

EC-MATERIAL SAFETY DATA SHEET – BRUSHWELLMAN No.: 8/GB

(Prepared in compliance with the EC-M.S.D.S. Directives 91/155/EEC and 2001/58/EC, EC-Preparations Directive 1999/45/EC, German TRGS 220 M.S.D.S., as per § 14 of the German Ordinance on hazardous Substances/GefStoffV)

SPINODAL ALLOYS (ToughMet®)**Date:** 05.05.2003**Revised:****Page:** 1 of 7**1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/ UNDERTAKING****1.1. Identification of the substance or preparation**

BRUSH WELLMAN Alloys: ToughMet® 2 CX, 3 CX and 3 AT

Spinodal alloys are preparations.

1.2. Use of the substance/preparation

Spinodal alloys are semifinished/wrought products and are used and processed by professional users – ref. to item 7.3.

1.3. Company/undertaking identification

Importer into the EC	Manufacturer
BRUSH WELLMAN GmbH Motorstrasse 34 D-70499 STUTTGART Federal Republic of Germany Tel.: +49(0)711/83093-0 Fax: +49(0)711/833 822 Internet: www.brushwellman.de E-mail: K_L_Rausch@brushwellman.com Uli_Büttner@brushwellman.com	BRUSH ENGINEERED BRONZE 7375 Industrial Parkway LORAIN, Ohio 44053 U.S.A. Tel.: +1(440)960-5660 Fax: +1(440)960-5668 BRUSH WELLMAN Inc. 17876 St. Clair Avenue CLEVELAND, Ohio 44110 U.S.A. Tel.: +1(216)486-4200 Fax: +1(216)383-4091 Internet: www.brushwellman.com

1.4. Emergency telephone**1.4.1. Business hours**

BRUSH WELLMAN GmbH - Germany +49(0)711/83093-0 (switch board)	BRUSH WELLMAN Inc. - U.S.A. +1(216)486-4200 (switch board)
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1.4.2. After business hours

+49(0)711/755 155 (Mr Rausch) +49(0)7156/83 50 (Mr Büttner)	+1(216)486-4200 (switch board)
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2. COMPOSITION/INFORMATION ON INGREDIENTS**2.1. Chemical characterisation of the preparations**

Spinodal alloys in massive form do not require hazard labelling as per Commission Directive 1999/45/EC.

2.2. Alloying substances and their hazard classifications

Substances	Einecs number CAS number INDEX number	Classification: carcinogenic, hazard symbols, R phrases	
Copper (Cu)	231-159-6 7440-50-8 -	-	-
Nickel (Ni)	231-111-4 7440-02-0 028-002-00-7	EU/Germany: Carc.Cat.3/K3	R40 R43
Tin (Sn)	231-141-8 7440-31-5 -	-	-
Zinc (Zn)	231-175-3 7440-66-6 030-001-00-1	(applies for zinc in powder form only)	F; R15-17
Iron (Fe)	231-096-4 7439-89-6 -	-	-

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2.3. Alloying substances and their concentrations

Substance (weight-%)	ToughMet® 2CX	ToughMet® 3 CX	ToughMet® 3 AT
Copper (Cu)	83-85	69.95-76.7	69.95-76.7
Nickel (Ni)	8.5-9.5	14.5-15.5	14.5-15.5
Tin (Sn)	5.5-6.5	7.5-8.5	7.5-8.5
Zinc (Zn)	0-0.5	0-0.5	0-0.5
Iron (Fe)	0-0.5	0-0.5	0-0.5

3. HAZARDS IDENTIFICATION**3.1. Classification of the preparations**

Brush Wellman Alloy	Classification carcinogenic	Classification: Hazard symbols, R phrases	
all ToughMet alloys	Carc.Cat.3/K3	Xn; R40	R43

These preparations do not require hazard labelling as per Commission Directive 1999/45/EC – for addition information ref. to item **15./16.**

3.2. Hazards identification

These alloys as preparations in massive form present no special hazards to man and the environment.

- R40: *Limited evidence of a carcinogenic effect* – the classification (Carc.Cat.3/K3) is based on the nickel content.
- R43: *May cause sensitization by skin contact* – is based on the nickel content.

4. FIRST AID MEASURES**4.1. General information**

There is no immediate medical risk associated with these alloys in massive form.

4.1.1. Inhalation

Breathing difficulties caused by inhalation of particulate requires immediate removal to fresh air. If breathing has stopped, perform artificial respiration and obtain medical help.

4.1.2. Skin contact

Cuts should be treated by normal first aid. Embedded foreign bodies must be removed. If rashes or other skin effects develop, obtain medical help.

4.1.3. Eye contact

There is no special hazard to the eyes. Avoid transferring particulate material to the eyes from the hands. Any particulate which does enter the eyes could cause damage to the eye and surrounding tissues and should be removed by copious flushing with clean water, obtain medical help.

4.1.4. Ingestion

In case of accidental swallowing of dust or powder induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. If unconscious, obtain medical help.

4.2. Medical information

- Nickel: Sensitisation/Nickel Allergy, German BK 5101, and “Lung Damage from Nickel and its Compounds”, German BK 4109
- Copper: Metal Fume Fever

For additional information ref. to item **11.1.**

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SPINODAL ALLOYS (ToughMet®)**Date:** 05.05.2003**Revised:****Page:** 3 of 7**5. FIRE-FIGHTING MEASURES**

The alloys are non-flammable. Do not use water in fire-fighting metal melting operations. To avoid risk of explosion, dry sand or other fire-fighting powders should be used.

6. ACCIDENTAL RELEASE MEASURES

Not applicable to alloys in massive forms.

7. HANDLING AND STORAGE**7.1. Handling**

No special precautions are required for handling alloys in massive form. Use local exhaust ventilation when particulate (dust, mist, fume) is present – ref. to **8.2.1**. Use gloves when handling sharp edged alloy products, to prevent metal cuts and when particulate is present, to prevent sensitisation. If necessary use disposable gloves (nitrile or vinyl) under work gloves to prevent against mechanical risks – ref. to **8.2.1.2**.

7.2. Storage

No special precautions required. No prohibitions for mixed-goods-storage.

7.3. Specific use(s)

The company Brush Engineered Bronze/Brush Wellman Inc., U.S.A., manufactures and sells semifinished Spinodal alloys worldwide, in forms of rod, tubes and plate, etc. Among other things the alloys are used to manufacture bearings and bushings.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION**8.1. Exposure limit values**

Substance	Einecs number CAS number INDEX number	Limit Value (mg/m ³)	Dust Class E	Dust Class A	Operations/German EKA
Copper (Cu)	231-159-6 7440-50-8	1E MAK	class M	-	
Copper fumes	-	0.1A MAK	-	class H	
Nickel (Ni)	231-111-4 7440-02-0 028-002-00-7	0.5E MAK EKA*)	class M	-	*)EKA (500µg/m ³ = 45µg/l urine)
Tin (Sn)	231-141-8 7440-31-5	2E MAK	class L	-	
Zinc (Zn)	231-175-3 7440-66-6 030-001-00-1		-	-	
Zinc oxide fume (ZnO)	215-222-5 1314-13-2	1A MAK	-	class L	
Iron (Fe)	231-096-4 7439-89-6	-			

Particle size as per European standard EN 481:

L (light hazard): particulate with exposure limit values > 1 mg/m³

M (medium hazard): particulate with exposure limit values > 0.1 mg/m³

H (high hazard): all particulate with exposure limit values incl. carcinogenic substances and pathogenic agents

The German MAK **E** stands for inhalable (einatembare) and **A** stands for respirable (alveolar) particulate.

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SPINODAL ALLOYS (ToughMet®)**Date:** 05.05.2003**Revised:****Page:** 4 of 7**8.2. Exposure controls****8.2.1. Occupational exposure controls**

- Any process which could generate airborne particulate (dust, mist, fume) from the alloys must be provided with proper controls to ensure that airborne levels are kept as far below the Occupational Exposure Standards as is practically possible – ref. to item 8.1.
- Control to the above standards is achieved by means of local exhaust ventilation fitted with appropriate filtration of category K1 – ref. to 8.1.. Activities without full protection, such as repair and maintenance of machinery, processing equipment or ductwork, melting and casting operations, or filter change may require the use of personal respiratory protective equipment and protective over-garments. Clothing contaminated by such work must be handled in a controlled manner in order to prevent secondary exposure of workers or third parties.
- The installation and use of local exhaust ventilation and the use of respiratory equipment requires specialist advice and approval in order to ensure full protection.
- Operations which require controls include any form of abrasive machining or cutting, grinding, polishing, electrodischarge machining, welding, melting and casting. Operations which may not require controls (but need risk analysis) include milling, turning and general handling.

8.2.1.1. Respiratory protection

- Type of equipment:

1.

Particle filter P2	Particle filter P3	in combination with: - ref. BIA*)
10 x exposure limit	30 x exposure limit	half-/quarter mask or particle filtered half mask (FFP2/FFP3)
15 x exposure limit	400 x exposure limit	full mask/mouthpiece garniture

2.

Particle filter units with ventilation and full mask, half mask or quarter mask: - ref. BIA*)		Particle filter units with ventilation and helmet or caps: - ref. BIA*)	
class	multiple of exposure limit	class	multiple of exposure limit
TH2P	20	TM1P	10
TH3P	100	TM2P	100
or self-contained breathing apparatus: - ref. BIA*)		TM3P	500

3.

*) Recommended by BIA (German Professional Associations' Institute for Occupational Safety).

Dräger recommends to use filter P2 for dust and P3 for mist and fume.

Brush Wellman recommends the use of half- or full masks, or pressure demand self-contained breathing apparatus. Refer to German BGR 190 (former ZH 1/701), "Regeln für den Einsatz von Atemschutzgeräten/Regulations for the Usage of Respiratory Equipment" and "§ 19 Abs, 5 of the GefStoffV/German Ordinance on hazardous Substances" – time limits for usage.

- Type of filter: particle filter P2 or P3, as per EN 141/143
- Half mask, as per EN 140, or full mask, as per EN 136
- Manufacturer: for example, ECASTU (Universal, Selecta) and Dräger (Cirrus, Combitor Nova, Panorama Nova Standard, f2)
- Availability: for example, Kroschke sign-international GmbH – ref. to 8.2.1.2. Hand protection

8.2.1.2. Hand protection

Follow the standard work place hygiene recommendations. Gloves against particulate/cuts, for example:

- disposable glove (EN 374/388/455) "Dermatril" made of nitrile (KCL)
- disposable glove (EN 455) "Nimm den" made of vinyl (KCL)
- disposable glove (EN 420!) "Stretch" made of vinyl

If necessary use disposable gloves, protection against particulate, under work gloves, protection against cuts, for example leather gloves, against mechanical risks (EN 388).

Availability: for example, Kroschke sign-international GmbH, Daimlerstrasse 20,

D-38112 BRAUNSCHWEIG, Germany

Telephone: +49(0)531/318-318/Telefax: +49(0)531/318-151/E-mail: vertrieb@kroschke.com

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8.2.1.3. Eye protection

For processing the alloys the use of safety classes is recommended as required by the various operations, so for example safety classes with side protection, closed safety classes/goggles or face shields, as per EN 166.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1. General information

Appearance

Physical condition: solid

Colour: silver

9.2. Important health, safety and environmental information

Density: 8.9 g/cm³ (all ToughMet alloys)

Other data are not relevant or applicable for alloys in massive form.

9.3. Other information

Melting point: 925°C (ToughMet® 2 CX)

950°C (ToughMet® 3 CX and 3 AT)

Other data are not relevant or applicable for alloys in massive form.

10. STABILITY AND REACTIVITY

The alloys are stable. They do not corrode, dissolve or disintegrate under normal conditions. Acid treatment of metals may generate explosive hydrogen.

11. TOXICOLOGICAL INFORMATION

For questions concerning toxicological information, write to:

Medical Director, Brush Wellman Inc., 14710 West Portage River South Road, ELMORE, Ohio 43416-9502, U.S.A.

11.1. Inhalation and skin contact

- Based on its nickel content the alloys are classified as of limited evidence of a carcinogenic effect (Carc.Cat.3/K3 – Xn; R40).
- Inhalation of metal fumes can cause metal fume fever.
- The alloys are classified as potential sensitiser by skin contact (Xi; R43), based on the nickel content – German occupational disease: BK 4109, BK 5101

12. ECOLOGICAL INFORMATION

In massive form the alloys present no risk to the environment.

Hazardous Water Direction: not hazardous to the aquatic environment, as per annex 1 German VwVwS

13. DISPOSAL CONSIDERATIONS

- The alloys are recyclable if kept clean and separate from other materials. Consult Brush Wellman, or your own recycling partner, for scrap purchase.
- German Ordinance on hazardous Waste – AVV: for example 12 01 03 (non-ferrous metal filings and turnings)
The restrictions of the German AVV § 3, annex 2 (wastes under special control), do not apply for uncontaminated metal alloys.
- Transboundary movements of uncontaminated alloys in massive form as wastes/scrap for recovery are classified in accordance to the Basel Convention and OECD Green Control Procedure – see Annex IX of the Basel Convention and OECD: GA120 (wastes and scrap – copper).
There are no hazard labelling requirements.

14. TRANSPORT INFORMATION

No national or international restrictions. There are no labelling requirements.

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15. REGULATORY INFORMATION

15.1. Hazard labelling

- Though they are classified for health hazard, the alloys in massive form do not pose any immediate health risk, and so are derogated from the hazard labelling requirement, according to Directives 1999/45/EC and 67/548/EEC, so long as their hazard classification is provided via the M.S.D.S.
- In addition, the German TRGS 200, annex 7.1 (8) states: “Metals and alloys in massive form do than not have to be labelled, if their hazardous characteristics only apply, when further processed. The classification of those products have to be made known in the Material Safety Data Sheet, or in the Product Handling Instruction.”
- Labelling – refer also to **3.1.** and **16.1.**

SPINODAL ALLOYS ToughMet® 2, 3 CX, 3 AT Xn – HARMFUL R: 40-43 S: 22-36	Sold for manufacturing purposes only. Metals and alloys in massive form are derogated from the hazard labelling requirement.
R phrases: R40: <i>Limited evidence of a carcinogenic effect.</i> R43: <i>May cause sensitisation by skin contact.</i>	S phrases: S22: <i>Do not breathe dust.</i> S36: <i>Wear suitable protective clothing..</i>

15.2. National regulations

- Spinodal alloys (ToughMet®) are not subject to any national or international restrictions on marketing and use.
- German TRGS 900 – “Limit values relating to air in the workplace”
- German TRGS 905 (Annex I of the Directive 67/548/EEC) – “Index of substances which can cause cancer, genetic changes or limit reproductive capability”
- European Waste Catalogue – EWC, (German Abfallverzeichnis-Verordnung – AVV)
- German Hazardous Water Direction: not hazardous to the aquatic environment, as per annex 1 German VwVwS (Verwaltungsvorschrift wassergefährdende Stoffe)
- Nickel containing alloys are not listed as restricted or prohibited in any end-of-life requirements in the EU Directives “on end-of life vehicles 2000/53/EC (18.09.2000/ 21.10.2000) and 2002/525/EC (27.06.2002/29.06.2002)”, “on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS) 2002/95/EC (27.01.2003/13.02.2003)”, “on waste electrical and electronic equipment (WEEE) 2002/96/EC (27.01.2003/13.02.2003)”.

16. OTHER INFORMATION

16.1. List of the full text of the R phrases referred to under heading 2 and 3 of this M.S.D.S.

R15: *Contact with water liberates highly flammable gases.*
R17: *Spontaneously flammable in air.*
R40: *Limited evidence of a carcinogenic effect.*
R43: *May cause sensitisation by skin contact.*

16.2. Sources of key data used to compile this data sheet

- M.S.D.S. No. L19 - BRUSH WELLMAN Inc., U.S.A. - 31. January 2002
- M.S.D.S. No. L20 - BRUSH WELLMAN Inc., U.S.A. - 01. January 2002
- M.S.D.S. No. L21 - BRUSH WELLMAN Inc., U.S.A. - 01. January 2002
- Gefahrstoffrecht – 7. Auflage/Mai 2000, Band 1 u. 2 – Deutscher Bundesverlag
- TRGS 900 and TRGS 905 (annex I, Directive 67/548/EEC) – as per autumn 2001
Wirtschaftsverlag NW Verlag für neue Wissenschaft GmbH, Bremerhaven/ISNN 1433-2124
- BIA-Report 1/2002 (Gefahrstoffliste 2002/Gefahrstoffe am Arbeitsplatz)

16.3. Information about this Material Safety Data Sheet and the revisions

This Material Safety Data Sheet No.: 8/GB/D is valid for the Federal Republic of Germany. If used outside of Germany, for example if translated into other languages, the respective national legislation, which could be different, has to be taken into consideration.

English translation of the German M.S.D.S. No.: 8 (EG-Sicherheitsdatenblatt Nr.: 8/D)

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16.4. Additional information

In this Material Safety Data Sheet Brush Wellman has provided the basic up-to-date information which is required to ensure that these products are used safely. However, in light of this information, it is the responsibility of the user of the products to carry out risk assessment of any further processing to determine if health and environmental controls are necessary, and to ensure that those controls are properly used and maintained. The user must ensure that all relevant personnel are properly instructed about the hazards and controls.

Brush Wellman will be pleased to be of further assistance in these areas – ref. to item 1.

BRUSH WELLMAN GmbH, Motorstr. 34, D-70499 STUTTGART, Federal Rep. of Germany
Tel.: +49(0)711/83093-0 (switch board) Fax: +49(0)711/833 822

Contact person:

Mr Rausch

Mr Büttner

E-mail: K_L_Rausch@brushwellman.com

Uli_Buettner@brushwellman.com

This Material Safety Data Sheet is not intended to be a warranty of product quality.

16.5. Product handling information

From 2003 onwards this revised product handling booklet (now in 27 European languages) is part of the Brush Wellman GmbH, Germany, material shipments.

<p>1. BG УПЪТВАНЕ ЗА УПОТРЕБА - БЪЛГАРСКИ 2. CZ NÁVOD K POUŽITÍ - ČESKY 3. D GEBRAUCHSANWEISUNG - DEUTSCH 4. DK MATERIALEHÅNDBTERING - DANSK 5. E MANIPULACION DEL PRODUCTO - ESPAÑOL 6. EST EESTIKEELNEE MATERIALI KÄSITLUSE LEHT 7. F MANUTENTION DU PRODUIT - FRANÇAIS 8. FIN MATERIAALINKÄSITTELY - SUOMENKIELINEN 9. GB PRODUCT HANDLING - ENGLISH 10. GR ΧΡΗΣΗ ΠΡΟΪΟΝΤΟΣ - ΕΛΛΗΝΙΚΑ 11. H HASZNÁLATI UTASÍTÁS - MAGYARUL 12. HR UPUTSTVO ZA UPORABU - HRVATSKI 13. I MOVIMENTAZIONE PRODOTTO - ITALIANO 14. IL דפי הודרכה לשימוש בבריליום קופר 15. LT NAUDOJIMOSI INSTRUKCIJA - LIETUVIŠKAI 16. LV EKSPLUATĀCIJAS INSTRUKCIJA - LATVIEŠU VALODĀ 17. N RÅD TIL BRUK - NORGE 18. NL HANTERING VAN HET PRODUCT - NEDERLANDS 19. P MANUSEAMENTO DO PRODUTO - PORTUGUÉS 20. PL SPOSÓB UŻYCIA - POLSKI 21. RO INSTRUCȚIUNI DE UTILIZARE - ÎN LIMBA ROMÂNĂ 22. RUS ИНСТРУКЦИЯ ПО ИСПОЛЬЗОВАНИЮ - НА РУССКОМ ЯЗЫКЕ 23. S MATERIALHANTERING - SVENSK 24. SK NÁVOD NA POUŽITIE - SLOVENSKY 25. SLO NAVODILO ZA UPORABO - SLOVENSKO 26. UA ІНСТРУКЦІЯ ДЛЯ КОРИСТУВАННЯ - ПО-УКРАЇНСЬКОМУ 27. TR ÜRÜN KULLANIMI - TÜRKÇE</p> <p>BRUSHWELLMAN</p>	<h3>PRODUCT HANDLING - ENGLISH</h3> <p>Safety data sheet available for professional user on request.</p> <p>In solid form, as supplied by BRUSH WELLMAN, this alloy does not present any immediate health risk.</p> <p>However, inhalation of dust or fumes generated during processing of the alloy, for instance by grinding or welding, could cause risk of a chronic lung disease.</p> <p>All processing of the alloy should therefore be assessed for this possibility, and appropriate controls, such as local exhaust ventilation, should be used wherever necessary.</p> <p>Read and follow the guidance in the M.S.D.S. (Material Safety Data Sheet) before processing.</p> <p>Sold for manufacturing purposes only.</p> <p>This alloy can be recycled; please contact BRUSH WELLMAN.</p>
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