CHROMIUM CARBIDE HARDFACING

DATA SHEET E-55
TOKO TECH(WUXI) CO., LTD
Tel: +86(510)8359 5138
Fax: +86(510)8359 7138
Email: office@tokoc.com
Website: https://www.tokoc.com

Alloy type

Chromium carbide hardfacing.

Materials to be welded

These consumables are not used for joining they are used for surfacing/hardfacing applications. They can be used for hardfacing many materials including structural steel (BS 4360), wear resisting steel, high strength cast steel (BS 3100 & BS 1504), and Hadfield 13%Mn steel (with appropriate buffer layer).

Applications

These consumables produce high carbon, high chromium, chromium carbide deposits with high hardness and resistance to extreme abrasion. They also exhibit high temperature stability with good oxidation resistance up to about 1000°C (although hot hardness above about 450°C is inferior to cobalt types); also have moderate corrosion resistance.

Used for **earth moving** and **dredging equipment**, **steel works equipment**, **sinter plants**, **cement works**, **sizing screens**, **augers**, **rolling mill guides**, **pump impellers**, **augers** and **feed screws**; which are handling **abrasive sands** and **sludges** under conditions of extreme abrasion but limited impact.

Microstructure

In the as-welded condition the microstructure consists of an austenitic alloy matrix (bulk hardness 500-600HV) and chromium/complex carbides (approximate hardness 1500HV).

Welding guidelines

Use with a stringer bead technique or a wide weave for maximum coverage. Thermal contraction stresses will normally cause some cold cracking (stress-reliefchecking). Preheating to 200-450°C and slow cooling can minimise surface cracking but not eliminate it.

Build-ups should be restricted to two layers or a maximum of three (8mm maximum build-up). For large build-ups on low alloy steels, or any hardfacing on 13%Mn Hadfield steel, a buffer layer of 307 (data sheet E-21) should be used.

Additional information

Deposits are non-machinable or heat-treatable but can be ground. With the MMA electrodes a weave/wash technique produces a very smooth glass like surface which is highly resistant to fine hard powder abrasion.

Hardness figures are quoted for all the products but these only provide a guide to expected performance, because of the complex nature of the chromium carbide weld deposit. Chromium carbide types have greater resistance to high stress abrasion than martensitic types of equivalent hardness.

Related alloy groups

For lower abrasion resistance but better impact properties the 650 hardfacing types (data sheet E-51) are used. The cobalt hardfacing types (data sheet E-65) have superior hot hardness.

Products available

Process	Product	Specification
MMA	**TOKO 850**	BS EN EFe14
	TOKO 950	BS EN EFe14
FCW	**TOKO 850**	BS EN TFe15
	TOKO 950	BS EN TFe15

General Data for all MMA Electrodes

Storage	**3 hermetically sealed ring-pull metal tins** per carton, with unlimited shelf life. Direct use from tin is satisfactory. For electrodes that have been exposed: **Redry** 200 – 300°C/1-2h to restore to as-packed condition. Maximum 350° C, 3 cycles, 10h total. **Storage**: Recommended ambient storage conditions for opened tins (using plastic lid): < 60% RH, > 18°C.
Fume data	Fume composition, wt % typical:

Fe	Mn	Cr	Mo	V	F	OES (mg/m³)
25	4	12	2	0.5	3	0.4

TOKO 850

MMA electrode producing a chromium carbide deposit

Product description

MMA electrode with a rutile metal powder type flux coating on a pure low carbon core wire. Moisture resistant coating giving freedom from porosity.

Recovery is about 175% with respect to core wire.

Specifications

DIN 8555 E10-UM-60-G
BS EN 14700 E Fe14

ASME IX Qualification

QW432 F-No --

Composition (weld metal wt %)

	C	Mn	Si	Cr	Mo+Nb+V+W
typ	3	0.8	1	25	2

All-weld mechanical Properties

Typical hardness on mild steel:

		1 layer	2 layers	3 layers
Vickers	HV	450-500	600-700	650-750
Rockwell	HRC	45-50	55-60	58-62

Actual hardness is dependent upon base material composition, number of layers, cooling rate and welding conditions.

Operating parameters

DC +ve or AC (OCV: 70V min)

ø mm	3.2	4.0	5.0
min A	110	150	190
max A	160	220	280

Packaging data

ø mm	3.2	4.0	5.0
length mm	380	380	450
kg/carton	13.2	13.2	15.0
pieces/carton	213	153	105

TOKO 950

MMA electrode producing a chromium carbide deposit

Product description

MMA electrode with a rutile metal powder type flux coating on a pure low carbon core wire. Moisture resistant coating giving freedom from porosity.

Recovery is about 175% with respect to core wire.

Specifications

DIN 8555 E10-UM-65-G
BS EN 14700 E Fe14

ASME IX Qualification

QW432 F-No --

Composition (weld metal wt %)

	C	Mn	Si	Cr	Mo+Nb+V+W
typ	4	1.2	1	34	3

All-weld mechanical properties

Typical hardness on mild steel:

		1 layer	2 layers	3 layers
Vickers	HV	475-575	675-750	700-850
Rockwell	HRC	48-54	56-62	60-66

Actual hardness is dependent upon base material composition, number of layers, cooling rate and welding conditions.

Operating parameters

DC +ve or AC (OCV: 70V min)

ø mm	3.2	4.0	5.0
min A	110	150	190
max A	160	220	280

Packaging data

ø mm	3.2	4.0	5.0
length mm	380	380	450
kg/carton	13.5	13.8	15.9
pieces/carton	252	159	108

Data For all FCW

Operating parameters

No shielding gas is required.

Current: DC+ve ranges as below:

ø mm	amp-volt range	stickout
1.6	200-300A, 24-30V	40-50mm

Packaging data

Spools in cardboard carton: 13kg
Where possible, preferred storage conditions are 60% RH max, 18°C min.

Fume data

Fume composition (wt %)

Fe	Mn	Ni	Cr^3	Cr^6	Cu	F	OES (mg/m^3)
35	7	1	13	5	<1	12	1

TOKO 850

Self-shielded hardfacing flux-cored wire

Product description

Self-shield flux cored wire for surfacing applications in the flat and HV positions. The tubular wire has a lime-fluorspar flux fill which eliminates the need for an external shielding gas. Nominal 60HRC deposit is produced which is non-machinable.

Metal recovery about 90% with respect to wire.

Specifications

DIN 8555 MF10-GW-60-G
BS EN 14700 T Fe15

ASME IX Qualification

QW432 F-No --

Composition (weld metal wt %)

	C	Mn	Si	Cr
Typical	4.8	2.7	1.7	22

All-weld mechanical properties

Typical all-weld metal hardness on mild steel:
55-59 HRC

Actual hardness dependent on base material, number of layers, cooling rate and welding conditions.
Maximum deposit thickness 8mm.

TOKO 950

Self-shielded hardfacing flux-cored wire

Product description

Self-shield flux cored wire for surfacing applications in the flat and HV positions. The tubular wire has a lime-fluorspar flux fill which eliminates the need for an external shielding gas. Nominal 60HRC deposit is produced which is non-machinable.

Metal recovery about 90% with respect to wire.

Specifications

DIN 8555 MF10-GW-65-G
BS EN 14700 T Fe15

ASME IX Qualification

QW432 F-No --

Composition (weld metal wt %)

	C	Mn	Si	Cr
typ	5	3	1.5	27

All-weld mechanical properties

Typical all-weld metal hardness on mild steel:
57-60 HRC

Actual hardness dependent on base material, number of layers, cooling rate and welding conditions.
Maximum deposit thickness 8mm (2-3 layers).