well as similar CrMo-alloyed, hydrogen pressure resistant steels at service temperatures up to 550°C.
Additionally suitable for fusion and overlay welding of similar alloyed hardened and tempered steels.

Applications:

For fusion welding of steel grades as follows:

13 CrMo 4 4, GS-17 CrMo 5 5,
16 CrMo 4 4, 25 CrMo 4,
GS-25 CrMo 4, 22 CrMo 4 4,
GS-22 CrMo 5 4, 42 CrMo 4

Typical weld metal composition:

[wt. - %]

	C	Mn	Si	Cr	Mo	Fe
Min.						
Max.	**0,08**	**0,9**	**0,6**	**1,1**	**0,5**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Tensile strength R_m:	580	[MPa]
Yield strength $R_{p0,2}$:	490	[MPa]
Yield strength $R_{p1,0}$:	-	[MPa]
Elongation (L=5d):	20	[%]
Impact strength (ISO-V):	80	[J]

Positions: all except PG

Redrying: 300°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,0	300	50 – 70
2,5	350	70 – 90
3,25	350/450	115 – 135
4,0	450	150 – 175
5,0	450	190 – 240

Polarity =(+)~

also available:
find in table of content

Capilla CrMo B
Capilla SG CrMo 1 MAG
Capilla SG CrMo 1 WIG

Standards:

EN ISO 3580-A:	E Cr Mo 2 B 42
(EN 1599):	E Cr Mo 2 B 42
AWS A 5.5:	~E 9018-B 3
Mat.-No.:	1.7384

capilla® CrMo 2 B

Product description:

Basic coated stick electrode suitable for fusion welding of boiler and tube steels as well as similar CrMo-alloyed, hydrogen pressure resistant steels at service temperatures up to 550°C.
Additionally suitable for fusion and overlay welding of similar alloyed hardened and tempered steels.

Applications:

For fusion welding of steel grades as follows:

Boiler steels: 10 CrMo 9-10,
11 CrMo 9-10.
Steel casts: GS 17 CrMo 9-10.

Typical weld metal composition:

[wt. - %]

	C	Mn	Si	Cr	Mo	Fe
Min.						
Max.	**0,08**	**0,9**	**0,3**	**2,2**	**1,0**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Tensile strength R_m:	550	[MPa]
Yield strength $R_{p0,2}$:	440	[MPa]
Yield strength $R_{p1,0}$:	-	[MPa]
Elongation (L=5d):	20	[%]
Impact strength (ISO-V):	100	[J]

Positions: all except PG

Redrying: 300°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,0	300	50 – 70
2,5	350	70 – 90
3,25	350/450	115 – 135
4,0	450	150 – 175
5,0	450	190 – 240

Polarity =(+)~

also available:
find in table of content

Capilla SG CrMo 2 MAG
Capilla SG CrMo 2 WIG

Standards:

EN ISO 2380-A: EZ CrMo 3 V B 42
(EN 1599): E CrMo 3 V B 42

capilla® CrMoV 3

Product description:

CrMoV-alloyed basic coated stick electrode suitable for welding of similar alloyed steel grades.

Applications:

Welding of heat resistant and high-pressure hydrogen resistant steels used in boilers, vessels and tubings.

Welding of CrMoV-alloyed steels used for oil processing applications.

Typical weld metal composition:

[wt. - %]

	C	Mn	Si	Cr	Mo	V	Fe
Min.		**0,5**	**0,3**	**2,8**	**0,8**	**0,2**	
Max.	**0,09**	**0,6**	**0,5**	**3,5**	**1,1**	**0,3**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Tensile strength R_m:	510	[MPa]
Yield strength $R_{p0,2}$:	420	[MPa]
Yield strength $R_{p1,0}$:	-	[MPa]
Elongation (L=5d):	20	[%]
Impact strength (ISO-V):	60	[J]

Positions: all

Redrying: 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,5	350	70 – 90
3,25	350/450	115 – 135
4,0	350/450	150 – 175
5,0	450	190 – 240

Polarity =(+)

Standards:

EN ISO 3580-A:	E CrMo 5 B 2 2
(EN 1599):	E CrMo 5 B 4 2
AWS A5.5:	E 8015-B6

capilla® CrMo 5 B

Product description:

CrMo-alloyed basic coated stick electrode suitable for welding of similar alloyed steel grades.

Applications:

Welding of heat resistant and high-pressure hydrogen resistant steels used in boilers, vessels and tubings.

Base material: 12 CrMo 19-5.

Typical weld metal composition:

[wt. - %]

	C	Mn	Si	Cr	Mo	Fe
Min.		**0,5**	**0,5**	**5,5**	**0,6**	
Max.	**0,08**	**0,6**	**0,7**	**6,5**	**0,7**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Tensile strength R_m:	620	[MPa]
Yield strength $R_{p0,2}$:	490	[MPa]
Yield strength $R_{p1,0}$:	-	[MPa]
Elongation (L=5d):	19	[%]
Impact strength (ISO-V):	70	[J]

Positions: all except PG

Redrying: 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,5	350	70 – 90
3,25	350	115 – 135
4,0	350/450	150 – 175
5,0	450	180 – 240

Polarity =(+)~

also available:
find in table of content

SG CrMo 5 MAG
SG CrMo 5 WIG

1.2 Wire electrodes for welding of structural and constructional steels

1.2.1 solid wires for gas shielded arc welding of structural and constructional steels

Designation	Standard/ Mat.-No.:	Weld Metal Analysis [Wt.%]							Properties				
capilla®	**EN ISO 14341-A EN ISO 21952-A* AWS A5.28** EN ISO 16834-A*** **	**C**	**Mn**	**Si**	**Cr**	**Ni**	**Mo**	**Fe**	**Ro0,2 [MPa]**	**Rm [MPa]**	**L=5d [%]**	**KV (ISO-V) [J]**	**SG**
30 MAG	G 3Si1	0,08	1,5	0,8	-	-	-	Bal.	420	560	25	50 (-50°C)	M21
49 MAG	G 4Si1	0,08	1,8	1	-	-	-	Bal.	460	620	25	50(-50°C)	M21
SG Mo MAG	G Mo Si*	1	1,1	0,6			0,5	Bal.	480	570	22	110	M21
SG CrMo 1 MAG	G CrMo 1 Si*	0,1	1,1	0,6	1	-	0,2	Bal.	510	640	22	95	M21
SG CrMo 2 MAG	G CrMo 2 Si*	0,06	1,1	0,6	2,4	-	1	Bal.	450	600	20	80	M21
SG CrMo 5 MAG	G CrMo 5 Si*	0,08	0,55	0,35	6	-	0,65	Bal.	450	550	18	100	M12
SG NiMo MAG	ER 90S-G**	0,1	1,6	0,5	-	1,3	0,3	Bal.	620	700	18	100	M21
SG NiMoCr MAG	ER 100S-G**	0,08	1,7	0,6	0,2	1,5	0,5	Bal.	720	780	16	100	M21
690 F MAG	G 69 6 M Mn4Ni1,5CrMo***	0,1	1,5	0,5	0,2	1,2	0,4	Bal.	700	770	15	100	M21

Min. values at AT / no heat treatment; shielding gas (SG) acc. EN ISO 14175
Dimensions: Ø 1,0; 1,2; 1,6 [mm]; Spools: K 300; other dimensions and packing units on demand

1.2.2 Welding rods for tungsten inert gas welding of structural and constructional steels

Designation	Standard	Weld Metal Analysis [Wt.%]							Properties				
capilla®	**EN ISO 636-A EN ISO 21952-A* AWS A5.28** EN ISO 16834-A*** **	**C**	**Mn**	**Si**	**Cr**	**Ni**	**Mo**	**Fe**	**Ro0,2 [MPa]**	**Rm [MPa]**	**L=5d [%]**	**KV (ISO-V) [J]**	**SG**
30 WIG	W3Si1	0,08	1,5	0,8	-	-	-	Bal.	420	560	25	50 (-50°C)	I1
49 WIG	W 4Si1	0,08	1,8	1	-	-	-	Bal.	460	620	25	50(-50°C)	I1
SG Mo WIG	W Mo Si*	1	1,1	0,6			0,5	Bal.	480	570	22	110	I1
SG CrMo 1 WIG	W CrMo 1 Si*	0,1	1,1	0,6	1	-	0,2	Bal.	510	640	22	95	I1
SG CrMo 2 WIG	W CrMo 2 Si*	0,06	1,1	0,6	2,4	-	1	Bal.	450	600	20	80	I1
SG CrMo 5 WIG	W CrMo 5 Si*	0,08	0,55	0,35	6	-	0,65	Bal.	450	550	18	100	I1
SG NiMo WIG	ER 90S-G**	0,1	1,6	0,5	-	1,3	0,3	Bal.	620	700	18	100	I1
SG NiMoCr WIG	ER 100S-G**	0,08	1,7	0,6	0,2	1,5	0,5	Bal.	720	780	16	100	I1
690 F WIG	G 69 6 M Mn4Ni1,5CrMo***	0,1	1,5	0,5	0,2	1,2	0,4	Bal.	700	770	15	100	I1

Minimum values at AT / no heat treatment; shielding gas (SG) acc. EN ISO 14175
Dimensions: Ø 1,0; 1,6; 2,0; 2,4 [mm]; Length: 1000 [mm]; other dimensions on demand

1.2.3 Tubular wires for gas shielded arc welding of structural and constructional steels

Designation	Standard	Weld Metal Analysis [Wt.%]							Properties				
capilla®	**EN ISO 17632-A**	**C**	**Mn**	**Si**	**Cr**	**Ni**	**Al**	**Fe**	**$R_{o0,2}$ [MPa]**	**R_m [MPa]**	**L=5d [%]**	**KV (ISO-V) [J]**	**SG**
30 K RLD	T 38 Z W3	0,04	1,2	0,4	-	-	1,4	Bal.	380	520	20	-	OA
G 460 MM	T 46 4 MM 2	0,06	1,3	0,6	-	-	-	Bal.	460	550	24	80	M21
G 460 PM	T 46 4 PM 1	0,06	1,5	0,5	-	-	-	Bal.	460	560	24	140	M21
G 460 BM	T 46 4 BM 3	0,06	1,4	0,45	-	-	-	Bal.	460	560	24	150	M21
G 690 BM	T 69 5 Mn2NiCrMoBM	0,05	1,4	0,3	0,5	2,4	-	Bal.	840	900	20	140	M21

Minimum values at AT / no heat treatment; shielding gas (SG) acc. EN ISO 14175; OA (open-arc) = self shielding tubular wire
Dimensions: Ø 1,2; 1,6 [mm]; Spools: K 300; other dimensions and packing units on demand

2 Welding consumables for welding of stainless steels

2.1 Coated stick electrodes for welding of stainless steels

capilla®	EN ISO 3581-A:	Mat.-No.:	AWS:	Page
308 L	E 19 9 LR 12	1.4316	E 308 L-16	**25**
308 LR	E 19 9 LR 12	1.4316	E 308 L-17	**26**
308 KB	E 19 9 LB 12	1.4316	E 308 L-15	**27**
347	E 19 9 Nb R 12	1.4551	E 347-16	**28**
347 LR	E 19 9 Nb R 12	1.4551	E 347-17	**29**
316 L	E 19 12 3 LR 12	1.4430	E 316 L-16	**30**
316 LR	E 19 12 3 LR 12	1.4430	E 316 L-17	**31**
316 KB	E 19 12 3 LB 12	1.4430	E 316 L-15	**32**
316 LF	E 16 12 3 LR 12	1.4430	E 316 L-16	**33**
317-17	E 18 16 5 LR 32	1.4440	~E 317 L-17	**34**
318	E 19 12 3 Nb R 12	1.4576	E 318-16	**35**
318 LR	E 19 12 3 Nb R 12	1.4576	E 318-17	**36**
2209	E 22 9 3 LR 32	1.4462	E 2209 L-26	**37**
4460 Cu	EZ 25 9 3 CuWN LR 32	~1.4501	~E 25 5 3 L-26	**38**
4460 Cu B	E 25 9 4 LB 32	~1.4501	~E 25 5 3 L-26	**39**
4507	E 25 9 3 CuN LR 32	1.4507	-	**40**
309 L	E 23 12 LR 32	~1.4332	~E 309 L-26	**41**
309 LR	E 23 12 LR 32	~1.4332	~E 309 L-27	**42**
309 L KB	E 23 12 LB 32	1.4332	E 309 L-15	**43**
309 Mo	E 23 12 2 LR 32	1.4459	E 309 Mo-26	**44**
51 Ti	E 18 8 Mn R 12	1.4370	~E 307-16	**45**
51 KBN	E 18 8 Mn B 32	1.4370	E 307-15	**46**
4370 Ti	E 18 8 Mn R 12	1.4370	~E 307-17	**47**
51 Mo	E 18 8 MnMo R 12	~1.4370	~E 307-16	**48**
52 K	E 29 9 R 12	1.4337	E 312-16	**49**
52 K Mo	EZ 29 9 3 R 32	-	-	**50**
310	E 25 20 R 12	~ 1.4842	E 310-16	**51**
310 KB	E 25 20 B 12	1.4842	E 310-15	**52**
310 Mo	E 25 20 3 R 12	1.4466	E 310 Mo-16	**53**
4455	EZ 20 16 3 Mn 3 LR 32	1.4455	--	**54**
385	E 20 25 5 Cu L R 32	~1.4539	E 385 L-26	**55**

2.2 Wire electrodes for welding of stainless steels

2.2.1 Solid wires for gas shielded arc welding of stainless steels

capilla®	DIN EN ISO 14343-A:	Mat.-No.:	AWS:	Page
308 L MAG	G 19 9 L Si	1.4316	ER 308 L Si	**56**
347 MAG	G 19 9 Nb Si	1.4551	ER 347 Si	**56**
316 L MAG	G 19 12 3 L Si	1.4430	ER 316 L Si	**56**
318 MAG	G 19 12 3 Nb Si	1.4576	ER 318 Si	**56**
2209 MAG	G 22 9 3 L Si	1.4462	ER 2209 L	**56**
4460 Cu MAG	G 25 9 3 N L Si	~1.4501	ER 2594	**56**
309 L MAG	G 23 12 L Si	1.4332	ER 309 L	**56**
51 MAG	G 18 8 Mn	1.4370	ER 307	**56**
52 MAG	G 29 9	1.4337	~ER 312	**56**
317 MAG	G 18 16 5 L	1.4440	ER 317 L	**56**
310 MAG	G 25 20 Si	1.4842	ER 310	**56**
385 MAG	G 20 25 5 Cu	1.4539	ER 385 L	**56**

2.2.2 Welding rods for tungsten inert gas welding of stainless steels

capilla®	DIN EN ISO 14343-A:	Mat.-No.:	AWS:	Page
308 L WIG	W 19 9 L Si	1.4316	ER 308 L Si	**57**
347 WIG	W 19 9 Nb Si	1.4551	ER 347 Si	**57**
316 L WIG	W 19 12 3 L Si	1.4430	ER 316 L Si	**57**
318 WIG	W 19 12 3 Nb Si	1.4576	ER 318 Si	**57**
2209 WIG	W 22 9 3 L	1.4462	ER 2209 L	**57**
4460 Cu WIG	W 25 9 4 N L	~1.4501	ER 2594	**57**
309 L WIG	W 23 12 L Si	1.4332	ER 309 L	**57**
51 WIG	W 18 8 Mn	1.4370	ER 307	**57**
52 WIG	W 29 9	1.4337	~ER 312	**57**
317 WIG	W 18 16 5 L	1.4440	ER 317 L	**57**
310 WIG	W 25 20 Si	1.4842	ER 310	**57**
385 WIG	W 20 25 5 Cu	~ 1.4539	ER 385 L	**57**

2.2.3 Tubular wires for gas shielded arc welding of stainless steels

capilla®	EN ISO 17633-A	Mat.-No.:	AWS	Page
G 308 L RM	T 19 9 L RM	1.4316	E 308 LT0-4	**58**
G 316 L RM	T 19 12 3 L RM	1.4430	E 316 LT1-4	**58**
G 347 RM	T 19 9 Nb RM	1.4551	E 347 T1-4	**58**
G 309 L RM	T 23 12 L RM	1.4332	E 309 LT1-4	**58**
G 318 RM	T 19 12 3 Nb RM	1.4576	E 318 T1-4	**58**
G 2209 RM	T 22 9 3 N L RM	1.4462	E 22 5 3 LT1-4	**58**
G 4507 RM	TZ 25 9 4 CuN L RM	1.4507	~E 2563 LT1-4	**58**
G 51 RM	T 19 9 Mn RM	1.4370	E 307 T1-4	**58**
G 52 RM	T 29 9 RM	1.4337	E 312 T1-4	**58**
G 310 RM	T 25 20 L RM	1.4842	E 310 T1-4	**58**

Standards:

EN ISO 3581-A:	E 19 9 LR 12
EN 1600:	E 19 9 LR 12
AWS A 5.4:	E 308 L-16
Mat.-No.:	1.4316
Approvals:	**TÜV, DB**

capilla® 308 L

Product description:

Rutile-basic coated stick electrode for welding of non-stabilized austenitic stainless Cr-Ni steels with extra low carbon content; suitable for service temperatures of up to 350°C; good low temperature properties down to -196°C.

Applications:

Suitable for materials as:
1.4300, 1.4301, 1.4303, 1.4306, 1.4308, 1.4311, 1.4312, 1.4371, 1.4541, 1.4543, 1.4550, 1.4552.

Typical weld metal composition:

[wt. - %]

	C	Cr	Ni	Fe
Min.		**18**	**9**	
Max.	**0,03**	**20**	**11**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Tensile strength R_m:	550	[MPa]
Yield strength $R_{p0,2}$:	320	[MPa]
Yield strength $R_{p1,0}$:	-	[MPa]
Elongation (L=5d):	35	[%]
Impact strength (ISO-V):	70	[J]

Positions: all except PG

Redrying: 300°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]	Polarity
2,0	300	40 – 60	=(+)~
2,5	300	50 – 90	
3,25	350	80 – 110	
4,0	350	100 – 150	
5,0	450	150 – 200	

also available:
find in table of content

Capilla 308 H
Capilla 308 KB
Capilla 308 LR

Capilla 308 L MAG
Capilla 308 L WIG
Capilla G 308 L RM (tubular wire)

Standards:

EN ISO 3581-A:	E 19 9 LR 12
EN 1600:	E 19 9 LR 12
AWS A 5.4:	E 308 L-17
Mat.-No.:	1.4316
Approvals:	**TÜV**

capilla® 308 LR

Product description:

Rutile coated stick electrode for welding of non-stabilized austenitic stainless Cr-Ni steels with extra low carbon content; suitable for service temperatures of up to 350°C; good low temperature properties down to -78°C.

Applications:

Suitable for materials as:
1.4300, 1.4301, 1.4303, 1.4306, 1.4308, 1.4311, 1.4312, 1.4371, 1.4541, 1.4543, 1.4550, 1.4552.

Typical weld metal composition:

[wt. - %]

	C	Cr	Ni	Fe
Min.		**18**	**9**	
Max.	**0,03**	**20**	**11**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Tensile strength R_m:	550	[MPa]
Yield strength $R_{p0,2}$:	320	[MPa]
Yield strength $R_{p1,0}$:	-	[MPa]
Elongation (L=5d):	35	[%]
Impact strength (ISO-V):	70	[J]

Positions: all except PG

Redrying: 300°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,0	300	40 – 60
2,5	300	50 – 90
3,25	350	80 – 110
4,0	350	100 – 150
5,0	450	150 – 200

Polarity =(+)~

also available:
find in table of content

Capilla 308 H
Capilla 308 KB
Capilla 308 L

Capilla 308 L MAG
Capilla 308 L WIG
Capilla G 308 L RM (tubular wire)

Standards:	
EN ISO 3581-A:	E 19 9 LB 12
EN 1600:	E 19 9 LB 12
AWS A 5.4:	E 308 L-15
Mat.-No.:	1.4316

capilla® 308 KB

Product description:

Basic coated stick electrode for welding of non-stabilized austenitic stainless Cr-Ni steels with extra low carbon content; suitable for service temperatures of up to 350°C; good low temperature properties down to -196°C.

Applications:

Suitable for materials as:
1.4300, 1.4301, 1.4303, 1.4306, 1.4308, 1.4311, 1.4312, 1.4371, 1.4541, 1.4543, 1.4550, 1.4552.

Typical weld metal composition:

[wt. - %]

	C	Cr	Ni	Fe
Min.		**18**	**9**	
Max.	**0,03**	**20**	**11**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Tensile strength R_m:	550	[MPa]
Yield strength $R_{p0,2}$:	320	[MPa]
Yield strength $R_{p1,0}$:	-	[MPa]
Elongation (L=5d):	35	[%]
Impact strength (ISO-V):	70	[J]

Positions: all except PG

Redrying: 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]	**Polarity**
2,0	300	40 – 60	=(+)
2,5	300	50 – 90	
3,25	350	80 – 110	
4,0	350	100 – 150	
5,0	450	150 – 200	

also available:
find in table of content

Capilla 308 H
Capilla 308 HL
Capilla 308 L
Capilla 308 LR

Capilla 308 L MAG
Capilla 308 L WIG
Capilla G 308 L RM (tubular wire)

Standards:

EN ISO 3581-A:	E 19 9 Nb R 12
EN 1600:	E 19 9 Nb R 12
AWS A 5.4:	E 347-16
Mat.-No.:	1.4551
Approvals:	**TÜV, DB**

capilla® 347

Product description:

Rutile-basic coated stick electrode suitable for welding of Nb- and/or Ti-stabilized, austenitic stainless steels. Weld deposit consists of stabilized austenitic CrNi-steel. Service temperatures up to 400°C.

Applications:

Suitable for materials as:
1.4301, 1.4303, 1.4306, 1.4308, 1.4310, 1.4312, 1.4319, 1.4541, 1.4550, 1.4552.

Typical weld metal composition:

[wt. - %]

	C	Cr	Ni	Nb	Fe
Min.		**18**	**9**	**10 x %C**	
Max.	**0,03**	**20**	**11**		**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Tensile strength R_m:	600	[MPa]
Yield strength $R_{p0,2}$:	400	[MPa]
Yield strength $R_{p1,0}$:	-	[MPa]
Elongation (L=5d):	30	[%]
Impact strength (ISO-V):	65	[J]

Positions: all

Redrying:: 300°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,0	300	40 – 60
2,5	300	50 – 90
3,25	350	80 – 110
4,0	350	100 – 150
5,0	450	150 – 200

Polarity =(+)~

also available:
find in table of content

Capilla 347 LR
Capilla 347 MAG

Capilla 347 WIG

Standards:

EN ISO 3581-A:	E 19 9 Nb R 12
(EN 1600):	E 19 9 Nb R 12
AWS A 5.4:	E 347-17
Mat.-No.:	1.4551

capilla® 347 LR

Product description:

Rutile coated stick electrode suitable for welding of Nb- and/or Ti-stabilized, austenitic stainless steels. Weld deposit consists of stabilized austenitic CrNi-steel. Service temperatures up to 400°C.

Applications:

Suitable for materials as:
1.4301, 1.4303, 1.4306, 1.4308, 1.4310, 1.4312, 1.4319, 1.4541, 1.4550, 1.4552.

Typical weld metal composition:

[wt. - %]

	C	Cr	Ni	Nb	Fe
Min.		**18**	**9**	**10 x %C**	
Max.	**0,03**	**20**	**11**		**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Tensile strength R_m:	600	[MPa]
Yield strength $R_{p0,2}$:	400	[MPa]
Yield strength $R_{p1,0}$:	-	[MPa]
Elongation (L=5d):	30	[%]
Impact strength (ISO-V):	65	[J]

Positions: all

Redrying:: 300°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]	Polarity
2,0	300	40 – 60	=(+)~
2,5	300	50 – 90	
3,25	350	80 – 110	
4,0	350	100 – 150	
5,0	450	150 – 200	

also available:
find in table of content

Capilla 347
Capilla 347 MAG
Capilla 347 WIG

Standards:

EN ISO 3581-A:	E 19 12 3 LR 12
EN 1600:	E 19 12 3 LR 12
AWS A 5.4:	E 316 L-16
Mat.-No.:	1.4430
Approvals:	**TÜV, DB**

capilla® 316 L

Product description:

Rutile-basic coated stick electrode for welding of austenitic stainless Cr-Ni-Mo steels with extra low carbon content. Service temperatures up to 400°C.

Applications:

Suitable for materials as:
1.4401, 1.4404, 1.4406, 1.4408, 1.4420, 1.4435, 1.4436, 1.4571, 1.4573, 1.4580, 1.4581, 1.4583.

Typical weld metal composition:

[wt. - %]

	C	Cr	Ni	Mo	Fe
Min.		**18**	**11**	**2,5**	
Max.	**0,03**	**20**	**13**	**3**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Tensile strength R_m:	550	[MPa]
Yield strength $R_{p0,2}$:	320	[MPa]
Yield strength $R_{p1,0}$:	-	[MPa]
Elongation (L=5d):	35	[%]
Impact strength (ISO-V):	70	[J]

Positions: all except PG

Redrying: 300°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]	**Polarity**
2,0	300	40 – 60	=(+)~
2,5	300	60 – 90	
3,25	350	80 – 110	
4,0	350	100 – 150	
5,0	450	150 – 200	

also available:
find in table of content

Capilla 316 H
Capilla 316 KB
Capilla 316 LF
Capilla 316 LR

Capilla 316 L MAG
Capilla 316 L WIG
Capilla G 316 L RM (tubular wire)

Standards:	
EN ISO 3581-A:	E 19 12 3 LR 12
EN 1600:	E 19 12 3 LR 12
AWS A 5.4:	E 316 L-17
Mat.-No.:	1.4430
Approvals:	**TÜV**

capilla® 316 LR

Product description:

Rutile coated stick electrode for welding of austenitic stainless Cr-Ni-Mo steels with extra low carbon content. Service temperatures up to 400°C.

Applications:

Suitable for materials as:
1.4401, 1.4404, 1.4406, 1.4408, 1.4420, 1.4435, 1.4436, 1.4571, 1.4573, 1.4580, 1.4581, 1.4583.

Typical weld metal composition:

[wt. - %]

	C	Cr	Ni	Mo	Fe
Min.		**18**	**11**	**2,5**	
Max.	**0,03**	**20**	**13**	**3**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Tensile strength R_m:	550	[MPa]
Yield strength $R_{p0,2}$:	320	[MPa]
Yield strength $R_{p1,0}$:	-	[MPa]
Elongation (L=5d):	35	[%]
Impact strength (ISO-V):	70	[J]

Positions: all except PG

Redrying: 300°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,0	300	40 – 60
2,5	300	60 – 90
3,25	350	80 – 110
4,0	350	100 – 150
5,0	450	150 – 200

Polarity =(+)~

also available:
find in table of content

Capilla 316 H
Capilla 316 KB
Capilla 316 L
Capilla 316 LF

Capilla 316 L MAG
Capilla 316 L WIG
Capilla G 316 L RM (tubular wire)

Standards:

EN ISO 3581-A:	E 19 12 3 LB 12
EN 1600:	E 19 12 3 LB 12
AWS A 5.4:	E 316 L-15
Mat.-No.:	1.4430

capilla® 316 KB

Product description:

Basic coated stick electrode for welding of austenitic stainless Cr-Ni-Mo steels with extra low carbon content;

Service temperatures up to 400°C

Applications:

Suitable for materials as:
1.4401, 1.4404, 1.4406, 1.4408, 1.4420, 1.4435, 1.4436, 1.4571, 1.4573, 1.4580, 1.4581, 1.4583.

Typical weld metal composition:

[wt. - %]

	C	Cr	Ni	Mo	Fe
Min.		**18**	**11**	**2,5**	
Max.	**0,03**	**20**	**13**	**3**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Tensile strength R_m:	550	[MPa]
Yield strength $R_{p0,2}$:	320	[MPa]
Yield strength $R_{p1,0}$:	-	[MPa]
Elongation (L=5d):	35	[%]
Impact strength (ISO-V):	70	[J]

Positions: all except PG

Redrying: 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,0	300	40 – 60
2,5	300	60 – 90
3,25	350	80 – 110
4,0	350	100 – 150
5,0	450	150 – 200

Polarity =(+)~

also available:
find in table of content

Capilla 316 H
Capilla 316 L
Capilla 316 LF
Capilla 316 LR

Capilla 316 L MAG
Capilla 316 L WIG
Capilla G 316 L RM (tubular wire)

Standards:

EN ISO 3581-A:	E 19 12 3 LR 12
EN 1600:	E 19 12 3 LR 12
AWS A 5.4:	E 316 L-16
Mat.-No.:	1.4430

capilla® 316 LF

Product description:

Rutile-basic coated stick electrode for welding of austenitic stainless Cr-Ni-Mo steels with extra low carbon content;
Service temperatures up to 400°C;

Suitable for welding in vertical down (VD) position

Applications:

Suitable for materials as:
1.4401, 1.4404, 1.4406, 1.4408, 1.4420, 1.4435, 1.4436, 1.4571, 1.4573, 1.4580, 1.4581, 1.4583.

Typical weld metal composition:

[wt. - %]

	C	Cr	Ni	Mo	Fe
Min.		**18**	**11**	**2,5**	
Max.	**0,03**	**20**	**13**	**3**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Tensile strength R_m:	550	[MPa]
Yield strength $R_{p0,2}$:	320	[MPa]
Yield strength $R_{p1,0}$:	-	[MPa]
Elongation (L=5d):	35	[%]
Impact strength (ISO-V):	70	[J]

Positions: all

Redrying: 300°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,0	300	40 – 60
2,5	300	60 – 90
3,25	350	80 – 110
4,0	350	100 – 150
5,0	450	150 – 200

Polarity =(+)~

also available:
find in table of content

Capilla 316 H
Capilla 316 KB
Capilla 316 L
Capilla 316 LR

Capilla 316 L MAG
Capilla 316 L WIG
Capilla G 316 L RM (tubular wire)

Standards:

EN ISO 3581-A:	EZ 18 16 5 LR 32
EN 1600::	EZ 18 16 5 LR 32
AWS A 5.4:	E 317 L-17
Mat.-No.:	1.4440

capilla® 317 - 17

Product description:

Rutile coated stick electrode for welding of austenitic stainless Cr-Ni-Mo steelswith extra low carbon content;

Service temperatures up to 400°C;

The weld metal has a good resistance to IC- and pitting corrosion especially if exposed to chloridic media and is non-magnetic.

Applications:

Cladding and fusion welding of similar alloyed steel grades e.g.

1.4439, 1.4438, 1.4429.

Furthermore suitable for fusion welding of these steels with corrosion resistant Cr-steels and non-alloyed steels;
Buffer layers

Typical weld metal composition:

[wt. - %]

	C	Cr	Ni	Mo	N	Fe
Min.		**18**	**16**	**4,0**		
Max.	**0,03**	**19**	**17**	**5,0**	**0,1**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Tensile strength R_m:	600	[MPa]
Yield strength $R_{p0,2}$:	440	[MPa]
Yield strength $R_{p1,0}$:	-	[MPa]
Elongation (L=5d):	30	[%]
Impact strength (ISO-V):	70	[J]

Positions: all except PG

Redrying: 300°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]	Polarity
2,5	300	40 – 60	=(+)~
2,5	300	50 – 90	
3,25	350	80 – 110	
4,0	350/450	100 – 150	
5,0	450	150 – 200	

also available:
find in table of content

Capilla 317 MAG
Capilla 317 WIG

Standards:

EN ISO 3581-A:	E 19 12 3 Nb R 12
EN 1600:	E 19 12 3 Nb R 12
AWS A 5.4:	E 318-16
Mat.-No.:	1.4576
Approvals:	**TÜV, DB**

capilla® 318

Product description:

Rutile-basic coated stick electrode for welding of austenitic stainless Cr-Ni-Mo-steels especially for Nb-and Ti - stabilised types of steel with extra low carbon content;

Service temperatures up to 400°C

Applications:

Suitable for materials such as:
1.4571, 1.4573, 1.4580, 1.4581, 1.4583, 1.4401, 1.4404, 1.4408 1.4420, 1.4435, 1.4436.

Typical weld metal composition:

[wt. - %]

	C	Cr	Ni	Mo	Nb	Fe
Min.		**18**	**12**	**2,5**	**10 x %C**	
Max.	**0,03**	**20**	**13**	**3**		**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Tensile strength R_m:	600	[MPa]
Yield strength $R_{p0,2}$:	440	[MPa]
Yield strength $R_{p1,0}$:	-	[MPa]
Elongation (L=5d):	30	[%]
Impact strength (ISO-V):	70	[J]

Positions: all

Redrying:: 300°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]	Polarity
2,0	300	40 – 60	=(+)~
2,5	300	50 – 90	
3,25	350	80 – 110	
4,0	350	100 – 150	
5,0	450	150 – 200	

also available:
find in table of content

Capilla 318 KB
Capilla 318 LR

Capilla 318 MAG
Capilla 318 WIG
Capilla G 318 RM (tubular wire)

Standards:

EN ISO 3581-A:	E 19 12 3 Nb R 12
EN 1600:	E 19 12 3 Nb R 12
AWS A 5.4:	E 318-17
Mat.-No.:	1.4576
Approvals:	**TÜV**

capilla® 318 LR

Product description:

Rutile coated stick electrode for welding of austenitic stainless Cr-Ni-Mo-steels especially for Nb-and Ti - stabilised types of steel with extra low carbon content;

Service temperatures up to. 400°C

Applications:

Suitable for materials such as:
1.4571, 1.4573, 1.4580, 1.4581, 1.4583, 1.4401, 1.4404, 1.4408, 1.4420, 1.4435, 1.4436.

Typical weld metal composition:

[wt. - %]

	C	Cr	Ni	Mo	Nb	Fe
Min.		**18**	**11**	**2,5**	**10 x %C**	
Max.	**0,03**	**20**	**13**	**3**		**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Tensile strength R_m:	600	[MPa]
Yield strength $R_{p0,2}$:	440	[MPa]
Yield strength $R_{p1,0}$:	-	[MPa]
Elongation (L=5d):	30	[%]
Impact strength (ISO-V):	70	[J]

Positions: all

Redrying:: 300°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,0	300	40 – 60
2,5	300	50 – 90
3,25	350	80 – 110
4,0	350	100 – 150
5,0	450	150 – 200

Polarity =(+)~

also available:
find in table of content

Capilla 318 KB
Capilla 318 L
Capilla 318 MAG

Capilla 318 WIG
Capilla G 318 RM (tubular wire)

Standards:

EN ISO 3581-A:	E 22 9 3 N LR 32
EN 1600:	E 22 9 3 N LR23
AWS A 5.4:	E 2209 L - 16
Mat.-No.:	1.4462
Recovery:	**120%**

capilla® 2209

Product description:

Rutile-basic coated stick electrode for overlay and fusion welding of corrosion resistant Cr-Ni-Mo alloyed Duplex-steels;

The weld metal has a ferritic-austenitic structure and is very resistant against wet corrosion in chloridic and H_2S containing media.

Maximum service temperature: 300°C

Applications:

This electrode is suitable for overlay and fusion welding of similar alloyed high corrosion resistant steels

(1.4462, 1.4362)

Typical weld metal composition:

[wt. - %]

	C	Cr	Ni	Mo	N	Fe
Min.		**21**	**9**	**2,8**		
Max.	**0,03**	**23**	**10**	**3,3**	**0,15**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Tensile strength R_m:	690	[MPa]
Yield strength $R_{p0,2}$:	480	[MPa]
Yield strength $R_{p1,0}$:	520	[MPa]
Elongation (L=5d):	25	[%]
Impact strength (ISO-V):	50	[J]

Positions: all except PG

Redrying: 300°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]	Polarity
2,5	300	60 – 90	=(+)~
3,25	350	80 – 120	
4,0	350	110 – 170	

also available:
find in table of content

Capilla 2209 MAG
Capilla 2209 WIG

Standards:

EN ISO 3581-A: E 25 9 3 N LR 32
EN 1600: EZ 25 9 3 Cu N LR 23
Mat.-No.: ~1.4501

Recovery: **130%**

capilla® 4460 Cu

Product description:

Rutile-basic coated stick electrode for welding of super duplex steels. Good resistance against inter-crystalline corrosion, stress corrosion cracking and pitting corrosion;

Suitable for applications requiring a combination of very good corrosion resistance and excellent mechanical properties;

Service temperature ≤ 250°C.

Applications:

Overlay and fusion welding of super duplex stainless steel;

Base metals:

GX 3 CrNiMoCuN 26-6-3 (1.4515),
GX 3 CrNiMoCuN 26.6-3-3 (1.4517),
25%-Cr super duplex steels (SAF 25/07; Zeron 100)

Typical weld metal composition:

[wt. - %]

	C	Si	Cr	Ni	Mo	Mn	W	Cu	N	Fe
Min.			**24**	**8**	**2,5**	**1**	**0,5**	**0,5**	**0,15**	
Max.	**0,02**	**0,8**	**26**	**10**	**3,5**	**1,2**	**0,7**	**0,8**	**0,18**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Tensile strength R_m:	730	[MPa]
Yield strength $R_{p0,2}$:	550	[MPa]
Yield strength $R_{p1,0}$:	-	[MPa]
Elongation (L=5d):	23	[%]
Impact strength (ISO-V):	50	[J]

Positions: all except PG

Redrying: 300°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]	**Polarity**
2,5	300	60 – 90	=(+)~
3,25	350	80 – 120	
4,0	350	110 – 170	
5,0	450	150 – 200	

also available:
find in table of content

Capilla 4460 Cu MAG
Capilla 4460 Cu WIG

Standards:

EN ISO 3581-A E 25 9 4 N LB 12
EN 1600 E 25 9 3 N LB 12
Mat.-No.: ~1.4501

capilla® 4460 CuB

Product description:

Basic coated stick electrode for welding of super duplex steels. Good resistance against inter-crystalline corrosion, stress corrosion cracking and pitting corrosion;

Suitable for applications requiring a combination of very good corrosion resistance and excellent mechanical properties;

Service temperature ≤ 250°C.

Applications:

Overlay and fusion welding of super duplex stainless steel;

Base metals:

GX 3 CrNiMoCuN 26-6-3 (1.4515),
GX 3 CrNiMoCuN 26.6-3-3 (1.4517),
25%-Cr super duplex steels (SAF 25/07; Zeron 100)

Typical weld metal composition:

[wt. - %]

	C	Si	Cr	Ni	Mo	Mn	W	Cu	N	Fe
Min.			**24**	**8**	**2,5**	**1**	**0,5**	**0,5**	**0,15**	
Max.	**0,02**	**0,8**	**26**	**10**	**3,5**	**1,2**	**0,7**	**0,8**	**0,18**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Tensile strength R_m:	730	[MPa]
Yield strength $R_{p0,2}$:	550	[MPa]
Yield strength $R_{p1,0}$:	-	[MPa]
Elongation (L=5d):	23	[%]
Impact strength (ISO-V):	50	[J]

Positions: all except PG

Redrying: 300°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]	Polarity
2,5	300	60 – 90	=(+)~
3,25	350	80 – 120	
4,0	350	110 – 170	
5,0	450	150 – 200	

also available:
find in table of content

Capilla 4460 Cu MAG
Capilla 4460 Cu WIG

Standards:

EN ISO 3581-A: E 25 9 3 Cu N B 32
EN 1600: E 25 6 3 Cu LB 23
Mat.-No.: 1.4507

capilla® 4507

Product description:

Rutile-basic coated stick electrode for welding of super duplex steels. Good resistance against intercrystalline corrosion, stress corrosion cracking and pitting corrosion;

Suitable for applications requiring a combination of very good corrosion resistance and excellent mechanical properties;

Service temperature ≤ 250°C

Applications:

Overlay and fusion welding of super duplex stainless steels.

Base metals:

GX 3 CrNiMoCuN 26-6-3 (1.4515),
GX 3 CrNiMoCuN 26.6-3-3 (1.4517)

Typical weld metal composition:

[wt. - %]

	C	Si	Cr	Ni	Mo	Mn	N	Cu	Fe
Min.			**24,5**	**9**	**3**	**0,8**	**0,15**	**1,5**	
Max.	**0,03**	**1**	**26**	**10**	**4**	**1,2**	**0,2**	**2,5**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Tensile strength R_m:	720	[MPa]
Yield strength $R_{p0,2}$:	530	[MPa]
Yield strength $R_{p1,0}$:	-	[MPa]
Elongation (L=5d):	15	[%]
Impact strength (ISO-V):	50	[J]

Positions: all except PG

Redrying: 300°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,0	300	40 – 60
2,5	300	60 – 90
3,25	350	80 – 110
4,0	350	100 – 150
5,0	450	150 – 200

Polarity =(+)~

also available:
find in table of content

Capilla G 4507 RM (tubular wire)

Standards:

EN ISO 3581-A:	E 23 12 LR 32
EN 1600:	E 23 12 LR 32
AWS A 5.4:	E 309 L-26
Mat.-No.:	~1.4332
Recovery:	**120%**

capilla® 309 L

Product description:

Rutile-basic coated stick electrode for overlay and fusion weldings of similar or lower alloyed heat-resistant CrNi-steels;

Service temperature ≤ 300°C ;

The weld metal is scaling resistant up to 1050°C;

Suitable for overlay weldings onto non-alloyed steels if an 18/8 Cr-Ni alloy composition has to be achieved in the first layer

Applications:

Claddings, buffer layers and joints, suitable for steels such as:

1.4541, 1.4550, 1.4710, 1.4712, 1.4727, 1.4729, 1.4740, 1.4742, 1.4780, 1.4825, 1.4826, 1.4828, 1.4878

Typical weld metal composition:

[wt. - %]

	C	Cr	Ni	Fe
Min.		**21**	**11**	
Max.	**0,03**	**23**	**13**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Tensile strength R_m:	550	[MPa]
Yield strength $R_{p0,2}$:	400	[MPa]
Yield strength $R_{p1,0}$:	430	[MPa]
Elongation (L=5d):	30	[%]
Impact strength (ISO-V):	55	[J]

Positions: all except PG

Redrying: 300°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,0	300	40 – 60
2,5	300	60 – 90
3,25	350	80 – 110
4,0	350	100 – 150
5,0	450	150 – 200

Polarity =(+)~

also available:
find in table of content

Capilla 309 L KB
Capilla 309 LR
Capilla 309 L MAG

Capilla 309 L WIG
Capilla G 309 L RM (tubular wire)

Standards:

EN ISO 3581-A:	E 23 12 LR 32
EN 1600:	E 23 12 LR 32
AWS A 5.4:	E 309 L-27
Mat.-No.:	~1.4332
Recovery:	**120%**

capilla® 309 LR

Product description:

Rutile coated stick electrode for overlay and fusion weldings of similar or lower alloyed heat-resistant CrNi-steels.
Service temperature of max. 300°C;

the weld metal is scaling resistant up to 1050°C;

Suitable for overlay weldings onto non-alloyed steels if an 18/8 Cr-Ni alloy composition has to be achieved in the first layer

Applications:

Claddings, buffer layers and joints, suitable for steels such as:

1.4541, 1.4550, 1.4710, 1.4712, 1.4727, 1.4729, 1.4740, 1.4742, 1.4780, 1.4825, 1.4826, 1.4828, 1.4878

Typical weld metal composition:

[wt. - %]

	C	Cr	Ni	Fe
Min.		**21**	**11**	
Max.	**0,03**	**23**	**13**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Tensile strength R_m:	550	[MPa]
Yield strength $R_{p0,2}$:	400	[MPa]
Yield strength $R_{p1,0}$:	430	[MPa]
Elongation (L=5d):	30	[%]
Impact strength (ISO-V):	55	[J]

Positions: all except PG

Redrying: 300°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,0	300	40 – 60
2,5	300	60 – 90
3,25	350	80 – 110
4,0	350	100 – 150
5,0	450	150 – 200

Polarity =(+)~

also available:
find in table of content

Capilla 309 L KB
Capilla 309 L
Capilla 309 L MAG

Capilla 309 L WIG
Capilla G 309 L RM (tubular wire)

Standards:

EN ISO 3581-A: E 23 12 L B 32
AWS SFA-5.4: ~E 309L-15
Mat.-No.: ~1.4332

capilla® 309 L KB

Product description:

Basic coated stick electrode for overlay and fusion weldings of similar or lower alloyed heat-resistant CrNi-steels;

Service temperature of max. 300°C;

The weld metal is scaling resistant up to 1050°C.

Suitable for overlay weldings onto non-alloyed steels if an 18/8 Cr-Ni alloy composition has to be achieved in the first layer.

Applications:

Claddings, buffer layers and joints, suitable for steels such as:

1.4541, 1.4550, 1.4710, 1.4712, 1.4727, 1.4729, 1.4740, 1.4742, 1.4780, 1.4825, 1.4826, 1.4828, 1.4878

Typical weld metal composition:

[wt. - %]

	C	Cr	Ni	Fe
Min.		**21**	**11**	
Max.	**0,03**	**23**	**13**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Tensile strength R_m:	550	[MPa]
Yield strength $R_{p0,2}$:	400	[MPa]
Yield strength $R_{p1,0}$:	430	[MPa]
Elongation (L=5d):	30	[%]
Impact strength (ISO-V):	55	[J]

Positions: all except PG

Redrying: 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,0	300	40 – 60
2,5	300	60 – 90
3,25	350	80 – 110
4,0	350	100 – 150
5,0	450	150 – 200

Polarity =(+)~

also available:
find in table of content

Capilla 309 L
Capilla 309 LR
Capilla 309 L MAG
Capilla 309 L WIG
Capilla G 309 L RM (tubular wire)

Standards:

EN ISO 3581-A:	E 23 12 2 LR 32
EN 1600:	E 23 12 2 LR 32
AWS A 5.4:	E 309 Mo-26
Mat.-No.:	1.4459
Approvals:	**TÜV, DB**

capilla® 309 Mo

Product description:

Rutile-basic coated stick electrode for fusion welding of similar or lower alloyed CrNiMo-steels;

Especially suitable for overlay weldings onto non-alloyed steels if an 18/8/2 CrNiMo alloy has to be realised in the first layer.

Scaling resistant up to 1050°C.

Applications:

Fusion welding and cladding of material such as:

1.4401, 1.4404, 1.4406, 1.4410, 1.4437, 1.4571, 1.4580;

Also suitable for dissimilar joints of high and low alloyed steels

Typical weld metal composition:

[wt. - %]

	C	Cr	Ni	Mo	Fe
Min.		**23**	**11**	**2,5**	
Max.	**0,03**	**24**	**13**	**3,5**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Tensile strength R_m:	650	[MPa]
Yield strength $R_{p0,2}$:	460	[MPa]
Yield strength $R_{p1,0}$:	-	[MPa]
Elongation (L=5d):	30	[%]
Impact strength (ISO-V):	55	[J]

Positions: all except PG

Redrying: 300°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,0	300	40 – 60
2,5	300	60 – 90
3,25	350	80 – 110
4,0	350	100 – 150
5,0	450	150 – 200

Polarity =(+)~

also available:
find in table of content

Capilla 309 Mo MAG
Capilla 309 Mo WIG

Standards:

EN ISO 3581-A:	E 18 8 Mn R 12
EN 1600:	E 18 8 Mn R 12
AWS A 5.4:	~ E 307-16
Mat.-No.:	1.4370

capilla® 51 Ti

Product description:

Rutile-basic coated stick electrode for fusion welding of dissimilar steels and for cladding;

The weld metal consists of austenitic Cr-Ni-Mn-steel for service temperatures of up to 300°C.

Applications:

Welding of dissimilar joints, fusion welding of high carbon steels and work hardening manganese steels e.g. X 120 Mn 12 (1.3401);

Fusion welding of “hard to weld” steels;

Buffer layers for hardfacing.

Typical weld metal composition:

[wt. - %]

	C	Cr	Ni	Mn	Fe
Min.		**17**	**7**	**5**	
Max.	**0,1**	**19**	**9**	**7**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Tensile strength R_m:	600	[MPa]
Yield strength $R_{p0,2}$:	350	[MPa]
Yield strength $R_{p1,0}$:	400	[MPa]
Elongation (L=5d):	40	[%]
Impact strength (ISO-V):	70	[J]

Positions: all except PG

Redrying: 300°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,5	300	60 – 90
3,25	350	80 – 110
4,0	350	100 – 150
5,0	350/450	150 – 200

Polarity =(+)~

also available:
find in table of content

Capilla 51 KBN
Capilla 51 W
Capilla 51 MAG
Capilla 51 WIG
Capilla G 51 MM (tubular wire)
Capicoat 51

Standards:

EN ISO 3581-A:	E 18 8 Mn B 32
EN 1600:	E 18 8 Mn B 32
AWS A 5.4:	~ E 307-15
Mat.-No.:	1.4370
Approvals:	**TÜV, DB**

capilla® 51 KBN

Product description:

Basic coated electrode for fusion welding of dissimilar steels and for cladding. The weld metal consists of austenitic Cr-Ni-Mn- steel for service temperatures of up to 300 °C.

Thin coated stick electrode especially suitable for repair welding of rails.

Applications:

Welding of dissimilar joints, fusion welding of high carbon steels and work hardening manganese steels e.g. X 120 Mn 12 (1.3401);

Fusion welding of “hard to weld” steels;

Buffer layers for hardfacing

Typical weld metal composition:

[wt. - %]

	C	Cr	Ni	Mn	Fe
Min.		**17**	**7**	**5**	
Max.	**0,1**	**19**	**9**	**7**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Tensile strength R_m:	600	[MPa]
Yield strength $R_{p0,2}$:	350	[MPa]
Yield strength $R_{p1,0}$:	400	[MPa]
Elongation (L=5d):	40	[%]
Impact strength (ISO-V):	70	[J]

Positions: all except PG

Redrying: 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,5	300	60 – 90
3,25	350	80 – 110
4,0	350	100 – 150
5,0	350/450	150 – 200

Polarity =(+)~

also available:
find in table of content

Capilla 51 Ti
Capilla 51 W
Capilla 51 MAG

Capilla 51 WIG
Capilla G 51 MM (tubular wire)
Capicoat 51

capilla® 4370 Ti

Standards:

EN ISO 3581-A	E 18 8 Mn R 12
EN 1600	E 18 8 Mn R 12
EN14700:	E Fe 10-200/400-cnz
AWS A 5.4:	~ E 307-17
Mat.-No.:	1.4370

Product description:

Rutile coated stick electrode for fusion welding of dissimilar steels and for cladding.

The weld metal consists of austenitic Cr-Ni-Mn-steel for service temperatures of up to 300°C.

Applications:

Welding of dissimilar joints, fusion welding of high carbon steels and work hardening manganese steels e.g. X 120 Mn 12 (1.3401);

Fusion welding of “hard to weld” steels;

Buffer layers for hardfacing.

Typical weld metal composition:

[wt. - %]

	C	Cr	Ni	Mn	Fe
Min.		**17**	**7**	**5**	
Max.	**0,1**	**19**	**9**	**7**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Tensile strength R_m:	600	[MPa]
Yield strength $R_{p0,2}$:	350	[MPa]
Yield strength $R_{p1,0}$:	400	[MPa]
Elongation (L=5d):	40	[%]
Impact strength (ISO-V):	70	[J]

Positions: all except PG

Redrying: 300°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]	Polarity
2,5	300	60 – 90	=(+)~
3,25	350	80 – 110	
4,0	350	100 – 150	
5,0	350/450	150 – 200	

also available:
find in table of content

Capilla 51 KBN
Capilla 51 W
Capilla 51 MAG
Capilla 51 WIG
Capilla G 51 MM (tubular wire)
Capicoat 51

Standards:

EN ISO 3581-A	E 18 8 MnMo R 12
EN 1600	EZ 18 8 MnMo R 12
AWS A 5.4:	~ E 307-16
Mat.-No.:	~1.4370

capilla® 51 Mo

Product description:

Rutile-basic coated stick electrode for fusion welding of dissimilar steels and for cladding.

The weld metal consists of austenitic Cr-Ni-Mn-Mo-steel for service temperatures of up to 300°C.

Applications:

Welding of dissimilar joints, fusion welding of high carbon steels and work hardening manganese steels e.g. X 120 Mn 12 (1.3401).

Fusion welding of “hard to weld” steels.

Buffer layers for hardfacing.

Typical weld metal composition:

[wt. - %]

	C	Cr	Ni	Mn	Mo	Fe
Min.		**19**	**8**	**4**	**0,5**	
Max.	**0,1**	**20**	**9**	**5**	**0,8**	**Rest**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Tensile strength R_m:	700	[MPa]
Yield strength $R_{p0,2}$:	500	[MPa]
Yield strength $R_{p1,0}$:	400	[MPa]
Elongation (L=5d):	35	[%]
Impact strength (ISO-V):	70	[J]

Positions: all except PG

Redrying: 300°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,5	300	60 – 90
3,25	350	80 – 110
4,0	350	100 – 150
5,0	350/450	150 – 200

Polarity =(+)~

also available:
find in table of content

Capilla 51 KBN
Capilla 51 W
Capilla 51 MAG

Capilla 51 WIG
Capilla G 51 MM (tubular wire)
Capicoat 51

Standards:

EN ISO 3581-A:	E 29 9 R 12
EN 1600:	E 29 9 R 12
AWS A 5.4:	E 312-16
Mat.-No.:	1.4337
Approvals:	**DB**

capilla® 52 K

Product description:

Rutile-basic coated stick electrode for joint welding of dissimilar steels; very good suitability for buffer layers and overlay weldings.
The electrode produces a very soft arc and self-removing slags; easy to weld without any splatters.
The weld metal has a ferritic-austenitic microstructure (high strength duplex stainless steel).

Applications:

Corrosion resistant like similar alloyed steel and steel cast e.g.

1.4762 (X 10 CrAl 24),
1.4085 (G-X 70 Cr 29).

Suitable for difficult to weld steels, e.g. constructional steel with high tensile strength, cladding of rail steels, fusion welding of high alloyed manganese steels and joints of this steels with high-alloyed steel, suitable for repair and maintenance.

Typical weld metal composition:

[wt. - %]

	C	Cr	Ni	Fe
Min.		**27,5**	**8**	
Max.	**0,1**	**30**	**10**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Tensile strength R_m:	750	[MPa]
Yield strength $R_{p0,2}$:	500	[MPa]
Yield strength $R_{p1,0}$:	-	[MPa]
Elongation (L=5d):	20	[%]
Impact strength (ISO-V):	40	[J]

Positions: all except PG

Redrying: 300°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
1,6	250	30 – 50
2,0	250	40 – 60
2,5	300	60 – 90
3,25	350	80 – 110
4,0	350	100 – 150
5,0	350	150 – 200

Polarity =(+)~

also available:
find in table of content

Capilla 52
Capilla 52 MAG
Capilla 52 WIG

Standards:

EN ISO 3581-A: EZ 29 9 3 R 32
EN 1600: EZ 29 9 3 R 32

capilla® 52 K Mo

Product description:

Rutile-basic coated stick electrode for joint welding of dissimilar steels;
very good suitability for buffer layers and overlay weldings;
The electrode produces a very soft arc and self-removing slags, easy to weld without any splatters.
The weld metal has a ferritic-austenitic microstructure (high strength duplex stainless steel).

Very good mechanical properties and corrosion resistance even in comparison to Capilla 52 K.

Applications:

Corrosion resistant like similar alloyed steel and steel cast e.g.

1.4762 (X 10 CrAl 24),
1.4085 (G-X 70 Cr 29).

Suitable for difficult to weld steels, e.g. constructional steel with high tensile strength, fusion welding of high alloyed manganese steels and joints of this steels with high-alloyed steel, suitable for repair and maintenance;
Very corrosion resistant claddings on mild steel.

Typical weld metal composition:

[wt. - %]

	C	Cr	Ni	Mo	Fe
Min.		**27,5**	**8**	**2,5**	
Max.	**0,1**	**30**	**10**	**3,5**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Tensile strength R_m:	780	[MPa]
Yield strength $R_{p0,2}$:	550	[MPa]
Yield strength $R_{p1,0}$:	-	[MPa]
Elongation (L=5d):	18	[%]
Impact strength (ISO-V):	40	[J]

Positions: all except PG

Redrying: 300°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
1,6	250	30 – 50
2,0	250	40 – 60
2,5	300	60 – 90
3,25	350	80 – 110
4,0	350	100 – 150
5,0	350	150 – 200

Polarity
=(+)~

Standards:

EN ISO 3581-A:	E 25 20 R 12
EN 1600:	E 25 20 R 12
AWS A 5.4:	E 310-16
Mat.-No.:	~ 1.4842

capilla® 310

Product description:

Rutile-basic coated electrode for welding of heat resistant austenitic steels;

The weld metal is fully austenitic and scaling resistant up to 1200°C. Deposited material is not resistant to sulphurous gases.

Applications:

Suitable for materials as:

1.4832, 1.4837, 1.4840, 1.4841, 1.4845, 1.4846, 1.4849, 1.4848, 1.4828, 1.4713, 1.4726, 1.4710, 1.4745, 1.4823

Typical weld metal composition:

[wt. - %]

	C	Cr	Ni	Mn	Fe
Min.		**23**	**19**	**2,5**	
Max.	**0,1**	**26**	**21**	**3**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Tensile strength R_m:	570	[MPa]
Yield strength $R_{p0,2}$:	380	[MPa]
Yield strength $R_{p1,0}$:	410	[MPa]
Elongation (L=5d):	20	[%]
Impact strength (ISO-V):	40	[J]

Positions: all except PG

Redrying: 300°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,0	250/300	60 – 90
2,5	300	80 – 110
3,25	350	100 – 150
4,0	350	150 – 190
5,0	350	160 – 210

Polarity =(+)~

also available:
find in table of content

Capilla 310 KB
Capilla 310 MAG
Capilla 310 WIG

Standards:

EN ISO 3581-A:	E 25 20 B 12
EN 1600:	E 25 20 B 12
AWS A 5.4:	E 310-15
Mat.-No.:	~1.4842

capilla® 310 KB

Product description:

Basic coated electrode for welding of heat resistant austenitic steels.
The weld metal is fully austenitic and scaling resistant up to 1200°C.
Deposited material is not resistant to sulphurous gases.

Applications:

Suitable for materials as:

1.4832, 1.4837, 1.4840, 1.4841, 1.4845, 1.4846, 1.4849, 1.4848, 1.4828, 1.4713, 1.4726, 1.4710, 1.4745, 1.4823

Typical weld metal composition:

[wt. - %]

	C	Cr	Ni	Mn	Fe
Min.		**23**	**19**	**2,5**	
Max.	**0,1**	**26**	**21**	**3**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Tensile strength R_m:	570	[MPa]
Yield strength $R_{p0,2}$:	380	[MPa]
Yield strength $R_{p1,0}$:	410	[MPa]
Elongation (L=5d):	20	[%]
Impact strength (ISO-V):	40	[J]

Positions: all except PG

Redrying: 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,0	250/300	60 – 90
2,5	300	80 – 110
3,25	350	100 – 150
4,0	350	150 – 190
5,0	350	160 – 210

Polarity =(+)~

also available:
find in table of content

Capilla 310
Capilla 310 MAG
Capilla 310 WIG

Standards:

EN ISO 3581-A:	EZ 25 20 3 R 12
EN 1600:	EZ 25 20 3 R 12
AWS A 5.4:	E 310 Mo -16
Mat.-No.:	~1.4466

capilla® 310 Mo

Product description:

Rutile-basic coated stick electrode for welding of heat resistant austenitic steels.
The weld metal is fully austenitic and scaling resistant up to 1200°C.
Deposited material is not resistant against sulphurous gases.
The resistance to hot cracking is better than the resistance of comparable Mo-free grades.
Multi-layer weldings are not recommended if a very tough weld metal is desired.

Applications:

Suitable for materials as:

1.4832, 1.4837, 1.4840, 1.4841, 1.4845, 1.4846, 1.4849, 1.4848, 1.4828, 1.4713, 1.4726, 1.4710, 1.4745, 1.4823

Typical weld metal composition:

[wt. - %]

	C	Cr	Ni	Mo	Mn	Fe
Min.		**23**	**19**	**2,5**	**2,5**	
Max.	**0,1**	**26**	**21**	**3**	**3**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Tensile strength R_m:	570	[MPa]
Yield strength $R_{p0,2}$:	380	[MPa]
Yield strength $R_{p1,0}$:	410	[MPa]
Elongation (L=5d):	35	[%]
Impact strength (ISO-V):	70	[J]

Positions: all

Redrying: 300°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]	Polarity
2,0	250/300	60 – 90	=(+)~
2,5	300	80 – 110	
3,25	350	100 – 150	
4,0	350	150 – 190	
5,0	350	160 – 210	

Standards:

EN ISO 3581-A: EZ 20 16 3 Mn 3 LR 32
EN 1600: E 18 15 3 LR 23
Mat.-No.: 1.4455

capilla® 4455

Product description:

Rutile-basic coated stick electrode suitable for welding of austenitic stainless steel grades.
The deposit is nonmagnetic and has good properties at low temperatures.

Applications:

Cladding and fusion welding of similar alloyed cryogenic austenitic CrNi(N)- and CrNiMo(Mn,N)-steel grades;
Also used for welding of cryogenic martensitic Ni-steels.

Typical weld metal composition:

[wt. - %]

	C	Si	Cr	Ni	Mo	Mn	N	Fe
Min.			**18**	**14**	**2,6**	**2,5**	**0,1**	
Max.	**0,03**	**0,9**	**20**	**16,5**	**3**	**4**	**0,2**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Tensile strength R_m:	640	[MPa]
Yield strength $R_{p0,2}$:	440	[MPa]
Yield strength $R_{p1,0}$:	-	[MPa]
Elongation (L=5d):	35	[%]
Impact strength (ISO-V):	45 (-196°C)	[J]

Positions: all except PG

Redrying: 300°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,0	300	40 - 60
2,5	300	60 - 90
3,25	350	80 - 110
4,0	350	100 - 150
5,0	450	150 - 200

Polarity =(+)~

Standards:

EN ISO 3581-A:	E 20 25 5 Cu L R 32
EN 1600:	E 20 25 5 Cu LR 23
AWS A 5.4:	E 385 L-26
Mat.-No.:	~1.4519

capilla® 385

Product description:

Rutil-basic coated stick electrode for fusion and overlay welding of similar alloyed corrosion resistant steels. High resistance against phosphoric acid and stress corrosion cracking in fluids containing chlorides.

Applications:

Suitable for materials like:

1.4500, 1.4505, 1.4506, 1.4531, 1.4539, 1.4573, 1.4585, 1.4586,

Typical weld metal composition:

[wt. - %]

	C	Cr	Ni	Mo	Mn	Cu	Fe
Min.		**19**	**24**	**4**	**1,2**	**1,2**	
Max.	**0,03**	**21**	**26**	**5**	**1,8**	**1,8**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Tensile strength R_m:	600	[MPa]
Yield strength $R_{p0,2}$:	410	[MPa]
Yield strength $R_{p1,0}$:	-	[MPa]
Elongation (L=5d):	30	[%]
Impact strength (ISO-V):	40	[J]

Positions: all except PG

Redrying: 300°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,5	300	80 – 110
3,25	350	100 – 150
4,0	350	150 – 200
5,0	450	160 – 210

Polarity =(+)~

also available:
find in table of content

Capilla 385 MAG
Capilla 385 WIG

2.2 Wire electrodes for welding of stainless steels

2.2.1 Solid wires for gas shielded arc welding of stainless steels

Designation	Standard	Weld Metal Analysis [Wt.%]									Properties				
capilla®	EN ISO: 14343-A: Mat.-No.:	C	Mn	Si	Cr	Ni	Mo	Nb	Others	Fe	$R_{o0,2}$ [MPa]	R_m [MPa]	L=5d [%]	KV (ISO-V) [J]	SG
308 L MAG	G 19 9 L Si 1.4316	0,02	1,7	0,9	20	10	-	-	-	Bal.	320	550	35	75	M12
347 MAG	G 19 9 Nb Si 1.4551	0,06	1,5	0,8	19,5	9,5	-	12xC	-	Bal.	380	550	30	65	M12
316 L MAG	G 19 12 3 L Si 1.4430	0,02	1,7	0,8	18,8	12,5	2,5	-	-	Bal.	320	550	35	70	M12
318 MAG	G 19 12 3 Nb Si 1.4576	0,05	1,5	0,8	19	12	2,5	12xC	-	Bal.	380	550	30	70	M12
2209 MAG	G 22 9 3 L Si 1.4462	0,02	1,6	0,5	23	9	3,5	-	N=0,14	Bal.	480	680	22	50	M12
4460 Cu MAG	G 25 9 3 N L Si ~1.4501	0,02	0,3	1,5	25,5	9,5	3,7	-	N=0,22; Cu=0,8; W=0,6	Bal.	700	850	25	80	I1
309 L MAG	G 23 12 L Si 1.4332	0,03	2	0,9	24	13	-	-	-	Bal.	400	550	30	55	M13
51 MAG	G 18 8 Mn 1.4370	0,08	7	0,8	19	9	-	-	-	Bal.	320	600	40	100	M12
52 MAG	G 29 9 1.4337	0,15	1,6	0,5	29	9	-	-	-	Bal.	500	750	20	25	M13
317 MAG	G 18 16 5 L 1.4440	0,03	0,3	3,4	18,5	17,5	4,5	-	-	Bal.	320	570	34	65	M12
310 MAG	G 25 20 Si 1.4842	0,13	3,2	1	25	20	-	-	-	Bal.	320	550	25	80	M13
385 MAG	G 20 25 5 Cu 1.4539	0,02	3	1	21	25	5	-	Cu=1,5	Bal.	350	550	35	80	M13

Min. values at AT / no heat treatment; shielding gas (SG) acc. EN ISO 14175
Dimensions: Ø 1,0; 1,2; 1,6 [mm]; Spools: K 300; other dimensions and packing units on demand

2.2.2 Welding rod for tungsten inert gas welding of stainless steels

Designation	Standard	Weld Metal Analysis [Wt.%]									Properties				
capilla®	EN ISO: 14343-A: Mat.-No.:	C	Mn	Si	Cr	Ni	Mo	Nb	Others	Fe	$R_{o0,2}$ [MPa]	R_m [MPa]	L=5d [%]	KV (ISO-V) [J]	SG
308 L WIG	W 19 9 L Si/ 1.4316	0,02	1,7	0,9	20	10	-	-	-	Bal.	320	550	35	75	I1
347 WIG	W 19 9 Nb Si/ 1.4551	0,06	1,5	0,8	19,5	9,5	-	10xC	-	Bal.	380	550	30	65	I1
316 LWIG	W 19 12 3 L Si 1.4430	0,02	1,7	0,8	18,8	12,5	2,5	-	-	Bal.	320	550	35	70	I1
318 WIG	W 19 12 3 Nb Si 1.4576	0,05	1,5	0,8	19	12	2,5	10xC	-	Bal.	380	550	30	70	I1
2209 WIG	W 22 9 3 L 1.4462	0,02	1,6	0,5	23	9	3,5	-	N = 0,14	Bal.	480	680	22	50	I1
4460 Cu WIG	W 25 9 3 N L Si ~1.4501	0,02	0,3	1,5	25,5	9,5	3,7	-	N=0,22; Cu=0,8; W=0,6	Bal.	700	850	25	80	I1
309 L WIG	W 22 12 L Si 1.4332	0,11	1,2	1,2	22	11	-	-	-	Bal.	320	550	30	70	I1
51 WIG	W 18 8 Mn 1.4370	0,08	7	0,8	19	9	-	-	-	Bal.	320	600	40	100	I1
52 WIG	W 29 9 1.4337	0,15	1,6	0,5	29	9	-	-	-	Bal.	500	750	20	25	I1
317 WIG	W 18 16 5 L 1.4440	0,03	0,3	3,4	18,5	17,5	4,5	-	-	Bal.	320	570	34	65	I1
310 WIG	W 25 20 Si 1.4842	0,13	3,2	1	25	20	-	-	-	Bal.	320	550	25	80	I1
385 WIG	W 20 25 5 Cu 1.4539	0,02	3	1	21	25	5	-	Cu =1,5	Bal.	320	580	25	80	I1

Min. values at AT / no heat treatment; shielding gas (SG) acc. EN ISO 14175
Dimensions: Ø 1,0; 1,6; 2,0; 2,4 [mm]; Length: 1000 [mm]; other dimensions on demand

2.2.3 Tubular wires for gas shielded arc welding of stainless steels

Designation	Standard	Weld Metal Analysis [Wt.%]									Properties				
capilla®	EN ISO 17633-A Mat.-No.:	C	Mn	Si	Cr	Ni	Mo	Nb	Others	Fe	$R_{o0,2}$ [MPa]	R_m [MPa]	L=5d [%]	KV (ISO-V) [J]	SG
G 308 L RM	T 19 9 L RM 1.4316	0,02	1,7	0,9	20	10	-	-	-	Bal.	320	550	35	75	M21
G 316 L RM	T 19 12 3 L RM 1.4430	0,02	1,7	0,8	18,8	12,5	2,5	-	-	Bal.	320	550	35	70	M21
G 347 RM	T 19 9 Nb RM 1.4551	0,03	1,4	0,9	19,5	10,5	-	0,5	-	Bal.	470	660	35	60	M21
G 309 L RM	T 23 12 L RM 1.4332	0,03	2	0,9	24	13	-	-	-	Bal.	400	550	30	55	M21
G 318 RM	T 19 12 3 Nb RM 1.4576	0,03	1,5	0,9	19,5	12	2,9	0,45	-	Bal.	430	640	32	55	M21
G 2209 RM	T 22 9 3 N L RM 1.4462	0,03	1,4	0,8	23	9	3,2	-	N = 0,16	Bal.	670	830	28	55	M21
G 4507 RM	TZ 25 9 4 Cu NL RM 1.4507	0,03	0,6	25	9,5	9,3	3,3	-	N=0,25; Cu=0,9	Bal.	550	780	22	50	M21
G 51 RM	T 19 9 Mn RM 1.4370	0,1	6	0,7	19	9	-	-	-	Bal.	490	650	25	50	M21
G 52 RM	T 29 9 RM 1.4337	0,03	1,3	0,8	29	8,6	-	-	-	Bal.	650	860	25	40	M21
G 310 RM	T 25 20 L RM 1.4842	0,15	4	0,6	26	20,5	-	-	-	Bal.	410	560	30	60	M21

Minimum values at AT / no heat treatment; shielding gas (SG) acc. EN ISO 14175
Dimensions: Ø 1,2; 1,6 [mm]; Spools: K 300; other dimensions and packing units on demand.

3 Welding consumables for welding of creep and heat resistant materials

3.1 Coated stick electrodes for welding of creep and heat resistant materials

capilla®	EN ISI 3580-A EN ISO 14172* EN ISI 3581-A**	Mat.-No.:	AWS	Page
P 91	E CrMo 9 1 B 42**	-	E 9015-B9	**62**
P 911	E CrMoWV 9 1 1 B 42**	-	~E 9015-B9	**63**
P 92	E CrMoWV 9 0,5 2 B 42**	-	~E 9015-B9	**64**
P 121	E CrMoWV 12 B 42**	1.4937	-	**65**
4009	E 13 B 42	1.4009	E 410-25	**66**
4015	E 17 B 42	1.4015	E 430-25	**67**
4018	EZ 13 B 42	1.4018	E 410-25	**68**
410 NiMo	E 13 4 B 42	1.4351	E 410NiMo-25	**69**
4405	EZ 17 6 B 42	1.4405	-	**70**
4115	EZ 17 1 R 42	1.4115	-	**71**
4122	EZ 17 1 1 B 42	1.4122	-	**72**
4034	EZ 13 B 42	1.4034	E 420-25	**73**
308 H	E 19 9 R 12	1.4948	E 308 H	**74**
316 H	E 19 12 3 R 12	-	E 316 H	**75**
309	E 23 12 R 22	~1.4829	~E 309-16	**76**
310 H	E 25 20 H R 12	-	E 310 H	**77**
4820	E 25 5 R 32	1.4820	-	**78**
4830	EZ 25 24 Nb B 32	1.4830	-	**79**
4850	EZ 21 32 Nb B 32	~1.4850	-	**80**
4853	EZ 25 35 Nb B 32	~1.4853	-	**81**
4863	EZ 18 36 Nb B 32	~ 1.4863	~ E 330-15	**82**
4879	~E Ni 6702 (NiCr28Fe6W)*	~ 2.4879	-	**83**
625 K	E Ni6625 (NiCr22Mo9Nb)*	2.4621	E NiCrMo-3	**84**
Alloy C	~ E Ni 6059 (NiCr23Mo16)*	2.4608	E NiCrMo-13	**85**
6000 DL	~E Ni 6082 (NiCr20Mn3Nb)*	2.4648	~ E NiCr-3	**86**
6000 B	~E Ni 6082 (NiCr20Mn3Nb)*	2.4648	~ E NiCr-3	**87**
4778	-	~2.4778	-	**88**
50/50 Nb	-	2.4813	-	**89**

3.2 Wire electrodes for welding of creep and heat resistant materials

3.2.1 Solid wires for gas shielded arc welding of creep and heat resistant material

capilla®	EN ISO 14343-A EN ISO 18274 * EN ISO 21952-A**	Mat.-No.:	AWS	Page
P 91 MAG	G CrMo 9 1**	1.4903	ER 90S-B9	**90**
4009 MAG	G 13	1.4009	ER 410	**90**
4015 MAG	G 17	1.4015	ER 430	**90**
4018 MAG	G 13	1.4018	ER 410	**90**
410 NiMo MAG	G 13 4	1.4351	ER 410 NiMo	**90**
4115 MAG	GZ 17 1	1.4115	-	**90**
4122 MAG	GZ 17 1 1	1.4122	-	**90**
4034 MAG	GZ 13	1.4034	ER 420	**90**
308 H MAG	G 19 9 H	1.4948	ER 308 H	**91**
309 MAG	G 23 12	1.4829	ER 309	**91**
310 H MAG	G 25 20 H	1.4848	ER 310 H	**91**
4820 MAG	G 25 5	1.4820	-	**91**
4830 MAG	G(Z) 25 24	1.4830	-	**91**
4850 MAG	G(Z) 21 32 Nb	1.4850	-	**91**
4853 MAG	G(Z) 25 35 Nb	1.4551	-	**91**
Alloy C MAG	S Ni 6059 (NiCr23Mo16)*	2.4607	ER NiCrMo-13	**91**
625 MAG	S Ni 6625 (NiCr22Mo9Nb)*	2.4831	ER NiCrMo-3	**91**
6000 MAG	S Ni 6082 (NiCr20Mn3Nb)*	2.4806	ER NiCr-3	**91**

3.2.2 Welding rods for tungsten inert gas welding of creep and heat resistant materials

capilla®	EN ISO 14343-A EN ISO 18274 * EN ISO 21952-A**	Mat.-No.:	AWS	Page
P 91 WIG	G CrMo 9 1**	1.4903	ER 90S-B9	**92**
4009 WIG	W 13	1.4009	ER 410	**92**
4015 WIG	W 17	1.4015	ER 430	**92**
4018 WIG	W 13	1.4018	ER 410	**92**
410 NiMo WIG	W 13 4	1.4351	ER 410 NiMo	**92**
4115 WIG	WZ 17 1	1.4115	-	**92**
4122 WIG	WZ 17 1 1	1.4122	-	**92**
4034 WIG	WZ 13	1.4034	ER 420	**92**
308 H WIG	W 19 9 H	1.4948	ER 308 H	**93**
309 WIG	W 23 12	1.4829	ER 309	**93**
310 H WIG	W25 20 H	1.4848	ER 310 H	**93**
4820 WIG	W 25 5	1.4820	-	**93**
4830 WIG	W(Z) 25 24	1.4830	-	**93**
4850 WIG	W(Z) 21 32 Nb	1.4850	-	**93**
4853 WIG	W(Z) 25 35 Nb	1.4551	-	**93**
Alloy C WIG	S Ni 6059 (NiCr23Mo16)*	2.4607	ER NiCrMo-13	**93**
625 WIG	S Ni 6625 (NiCr22Mo9Nb)*	2.4831	ER NiCrMo-3	**93**
6000 WIG	S Ni 6082 (NiCr20Mn3Nb)*	2.4806	ER NiCr-3	**93**

3.2.3 Tubular wires for gas shielded arc welding of creep and heat resistant material

capilla®	EN ISO 17633-A EN ISO 17634-A*	Mat.-No.:	AWS	Page
G P91 MM	T CrMo 91 BM*	-	-	**94**
G 4009 MM	T 13 MM 2	1.4009	E 410 T0-4	**94**
G 4015 MM	T 17 MM 2	1.4015	-	**94**
G 410 NiMo MM	T 13 4 MM 2	1.4351	E 410 NiMo T0-4	**94**
G 4034 MM	TZ 13 MM 2	1.4034	E 420 T0-4	**94**
G 4405 MM	TZ 17 6 1 MM 2	1.4405	-	**94**

Standards:

EN ISO 3580-A:	E CrMo 91 B 42
EN 1599:	E CrMo 91 B 42
AWS SFA-5.5:	E 9018-B9
Mat.-No.:	1.4903
Recovery:	**130%**

capilla® P 91

Product description:

CrMoVNb-alloyed basic coated stick electrode, good welding characteristics producing a creep and ruptur resistant high temperature weld metal

Applications:

Designed for welding of quenched and tempered 9%-Cr-steels.

Base materials:

1.4903 (X10CrMoVNb 9 1),
ASTM A213-T91;ASTM A335-P91,
ASTM A387 Gr. 91, ASTM A182 F91.

Typical weld metal composition:

[wt. - %]

	C	Mn	Si	Cr	Mo	Ni	V	Nb	Fe
Min.		**0,6**		**8,5**	**1**	**0,6**	**0,18**		
Max.	**0,1**	**0,7**	**0,3**	**9,5**	**1,2**	**0,8**	**0,24**	**0,07**	**Bal.**

Mechanical properties:

(Heat treatment: 760°C/2h; Minimum values at ambient temperature)

Tensile strength R_m:	680	[MPa]
Yield strength $R_{p0,2}$:	550	[MPa]
Yield strength $R_{p1,0}$:	-	[MPa]
Elongation (L=5d):	17	[%]
Impact strength (ISO-V):	47	[J]

Positions: all except PD, PE and PG

Redrying: min. 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]	Polarity
2,5	350	60 – 90	=(+)
3,25	350	80 – 120	
4,0	350	110 – 170	

also available:
find in table of content

Capilla P 91 MAG
Capilla P 91 WIG
Capilla G P91 BM (tubular wire)

Standards:

EN ISO 3580-A:	E CrMoWV 9 1 1 B 42
EN 1599:	E CrMoWV 9 1 1 B 42
AWS SFA-5.5:	~E 9015-B9
Recovery:	**130%**

capilla® P 911

Product description:

CrMoNiVWNb-alloyed basic coated stick electrode, good welding characteristics producing a creep and rupture resistant high temperature weld metal matching similar alloyed base metals

Applications:

For welding of high temperature resistant martensitic Cr-steels

Base materials:

1.4905 (X11CrNiWVNb 9-1-1), E 911,
ASTM A355 Gr. 911 (T911),
ASTM A213 Gr. T911.

Typical weld metal composition:

[wt. - %]

	C	Mn	Si	Cr	Mo	Ni	Nb	W	Fe
Min.		**0,6**		**8,5**	**0,9**	**0,6**		**0,9**	
Max.	**0,11**	**0,7**	**0,25**	**9,5**	**1,1**	**0,8**	**0,05**	**1,1**	**Bal.**

Mechanical properties:

(Heat treatment: 760°C/2h; Minimum values at ambient temperature)

Tensile strength R_m:	720	[MPa]
Yield strength $R_{p0,2}$:	550	[MPa]
Yield strength $R_{p1,0}$:	-	[MPa]
Elongation (L=5d):	15	[%]
Impact strength (ISO-V):	41	[J]

Positions: all except PD, PE and PG

Redrying: min. 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,5	350	60 – 90
3,25	350	80 – 120
4,0	350	110 – 170

Polarity =(+)

Standards:

EN ISO 3580-A:	E CrMoWV 9 0,5 2 B 42
EN 1599:	E CrMoWV 9 0,5 2 B 42
AWS SFA-5.5:	~E 9015-B9
Recovery:	**130%**

capilla® P 92

Product description:

CrMoNiVWNb-alloyed basic coated stick electrode, good welding characteristics producing a creep and rupture resistant high temperature weld metal matching similar alloyed base metals

Applications:

For welding of high temperature resistant martensitic Cr-steels

Base materials:

ASTM A355 Gr. 92 (T92),
NF 616

Typical weld metal composition:

[wt. - %]

	C	Mn	Si	Cr	Mo	Ni	V	W	N	Nb	Fe
Min.	**0,9**	**0,6**		**8,5**	**0,5**	**0,6**	**0,18**	**1,3**	**0,04**	**0,05**	
Max.	**0,12**	**0,7**	**0,4**	**9,5**	**0,7**	**0,8**	**0,24**	**1,6**	**0,07**	**0,07**	**Bal.**

Mechanical properties:

(Heat treatment: 760°C/2h; Minimum values at ambient temperature)

Tensile strength R_m:	720	[MPa]
Yield strength $R_{p0,2}$:	560	[MPa]
Yield strength $R_{p1,0}$:	-	[MPa]
Elongation (L=5d):	15	[%]
Impact strength (ISO-V):	41	[J]

Positions: all except PD, PE and PG

Redrying: min. 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,5	350	60 – 90
3,25	350	80 – 110
4,0	350	100 – 150

Polarity =(+)

Standards:

EN ISO 3580-A: E CrMoWV 12 B 42
EN 1599: E CrMoWV 12 B 42
Mat.-No.: 1.4937

Recovery: **130%**

capilla® P 121

Product description:

CrMoNiVW-alloyed basic coated stick electrode, good welding characteristics producing a creep and rupture resistant high temperature weld metal matching similar alloyed base metals

Applications:

Welding of similar high temperature 12%-Cr-steels and steel casts (quenched and tempered)

Base materials:

1.4913 (X19CrMoVNb 11-1),
1.4922 (X20CrMoV 12-1),
1.4923 (X22CrMoV 12-1),
1.4935 (X20CrNoWV 12-1),
1.4931 (GX22CrMoV 12-1).

Typical weld metal composition:

[wt. - %]

	C	Mn	Si	Cr	Mo	Ni	V	W	Fe
Min.		**0,5**		**10,5**	**0,9**	**0,5**	**0,18**	**0,5**	
Max.	**0,03**	**0,6**	**0,4**	**11,5**	**1,1**	**0,6**	**0,24**	**0,6**	**Bal.**

Mechanical properties:

(Heat treatment: 760°C/2h; Minimum values at ambient temperature)

Tensile strength R_m:	700	[MPa]
Yield strength $R_{p0,2}$:	590	[MPa]
Yield strength $R_{p1,0}$:	-	[MPa]
Elongation (L=5d):	15	[%]
Impact strength (ISO-V):	35	[J]

Positions: all except PD, PE and PG

Redrying: min. 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,5	350	60 – 90
3,25	350	80 – 110
4,0	350	100 – 150

Polarity =(+)

Standards:

EN ISO 3581-A:	E 13 B 42
EN 1600:	E 13 B 42
AWS SFA-5.4:	E 410 - 25
Mat.-No.:	1.4009
Recovery:	**150%**

capilla® 4009

Product description:

Basic coated stick electrode for overlay and fusion welding of ferritic-martensitic chromium steels.
This stick electrode is suitable for overlays of sealing surfaces of gas-, water- and steam-fittings up to service temperatures of 450°C.
The weld metal is corrosion resistant as similar alloyed chromium steels.
If the base metal does not require a higher preheating temperature, T_{PH} = 200°C is recommended.

Applications:

The electrode shows an excellent suitability for overlay and fusion welding of 13 % Cr-steels.

Suitable for materials like:

1.4000, 1.4001, 1.4002, 1.4006, 1.4021, 1,4024.

Typical weld metal composition:

[wt. - %]

	C	Cr	Mn	Fe
Min.		**11,5**		
Max.	**0,1**	**14,5**	**0,7**	**Bal.**

Mechanical properties:

(Heat treatment: 680°C/8h; Minimum values at ambient temperature)

Tensile strength R_m:	650	[MPa]
Yield strength $R_{p0,2}$:	450	[MPa]
Yield strength $R_{p1,0}$:	-	[MPa]
Elongation (L=5d):	15	[%]
Hardness:	180	[HB 30]
	35	[HRC] without heat reatment

Positions: all except PD, PE and PG

Redrying: 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,5	350	60 – 90
3,25	350	80 – 110
4,0	350	100 – 150

Polarity =(+)

also available:
find in table of content

Capilla 4009 MAG
Capilla 4009 WIG

Standards:

EN ISO 3581-A:	E 17 B 42
EN 1600:	E 17 B 42
AWS SFA-5.4:	E 430 - 25
Mat.-Nr.:	1.4015
Recovery:	**150%**

capilla® 4015

Product description:

Basic coated stick electrode suitable for overlays of sealing surfaces at gas-, water- and steam-fittings up to service temperatures of 450°C.
The weld metal has a comparable corrosion resistance as similar alloyed chromium steels.
Scaling resistant up to 950°C.
It is recommended to preheat the work piece to approx. 250°C before welding.
A stress-relief-heat treatment up to temperatures of T_{PWHT} = 800°C is recommended if T_{PWHT} is not limited by the properties of the base metal.

Applications:

The electrode is suitable for overlay and fusion welding of heat treatable steels alloyed with 17 % chromium.
Often used as cover pass on tough austenitic filler passes (e.g in sulphurous media at elevated temperatures).

Suitable for materials like:

1.4057, 1.4740, 1.4742, 1.4059, 1.4741.

Typical weld metal composition:

[wt. - %]

	C	Cr	Mn	Fe
Min.		**16**	**0,5**	
Max.	**0,1**	**18**	**1**	**Bal.**

Mechanical properties:

(Heat treatment: 800°C/1h; Minimum values at ambient temperature)

Tensile strength R_m:	540	[MPa]
Yield strength $R_{p0,2}$:	340	[MPa]
Yield strength $R_{p1,0}$:	-	[MPa]
Elongation (L=5d):	20	[%]
Hardness:	150	[HB 30]
	240	[HB 30] without heat reatment

Positions: all except PD, PE and PG

Redrying: 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,5	350	60 – 90
3,25	350	80 – 110
4,0	350	100 – 150

Polarity =(+)

also available:
find in table of content

Capilla 4015 MAG
Capilla 4015 WIG
Capidur 4015

Standards:

EN ISO 3581-A:	EZ 13 1 B 42
EN 1600:	EZ 13 1 B 42
AWS SFA-5.4:	~E 410 - 25
Mat.-No.:	1.4018
Recovery:	**150%**

capilla® 4018

Product description:

Basic coated stick electrode suitable for overlays of sealing surfaces at gas, water and steam fittings up to service temperatures of 450°C.
The weld metal is corrosion resistant as similar alloyed chromium steels.
It is recommended to preheat the work piece to approx. 250°C.
A stress-relief heat treatment at T_{PWHT} up to 680°C is recommended.

Applications:

The electrode is suitable for overlay and fusion welding of heat treatable steels with 13 % Cr.
Often used as filler material for cover passes on austenitic fusion weldings (e.g. in sulphurous media at higher temperatures).

Suitable for materials like:

1.4008.

Typical weld metal composition:

[wt. - %]

	C	Cr	Ni	Fe
Min.		**11,5**	**1,5**	
Max.	**0,1**	**13,5**	**2**	**Bal.**

Mechanical properties:

(Heat treatment: 640°C/8h; Minimum values at ambient temperature)

Tensile strength R_m:	650	[MPa]
Yield strength $R_{p0,2}$:	450	[MPa]
Yield strength $R_{p1,0}$:	-	[MPa]
Elongation (L=5d):	25	[%]
Hardness:	180 35	[HB 30] [HRC] without heat reatment

Positions: all except PD, PE and PG

Redrying: 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,5	350	60 – 90
3,25	350	80 – 110
4,0	350	100 – 150

Polarity =(+)

also available:
find in table of content

Capilla 4018 MAG
Capilla 4018 WIG
Capilla G 4018 BM (tubular wire)

Standards:	
EN ISO 3581-A:	E 13 4 B 42
EN 1600:	E 13 4 B 42
AWS A 5.4:	E 410 NiMo-25
Mat.-No.:	1.4351
Recovery:	**150%**

capilla® 410 NiMo

Product description:

Basic coated stick electrode for overlay and joint welding of ferritic-martensitic chromium steels. The weld metal is corrosion resistant as similar alloyed chromium (nickel) steels and exhibits a very good resistant against wear and cavitation, especially when used as material of hydraulic turbines. If thick-walled components have to be preheated at 200°C, a post weld heat treatment should be performed to improve the toughness of weld and base metal.

Applications:

The electrode is suitable for overlay and fusion welding of 13 % chromium (nickel) steels.

Suitable for materials such as:
1.4313, 1.4001, 1.4002.

Typical weld metal composition:

[wt. - %]

	C	Cr	Ni	Mo	Mn	Fe
Min.		**11,5**	**3**	**0,5**		
Max.	**0,1**	**14,5**	**5**	**1**	**0,7**	**Bal.**

Mechanical properties:

(Heat treatment: 600°C/8h; Minimum values at ambient temperature)

Tensile strength R_m:	800	[MPa]
Yield strength $R_{p0,2}$:	600	[MPa]
Yield strength $R_{p1,0}$:	-	[MPa]
Elongation (L=5d):	25	[%]
Hardness:	310	[HB 30]
	38	[HRC] without heat reatment

Positions: all except PD, PE and PG

Redrying: 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,5	350	60 – 90
3,25	350	80 – 110
4,0	350	100 – 150

Polarity =(+)

also available:
find in table of content

Capilla 410 NiMo MAG
Capilla 410 NiMo WIG
Capilla G 135 MM (tubular wire)

Capidur 410 NiMo

Standards:

EN ISO 3581-A: EZ 17 6 1 B 42
EN 1600: EZ 17 6 1 B 42
Mat.-No.: ~1.4405

Recovery: **150%**

capilla® 4405

Product description:

Basic coated high-recovery stick electrode suitable for welding of similar alloyed stainless ferritic-martensitic chromium steels. Overlay welding of steam and gas fitting for service temperatures up to 450°C.
The corrosion resistance of the weld metal is comparable with similar CrNi(Mo) steel grades and casts.
Preheating of thick walled base materials (s ≥ 10mm): 150 – 350°C

A PWHT is recommended.

Applications:

The electrode is perfectly suitable for overlay and fusion welding of 13 - 17 % Cr(Ni)- steels.

Typical weld metal composition:

[wt. - %]

	C	Cr	Ni	Mo	Mn	Fe
Min.		**16**	**5**	**0,8**		
Max.	**0,06**	**17**	**6**	**1,3**	**0,7**	**Bal.**

Mechanical properties:

(Heat treatment: 600°C/8h; Minimum values at ambient temperature)

Tensile strength R_m:	800	[MPa]
Yield strength $R_{p0,2}$:	570	[MPa]
Yield strength $R_{p1,0}$:	-	[MPa]
Elongation (L=5d):	15	[%]
Impact strength (ISO-V):	35	[J]

Positions: all except PD; PE and PG

Redrying: 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,5	350	60 – 90
3,25	350	80 – 110
4,0	350	100 – 150

Polarity =(+)

also available:
find in table of content

Capilla G 4405 BM (tubular wire)

Standards:

EN ISO 3581-A: EZ 17 1 B 42
EN 1600: EZ 17 1 B 42
Mat.-No.: 1.4115

Recovery: **150%**

capilla® 4115

Product description:

Basic coated high-recovery stick electrode suitable for welding of similar alloyed stainless chromium steels. Overlay welding of steam and gas fitting for service temperatures up to 450°C.

Preheating: similar base metals: 300 – 400°C,
dissimilar base metals: 150 – 350°C.

Applications:

The electrode is perfectly suitable for overlay and fusion welding of 17 % chromium (nickel) steels.

Suitable for materials like:

1.4313, 1.400, 1.4001, 1.4002.

Typical weld metal composition:

[wt. - %]

	C	Cr	Ni	Mo	Mn	Fe
Min.	**0,15**	**16**		**0,8**		
Max.	**0,2**	**17**	**0,5**	**1,2**	**0,7**	**Bal.**

Mechanical properties:

(Heat treatment: 720°C/8h; Minimum values at ambient temperature)

Tensile strength R_m:	700	[MPa]
Yield strength $R_{p0,2}$:	650	[MPa]
Yield strength $R_{p1,0}$:	-	[MPa]
Elongation (L=5d):	15	[%]
Hardness:	200 43	[HB 30] [HRC] without heat reatment

Positions: all except PD; PE and PG

Redrying: 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,5	350	60 – 90
3,25	350	80 – 110
4,0	350	100 – 150

Polarity =(+)

also available:
find in table of content

Capilla 4115 MAG
Capilla 4115 WIG
Capidur 4115

Standards:

EN ISO 3581-A: EZ 17 1 1 B 42
EN 1600: EZ 17 1 1 B 42
Mat.-No.: 1.4122

Recovery: **150%**

capilla® 4122

Product description:

Basic electrode for weld metal which is corrosion resistant as chromium steels of the same or similar kind.
In case of welding unalloyed or low alloyed base metals, preheating of the work piece is recommended (150 - 350°C; depending on wall thickness).
Base metals of the same or similar kind should be preheated between 300 and 400°C.

Applications:

The electrode is suitable for overlay and fusion welding of curable 17%-chromium steels.

Overlay welding of gas, water and steam valves and fittings. Service temperatures up to 450°C.
Furthermore suitable for heat and wear resistant overlays of rolls, drums and gripper tongs.

Typical weld metal composition:

[wt. - %]

	C	Cr	Ni	Mo	Mn	Fe
Min.		**16**		**0,9**		
Max.	**0,4**	**18**	**0,5**	**1,1**	**0,6**	**Bal.**

Mechanical properties:

(Heat treatment: 760°C/2h; Minimum values at ambient temperature)

Tensile strength R_m:	800	[MPa]
Yield strength $R_{p0,2}$:	600	[MPa]
Yield strength $R_{p1,0}$:	-	[MPa]
Elongation (L=5d):	12	[%]
Hardness:	230	[HB 30]
	48	[HRC] without heat reatment

Positions: all except PD, PE and PG

Redrying: 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,5	350	60 – 90
3,25	350	80 – 110
4,0	350	100 – 150

Polarity =(+)

also available:
find in table of content

Capilla 4122 MAG
Capilla 4122 WIG

Standards:

EN ISO 3581-A:	EZ 13
EN 14700:	E Fe 7
Mat.-No.:	1.4034
Recovery:	**150%**

capilla® 4034

Product description:

Basic coated stick electrode for weld metal which is corrosion resistant as chromium steels of the same or similar kind.
In case of welding unalloyed or low alloyed base metals preheating of the work piece is recommended (150°C - 350°C; depending on wall thickness).
Base metals of the same or similar kind should be preheated in the range between 300 and 400°C.

Applications:

The electrode is suitable for overlay and fusion welding of curable 13%-chromium steels.

Overlay welding of gas, water and steam valves and fittings. Service temperatures up to 450°C. Furthermore suitable for heat and wear resistant overlays of rolls, drums and gripper tongs.

Typical weld metal composition:

[wt. - %]

	C	Cr	Mn	Ni	Fe
Min.		**12,5**			
Max.	**0,4**	**13,5**	**0,5**	**0,6**	**Bal.**

Mechanical properties:

(Heat treatment: 550 - 760°C/ 2h; Minimum values at ambient temperature)

Hardness:	240 – 360	[HB 30
	51 – 55	[HRC] without heat reatment

Positions: all except PD, PE and PG

Redrying: 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,5	350	60 – 90
3,25	350	80 – 110
4,0	350	100 – 150

Polarity =(+)~

Standards:

EN ISO 3581-A:	E 19 9 H R 12
EN 1600:	E 19 9 R 12
AWS A 5.4:	E 308 H-16
Mat.-No.:	1.4948

capilla® 308 H

Product description:

Rutile-basic coated stick electrode suitable for fusion welding of heat resistant stainless austenitic steel grades without Nb or Ti.

Service temperatures: up to 700°C

Applications:

Suitable for welding steel grades like:

1.4948, 1.4878, 1.4550.

Typical weld metal composition:

[wt. - %]

	C	Cr	Ni	Fe
Min.		**18**	**9**	
Max.	**0,03**	**20**	**11**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Tensile strength R_m:	550	[MPa]
Yield strength $R_{p0,2}$:	320	[MPa]
Yield strength $R_{p1,0}$:	-	[MPa]
Elongation (L=5d):	35	[%]
Impact strength (ISO-V):	70	[J]

Positions: all except PG

Redrying: 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,0	300	40 – 60
2,5	300	50 – 90
3,25	350	80 – 110
4,0	350	100 – 150
5,0	450	150 – 200

Polarity =(+)~

also available:
find in table of content

Capilla 308 KB
Capilla 308 L
Capilla 308 LR

Capilla 308 MAG
Capilla 308 WIG
Capilla G 308 L RM (tubular wire)

Standards:

EN ISO 3581-A: E 19 12 3 R 12
EN 1600: E 19 12 3 R 12
AWS A 5.4: E 316 H-16

capilla® 316 H

Product description:

Rutile-basic coated stick electrode suitable for fusion welding of heat resistant stainless Cr-Ni-Mo-steel grades.
Due to elevated Si- and Cr-contents the weld metal has better scaling resistance in comparison to Capilla 316 L.

Applications:

Suitable for welding steel grades like:

1.4401, 1.4404, 1.4406, 1.4408,
1.4420, 1.4435, 1.4436, 1.4571,
1.4573, 1.4580, 1.4581, 1.4583.

Typical weld metal composition:

[wt. - %]

	C	Si	Cr	Ni	Mo	Fe
Min.			**18**	**11**	**2,5**	
Max.	**0,03**	**1,0**	**20**	**13**	**3**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Tensile strength R_m:	550	[MPa]
Yield strength $R_{p0,2}$:	320	[MPa]
Yield strength $R_{p1,0}$:	-	[MPa]
Elongation (L=5d):	35	[%]
Impact strength (ISO-V):	70	[J]

Positions: all except PG

Redrying: 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]	**Polarity**
2,0	300	40 – 60	=(+)~
2,5	300	60 – 90	
3,25	350	80 – 110	
4,0	350	100 – 150	
5,0	450	150 – 200	

also available:
find in table of content

Capilla 316 KB
Capilla 316 L
Capilla 316 LF
Capilla 316 LR
Capilla 316 MAG
Capilla 316 WIG
Capilla G 316 L RM (tubular wire)
Capicoat 316 H

Standards:

EN ISO 3581-A:	E 23 12 R 32
EN 1600:	E 23 12 R 32
AWS A 5.4:	E 309 -26
Mat.-No.:	~1.4829
Recovery:	**120%**

capilla® 309

Product description:

Rutile-basic coated stick electrode for fusion welding of heat resistant Cr-Ni steels.
Also suitable for fusion welding of dissimilar steels (high alloyed to low alloyed steels).
The weld metal is heat resistant up to 1050°C.
Also appropriate for overlay weldings of non-alloyed steels, if an 18/8 Cr-Ni alloy shall be realised in the first layer.

Applications:

Claddings, buffer layers and joints

Base materials:

1.4710, 1.4729, 1.4740, 1.4825, 1.4828, 1.4878, 1.4780, 1.4541, 1.4550, 1.4712, 1.4724, 1.4742, 1.4826

Typical weld metal composition:

[wt. - %]

	C	Cr	Ni	Fe
Min.		**21**	**11**	
Max.	**0,08**	**23**	**13**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Tensile strength R_m:	550	[MPa]
Yield strength $R_{p0,2}$:	400	[MPa]
Yield strength $R_{p1,0}$:	430	[MPa]
Elongation (L=5d):	30	[%]
Impact strength (ISO-V):	55	[J]

Positions: all except PG

Redrying: 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,0	300	40 – 60
2,5	300	60 – 90
3,25	350	80 – 110
4,0	350	100 – 150
5,0	450	150 – 200

Polarity =(+)~

also available:
find in table of content

Capilla 309 MAG
Capilla 309 WIG

Capilla G 309 RM (tubular wire)

Standards:

EN ISO 3581-A:	E 25 20 H R 12
EN 1600:	E 25 20 H R 12
AWS A 5.4:	E 310H -16
Mat.-No.:	~1.4846

capilla® 310 H

Product description:

Basic coated stick electrode for welding of heat resistant CrNi-steels. The weld metal is fully austenitic. It is resistant to low-sulphur, nitrogenous gases at service temperatures up to 1200°C.

Not resistant to high sulphuric gases.

Applications:

Suitable for welding steel grades like:

1.4826, 1.4837, 1.4848.

Typical weld metal composition:

[wt. - %]

	C	Cr	Ni	Mn	Fe
Min.		**23**	**19**	**2,5**	
Max.	**0,4**	**26**	**21**	**3**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Tensile strength R_m:	600	[MPa]
Yield strength $R_{p0,2}$:	400	[MPa]
Yield strength $R_{p1,0}$:	450	[MPa]
Elongation (L=5d):	10	[%]

Positions: all except PG

Redrying: 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,0	250/300	60 – 90
2,5	300	80 – 110
3,25	350	100 – 150
4,0	350	150 – 190
5,0	350	160 – 210

Polarity =(+)~

also available:
find in table of content

Capilla 310
Capilla 310 KB
Capilla 310 H MAG
Capilla 310 H WIG

Standards:

EN ISO 3581-A: E 25 4 R 32
EN 1600: E 25 4 R 32
Mat.-No.: 1.4820

Recovery: **120%**

capilla® 4820

Product description:

Rutile-basic coated stick electrode suitable for cladding and fusion welding of similar alloyed 25%-Cr-steels.

Scaling resistant in oxidising fume gases up to 1150°C.

Very resistant to sulphuric gases at elevated temperatures

Applications:

Suitable for cladding and fusion welding of corrosion and scaling resistant 25%-Cr-steels without Mo.

The weld deposit is corrosion resistant like similar alloyed duplex stainless steels.

Base materials:

1.4340, 1.4347, 1.4821.

Typical weld metal composition:

[wt. - %]

	C	Cr	Ni	Fe
Min.	**0,05**	**25**	**4,5**	
Max.	**0,08**	**26**	**5,5**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Tensile strength R_m:	700	[MPa]
Yield strength $R_{p0,2}$:	500	[MPa]
Yield strength $R_{p1,0}$:	-	[MPa]
Elongation (L=5d):	20	[%]
Hardness:	180	[HB 30]

Positions: all except PG

Redrying: 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,0	300	40 – 60
2,5	300	60 – 90
3,25	350	80 – 110
4,0	350	100 – 150
5,0	450	150 – 200

Polarity =(+)

also available:
find in table of content

Capilla 4820 MAG
Capilla 4820 WIG

Standards:

EN ISO 3581-A: EZ 25 24 Nb B 32
EN 1600: EZ 25 24 Nb B 32
Mat.-No.: 1.4830

Recovery: **120%**

capilla® 4830

Product description:

Basic coated high recovery stick electrode;
The deposited weld metal has a fully austenitic structure with carbide precipitations.

Scaling resistant up to 1000°C

Applications:

Fusion welding and cladding of heat resistant fully austenitic steels and similar alloyed steel casts, e.g.

Material No.: 1.4855, 1.4845.

Typical weld metal composition:

[wt. - %]

	C	Cr	Ni	Nb	Fe
Min.		**24**	**23**	**0,9**	
Max.	**0,25**	**26**	**25**	**1,2**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Tensile strength R_m:	600	[MPa]
Yield strength $R_{p0,2}$:	400	[MPa]
Yield strength $R_{p1,0}$:	450	[MPa]
Elongation (L=5d):	10	[%]

Positions: all except PE and PG

Redrying: 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]	Polarity
2,5	300	60 – 90	=(+)~
3,25	350	80 – 110	
4,0	350	100 – 150	

Standards:

EN ISO 3581-A: EZ 21 32 Nb B 32
EN 1600: EZ 21 32 Nb B 32
Mat.-No.: ~1.4850

Recovery: **130%**

capilla® 4850

Product description:

Basic coated high recovery stick electrode;
The deposited weld metal has a fully austenitic structure with carbide precipitations.

Scaling resistant up to 1050°C

Applications:

Joint and overlay weldings at heat resistant steels and sorts of steel cast which have similar alloying composition e.g.

Material No.: 1.4876, 1.4861, 1.4859.

Typical weld metal composition:

[wt. - %]

	C	Cr	Ni	Nb	Fe
Min.	**0,12**	**21**	**32**	**0,9**	
Max.	**0,18**	**23**	**35**	**1,2**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Tensile strength R_m:	600	[MPa]
Yield strength $R_{p0,2}$:	380	[MPa]
Yield strength $R_{p1,0}$:	400	[MPa]
Elongation (L=5d):	25	[%]
Impact strength (ISO-V):	50	[J]

Positions: all except PE and PG

Redrying: 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]	Polarity
2,0	300	60 – 90	=(+)~
3,25	350	80 – 110	
4,0	350	100 – 150	

also available:
find in table of content

Capilla 4850 MAG
Capilla 4850 WIG

Standards:

EN ISO 3581-A:	EZ 25 35 Nb B 32
EN 1600:	EZ 25 35 Nb B 32
EN 14700:	~E Ni 1
Mat.-No.:	~1.4853
Recovery:	**130%**

capilla® 4853

Product description:

Basic coated high-recovery stick electrode suitable for welding of high heat resistant steel casts.

The weld metal is scaling resistant at service temperatures up to 1050°C.

Applications:

Fusion welding and cladding of similar alloyed heat resistant steels and steel casts e.g.

Material No.: 1.4852

Typical weld metal composition:

[wt. - %]

	C	Cr	Ni	Nb	Mn	Fe
Min.	**0,3**	**25**	**34**	**1,2**	**0,9**	
Max.	**0,5**	**27**	**36**	**1,5**	**1,1**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Tensile strength R_m:	600	[MPa]
Yield strength $R_{p0,2}$:	400	[MPa]
Yield strength $R_{p1,0}$:	450	[MPa]
Elongation (L=5d):	8	[%]

Positions: all except PE and PG

Redrying: 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]	Polarity
2,5	300	60 – 90	=(+)~
3,25	350	80 – 110	
4,0	350	100 – 150	

also available:
find in table of content

Capilla 4853 MAG
Capilla 4853 WIG

Standards:

EN ISO 3581-A:	EZ 18 36 Nb B 32
EN 1600:	EZ 18 36 Nb B 32
EN 14700:	~E Ni 1
AWS A 5.4:	~ E330-15
Mat.-No.:	~ 1.4863
Recovery:	**130%**

capilla® 4863

Product description:

Basic coated high-recovery electrode suitable for welding of high heat resistant steels and steel casts. Scaling resistant at service temperatures up to 950°C.
High resistance to carburizing atmosphere.

Applications:

Fusion welding and cladding of similar alloyed heat resistant steels and steel casts e.g.

Material No.: 1.4849, 1.4864, 1.4865.

Typical weld metal composition:

[wt. - %]

	C	Cr	Ni	Nb	Fe
Min.	**0,19**	**17**	**34**	**1,2**	
Max.	**0,25**	**19**	**36**	**1,5**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Tensile strength R_m:	550	[MPa]
Yield strength $R_{p0,2}$:	320	[MPa]
Yield strength $R_{p1,0}$:	340	[MPa]
Elongation (L=5d):	15	[%]
Impact strength (ISO-V):	40	[J]

Positions: all except PE and PG

Redrying: 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,5	300	60 – 90
3,25	350	80 – 110
4,0	350	100 – 150

Polarity =(+)~

Standards:

EN ISO 14172: ~E Ni 6702 (NiCr28Fe6W)
Mat.-No.: ~2.4879

Recovery: **130%**

capilla® 4879

Product description:

Basic coated high recovery stick electrode suitable for welding of heat resistant Ni-base alloys and very high alloyed NiCr(W)-steel casts.
Scaling resistant at service temperatures up to 1150°C.

Applications:

Fusion welding and cladding of similar alloyed heat resistant alloys e.g.

Material No.: 2.4879.

Typical weld metal composition:

[wt. - %]

	C	Cr	Ni	W	Fe
Min.	**0,4**	**27**	**48**	**4**	
Max.	**0,6**	**30**	**52**	**5**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Tensile strength R_m:	650	[MPa]
Yield strength $R_{p0,2}$:	450	[MPa]
Yield strength $R_{p1,0}$:	500	[MPa]
Elongation (L=5d):	5	[%]
Impact strength (ISO-V):	-	[J]

Positions: all except PE and PG

Redrying: 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,5	300	60 – 90
3,25	350	80 – 110
4,0	350	100 – 150

Polarity =(+)~

Standards:

EN ISO 14172	E Ni 6625 (NiCr22Mo9Nb)
EN 14700:	E Ni 2
AWS A 5.11:	E NiCrMo 3
Mat.-No.:	2.4621

capilla® 625 K

Product description:

High corrosion resistance in several media, also against stress corrosion cracking.
Scale resistant at service temperatures up to 1100°C, good mechanical properties up to 1000°C and down to -196°C.

Max. service temperature in sulphurous media: 500°C.

Applications:

Joints and claddings of similar materials and steels.

Fusion welding of CrNi(N) steels for cryogenic applications and heat treatable nickel steels.

Appropriate base metals:

Alloy 800, 1.4876, 2.4856, 1.4539.

Typical weld metal composition:

[wt. - %]

	C	Cr	Mo	Nb	Ni
Min.		**19**	**8**	**2**	
Max.	**0,6**	**30**	**11**	**4**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Tensile strength R_m:	760	[MPa]
Yield strength $R_{p0,2}$:	450	[MPa]
Yield strength $R_{p1,0}$:	-	[MPa]
Elongation (L=5d):	30	[%]
Impact strength (ISO-V):	75 60	[J] [J] -196°C

Positions: all except PG

Redrying: 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,5	300	60 – 90
3,25	350	80 – 110
4,0	350	100 – 150
5,0	350	150 – 200

Polarity =(+)

also available:
find in table of content

Capilla 625
Capilla 625 MIG
Capilla 625 WIG

Standards:

DIN EN ISO 14172:	E Ni 6059 (NiCr23Mo16)
(DIN 1736):	EL-NiCr 23 Mo 16
(DIN 8555):	E: 23-UM-200 CPRTZ
AWS A5.14:	E NiCrMo-13
Mat.-No.:	2.4609
Recovery:	**150%**

capilla® Alloy C

Product description:

The weld metal of this rutile-basic coated stick electrode is corrosion resistant in reducing and especially oxidising media. Due to the high Cr-content this alloy is heat and scaling resistant.

The weld deposit is work hardening.

Applications:

Claddings and fusion welds of similar alloyed materials used in the chemocal plan engineering. Also suitable for corrosion resistant claddings on mild steels.
Also used for wear resistant weldings on hot forming tools

base materials:

NiCr21Mo14W (2.4602),
NiCr23 Mo16Al (2.4605),
NiMo16Cr16Ti (2.4610),
NiMo16Cr15W (2.4819).

Typical weld metal composition:

[wt. - %]

	C	Si	Cr	Mo	Fe	Mn	Ni
Min.			**22**	**15**			
Max.	**0,01**	**0,1**	**24**	**16**	**1,5**	**0,5**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Tensile strength R_m:	700	[MPa]
Yield strength $R_{p0,2}$:	420	[MPa]
Yield strength $R_{p1,0}$:	-	[MPa]
Elongation (L=5d):	30	[%]
Impact strength (ISO-V):	60	[J]

Positions: -

Redrying: 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,5	300	60 – 90
3,25	350	80 – 110
4,0	350	100 – 150
5,0	350	150 – 200

Polarity =(+)

also available:
find in table of content

Capilla Alloy C MAG
Capilla Alloy C WIG

Standards:

EN ISO 14172: ~ E Ni 6082 (NiCr20Mn3Nb)
EN 14700: E Ni 2
AWS A 5.11: ~ E NiCrFe-3
Mat.-No.: ~ 2.4648

capilla® 6000 DL

Product description:

Basic coated stick electrode for fusion welding and cladding of nickel alloys and cryogenic nickel steels.
In case of dissimilar welding of nickel base materials to carbon steels even at high temperatures no carbon diffusion from the ferritic base material into the fully austenitic weld metal occurs.

Good resistance to thermal shocks.

Applications:

Especially suitable for dissimilar joints at working temperatures from –196°C to + 650°C.

Temperature limitations:
Scale resistant up to 1000°C;
in sulphurous atmosphere max. 500 °C;
fully loaded welds max. 800 °C.

Material Nos.:

1.4876, 2.4870, 2.4867, 2.4816,
1.5662, 1.4429, 1.4539, 1.4922
and joints of these materials with low alloyed steels.

Typical weld metal composition:

[wt. - %]

	C	Cr	Mn	Nb	Fe	Ni
Min.	**0,03**	**18**	**4**	**2**	**3**	
Max.	**0,06**	**21**	**6**	**2,8**	**5**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Tensile strength R_m:	620	[MPa]
Yield strength $R_{p0,2}$:	380	[MPa]
Yield strength $R_{p1,0}$:	420	[MPa]
Elongation (L=5d):	35	[%]
Impact strength (ISO-V):	90	[J]
	70	[J] -196°C

Positions: all except PG

Redrying: 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,0	300	40 – 60
2,5	300	60 – 90
3,25	350	80 – 120
4,0	350	110 – 160
5,0	350	150 – 190

Polarity =(+)

also available:
find in table of content

Capilla 6000
Capilla 6000B

Capilla 6000 MAG
Capilla 6000 WIG

Standards:

EN ISO 14172: ~E Ni 6082 (NiCr20Mn3Nb)
EN 14700: E Ni 2
AWS A 5.11: ~E NiCrFe-3
Mat.-No.: ~2.4648

Recovery: **150%**

capilla® 6000 B

Product description:

Basic coated stick electrode for fusion welding and cladding of nickel alloys and cryogenic nickel steels.
In case of dissimilar welding of nickel base materials to carbon steels even at high temperatures no carbon diffusion from the ferritic base material into the fully austenitic weld metal occurs.

Good resistance to thermal shocks.

Applications:

Especially suitable for dissimilar joints at service temperatures in the range of –196°C to + 650°C.

Service temperature limitations:
Scaling resistant up to 1000 °C;
in sulphurous atmosphere max. 500 °C;
fully loaded welds max. 800 °C.

Material Nos.:

1.4876, 2.4870, 2.4867, 2.4816,
1.5662, 1.4429, 1.4539, 1.4922
and joints of these materials with low alloyed steels.

Typical weld metal composition:

[wt. - %]

	C	Cr	Mn	Nb	Fe	Ni
Min.	**0,03**	**18**	**4**	**2**	**3**	
Max.	**0,06**	**21**	**6**	**2,8**	**5**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Tensile strength R_m:	620	[MPa]
Yield strength $R_{p0,2}$:	380	[MPa]
Yield strength $R_{p1,0}$:	420	[MPa]
Elongation (L=5d):	35	[%]
Impact strength (ISO-V):	90 70	[J] [J] -196°C

Positions: all except PD, PE and PG

Redrying: 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,0	300	40 – 60
2,5	350	60 – 90
3,25	350	80 – 120
4,0	350	110 – 160
5,0	350	150 – 190

Polarity =(+)~

also available:
find in table of content

Capilla 6000
Capilla 6000 DL

Capilla 6000 MAG
Capilla 6000 WIG

Standards:

Special electrode (no standard)
Mat.-No.: ~2.4778

Recovery: **150%**

capilla® 4778

Product description:

Basic coated high-recovery stick electrode. The Co-base weld metal has an austenitic structure.

Scaling resistant up to 1250°C.

Applications:

Fusion welding and cladding of similar alloyed heat resistant materials and Ni-base alloys.

e.g. Material Nos.: 2.4778, 2.4779.

Typical weld metal composition:

[wt. - %]

	C	Cr	Co	Fe
Min.	**0,12**	**29**	**48**	
Max.	**0,18**	**30**	**50**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Tensile strength R_m:	490	[MPa]
Yield strength $R_{p1,0}$:	390	[MPa]
Yield strength $R_{p1,0/1000}$:	25 (900°C)	[MPa]
Elongation (L=5d):	6	[%]

Positions: all except PD, PE and PG

Redrying: 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,5	350	60 – 90
3,25	350	80 – 110
4,0	450	100 – 150

Polarity =(+)~

Standards:

Special electrode (no standard)
Mat.-No.: 2.4813

Recovery: **200%**

capilla® 50/50 Nb

Product description:

Rutile-basic coated special electrode suitable for construction welding of furnaces, burners and chimneys, especially if high mechanical stresses in combination with hot gas corrosion caused by sulphurous and vanadium containing media have to be expected.

High preheating (600 °C) before the welding is recommended.

Applications:

Scaling resistant in atmospheric gases and flue gases up to 1150°C .

Base metals:

IN 560, IN 657, IN 671.

Typical weld metal composition:

[wt. - %]

	C	Cr	Nb	Fe	Ni
Min.		**48**	**1,5**		
Max.	**0,1**	**49**	**1,8**	**0,8**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Tensile strength R_m:	900	[MPa]
Yield strength $R_{p0,2}$:	690	[MPa]
Yield strength $R_{p1,0}$:	450	[MPa]
Elongation (L=5d):	3	[%]

Positions: PA, PB, PC

Redrying: 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]	Polarity
2,5	350	60 – 90	=(+)~
3,25	350	80 – 110	
4,0	450	100 – 150	

3.2 Wire electrodes for welding of creep and heat resistant material

3.2.1 Solid wires for gas shielded arc welding of creep and heat resistant material

Designation	Standard	Weld Metal Analysis [Wt.%]									Properties					
capilla®	**EN ISO 14343-A EN ISO 21953-A***	**C**	**Mn**	**Si**	**Cr**	**Ni**	**Mo**	**Nb**	**others**	**Fe**	**$R_{o0,2}$ [MPa]**	**R_m [MPa]**	**L=5d [%]**	**Hardness [HB/*HRC*]**	**Hardness (PWHT) [HB/*HRC*)**	**SG**
P 91 MAG	G CrMo 91* 1.4903	0,1	0,5	0,3	9	0,7	1	0,06	-	Bal.	520	620	17	-	ISO-V 50 J (760°C/4h)	M13
4009 MAG	G 13 1.4009	0,08	0,6	0,9	14	0,4	-	-	-	Bal.	450	650	15	*35*	180 (680°C/8h)	M13
4015 MAG	G 17 1.4015	0,07	0,7	0,8	17	-	-	-	-	Bal.	340	540	20	240	150 (800°C/1h)	M13
4018 MAG	G 13 1.4018	0,06	0,6	0,3	12	1,3	-	-	-	Bal.	450	650	15	*35*	180 (680°C/8h)	M13
410 NiMo MAG	G 13 4 1.4351	0,03	0,7	0,8	13	4,7	0,5	-	-	Bal.	600	800	15	*38*	250 (600°C/8h)	M13
4115 MAG	GZ 17 1 1.4115	0,2	0,4	0,6	17	0,4	1,1	-	-	Bal.	500	70	15	*43*	200 (760°C/2h)	I1 M13
4122 MAG	GZ 17 1 1 1.4122	0,4	0,5	0,5	16	0,5	1	-	-	Bal.	600	800	12	*48*	230 (760°C/2h)	M13
4034 MAG	GZ 13 1.4034	0,4	0,5	0,5	13	0,6	-	-	-	Bal.	-	-	-	*53*	240-360	M13

Min. values at AT; shielding gas (SG) acc. EN ISO 14175; (PWHT = post weld heat treatment);
Dimensions: Ø 1,0; 1,2; 1,6 [mm]; Spools: K 300; other dimensions and packing units on demand

3.2.1 Solid wires for gas shielded arc welding of creep and heat resistant material (continued)

Designation	Standard	Weld Metal Analysis [Wt.%]									Properties				
capilla®	**EN ISO 14343-A EN ISO 18274 ***	**C**	**Mn**	**Si**	**Cr**	**Ni**	**Mo**	**Nb**	**Others**	**Fe**	**$R_{o0,2}$ [MPa]**	**R_m [MPa]**	**L=5d [%]**	**KV (ISO-V) [J]**	**SG**
308 H MAG	G 19 9 H 1.4948	0,08	1,2	1,2	19	9	-	-	-	Bal.	320	550	30	70	M13
309 MAG	G 23 12 1.4829	0,11	1,2	1,2	22	11	-	-	-	Bal.	320	550	30	70	M13
310 H MAG	G 25 20 H 1.4848	0,4	1,5	1	26	21	-	-	-	Bal.	400	600	10	-	M13
4820 MAG	G 25 5 1.4820	0,06	1	0,7	25	5	-	-	-	Bal.	500	700	20	-	M13
4830 MAG	G(Z) 25 24 1.4830	0,3	1,4	0,6	25	24	-	1,3	-	Bal.	400	600	10	-	M13
4850 MAG	G(Z) 21 32 Nb 1.4850	0,2	2,3	0,2	22	33	-	1,7	-	Bal.	380	600	25	50	M13
4853 MAG	G(Z) 25 35 Nb 1.4551	0,42	1,8	1,2	25	35	-	1,3	-	Bal.	400	600	8	-	M13
Alloy C MAG	S Ni 6059 (NiCr23Mo16)* 2.4607	0,01	0,5	0,1	23	Bal.	16	-	-	1,5	420	700	40	60	I1
625 MAG	S Ni 6625 (NiCr22Mo9Nb)* 2.4831	0,03	0,2	0,25	22	Bal.	9	3,6	-	1,5	420	760	30	60	I1
6000 MAG	S Ni 6082 (NiCr20Mn3Nb)* 2.4806	0,02	2,8	0,2	19,5	Bal.	-	2,5	-	>2	380	620	35	90	I1

Min. values at AT; shielding gas (SG) acc. EN ISO 14175; (PWHT = post weld heat treatment);
Dimensions: Ø 1,0; 1,2; 1,6 [mm]; Spools: K 300; other dimensions and packing units on demand

3.2.2 Welding rods for tungsten inert gas welding of creep and heat resistant material

Designation	Standard	Weld Metal Analysis [Wt.%]									Properties					
capilla®	**EN ISO 14343-A EN ISO 21953-A***	**C**	**Mn**	**Si**	**Cr**	**Ni**	**Mo**	**Nb**	**others**	**Fe**	**$R_{o0,2}$ [MPa]**	**R_m [MPa]**	**L=5d [%]**	**Hardness [HB/*HRC*]**	**Hardness (PWHT) [HB/*HRC*)**	**SG**
P 91 WIG	G CrMo 91* 1.4903	0,1	0,5	0,3	9	0,7	1	0,06	-	Bal.	520	620	17	-	**ISO-V** 50 J (760°C/4h)	I1
4009 WIG	W 13 1.4009	0,08	0,6	0,9	14	0,4	-	-	-	Bal.	450	650	15	*35*	180 (680°C/8h)	I1
4015 WIG	W 17 1.4015	0,07	0,7	0,8	17	-	-	-	-	Bal.	340	540	20	240	150 (800°C/1h)	I1
4018 WIG	W 13 1.4018	0,06	0,6	0,3	12	1,3	-	-	-	Bal.	450	650	15	*35*	180 (680°C/8h)	I1
410 NiMo WIG	W 13 4 1.4351	0,03	0,7	0,8	13	4,7	0,5	-	-	Bal.	600	800	15	*38*	250 (600°C/8h)	I1
4115 WIG	WZ 17 1 1.4115	0,2	0,4	0,6	17	0,4	1,1	-	-	Bal.	500	70	15	*43*	200 (760°C/2h)	I1
4122 WIG	WZ 17 1 1 1.4122	0,4	0,5	0,5	16	0,5	1	-	-	Bal.	600	800	12	*48*	230 (760°C/2h)	I1
4034 WIG	WZ 13 1.4034	0,4	0,5	0,5	13	0,6	-	-	-	Bal.	-	-	-	*53*	240-360	I1

Min. values at AT; shielding gas (SG) acc. EN ISO 14175; (PWHT = post weld heat treatment);
Dimensions: Ø 1,0; 1,6; 2,0; 2,4 [mm]; Length: 1000 [mm]; other dimensions on demand

3.2.2 Welding rods for tungsten inert gas welding of creep and heat resistant material (continued)

Designation	Standard	Weld Metal Analysis [Wt.%]									Properties				
capilla®	**EN ISO 14343-A EN ISO 18274 ***	**C**	**Mn**	**Si**	**Cr**	**Ni**	**Mo**	**Nb**	**Others**	**Fe**	**$R_{o0,2}$ [MPa]**	**R_m [MPa]**	**L=5d [%]**	**KV (ISO-V) [J]**	**SG**
308 H WIG	W 19 9 H 1.4948	0,08	1,2	1,2	19	9	-	-	-	Bal.	320	550	30	70	M13
309 WIG	W 23 12 1.4829	0,11	1,2	1,2	22	11	-	-	-	Bal.	320	550	30	70	I1
310 H WIG	W 25 20 1.4848	0,4	1,5	1	26	21	-	-	-	Bal.	400	600	10	-	I1
4820 WIG	W 25 5 1.4820	0,06	1	0,7	25	5	-	-	-	Bal.	500	700	20	-	I1
4830 WIG	W(Z) 25 24 1.4830	0,3	1,4	0,6	25	24	-	1,3	-	Bal.	400	600	10	-	I1
4850 WIG	W(Z) 21 32 Nb 1.4850	0,2	2,3	0,2	22	33	-	1,7	-	Bal.	380	600	25	50	I1
4853 WIG	W(Z) 25 35 Nb 1.4551	0,42	1,8	1,2	25	35	-	1,3	-	Bal.	400	600	8	-	I1
Alloy C WIG	S Ni 6059 (NiCr23Mo16) 2.4607	0,01	0,5	0,1	23	Bal.	16	-	-	1,5	420	700	40	60	I1
625 WIG	S Ni 6625 (NiCr22Mo9Nb)* 2.4831	0,03	0,2	0,25	22	Bal.	9	3,6	-	1,5	420	760	30	60	I1
6000 WIG	S Ni 6082 (NiCr20Mn3Nb)* 2.4806	0,02	2,8	0,2	19,5	Bal.	-	2,5	-	>2	380	620	35	90	I1

Min. values at AT; shielding gas (SG) acc. EN ISO 14175;
Dimensions: Ø 1,0; 1,6; 2,0; 2,4 [mm]; Length: 1000 [mm]; other dimensions on demand

3.2.3 Tubular wires for gas shielded arc welding of creep and heat resistant material

Designation	Standard	Weld Metal Analysis [Wt.%]									Properties					
capilla®	EN ISO 17633-A EN ISO 17634-A*	C	Mn	Si	Cr	Ni	Mo	Nb	Others	Fe	$R_{o0,2}$ [MPa]	R_m [MPa]	L=5d [%]	Hardness [HB/*HRC*]	Hardness (PWHT) [HB/*HRC*]	SG
G P91 MM	T CrMo 91 BM	0,1	0,6	0,3	9	0,7	1	0,07	V= 0,2	Bal.	550	680	17	-	220 (760°C/2h)	M13
G 4009 MM	T 13 MM 2 1.4009	0,08	0,6	0,9	12	-	-	-	-	Bal.	450	650	15	*38*	220 (680°C/8h)	M13 M21
G 4015 MM	T 17 MM 2 1.4015	0,08	1,2	0,8	17	-	-	-	-	Bal.	340	540	20	220	150 (800°C/1h)	M13 M21
G 410 NiMo MM	T 13 4 MM 2 1.4351	0,03	0,7	0,8	13	4,7	0,5	-	-	Bal.	600	800	15	*38*	250 (600°C/8h)	M13 M21
G 4034 MM	TZ 13 MM 2 1.4034	0,4	0,5	0,5	13	0,6	-	-	-	Bal.	-	-	-	*50*	240-360	M13 M21
G 4405 MM	TZ 17 6 1 MM 2 1.4405	0,06	0,7	0,4	17	6	1	-	-	Bal.	570	800	15	-	250 (620°C/4h)	M13 M21

Min. values at AT; shielding gas (SG) acc. EN ISO 14175. (PWHT = post weld heat treatment).
Dimensions: Ø 1,0; 1,2; 1,6 [mm]; Spools: K 300; other dimensions and packing units on demand.

4 Welding consumables for welding of tool steels

4.1 Coated stick electrodes for welding of tool steels

capilla®	EN 14700:	(DIN 8555):	Page
4914	E Fe 8	E 6-UM-350-PRT	**99**
64 KB	E Fe 3	E 3-UM-300-T	**100**
64 KBS	E Fe3	E 3-UM-350-T	**101**
65	E Fe 3	E 3-UM-45-T	**102**
65 Ti	E Fe 3	E 3-UM-45-T	**103**
66	E Fe 3	E 3-UM-55-T	**104**
6500	E Fe 3	E 6-UM-50-PST	**105**
6500 Ti	E Fe 3	E 6-UM-50-PST	**106**
25 S	E Fe 3	E 3-UM-50-ST	**107**
732	E Fe 3	E 3-UM-55-ST	**108**
733	E Fe 3	E 3-UM-50-T	**109**
734	E Fe 3	E 3-UM-40-PT	**110**
5400	E Fe 8	E 6-UM-60	**111**
53	E Fe 4	E 4-UM-60-ST	**112**
53 N	E Fe 4	E 4-UM-60-ST	**113**
2709	not classified	E 4-UM-40 PT	**114**
93	not classified	special alloy	**115**
6000	E Ni 2	E 23-UM-200-CRTZ	**116**
5200	E Ni 2	E 23-UM-200-CKPTZ	**117**
5200 S	E Ni 2	E 23-UM-250-CKPTZ	**118**
526	E Ni 2	E 23-UM-300-CKPTZ	**119**
533	E Ni 2	E 23-UM-200-CKPTZ	**120**
625	E Ni 2	E 23-UM-250-CKPTZ	**121**
501 EHL	E Co 3	E 20-UM-55 CTZ	**122**
501 K	E Co 3	E 20-UM-55 CTZ	**123**
506 EHL	E Co 2	E 20-UM-45 CTZ	**124**
506 K	E Co 2	E 20-UM-45 CTZ	**125**
512 EHL	E Co 2	E 20-UM-50 CTZ	**126**
512 K	E Co 2	E 20-UM-50 CTZ	**127**
516 EHL	E Co 1	E 20-UM-250 CKTZ	**128**
521 EHL	E Co 1	E 20-UM-300 CTZ	**129**
521 K	E Co 1	E 20-UM-300 CTZ	**130**
523 EHL	E Co 1	E 20-UM-350 CTZ	**131**
524 EHL	E Co 1	E 20-UM-350 CTZ	**132**

4.2 Wire electrodes for welding of tool steels

4.2.1 Solid wires for gas shielded arc welding of tool steels

capilla®	EN 14700:	(DIN 8555):	Page
4914 MAG	S Fe 8	MSG 6-GZ-350 PRT	**133**
64 MAG	S Fe 1	MSG 1-GZ-300 T	**133**
64 MAG-S	S Fe 1	MSG 1-GZ-250	**133**
65 MAG	S Fe 3	MSG 3-GZ-45 T	**133**
6500 MAG	S Fe 3	MSG 6-GZ-50 T	**133**
732 MAG	S Fe 3	MSG 6-GZ-55 ST	**133**
733 MAG	S Fe 3	MSG 6-GZ-50 ST	**133**
734 MAG	S Fe 3	MSG 3-GZ-40 ST	**133**
5400 MAG	S Fe 8	MSG 6-GZ-60 T	**133**
2709 MAG	not classified	MSG 4-GZ-40 PT	**133**
53 MAG	S Fe 4	MSG 4-GZ-60 ST	**133**
650 MAG	S Fe 8	MSG 6-GZ-350 RPT	**133**
526 MAG	S Ni 2	MSG 23-GZ-300 CKTZ	**134**
5200 MAG	S Ni 2	MSG 23-GZ-250 KPTZ	**134**
533 MAG	~ S Ni 2	MSG 23-GT-200 CPRTZ	**134**
6000 MIG	S Ni 2	MSG 23-GZ-300 CKPTZ	**134**
625 N MAG	S Ni 2	MSG 23-GZ-300 CKPTZ	**134**
838 MAG	S Ni 2	MSG 23-GZ-300 CKTZ	**134**

4.2.2 Welding rods for tungsten inert gas welding of tool steels

capilla®	EN 14700:	(DIN 8555):	Page
4914 WIG	S Fe 8	WSG 6-GZ-350 PRT	**134**
64 WIG	S Fe 1	WSG 1-GZ-300 T	**134**
64 WIG-S	S Fe 1	WSG 1-GZ-250	**134**
65 WIG	S Fe 3	WSG 3-GZ-45 T	**135**
6500 WIG	S Fe 3	WSG 6-GZ-50 T	**135**
732 WIG	S Fe 3	WSG 6-GZ-55 ST	**135**
733 WIG	S Fe 3	WSG 6-GZ-50 ST	**135**
734 WIG	S Fe 3	WSG 3-GZ-40 ST	**135**
5400 WIG	S Fe 8	WSG 6-GZ-60 T	**135**
2709 WIG	not classified	WSG 4-GZ-40 PT	**135**
53 WIG	S Fe 4	WSG 4-GZ-60 ST	**135**
650 WIG	S Fe 8	WSG 6-GZ-350 RPT	**135**
526 WIG	S Ni 2	WSG 23-GZ-300 CKTZ	**135**
5200 WIG	S Ni 2	WSG 23-GZ-250 KPTZ	**135**
533 WIG	~S Ni 2	WSG 23-GT-200 CPRTZ	**135**
6000 WIG	S Ni 2	WSG 23-GZ-300 CKPTZ	**135**
625 N WIG	S Ni 2	WSG 23-GZ-300 CKPTZ	**135**
838 WIG	S Ni 2	WSG 23-GZ-300 CKTZ	**135**
501 WIG	S Co 3	WSG 20-GG-55 CKTZ	**136**
506 WIG	S Co 2	WSG 20-GG-40 CKTZ	**136**
512 WIG	S Co 2	WSG 20-GG-45 CKTZ	**136**
516 WIG	S Co 1	WSG 20-GG-250 CKTZ	**136**
521 WIG	S Co 1	WSG 20-GG-300 CKTZ	**136**

4.2.3 Tubular wires for gas shielded arc welding of tool steels

capilla®	EN 14700:	(DIN 8555):	Page
G 135 MM	T Fe 8	MF 3-GF-40 CT	**137**
G 370 MM	T Fe 6	MF 5-GF-350 CT	**137**
G 654 MM	T Fe 3	MF 6-GF-55 G	**137**
G 654 N MM	T Fe 3	MF 6-GF-45 GP	**137**
G 5400 MM	T Fe 8	MF 6-GF-55 GP	**137**
G 64 MM	T Fe 1	MF 3-GF-300 GP	**137**
G 105 MM	T Fe 1	MF 3-GF-350 GP	**137**
G 65 MM	T Fe 3	MF 3-GF-40 PST	**137**
G 93 MM	not classified	MF 5-GF-50 CRST	**137**
G 5200 MM	T Ni 2	MF 23-GF-200 CKT	**137**
G 530 MM	~T Ni 2	MF 23-GF-200 CKTZ	**137**
G 501 MM	T Co 3	MF 20-GF-55 CKTZ	**137**
G 506 MM	T Co 2	MF 20-GF-40 CKTZ	**138**
G 512 MM	T Co 2	MF 20-GF-45 CKTZ	**138**
G 516 MM	T Co 1	MF 20-GF-250 CKTZ	**138**
G 521 MM	T Co 1	MF 20-GF-300 CKTZ	**138**
G 563 MM	T Fe 3	MF 3-GF-50 T	**138**
G 569 MM	T Fe 3	MF 6-GF-55 T	**138**
G 7940 MM	T Fe 3	MF3-GF-40 ST	**138**
G 7945 MM	T Fe 3	MF 3-GF-50 ST	**138**
G 7950 MM	T Fe 3	MF 3-GF-55 ST	**138**
G 2040 RM	TZ Fe 3	MF 3-GF-40-PT	**138**
G 2045 RM	TZ Fe 3	MF 3-GF-45-PT	**138**
G 2048 RM	TZ Fe 3	MF 3-GF-45-PT	**138**
G 2050 RM	TZ Fe 3	MF 3-GF-50-PT	**138**
G 2055 RM	TZ Fe 3	MF 3-GF-55-PT	**138**
G 53 MM	TZ Fe 4	MF 4-GF-60 ST	**138**

Standards:

EN 14700:	E Fe 7-350-cpt
EN ISO 3581-A:	EZ 13 1 R 53
(DIN 8555):	E 6-UM-350-PRT
Recovery:	**150%**

capilla® 4914

Product description:

Rutile coated high-recovery stick electrode for repair welding of hot-forming tools. The weld metal is characterised by its extraordinarily high crack resistance.

Applications:

The weld metal exhibits a combination of high tensile strength and toughness, thus allows crack-free overlays on rollers, cylinders and plier heads.

Typical weld metal composition:

[wt. - %]

	C	Cr	Ni	Fe
Min.		**12,5**	**0,8**	
Max.	**0,25**	**14**	**1**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Tensile strength R_m:	1150	[MPa]
Yield strength $R_{p0,2}$:	650	[MPa]
Yield strength $R_{p1,0}$:	-	[MPa]
Elongation (L=5d):	15	[%]
Hardness:	37	[HRC]

Positions: all except PD, PE and PG

Redrying: -

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,0	350	60 – 90
2,5	350	80 – 120
3,25	350	100 – 160
4,0	450	160 – 220
5,0	450	190 – 260

Polarity =(+)~

also available:
find in table of content

Capilla 4914 MAG
Capilla 4914 WIG

Standards:

EN 14700 E Fe 1-300-p
(DIN 8555): E 3-UM-300 GP

Recovery: **130%**

capilla® 64 KB

Product description:

Basic-coated high-recovery stick electrode for high-strength, heat treatable joint and overlay welding. The weld metal exhibits good crack resistance and is resistant against compressive and impact stress.

Applications:

The electrode is used for repair and maintenance work on dies, rails, crane rims, feeder rollers.

Base Materials:

Mild steels, tool steels, heat treatable steels (TS up to 1200 MPa), high-temperature structural steels.

Typical weld metal composition:

[wt. - %]

	C	Cr	Si	Mo	Fe
Min.	**0,06**	**2**		**0,8**	
Max.	**0,1**	**2,5**	**0,5**	**1**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Tensile strength R_m:	1000	[MPa]
Yield strength $R_{p0,2}$:	650	[MPa]
Yield strength $R_{p1,0}$:	-	[MPa]
Elongation (L=5d):	19	[%]
Hardness:	290	[HB]

Positions: all except PD, PE and PG

Redrying: 300 - 330°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,5	350	60 – 90
3,25	350	95 – 150
4,0	450	140 – 190
5,0	450	190 – 250
6,0	450	220 – 290

Polarity =(+)~

also available:
find in table of content

Capilla 64 MAG
Capilla 64 WIG

Capilla G 64 MM (tubular wire)

Standards:

EN 14700 E Fe 3-350-st
(DIN 8555): E 3-UM-350 GP

Recovery: **130%**

capilla® 64 KBS

Product description:

Basic-coated high recovery stick electrode for high-strength, heat treatable fusion and overlay welding. Also suitable as filler for difficult to weld steels. The weld metal is characterized by its high crack resistance and is extremely resistant against compressive and impact stress.

Applications:

The electrode is used for repair and maintenance welding of all kinds of medium alloyed steels especially constructional and tool steels.
Suitable for repair and manufacturing welding of dies, rails, crane rims, support rollers, various machine parts.

Typical weld metal composition:

[wt. - %]

	C	Cr	Si	Mo	Mn	Fe
Min.		**2,2**		**2**		
Max.	**0,1**	**2,7**	**0,5**	**2,5**	**1**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Tensile strength R_m:	1200	[MPa]
Yield strength $R_{p0,2}$:	810	[MPa]
Yield strength $R_{p1,0}$:	-	[MPa]
Elongation (L=5d):	-	[%]
Hardness:	350	[HB]

Positions: all except PD, PE and PG

Redrying: 300 - 330°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,5	350	60 – 90
3,25	350	95 – 150
4,0	450	140 – 190
5,0	450	190 – 250
6,0	450	220 – 290

Polarity =(+)~

also available:
find in table of content

Capilla G 105 MM (tubular wire)

Standards:

EN 14700: E Fe 3-45-st
(DIN 8555): E 3-UM-45-T
Mat.-No.: ~1.2567

Recovery: **130%**

capilla® 65

Product description:

Basic coated universal stick electrode for heat-resistant, tough repair welding of hot-forming tools, having similar alloying composition and properties. The weld metal exhibits good resistance to thermal shocks.
Service temperature max. 550°C.

Applications:

Repair and manufacturing welding of tools which are exposed to wear at elevated temperatures such as:

dies, punches, hot shearing tools, swaging tools.

Typical weld metal composition:

[wt. - %]

	C	Cr	Mn	W	V	Si	Fe
Min.	**0,1**	**2,2**	**1**	**4**	**0,4**		
Max.	**0,3**	**2,8**	**1,2**	**5**	**0,8**	**0,6**	**Bal.**

Mechanical properties:

(Minimum values at ambient temperature)

Hardness:	41 - 45	[HRC] as welded
	45 - 50	[HRC] annealed(550°C/2h)
	20 - 25	[HRC] soft annealed (ca.800°C)

Positions: all except PE and PG

Redrying:: 300 – 330 °C/2h

Dimension::

Ø [mm]	Length [mm]	Welding current [A]	**Polarity**
2,5	350	60 - 90	=(+)~
3,25	350	95 - 150	
4,0	450	140 - 190	
5,0	450	190 - 250	
6,0	450	220 - 290	

also available:
find in table of content

Capilla 65 Ti
Capilla 65 MAG
Capilla 65 WIG
Capilla G 65 MM (tubular wire)

Standards:

EN 14700:	E Fe 3-45-st
(DIN 8555):	E 3-UM-45-T
Mat.-No.:	~1.2567
Recovery:	**130%**

capilla® 65 Ti

Product description:

Rutile coated universal stick electrode for heat-resistant, tough repair welding of hot-forming tools having similar alloying composition and properties. The weld metal exhibits good resistance to thermal shocks.
Service temperature max. 550°C

Applications:

Repair and manufacturing welding of tools which are exposed to wear at elevated temperatures such as:

dies, punches, hot shearing tools, swaging tools.

Typical weld metal composition:

[wt. - %]

	C	Cr	Mn	W	V	Si	Fe
Min.	**0,1**	**2,2**	**1**	**4**	**0,4**		
Max.	**0,3**	**2,8**	**1,2**	**5**	**0,8**	**0,6**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Hardness:	41 - 45	[HRC] as welded
	45 - 50	[HRC] annealed(550°C/2h)
	20 - 25	[HRC] soft annealed (ca.800°C)

Positions: all except PE and PG

Redrying: 300 - 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,5	350	60 – 90
3,25	350	95 – 150
4,0	450	140 – 190
5,0	450	190 – 250
6,0	450	220 – 290

Polarity =(+)~

also available:
find in table of content

Capilla 65
Capilla 65 MAG
Capilla 65 WIG
Capilla G 65 MM (tubular wire)

Standards:

EN 14700: E Fe 3-55-st
(DIN 8555): E 3-UM-55-T

Recovery: **140%**

capilla® 66

Product description:

Rutile-basic coated high-recovery stick electrode for overlay welding on heat resistant forming tools.
The weld metal is extremely resistant to abrasion, impact and pressure.

Applications:

This electrode is used for repair welding of hot-forming tools such as dies.
Also qualified for new production (contour changes) of dies, as well as hardfacing of cold shearing tools.

Typical weld metal composition:

[wt. - %]

	C	Cr	Ni	Mo	W	V	Fe
Min.		**6**	**0,4**	**1**	**6**	**0,5**	
Max.	**0,4**	**8**	**0,7**	**1,5**	**8**	**0,8**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Hardness:	50 – 55	[HRC] as welded
	53 – 56	[HRC] annealed(550°C/2-8h)

Positions: all except PD, PE and PG

Redrying: 300 - 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,5	350	80 – 120
3,25	350	100 – 160
4,0	450	160 – 220
5,0	450	190 – 260
6,0	450	220 – 290

Polarity =(+)~

Standards:

EN 14700: E Fe 3-55-st
(DIN 8555): E 6-UM-50-PST
Mat.-No.: 1.2344

Recovery: **130%**

capilla® 6500

Product description:

Basic coated stick electrode for hardfacing and repair welding of tool steels such as 1.2307-1.2377.

The surfaces of the tool to be welded must be cleaned carefully. All cracks have to be removed before welding.

Applications:

Overlays of similar alloyed hot forming tool steels and hardfacing of tools made of low alloyed steels. Before welding, tool steels need to be preheated to 300 - 500°C (max.: tempering temperature of base material). Low alloyed steels should be preheated up to 200 - 300°C. Cooling should be carried out slowly in the furnace. To improve the toughness of the weld metal, a post weld heat treatment is recommended.

Typical weld metal composition:

[wt. - %]

	C	Cr	Mo	V	Fe
Min.	**0,4**	**5**	**1,2**	**0,8**	
Max.	**0,6**	**6,5**	**1,8**	**1,2**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Hardness:	approx.. 55	[HRC] as welded
	52 – 55	[HRC] annealed(550°C/2-8h)
	42 – 48	[HRC] annealed(650°C/2-8h)

Positions: all except PD, PE and PG

Redrying: 300 - 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,5	350	80 – 110
3,25	350	90 – 150
4,0	450	160 – 220
5,0	450	190 – 260
6,0	450	220 – 290

Polarity =(+)~

also available:
find in table of content

Capilla 6500 Ti
Capilla 6500 MAG
Capilla 6500 WIG
Capilla G 6500 MM (tubular wire)

Standards:

EN 14700: E Fe 3-55-st
(DIN 8555): E 6-UM-50-PST
Mat.-No.: 1.2344

Recovery: **130%**

capilla® 6500 Ti

Product description:

Rutile coated stick electrode for hardfacing and repair welding of tool steels such as 1.2307-1.2377.

The surfaces of the tool to be welded must be cleaned carefully. All cracks have to be removed before welding.

Applications:

Overlays of similar alloyed hot forming tool steels and hardfacing of tools made of low alloyed steels. Before welding, tool steels need to be preheated to 300 - 500°C (max.: tempering temperature of base material). Low alloyed steels should be preheated up to 200 - 300°C. Cooling should be carried out slowly in the furnace. To improve the toughness of the weld metal, a post weld heat treatment is recommended.

Typical weld metal composition:

[wt. - %]

	C	Cr	Mo	V	Fe
Min.	**0,4**	**5**	**1,2**	**0,8**	
Max.	**0,6**	**6,5**	**1,8**	**1,2**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Hardness:	approx.. 55	[HRC] as welded
	52 – 55	[HRC] annealed(550°C/2-8h)
	42 – 48	[HRC] annealed(650°C/2-8h)

Positions: all except PE and PG

Redrying: 300 - 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,5	350	80 – 110
3,25	350	90 – 150
4,0	450	160 – 220
5,0	450	190 – 260
6,0	450	220 – 290

Polarity =(+)~

also available:
find in table of content

Capilla 6500
Capilla 6500 MAG
Capilla 6500 WIG
Capilla G 6500 MM (tubular wire)

Standards:

EN 14700: E Fe 3-50-st
(DIN 8555): E 3-UM-50-T

Recovery: **140%**

capilla® 25 S

Product description:

Rutile-basic coated high-recovery stick electrode for overlay welding on hot forming tools.

The weld metal is extremely resistant to abrasion, impact and pressure.

Applications:

This electrode is used for repair welding of hot-forming tools, especially dies.
Also qualified for new production and the change of surface design of tools.
Furthermore suitable for hard-facing of cutting edges of cold shearing tools.

Typical weld metal composition:

[wt. - %]

	C	Cr	W	Co	V	Nb	Fe
Min.		**2**	**8**	**1**	**0,3**		
Max.	**0,3**	**2,5**	**9**	**1,5**	**0,6**	**0,4**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Hardness:	46 – 48	[HRC] as welded
	52 – 55	[HRC] annealed(550°C/2-8h)

Positions: all except PD, PE and PG

Redrying: 300 - 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,5	350	80 – 120
3,25	350	100 – 160
4,0	450	160 – 220
5,0	450	190 – 260
6,0	450	220 – 290

Polarity =(+)~

also available:
find in table of content

Capilla G 563 MM (tubular wire)

Standards:

EN 14700: E Fe 3-55-st
(DIN 8555): E 3-UM-55-ST

Recovery: **130%**

capilla® 732

Product description:

Basic coated stick electrode for welding of heat resistant overlays on hot work tool steels.
Due to a good combination of toughness and hardness, the weld metal exhibits good resistance against pressure and abrasion.

Applications:

For overlays on cutting edges of hot shearing tools, plier heads, cutting edges of deburring tools, punching tools, continuous cast rollers.
Hardfacing of cylinders and rolls of plate levelling devices. Furthermore suitable for the repair welding and new production of hot work tools.
Service temperatures: max. 550°C.

In order to improve the toughness of weld metal and heat affected zone of the base material, a post weld heat treatment is recommended.

Typical weld metal composition:

[wt. - %]

	C	Cr	Mn	Mo	Ti	Si	Fe
Min.		**6,0**	**1**	**2**			
Max.	**0,35**	**7,5**	**1,5**	**2,5**	**+**	**0,7**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Hardness:	50 – 55	[HRC]

Positions: all except PD, PE and PG

Redrying: 300 - 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,5	350	80 – 120
3,25	350	100 – 160
4,0	450	160 – 220
5,0	450	190 – 260

Polarity =(+)~

also available:
find in table of content

Capilla 732 MAG
Capilla 732 WIG

Standards:

EN 14700: E Fe 3-50-st
(DIN 8555): E 3-UM-50-ST

Recovery: **130%**

capilla® 733

Product description:

Basic coated stick electrode for welding of heat resistant overlays on hot work tool steels.
Due to a good combination of toughness and hardness, the weld metal exhibits good resistance against pressure, abrasion and cracks.

Applications:

For overlays on cutting edges of hot shearing tools, plier heads, cutting edges of deburring tools, punching tools, continuous cast rollers.
Hardfacing of cylinders and rolls of plate levelling devices. Furthermore suitable for the repair welding and new production of hot work tools.
Service temperatures: max. 550°C.

In order to improve the toughness of weld metal and heat affected zone of the base material, a post weld heat treatment is recommended.

Typical weld metal composition:

[wt. - %]

	C	Cr	Mn	Mo	Ti	Si	Fe
Min.		**4**		**3,0**			
Max.	**0,25**	**6**	**0,7**	**4,0**	**+**	**1,0**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Hardness:	45 – 50	[HRC]

Positions: all except PD, PE and PG

Redrying: 300 - 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,5	350	80 – 120
3,25	350	100 – 160
4,0	450	160 – 220
5,0	450	190 – 260

Polarity =(+)~

also available:
find in table of content

Capilla 733 MAG
Capilla 733 WIG

Standards:

EN 14700: E Fe 3-40-st
(DIN 8555): E 3-UM-40-PT

Recovery: **130%**

capilla® 734

Product description:

Basic coated stick electrode suitable for welding of heat resistant overlays on hot forming tools. Good resistance against shock, pressure and abrasive wear. The weld metal exhibits medium hardness and is not susceptible to cracks.

Applications:

For overlays on forging dies, die casting tools, continuous cast rollers, rolls, fences of tools and machines;
New production and repair of hot forming tools;

Service temperatures: max. 550°C.

Typical weld metal composition:

[wt. - %]

	C	Cr	Mn	Mo	Si	Fe
Min.		**6**		**3**		
Max.	**0,1**	**7**	**0,6**	**3,5**	**0,4**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Hardness:	38 – 42	[HRC]

Positions: all except PD, PE and PG

Redrying: 300 - 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,5	350	60 – 90
3,25	350	95 – 150
4,0	450	140 – 190
5,0	450	190 – 250

Polarity =(+)~

also available:
find in table of content

Capilla 734 MAG
Capilla 734 WIG

Standards:

EN 14700: E Fe 8-60-gpt
(DIN 8555): E 6-UM-60

Recovery: **130%**

capilla® 5400

Product description:

Basic coated Cr-Mo-V alloyed stick electrode for extremely hard overlay welding on constructional components and machine parts, which are exposed to high levels of frictional wear and heavy impacts. Hardfacing of components of earth moving machines.

Applications:

Production of new tools and repair of worn out tools and machine parts such as rolls, baffle plates, forging, pressing and drawing tools.

Typical weld metal composition:

[wt. - %]

	C	Cr	Mo	V	Fe
Min.	**0,8**	**9**	**1,5**	**1**	
Max.	**1**	**10**	**2,5**	**1,5**	**Bal.**

Mechanical properties:

(Minimum values at ambient temperature)

Hardness:	57 – 60	[HRC] as welded
	30 – 40	[HRC] 500°C
	56 – 59	[HRC] hardened 1050°C

Positions: all except PD, PE and PG

Redrying: 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]	**Polarity**
2,5	350	60 – 90	=(+)~
3,25	350	95 – 150	
4,0	450	140 – 190	
5,0	450	190 – 250	

also available:
find in table of content

Capilla 5400 MAG
Capilla 5400 WIG

Capilla G 5400 MM (tubular wire)

Standards:

EN 14700: E Fe 4-60-stp
(DIN 8555): E 4-UM-60-ST
Mat.-No.: 1.3346

Recovery: **140%**

capilla® 53

Product description:

Very thick basic coated high-recovery stick electrode for overlay welding of tool and high-speed steels.
The weld metal is resistant against abrasion, impact, pressure and temperatures up to 550°C.

Applications:

Stick electrode for the hardfacing of cutting tools, such as hot block and billet shears, coal cutting devices (mining industry), cutting, punching, forging, pressing and drawing tools.

Typical weld metal composition:

[wt. - %]

	C	Cr	Mo	V	W	Fe
Min.	**0,8**	**4**	**7**	**1,2**	**1,5**	
Max.	**1**	**5**	**9**	**1,8**	**2,5**	**Bal.**

Mechanical properties:

(Minimum values at ambient temperature)

Hardness:	58 - 62	[HRC] as welded
	63 - 65	[HRC] annealed (530°C)
	250	[HB] soft annealed (810°C)
	60 - 63	[HRC] hardened 1220°C

Positions: all except PD, PE and PG

Redrying: 300°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,5	350	80 – 120
3,25	350	100 – 160
4,0	450	160 – 220
5,0	450	190 – 260

Polarity =(+)~

also available: Capilla 53 Ti, Capilla 53 MAG, Capilla 53 WIG

Standards:

EN 14700: E Fe 4-65-st
(DIN 8555): E 4-UM-65-ST
Mat.-No.: 1.3255

Recovery: **140%**

capilla® 53 N

Product description:

Very thick basic coated high-performance stick electrode for overlay welding of cutting edges at tool bodies of low alloyed or non-alloyed steels as well as for hardfacing of hot and cold cutting tools.

Applications:

Overlay and repair welding of used and broken tools made of high-speed steels. Hardfacing of cutting edges of tools made of non-alloyed and low alloyed steels. Furthermore as armour-plating of parts which are exposed to heavy frictional wear such as hot and cold burring tools, cutting, punching, pressing and drawing tools.

Typical weld metal composition:

[wt. - %]

	C	Cr	Mo	V	W	Co	Fe
Min.	**0,7**	**4**	**1**	**1,5**	**17**	**4**	
Max.	**0,9**	**5**	**2**	**2**	**19**	**6**	**Bal.**

Mechanical properties:

(Minimum values at ambient temperature)

Hardness:	62 - 65	[HRC] as welded
	64 - 66	[HRC] annealed (570°C)
	62 - 65	[HRC] hardened 1290°C/Oil
	63 - 66	[HRC] hardened and tempered

Positions: PD, PE and PG

Redrying: 300 – 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,5	350	80 – 120
3,25	350	100 – 160
4,0	450	160 – 220
5,0	450	190 – 260

Polarity =(+)~

Standards:

EN 14700: E Fe 5-40-stp
(DIN 8555): E 4-UM-40 PT

Recovery: **160%**

capilla® 2709

Product description:

Basic coated high-recovery stick electrode, especially suitable for welding hard or hard/tough overlays. The weld metal is very resistant to metal-metal-friction wear.

Service temperature: max. 350°C

(Maraging steel).

Applications:

Overlays at metal shear blades, die stamps, cold extrusion tools, die casting moulds and plastic moulds.

Typical weld metal composition:

[wt. - %]

	C	Ni	Co	Mo	Mn	Si	Ti	Al	Fe
Min.		**17**	**10**	**4**					
Max.	**0,03**	**19**	**12**	**4,5**	**0,3**	**0,8**	**+**	**+**	**Bal.**

Mechanical properties:

(Minimum values at ambient temperature)

Hardness:	38 – 40	[HRC] as welded
	53 - 54	[HRC] annealed (480°C/3h)

Positions: PA, PB, (PC)

Redrying: 300 – 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]	**Polarity**
2,5	350	80 – 120	=(+)~
3,25	350	100 – 160	
4,0	350	160 – 220	

also available:
find in table of content

Capilla 2709 MAG
Capilla 2709 WIG

Standards:

EN 14700: not classified
(DIN 8555): special alloy

Recovery: **170%**

capilla® 93

Product description:

Rutile-basic coated stick electrode for overlay welding. The weld metal is not susceptible to cracks. Even in the first layer good hardness can be realised.
The weld metal exhibits high resistance to metal/metal friction, cavitation, corrosion and fatigue wear and provides an extremely high level of oxidation resistance when exposed to high temperatures.

Applications:

For partial or complete overlays on forging dies, die stamps, tools for hot forming in general, high-temperature pumps, rollers for continuous casting facilities, etc.

Typical weld metal composition:

[wt. - %]

	C	Cr	Co	Mo	Fe
Min.		**15**	**13**	**2,2**	
Max.	**0,15**	**16**	**14**	**2,8**	**Bal.**

Mechanical properties:

(Minimum values at ambient temperature)

Hardness:	42 – 48	[HRC] As welded

Positions: PA, PB, (PC)

Redrying: 300°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,5	350	80 – 120
3,25	350	100 – 160
4,0	450	160 – 220
5,0	450	190 – 260

Polarity =(+)~

also available: Capilla G 93 MM
find in table of content

Standards:

EN ISO 14172:	E Ni 6082 (NiCr20Mn3Nb)
EN 14700:	E Ni 2-200-ckptz
AWS A5.11:	~E Ni Cr Fe-3
Mat.-No.:	2.4648
Recovery:	**150%**

capilla® 6000

Product description:

Basic coated high-recovery stick electrode for fusion and overlay welding. The weld metal is very ductile. Welding of nickel base alloys and tough at subzero nickel steels (cryogenic applications).
Even at high temperatures, no carbon diffusion from the ferritic base metal into the fully austenitic weld metal occurs.
Good resistance to thermal shocks.

Applications:

Especially suitable for dissimilar joints at working temperatures in the range of –196°C to + 650°C.

Temperature limitations:
Scaling resistant up to 1000 °C;
in sulphurous atmosphere max. 500 °C;
fully loaded welds max. 800 °C.

Material Nos.:
1.4876, 2.4870, 2.4867, 2.4816, 1.5662, 1.4429, 1.4539, 1.4922, and joints of these materials to mild steels.

Typical weld metal composition:

[wt. - %]

	C	Cr	Mn	Nb	Fe	Ni
Min.		**18**	**4**	**2**	**3**	
Max.	**0,15**	**21**	**6**	**2,8**	**5**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Tensile strength Rm:	620	[MPa]
Yield strength $R_{p0,2}$:	380	[MPa]
Yield strength $R_{p1,0}$:	420	[MPa]
Elongation (L=5d):	35	[%]
Impact strength:	90	[J]
	70 (-196°C)	[J]

Positions: all except PD, PE and PG

Redrying: 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,0	350	40 – 60
2,5	350	60 – 90
3,25	350	80 – 110
4,0	450	100 – 150
5,0	450	150 – 200

Polarity =(+)~

also available:
find in table of content

Capilla 6000 B
Capilla 6000 DL

Capilla 6000 MIG
Capilla 6000 WIG

Standards:

EN 14700:	E Ni 2-200-ckptz
(DIN 8555):	E 23-UM-200-CKPTZ
AWS A 5.11:	~E NiCrMo 4
Mat.-No.:	c2.4887
Recovery:	**170%**

capilla® 5200

Product description:

Overlay welding on hot forming tools. The deposited metal shows good scaling resistance and good strength at elevated temperatures.
Furthermore, corrosion resistant in oxidizing and reducing media.

Applications:

Overlays on dies, hot shearing tools, punching tools and all tools used for high temperature applications.

Typical weld metal composition:

[wt. - %]

	C	Cr	Mo	W	Fe	Co	Ni
Min.		**15**	**15**	**3**	**5**	**2,5**	
Max.	**0,06**	**17**	**17**	**5**	**6**	**3,5**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Tensile strength Rm:	700	[MPa]
Yield strength $R_{p0,2}$:	400	[MPa]
Yield strength $R_{p1,0}$:	-	[MPa]
Elongation (L=5d):	25	[%]
Hardness:	220	[HB]
	>400	[HB] workhardened

Positions: PA; PB

Redrying: 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,0	350	40 – 60
2,5	350	60 – 90
3,25	350	80 – 110
4,0	450	100 – 150
5,0	450	150 – 200

Polarity =(+)~

Standards:

EN 14700:	E Ni 2-200-ckptz
(DIN 8555):	E 23-UM-200-CKPTZ
AWS A 5.11:	E NiCrMo 4
Mat.-No.:	~2.4887
Recovery:	**170%**

capilla® 5200 S

Product description:

Rutile-basic coated stick electrode for overlay welding on hot forming tools. The deposited metal exhibits good scaling resistance and good strength at elevated temperatures.
Furthermore, corrosion resistant at high temperatures in oxidizing and reducing media.

Applications:

Overlays on dies, hot shearing tools, punching tools and all tools used for high temperature applications. Furthermore, suitable for welding of corrosion resistant claddings of vessels and equipment used in the chemical industry

Typical weld metal composition:

[wt. - %]

	C	Cr	Mo	W	Fe	V	Ni
Min.		**14**	**15**	**3**	**5**		
Max.	**0,06**	**17**	**17**	**5**	**6**	**0,6**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Tensile strength Rm:	700	[MPa]
Yield strength $R_{p0,2}$:	400	[MPa]
Yield strength $R_{p1,0}$:	-	[MPa]
Elongation (L=5d):	25	[%]
Hardness:	250 >400	[HB] [HB] workhardened

Positions: PA, PB

Redrying: 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,0	350	40 – 70
2,5	350	60 – 90
3,25	350	80 – 110
4,0	450	100 – 150
5,0	450	150 – 200

Polarity =(+)~

also available:
find in table of content

Capilla 5200 MAG
Capilla 5200 WIG
Capilla G 5200 MM (tubular wire)
Capicoat 5200 S

Standards:

EN14700:	E Ni 2-200-ckptz
(DIN 8555):	E 23-UM-250 CKPTZ
EN ISO 14172:	E Ni 6625 (NiCr22Mo9Nb)
AWS A5.11:	E NiCrMo 3
Mat.-No.:	2.4621
Recovery:	**170%**

capilla® 526

Product description:

Thick coated special stick electrode for repair and maintenance of highly temperature resistant hot working tools which are heavy loaded by impact and thermal shock.

Applications:

Stick electrode suitable for hardfacing of hot shearing tools, hot deburring tools, punches, hot extrusion dies etc.

Typical weld metal composition:

[wt. - %]

	C	Cr	Mo	Nb	Fe	Ni
Min.		**20**	**8**	**3**	**2,5**	
Max.	**0,06**	**22**	**10**	**4**	**3,5**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Tensile strength R_m:	750	[MPa]
Yield strength $R_{p0,2}$:	480	[MPa]
Yield strength $R_{p1,0}$:	-	[MPa]
Elongation (L=5d):	35	[%]
Impact strength (ISO-V):	70	[J]

Positions: PA, PB

Redrying: 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,5	350	60 – 90
3,25	350	80 – 110
4,0	350	100 – 150
5,0	450	150 – 200

Polarity =(+)~

also available:
find in table of content

Capilla 526 MAG
Capilla 526 WIG

Standards:

EN 14700:	E Ni2-200-ckptz
EN ISO 14172:	E Ni6617(NiCr22Co12Mo)
AWS A5.11:	E NiCrCoMo 1
Mat.-No.:	2.4628
Recovery:	**170%**

capilla® 533

Product description:

Stick electrode for cladding and fusion welding of Ni-Cr-Co-Mo-alloys and for fusion welding of these materials with steels.
Fusion welding of dissimilar heat resistant Ni-base-alloys.
The weld metal is creep-resistant and scaling resistant at service temperatures up to 1100°C.

Applications:

Chemical equipment construction, fume gas desulphurisation plants, gas turbines, booster, furnaces.

Cladding of thermally highly loaded hot forming tools.

Base materials:

2.4851 (Alloy 617), 1.4958 (Alloy 800), 2.4851 (Alloy 601), 1.4862.

Typical weld metal composition:

[wt. - %]

	C	Cr	Co	Mo	Mn	Fe	Ti	Al	Ni
Min.		**20**	**10**	**8**					
Max.	**0,05**	**22**	**14**	**10**	**0,5**	**1**	**1**	**0,3**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Tensile strength Rm:	700	[MPa]
Yield strength $R_{p0,2}$:	400	[MPa]
Yield strength $R_{p1,0}$:	-	[MPa]
Elongation (L=5d):	30	[%]
Impact strength:	60	[J]

Positions: PA, PB, (PC)

Redrying: 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,5	350	60 – 90
3,25	350	80 – 110
4,0	450	100 – 150
5,0	450	150 – 200

Polarity =(+)~

also available:
find in table of content

Capilla 533 MAG
Capilla 533 WIG

Standards:

EN14700:	E Ni 2-200-ckptz
(DIN 8555):	E 23-UM-250 CKPTZ
EN ISO 14172:	E Ni 6625 (NiCr22Mo9Nb)
AWS A5.11:	E NiCrMo 3
Mat.-No.:	2.4621
Recovery:	**170%**

capilla® 625

Product description:

High corrosion resistance in several media, also against stress corrosion cracking.
Scale resistant at service temperatures up to 1100°C, good mechanical properties up to 1000°C and down to –196°C;

Max.service temperature in sulphurous media: 500°C.

Applications:

Joints and claddings of similar materials and steels. Fusion welding of CrNi(N) steels for cryogenic applications and heat treatable nickel steels.

Appropriate base metals:
Alloy 800, 1.4876, 2.4856, 1.4539

Typical weld metal composition:

[wt. - %]

	C	Cr	Mo	Nb	Fe	Ni
Min.		**19**	**8**	**2**	**2,5**	
Max.	**0,06**	**21**	**11**	**4**	**3,5**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Hardness:	220	[HB]
	400	[MPa]

Positions: PA, PB

Redrying: 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,5	350	60 – 90
3,25	350	80 – 110
4,0	350	100 – 150
5,0	450	150 – 200

Polarity =(+)~

also available:
find in table of content

Capilla 625 K
Capilla 625 MIG

Capilla 625 WIG

Standards:

EN 14700:	E Co 3
(DIN 8555):	E 20-UM-55 CTZ
AWS:	~E Co Cr-C
Recovery:	**170%**

capilla® 501 EHL

Product description:

Synthetic high recovery stick electrode for overlays on sealing surfaces exposed to high pressure and elevated temperatures. The weld metal has excellent sliding properties on steels and a good cavitation resistance.

Applications:

Qualified for wear and heat resistant overlays on non-, low and high alloyed steels and steel cast which are heat-, rust- and acid-resisting. The weld metal stands out due to its very good coefficient of friction in case of metal to metal wear and its capability to be highly polished. The weld metal is scaling resistant.

Machining: grinding

Typical weld metal composition:

[wt. - %]

	C	Cr	W	Co
Min.	**2,2**	**2,8**	**12**	
Max.	**2,6**	**32**	**14**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Hardness:	53 – 57	[HRC]
	43 – 47	[HRC] at 600°C

Positions: PA, PB

Redrying: 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,5	350	70 – 100
3,25	350	100 – 140
4,0	450	140 – 180
5,0	450	180 – 220

Polarity =(+)~

also available:
find in table of content

Capilla 501 K
Capilla 501 WIG

Capilla G 501 MM (tubular wire)
Capidur 501

Standards:

EN 14700: E Co-3-55-tzcs
(DIN 8555): E 20-UM-55 CTZ
AWS: ~E CoCr-C

Recovery: **130%**

capilla® 501 K

Product description:

Core wire alloyed stick electrode for overlays on sealing surfaces exposed to high pressure at elevated temperatures. The weld metal has excellent sliding properties on steels and a good cavitation resistance.

Applications:

Qualified for wear and heat resistant overlays on non-, low and high alloyed steels and steel cast which are heat-, rust- and acid-resisting. The weld metal stands out due to its very good coefficient of friction in case of metal to metal wear and its capability to be highly polished. The weld metal is scaling resistant.

Machining: grinding

Typical weld metal composition:

[wt. - %]

	C	Cr	W	Co
Min.	**2,2**	**28**	**12**	
Max.	**2,6**	**32**	**14**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Hardness:	53 – 57	[HRC]
	43 – 47	[HRC] at 600°C

Positions: PA; PB; PC

Redrying: 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]	**Polarity**
2,5	350	70 – 100	=(+)~
3,25	350	90 – 120	
4,0	350	120 - 155	
5,0	350	150 - 190	

also available:
find in table of content

Capilla 501 EHL
Capilla 501 WIG

Capilla G 501 MM (tubular wire)
Capidur 501

Standards:

EN 14700:	E Co 2
(DIN 8555):	E 20-UM-45 CTZ
AWS:	E Co Cr-A
Recovery:	**170%**

capilla® 506 EHL

Product description:

Core wire alloyed stick electrode for overlays on working surfaces stressed by heavy impact and shock and simultaneously exposed to elevated temperatures. The weld metal has a good resistance against cavitation and erosion. Welded surfaces have good sliding properties (metal to metal) and are resistant to thermal shocks.

Microstructure: Cr- and W-carbides embedded in austenitic Co-base matrix

Applications:

For overlays on sealing surfaces of steam-, gas-, water- and acid-fittings, valve seats of combustion engines.
Also suitable for hardfacing of edges of billet shears, hot extruder nozzles, sawteeth (wood processing) etc.

Typical weld metal composition:

[wt. - %]

	C	Cr	W	Co
Min.	**1,2**	**26**	**4**	
Max.	**1,4**	**30**	**6**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Hardness:	42	[HRC]

Positions: PA, PB

Redrying: 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]	**Polarity**
2,5	350	70 – 110	=(+)~
3,25	350	100 – 140	
4,0	450	140 – 180	
5,0	450	180 – 220	

also available:
find in table of content

Capilla 506 K
Capilla 506 WIG

Capilla G 506 MM (tubular wire)
Capidur 506

Standards:

EN 14700: E Co 2-40-ctz
(DIN 8555): E 20-UM-40 CTZ
AWS: E Co Cr-A

Recovery: **130%**

capilla® 506 K

Product description:

Core wire alloyed stick electrode for overlays on working surfaces stressed by heavy impact and shock and simultaneously exposed to elevated temperatures. The weld metal has a good resistance against cavitation and erosion. Welded surfaces have good sliding properties (metal to metal) and are resistant to thermal shocks.

Microstructure: Cr- and W-carbides embedded in austenitic Co-base matrix

Applications:

For overlays on sealing surfaces of steam-, gas-, water- and acid-fittings, valve seats of combustion engines.
Also suitable for hardfacing of edges of billet shears, hot extruder nozzles, sawteeth (wood processing) etc.

Typical weld metal composition:

[wt. - %]

	C	Cr	W	Co
Min.	**1,2**	**26**	**4**	
Max.	**1,4**	**30**	**6**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Hardness:	42	[HRC]

Positions: PA, PB, PC

Redrying: 300 – 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,5	350	70 – 100
3,25	350	90 – 120
4,0	350	120 - 155
5,0	350	150 - 190

Polarity =(+)~

also available:
find in table of content

Capilla 506 EHL
Capilla 506 WIG

Capilla G 506 MM (tubular wire)
Capidur 506

Standards:

EN 14700:	E Co 2
(DIN 8555):	E 20-UM-50 CTZ
AWS:	E Co Cr-B
Recovery:	**170%**

capilla® 512 EHL

Product description:

Synthetic high recovery stick electrode for overlays on working surfaces stressed by heavy impact and shock and simultaneously exposed to elevated temperatures. The weld metal has a good resistance against cavitation and erosion. Welded surfaces have good sliding properties (metal to metal) and are resistant to thermal shocks.

Microstructure: Cr- and W-carbides embedded in austenitic Co-base matrix

Applications:

For overlays on sealing surfaces of steam-, gas-, water- and acid-fittings, valve seats of combustion engines.
Also suitable for hardfacing of edges of billet shears, hot extruder nozzles, sawteeth (wood processing) etc.

Typical weld metal composition:

[wt. - %]

	C	Cr	W	Co
Min.	**1,2**	**26**	**9**	
Max.	**1,4**	**30**	**11**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Hardness:	46 – 58	[HRC]
	36 – 42	[HRC] at 600°C

Positions: PA, PB

Redrying: 300 - 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,5	350	70 – 110
3,25	350	100 – 140
4,0	450	140 – 180
5,0	450	180 – 220

Polarity =(+)~

also available:
find in table of content

Capilla 512 K
Capilla 512 WIG
Capilla G 512 MM (tubular wire)
Capidur 512

Standards:

EN 14700:	E Co 2-55-cstz
(DIN 8555):	E 20-UM-50 CTZ
AWS:	E Co Cr-B
Recovery:	**130%**

capilla® 512 K

Product description:

Core wire alloyed stick electrode for overlays on working surfaces stressed by heavy impact and shock and simultaneously exposed to elevated temperatures. The weld metal has a good resistance against cavitation and erosion. Welded surfaces have good sliding properties (metal to metal) and are resistant to thermal shocks.

Microstructure: Cr- and W-carbides embedded in austenitic Co-base matrix

Applications:

For overlays on sealing surfaces of steam-, gas-, water- and acid-fittings, valve seats of combustion engines.
Also suitable for hardfacing of edges of billet shears, hot extruder nozzles, sawteeth (wood processing) etc.

Typical weld metal composition:

[wt. - %]

	C	Cr	W	Co
Min.	**1,2**	**26**	**9**	
Max.	**1,4**	**30**	**11**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Hardness:	46 – 58	[HRC]
	36 – 42	[HRC] at 600°C

Positions: PA, PB, PC

Redrying: 300 – 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,5	350	70 – 100
3,25	350	90 – 120
4,0	350	120 - 155
5,0	350	150 - 190

Polarity =(+)~

also available:
find in table of content

Capilla 512 EHL
Capilla 512 WIG

Capilla G 512 MM (tubular wire)
Capidur 512

Standards:

EN 14700: E Co 1
(DIN 8555): E 20-UM-250 CKTZ

Recovery: **170%**

capilla® 516 EHL

Product description:

High recovery stick electrode suitable for welding of wear resistant and corrosion resistant overlay clads on un-, low and high alloyed steels and steel casts. Due to the very good coefficient of friction (metal to metal) the deposits show an outstanding resistance to sliding wear.
The weld metal has no susceptibility to cracks. The wear resistance of the cladding can be improved by strain hardening.

Max.service temperatures:
Long term duty: up to 800 °C,
Short term duty: up to 1100 °C.

Applications:

Highly heat resistant special alloy for platings which are exposed to thermal shock and impact e.g. cladding of hot working tools such as dies, punches and hot deburring tools.

If attention is paid to the strain hardening characteristic of the alloy, machining by chipping technology is feasible.

Typical weld metal composition:

[wt. - %]

	C	Cr	W	Ni	Fe	Co
Min.		**17**	**11**	**8**	**1,5**	
Max.	**0,1**	**19**	**13**	**10**	**3**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Hardness:	240	[HB]
	>300	[HB] workhardened

Positions: PA, PB

Redrying: 300 - 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,5	350	70 – 100
3,25	350	100 – 140
4,0	450	140 – 180
5,0	450	180 – 220

Polarity =(+)~

also available:
find in table of content

Capilla G 516 MM (tubular wire)
Capdur 516

Standards:

EN 14700:	E Co 1
(DIN 8555):	E 20-UM-300 CTZ
AWS:	E CoCr-E
Recovery:	**170%**

capilla® 521 EHL

Product description:

High recovery stick electrode for hardfacing of unalloyed, low alloyed and high alloyed steels. The weld metal is heat resistant and shows a good resistance to corrosive media.
In the case of friction and sliding wear the alloy has a low friction coefficient to steels.

Max. service temperatures: 800°C.

Applications:

High heat resistant special alloy with good high temperature strength. The weld metal shows an excellent resistance to mechanical shock.
This electrode is standardly used for the hardfacing of forging dies, punches and hot cutting tools.
Furthermore suitable for the cladding of sealing surface of valves used in power plants and chemical industry.

Typical weld metal composition:

[wt. - %]

	C	Cr	Mo	Ni	Co
Min.	**0,15**	**30**	**4,5**	**3**	
Max.	**0,3**	**33**	**5,5**	**4**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Hardness:	27 – 31	[HRC]

Positions: PA, PB

Redrying: 300 - 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,5	350	70 – 100
3,25	350	100 – 140
4,0	450	140 – 180
5,0	450	180 – 220

Polarity =(+)~

also available:
find in table of content

Capilla 521 K
Capilla 521 WIG

Capilla G 521 MM (tubular wire)
Capidur 521

Standards:

EN 14700:	E Co 1
(DIN 8555):	E 20-UM-300 CTZ
AWS:	E CoCr-E
Recovery:	**130%**

capilla® 521 K

Product description:

Core wire alloyed stick electrode for the hardfacing of unalloyed, low alloyed and high alloyed steels. The weld metal is heat resistant and shows a good resistance to corrosive media.
In the case of friction and sliding wear the alloy has a low friction coefficient to steels.

Max. service temperatures: 800°C.

Applications:

High heat resistant special alloy with good high temperature strength. The weld metal shows an excellent resistance to mechanical shock.
This electrode is standardly used for the hardfacing of forging dies, punches and hot cutting tools. Furthermore suitable for the cladding of sealing surface of valves used in power plants and chemical industry

Typical weld metal composition:

[wt. - %]

	C	Cr	Mo	Ni	Co
Min.	**0,15**	**30**	**4,5**	**3**	
Max.	**0,3**	**33**	**5,5**	**4**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Hardness:	27 – 31	[HRC]

Positions: PA, PB, PC

Redrying: 300 – 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,5	350	70 – 100
3,25	350	90 – 120
4,0	350	120 - 155
5,0	350	150 - 190

Polarity =(+)~

also available:
find in table of content

Capilla 521 EHL
Capilla 521 WIG

Capilla G 521 MM (tubular wire)
Capidur 521

Standards:

EN 14700: E Co 1
(DIN 8555): E 20-UM-350 CTZ

Recovery: **170%**

capilla® 523 EHL

Product description:

High recovery stick electrode for the hardfacing of non-alloyed, low alloyed and high alloyed steels. The weld metal is heat resistant and shows a good resistance against corrosive media.
In the case of friction and sliding wear the alloy has a low friction coefficient against steels.
Service temperatures up to 800°C.

Slightly harder than Capilla 521

Applications:

High heat resistant special alloy with good high temperature strength. The weld metal shows an excellent resistance to mechanical shock.
This electrode is used for hardfacing of forging dies, punches and hot cutting tools.
Furthermore suitable for the cladding of sealing surface of valves used in power plants and chemical industry.

Typical weld metal composition:

[wt. - %]

	C	Cr	Mo	Ni	Nb	W	Fe	Co
Min.	**0,3**	**24**	**4,5**	**5**	**6**	**2**		
Max.	**0,4**	**26**	**5,5**	**6**	**7**	**3**	**3**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Hardness:	35 – 37	[HRC]

Positions: PA, PB

Redrying: 300 – 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,5	350	70 – 110
3,25	350	100 – 140
4,0	450	140 – 180
5,0	450	180 – 220

Polarity =(+)~

Standards:

EN 14700: E Co 1
(DIN 8555): E 20-UM-300 CTZ

Recovery: **170%**

capilla® 524 EHL

Product description:

High recovery stick electrode for the hardfacing of unalloyed, low alloyed and high alloyed steels. The weld metal is heat resistant and shows a good resistance against corrosive media.
In the case of friction and sliding wear the alloy has a low friction coefficient against steels.
Service temperatures up to 800°C.
Good resistance against heat checking cracks (thermal fatigue).

Applications:

High heat resistant special alloy with good high temperature strength. The weld metal shows an excellent resistance to mechanical shock.
This electrode is standardly used for the hardfacing of forging dies, punches and hot cutting tools.
Furthermore suitable for the cladding of sealing surface of valves used in power plants and chemical industry.

Typical weld metal composition:

[wt. - %]

	C	Cr	Mo	Ni	W	Fe	Co
Min.		**25**	**4,5**	**10**	**2**		
Max.	**0,1**	**27**	**6,0**	**11**	**3**	**3**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Hardness:	320	[HB]

Positions: PA, PB

Redrying: 300 – 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]	**Polarity**
2,5	350	70 – 110	=(+)~
3,25	350	100 – 140	
4,0	450	140 – 180	
5,0	450	180 – 220	

4.2 Wire electrodes for welding of tool steels

4.2.1 Solid wires for gas shielded arc welding of tool steels

Designation	Standard	Weld Metal Analysis [Wt.%]											
capilla®	**EN 14700 (DIN 8555):**	**C**	**Mn**	**Si**	**Cr**	**Ni**	**Mo**	**Nb**	**Co**	**Others**	**Fe**	**SG**	**Hardness*)**
4914 MAG	S Fe 8 (MSG 6-GZ-350 PRT)	0,25	0,5	0,5	17	1	-	-	-	-	Bal.	M21	350 HB
64 MAG	S Fe 1 (MSG 1-GZ-300 T)	0,1	1,2	0,5	1,1	-	0,5	-	-	-	Bal.	M21	300 HB
64 MAG-S	S Fe 1 (MSG 1-GZ-250)	0,3	1,2	0,5	1,2	-					Bal.	M21	240 HB
65 MAG	S Fe 3 (MSG 3-GZ-45 T)	0,2	0,4	0,35	2,5	-	-	-	-	W=4,5 V= 0,7	Bal.	M21	43 HRC
6500 MAG	S Fe 3 (MSG 6-GZ-50 T)	0,4	0,5	1	6	-	1,6	-	-	V= 1	Bal.	M21	52 HRC
732 MAG	S Fe 3 (MSG 6-GZ-55 ST)	0,35	1,3	0,4	7	-	2,2	-	-	Ti+	Bal.	M21	56 HRC
733 MAG	S Fe 3 (MSG 6-GZ-50 ST)	0,3	0,6	0,7	5	-	4	-	-	-	Bal.	M21	48 HRC
734 MAG	S Fe 3 (MSG 3-GZ-40 ST)	0,1	0,6	0,6	6,5	-	3,5	-	-	-	Bal.	M21	40 HRC
5400 MAG	S Fe 8 (MSG 6-GZ-60 T)	0,9	0,5	0,3	10	-	2	-	-	-	Bal.	M21	60 HRC
2709 MAG	not classified (no standard)	0,03	0,8	0,3	-	18	5	-	12	Ti+; Al+	Bal.	M12	40 HRC**
53 MAG	S Fe 4 (MSG 4-GZ-60 ST)	1	0,7	0,4	4,5	-	8	-	-	W=2; V=1,5	Bal.	M21	60 HRC
650 MAG	S Fe 8 (MSG 6-GZ-350 RPT)	0,2	0,5	0,5	17	0,8	1	-	-	-	Bal.	M21	350 HB

***) Min. values at AT / no heat treatment; shielding gas (SG) acc. EN ISO 14175;**
****) strain hardening;**
*****) strain and precipitation hardening;**
Dimensions: Ø 1,0; 1,2; 1,6; [mm]; Spools: K 300; other dimensions and packing units on demand

4.2.1 Solid wires for gas shielded arc welding of tool steels (continued)

Designation	Standard	Weld Metal Analysis [Wt.%]											
capilla®	EN 14700 (DIN 8555):	C	Mn	Si	Cr	Ni	Mo	Nb	Co	Others	Fe	SG	Hardness*
526 MAG	S Ni 2 (MSG 23-GZ-300 CKTZ)	<0,06	0,5	0,23	21	Bal.	8	3,5	-	-	<3	I1	300 HB **
5200 MAG	S Ni 2 (MSG 23-GZ-250 KPTZ)	0,05	1	0,2	17	Bal.	17	-	-	W=5	<1	I1	240 HB**
533 MAG	S Ni 2 (MSG 23-GT-200 CPRTZ)	0,03	1	0,1	19	Bal.	5	1	11	W= 1; Tl+; Al+	-	I1	200 HB***
6000 MIG	S Ni 2 (MSG 23-GZ-300 CKPTZ)	0,02	2,8	0,2	19	Bal.	-	2,5	-	-	<2	I1	290 HB**
625 N MAG	S Ni 2 (MSG 23-GZ-300 CKPTZ)	<0,03	0,3	0,25	22	Bal.	9	3	-	-	<1,5	I1	290 HB**
838 MAG	S Ni 2 (MSG 23-GZ-300 CKTZ)	<0,04	0,2	0,25	23	Bal.	8,5	3,7	-	-	2	I1	310 HB**

***) Min. values at AT / no heat treatment; shielding gas (SG) acc. EN ISO 14175;**
****) strain hardening;**
*****) strain and precipitation hardening;**
Dimensions: Ø 1,6; 2,0; 2,4 [mm]; Spools: K 300; other dimensions and packing units on demand

4.2.2 Welding rods for tungsten inert gas welding of tool steels

Designation	Standard	Weld Metal Analysis [Wt.%]											
capilla®	EN 14700/ (DIN 8555):	C	Mn	Si	Cr	Ni	Mo	Nb	Co	Others	Fe	SG	Hardness*)
4914 WIG	S Fe 8 (WSG 6-GZ-350 PRT)	0,25	0,5	0,5	17	1	-	-	-	-	Bal.	I1	350 HB
64 WIG	S Fe 1 (WSG 1-GZ-250)	0,3	1,2	0,5	3	-	-	-	-	-	Bal.	I1	250 HB
64 WIG-S	S Fe 1 (WSG 1-GZ-300 T)	0,1	1,2	0,5	1,1	-	0,5				Bal.	I1	300 HB

***) Min. values at AT / no heat treatment; shielding gas (SG) acc. EN ISO 14175;**
Dimensions: Ø 1,0; 1,6; 2,0; 2,4 [mm]; Length: 1000 [mm]; other dimensions on demand

4.2.2 Welding rods for tungsten inert gas welding of tool steels (continued)

Designation	Standard	Weld Metal Analysis [Wt.%]											
capilla®	EN 14700/ (DIN 8555):	C	Mn	Si	Cr	Ni	Mo	Nb	Co	Others	Fe	SG	Hardness*
65 WIG	S Fe 3 (WSG 3-GZ-45 T)	0,2	0,4	0,35	2,5	-	-	-	-	W=4,5, V= 0,7	Bal.	I1	43 HRC
6500 WIG	S Fe 3 (WSG 6-GZ-50 T)	0,4	0,5	1	6	-	1,6	-	-	V= 1	Bal.	I1	52 HRC
732 WIG	S Fe 3 (WSG 6-GZ-55 ST)	0,35	1,3	0,4	7	-	2,2	-	-	Ti+	Bal.	I1	56 HRC
733 WIG	S Fe 3 (WSG 6-GZ-50 ST)	0,3	0,6	0,7	5	-	4	-	-	-	Bal.	I1	48 HRC
734 WIG	S Fe 3 (WSG 3-GZ-40 ST)	0,1	0,6	0,6	6,5	-	3,5	-	-	-	Bal.	I1	40 HRC
5400 WIG	S Fe 8 (WSG 6-GZ-60 T)	0,9	0,5	0,3	10	-	2	-	-	-	Bal.	I1	60 HRC
2709 WIG	(no standard)	0,03	0,8	0,3	-	18	5	-	12	Ti+; Al+	Bal.	I1	40 HRC**
53 WIG	S Fe 4 (WSG 4-GZ-60 ST)	1	0,7	0,4	4,5	-	8	-	-	W=2; V=1,5	Bal.	I1	60 HRC
650 WIG	S Fe 8 (WSG 6-GZ-350 RPT)	0,2	0,5	0,5	17	0,8	1	-	-	-	Bal.	I1	350 HB
526 WIG	S Ni 2 (WSG 23-GZ-300 CKTZ)	<0,06	0,5	0,23	21	Bal.	8	3,5	-	-	<3	I1	300 HB **
5200 WIG	S Ni 2 (WSG 23-GZ-250 KPTZ)	0,05	1	0,2	17	Bal.	17	-	-	W=5	<1	I1	240 HB**
533 WIG	~S Ni 2 (WSG 23-GT-200 CPRTZ)	0,03	1	0,1	19	Bal.	5	1	11	W= 1; Ti+; Al+	-	I1	200 HB***
6000 WIG	S Ni 2 (WSG 23-GZ-300 CKPTZ)	0,02	2,8	0,2	19	Bal.	-	2,5	-	-	<2	I1	290 HB**
625 N WIG	S Ni 2 (WSG 23-GZ-300 CKPTZ)	<0,03	0,3	0,25	22	Bal.	9	3	-	-	<1,5	I1	290 HB**
838 WIG	S Ni 2 (WSG 23-GZ-300 CKTZ)	<0,04	0,2	0,25	23	Bal.	8,5	3,7	-	-	2	I1	310 HB**

***) Min. values at AT / no heat treatment; shielding gas (SG) acc. EN ISO 14175;**
****) strain hardening;**
*****) strain and precipitation hardening;**
Dimensions: Ø 1,0; 1,6; 2,0; 2,4 [mm]; Length: 1000 [mm]; other dimensions on demand

4.2.2 Welding rods for tungsten inert gas welding of tool steels (continued)

Designation	Standard	Weld Metal Analysis [Wt.%]											
capilla®	EN 14700/ (DIN 8555):	C	Mn	Si	Cr	Ni	Mo	Nb	Co	Others	Fe	SG	Hardness*
501 WIG	S Co 3 (WSG 20-GG-55 CKTZ)	2	1,5	1,5	26	-	-	-	Bal.	W = 11	3	I1	53 HRC
506 WIG	S Co 2 (WSG 20-GG-40 CKTZ)	0,9	1,5	1,5	27	-	-	-	Bal.	W = 5	3	I1	40HRC
512 WIG	S Co 2 (WSG 20-GG-45 CKTZ)	1,3	1	1	27	-	-	-	Bal.	W = 7,5	3	I1	46HRC
516 WIG	S Co 1 (WSG 20-GG-250 CKTZ)	0,1	1	1	18	9	-	-	Bal.	W = 12	2,5	I1	250HB**
521 WIG	S Co 1 (WSG 20-GG-300 CKTZ)	0,3	1,5	1	27,5	2,5	4,2	-	Bal.	-	3	I1	32HRC**

***) Min. values at AT / no heat treatment; shielding gas (SG) acc. EN ISO 14175;**
****) strain hardening;**
*****) strain and precipitation hardening;**
Dimensions: Ø 2,5; 3,2; 4,0; 5,0 [mm]; Length: 1000 [mm]; other dimensions on demand

4.2.3 Tubular wires for gas shielded arc welding of tool steels

Designation	Standard	Weld Metal Analysis [Wt.%]											
capilla®	EN 14700/ (DIN 8555):	C	Mn	Si	Cr	Ni	Mo	Nb	Co	Others	Fe	SG	Hardness*
G 135 MM	T Fe 8 (MF 3-GF-40 CT)	0,05	0,8	1,1	13,5	4	0,8	-	-	-	Bal.	I1/M21	40 HRC
G 370 MM	T Fe 6 (MF 5-GF-350 CT)	0,07	0,3	0,5	9	1,7	2,5	-	-	Ti+	Bal.	I1/M21	350 HB
G 654 MM	T Fe 3 (MF 6-GF-55 G)	0,5	1,5	0,8	5,5	-	1,2	-	-	W = 1,2	Bal.	I1/M21	55 HRC
G 654 N MM	T Fe 3 (MF 6-GF-45 GP)	0,25	1,5	1	6	-	-	1,5	-	-	Bal.	I1/M21	45 HRC
G 5400 MM	T Fe 8 (MF 6-GF-55 GP)	0,4	1	2,5	9	-	-	-	-	-	Bal.	I1/M21	55 HRC
G 64 MM	T Fe 1 (MF 3-GF-300 GP)	0,15	1	0,5	0,5	-	0,4	-	-	-	Bal.	M21	300 HB
G 105 MM	T Fe 1 (MF 3-GF-350 GP)	0,06	1	0,6	2,2	1,2	1	-	-	-	Bal.	M21	340 HB
G 65 MM	T Fe 3 (MF 3-GF-40 PST)	0,1	1	0,5	2,2	-	-	-	-	W= 3,5; V = 0,7	Bal.	M21	40 HRC
G 93 MM	not classified (MF 5-GF-50 CRST)	0,15	0,25	0,4	15,5	-	2,5	-	13,5	-	Bal.	I1/M12	48 HRC
G 5200 MM	T Ni 2 (MF 23-GF-200 CKT)	0,05	0,5	0,5	16	Bal.	16	-	-	W = 4	4	I1/M12	200 HB**
G 530 MM	~T Ni 2 (MF 23-GF-200 CKTZ)	0,05	0,2	<0,1	18,5	Bal.	4,5	-	11,5	Ti+/Al+	-	I1/M12	220HB***
G 501 MM	T Co 3 (MF 20-GF-55 CKTZ)	2	1,5	1,5	26	-	-	-	Bal.	W = 11	3	I1/M12	53 HRC

*) Min. values at AT / no heat treatment; shielding gas (SG) acc. EN ISO 14175;
**) strain hardening;
***) strain and precipitation hardening;
Dimensions: Ø 1,6; 2,0; 2,4 [mm]; Spools: K 300; other dimensions and packing units on demand

4.2.3 Tubular wires for gas shielded arc welding of tool steels (continued)

Designation	Standard	Weld Metal Analysis [Wt.%]											
capilla®	EN 14700/ (DIN 8555):	C	Mn	Si	Cr	Ni	Mo	Nb	Co	Others	Fe	SG	Hardness*
G 506 MM	T Co 2 (MF 20-GF-40 CKTZ)	0,9	1,5	1,5	27	-	-	-	Bal.	W = 5	3	I1/M12	40HRC
G 512 MM	T Co 2 (MF 20-GF-45 CKTZ)	1,3	1	1	27	-	-	-	Bal.	W = 7,5	3	I1/M12	46HRC
G 516 MM	T Co 1 (MF 20-GF-250 CKTZ)	0,1	1	1	18	9	-	-	Bal.	W = 12	2,5	I1/M12	250HB**
G 521MM	T Co 1 (MF 20-GF-300 CKTZ)	0,3	1,5	1	27,5	2,5	4,2	-	Bal.	-	3	I1/M12	32HRC**
G 563 MM	T Fe 3 (MF 3-GF-50 T)	0,35	1	1	1,8	-	0,5	-	2	W = 9	Bal.	M21	48HRC****
G 569 MM	T Fe 3 (MF 6-GF-55 T)	0,25	0,8	1	9	2,2	2,5	-	-	W+; V+	Bal.	M21	55HRC
G 7940 MM	T Fe 3 (MF3-GF-40 ST)	0,17	0,7	0,4	6,5	0,25	2,5	-	-	Ti = 0,1	Bal.	M21	40 HRC
G 7945 MM	T Fe 3 (MF 3-GF-50 ST)	0,25	0,8	0,5	6	-	3,5	-	-	Ti = 0,25	Bal.	M21	50 HRC
G 7950 MM	T Fe 3 (MF 3-GF-55 ST)	0,3	0,95	0,5	6,5	-	2,1	-	-	Ti = 0,3	Bal.	M21	55 HRC
G 2040 RM	TZ Fe 3 (MF 3-GF-40-PT)	0,09	0,7	0,6	9,5	1,3	3	-	-	Ti = 0,2	Bal.	M21	40 HRC
G 2045 RM	TZ Fe 3 (MF 3-GF-45-PT)	0,15	0,7	0,6	9,5	1,3	3	-	-	Ti=2,5	Bal.	M21	45 HRC
G 2048 RM	TZ Fe 3 (MF 3-GF-45-PT	0,2	0,7	0,6	5,8	-	2,2	-	-	V=0,6, W=2	Bal.	M21	45 HRC
G 2050 RM	TZ Fe 3 (MF 3-GF-50-PT	0,25	0,7	0,5	5,8	-	2,2	-	-	V=0,7, W=2	Bal.	M21	50 HRC
G 2055 RM	TZ Fe 3 (MF 3-GF-55-PT	0,3	0,7	0,5	5,8	-	3	-	-	V=0,7, W=2	Bal.	M21	55 HRC
G 53 MM	S Fe 4 (MSG 4-GZ-60 ST)	1	0,7	0,4	4,5	-	8	-	-	W=2; V=1,5	Bal.	M21	60 HRC

***) Min. values at AT / no heat treatment; shielding gas (SG) acc. EN ISO 14175;**
****) strain hardening; ***) strain and precipitation hardening; ****) precipitation hardening**
Dimensions: Ø 1,6; 2,0; 2,4 [mm]; Spools: K 300; other dimensions and packing units on demand

5 Welding consumables for cladding and hardfacing

5.1 Coated stick electrodes for cladding and hardfacing

capilla®	EN 14700	(DIN 8555):	Page
308 HL	E Fe 11	E 8-UM-200 CKPR	**142**
318 HL	E Fe 11	E 8-UM-200 CKPR	**143**
309 HL	E Fe 11	E 8-UM-200 CKPR	**144**
51 W	E Fe 10	E 8-UM-250 CKPR	**145**
5201	E Fe 11	E 8-UM-250 CKPR	**146**
52	E Fe 11	E 8-UM-300 CKPR	**147**
56	E Fe 9	E 7-UM-200-K	**148**
56 Fe	E Fe 9	E 7-UM-200-K	**149**
CR MA 47	E Fe 9	E7-UM-250-K	**150**
250 B	E Fe 1	E 1-UM-250 P	**151**
300 B	E Fe 1	E 1-UM-300 P	**152**
400 B	E Fe 1	E 1-UM-400 P	**153**
500 B	E Fe 1	E 1-UM-50 P	**154**
54 W	E Fe 8	E 6-UM-60 PS	**155**
54-160	E Fe 8	E 6-UM-60 PS	**156**
60 HRC	E Fe 15	E 10-UM-60-GRZ	**157**
540	E Fe 15	E 10-UM-65-GRZ	**158**
540 SF	E Fe 15	E 10-UM-65-GRZ	**159**
540 Nb	E Fe 15	E 10-UM-65-GRZ	**160**
540 N	E Fe 16	E 10-UM-65-TZ	**161**
540 V	E Fe 16	E 10-UM-65-TZ	**162**
635 S	E Fe 15	E 10-UM-65-Z	**163**
68 HRC	E Fe 15	E 10-UM-70-GCZ	**164**
550 E	T Fe 20	E 21-GF-UM-65 G	**165**
550 G	T Fe 20	G 21-GF-UM-65 G	**166**
900 G	not classified	G 21-UM-65 G	**167**

5.2 Wire electrodes for cladding and hardfacing

5.2.1 Solid wires for gas shielded arc welding of claddings and hardfacings

capilla®	EN 14700	(DIN 8555):	Page
5201 MAG	S Fe 10	MSG 8-GZ-200 KPZ	**168**
250 MAG	S Fe 1	MSG 1-GZ-250	**168**
300 MAG	S Fe 1	MSG 1-GZ-300	**168**
600 MAG	S Fe 8	MSG 6-GZ-60	**168**
54 MAG	S Fe 8	MSG 6-GZ-60 P	**168**
655 MAG	S Fe 8	MSG 6-GZ-60 GZ	**168**

5.2.2 Welding rods for tungsten inert gas welding of claddings and hardfacings

capilla®	EN 14700	(DIN 8555):	Page
5201 WIG	S Fe 10	MSG 8-GZ-200 KPZ	**169**
250 WIG	S Fe 1	MSG 1-GZ-250	**169**
300 WIG	S Fe 1	MSG 1-GZ-300	**169**
600 WIG	S Fe 8	MSG 6-GZ-60	**169**
54 WIG	S Fe 8	MSG 6-GZ-60 P	**169**
655 WIG	S Fe 8	MSG 6-GZ-60 GZ	**169**

5.2.3 Tubular wires for gas shielded arc welding of claddings and hardfacings

capilla®	EN 14700	DIN 8555	Page
G 350 MM	T Fe 1	MF 1-GF-350 P	**170**
G 500 MM	T Fe 1	MF 1-GF-50 GP	**170**
G 600 MM	T Fe 8	MF 6-GF-60 GZ	**170**
G 600 Si MM	T Fe 8	MF 6-GF-60 GZ	**170**
G 655 MM	T Fe 8	MF 6-GF-60 GZ	**170**
561 RLD	T Fe 9	MF 7-GF-200/450 KPN	**170**
562 RLD	T Fe 9	MF 7-GF-200/450 KPN	**170**
56 RLD	T Fe 9	MF 7-GF-200/50 CKP	**170**
52 RLD	T Fe 11	MF 8-GF-150/400 KPZ	**170**
5201 RLD	T Fe 10	MF 8-GF-150/400 KPZ	**170**
354 RLD	T Fe 14	MF 10-GF-50 G	**170**
G 154 MM	T Fe 1	MF 1-GF-40 P	**170**
G 254 MM	T Fe 1	MF 1-GF-45 G	**170**
5600 RLD	T Fe 9	MF 7-GF-40 GKP	**170**
G54 MM	T Fe 8	MF 6-GF-55 GP	**171**
G 54 N MM	T Fe 8	MF 10-GF- 60 G	**171**
55 RLD	T Fe 15	MF 10-GF-60 G	**171**
60 RLD	T Fe 15	MF 10-GF-60 G	**171**
540 RLD	T Fe 14	MF 10-GF-60 CGT	**171**
540 Nb RLD	T Fe 15	MF10-GF-65 G	**171**
540 N RLD	T Fe 16	MF 10-GF-65 GT	**171**
540 V RLD	T Fe 13	MF 10-GF-65 GRZ	**171**
540 B RLD	T Fe 13	MF 10-GF-70 GRZ	**171**
68 HRC RLD	T Fe 15	MF 10-GF-70 GRZ	**171**
HR MAG	special alloy	MF 21-GF-55 G	**171**
911 G	special alloy	MF 21-GF-65 G	**171**

Standards:

EN 14700:	E Fe 11-200-cnz
EN ISO 3581-A:	E 19 9 LR 52
EN 1600:	E 19 9 LR 52
AWS A 5.4:	E 308 L-25
Mat.-No.:	1.4316
Recovery:	**150%**

capilla® 308 HL

Product description:

High recovery rutile-basic coated stick electrode for welding of non-stabilized austenitic stainless Cr-Ni steels with extra low carbon content, suitable for service temperatures of up to 350°C, good low temperature properties down to -78°C.

Also suitable for cladding non-alloyed steels
In this case welding a buffer layer using Capilla 309 HL is recommended.

Applications:

1.4300, 1.4301, 1.4303, 1.4306, 1.4308, 1.4311, 1.4312, 1.4371, 1.4541, 1.4543, 1.4550, 1.4552.

Typical weld metal composition:

[wt. - %]

	C	Cr	Ni	Fe
Min.		**18**	**9**	
Max.	**0,03**	**20**	**11**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Tensile strength R_m:	550	[MPa]
Yield strength $R_{p0,2}$:	320	[MPa]
Yield strength $R_{p1,0}$:	-	[MPa]
Elongation (L=5d):	35	[%]
Impact strength (ISO-V):	70	[J]

Positions: all except PG

Redrying: 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]	**Polarity**
2,0	350	40 – 60	=(+)~
2,5	350	50 – 90	
3,25	350	80 – 110	
4,0	350	100 – 150	
5,0	450	150 – 200	

also available:
find in table of content

Capilla 308 H
Capilla 308 KB
Capilla 308 L
Capilla 308 LR

Capilla 308 MAG
Capilla 308 WIG
Capilla G 308 L RM (tubular wire)

Standards:

EN 14700:	E Fe 11-200-cnz
EN ISO 3581-A:	E 19 12 3 Nb R 52
EN 1600:	E 19 12 3 Nb R 52
AWS A 5.4:	E 318-26
Mat.-No.:	1.4576
Recovery:	**150%**

capilla® 318 HL

Product description:

High recovery rutile-basic coated stick electrode for welding of austenitic stainless Cr-Ni-Mo-steels especially for Nb-and Ti - stabilised ELC-types of steel.
Also suitable for cladding non-alloyed steels
In this case welding a buffer layer using Capilla 309 HL is recommended.

Service temperatures up to. 400°C.

Applications:

Suitable for materials as:
1.4571, 1.4573, 1.4580, 1.4581, 1.4583, 1.4401, 1.4404, 1.4408, 1.4420, 1.4435, 1.4436.

Typical weld metal composition:

[wt. - %]

	C	Cr	Ni	Mo	Nb	Fe
Min.		**18**	**11**	**2,5**	**10 x %C**	
Max.	**0,03**	**20**	**13**	**3**		**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Tensile strength R_m:	600	[MPa]
Yield strength $R_{p0,2}$:	440	[MPa]
Yield strength $R_{p1,0}$:	-	[MPa]
Elongation (L=5d):	30	[%]
Impact strength (ISO-V):	70	[J]

Positions: all except PG

Redrying:: 300°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]	Polarity
2,0	350	40 – 60	=(+)~
2,5	350	50 – 90	
3,25	350	80 – 110	
4,0	350	100 – 150	
5,0	450	150 – 200	

also available:
find in table of content

Capilla 318 KB
Capilla 318 LR

Capilla 318 MAG
Capilla 318 WIG

Standards:

EN 14700:	E Fe 11-200-cnz
EN ISO 3581-A:	E 23 12 LR 52
EN 1600:	E 23 12 LR 52
AWS A 5.4:	E 309 L-26
Mat.-No.:	~1.4332
Recovery:	**160%**

capilla® 309 HL

Product description:

Rutile-basic coated high recovery stick electrode for overlay and fusion weldings of similar or lower alloyed heat-resistant CrNi- steels.
Service temperature of max. 300°C. The weld metal is scaling resistant up to 1050°C.
Suitable for overlay weldings onto non-alloyed steels if an 18/8 Cr-Ni alloy composition has to be achieved in the first layer.

Applications:

Claddings, buffer layers and joints, suitable for steels such as:

1.4541, 1.4550, 1.4710, 1.4712, 1.4727, 1.4729, 1.4740, 1.4742, 1.4780, 1.4825, 1.4826, 1.4828, 1.4878.

Typical weld metal composition:

[wt. - %]

	C	Cr	Ni	Fe
Min.		**21**	**11**	
Max.	**0,03**	**23**	**13**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Tensile strength R_m:	550	[MPa]
Yield strength $R_{p0,2}$:	400	[MPa]
Yield strength $R_{p1,0}$:	430	[MPa]
Elongation (L=5d):	30	[%]
Impact strength (ISO-V):	55	[J]

Positions: all except PG

Redrying: 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,0	350	40 – 60
2,5	350	60 – 90
3,25	350	80 – 110
4,0	350	100 – 150
5,0	450	150 – 200

Polarity =(+)~

also available:
find in table of content

Capilla 309 L KB
Capilla 309 LR
Capilla 309 L MAG
Capilla 309 L WIG
Capilla G 309 L RM (tubular wire)

Standards:

EN14700:	E Fe 10-200/400-cnz
EN ISO 3581-A:	E 18 8 Mn R 52
EN 1600:	E 18 8 Mn R 52
AWS A 5.4:	~ E 307-26
Mat.-No.:	1.4370
Recovery:	**160%**

capilla® 51 W

Product description:

Rutile-basic coated high recovery stick electrode suitable for fusion welding of dissimilar joints and cladding of mild steel.
The Cr-Ni-Mn-alloyed weld metal has a fully of austenitic structure and can be strainhardened.

Service temperatures in corrosive media: up to 300 °C.

Scaling resistant: up to 900 °C.

Applications:

Fusion welding of dissimilar ferritic-austenitic joints; welding of "hard-to-weld"-steels having a high C-content, e.g. rail steels,
fusion welding of strain hardening Mn-steels, e.g. X 120 Mn 12 (1.3401).

Buffer layers of hardfacings.

Typical weld metal composition:

[wt. - %]

	C	Cr	Ni	Mn	Fe
Min.		**17**	**7**	**5**	
Max.	**0,1**	**19**	**9**	**7**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Tensile strength R_m:	600	[MPa]
Yield strength $R_{p0,2}$:	350	[MPa]
Yield strength $R_{p1,0}$:	400	[MPa]
Elongation (L=5d):	40	[%]
Impact strength (ISO-V):	70	[J]

Positions: all except PG

Redrying: 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,5	350	60 – 90
3,25	350	80 – 110
4,0	350	100 – 150
5,0	350/450	150 – 200

Polarity =(+)~

also available:
find in table of content

Capilla 51 Kb
Capilla 51 Ti
Capilla 51 MAG

Capilla 51 WIG
Capilla G 51 MM
Capicoat 51

Standards:

EN 14700:	E Fe 11-200-cz
(DIN 8555):	E 8-UM-250 CKPR
EN ISO 3581-A:	E 23 12 2 R 52
AWS:	~ E 309 Mo-26
Mat.-No.:	~ 1.4459
Recovery:	**170%**

capilla® 5201

Product description:

High recovery electrode for for welding of crack-free, wear and heat resistant joints and overlays exposed to heavy shock and impact. Fusion welding of dissimilar steels, tool steels, hot working steels, cast steel or manganese steel.

Applications:

Suitable for fusion and overlay welding on hot forming tools, e.g.:

Dies, trimming tools and valve seats.
Verstatile electrode for repair welding of worn machine parts and for new manufacturing of tools.
Suitable for welding of bufering layers of Co-based hardfacings.

Typical weld metal composition:

[wt. - %]

	C	Cr	Ni	Mo	Fe
Min.		**22**	**10**	**2,5**	
Max.	**0,04**	**24**	**12**	**3,5**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Tensile strength R_m:	600	[MPa]
Yield strength $R_{p0,2}$:	400	[MPa]
Yield strength $R_{p1,0}$:	-	[MPa]
Elongation (L=5d):	25	[%]
Impact strength (ISO-V):	70	[J]
Hardness:	240	[HB]
	340	[HB] workhardened

Positions: PA, PB

Redrying: 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]	Polarity
2,0	350	50 – 90	=(+)~
2,5	350	80 – 120	
3,25	350	100 – 160	
4,0	450	160 – 220	
5,0	450	190 – 260	

also available:
find in table of content

Capilla 5201 MAG
Capilla G 5201 MM

Standards:

EN 14700:	E Fe 11-250-cz
EN ISO 3581-A:	E 29 9 R 52
EN 1600:	E 29 9 R 52
AWS A 5.4:	E 312-26
Mat.-No.:	1.4337
Recovery:	**170%**

capilla® 52

Product description:

Rutile-basic coated high recovery electrode for fusion welding of dissimilar steels. Suitable for welding buffering layers and corrosion resistant and scaling resistant overlay clads.
The electrode produces a very soft arc and self-detaching slag, easy to weld without any splatters. The weld metal has a ferritic-austenitic microstructure (high strength duplex stainless steel).

Applications:

Corrosion resistant like similar alloyed steels and steel casts, e.g.

1.4762 (X 10 CrAl 24),
1.4085 (G-X 70 Cr 29).

Suitable for “difficult to weld” steels, e.g. constructional steel with high tensile strength, fusion welding of high alloyed manganese steels and joints of this steels with high-alloyed steel, suitable for repair and maintenance.

Typical weld metal composition:

[wt. - %]

	C	Cr	Ni	Fe
Min.		**27,5**	**8**	
Max.	**0,1**	**30**	**10**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Tensile strength R_m:	750	[MPa]
Yield strength $R_{p0,2}$:	500	[MPa]
Yield strength $R_{p1,0}$:	-	[MPa]
Elongation (L=5d):	20	[%]
Impact strength (ISO-V):	40	[J]

Positions: all except PG

Redrying: 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]	**Polarity**
2,0	250	40 – 60	=(+)~
2,5	300	60 – 90	
3,25	350	80 – 110	
4,0	350	100 – 150	
5,0	350	150 – 200	

also available:
find in table of content

Capilla 52 K
Capilla 52 MAG

Capilla 52 WIG
Capilla G 52 MM (tubular wire)

Standards:		**capilla® 56**
EN 14700:	E Fe 9-200/450-knp	
(DIN 8555):	E 7-UM-250-K	
AWS:	E Fe Mn-A	
Mat.-No.:	1.3402	
Recovery:	**140%**	

Product description:

Basic-coated high recovery stick electrode. The strain hardening weld metal is highly Mn-alloyed. Suitable for welding of very tough and wear resistant overlays exposed to heavy impact Welding should be performed applying low heat input.

Applications:

For overlay welding of worn manganese steel surfaces and parts which are largely exposed to wear caused by impact and shock.

Excavator teeth, beating arm, dredger bolts, crusher jaws and cones, sand blasting and shot peening devices;

Railway systems:
crossing frogs and four-way pieces.

Typical weld metal composition:

[wt. - %]

	C	Mn	Ni	Fe
Min.		**12**		
Max.	**0,8**	**14**	**3**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Hardness:	240	[HB]
	440	[HB] workhardened

Positions: PA, PB, (PC)

Redrying: 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]	**Polarity**
3,25	450	100 – 160	=(+)~
4,0	450	160 – 220	
5,0	450	190 – 260	

also available:
find in table of content

Capilla 561 RLD (tubular wire)

Standards:

EN 14700: E Fe 9-200/450-knp
(DIN 8555): E 7-UM-250/450-K
AWS: E Fe Mn-A
Mat.-No.: ~1.3402

Recovery: **140%**

capilla® 56 Fe

Product description:

Basic-coated high recovery stick electrode. The strain hardening weld metal is highly Mn-alloyed. Suitable for welding of very tough and wear resistant overlays exposed to heavy impact Welding should be performed applying low heat input.

Applications:

For overlay welding of worn manganese steel surfaces and parts which are largely exposed to wear caused by impact and shock:
Excavator teeth, beating arm, dredger bolts, crusher jaws and cones, sand blasting and shot peening devices;

Railway systems:
crossing frogs and four-way pieces.

Typical weld metal composition:

[wt. - %]

	C	Mn	Fe
Min.		**12**	
Max.	**0,8**	**14**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Hardness:	200 – 220	[HB]
	430 – 450	[HB] workhardened

Positions: PA, PB, (PC)

Redrying: 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]	Polarity
3,25	450	100 – 160	=(+)~
4,0	450	160 – 220	
5,0	450	190 – 260	

also available:
find in table of content

Capilla 561 RLD (tubular wire)

Standards:

EN 14700: E Fe 9-250/450-cknp
(DIN 8555): E7-UM-250-K

Recovery: **140%**

capilla® CR MA 47

Product description:

Basic-coated high recovery stick electrode. The strain hardening weld metal is highly Mn-alloyed. Suitable for welding of very tough and wear resistant overlays exposed to heavy impact. Welding should be performed applying low heat input.
The weld metal is corrosion resistant.

Applications:

For overlay welding of worn manganese steel surfaces and parts which are largely exposed to wear caused by impact and shock:
Excavator teeth, beating arm, dredger bolts, crusher jaws and cones, sand blasting and shot peening devices;

Railway systems:
crossing frogs and four-way pieces.

Typical weld metal composition:

[wt. - %]

	C	Cr	Mn	Fe
Min.	**0,5**	**13**	**16**	
Max.	**0,6**	**15**	**18**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Hardness:	250	[HB]
	450	[HB] workhardened

Positions: PA, PB, (PC)

Redrying: 300°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]	Polarity
2,5	350	80 – 120	=(+)~
3,25	350	100 – 160	
4,0	450	160 – 220	
5,0	450	190 – 260	

also available:
find in table of content

Capilla 56 RLD (tubular wire)

Standards:		**capilla® 250 B**
EN 14700:	E Fe 1-250-p	
(DIN 8555):	E 1-UM-250 P	
Recovery:	**120%**	

Product description:

Basic-coated low alloyed stick electrode for welding of wear resistant overlays.

Applications:

For crack-free, shock-proof overlays of guides, rollers, couplings, running wheels, rails, brake drums, wheel rims, bearing surfaces and rope winches.

Typical weld metal composition:

[wt. - %]

	C	Cr	Mn	Fe
Min.	**0,1**	**2**	**1**	
Max.	**0,12**	**2,5**	**1,5**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Hardness:	230	[HB]

Positions: all except PG

Redrying: 300 – 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
3,25	350	95 – 150
4,0	450	140 – 190
5,0	450	190 – 250

Polarity =(+)~

also available:
find in table of content

Capilla 250 MAG
Capilla 250 WIG

Standards:		**capilla® 300 B**
EN 14700:	E Fe 1-300-p	
DIN 8555:	E 1-UM-300 P	
Recovery:	**120%**	

Product description:

Basic coated stick electrode for welding of wear resisting overlays. Weld metal of low alloyed Cr-Mn-steel.

Applications:

For crack-free, shock-proof overlays of guides, rollers, couplings, running wheels, rails, brake drums, sliding ways, wheel rims, bearing surfaces and rope winches.

Typical weld metal composition:

[wt. - %]

	C	Cr	Mn	Fe
Min.	**0,1**	**2,5**	**1**	
Max.	**0,15**	**3**	**1,5**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Hardness:	300	[HB]

Positions: all except PG

Redrying: 300 – 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,5	350	60 – 90
3,25	350	95 – 150
4,0	450	140 – 190
5,0	450	190 – 250

Polarity =(+)~

also available: Capilla 300 MAG
find in table of content

Standards:

EN 14700: E Fe 1-400-p
(DIN 8555): E 1-UM-400 P

Recovery: **120%**

capilla® 400 B

Product description:

Basic coated stick electrode suitable for hardfacing of machine components which are exposed to wear. The electrode has good welding properties when AC-power sources are used.

Good applicability for positional work.
The slag can be removed easily.

Applications:

Hardfacings on surfaces which are exposed to heavy impact and abrasion e.g.
running wheels, earthmoving machines, conveyor screws, chain and bucket conveyors, rails, etc.

The overlays are crack-free. Machining by chipping using hard metal tools is possible.

Typical weld metal composition:

[wt. - %]

	C	Cr	Mn	Fe
Min.		**2,5**		
Max.	**0,15**	**3,5**	**1**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Hardness:	375	[HB]

Positions: all except PG

Redrying: 300 – 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]	**Polarity**
3,25	350	100 – 140	=(+)~
4,0	450	140 – 180	
5,0	450	180 – 220	

Standards:

EN 14700: E Fe 7-50-gpt
(DIN 8555): E 6-UM-50

Recovery: **120%**

capilla® 500 B

Product description:

Basic coated stick electrode suitable for hardfacing of machine components which are exposed to wear. The electrode has good welding properties when AC-power sources are used.

Good applicability for positional work.

Hardening parameters: 840°C/Oil

Applications:

Hardfacings on surfaces which are exposed to heavy impact and abrasion e.g.
running wheels, earthmoving machines, conveyor screws, chain and bucket conveyors, rails, etc.

The overlays are crack-free. Machining by chipping using hard metal tools is possible.

Typical weld metal composition:

[wt. - %]

	C	Cr	Si	Fe
Min.		**2,5**	**1,0**	
Max.	**0,30**	**3,5**	**1,3**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Hardness:	50	[HB]

Positions: all except PG

Redrying: 300 – 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]	**Polarity**
3,25	450	100 – 140	=(+)~
4,0	450	140 – 180	
5,0	450	180 – 220	

also available: Capilla 500 MAG
find in table of content

Standards:

EN 14700: E Fe 7-55-gpt
(DIN 8555): E 6-UM-60
Mat.-No.: ~ 1.4718

Recovery: **120%**

capilla® 54 W

Product description:

Basic coated Cr-Mo-V-alloyed stick electrode for tough and wear-resistant deposits on parts that are subject to abrasive wear and heavy impacts. Deposits without cracks and pinholes. Deposit thickness as required.

Applications:

Hardfacing of dredger teeth, crusher jaws, screw conveyors, coal cutters, beaters, edge runners, hammers etc.

Typical weld metal composition:

[wt. - %]

	C	Cr	Mn	Mo	V	Fe
Min.	**0,5**	**7**	**0,5**	**0,5**	**1**	
Max.	**0,8**	**10**	**0,7**	**1**	**1,2**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Hardness:	54 – 60	[HRC]

Positions: all except PG

Redrying: 300°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]	Polarity
2,5	350	80 – 120	=(+)~
3,25	350	100 – 160	
4,0	450	160 – 220	
5,0	450	190 – 260	
6,0	450	220 – 290	

also available:
find in table of content

Capilla 54 Ti
Capilla 54 MAG

Capilla 54 WIG
Capilla G 54 MM (tubular wire)

Standards:

EN 14700: E Fe 7-55-gpt
(DIN 8555): E 6-UM-60 PS
Mat.-No.: ~ 1.4718

Recovery: **160%**

capilla® 54-160

Product description:

Basic coated Cr-Mo-V-alloyed stick electrode for tough and wear-resistant deposits on parts that are subject to abrasive wear and heavy impacts. Deposits without cracks and pinholes. Deposit thickness as required.

Applications:

For dredger teeth, crusher jaws, screw conveyors, coal cutters, beaters, edge runners, hammers etc.

Typical weld metal composition:

[wt. - %]

	C	Cr	Mn	Mo	Fe
Min.	**0,5**	**7**	**0,5**	**0,5**	
Max.	**0,8**	**10**	**0,7**	**1**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Hardness:	54 – 60	[HRC]

Positions: all except PD, PE, PG

Redrying: 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]	Polarity
2,5	350	80 – 120	=(+)~
3,25	350	100 – 160	
4,0	450	160 – 220	
5,0	450	190 – 260	
6,0	450	220 – 290	

Standards:

EN 14700: E Fe 14-60-cg
(DIN 8555): E 10-UM-60-GRZ
AWS: E Fe Cr A1

Recovery: **160%**

capilla® 60 HRC

Product description:

Rutile-coated high recovery stick electrode for welding of highly wear resistant overlays at machine parts which are exposed to high emery wear caused by abrasive substances.

Applications:

Hardfacing of moulds, agitator blades, dredger teeth, guidance, slides, components of hoisting devices etc. which are exposed to heavy abrasive wear in combination with moderate pressure or impact.

Base materials:
mild steels, low alloyed steels, steel casts and high-manganese steel.

Typical weld metal composition:

[wt. - %]

	C	Cr	Fe
Min.	**3,5**	**28**	
Max.	**4,2**	**32**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Hardness:	57 – 61	[HRC]

Positions: PA, PB

Redrying: 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,5	350	80 – 120
3,25	350	100 – 160
4,0	450	160 – 220
5,0	450	190 – 260

Polarity =(+)~

also available: Capilla 60 RLD
find in table of content

Standards:

EN 14700: E Fe 15-60-cg
(DIN 8555): E 10-UM-65-GRZ

Recovery: **150%**

capilla® 540

Product description:

Rutile-coated high recovery stick electrode for welding of highly wear resistant overlays at machine parts which are exposed to wear caused by abrasive substances.
Base material:
mild steels, low alloyed steels, steel casts and high-manganese steel.

Applications:

Hardfacing of moulds, agitator blades, dredger teeth, guidance, slides, components of hoisting devices etc. which are exposed to heavy abrasive wear in combination with moderate pressure or impact.

Typical weld metal composition:

[wt. - %]

	C	Cr	Fe
Min.	**4,7**	**32**	
Max.	**5,2**	**35**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Hardness:	60 – 63	[HRC]

Positions: PA, PB

Redrying: 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]	**Polarity**
3,25	350	100 – 160	=(+)~
4,0	450	160 – 220	
5,0	450	190 – 260	

also available:
find in table of content

Capilla 540 RLD
Capidur 60 FeCr

Standards:

EN 14700: E Fe 15-60-cg
(DIN 8555): E 10-UM-65-GRZ

Recovery: **170%**

capilla® 540 SF

Product description:

High recovery coated stick electrode for high wear resistant overlays at building and machine parts. Good resistance to abrasion and moderate shock. Due to the special properties of the coating of the electrode overlays at corners and edges can be made easily (no slag).

Applications:

Components of sinter plants, dredger teeth and cutters, skirting boards, roller heads, extruder skrews, mixer blades, ore milling devices, coal ploughs.

Typical weld metal composition:

[wt. - %]

	C	Cr	Fe
Min.	**4**	**33**	
Max.	**5**	**36**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Hardness:	40 – 50	[HRC] first layer
	60 – 63	[HRC] multiple layers

Positions: PA, PB

Redrying: 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,5	350	60 - 90
3,25	350	110 - 140
4,0	450	140 - 180
5,0	450	200 - 240

Polarity =(+)~

also available:
find in table of content

Capilla 540 RLD (tubular wire)

Standards:

EN 14700: E Fe 15-60-cg
(DIN 8555): E 10-UM-65-GRZ

Recovery: **190%**

capilla® 540 Nb

Product description:

Basic coated stick electrode suitable for hardfacing of components which are exposed to heavy abrasive wear in combination with medium impact. The maximum service temperature is limited to 450°C.
Usually 2 to 3 layers have to be welded.

Excellent weldability at AC.

Austenitic matrix with embedded Cr-primary and Nb-primary carbides.

Applications:

Overlays on parts like baffle plates, suction pump excavating machines, crusher hammer, guidance elements, turbine wheels of descaling devices and crusher rolls.

Typical weld metal composition:

[wt. - %]

	C	Cr	Nb	Fe
Min.	**5,5**	**22**	**5**	
Max.	**6**	**26**	**7**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Hardness:	57 – 60	[HRC] first layer
	59 – 62	[HRC] second layer
	61 – 65	[HRC] third layer

Positions: PA, PB

Redrying: 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]	Polarity
3,25	350	100 – 160	=(+)~
4,0	450	160 – 220	
5,0	450	190 – 250	

also available:
find in table of content

Capilla 540 Nb RLD (tubular wire)

Standards:

EN 14700: E Fe 16-65-cgt
(DIN 8555): E 10-UM-65-TZ

Recovery: **190%**

capilla® 540 N

Product description:

Basis coated high-performance stick electrode for welding of parts exposed to extreme abrasion with moderate impact.
Due to the high Mo content the wear resistance is maintained up to high service temperatures (600°C).

Applications:

For welding of overlays of :

crusher components, grate bars of ore processing plants, grates, screw conveyors, grinding rolls, deflector rails, trepans, briquetting dies, coal ploughs, earth scrapers, repair welding of hardfacings of blast furnace exhaust hoods.

Typical weld metal composition:

[wt. - %]

	C	Cr	Mo	V	W	Nb	Fe
Min.	**4**	**22**	**5**	**0,8**	**1,8**	**5**	
Max.	**6**	**25**	**7**	**1,2**	**2,2**	**7**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Hardness:	63 – 65	[HRC]
	40 – 45	[HRC] at 600°C

Positions: PA

Redrying: 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]	Polarity
3,25	350	100 – 160	=(+)~
4,0	450	160 – 220	
5,0	450	190 – 250	

also available:
find in table of content

Capilla 540 N RLD (tubular wire)

Standards:		**capilla® 540 V**
EN 14700:	E Fe 16-65-cgt	
(DIN 8555):	E 10-UM-65-TZ	
Recovery:	**190%**	

Product description:

Basis coated high-recovery electrode producing a special C-Cr-V-Fe-alloy used for services at elevated temperatures. Good resistance against abrasion in combination with low impact.

Applications:

For welding of overlays of :

crusher components, grate bars of ore processing plants, grates, screw conveyors, grinding rolls, deflector rails, trepans, briquetting dies, coal ploughs, earth scrapers, repair welding of hardfacings of blast furnace exhaust hoods.

Typical weld metal composition:

[wt. - %]

	C	Cr	V	Fe
Min.	**4**	**20**	**8**	
Max.	**5**	**22**	**10**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Hardness:	63 – 67	[HRC]

Positions: PA

Redrying: 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]	**Polarity**
3,25	350	100 – 160	=(+)~
4,0	450	160 – 220	
5,0	450	190 – 250	

also available:
find in table of content

Capilla 540 V RLD (tubular wire)

Standards:
EN 14700: E Fe 15-60-cg
(DIN 8555): E 10-UM-65-Z

Recovery: **200%**

capilla® 635 S

Product description:

Basis coated high-recovery stick electrode for highly wear resistant hardfacings which are exposed to grinding abrasion and low impact. Despite the weld metal is highly alloyed with C and Cr.

3-layer overlays can be realised.

Applications:

Suitable for highly abrasion resistant overlays on components used in the ore and coal processing industry as well as for the earth moving devices like sheer rails, screw conveyors and sliding surfaces.

Typical weld metal composition:

[wt. - %]

	C	Cr	Others	Fe
Min.	**5,5**	**34**		
Max.	**6,2**	**37**	**3**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Hardness:	61 – 64	[HRC]

Positions: PA

Redrying: 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]	**Polarity**
3,25	350	100 – 160	=(+)~
4,0	450	160 – 220	
5,0	450	190 – 250	

Standards:

EN 14700: E Fe 15-70-cgt
(DIN 8555): E 10-UM-70 CZ

Recovery: **180%**

capilla® 68 HRC

Product description:

Basic graphite coated high recovery stick electrode for welding of extremely abrasion resistant overlays which are exposed to moderate impact.

Applications:

For hardfacing on components made of non-alloyed and alloyed steel, which are exposed to extreme abrasive wear caused by ore, pyrites, sand, coal, cement or slag.

Especially suitable for armouring of components of crushing plants for live coals, coke and slag.

Typical weld metal composition:

[wt. - %]

	C	Cr	Others	Fe
Min.	**4**	**27**		
Max.	**5**	**30**	**5**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Hardness:	65 – 68	[HRC]

Positions: PA

Redrying: 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]	**Polarity**
2,5	350	80 - 120	=(+)~
3,25	350	100 - 160	
4,0	450	160 - 220	
5	450	190 - 260	

also available: Capilla 68 HRC RLD (tubular wire)
find in table of content

Standards:

EN 14700: E Fe 15-70-cgt
(DIN 8555): E 10-UM-70 CZ

capilla® 550 E

Product description:

Carbide filled tubular stick electrode having a thin graphitic coating. The deposited material is extremely resistant to abrasive wear.

Applications:

Hardfacing of coal ploughs and similar mining equipment, protection of screw compactors and screw conveyors, crusher and dredger teeth, oil drilling equipment.

Typical weld metal composition:

[wt. - %]

Tungsten carbides of various grain sizes embedded in an iron matrix

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Hardness:	68 – 70	[HRC] mixed hardness
Hardness of carbides:	2000 – 2400	[HV]

Positions: PA

Redrying: -

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
4,0	350	80 - 110
5,0	350	100 - 130
6,0	350	120 - 150

Polarity =(+)~

also available:
find in table of content

Capilla 550 G

Standards:

EN 14700: T Fe 20-65-gz
(DIN 8555): E 21-GF-UM-65 G

capilla® 550 G

Product description:

Carbide filled tube rod for oxyacetylene welding of tungsten-carbide reinforced hardfacings. The deposited material is extremely resistant to abrasive wear.

Applications:

Hardfacing of coal ploughs and similar mining equipment, protection of screw compactors and screw conveyors, crusher and dredger teeth, oil drilling equipment.

Typical weld metal composition:

[wt. - %]

Tungsten carbides of various grain sizes embedded in an iron matrix

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Hardness:	68 – 70	[HRC] mixed hardness
Hardness of carbides:	2000 – 2400	[HV]

Positions: PA

Redrying: -

Dimension:

Ø [mm]	Length [mm]
4,0	350/700
5,0	350/700
6,0	350/700

also available: Capilla 550 E
find in table of content

Standards:

EN 14700: not classified
(DIN 8555): G 21-UM-65 G

capilla® 900 G

Product description:

Flexible welding rod for oxy-acetylene welding of highly wear resistant coatings on earthmoving devices. The deposited material mainly consists of tungsten carbides of various sizes embedded in a nickel-base matrix.
A reducing flame should be used.

Applications:

Overlays on coal ploughs and coal cutting machine, armouring of oil drilling devices, worm extruder, cutting edges and crusher teeth.

Typical weld metal composition:

[wt. - %]

Tungsten carbides of various grain sizes embedded in a nickel matrix

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Hardness:	68 – 70	[HRC] mixed hardness
Hardness of carbides:	2000 – 2400	[HV]

Positions: PA

Redrying: -

Dimension:

Ø [mm]	Length [mm]
6,0	450

additional dimensions upon request

5.2 Wire electrodes for cladding and hardfacing

5.2.1 Solid wires for gas shielded arc welding of claddings and hardfacings

Designation	Standard	Weld Metal Analysis [Wt.%]											
capilla®	**EN 14700 (DIN 8555):**	**C**	**Mn**	**Si**	**Cr**	**Ni**	**Mo**	**Nb**	**Co**	**Others**	**Fe**	**SG**	**Hardness*)**
5201 MAG	G Fe 10 (MSG 8-GZ-200 KPZ)	0,05	6	0,5	19	7,5	-	-	-	-	Bal.	I1/M12	180HB/400HB**
250 MAG	S Fe 1 (MSG 1-GZ-250)	0,1	1	0,4	1	-	-	-	-	-	Bal.	C1/M21	250 HB
300 MAG	S Fe 1 (MSG 1-GZ-300)	0,15	1,5	0,4	1	-	-	-	-	-	Bal.	C1/M21	300 HB
600 MAG	S Fe 8 (MSG 6-GZ-60)	0,45	1	2,5	9	-	-	-	-	-	Bal.	C1/M21	60 HRC
54 MAG	S Fe 8 (MSG 6-GZ-60 P)	0,5	0,5	2	9,5	-	-	-	-	-	Bal.	C1/M21	58 HRC
655 MAG	S Fe 8 (MSG6-GZ-60 GZ)	0,5	1,2	1,2	5	-	1,2	-	-	W=1,5; V=0,5	Bal.	C1/M21	60 HRC

***) Min. values at AT / no heat treatment; shielding gas (SG) acc. EN ISO 14175.**

****) strain hardening**

Dimensions: Ø 1,6; 2,0; 2,4 [mm]; Spools: B 300; other dimensions and packing units on demand.

5.2.2 Welding rods for tungsten inert gas welding of claddings and hardfacings

Designation	Standard	Weld Metal Analysis [Wt.%]											
capilla®	EN 14700 (DIN 8555):	C	Mn	Si	Cr	Ni	Mo	Nb	Co	Others	Fe	SG	Hardness*)
5201 WIG	G Fe 10 (WSG 8-GZ-200 KPZ)	0,05	6	0,5	19	7,5	-	-	-	-	Bal.	I1	180HB/400HB**
250 WIG	S Fe 1 (WSG 1-GZ-250)	0,1	1	0,4	1	-	-	-	-	-	Bal.	I1	250 HB
300 WIG	S Fe 1 (WSG 1-GZ-300)	0,15	1,5	0,4	1	-	-	-	-	-	Bal.	I1	300 HB
600 WIG	S Fe 8 (WSG 6-GZ-60)	0,45	1	2,5	9	-	-	-	-	-	Bal.	I1	60 HRC
54 WIG	S Fe 8 (WSG 6-GZ-60 P)	0,5	0,5	2	9,5	-	-	-	-	-	Bal.	I1	58 HRC
655 WIG	S Fe 8 (WSG6-GZ-60 GZ)	0,5	1,2	1,2	5	-	1,2	-	-	W=1,5; V=0,5	Bal.	I1	60 HRC

***) Min. values at AT / no heat treatment; shielding gas (SG) acc. EN ISO 14175;**
****) strain hardening;**
Dimensions: Ø 1,6; 2,0; 2,4 [mm]; length 1000mm; other dimensions and packing units on demand

5.2.3 Tubular wires for gas shielded arc welding of claddings and hardfacings

Designation	Standard	Weld Metal Analysis [Wt.%]											
capilla®	EN 14700 (DIN 8555):	C	Mn	Si	Cr	Ni	Mo	Nb	Co	Others	Fe	SG	Hardness*
G 350 MM	T Fe 1 (MF 1-GF-350 P	0,22	1,5	0,5	2	-	-	-	-	-	Bal.	M21	350 HB
G 500 MM	T Fe 1 (MF 2-GF-50 GP)	1	2	0,3	2	-	0,2	-	-	-	Bal.	M21	50 HRC
G 600 MM	T Fe 8 (MF 6-GF-60 GZ)	0,45	1,5	0,6	5,5	-	0,5	-	-	-	Bal.	M21	59 HRC
G 600 Si MM	T Fe 8 (MF 6-GF-60 GZ)	0,45	1	2,5	9	-	-	-	-	-	Bal.	M21	60 HRC
G 655 MM	T Fe 8 (MF 6-GF-60 GZ)	0,5	1,2	1,2	5	-	1,2	-	-	W=1,5; V=0,5	Bal.	M21	60 HRC
561 RLD	T Fe 9 (MF 7-GF-200/450 KPN)	1,1	13,5	0,3	3,5	0,4	-	-	-	-	Bal.	OA	200HB/450HB**
562 RLD	T Fe 9 (MF 7–GF-200/450 KPN)	1,2	21	0,3	5	-	-	-	-	-	Bal.	OA	200HB/450HB**
56 RLD	T Fe 9 (MF 7-GF-200/50 CKP)	0,38	16	0,3	13	-	-	-	-	-	Bal.	OA	200HB/52HRC**
52 RLD	T Fe 11 (MF 8-GF-150/400 KPZ)	0,14	7	0,3	19	8,5	-	-	-	-	Bal.	OA	160HB/400HB**
5201 RLD	T Fe 10 (MF 8-GF-150/400 KPZ)	0,11	6,6	0,4	18,2	8	-	-	-	-	Bal.	OA	150HB/400HB**
354 RLD	~T Fe 14 (MF 10 GF-50 G)	3,2	1,5	1,5	16	-	-	-	-	-	Bal.	OA	50 HRC
G 154 MM	T Fe 1 (MF 1-GF-40 P)	0,13	1,5	0,75	2,5	-	-	-	-	-.	Bal.	OA	41 HRC
G 254 MM	T Fe 1 (MF 1-GF-45 G)	0,18	2,8	0,9	2,8	-	-	-	-	-	Bal.	OA	44 HRC
5600 RLD	T Fe 9 (MF 7-GF-40 GKP)	1,2	17,5	0,35	8,5	-	-	2,6	-	Ti=0,1	Bal.	OA	250HB/40HRC**

***) Min. values at AT / no heat treatment; shielding gas (SG) acc. EN ISO 14175; OA = self shielding wire (open arc);**
****) strain hardening; ***) strain and precipitation hardening;**
Dimensions: Ø 1,6; 2,0; 2,4 [mm]; Spools: B 300; other dimensions and packing units on demand

5.2.3 Tubular wires for gas shielded arc welding of claddings and hardfacings (continued)

Designation	Standard	Weld Metal Analysis [Wt.%]											
capilla®	EN 14700 (DIN 8555):	C	Mn	Si	Cr	Ni	Mo	Nb	Co	Others	Fe	SG	Hardness*
G 54 MM	T Fe 8 (MF 6-GF-55 GP)	0,4	0,9	2,7	9,3	-	-	-	-	-	Bal.	M21	55 HRC
G 54 N MM	T Fe 8 (MF 6-GF- 60 G)	1,6	1,5	0,5	6,3	-	1,4	-	-	Ti=5	Bal.	M21	57 HRC
55 RLD	T Fe 15 (MF 10-GF-60 G)	4,5	0,75	0,5	26	-	-	-	-	B=0,5	Bal.	OA	57 HRC
60 RLD	T Fe 15 (MF 10-GF-60 CG)	4,7	0,6	0,6	30	-	-	-	-	B=0,6	Bal.	OA	60 HRC
540 RLD	T Fe 14 (MF 10-GF-60 CGT)	3,7	1,5	1,2	32	-	0,5	-	-	-	Bal.	OA	59 HRC
540 Nb RLD	T Fe 15 (MF10-GF-65-CGT)	5,5	0,2	1,6	21	-	-	6,7	-	-	Bal.	OA	64 HRC
540 N RLD	T Fe 16 (MF 10-GF-65 CGT)	5,7	0,2	0,8	21	-	6,7	6,1	-	W=1,8; V=0,85	Bal.	OA	63HRC
540 V RLD	T Fe 13 (MF 10-GF-65 GRZ	4,8	1	0,8	21	-	-	-	-	V= 9	Bal.	OA	65 HRC
540 B RLD	T Fe 13 (MF 10-GF-70 GT)	0,5	1,7	1	-	3	-	-	-	B=4,8; V=0,85	Bal.	OA	68 HRC
68 HRC RLD	T Fe 15 (MF 10-GF-70 CZ)	5	0,4	0,8	38	-	-	-	-	B = 2	Bal.	OA	67 HRC
HR MAG	special alloy (MF 21-GF-55 G)	0,05	0,3	0,1	-	-	-	-	-	WSC=50	Bal.	M12	55 HRC
911 G	special alloy (MF 21-GF-65 G)	0,03	1	0,5	-	Bal.	-	-	-	WSC=50	-	I1	65 HRC

***) Min. values at AT / no heat treatment; shielding gas (SG) acc. EN ISO 14175; OA = self shielding wire (open arc);**
****) strain hardening;**
*****) strain and precipitation hardening;**
Dimensions: Ø 1,6; 2,0; 2,4 [mm]; Spools: B 300; other dimensions and packing units on demand

6 Welding consumables for welding of cast iron, Cu- and Al-base-alloys as well as for special applications

6.1 Coated stick electrodes for welding of cast iron, Cu- and Al-base-alloys as well as for special applications

capilla®	Standard	Mat.-No.:	Page
50 B	-	-	**175**
50 N	-	-	**176**
50 K	-	-	**177**
Capitherm	-	-	**178**
41	EN ISO 1071: E FeC-GP 2 1		**179**
43	EN ISO 1071: E C Ni-Cl 1	-	**180**
44	EN ISO 1071: E C NiCu-B 1	-	**181**
45	EN ISO 1071: E C NiFe 1 1	-	**182**
45-2	EN ISO 1071: E C NiFe 1 1	-	**183**
45-2 minus	EN ISO 1071: E C NiFe 1 1		**184**
47 N	~DIN EN 14640: E Cu6338 (CuMn14Al7)	2.1368	**185**
48	~DIN EN 14640: E Cu5210 (CuSn9)	2.1025	**186**
NiCu 30 Mn	EN ISO 14172 E Ni 4060 (NiCu 30 Mn3)	2.4377	**187**
NiTi 3	EN ISO 14172: E Ni2061 (NiTi4)	2.4156	**188**
FeNi 55	EN ISO 1071: E C NiFe-1 6	-	**189**
60/5	~EN ISO 18273: E Al 4043 (AlSi 5)	3.2245	**190**
60/12	~EN ISO 18273: E Al 4047 (AlSi 12)	3.2585	**191**

6.2 Wire electrodes for welding of cast iron, Cu- and Al-base-alloys as well as for special applications

6.2.1 Solid wires for gas shielded arc welding of cast iron, Cu- and Al-base-alloys as well as for special applications

capilla®	Standard	Mat.-No.:	Page
45 MIG	EN ISO 1071: S C NiFE 1 M		**192**
NiTi 4 MIG	EN ISO 14172: S Ni2061 (NiTi4)	2.4155	**192**
NiCu 30 Mn MIG	EN ISO 18274: S Ni 4060 (NiCu30Mn3Ti)	2.4377	**192**
47 MIG	EN ISO 24373: S Cu6100 (CuAl8)	2.0921	**192**
47 N MIG	EN ISO 24373: S Cu6338 (CuMn14Al7)	2.1367	**192**
47 Ni MIG	EN ISO 24373: S Cu 6327 (CuAl8Ni5Fe3Mn2)	2.0922	**192**
47 Ni 6 MIG	EN ISO 24373: S Cu 6328 (CuAl9Ni2Fe2Mn2)	2.0923	**193**
48 MIG	EN ISO 24373: S Cu5180 (CuSn6P)	2.1022	**193**
CuSn MIG	EN ISO 24373: S Cu 5180A (CuSn1MnSi)	2.1006	**193**
CuSn 12 MIG	EN ISO 24373: S Cu 5410 (CuSn12P)	2.1056	**193**
CuAl 10 MIG	EN ISO 24373: S Cu 6180 (CuAl10Fe)	2.0937	**193**
CuSi 3 MIG	EN ISO 24373: S Cu6560 (CuSi3Mn1)	2.1461	**193**
CuAg MIG	EN ISO 24373: S Cu 1897 (CuAg1)	2.1211	**193**
AlSi 12 MIG	EN ISO 18273: S Al4047 (AlSi 12)	3.2585	**194**
AlSi 5 MIG	EN ISO 18273: S Al4043 (AlSi5)	3.2245	**194**
Al 99,5 MIG	EN ISO 18273: S Al 1450 (Al99,5Ti)	3.0805	**194**
AlMg 3 MIG	EN ISO 18273: S Al5754 (AlMg 3)	3.3536	**194**
AlMg 5 MIG	EN ISO 18273: S Al5356 (AlMg5Cr)	3.3556	**194**
AlMg 4,5 Mn MIG	EN ISO 18273: S Al5183 (AlMg4,5Mn0,7)	3.3548	**194**

6.2.2 TIG-rods for tungsten inert gas welding of cast iron, Cu- and Al-base-alloys as well as for special applications

capilla®	Standard	Mat.-No.:	Page
45 WIG	EN ISO 1071: S C NiFE 1 M	-	**195**
NiTi 4 WIG	EN ISO 14172:S Ni2061 (NiTi4)	2.4155	**195**
NiCu 30 Mn WIG	EN ISO 18274: S Ni 4060 (NiCu30Mn3Ti)	2.4377	**195**
47 WIG	EN ISO 24373: S Cu6100 (CuAl8)	2.0921	**195**
47 N WIG	EN ISO 24373: S Cu6338 (CuMn14Al7)	2.1367	**195**
47 Ni WIG	EN ISO 24373: S Cu 6327 (CuAl8Ni5Fe3Mn2)	2.0922	**195**
47 Ni 6 WIG	EN ISO 24373: S Cu 6328 (CuAl9Ni2Fe2Mn2)	2.0923	**196**
48 WIG	EN ISO 24373: S Cu5180 (CuSn6P)	2.1022	**196**
CuSn WIG	EN ISO 24373: S Cu 5180A (CuSn1MnSi)	2.1006	**196**
CuSn 12 WIG	EN ISO 24373: S Cu 5410 (CuSn12P)	2.1056	**196**
CuAl 10 WIG	EN ISO 24373: S Cu 6180 (CuAl10Fe)	2.0937	**196**
CuSi 3 WIG	EN ISO 24373: S Cu6560 (CuSi3Mn1)	2.1461	**196**
CuAg WIG	EN ISO 24373: S Cu 1897 (CuAg1)	2.1211	**196**
AlSi 12 WIG	EN ISO 18273: S Al4047 (AlSi 12)	3.2585	**197**
AlSi 5 WIG	EN ISO 18273: S Al4043 (AlSi5)	3,2245	**197**
Al 99,5 WIG	EN ISO 18273: S Al 1450 (Al99,5Ti)	3.0805	**197**
AlMg 3 WIG	EN ISO 18273: S Al5754 (AlMg 3)	3.3536	**197**
AlMg 5 WIG	EN ISO 18273: S Al5356 (AlMg5Cr)	3.3556	**197**
AlMg 4,5 Mn WIG	EN ISO 18273: S Al5183 (AlMg4,5Mn0,7)	3.3548	**197**

6.2.3 Tubular wires for gas shielded arc welding of cast iron, Cu- and Al-base-alloys as well as for special applications

capilla®	Standard	Mat.-No.:	Page
FeC 3 RLD	EN ISO 1071: T C FE-3 N	-	**198**
45 RLD	DIN EN ISO 1071: T C NiFe1 M	-	**198**
47 N RLD	EN 14640: T Cu6338 (Cu Mn14Al7)	2.0921	**198**

Standards:
No standard

capilla® 50 B

Product description:

Special coated stick electrode designed for high speed grooving, chamfering and gouging all metals, e.g. mild steels, high alloyed steel, cast iron, stainless and heat resistant steels, steel cast, light metal, nonferrous heavy metal etc.
AC or DC power sources may be used.

Applications:

Special developed for grooving and gouging of worn hot forming dies e.g. forging dies and moulds. This electrode allows the accurate removal of fatigue and cracked surfaces of tool steels. After grooving, a dye penetration test should be performed to ensure whether the base metal is absolutely crack-free.

Typical weld metal composition:

[wt. - %]

No weld metal

Mechanical properties:

Void

Positions: all

Redrying: Void

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,5	350	100 - 150
3,25	450	150 - 200
4,0	450	220 - 300
5,0	450	300 - 400
6,0	450	350 - 450

Polarity
=(-)~

Standards:
No standard

capilla® 50 N

Product description:

Special coated stick electrode designed for high speed grooving, chamfering and gouging all metals, e.g. mild steels, high alloyed steel, cast iron, stainless and heat resistant steels, steel cast, light metal, nonferrous heavy metal etc.
AC or DC power sources may be used.

Applications:

For removal of a scaled or corroded metallic surfaces. Removal of worn hardfacings and corrosion resistant claddings.

Typical weld metal composition:

[wt. - %]

No weld metal

Mechanical properties:

Void

Positions: all

Redrying: Void

Dimension:

Ø [mm]	Length [mm]	Welding current [A]	Polarity
2,5	350	100 - 150	=(-)~
3,25	350	150 - 200	
4,0	350/450	220 - 300	
5,0	350/450	300 - 400	

Standards:
No standard

capilla® 50 K

Product description:

Coated carbon stick electrode designed for high speed grooving, chamfering and gouging of all metals, e.g. mild steels, high alloyed steel, cast iron, stainless and heat resistant steels, steel cast, light metal, nonferrous heavy metal etc.
It is used for grooving and thermal cutting in all positions when the conventional oxy-acetylene process is not possible for metallurgical reasons.

Applications:

For removal of scaled or corroded metallic surfaces. Removal of worn hardfacings and corrosion resistant claddings.

Typical weld metal composition:

[wt. - %]

No weld metal

Mechanical properties:

Void

Positions: all

Redrying: -

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
4,0	305	220 - 300
6,5	305	400 - 600
8,0	305	500 - 700
9,5	305	600 – 800
13,0	355	700 - 900

Polarity
=(+)~

Standards:
No standard

capilla® Capitherm

Product description:

Special coated stick electrode for preheating of small or medium sized steel workpieces. Using this electrode very long electrical arcs can be realised (up to 30 mm) without melting the surface of the workpiece.

Applications:

The energy of the electrical arc allows an intensive and controlled preheating of the metallic base metal. AC and DC power sources can be used.

Typical weld metal composition:

[wt. - %]

No weld metal

Mechanical properties:

Void

Positions: all

Redrying: Void

Dimension:

Ø [mm]	Length [mm]	Welding current [A]	Polarity
2,5	350	70 - 120	=(+)~
3,25	350/450	100 - 150	
4,0	450	130 - 180	

Standards:

EN ISO 1071: E FeC-GP2 1
(DIN 8573): E FeC-G
AWS: E St

capilla® 41

Product description:

Special coated stick electrode suitable for repair and maintenance welding of grey cast iron.
Characteristics of weld metal:

Ni-alloyed Fe-base alloy with high content of carbon

If heat treated correctly and if composition of the base material is suitable, the weld metal is mainly perltic with embedded globular carbon.

Pre-heating of base material in the range between 600°C and 650°C.

Applications:

For cold welding of grey cast iron, malleable cast iron and nodular cast iron.

Base metals:
EN 1561: EN-GJL-100 (GG10) to EN-GJL-350 (GG 35).
EN 1562: EN-GJMB-350 (GTS 35) to EN-GJMB-550 (GTS 55).
EN-GJMW-350 (GTW 35) to EN-GJMW-550 (GTW 55).
EN 1563: EN-GJS-400 (GGG40) to EN-GJS-700 (GGG 70).

Typical weld metal composition:

[wt. - %]

	C	Si	Mn	Ni	Ti	Fe
Min.	**2,0**	**1,5**	**0,8**	**1,5**	**0,3**	
Max.	**2,5**	**2,0**	**1,0**	**2,5**	**0,5**	**Bal.**

Mechanical properties:

The mechanical properties of the deposit are mainly influenced by the base material and the heat treatment during and after welding.

Positions: PA

Redrying: 150 – 180°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,5	350	60 - 80
3,25	350	80 - 120
4,0	350	110 - 140
5,0	350	140 - 180

Polarity =(-)~

Standards:

DIN EN ISO 1071: E C NI-CI 1
(DIN 8573): E Ni-BG 22
AWS: E Ni-CI

capilla® 43

Product description:

Basic-graphitic coated stick electrode for fusion and deposition welding of cast iron. The soft characteristic of the electrical arc allows a controlled, spatter free transfer of weld metal to the workpiece. Welding using low amperage ensures machinable weld deposits and HAZ. Carbon is precipitated as graphite in the weld metal.

Applications:

For cold welding of grey cast and annealed cast iron, suitable for repair and maintenance work.

Base metals:
EN 1561: EN-GJL-100 (GG10) to EN-GJL-350 (GG 35).
EN 1562: EN-GJMB-350 (GTS 35) to EN-GJMB-550 (GTS 55).
EN-GJMW-350 (GTW 35) to EN-GJMW-550 (GTW 55).

Typical weld metal composition:

[wt. - %]

	C	Fe	Ni
Min.			
Max.	**0,5**	**2,5**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Hardness:	160	[HB]

Positions: all except PG

Redrying: 150 – 180°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,5	350	60 - 90
3,25	350	90 - 120
4,0	350	110 - 150
5,0	450	130 - 180

Polarity =(+)~

Standards:

DIN EN ISO 1071: E C NiCu-B 1
(DIN 8573): E Ni Cu-BG 22
AWS: E Ni Cu-B

capilla® 44

Product description:

Special coated stick electrode made of an alloyed core wire with a basic-graphitic flux coating. The weld metal consists of nickel-copper-alloy.
The deposits are ductile, machinable and show nearly the same colour as the base metal.

Applications:

For repair and maintenance of grey cast iron and malleable cast iron. The weld deposits are free of blowholes and undercuts.

Typical weld metal composition:

[wt. - %]

	C	Cu	Ni
Min.		**28**	
Max.	**0,7**	**30**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Hardness:	160	[HB]

Positions: all except PG

Redrying: 150 – 180°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,5	350	60 - 90
3,25	350	90 - 120
4,0	350	110 - 150

Polarity
=(+)~

Standards:

DIN EN ISO 1071: E C NiFe 1 1
(DIN 8573): E NiFe-1-BG 23
AWS: E NiFe-CI

capilla® 45

Product description:

Special flux coated stick electrode with a nickel-iron alloyed core wire for repair and maintenance of cast iron.
The welding properties of the electrode are excellent. The seams are free of blow holes.
The deposits can be machined excellently.

Carbon is precipitated as graphite in the weld metal.

Applications:

For cold welding of grey cast iron, malleable cast iron and nodular cast iron.

Base metals:
EN 1561: EN-GJL-100 (GG10) to EN-GJL-350 (GG 35);
EN 1562: EN-GJMB-350 (GTS 35) to EN-GJMB-550 (GTS 55); EN-GJMW-350 (GTW 35) to EN-GJMW-550 (GTW 55);
EN 1563: EN-GJS-400 (GGG40) to EN-GJS-700 (GGG 70)

Typical weld metal composition:

[wt. - %]

	C	Ni	Fe
Min.		**51**	
Max.	**1,5**	**55**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Hardness:	200	[HB]

Positions: all except PG

Redrying: 150 – 180°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]	**Polarity**
2,5	350	60 - 90	=(+)~
3,25	350	90 - 120	
4,0	350	110 - 150	

also available:
find in table of content

Capilla 45-2
Capilla 45 MIG
Capilla 45 WIG
Capilla G 45 MM (tubular wire)

Standards:

DIN EN ISO 1071: E C NiFe 1 1
(DIN 8573): E NiFe-1-BG 23
AWS: E NiFe-CI

capilla® 45-2

Product description:

Special flux coated stick electrode with a nickel-iron alloyed bi-metal core wire for repair and maintenance of cast iron.
Due to the special core wire even higher amperage can be used.
The welding properties of the electrode are excellent. The seams are free of blow holes.
The deposits can be machined excellently.

Carbon is precipitated as graphite in the weld metal.

Applications:

For cold welding of grey cast iron, malleable cast iron and nodular cast iron.

Base metals:

EN 1561: EN-GJL-100 (GG10) to EN-GJL-350 (GG 35);
EN 1562: EN-GJMB-350 (GTS 35) to EN-GJMB-550 (GTS 55); EN-GJMW-350 (GTW 35) to EN-GJMW-550 (GTW 55);
EN 1563: EN-GJS-400 (GGG40) to EN-GJS-700 (GGG 70)

Typical weld metal composition:

[wt. - %]

	C	Ni	Fe
Min.		**51**	
Max.	**1,5**	**55**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Hardness:	200	[HB]

Positions: all except PG

Redrying: 150 – 180°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,5	350	60 - 90
3,25	350	90 - 120
4,0	350	110 - 150

Polarity =(+)~

Standards:

DIN EN ISO 1071: E C NiFe 1 1
(DIN 8573): E NiFe-1-BG 23
AWS: E NiFe-CI

capilla® 45-2 minus

Product description:

Special flux coated stick electrode with a nickel-iron alloyed bi-metal core wire for repair and maintenance of cast iron.
Due to the special core wire even higher amperage can be used.
The welding properties of the electrode are excellent. The seams are free of blow holes.
The deposits can be machined excellently.

Carbon is precipitated as graphite in the weld metal.

Applications:

For cold welding of grey cast iron, malleable cast iron and nodular cast iron.

Base metals:
EN 1561: EN-GJL-100 (GG10) to EN-GJL-350 (GG 35);
EN 1562: EN-GJMB-350 (GTS 35) to EN-GJMB-550 (GTS 55); EN-GJMW-350 (GTW 35) to EN-GJMW-550 (GTW 55);
EN 1563: EN-GJS-400 (GGG40) to EN-GJS-700 (GGG 70)

Typical weld metal composition:

[wt. - %]

	C	Ni	Fe
Min.		**51**	
Max.	**1,5**	**55**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Hardness:	200	[HB]

Positions: all except PG

Redrying: 150 – 180°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,5	350	60 - 90
3,25	350	90 - 120
4,0	350	110 - 150

Polarity =(-)~

also available:
find in table of content

Capilla 45
Capilla 45 MIG
Capilla 45 WIG
Capilla G 45 MM (tubular wire)

Standards:

~EN 14640:	E Cu6338 (CuMn14Al7)
(DIN 1733):	E-Cu Mn14Al7
(DIN 8555):	E 31-UM-200-CN
AWS A 5.7:	(E CuMnNiAl)
Mat.-No.:	2.1368

capilla® 47 N

Product description:

Flux coated aluminium-bronze stick electrode for joint welding of similar alloyed base metals.
The weld metal is corrosion resistant to salt-water and erosion resistant.

Applications:

Welding of high strength and corrosion resistant CuAl-bronze containing Mn and Ni.

Overlay welding of low-alloyed steels, steel cast and grey cast iron.

Dissimilar joints of Cu-alloys with steels.

Typical weld metal composition:

[wt. - %]

	Mn	AL	Ni	Fe	Cu
Min.	**12**	**7**	**1,5**	**2,3**	
Max.	**14**	**8,5**	**3**	**3,5**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Tensile strength R_m:	640	[MPa]
Yield strength $R_{p0,2}$:	420	[MPa]
Yield strength $R_{p1,0}$:	-	[MPa]
Elongation (L=5d):	20	[%]
Hardness	160	[HB]

Positions: all except PG

Redrying: 300°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,5	350	50 - 80
3,25	350	60 - 100
4,0	350	80 - 130
5,0	450	110 - 160

Polarity =(+)~

also available:
find in table of content

Capilla 47 N MIG
Capilla 47 N WIG
Capilla G 47 MM (tubular wire)

Standards:

~EN 14640:	E Cu5210 (CuSn9)
(DIN 1733):	EL-CuSn 7
(DIN 8555):	E30-UM-100-CNR
AWS A 5.7:	E CuSn-C
Mat.-No.:	2.1025

capilla® 48

Product description:

Flux coated tin-bronze stick electrode for joint welding with elevated tin content.

Applications:

For joint and overlay welding of:

CuSn-alloys (bronze), CuZn alloys (brass) and CuSnZnPb alloys (special brass).

Overlay welding of steel and grey cast iron.

Typical weld metal composition:

[wt. - %]

	Sn	Cu
Min.	**7,5**	
Max.	**8**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Tensile strength R_m:	280	[MPa]
Yield strength $R_{p0,2}$:	120	[MPa]
Yield strength $R_{p1,0}$:	-	[MPa]
Elongation (L=5d):	-	[%]
Hardness	120	[HB]

Positions: all except PG

Redrying: 200°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,5	350	50 - 80
3,25	350	60 - 100
4,0	350	80 - 130
5,0	450	110 - 160

Polarity =(+)~

also available:
find in table of content

Capilla 48 MIG
Capilla 48 WIG

Standards:

(DIN 1736): E-NiCu30Mn
AWS: E NiCu-7
Mat.-No.: 2.4377

capilla® NiCu30Mn

Product description:

Stick electrode for cladding and fusion welding of Ni-Cu-alloys (Monel).
Dissimilar joints of steels with copper and copper alloys.

Max.service temperatures : ≤425°C,
good toughness down to -196°C.

Applications:

Chemical and petro-chemical plant construction, desalination plants, ship building .

Base materials:

2.4360, 2.4375.

Typical weld metal composition:

[wt. - %]

	C	Cu	Si	Mn	Fe	Ni
Min.		**28**		**3**		
Max.	**0,2**	**30**	**0,3**	**3,5**	**1**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Tensile strength R_m:	280	[MPa]
Yield strength $R_{p0,2}$:	330	[MPa]
Yield strength $R_{p1,0}$:	-	[MPa]
Elongation (L=5d):	36	[%]

Positions: all except PG

Redrying: 300°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,5	350	60 - 90
3,25	350	80 - 110
4,0	350	100 - 150
5,0	450	150 - 200

Polarity =(+)~

also available:
find in table of content

Capilla NiCu 30 Mn MIG
Capilla NiCu 30 Mn WIG

Standards:

EN ISO 14172:	E Ni 2061 (NiTi4)
(DIN 1736):	EL-NiTi 3
Mat.-No.:	2.4156
AWS:	E Ni-1

capilla® NiTi 3

Product description:

Special basic flux coated stick electrode suitable for welding of pure nickel and nickel alloys as well as welding of dissimilar joints of this materials with low- and medium-alloyed steels and fusion welding of steels and Cu-alloys.
Cladding on carbon steel. Welding of buffer layers preventing carbon diffusion from high carbon steels to corrosion resistant low carbon steels.

Applications:

Welding of nickel base alloys, low-alloyed nickel (Ni-semifinished products/Ni-cast) e.g.:

2.4066, 2.4068, 2.4061, 2.4060, 2.4050, 2.4062, 2.4106, 2.4110, 2.4122, 2.4116, 2.4128

as well as steel/grey cast iron joints, dissimilar joints copper/iron,corrosion resistant claddings and buffer layers.

Typical weld metal composition:

[wt. - %]

	C	Mn	Si	Al	Ti	Ni
Min.					**2**	
Max.	**0,02**	**0,03**	**0,7**	**0,3**	**2,5**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Tensile strength R_m:	500	[MPa]
Yield strength $R_{p0,2}$:	320	[MPa]
Yield strength $R_{p1,0}$:	-	[MPa]
Elongation (L=5d):	28	[%]
Impact strength (ISO-V):	160	[J]

Positions: all except PG

Redrying: 320°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,5	350	50 – 90
3,25	350	80 – 110
4,0	350	100 – 150

Polarity =(+)~

also available:
find in table of content

Capilla NiTi 4 MAG
Capilla NiTi 4 WIG

Standards:

DIN EN ISO 1071: E C NiFe-1 6
(DIN 8573): E NiFe-1-BG 23
AWS: E NiFe-CI

Recovery: **150%**

capilla® FeNi 55

Product description:

Special flux coated high recovery stick electrode for repair and maintenance of cast iron.
The welding properties of the electrode are excellent. The seams are free of blow holes.
The deposits can be machined excellently.

Carbon is precipitated as graphite in the weld metal.

Applications:

For cold welding of grey cast iron, malleable cast iron and nodular cast iron.

Base metals:
EN 1561: EN-GJL-100 (GG10) to EN-GJL-350 (GG 35);
EN 1562: EN-GJMB-350 (GTS 35) to EN-GJMB-550 (GTS 55); EN-GJMW-350 (GTW 35) to EN-GJMW-550 (GTW 55);
EN 1563: EN-GJS-400 (GGG40) to EN-GJS-700 (GGG 70)

Typical weld metal composition:

[wt. - %]

	C	Ni	Fe
Min.		**51**	
Max.	**0,02**	**55**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Hardness:	200	[HB]

Positions: PA; PB; PC

Redrying: 150 – 180°C/2h

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,5	350	60 – 90
3,25	350	90 – 120
4,0	350	110 – 150

Polarity =(+)~

also available:
find in table of content

Capilla 45 MIG
Capilla 45 WIG
Capilla G 45 MM (tubular wire)

Standards:

~DIN EN ISO 18273: E Al 4043 (AlSi 5)
(DIN 1732): EL-AlSi 5
AWS A 5.3: E-4043
Mat.-No.: 3.2245

capilla® 60/5

Product description:

Special flux coated stick electrode.

In case of welding of heat treatable Al-alloys such as AlCuMg 1, AlMgSi1 and AlZn4,5Mg1 the mechanical properties of the base metals have to be taken into account.

Applications:

Fusion and overlay welding of AlSi-alloys with a maximum amount of 7 % Si.
Dissimilar joints of several different Al-alloys.

Typical weld metal composition:

[wt. - %]

	Si	Al
Min.	**4,5**	
Max.	**5,5**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Tensile strength R_m:	120	[MPa]
Yield strength $R_{p0,2}$:	60	[MPa]
Yield strength $R_{p1,0}$:	-	[MPa]
Elongation (L=5d):	15	[%]
Impact strength (ISO-V):	-	[J]

Positions: all except PG

Redrying: 120°C/2h (store dry)

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,5	300	40 – 70
3,25	350	60 – 90
4,0	350	80 – 120

Polarity =(+)~

also available:
find in table of content

Capilla Al Si 5 MIG
Capilla Al Si 5 WIG

Standards:

~DIN EN ISO 18273: E Al 4047 (AlSi 12)
DIN 1732: El-AlSi 12
AWS: E 4047
Mat.-No.: 3.2585

capilla® 60/12

Product description:

Special flux coated stick electrode, particularly for welding of aluminium cast alloys.

Applications:

Joint and overlay welding of AlSi-alloys with a maximum amount of 12 % Si (with and without additions of Cu and/or Mg).

Typical weld metal composition:

[wt. - %]

	Si	Al
Min.	**11**	
Max.	**12**	**Bal.**

Mechanical properties:

(without heat treatment; minimum values at ambient temperature)

Tensile strength R_m:	180	[MPa]
Yield strength $R_{p0,2}$:	80	[MPa]
Yield strength $R_{p1,0}$:	-	[MPa]
Elongation (L=5d):	5	[%]
Impact strength (ISO-V):	-	[J]

Positions: all except PG

Redrying: 120°C/2h (store dry)

Dimension:

Ø [mm]	Length [mm]	Welding current [A]
2,5	300	40 – 70
3,25	350	60 – 90
4,0	350	80 – 120

Polarity =(+)~

also available:
find in table of content

Capilla Al Si 12 MIG
Capilla Al Si 12 WIG

6.2 Wire electrodes for gas shielded arc welding of cast iron, Cu- and Al-base-alloys as well as for special applications

6.2.1 Solid wires for gas shielded arc welding of cast iron, Cu- and Al-base-alloys as well as for special applications

Designation	Standard	Weld Metal Analysis [Wt.%]									Properties*					
capilla®		C	Si	Mn	Ni	Fe	Cu	Al	Mg	Others	$R_{o0,2}$ [MPa]	R_m [MPa]	L=5d [%]	KV (ISO-V) [J]	Hardness [HB]	SG
45 MIG	EN ISO 1071: S C NiFE 1 M	0,1	0,2	0,8	54	Bal.	-	-	-	-	-	480	16	-	200	M12
NiTi 4 MIG	EN ISO 14172: S Ni2061 (NiTi4) 2.4155	0,03	0,4	0,5	Bal.	-	-	-	-	Ti = 2,8	250	460	30	120	-	I1
NiCu30Mn MIG	EN ISO 18274: S Ni 4060 (NiCu30Mn3Ti) 2.4377	0,2	0,3	3	Bal.	1	29	-	-	-	330	490	36	-	-	I1
47 MIG	EN ISO 24373: S Cu6100 (CuAl7) 2.0921	-	-	0,3	0,5	-	Bal.	8	-	-	185	430	30	-	-	I1
47 N MIG	EN ISO 24373: S Cu6338 (CuMn13Al8Fe3Ni2) 2.1367	-	<0,1	13	1,5	1,5	Bal.	7			400	650	10	-	290	I1
47 Ni MIG	EN ISO 24373: S Cu 6327 (CuAl8Ni2Fe2Mn2) 2.0922	-	≤0,1	2,2	2,2	2,3	Bal.	8	-	-	290	550	30	-	140	I1

*** Min. values at AT / no heat treatment; shielding gas (SG) acc. EN ISO 14175;**
Dimensions: Ø 1,0; 1,2; 1,6 [mm]; Spools: K 300; other dimensions and packing units on demand;
****The mechanical properties of the deposit are mainly influenced by the base material and the heat treatment during and after welding**

6.2.1 Solid wires for gas shielded arc welding of cast iron, Cu- and Al-base-alloys as well as for special applications (continued)

Designation	Standard	Weld Metal Analysis [Wt.%]									Properties*					
capilla®		**C**	**Si**	**Mn**	**Ni**	**Fe**	**Cu**	**Al**	**Mg**	**Others**	**$R_{o0,2}$ [MPa]**	**R_m [MPa]**	**L=5d [%]**	**KV (ISO-V) [J]**	**Hardness [HB]**	**SG**
47 Ni 6 MIG	EN ISO 24373: S Cu 6328 (CuAl9Ni5Fe3Mn2) 2.0923	-	≤0,1	1,8	5	3	Bal.	9	-	-	-	690	16	-	150	I1
48 MIG	EN ISO 24373: S Cu5180A (CuSn6P) 2.1022	-	-	-	-	-	Bal.	-	-	Sn = 6; P< 0,2	150	260	20	-	80	I1
CuSn MIG	EN ISO 24373: S Cu 1898A (CuSn1MnSi) 2.1006	-	0,25	0,3	-	-	Bal.	-	-	Sn=1	-	230	-	-	70	I1
CuSn 12 MIG	EN ISO 24373: S CU 5410 (CuSn12P) 2.1056	-	-	-	-	-	Bal.	-	-	Sn=12 P=0,3	190	380	25	-	100	I1
CuAl 10 MIG	EN ISO 24373: S Cu 6180 (CuAl10Fe) 2.0937	-	0,1	-	-	1,5	Bal.	10	-	-	-	420	35	-	150	I1
CuSi 3 MIG	EN 14640: S Cu6560 (CuSi3Mn1) 2.1461	-	3	1	-	-	Bal.	-	-	-	120	350	40	-	-	I1
CuAg MIG	EN ISO 24373: S Cu 1897 (CuAg1) 2.1211	-	0,1	0,5	-	-	Bal.	-	-	Ag=0,9	-	200	30	-	60	I1

*** Min. values at AT / no heat treatment; shielding gas (SG) acc. EN ISO 14175;**
Dimensions: Ø 1,0; 1,2; 1,6 [mm]; Spools: K 300; other dimensions and packing units on demand

6.2.1 Solid wires for gas shielded arc welding of cast iron, Cu- and Al-base-alloys as well as for special applications (continued)

Designation	Standard	Weld Metal Analysis [Wt.%]									Properties*					
capilla®		**C**	**Si**	**Mn**	**Ni**	**Fe**	**Cu**	**Al**	**Mg**	**Others**	**$R_{o0,2}$ [MPa]**	**R_m [MPa]**	**L=5d [%]**	**KV (ISO-V) [J]**		**SG**
AlSi 12 MIG	EN ISO 18273: S Al4047 (AlSi 12) 3.2585	-	12	-	-	-	-	Bal.	-	Ti=0,1	>60	>130	>5	-		I1
AlSi 5 MIG	EN ISO 18273 S Al4043 (AlSi5) 3.2245	-	5	-	-	0,3	-	Bal.	-	Ti=0,1	>40	>120	>8	-	-	I1
Al 99,5 MIG	EN ISO 18273: S Al1450 (Al99,5Ti) 3.0805	-	0,1	0,01	-	-	0,01	Bal.	0,01	Ti=0,15	>20	>65	>35	-	-	I1
AlMg 3 MIG	EN ISO 18273: S Al5754 (AlMg 3) 3.3536	-	0,2	-	-	-	-	Bal.	3,2	Mn+Cr=0,5	>80	>190	20	-		I1
AlMg 5 MIG	EN ISO 18273: S Al5356 (AlMg5Cr) 3.3556	-	0,2	0,1	-	-	-	Bal.	5	Ti=0,1 Cr=0,1	>120	>250	>8	-		I1
AlMg 4,5 Mn MIG	EN ISO 18273: S Al5183 (AlMg4,5Mn0,7) 3.3548	-	0,2	0,8	-	-	-	Bal.	4,8	Cr=0,15; Fe≤0,1	>125	>275	>17	-		I1

*** Min. values at AT / no heat treatment; shielding gas (SG) acc. EN ISO 14175;**
Dimensions: Ø 1,0; 1,2; 1,6 [mm]; Spools: K 300; other dimensions and packing units on demand

6.2.2 Welding rods for tungsten inert gas welding of cast iron, Cu- and Al-base-alloys as well as for special applications

Designation	Standard	Weld Metal Analysis [Wt.%]									Properties*					
capilla®		**C**	**Si**	**Mn**	**Ni**	**Fe**	**Cu**	**Al**	**Mg**	**Others**	**$R_{o0,2}$ [MPa]**	**R_m [MPa]**	**L=5d [%]**	**KV (ISO-V) [J]**	**Hardness [HB]**	**SG**
45 WIG	EN ISO 1071: S C NiFE 1 M	0,1	0,2	0,8	54	Bal.	-	-	-	-	-	480	16	-	200	M12
NiTi 4 WIG	EN ISO 14172: S Ni2061 (NiTi4) 2.4155	0,03	0,4	0,5	Bal.	-	-	-	-	Ti = 2,8	250	460	30	120	-	I1
NiCu30Mn WIG	EN ISO 18274: S Ni 4060 (NiCu30Mn3Ti) 2.4377	0,2	0,3	3	Bal.	1	29	-	-	-	330	490	36	-	-	I1
47 WIG	EN ISO 24373: S Cu6100 (CuAl7) 2.0921	-	-	0,3	0,5	-	Bal.	8	-	-	185	430	30	-	-	I1
47 N WIG	EN ISO 24373: S Cu6338 (CuMn13Al8Fe3Ni2) 2.1367	-	<0,1	13	1,5	1,5	Bal.	7			400	650	10	-	290	I1
47 Ni WIG	EN ISO 24373: S Cu 6327 (CuAl8Ni2Fe2Mn2) 2.0922	-	≤0,1	2,2	2,2	2,3	Bal.	8	-	-	290	550	30	-	140	I1

*** Dimensions: Ø 1,0; 1,6; 2,0; 2,4 [mm]; Length: 1000 [mm]; other dimensions on demand; shielding gas (SG) acc EN ISO 14175**

6.2.2 Welding rods for tungsten inert gas welding of cast iron, Cu- and Al-base-alloys as well as for special applications (continued)

Designation	Standard	Weld Metal Analysis [Wt.%]									Properties*					
capilla®		C	Si	Mn	Ni	Fe	Cu	Al	Mg	Others	$R_{o0,2}$ [MPa]	R_m [MPa]	L=5d [%]	KV (ISO-V) [J]	Hardness [HB]	SG
47 Ni 6 WIG	EN ISO 24373: S Cu 6328 (CuAl9Ni5Fe3Mn2) 2.0923	-	≤0,1	1,8	5	3	Bal.	9	-	-	-	690	16	-	150	I1
48 WIG	EN ISO 24373: S Cu5180A (CuSn6P) 2.1022	-	-	-	-	-	Bal.	-	-	Sn = 6; P< 0,2	150	260	20	-	80	I1
CuSn WIG	EN ISO 24373: S Cu 1898A (CuSn1MnSi) 2.1006	-	0,25	0,3	-	-	Bal.	-	-	Sn=1	-	230	-	-	70	I1
CuSn 12 WIG	EN ISO 24373: S CU 5410 (CuSn12P) 2.1056	-	-	-	-	-	Bal.	-	-	Sn=12 P=0,3	190	380	25	-	100	I1
CuAl 10 WIG	EN ISO 24373: S Cu 6180 (CuAl10Fe) 2.0937	-	0,1	-	-	1,5	Bal.	10	-	-	-	420	35	-	150	I1
CuSi 3 WIG	EN 14640: S Cu6560 (CuSi3Mn1) 2.1461	-	3	1	-	-	Bal.	-	-	-	120	350	40	-	-	I1
CuAg WIG	EN ISO 24373: S Cu 1897 (CuAg1) 2.1211	-	0,1	0,5	-	-	Bal.	-	-	Ag=0,9	-	200	30	-	60	I1

*** Dimensions: Ø 1,0; 1,6; 2,0; 2,4 [mm]; Length: 1000 [mm]; other dimensions on demand; shielding gas (SG) acc EN ISO 14175**

6.2.2 Welding rods for tungsten inert gas welding of cast iron, Cu- and Al-base-alloys as well as for special applications (continued)

Designation	Standard	Weld Metal Analysis [Wt.%]									Properties*					
capilla®		C	Si	Mn	Ni	Fe	Cu	Al	Mg	Others	$R_{o0,2}$ [MPa]	R_m [MPa]	L=5d [%]	KV (ISO-V) [J]		SG
AlSi 12 WIG	EN ISO 18273: S Al4047 (AlSi 12) 3.2585	-	12	-	-	-	-	Bal.	-	Ti=0,1	>60	>130	>5	-		I1
AlSi 5 WIG	EN ISO 18273 S Al4043 (AlSi5) 3.2245	-	5	-	-	0,3	-	Bal.	-	Ti=0,1	>40	>120	>8	-	-	I1
Al 99,5 WIG	EN ISO 18273: S Al1450 (Al99,5Ti) 3.0805	-	0,1	0,01	-	-	0,01	Bal.	0,01	Ti=0,15	>20	>65	>35	-	-	I1
AlMg 3 WIG	EN ISO 18273: S Al5754 (AlMg 3) 3.3536	-	0,2	-	-	-	-	Bal.	3,2	Mn+Cr=0,5	>80	>190	20	-		I1
AlMg 5 WIG	EN ISO 18273: S Al5356 (AlMg5Cr) 3.3556	-	0,2	0,1	-	-	-	Bal.	5	Ti=0,1 Cr=0,1	>120	>250	>8	-		I1
AlMg 4,5 Mn WIG	EN ISO 18273: S Al5183 (AlMg4,5Mn0,7) 3.3548	-	0,2	0,8	-	-	-	Bal.	4,8	Cr=0,15; Fe≤0,1	>125	>275	>17	-		I1

*** Dimensions: Ø 1,0; 1,6; 2,0; 2,4 [mm]; Length: 1000 [mm]; other dimensions on demand; shielding gas (SG) acc EN ISO 14175**

6.2.3 Tubular wires for gas shielded arc welding of cast iron, Cu- and Al-base-alloys as well as for special applications

Designation	Standard	Weld Metal Analysis [Wt.%]									Properties*					
capilla®		C	Si	Mn	Ni	Fe	Cu	Al	Mg	Others	$R_{o0,2}$ [MPa]	R_m [MPa]	L=5d [%]	KV (ISO-V) [J]	Hardness	SG
FeC 3 RLD*	EN ISO 1071: T C FeC-3 N	2,3	1,8	0,9	-	Bal.	-	-	-	Ti=0,4	-*	-*	-*	-*	-*	OA
45 RLD	DIN EN ISO 1071: T C NiFe1 M	1,5	-	-	55	Bal.	-	-	-	-	-	-	-	-	200	M21
47 N RLD	EN ISO 24373: T Cu6338 (Cu Mn14Al7)	-	<0,1	13	1,5	1,5	Bal.	7			400	650	10	-	290	I1

*** Min. values at AT / no heat treatment; shielding gas (SG) acc. EN ISO 14175;**

Dimensions: Ø 1,0; 1,2; 1,6 [mm]; Spools: K 300; other dimensions and packing units on demand;

****The mechanical properties of the deposit are mainly influenced by the base material and the heat treatment during and after welding.**

7 Filler material for brazing and soldering

Designation	DIN EN 1044	DIN EN ISO 3677	(DIN 8513)	Solidus/Liquidus [°C]	Working temperature [°C]	Tensile strength of fusion zone [daN/mm²]*	Flux DIN EN 1045
Ag-solder							
capilla® AG 102F / AG 102	AG 102	B-Ag56CuZnSn	L-Ag55Sn	620 - 655	655	45	FH 10
capilla® AG 103F / AG 103	AG 103	B-Ag55ZnCuSn	L-Ag55Sn	620 - 660	660	40	FH 10
capilla® AG 104F / AG 104	AG 104	B-Ag45ZnCuSn	L-Ag45Sn	640 - 680	670	40	FH 10
capilla® AG 105F / AG 105	AG 105	B-Ag40CuZnSn	L-Ag40Sn	640 - 700	690	36	FH 10
capilla® AG 106F / AG 106	AG 106	B-Cu36AgZnSn	L-Ag34Sn	630 - 730	710	43	FH 10
capilla® AG 107F / AG 107	AG 107	B-Cu36ZnAgSn	L-Ag30Sn	650 - 750	740	38	FH 10
capilla® AG 502F / AG 502	AG 502	B-Ag49ZnCuMnNi	L-Ag49	680 - 705	690	30	FH 10
capilla® AG 203F / AG 203	AG 203	B-Ag44CuZn	L-Ag44	675 - 735	730	45	FH 10
capilla® AG 206F / AG 206	AG 206	B-Cu44ZnAg(Si)	L-Ag20	690 - 810	810	40	FH 10
Brass solder							
capilla® CU 303F / CU 303	CU 303	B-Cu60Zn(Si)(Mn)	L-CuZn40	890 - 900	900	40	FH 21
capilla® CU 306F / CU 306	CU 306	B-Cu60ZnSn(Ni)(Si)(Mn)	L-CuZn39Sn	870 - 890	900	42	FH 21
capilla® CU 305F / CU 305	CU 305	B-Cu48ZnNi(Si)	L-CuNi10Zn42	890 - 920	910	45	FH 21
Al-solder							
capilla® AL 104F / AL 104	AL 104	B-Al88Si	L-AlSi12	575 - 585	590	15	FL 20

Due to the fact, that mechanical properties of the fusion zone are dependent on the properties of the base material, technical data are standard values.

8 Powders for plasma welding, plasma spraying, gas powder welding and flame spraying

Designation										
Fe-based	**C**	**Si**	**Cr**	**Mo**	**Ni**	**W**	**B**	**Others**	**Hardness**	**Remarks**
capilla®										
Capidur 4015	0,04	0,7	17	-	-	-	-	Mn = 0,5	20 – 40 HRC	
Capidur 4115	0,2	0,6	17	1,1	-	-	-	Mn = 0,5	30 – 50 HRC	
Capidur 410 NiMo	0,04	0,7	13	0,5	4,7	-	-	-	40 HRC	
Capidur 4031	0,4	0,4	13	-	-	-	-	-	44 HRC	
Capicoat 316 H	0,1	-	17	2,2	13	-	-	-	170 HB	
Capicoat 51	0,08	0,75	19	-	9	-	-	Mn = 7	170 HB	
Capidur 30 FeCrMn	0,12	5	21	-	8	-	-	Co ≤ 0,07; Mn = 6,5	30 HRC	
Capidur 60 FeCr	3,9	-	31	-	-	-	-	-	57 HRC	
Capidur 45 FeCr	2	0,6	31	-	-	-	-	-	43 HRC	
Capidur 65 FeCrNb	5,4	1,4	12	-	-	-	1	V = 6; Nb = 6,5	65 HRC	

Designation										
Ni-based	**C**	**Si**	**Cr**	**Mo**	**Ni**	**W**	**B**	**Others**	**Hardness**	**Remarks**
capilla®										
Capidur 20 Ni	0,05	3	-	-	Bal.	-	2	Fe = 2,5	31 HRC	self-fluxing
Capidur 40 Ni	0,3	3,5	8	-	Bal.	-	1,6	Fe = 3	40 HRC	self-fluxing
Capidur 45 Ni	0,4	3,5	9	-	Bal.	-	2	Fe = 3	45 HRC	self-fluxing
Capidur 50 Ni	0,6	3,8	11	-	Bal.	-	2,5	Fe = 3	50 HR	self-fluxing
Capidur 55 Ni	0,5	3,7	17	4,5	Bal.	-	2,5	Cu = 2	55 HRC	self-fluxing
Capidur 60 Ni	0,8	4,3	16	-	Bal.	-	3,5	Fe = 4,5	60 HRC	self-fluxing
Capidur 35 NiCr	0,05	4,5	33	-	Bal.	-	1,1	Cu = 1,6; Nb = 0,5	34 HRC	self-fluxing
Capidur 40 NiCr	0,1	4,6	36	-	Bal.	-	1,7	Co ≤ 0,07	39 HRC	self-fluxing
Capibond NiAl 5	0,03	-	-	-	Bal.	-	-	Al = 5		adhesion primer
Capibond NiAl 6	1	-	18	-	Bal.	-	-	Al = 6		adhesion primer
Capidur NiCrMo 24/21	0,03	3,40	24	21	Bal.	-	-	Co = 0,07	43 HRC	

8 Powders for plasma welding, plasma spraying, gas powder welding and flame spraying (continued)

Designation										
Ni-based	**C**	**Si**	**Cr**	**Mo**	**Ni**	**W**	**B**	**Others**	**Hardness**	**Remarks**
capilla®										
Capidur NiCrW 26/9	2	-	26	-	Bal.	9	-	-	38 HRC	
Capicoat 5200 S	0,1	0,8	16	16	Bal.	4	-	V = 0,3; Fe = 6	200 HB	
Capicoat 530	0,05	0,4	19	6	Bal.	1		Co = 12; Al = 2,2; Ti = 3	180 HB	
Capicoat NiCr 20	0,1	0,6	20	-	Bal.	-	-	-	170 HB	

Designation										
Co-based	**C**	**Si**	**Cr**	**Mo**	**Ni**	**W**	**B**	**Others**	**Hardness**	**Remarks**
capilla®										
Capidur 506	1,1	-	28	-	-	4,5	-	-	41 HRC	
Capidur 512	1,4	-	30	-	-	8,5	-	-	48 HRC	
Capidur 501	2,4	-	31	-	-	13	-	-	53 HRC	
Capidur R 40 Co	1,2	-	28	3,7	6,5	4,5	-	Cu = 1,6	42 HRC	
Capidur R 40 CoNb	1,6	-	29	3,7	6,5	-	-	Cu = 1,6; Nb = 4	41 HRC	
Capidur R 50 Co	2	-	28	3,7	6,5	10	-	Cu = 1,6	49 HRC	
Capidur R 50 CoNb	2	-	28	3,7	6,5	-	-	Cu 0 1,6; Nb = 5,5	45 HRC	
Capidur 521	0,25	-	28	5	2,8	-	-	-	32 HRC	
Capidur FN	1,6	1	28	-	22	13	-	-	43 HRC	
Capidur F	1,8	-	26	-	23	12,5	-	-	45 HRC	
Capidur 516	0,1	-	20	-	10	15	-	-	230 HB	
Capidur 45 Co	0,8	2,3	19	-	13	8	1,7	Cu = 0,6; Fe = 3	45 HRC	self-fluxing
Capidur 50 Co	0,2	3,5	18	6	27	-	3	-	50 HRC	self-fluxing
Capidur 55 Co	1,3	3	19	-	13	13	2,2	Cu = 0,6; Fe = 3	55 HRC	self-fluxing
Capidur 60 Co	1,3	2,8	19	-	13	15	3	-	60 HRC	self-fluxing

8.1 Powders for plasma welding, plasma spraying, gas powder welding and flame spraying [processing]

Designation	Plasma-welding	Plasma-spraying	Gas powder welding	Flame-spraying
Grain size	50 – 160 µm 63 - 200 µm	32 - 106 µm 45 - 125 µm	16 - 63 µm 45 – 90 µm 32 – 106 µm	32 – 106 µm 45 – 125 µm
Fe-based				
capilla®				
Capidur 4015	X	X		X
Capidur 4115	X	X		X
Capidur 410 NiMo	X	X		X
Capidur 4031	X	X		X
Capicoat 316 H	X	X		X
Capicoat 51	X	X		X
Capidur 30 FeCrMn	X	X		X
Capidur 60 FeCr	X	X		X
Capidur 45 FeCr	X	X		X
Capidur 65 FeCrNb	X	X		X
Ni-based				
capilla®				
Capidur 20 Ni	X	X	X	X
Capidur 40 Ni	X	X	X	X
Capidur 45 Ni	X	X	X	X
Capidur 50 Ni	X	X	X	X
Capidur 55 Ni	X	X	X	X
Capidur 60 Ni	X	X	X	X
Capidur 35 NiCr	X	X		X
Capidur 40 NiCr	X	X		X
Capibond NiAl 5		X		X
Capibond NiAl 6		X		X
Capidur NiCrMo 24/21	X	X		X
Capidur NiCrW 26/9	X	X		X
Capicoat 5200 S	X	X		X
Capicoat 530	X	X		X
Capicoat NiCr 20		X		X

8.1 Powders for plasma welding, plasma spraying, gas powder welding and flame spraying [processing] (continued)

Designation	Plasma-welding	Plasma-spraying	Gas powder welding	Flame-spraying
Grain size	50 – 160 µm 63 - 200 µm	32 - 106 µm 45 - 125 µm	16 - 63 µm 45 – 90 µm 32 – 106 µm	32 – 106 µm 45 – 125 µm
Co-based				
capilla®				
Capidur 506	X	X		X
Capidur 512	X	X		X
Capidur 501	X	X		X
Capidur R 40 Co	X	X		X
Capidur R 40 CoNb	X	X		X
Capidur R 50 Co	X	X		X
Capidur R 50 CoNb	X	X		X
Capidur 521	X	X		X
Capidur FN	X			
Capidur F	X	X		X
Capidur 516	X	X		X
Capidur 45 Co	X	X		
Capidur 50 Co	X	X		
Capidur 55 Co	X	X		
Capidur 60 Co	X	X		

I. List of approved Capilla welding consumables

Capilla	TÜV Kennblatt-Nr.	DB-approval number	CE-declaration of performance
30 S	10166.03	10.020.03	ME-30S-2014-1
30 Mag	09673.07	42.020.02	ME-30MAG-2014-1
49	10167.04	10.020.04	ME-49-2014-1
49 KBS	11715.01	10.020.05	ME-49KBS-2014-1
49 MAG	09674.05	42.020.03	ME-49MAG-2014-1
308 L	07217.04	30.020.01	ME-308L-2014-1
308 LR	12301.02		ME-308LR-2014-1
308 L MAG	11934.02		ME-308LMAG-2014-1
308 L WIG	11935.02		ME-308LWIG-2014-1
309 Mo	07218.04	30.020.02	ME-309Mo-2014-1
309 L MAG	11936.01		ME-309LMAG-2014-1
309 L WIG	11937.01		ME-309LWIG-2014-1
316 L	07221.04	30.020.03	ME-316L-2014-1
316 LR	12302.02		ME-316LR-2014-1
316 L MAG	11938.01		ME-316LMAG-2014-1
316 L WIG	11939.02		ME-316LWIG-2014-1
318	07219.04	30.020.04	ME-318-2014-1
318 LR	12303.02		ME-318LR-2014-1
318 MAG	11940.01		ME-318MAG-2014-1
318 WIG	11941.01		ME-318WIG-2014-1
347	07220.04	30.020.05	ME-347-2014-1
347 MAG	11942.01		ME-347MAG-2014-1
347 WIG	11943.01		ME-347WIG-2014-1
51 KBN	10413.03	30.020.07	ME-51KBN-2014-1
51 MAG	11944.01		ME-51MAG-2014-1
51 WIG	11945.01		ME-51WIG-2014-1
2209 MAG	11946.01		ME-2209MAG-2014-1
2209 WIG	11947.01		ME-2209WIG-2014-1
52 K		30.020.06	ME-52K-2014-1
625 WIG	11738.02		ME-625WIG-2014-1
625 MAG	11739.02		ME-625MAG-2014-1
6000 MAG	10162.06		ME-6000MAG-2014-1
CuSi 3	09154.03		ME-CuSi3-2014-1
734 MAG	10524.02		ME-734MAG-2014-1

II. Table of content

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III. Shielding gases acc. DIN EN ISO 14175

Designation		Components in vol.-%						Standard application	remarks
main group	sub group	oxidising		inert		reducing	inert		
		CO_2	O_2	Ar	He	H_2	N_2		
R	1	-	-	Bal.		> 0 - 15	-	TIG; plasma welding; plasma cutting; root shielding	reducing
	2	-	-	Bal.	-	> 15 - 35			
I	1	-	-	100	-	-	-	plasma welding; root shielding	inert
	2	-	-	-	100	-	-		
	3	-	-	Bal.	> 0 - 95	-	-		
M1	1	>0-5		Bal.	-	> 0 – 5	-	MAG	slightly oxidising
	2	>0-5		Bal.	-	-	-		
	3		>0 3	Bal.	-	-	-		
	4	>0-5	> 0 - 3	Bal.	-	-	-		
M2	0	> 5 - 15	-	Bal.	-	-	-	MAG	oxidising
	1	15 - 25	-	Bal.	-	-	-		
	2	-	>3 - 10	Bal.	-	-	-		
	3	0,5 – 5	3 – 10	Bal.	-	-	-		
	5	5 - 15	3 - 10	Bal.	-	-	-		
M3	1	25 - 50		Bal.	-	-	-	MAG	oxidising
	2	-	>10 - 15	Bal.	-	-	-		
	3	25 – 50	2 – 10	Bal.	-	-	-		
	4	5 – 25	10 – 15	Bal.	-	-	-		
	5	25 - 50	10 - 15	Bal.	-	-	-		
C	1	100		-	-	-	-	MAG	Deeply oxidising
	2	Bal.	0,5 - 30	-	-	-	-		
R	1	-	-	Bal.	-	0,5 – 15	-	MIG/WIG	
	2	-	-	Bal.	-	15 - 50	-		
N	1	-	-	-	-	-	100	plasma cutting; root shielding	reducing
	3	-	-	Bal.	-	-	5 – 50		
	4	-	-	Bal.	-	0,5 – 10	0,5 – 5		
	5	-	-	-	-	0,5 - 50	Bal.		
O	1	-	100	-	-	-	-	autogenuous thermal cutting	

Notes

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Notizen

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Notizen

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