



## Repair welding

Ultrafine, precise, powerful – the joke welding range provides innovative solutions with tried and trusted quality for the widest range of applications.

# Everything you need for welding.

Dear Ladies and Gentlemen,

for many years, joke has represented utmost quality and this applies to repair welding too. When it comes to devices and accessories, as well as fillers, joke supplies first-rate products for optimum welding results.

Our unique multispot system achieves results similar to those obtained with a laser through its TIG pulse method. Since it allows highly versatile and mobile use, it is particularly suitable for work on large moulds that are difficult to access. Owing to its unique arc, it allows work with pinpoint accuracy using 0.2 mm welding fillers.

In recent years however, the laser device family has grown in particular. Today, joke offers laser-welding systems to meet almost every requirement. Yet all systems have one thing in common: with many included extras and high power, they offer an extremely high price/performance ratio.

Our team is out and about all over Germany with our joke welding vans. We will be pleased to pay you a visit too and introduce you to our complete product portfolio on site without any commitment on your part. Just consult us.



Fabian Bickenbach

## Have you already seen our welding vans?



Every day, they are on the road throughout Germany and in a number of neighbouring countries. Not only browse through the brochure, but also try out your tool moulds on site - that is the motto here. No matter whether laser or pulse welding, we have everything on board!

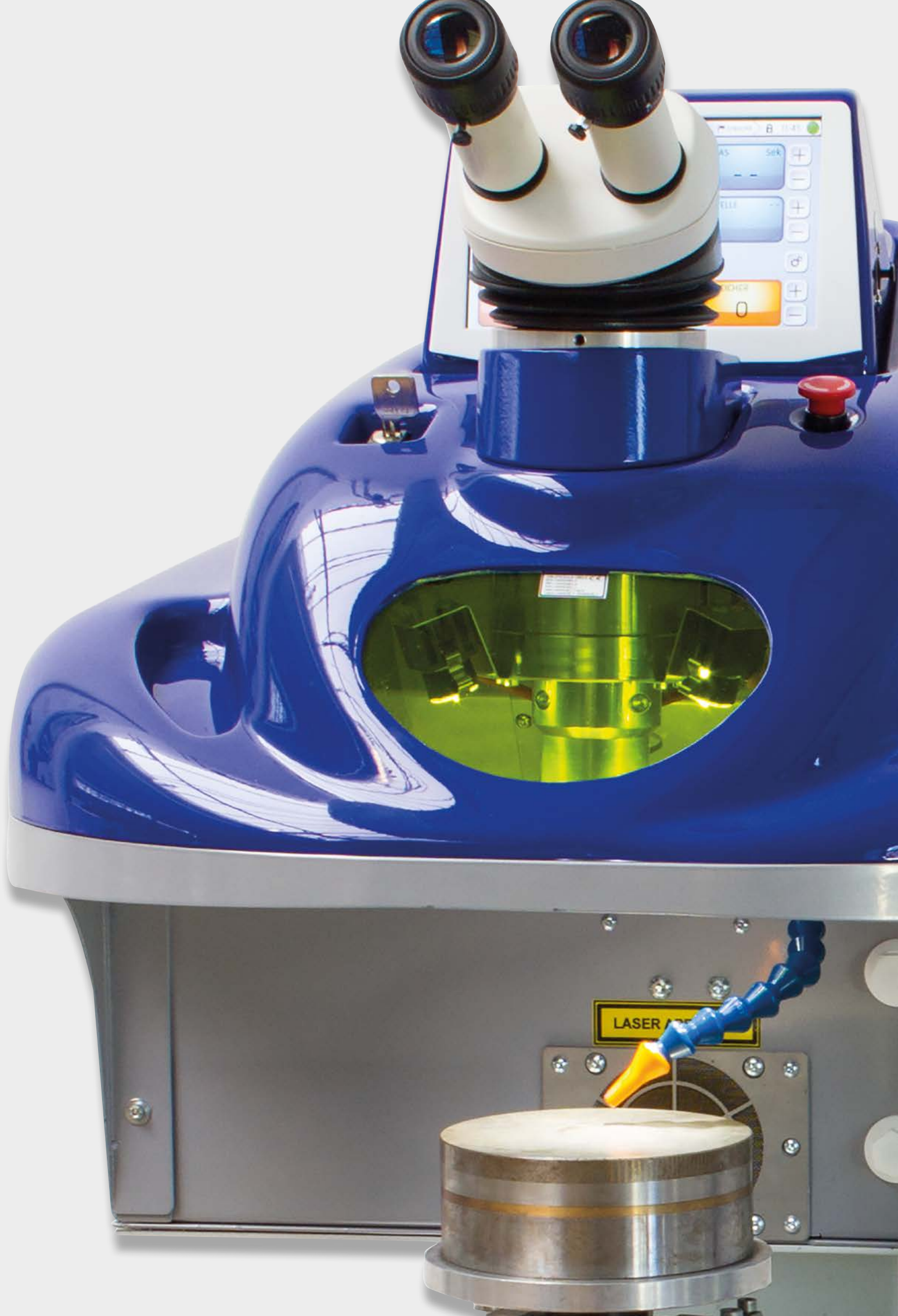
Would you like an appointment for a personal demonstration?

Our sales team will be happy to arrange the next possible date with you. They can be contacted at +49 (0) 2204 / 839-0 or by email at [sales@joke.de](mailto:sales@joke.de).

# Contents

04	Welding devices
16	Training programmes
18	Welding torches
34	Electrode grinding device
36	Workplace equipment
45	Workplace protection
54	Tungsten carbide coating unit
56	Welding filler





# Welding devices

- 06 Laser welding system
- 10 Welding system joke multiSpot 3
- 13 Water cooling unit
- 14 Welding device joke easyWIG



# Laser welding system

## ENESKAlaser

The ENESKAlaser is particularly suitable as a mobile workstation, above all for smaller repairs and joining processes, with excellent results.

The entire control of the laser system is performed by means of a convenient touchscreen interface. Open laser welding systems can be operated using a joystick in combination with the 3-axis welding table (order no. 4 910 501). The laser output, pulse length, repetition rate and beam diameter can be conveniently adjusted on the display. Furthermore, it is possible to follow the welding process via the eyepieces, the touch screen or an external monitor. The software has a program management, under which various machining parameters can be stored (over 100 memory locations).

### Highlights








- 7" colour touchscreen
- Leica stereo microscope, 10 x magnification
- 3-stage LED cold light illumination of the working area
- integrated camera with quadruple zoom
- Wi-Fi connection possible
- USB and HDMI connection optionally available



	<b>ENESKAlaser 750 (open system)</b>	<b>ENESKAlaser 1000 (open system)</b>	<b>ENESKAlaser 750 (closed system)</b>	<b>ENESKAlaser 1000 (closed system)</b>
Frequency	0.5 – 30 Hz	0.5 – 30 Hz	0.5 – 30 Hz	0.5 – 30 Hz
Gas post-flow time	0 – 10 s	0 – 10 s	0 – 10 s	0 – 10 s
Pulse time	0.1 – 20 ms	0.1 – 20 ms	0.1 – 20 ms	0.1 – 20 ms
Cooling	water-cooled	water-cooled	water-cooled	water-cooled
Max. pulse energy	80 J	140 J	80 J	140 J
Pulse frequency	0.5 – 30 Hz	0.5 – 30 Hz	0.5 – 30 Hz	0.5 – 30 Hz
Beam diameter	0.2 – 2 mm	0.2 – 2 mm	0.2 – 2 mm	0.2 – 2 mm
Power	75 W	100 W	75 W	100 W
Noise level	< 70 dB(A)	< 70 dB(A)	< 70 dB(A)	< 70 dB(A)
Dimensions	50 x 50 x 80 cm	50 x 50 x 80 cm	50 x 50 x 80 cm	50 x 50 x 80 cm
Power consumption	1700 W	1700 W	1700 W	1700 W
Supply voltage	230 V, 50/60 Hz	230 V, 50/60 Hz	230 V, 50/60 Hz	230 V, 50/60 Hz
Weight [kg]	55 kg	55 kg	55 kg	55 kg
Order No.	<b>4 910 750</b>	<b>4 910 800</b>	<b>4 910 760</b>	<b>4 910 770</b>
Price	18392.00 €	21177.00 €	18392.00 €	21177.00 €

# Laser welding system ENESKAlaser

## ⚙️ Accessories / spare parts

		Order No.	Price from 1 piece
<b>3-axis welding table with joystick, motorized</b>			
	X-Y-Z travel unit for precise positioning of the workpieces and for receiving the open laser devices ENESKAlaser 750/1000. The 3-axis table is equipped with 3 sturdy castors and is therefore mobile. Furthermore, the open ENESKAlaser together with the 3-axis table forms an optimum technical unit.  Technical data: (Aluminium) worktop dimensions: 400 x 210 mm Travels of the individual axes X (right/left): 145 mm Y (forwards/reverse): 95 mm Z (up/down): 230 mm	<b>4 910 501</b>	10471.00 €
<b>Lift table, automatically height-adjustable work table for ENESKAlaser models 750/1000 (closed system)</b>			
	In combination with the ENESKAlaser, the Plexiglas table is height-adjustable from 700 mm to 880 mm.	<b>4 910 763</b>	1440.00 €
<b>Lift table, manual workpiece height adjustment</b>			
	Dimensions lifting plate: 100 x 100 mm Height adjustable from approx. 50 – 150 mm Stainless steel plate approx. 550 g	<b>4 910 761</b>	76.30 €
	Dimensions lifting plate: 200 x 200 mm Height adjustable from approx. 85 – 280 mm Stainless steel plate approx. 1.8 kg	<b>4 910 762</b>	99.95 €
<b>Automatic Rotator</b>			
	The pivoting device can be controlled using the welding table joystick. It is equipped with infinite speed control in addition to clockwise and anticlockwise running. This greatly facilitates welding of round seams. The rotary unit is infinitely adjustable through 0–90°.	<b>4 910 502</b>	2008.00 €
<b>Eyepiece 25x magnification suitable for all ENESKAlaser models (1 pair)</b>			
		<b>4 910 817</b>	1495.00 €
<b>Gas pressure reducer (200 bar) with flowmeter</b>			
	Cylinder pressure reducer with flowmeter for controlling the precise flow volume in l/min, with inlet pressure compensation for constant outlet pressure in case of decreasing inlet pressure. The float-type flowmeter is permanently set to a fixed pressure; regulation is performed via the shut-off valve.	<b>4 800 250</b>	173.00 €
<b>Water cooling unit, external for models 750/1000</b>			
	This unit serves to increase cooling capacity during continuous operation in order to avoid failure due to overheating.	<b>4 910 818</b>	1655.00 €
<b>Leica Ergo Wedge 5° – 25°</b>			
	The ergonomic wedge allows the binocular to be swivelled steplessly down to 25°. This provides optimum support for the ergonomic sitting position of the operator on the ENESKA laser.	<b>4 910 808</b>	1762.00 €



Leica Ergo Wedge 5° – 25°

# Laser welding system ENESKAlaser

### Repair moulds/workpieces with ease

The laser welding system is suitable for repairing medium- and large-size moulds/workpieces. Ideal for mold shops. Simple and functional. Allows a wide range of repairs to be carried out directly on site.

The extension arm pivotable through 180° makes alignment with the workpiece very easy and flexible. The high quality 10 x stereo microscope with integrated safety filters and a very rapid, eye-friendly LCD shutter provides a perfect view and safety for the operator. The welding head is equipped with motorised beam diameter adjustment, dimmable LED workpiece lighting and a flexibly adjustable gas supply. A generously dimensioned colour touchscreen for configuring all the necessary laser parameters simplifies operation and control.

### Equipment:

- Colour display with touchscreen function
- 100 program memory locations with names – Welding parameters can be stored in the internal memory
- Leica 10 x stereo microscope
- Integrated camera
- Powerful, integrated cooling system
- Joystick-controlled
- Extension arm length 1,200 mm
- Manual axis adjustment
- Dual-laser resonator – 15° pivotable and 30° rotatable resonator head
- LED lighting with white cold light
- HDMI port

### Traverse paths:

- x-axis 410 mm
- y-axis 500 mm
- z-axis 600 mm








		Price from
		Order No. 1 piece

ENESKAlaser 1500 mobile		4 910 880	57900.00 €
	Technical data		
	Laser source / wavelength:	Nd:YAG 1064 nm x 2	
	Output:	150 W	
	Max. pulse power:	15 kW	
	Max. pulse energy:	200 J	
	Puls time:	0.1 – 20 ms	
	Pulse frequency:	0.5 – 30 Hz	
	Beam diameter:	0.6 – 2 mm	
	Joystick-controlled:	yes	
	External controlled:	colour display	
	Input:	230 V AC, 50/60 Hz, single	
	Ampere:	20 A	
	Max. dimension generator (W x D x H):	50 x 50 x 80 cm	
	Max. length of jib:	1,200 mm	
Weight:	260 kg		
Argon gas:	yes		



# Laser welding system ENESKAlaser

## ⚙️ Accessories / spare parts

		Load bearing capacity of work area	Dimensions	Order No.	Price from 1 piece
<b>Platform trolley</b>					
	Technical data: Colour: blue (RAL 5002) Tyre material: polyurethane (PU) Design: platform trolley Drive type: manual Lifting: manual hydraulic Number of increments up to max. height: 32 Weight: 82 kg Lifting height: 900 mm Length: 925 mm min. platform height: 340 mm Height: 970 mm Wheel diameter: 127 mm	300 kg	855 x 500 x 50 mm	<b>4 910 881</b>	534.00 €
		Technical data: Colour: blue (RAL 5002) Tyre material: polyurethane (PU) Design: platform trolley Drive type: manual Lifting: manual hydraulic Weight: 135 kg Lifting height: 1,000 mm Length: 1,379 mm min. platform height: 420 mm Height: 962 mm Wheel diameter: 150 mm	1,500 kg	1,220 x 610 x 60 mm	<b>4 910 882</b>
<b>Automatic Rotator</b>					
	optionally for ENESKAlaser welding systems The pivoting device can be controlled using the welding table joystick. It is equipped with infinite speed control in addition to clockwise and anticlockwise running. This greatly facilitates welding of round seams. The rotary unit is infinitely adjustable through 0–90°.			<b>4 910 502</b>	2008.00 €
<b>Gas pressure reducer (200 bar) with flowmeter</b>					
	Cylinder pressure reducer with flowmeter for controlling the precise flow volume in l/min, with inlet pressure compensation for constant outlet pressure in case of decreasing inlet pressure.  The float-type flowmeter is permanently set to a fixed pressure; regulation is performed via the shut-of valve.			<b>4 800 250</b>	173.00 €
<b>Eyepiece 25x magnification suitable for all ENESKAlaser models (1 pair)</b>					
				<b>4 910 817</b>	1495.00 €
<b>Leica Ergo Wedge 5° – 25°</b>					
	The ergonomic wedge allows the binocular to be swivelled steplessly down to 25°. This provides optimum support for the ergonomic sitting position of the operator on the ENESKA laser.			<b>4 910 808</b>	1762.00 €



## Welding system joke multiSpot 3 with individual pulse function

### joke multiSpot 3 – the reference for pulsed welding for safe repair of tool moulds with laser-like results

Simple, fast and inexpensive. The ideal system for efficient in-house tool repair. The multiSpot pulse technology enables uniform, notch-free transitions. The individual pulses for the smallest and finest welds are triggered in a controlled manner. An interval circuit with adjustable pauses and welding times enables exact build-ups. Welding fillers of Ø 0.2 mm and more can be processed. Such fine and precise weldings only existed up to now with laser.

#### Technical Data

##### joke multiSpot 3

in accordance with IEC 974.1/EN 60974.1/CE declaration of conformity

Dimensions (L x W x H): 480 x 260 x 380 mm

Weight: 26.2 kg

Insulation class: H

Type of protection: IP 23

Cooling type: Forced-air cooled

#### Input data

Mains voltage  $U_1$ : 230 Volt (single phase), 50/60 Hz

Mains fuse  $I_1$ : 16 A, slow-blow

Efficiency factor  $\cos \phi$ : 0.9 at 150 A extraction

Primary constant power  $S_1$ : max. 5 kVA

#### Output data

No-load voltage  $U_0$ : 85 Volt TIG/TIG/electrode

Operating voltage  $U_2$ : 19.1 – 16.5 V/TIG max. 18 V/Electrode  
max. 26 V

Welding current ignition  $I_2$ : from 3 A

Welding current range  $I_2$ : 3 – 210 (or 300) A

Power-on time at 200 A: 50 % at +40 °C

Power-on time at 130 A: 100 % at +40 °C

Pulse time: 20 – 300 ms

Break time: 20 – 1,000 ms



Price from

Order No.

1 piece

### Welding system joke multiSpot 3 AC/DC pulse with 300 A



The top-of-the-range model from the multiSpot line with a particularly high performance – the all-rounder for fine and coarse applications.


TIG and single-pulse welding for all weldable materials such as steel or aluminium for example.


Convinces with its high performance of 300 A even for the coarse range.


**4 904 300**

15324.00 €


## Welding system joke multiSpot 3 with individual pulse function

	Order No.	Price from 1 piece
<b>Welding system joke multiSpot 3 300 AC/DC</b>		
 <p>Very high-power TIG welding device (300 A) for steel, bronze, copper and aluminium. The unique TIG electric arc allows excellent weldings without single-pulse, but with a TIG pulse function.</p>	<b>4 903 300</b>	9126.00 €

	Order No.	Price from 1 piece
<b>Welding system joke multiSpot 3 DC pulse</b>		
 <p>The model from the multiSpot line for simple use from fine to coarse for welding fine edges as well as TIG welding tasks – without aluminium function.</p>	<b>4 902 210</b>	13594.00 €







	Order No.	Price from 1 piece
<b>Welding system joke multiSpot 3 AC/DC pulse</b>		
 <p>The model from the multiSpot line for daily use from fine to coarse. TIG and single-pulse welding for all weldable materials such as steel or aluminium for example.</p>	<b>4 901 210</b>	14456.00 €

## Welding system joke multiSpot 3 without pulse function


	Order No.	Price from 1 piece
<b>Welding system joke multiSpot 3 AC/DC</b>		
 <p>Using this device, you can achieve excellent welding results on steel and aluminium with welding fillers between Ø 0.8 and Ø 4 mm. No pulse function.</p>	<b>4 903 210</b>	8263.00 €

# Welding system joke multiSpot 3 with individual pulse function




## Accessories / spare parts

	Order No.	Price from 1 piece
<b>Foot pulse switch for multiSpot</b>		
 <p>for triggering the welding pulses</p>	<b>4 901 000</b>	212.00 €
<b>Foot pedal controller for multiSpot</b>		
 <p>Foot control of the welding energy</p>	<b>4 902 000</b>	599.00 €
<b>Earthing cable with crocodile clip</b>		
	<b>4 902 125</b>	58.05 €
<b>Earthing cable with magnetic pole clamps</b>		
	<b>4 902 124</b>	65.10 €
<b>Gas pressure reducer (200 bar) with flowmeter</b>		
 <p>Cylinder pressure reducer with flowmeter for controlling the precise flow volume in l/min, with inlet pressure compensation for constant outlet pressure in case of decreasing inlet pressure.</p> <p>The float-type flowmeter is permanently set to a fixed pressure; regulation is performed via the shut-of valve.</p>	<b>4 800 250</b>	173.00 €
<b>Double extraction valve</b>		
	<b>4 800 260</b>	38.65 €

# Water cooling unit WK 3.1

	Order No.	Price from 1 piece
<b>Water cooling unit, compact, type WK 3.1</b>		
 <p>with closed circuit cooling for connecting all suitable TIG or MAG torches</p> <p>Technical data:                      Cooling capacity: 1.5 kW                      Water tank: 3.4 l                      Centrifugal pump: Qmax = 10 l/min. Hmax: 33 m                      Cooler: 3-row heat exchanger made of Cu material                      Fan: 230 V, 115 mm                      Water reservoir: VA material                      Electrical connection: 230 V / 50 Hz / 300 VA                      Supply lead: 3 x 1.5 mm<sup>2</sup> / L = 1 m via a earthing pin plug                      Water connection: Rapid-release coupling for push-fit nipple, 9 mm                      Coolant: HKF 15.1                      Empty weight: 15.7 kg                      Dimensions (H x W x L): 330 x 260 x 510 mm                      Protection class: IP 23, CE labelling                      Standard: EN 60974-2:2008-11</p>	<b>4 905 100</b>	926.00 €

## Accessories / spare parts

	Order No.	Price from 1 piece
<b>joke-Special coolant</b>		
 <p>suitable for water cooling unit Type WK 3.1</p> <p>5-litre canister</p>	<b>4 905 105</b>	47.05 €
<b>Hose extension</b>		
 <p>Inflow</p>	<b>4 905 110</b>	22.90 €
 <p>Return flow</p>	<b>4 905 111</b>	22.90 €

# Welding device joke easyWIG for TIG (tungsten-inert-gas) weldings

## Welding device joke easyWIG

With easyWIG, the name says it all – easy configuration and understanding of the device within the shortest time is a matter of course here. If you are looking for a TIG welding device that is handy and light, yet still achieves professional results, the joke easyWIG is your ideal companion. With its ampere range adjustable between 5 and 140 A, it can be used for a broad spectrum.

Mobile use is no problem either owing to the light weight.

### Technical Data

Mains voltage:	230 V, 50/60 Hz
Phases:	1
Mains fuse:	16 A slow-blow
Type of protection:	IP 23
Insulation class:	H
Dimensions	(H x L x W): 340 x 365 x 165 mm
Weight:	12.7 kg
Mark of conformity:	EN 6097.4, IEC 974.1, S/CE identification
No-load voltage:	85 V
Max. output current:	165 A
Primary constant power ED 60/40 % (TIG / electrode):	4.4 kvA / 6 kvA
Temperature range:	0 – 40 °C
Upslope/Downslope:	0 – 20 sec. (on final value)

Postsurge gas-flow time:	0 – 25 sec
Presurge gas-flow time:	0.5 sec

### Electrode welding

Welding current range:	5 – 140 A
Welding current range ED 40 %:	140 A (25 V)

### TIG DC welding






HF ignition:	yes
Welding current range:	5 – 165 A
Welding current range ED 60 % (40 °C):	165 A (16,4 V)
Welding current range ED 100 % (40 °C):	120 A (14 V)



		Order No.	Price from 1 piece
<b>Welding device joke easyWIG</b>			
	Basic device without accessories	<b>4 904 160</b>	2529.00 €

# Welding device joke easyWIG for TIG (tungsten-inert-gas) weldings

## ⚙️ Accessories / spare parts

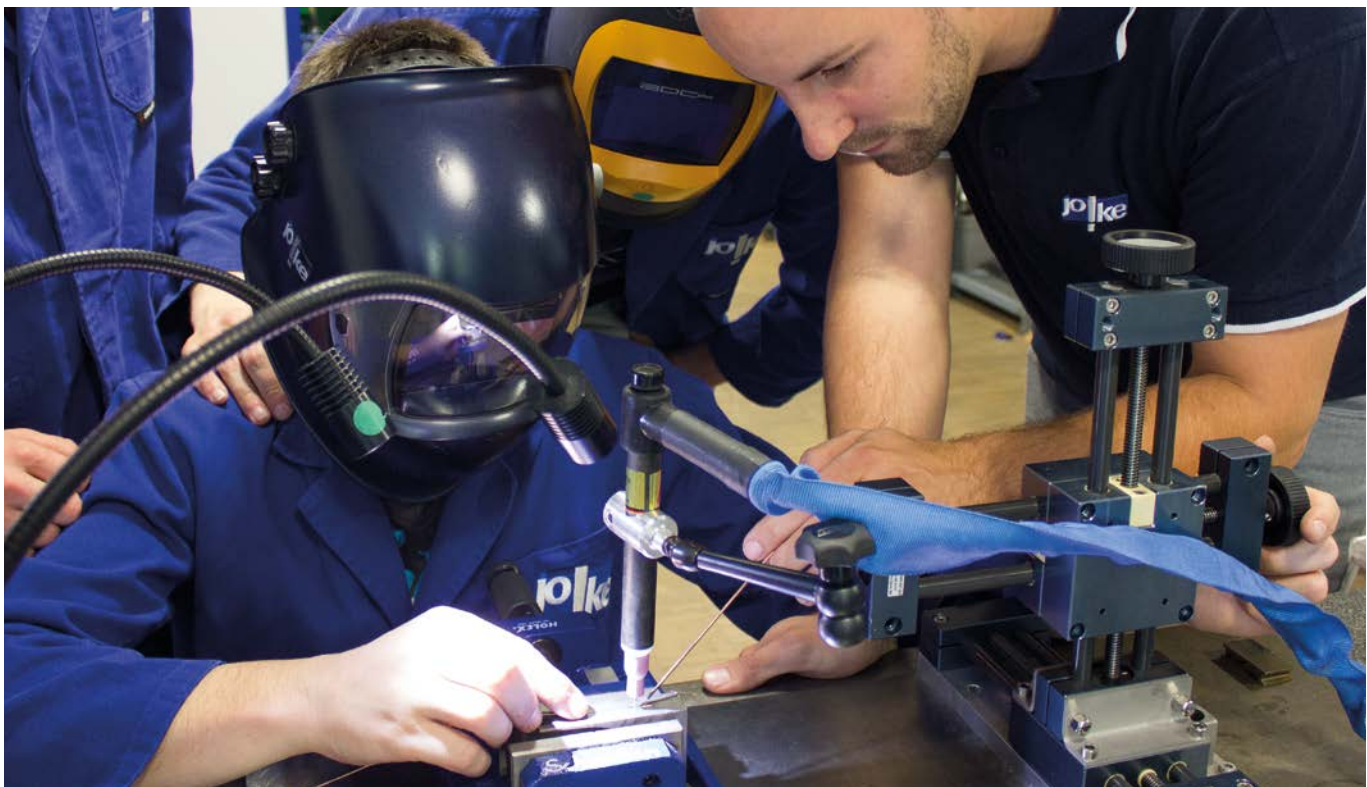
	Order No.	Price from 1 piece
<b>Foot pedal controller for easyWIG</b>		
 <p>Foot control of the welding energy</p>	<b>4 902 001</b>	599.00 €
<b>Earthing cable with crocodile clip</b>		
	<b>4 902 125</b>	58.05 €
<b>Earthing cable with magnetic pole clamps</b>		
	<b>4 902 124</b>	65.10 €
<b>Gas pressure reducer (200 bar) with flowmeter</b>		
 <p>Cylinder pressure reducer with flowmeter for controlling the precise flow volume in l/min, with inlet pressure compensation for constant outlet pressure in case of decreasing inlet pressure.</p> <p>The float-type flowmeter is permanently set to a fixed pressure; regulation is performed via the shut-of valve.</p>	<b>4 800 250</b>	173.00 €
<b>Double extraction valve</b>		
	<b>4 800 260</b>	38.65 €

## Training programmes

### “Welding in toolmaking and mould building”

#### Good reasons why a training course in welding is worthwhile:

- Wear, breakage, material fatigue, design change, human and mechanical failure, etc. etc. are normal – rapid, reliable repairs are called for in this case!
- “Learning-by-doing” is all well and good, but very time consuming and errors still creep in. Let our welding specialists show you the tricks of the trade!
- Modern production is no longer conceivable without repair welding – you should also move with the times!
- Minimise the costs for external welding providers by performing own on-site repairs.
- We train your employees individually for your specific applications here at joke or directly within your company. It is therefore possible to deal very specifically with your requirements and devise solutions to problems in daily practice in small training groups. Feel free to bring sample components along to practice on your workpieces straight away.
- Our recipe for success: the training programmes are geared to the participants’ daily working practice and over one to two days, mainly focus on practice in coordinated exercises in addition to the essential theoretical bases.
- Bridge the gap between TIG and LASER processes by optimum use of joke multiSpot technology.
- You will of course receive from joke all the necessary work utensils during the training in addition to a certificate for your further personal career.





# Training programmes

## “Welding in toolmaking and mould building”

**Equipment: joke multiSpot including welding fillers and accessories**

at joke in Bergisch Gladbach

### 3-day training programme “Welding in toolmaking and mould building” Order no.: 4 900 031

- Theoretical introduction to the multiSpot welding method, TIG and impulse welding
- Practical instruction in use of the devices, with emphases on fine welding of tool steel, aluminium using the TIG, multiSpot and laser methods
- Dates: by arrangement
- Participants: max. 8 participants - The order of registration will decide.
- Price: by arrangement

### 1-day training programme “Welding with multiSpot” Order no.: 4 900 033

- Theoretical introduction to the multiSpot welding method
- Practical instruction in using the multiSpot device
- Dates: by arrangement
- Participants: max. 4 participants - The order of registration will decide.
- Price: by arrangement

### 1-day training programme “TIG welding” Order no.: 4 900 039

- Theoretical introduction to the TIG welding method, meaning of direct and alternating current, seam preparation, selection and classification of welding fillers, welding of steel, chrome-nickel steel and aluminium
- Dates: by arrangement
- Participants: max. 4 participants - The order of registration will decide.
- Price: by arrangement

at your company

### 1-day training programme “Welding with multiSpot” Order no.: 4 900 032

- Theoretical introduction to the multiSpot welding method
- Practical instruction in using the multiSpot device and practical exercises on appropriate workpieces, debriefing and discussion
- Dates: by arrangement
- Participants: 2 - 4 participants
- Price: by arrangement

### 1-day training programme “TIG welding” Order no.: 4 900 038

- Theoretical introduction to the TIG welding method, meaning of direct and alternating current, seam preparation, selection and classification of welding fillers, practical exercises and discussion
- Welding of steel, chrome-nickel steel and aluminium
- Dates: by arrangement
- Participants: 2 - 4 participants
- Price: by arrangement

### 1-day training programme “Laser welding” Order no.: 4 900 040

- Laser welding for repairs in toolmaking and mould building in addition to production welding (only on the joke ENESKAlaser)
- Dates: by arrangement
- Price: by arrangement

Small hand welding torch



Microtorch



# Welding torches



Large hand  
welding torch

- 20 Series 9 machine torches
- 24 Large hand welding torches Series 17-18-26
- 28 Small hand welding torches Series 9
- 32 Microtorches Series 70-140



Machine  
welding torch

# Series 9 machine torches

## Hose packs

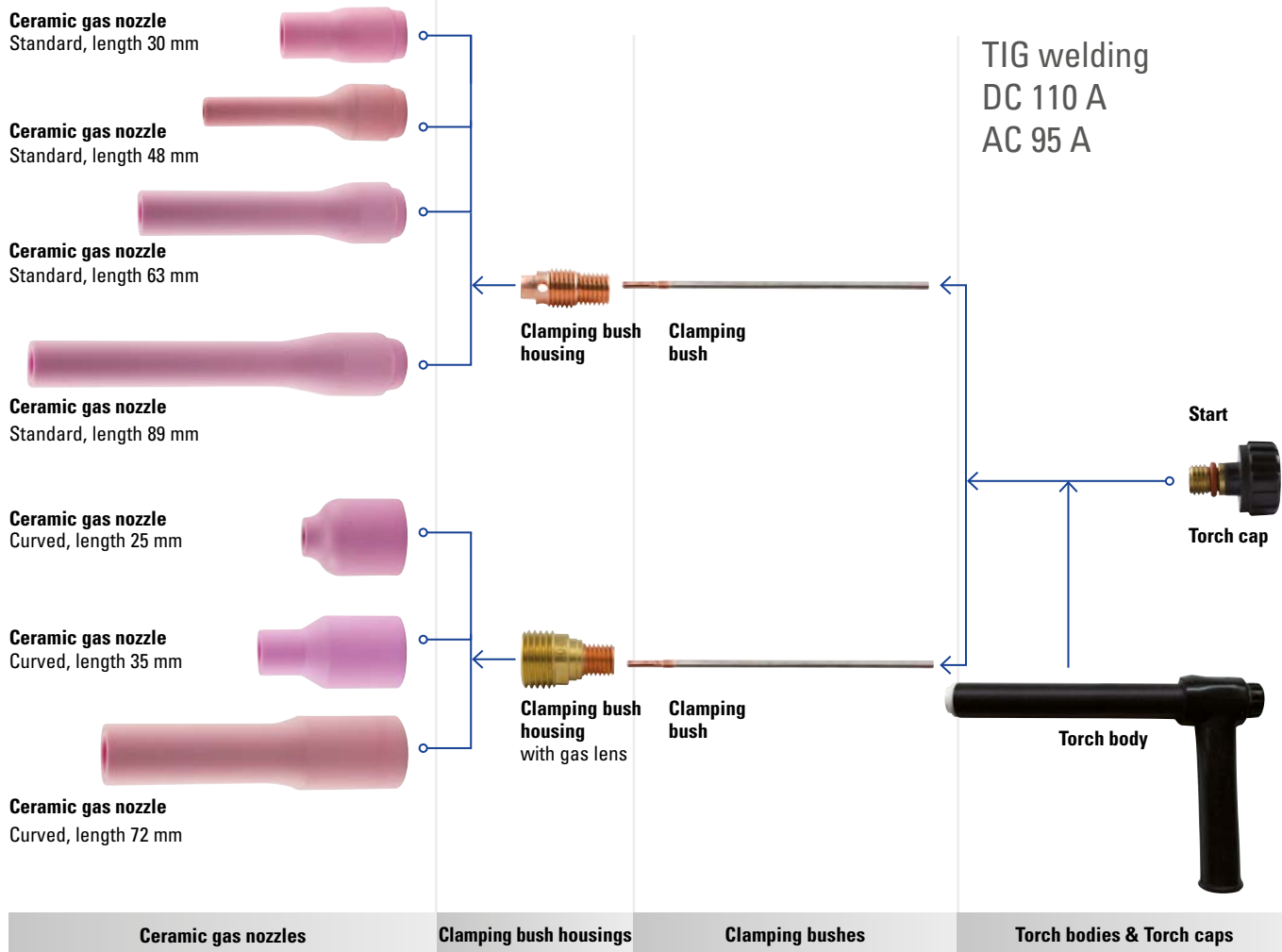
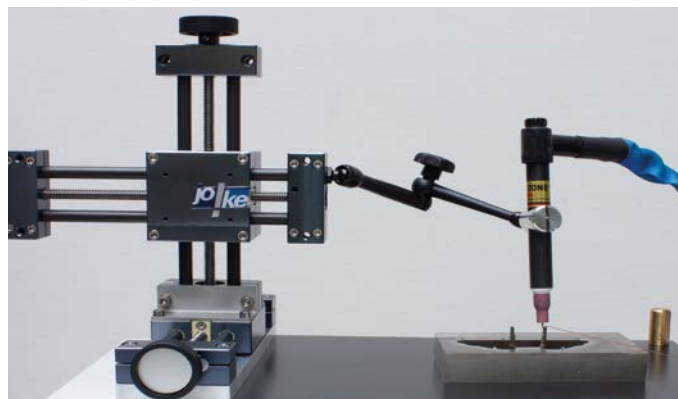
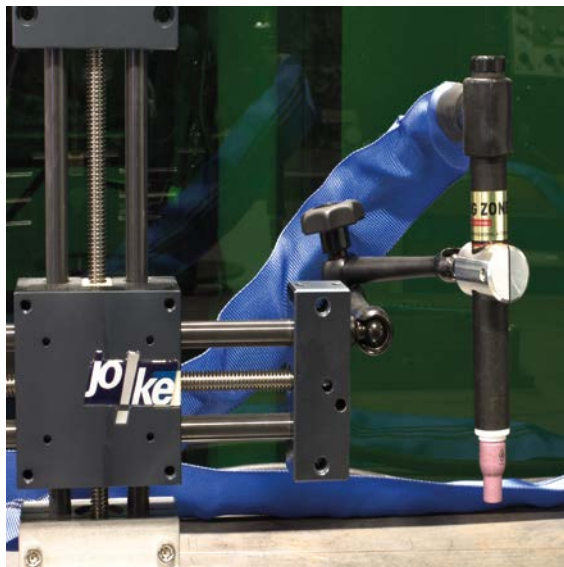



Illustration: Clamping bush original size








# Series 9 machine torches

## Hose packs

	Order No.	Price from 1 piece
<b>Series 9 machine torch hose pack</b>	<b>4 516 000</b>	<b>518.00 €</b>



### Accessories / spare parts

	Design	Interior Ø	Length	Order No.	Price from 1 piece
<b>Torch body</b>					
	rigid, for series MT-9			<b>4 511 200</b>	<b>190.00 €</b>
<b>Torch cap</b>					
	short	Ø 7.8 mm	22 mm	<b>4 513 600</b>	<b>17.05 €</b>
<b>Ceramic gas nozzle</b>					
	Standard, size 4	Ø 6.5 mm	30 mm	<b>4 512 004</b>	<b>4.28 €</b>
	Standard, size 5	Ø 8.0 mm	30 mm	<b>4 512 005</b>	<b>4.28 €</b>
	Standard, size 6	Ø 9.5 mm	30 mm	<b>4 512 006</b>	<b>4.28 €</b>
	Standard, size 7	Ø 11.0 mm	30 mm	<b>4 512 007</b>	<b>4.28 €</b>
	Standard, size 8	Ø 13.5 mm	30 mm	<b>4 512 008</b>	<b>4.28 €</b>
	Standard, size 10	Ø 16.0 mm	30 mm	<b>4 512 010</b>	<b>4.28 €</b>
	Standard, size 3	Ø 5.0 mm	48 mm	<b>4 512 103</b>	<b>13.25 €</b>
	Standard, size 4	Ø 6.5 mm	48 mm	<b>4 512 104</b>	<b>13.25 €</b>
	Standard, size 5	Ø 8.0 mm	48 mm	<b>4 512 105</b>	<b>13.25 €</b>
	Standard, size 6	Ø 9.5 mm	48 mm	<b>4 512 106</b>	<b>13.25 €</b>
	Standard, size 4	Ø 6.5 mm	63 mm	<b>4 512 204</b>	<b>14.60 €</b>
	Standard, size 5	Ø 8.0 mm	63 mm	<b>4 512 205</b>	<b>14.60 €</b>
	Standard, size 4	Ø 6.5 mm	89 mm	<b>4 512 304</b>	<b>15.60 €</b>
	Curved, size 4	Ø 6.5 mm	25 mm	<b>4 511 404</b>	<b>4.62 €</b>
	Curved, size 5	Ø 9.5 mm	25 mm	<b>4 511 405</b>	<b>4.62 €</b>
	Curved, size 6	Ø 9.5 mm	25 mm	<b>4 511 406</b>	<b>4.62 €</b>
	Curved, size 7	Ø 11.0 mm	25 mm	<b>4 511 407</b>	<b>4.62 €</b>
	Curved, size 8	Ø 13.5 mm	25 mm	<b>4 511 408</b>	<b>4.62 €</b>

# Series 9 machine torches

## Hose packs

Accessories / spare parts

	Design	Interior Ø	Length	Order No.	Price from 1 piece
	Curved, long, size 6	Ø 9.5 mm	35 mm	<b>4 511 506</b>	6.20 €
	Curved XL, size 6	Ø 9.5 mm	72 mm	<b>4 511 706</b>	13.25 €
<b>Clamping bush housing</b>					
	Standard	Ø 1.0 mm	21 mm	<b>4 513 310</b>	7.20 €
		Ø 1.6 mm	21 mm	<b>4 513 316</b>	7.20 €
	Gas lens	Ø 1.0 mm	22 mm	<b>4 513 110</b>	11.10 €
		Ø 1.6 mm	22 mm	<b>4 513 116</b>	11.10 €
<b>Clamping bushes</b>					
	Standard for type MT-9	Ø 1.0 mm	161 mm	<b>4 513 510</b>	16.30 €
		Ø 1.6 mm	161 mm	<b>4 513 516</b>	16.30 €

matching set

	Order No.	Price from 1 set
<b>Spare parts set for series 9 machine torch</b>		
	<b>4 519 901</b>	149.55 €
Set contains: • 1 x torch cap (order no. 4 513 600) • 5 x ceramic gas nozzles (order no. 4 512 004, 4 511 405, 4 511 407, 4 512 103, 4 512 204) • 4 x clamping bushes (order no. 4 513 510, 4 513 516) • 2 x clamping bush housings, gas lens (order no. 4 513 110 + 4 513 116) • 2 x clamping bush housings, standard (order no. 4 513 310, 4 513 316) • 4 x tungsten electrodes (order no. 4 569 010, 4 569 016) • 1 x fibreglass cleaning pen (order no. 4 805 501) • 1x storage box (order no. 0 200 820)		

# The perfect complement to weld seam preparation

## ENESKAmicro

- 30% more efficiency
- based on IP 54
- enhanced handpieces
- extremely high true running accuracy
- 20% higher final speed
- highest clamping force in the world
- handpieces & motors universally compatible regardless of manufacturer
- PLC suitable
- idletimer
- operator menu in eight different languages
- updatable



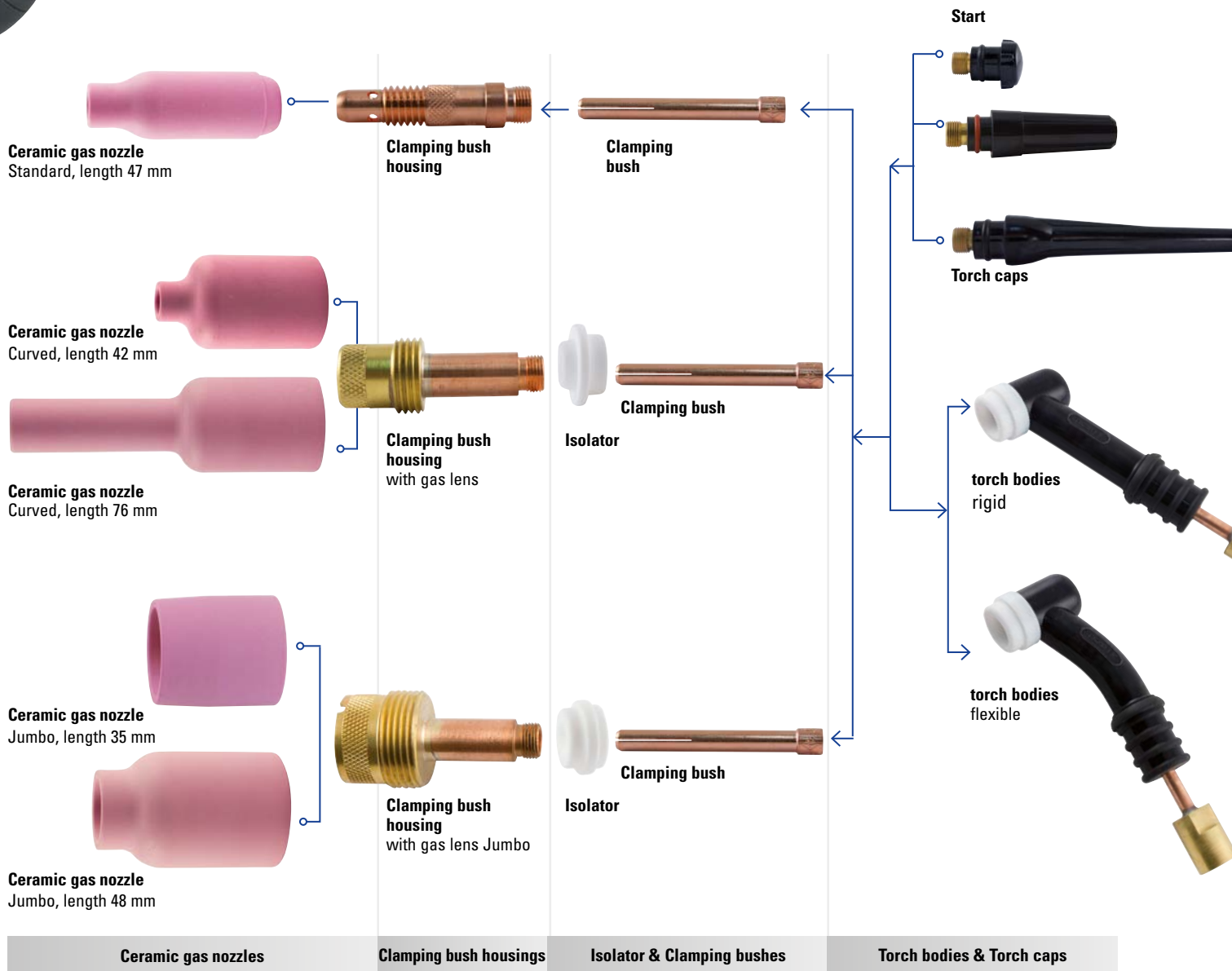
**100%**  
Made in GERMANY

# Large hand welding torches Series 17-18-26

## Hose packs





TIG welding  
DC 240 A  
AC 200 A











# Large hand welding torches Series 17-18-26

## Hose packs

	Design	Order No.	Price from 1 piece
<b>Series 18 hand torch hose pack</b>			
	rigid hose pack for hand torch series 18 without pushbutton, 4 m long, large torch with water cooling (350 A)	rigid, 4 m, with pushbutton, with water cooling	<b>4 526 200</b> 408.00 €
	<b>Series 26 hand torch hose pack</b>		
		rigid, 4 m, with pushbutton	<b>4 525 200</b> 364.00 €
		flexible, 4 m, with pushbutton	<b>4 525 600</b> 417.00 €

### Accessories / spare parts

	Design	Interior Ø	Length	Order No.	Price from 1 piece
<b>Torch body</b>					
	flexible, for series 17			<b>4 520 400</b>	78.15 €
	flexible, for series 18			<b>4 520 600</b>	135.30 €
	flexible, for series 26			<b>4 520 800</b>	116.95 €
	rigid, for series 17			<b>4 520 500</b>	38.65 €
	rigid, for series 18			<b>4 520 700</b>	80.40 €
	rigid, for series 26			<b>4 520 900</b>	70.45 €
<b>Torch cap</b>					
	short	Ø 12 mm	25 mm	<b>4 520 112</b>	13.85 €
		Ø 13 mm	25 mm	<b>4 520 113</b>	13.85 €
	medium	Ø 12 mm	60 mm	<b>4 520 312</b>	13.85 €
	long	Ø 12 mm	120 mm	<b>4 520 212</b>	14.60 €
		Ø 13 mm	120 mm	<b>4 520 213</b>	14.60 €
<b>Ceramic gas nozzle</b>					
	Standard, size 4	Ø 6.5 mm	47 mm	<b>4 522 204</b>	4.39 €
	Standard, size 5	Ø 8.0 mm	47 mm	<b>4 522 205</b>	4.39 €
	Standard, size 6	Ø 9.5 mm	47 mm	<b>4 522 206</b>	4.39 €
	Standard, size 7	Ø 11 mm	47 mm	<b>4 522 207</b>	4.39 €
	Standard, size 8	Ø 13 mm	47 mm	<b>4 522 208</b>	4.39 €

# Large hand welding torches Series 17-18-26

## Hose packs


### Accessories / spare parts

	Design	Interior Ø	Length	Order No.	Price from 1 piece
	Curved, size 4	Ø 6.5 mm	42 mm	<b>4 521 404</b>	4.18 €
	Curved, size 5	Ø 8.0 mm	42 mm	<b>4 521 405</b>	4.18 €
	Curved, size 6	Ø 9.5 mm	42 mm	<b>4 521 406</b>	4.18 €
	Curved, size 7	Ø 11 mm	42 mm	<b>4 521 407</b>	4.18 €
	Curved, size 8	Ø 12 mm	42 mm	<b>4 521 408</b>	4.18 €
	Curved, long, size 5	Ø 8.0 mm	76 mm	<b>4 521 505</b>	15.90 €
	Curved, long, size 6	Ø 9.5 mm	76 mm	<b>4 521 506</b>	15.90 €
	Curved, long, size 7	Ø 11 mm	76 mm	<b>4 521 507</b>	15.90 €
	Jumbo, short, size 15	Ø 24 mm	35 mm	<b>4 511 815</b>	10.05 €
	Jumbo, size 10	Ø 16 mm	48 mm	<b>4 511 910</b>	9.65 €
	Jumbo, size 12	Ø 19 mm	48 mm	<b>4 511 912</b>	10.05 €
<b>Clamping bush housings</b>					
	standard	Ø 1.0 mm	47 mm	<b>4 523 310</b>	6.90 €
		Ø 1.6 mm	47 mm	<b>4 523 316</b>	6.90 €
		Ø 2.4 mm	47 mm	<b>4 523 324</b>	6.90 €
		Ø 3.2 mm	47 mm	<b>4 523 332</b>	6.90 €
		Ø 4.0 mm	47 mm	<b>4 523 340</b>	6.90 €
<b>Gas lens</b>					
		Ø 1.0 mm	50 mm	<b>4 523 110</b>	12.00 €
		Ø 1.6 mm	50 mm	<b>4 523 116</b>	12.00 €
		Ø 2.4 mm	50 mm	<b>4 523 124</b>	12.00 €
		Ø 3.2 mm	50 mm	<b>4 523 132</b>	12.00 €
		Ø 4.0 mm	50 mm	<b>4 523 140</b>	12.00 €
	Jumbo	Ø 1.0 mm	50 mm	<b>4 523 210</b>	22.70 €
		Ø 1.6 mm	50 mm	<b>4 523 216</b>	22.70 €
		Ø 2.4 mm	50 mm	<b>4 523 224</b>	22.70 €
		Ø 3.2 mm	50 mm	<b>4 523 232</b>	22.70 €
<b>Clamping bushes</b>					
	Standard for type 17-18-26	Ø 1.0 mm	50 mm	<b>4 522 710</b>	3.95 €
		Ø 1.6 mm	50 mm	<b>4 522 716</b>	3.95 €
		Ø 2.4 mm	50 mm	<b>4 522 724</b>	3.95 €
		Ø 3.2 mm	50 mm	<b>4 522 732</b>	3.95 €
		Ø 4.0 mm	50 mm	<b>4 522 740</b>	3.95 €
		Ø 1.6 mm	52 mm	<b>4 522 816</b>	3.95 €
		Ø 2.4 mm	52 mm	<b>4 522 824</b>	3.95 €
		Ø 3.2 mm	52 mm	<b>4 522 832</b>	3.95 €
		Ø 4.0 mm	52 mm	<b>4 522 840</b>	3.95 €
		<b>Isolator</b>			
	for gas lens	Ø 25 mm	13 mm	<b>4 522 400</b>	6.40 €
	for jumbo gas lens	Ø 30 mm	16 mm	<b>4 523 030</b>	13.85 €

# Large hand welding torches Series 17-18-26

## Hose packs

*matching set*

	Order No.	Price from 1 set
<b>Spare parts set for series 26 large hand torch</b>		
 <p>The set contains:</p> <ul style="list-style-type: none"> <li>• 1 x torch cap, short (order no. 4 520 112)</li> <li>• 1 x torch cap, long (order no. 4 520 212)</li> <li>• 7 x ceramic gas nozzles, curved (order no. 4 521 404, 4 521 406, 4 521 408, 4 521 505)</li> <li>• 1 x isolator for gas lens (order no. 4 522 400)</li> <li>• 4 x clamping bushes (order no. 4 522 716 + 4 522 724)</li> <li>• 2 x clamping bush housings with gas lens (order no. 4 523 116 + 4 523 124)</li> <li>• 4 x tungsten electrodes, blue (order no. 4 569 016 + 4 569 024)</li> <li>• 1 x storage box (order no. 0 200 820)</li> </ul>	<b>4 529 900</b>	149.55 €

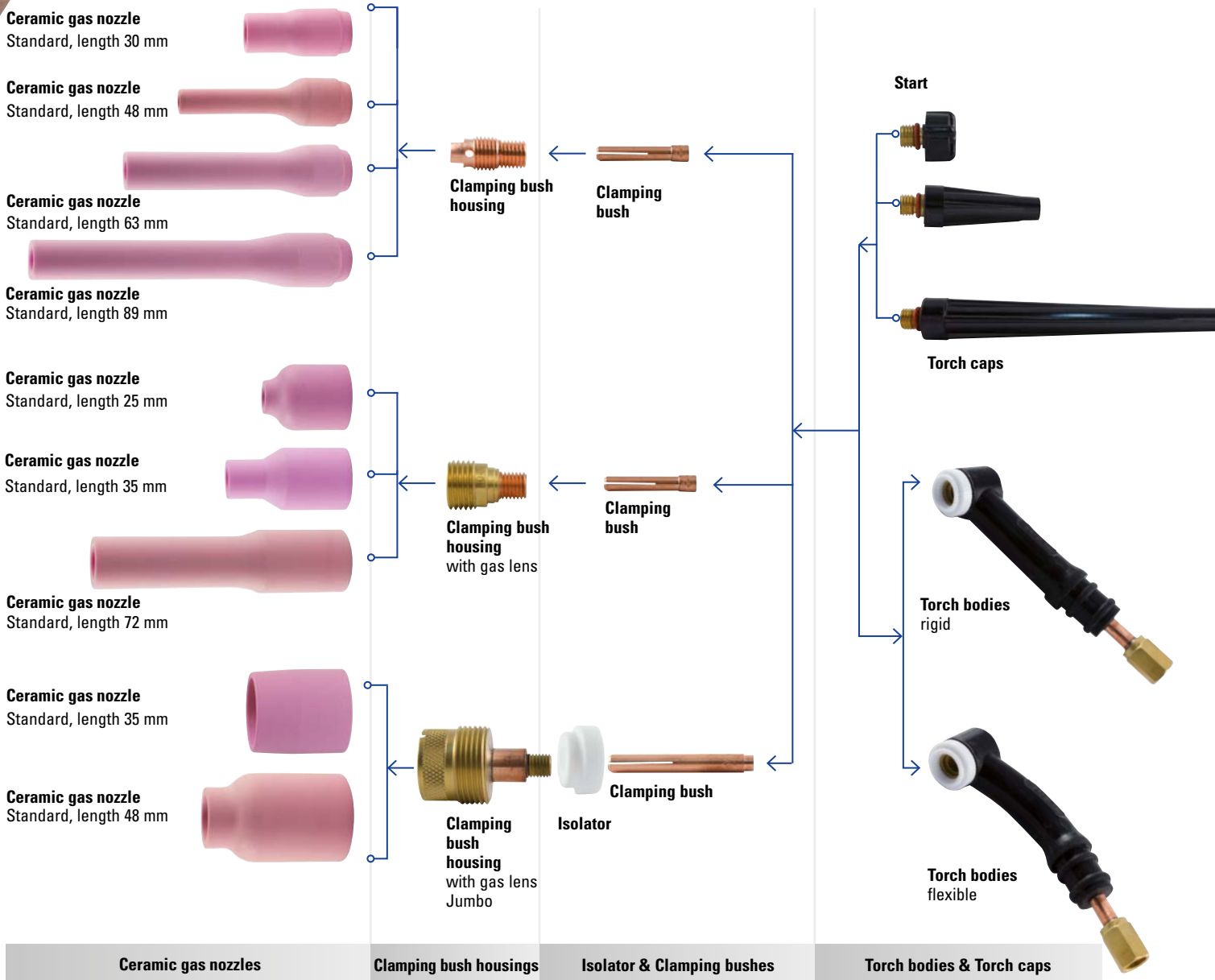


# Small hand welding torches Series 9




## Hose packs






TIG welding  
DC 110 A  
AC 95 A



## Small hand welding torches Series 9 Hose packs

	Design	Order No.	Price from 1 piece
<b>Series 9 hand torch hose pack</b>			
	rigid, 4 m, without pushbutton	<b>4 515 000</b>	260.00 €
	rigid, 4 m, with pushbutton	<b>4 515 200</b>	322.00 €
	flexible, 4 m, without pushbutton	<b>4 515 400</b>	300.00 €
	flexible, 4 m, with pushbutton	<b>4 515 600</b>	373.00 €
	rigid hose pack joke 230 WK without pushbutton, 4 m long, small torch with water cooling (300 A)	rigid, 4 m, without pushbutton, with water cooling	<b>4 517 010</b> 322.00 €
	flexible hose pack with pushbutton, 4 m long, small torch with water cooling (300 A)	flexible, 4 m, with pushbutton, with water cooling	<b>4 517 600</b> 353.00 €

### Accessories / spare parts

	Design	Interior Ø	Length	Order No.	Price from 1 piece
<b>Torch body</b>					
	flexible, for series 9			<b>4 511 000</b>	71.65 €
	flexible, for series 20 WK			<b>4 510 400</b>	139.65 €
	rigid, for series 9			<b>4 511 100</b>	37.55 €
	rigid, for series 20 WK			<b>4 510 500</b>	100.15 €
<b>Torch cap</b>					
	short	Ø 8.6 mm	20 mm	<b>4 510 186</b>	10.15 €
	medium	Ø 8.6 mm	50 mm	<b>4 510 386</b>	10.60 €
	long	Ø 8.6 mm	145 mm	<b>4 510 286</b>	11.00 €

# Small hand welding torches Series 9

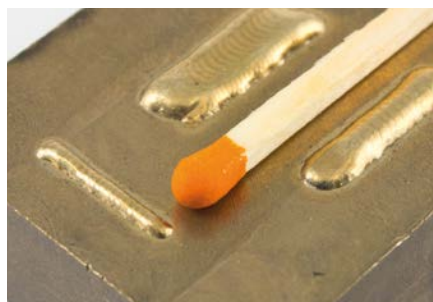
## Hose packs

Accessories / spare parts

	Design	Interior Ø	Length	Order No.	Price from 1 piece
<b>Ceramic gas nozzle</b>					
	Standard, size 4	Ø 6.5 mm	30 mm	<b>4 512 004</b>	4.28 €
	Standard, size 5	Ø 8.0 mm	30 mm	<b>4 512 005</b>	4.28 €
	Standard, size 6	Ø 9.5 mm	30 mm	<b>4 512 006</b>	4.28 €
	Standard, size 7	Ø 11.0 mm	30 mm	<b>4 512 007</b>	4.28 €
	Standard, size 8	Ø 13.5 mm	30 mm	<b>4 512 008</b>	4.28 €
	Standard, size 10	Ø 16.0 mm	30 mm	<b>4 512 010</b>	4.28 €
	Standard, size 3	Ø 5.0 mm	48 mm	<b>4 512 103</b>	13.25 €
	Standard, size 4	Ø 6.5 mm	48 mm	<b>4 512 104</b>	13.25 €
	Standard, size 5	Ø 8.0 mm	48 mm	<b>4 512 105</b>	13.25 €
	Standard, size 6	Ø 9.5 mm	48 mm	<b>4 512 106</b>	13.25 €
	Standard, size 4	Ø 6.5 mm	63 mm	<b>4 512 204</b>	14.60 €
	Standard, size 5	Ø 8.0 mm	63 mm	<b>4 512 205</b>	14.60 €
	Standard, size 4	Ø 6.5 mm	89 mm	<b>4 512 304</b>	15.60 €
	Curved XL, size 6	Ø 9.5 mm	72 mm	<b>4 511 706</b>	13.25 €
	Jumbo, short, size 15	Ø 24 mm	35 mm	<b>4 511 815</b>	10.05 €
	Curved, size 4	Ø 6.5 mm	25 mm	<b>4 511 404</b>	4.62 €
	Curved, size 5	Ø 9.5 mm	25 mm	<b>4 511 405</b>	4.62 €
	Curved, size 6	Ø 9.5 mm	25 mm	<b>4 511 406</b>	4.62 €
	Curved, size 7	Ø 11.0 mm	25 mm	<b>4 511 407</b>	4.62 €
	Curved, size 8	Ø 13.5 mm	25 mm	<b>4 511 408</b>	4.62 €
	Curved, long, size 6	Ø 9.5 mm	35 mm	<b>4 511 506</b>	6.20 €
	Jumbo, size 10	Ø 16 mm	48 mm	<b>4 511 910</b>	9.65 €
	Jumbo, size 12	Ø 19 mm	48 mm	<b>4 511 912</b>	10.05 €
<b>Isolator</b>					
	for jumbo gas lens	Ø 30 mm	14 mm	<b>4 512 600</b>	13.75 €



Welding seam build-up - steel material



Welding seam build-up - bronze material



Welding seam build-up - aluminium material

# Small hand welding torches Series 9

## Hose packs

### Accessories / spare parts

	Design	Interior Ø	Length	Order No.	Price from 1 piece
<b>Clamping bush housings</b>					
	standard	Ø 1.0 mm	47 mm	<b>4 523 310</b>	6.90 €
		Ø 1.6 mm	47 mm	<b>4 523 316</b>	6.90 €
		Ø 2.4 mm	47 mm	<b>4 523 324</b>	6.90 €
		Ø 3.2 mm	47 mm	<b>4 523 332</b>	6.90 €
<b>Gas lens</b>					
		Ø 1.0 mm	50 mm	<b>4 523 110</b>	12.00 €
		Ø 1.6 mm	50 mm	<b>4 523 116</b>	12.00 €
		Ø 2.4 mm	50 mm	<b>4 523 124</b>	12.00 €
		Ø 3.2 mm	50 mm	<b>4 523 132</b>	12.00 €
	Jumbo	Ø 1.0 mm	50 mm	<b>4 523 210</b>	22.70 €
		Ø 1.6 mm	50 mm	<b>4 523 216</b>	22.70 €
		Ø 2.4 mm	50 mm	<b>4 523 224</b>	22.70 €
		Ø 3.2 mm	50 mm	<b>4 523 232</b>	22.70 €
<b>Clamping bushes</b>					
	Standard for type 17-18-26	Ø 1.0 mm	50 mm	<b>4 522 710</b>	3.95 €
		Ø 1.6 mm	50 mm	<b>4 522 716</b>	3.95 €
		Ø 2.4 mm	50 mm	<b>4 522 724</b>	3.95 €
		Ø 3.2 mm	50 mm	<b>4 522 732</b>	3.95 €
	Jumbo	Ø 1.0 mm	40 mm	<b>4 512 910</b>	7.00 €
		Ø 1.6 mm	40 mm	<b>4 512 916</b>	7.00 €
		Ø 2.4 mm	40 mm	<b>4 512 924</b>	7.00 €

### matching set



	Order No.	Price from 1 set
<b>Spare parts set for series 9 small hand torch</b>		
<p>The set contains:</p> <ul style="list-style-type: none"> <li>• 1 x torch cap, short (order no. 4 510 186), 1 x torch cap, long (order no. 4 510 286), 1 x torch cap, medium (order no. 4 510 386)</li> <li>• 2 x ceramic gas nozzles, curved (order no. 4 511 405 + 4 511 407) + 4 x ceramic gas nozzles, standard (order no. 4 512 004, 4 512 103, 4 512 204, 4 512 304)</li> <li>• 2 x clamping bushes (order no. 4 512 710 + 4 512 716)</li> <li>• 4 x clamping bush housings, gas lens (order no. 4 513 110, 4 513 116, 4 513 310, 4 513 316)</li> <li>• 4 x tungsten electrodes (order no. 4 569 010, 4 569 016)</li> <li>• 1 x fibreglass cleaning pen (order no. 4 805 501)</li> <li>• 1x storage box (order no. 0 200 820)</li> </ul>	<b>4 519 900</b>	149.55 €

# Microtorches Series 70-140

## Hose packs



TIG welding  
 Serie 70: 70 A  
 Serie 140: 140 A  
 with watercooling








	Order No.	Price from 1 set
<b>Series 140 microtorch hose pack incl. accessory set</b>		
 <p>rigid hose pack for series 140 microtorch incl. accessories without pushbutton, with water cooling (140 A)</p>	<b>4 535 400</b>	518.00 €
<b>Series 70 microtorch hose pack incl. accessory set</b>		
	<b>4 535 000</b>	491.00 €




# Microtorches Series 70-140

## Hose packs

### Accessories / spare parts

Design	Interior Ø	Length	Order No.	Price from 1 piece
<b>PYREX gas nozzle</b>				
	Ø 7.0 mm	15 mm	<b>4 531 404</b>	28.50 €
<b>Insulating bush</b>				
	Ø 8.2 mm	90 mm	<b>4 532 400</b>	28.70 €
<b>Clamping bushes</b>				
	for type 70-140	Ø 1.0 mm	<b>4 532 710</b>	15.10 €
		Ø 1.6 mm	<b>4 532 716</b>	15.10 €
		Ø 2.4 mm	<b>4 532 724</b>	15.10 €
<b>Adjustment aid for tungsten electrode</b>				
			<b>4 533 400</b>	39.70 €
<b>45° replacement head for type 70-140</b>				
			<b>4 530 445</b>	35.30 €
<b>90° replacement head for type 70-140</b>				
			<b>4 530 590</b>	35.30 €
<b>Straight replacement head for type 70-140</b>				
			<b>4 530 618</b>	35.30 €

### matching set

	Order No.	Price from 1 set
<b>Spare parts set for series 70-140 microtorches</b>		
 <p>The set contains:</p> <ul style="list-style-type: none"> <li>• 4 x clamping bushes (order no. 4 532 710 + 4 532 716)</li> <li>• 1 x insulating bush (order no. 4 532 400)</li> <li>• 2 x PYREX gas nozzle (order no. 4 531 404)</li> <li>• 6 x tungsten electrodes (order no. 4 569 010 + 4 569 016)</li> </ul>	<b>4 539 900</b>	149.55 €

# Portable tungsten electrode grinding device for a perfect seam

## Tungsten electrode grinding device


It's all a matter of the "right grind"! The portable electrode grinding device from joke provides the optimum solution for giving your tungsten electrodes the right cylindrical grind, neatly and in a few simple moves. A precise grind at the tungsten electrode tip is tremendously important in ensuring a stable electric arc. A sharp-tipped tungsten electrode makes it possible to concentrate the electric arc energy on a small surface with deep penetration – which is how you ultimately achieve clean results!

About the technology: An integrated filter cartridge makes sure that the dusts generated during grinding are absorbed and are not dispersed in the atmosphere. A built-in diamond disc makes for the correct surface of your tungsten electrode tip. Furthermore, through the possibility of using different collets on the handpiece, you can also process all diameters between 1 and 4 mm.

In addition, the grinding device convinces through its light weight, for at 2.8 kg, it is easy to transport and therefore even more versatile. A carrying case rounds off the product.

### Scope of supply:

- Diamond disc (already installed)
- Electrode holder
- Collets for electrode diameter 1.6 mm
- Collets for electrode diameter 2.4 mm
- Collets for electrode diameter 3.2 mm
- Allen key, 2 mm
- Allen key, 4 mm
- Chuck key 13/17
- Chuck key 13/14
- Disposable filter (already installed)
- Disposal bag for disposable filter
- Carrying case
- Operating instructions

	Order No.	Price from
<b>Portable tungsten electrode grinding device in a carrying case</b>	<b>4 561 100</b>	<b>849.00 €</b>
	<b>Technical data:</b> Output: 650 W Power supply: 230 V Speed: min. 11500 bis 27000 rpm Sound pressure: 88.8 dB(A) Vibration value: 5 m/s <sup>2</sup> Diamond disc: Ø 40 mm Filter cartridge: disposable filter (classe:H12) Electrode diameter: 1 – 4 mm Grinding angle: 15° – 180° (infinitely adjustable) Shortest grindable electrode length: 15 mm Weight (device): 2.8 kg Weight (in case): 4.5 kg CE certification: yes	


ⓘ Accessories on request!



# Tungsten electrodes non-radioactive


## Tungsten electrodes, blue

Contains lanthanum special additives for perfect ignition even at the lowest inverter device current intensities. Very good service life and optimum re-ignition in the hot and cold state. Universally usable with direct and alternating current. Non-radioactive!

	Colour	Dimensions	Packing quantity	Order No.	Price from 1 piece
	blue	Ø 1.0 x 175 mm	10 pieces	<b>4 569 010</b>	2.91 €
		Ø 1.6 x 175 mm	10 pieces	<b>4 569 016</b>	4.28 €
		Ø 2.4 x 175 mm	10 pieces	<b>4 569 024</b>	8.55 €
		Ø 3.2 x 175 mm	10 pieces	<b>4 569 032</b>	14.80 €


## Tungsten electrodes, gold

Very economical-to-use electrodes for direct and alternating current when the ignition current is within the medium to high range. Non-radioactive!

	Colour	Dimensions	Packing quantity	Order No.	Price from 1 piece
	gold	Ø 1.0 x 175 mm	10 pieces	<b>4 569 210</b>	2.58 €
		Ø 1.6 x 175 mm	10 pieces	<b>4 569 216</b>	3.95 €
		Ø 2.4 x 175 mm	10 pieces	<b>4 569 224</b>	8.45 €
		Ø 3.2 x 175 mm	10 pieces	<b>4 569 232</b>	12.00 €

## Tungsten electrode, light green

The light green tungsten electrodes consist of pure tungsten and are mainly used for welding using alternating current. Non-radioactive!

	Colour	Dimensions	Packing quantity	Order No.	Price from 1 piece
	light green	Ø 1.0 x 175 mm	10 pieces	<b>4 569 610</b>	1.65 €
		Ø 1.6 x 175 mm	10 pieces	<b>4 569 616</b>	3.30 €
		Ø 2.4 x 175 mm	10 pieces	<b>4 569 624</b>	6.70 €
		Ø 3.2 x 175 mm	10 pieces	<b>4 569 632</b>	11.50 €



# Workplace & protection equipment



## Workplace equipment

- 38 Premium cross table with flexible arm and steel plate
- 39 Flowmeter for all gases up to 25 l/min.
- 39 Transport trolley, large
- 40 Standing aid
- 40 joke easy-Work positioner
- 41 Magnetic clamping balls
- 42 Compact stereomicroscope
- 43 Cold light source

## Protection equipment

- 45 Suction units
- 48 Automatic welding helmet Crystal 2.0, extra bright
- 49 Automatic welding helmet e684, extra light
- 50 Hand protection • Laser safety goggles
- 51 Mobile protection wall
- 51 Glare protection shield with flexible arm and magnetic foot

## Workplace equipment / Accessories for the torch

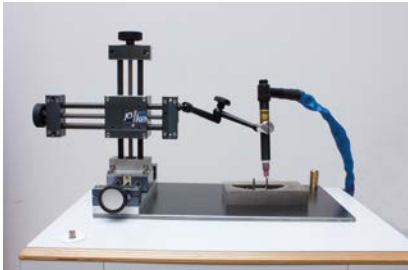
### Premium cross table

#### Premium cross table

Modern component geometries – particularly on contours – require precision accuracy when guiding your torch. This is why joke recommends you the Premium cross table, a high-quality addition in order to achieve optimum welding results. The Premium cross table lets you position the machine torch with millimetre accuracy over the workpiece. Flexible and easy handling of the flexible arm ensure rapid alignment. Its fine bearing-mounted spindles guarantee smooth and continuous travel.

The Premium cross table is equipped with a ground point mounted on the base plate for protective earthing.

The earth cable with a spring clamp (order no. 4 902 125) can be easily connected here.


	Order No.	Price from 1 piece
<b>Premium cross table with flexible arm and steel plate</b>		
	The cross table allows positioning of the machine torch with millimetre accuracy over the workpiece by means of x-y-z axes and the freely pivoting torch holder.	<b>4 901 700</b> 1607.00 €

#### Accessories / spare parts

	Dimensions	Order No.	Price from 1 piece
<b>Magnetic foot (spare) for cross table</b>			
	120 x 50 x 60 mm	<b>4 901 603</b>	185.00 €

## Workplace equipment / Accessories for the torch

### Welding torch holder

	Order No.	Price from 1 piece
<b>Welding torch holder, magnetic</b>		
	<ul style="list-style-type: none"> <li>• for the secure storage of your welding torch</li> <li>• easy to install thanks to magnet</li> </ul>	<b>4 802 000</b> 30.65 €

## Workplace equipment Flowmeter


### Flowmeter

The volumetric quantity of gas at the gas nozzle of the hose pack can be measured using the flowmeter. You can therefore ensure that the preset gas pressure of your inert gas cylinder also arrives at your hand torch.

	Order No.	Price from 1 piece
<b>Flowmeter for all gases up to 25 l/min.</b>	<b>4 800 251</b>	<b>11.70 €</b>



## Workplace equipment Transport trolley


	Order No.	Price from 1 piece
<p><b>Transport trolley, large</b></p>  <p>This trolley provides space for the welding device multiSpot 3, gas cylinder, cross table and other additional devices such as water cooling or other accessories.</p> <p>Completely welded and powder-coated steel frame, robust, very free-running and partly lockable swivel and fixed castors, compartments with non-slip mat, chain for securing cylinders.</p> <p>Dimensions (L x W x H): 860 x 500 x 1,250 mm Weight: 35 kg</p>	<b>4 905 001</b>	<b>864.00 €</b>

## Standing aid

### Standing aid

Even if you prefer to stand whilst working instead of sitting down – you still need the necessary support. Our standing aid relieves you during stand-up jobs resulting in enhanced efficiency with fewer inactivity periods due to injuries caused by poor posture.

- Integral foam padding
- Seat inclination 2–15° forwards
- Circular base with PU rim (anti-slip)
- Seat height adjustment by means of a pneumatic safety spring
- optimal as a supplement for your workplace


		Order No.	Price from
			1 piece
<b>Standing aid</b>			
	Seat height:	630 – 850 mm	<b>0 200 419</b> 283.00 €
	Seat surface (W x D):	390 x 350 mm	
	Circular base:	Ø 430 mm	

## Positioner joke easy-Work for attachment to table

### Positioner joke easy-Work

Compact and very flexible to use: the small rotating and pivoting unit unit joke easy-Work can be attached quickly and securely to almost any table by means of the drillings, such as the large joke Ergo-Work worktable.

The optionally available T-slot clamping plates ensure make fixing the workpieces child's play. These plates are made from aluminium and are optionally available in square or round shape.



		Order No.	Price from
			1 piece
<b>joke easy-Work positioner with magnet Ø 125 mm</b>			
	Rotation range:	manually through 360°	<b>0 200 872</b> 1091.00 €
	Pivoting range:	0 – 90° manually	
	Dimensions (W x H x D):	200 x 160 x 250 mm	
	Weight:	approx. 11 kg	
	Clamping system:	magnet Ø 125 mm	




# Magnetic clamping balls joke Magic-Ball

## Magnetic clamping balls joke Magic-Ball

Comfortable and ergonomic 3-dimensional work. Ideal for polishing and welding workplaces. The Magic-Ball magnetic clamping balls bring your workpiece into almost any desired position. Depending on the workpiece geometry and weight, pivoting angles of up to 90° can be set. The balls are enclosed in leather-lined, chemically nickel-plated steel rings that hold them absolutely securely in any position – the sliding adhesion effect makes it possible! The powerful magnetic chuck of the Magic-Ball is activated using the key supplied (partial activation is also possible for optimum positioning of the workpiece). The balls available in four sizes are all of “Made in Germany” quality.

	Weight (kg)	Dimensions	Clamping force	Pole pitch	Order No.	Price from 1 piece
<b>Magnetic clamping balls joke Magic-Ball</b>						
	ball: 4 kg ring: 1 kg	magnet (Ø): 80 mm ball (Ø x H): 128 x 104 mm	80 N/cm <sup>2</sup>	1.5 + 0.5 mm	<b>0 200 323</b>	789.00 €
	ball: 7 kg ring: 2 kg	magnet (Ø): 100 mm ball (Ø x H): 158 x 129 mm	100 N/cm <sup>2</sup>	1.5 + 0.5 mm	<b>0 200 324</b>	956.00 €
	ball: 11 kg ring: 4 kg	magnet (Ø): 130 mm ball (Ø x H): 188 x 145 mm	100 N/cm <sup>2</sup>	1.5 + 0.5 mm	<b>0 200 325</b>	1176.00 €
	ball: 17 kg ring: 5 kg	magnet (Ø): 160 mm ball (Ø x H): 218 x 164 mm	100 N/cm <sup>2</sup>	1.5 + 0.5 mm	<b>0 200 326</b>	1384.00 €
<b>Magnetic clamping balls joke Magic-Ball with earth cable especially for the multiSpot 3</b>						
	ball: 4 kg ring: 1 kg	magnet (Ø): 80 mm ball (Ø x H): 128 x 104 mm	80 N/cm <sup>2</sup>	1,5 + 0,5 mm	<b>4 901 801</b>	942.00 €
	ball: 7 kg ring: 2 kg	magnet (Ø): 100 mm ball (Ø x H): 158 x 129 mm	100 N/cm <sup>2</sup>	1,5 + 0,5 mm	<b>4 901 802</b>	1110.00 €
	ball: 11 kg ring: 4 kg	magnet (Ø): 130 mm ball (Ø x H): 188 x 145 mm	100 N/cm <sup>2</sup>	1,5 + 0,5 mm	<b>4 901 803</b>	1330.00 €
	ball: 17 kg ring: 5 kg	magnet (Ø): 160 mm ball (Ø x H): 218 x 164 mm	100 N/cm <sup>2</sup>	1,5 + 0,5 mm	<b>4 901 804</b>	1538.00 €

## Accessories / spare parts

	Order No.	Price from 1 piece
<b>Earth cable (25 mm<sup>2</sup>), length: 1,000 mm</b>		
	<b>4 902 110</b>	38.45 €

Earth cable is absolutely necessary for first-time use of the magnetic clamping ball joke Magic-Ball with earth connection and must be ordered separately.



# Compact stereo microscope for welding workstations

### Compact stereo microscope

This welding microscope leaves nothing to be desired. The extended working distance of approx. 225 mm allows simple use even on workpiece geometries where access is difficult. Precise positioning and welding is possible through 10 x magnification. The first-rate glare-protection cartridge appeals by the following advantages:

- Variable shade level 8–12 (DIN), variable sensitivity adjustment, two-stage opening delay adjustment.
- By removing the glare-protection cartridge, the microscope is also highly suitable for use during polishing or for quality control!

		Order No.	Price from 1 piece
<b>Compact stereomicroscope with XXL working distance</b>			
Working distance:	approx. 225 mm	<b>4 901 400</b>	1744.00 €
Magnification:	10 x		
Filter cassette:	degree of protection 8–12 (DIN)		
Scope of delivery:	stereomicroscope with filter cassette, magnetic foot and flexible arm		




### ⚙️ Accessories / spare parts




		Order No.	Price from 1 piece
<b>Replacement filter cassette</b>			
	fits for glare protection shield and welding microscope	<b>4 938 335</b>	210.00 €



# Cold light source LED

			Design	Order No.	Price from 1 piece
<b>Cold light source LED, 30 W Power LED</b>					
	Lamp:	Power-LED 30 W	30 W Power LED	<b>0 200 745</b>	478.00 €
	Colour temperature:	6,500 K			
	Bulb life:	approx. 25,000 h			
	Light brightness:	by rotary switch			
	Cooling:	by fan			
	Connection voltage:	100 – 240 V, 50/60 Hz			
	Fuse:	1.25 A, slow-blow			
Protection class:	IP 20				
Swan-necked light not in delivery					

## Accessories / spare parts




			Order No.	Price from 1 piece	
<b>Single swan-necked light guide, 53 cm</b>					
				<b>0 200 730</b>	116.75 €
<b>Double swan-necked light guide, 53 cm</b>					
				<b>0 200 720</b>	189.00 €
<b>XXL Flexlight for cold light sources</b>					
	For direct connection to our cold light sources. Delivery includes magnetic base for positioning on the workpiece in addition to two XXL swan necks (800 mm each) and flexible fibreglass supply lead (2,000 mm). Cold light source not included in scope of supply.			<b>0 200 778</b>	591.00 €
	Suitable light source:	0 200 745 and 0 200 710			

# Cold light source P 100 W





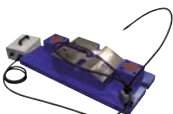
## Cold light source P 100 W

Powerful cold light source 100 watts of luminous power. Longlife illuminants as accessories are optionally available.

In this model, the brightness can be continuously adjusted by a rotary switch. The cold light sources are optionally available without, with a single swan-necked or double swannecked light guide.

		Design	Order No.	Price from 1 piece
<b>Cold light source P 100 W</b>				
  	Lamp: Halogen 100 W, 12 V Colour temperature: 3,200 K Bulb life: approx. 50 h Light brightness: by rotary switch Cooling: by fan Dimensions (W x H x D): approx. 110 x 155 x 240 mm Connection voltage: 230 V, 50/60 Hz Fuse: 1 A, slow blow Protection class: IP 20 Weight without light guide: approx. 4 kg Weight with light guide: approx. 4.4 kg	with double swan-necked light guide, 53 cm	<b>0 200 700</b>	496.00 €
		without swan-necked light guide	<b>0 200 710</b>	372.00 €
		with single swan-necked light guide, 53 cm	<b>0 200 740</b>	434.00 €

## Accessories / spare parts

		Order No.	Price from 1 piece
<b>Illuminant, halogen 100 W</b>			
		<b>0 200 721</b>	23.00 €
<b>Illuminant, halogen 100 W, "Longlife" (approx. 1,500 h)</b>			
	Lamp service life approx. 1,500 h, colour temperature 3,050 K	<b>0 200 725</b>	41.15 €
<b>Single swan-necked light guide, 53 cm</b>			
		<b>0 200 730</b>	116.75 €
<b>Double swan-necked light guide, 53 cm</b>			
		<b>0 200 720</b>	189.00 €
<b>XXL Flexlight for cold light sources</b>			
	For direct connection to our cold light sources. Delivery includes magnetic base for positioning on the workpiece in addition to two XXL swan necks (800 mm each) and flexible fibreglass supply lead (2,000 mm). Cold light source not included in scope of supply.	<b>0 200 778</b>	591.00 €
Suitable light source:		0 200 745 and 0 200 710	

# Suction units

## joke suction units

... Laser emissions, dust and fine particles, solvents, adhesive vapour, solder vapour/ welding vapour ...

at least one of these or some other pollutions also occur daily in your working environment. You should do something about them in order to avoid damage to health.

With a suction unit from joke, you create the optimum conditions for "good air" at the workplace – even if you ever "let it fly".

With us, you have a choice between two suction systems:

- **JF Compact** with favourably priced entrylevel products
- **AFD Premium** as a highly efficient system with comprehensive equipment details (high filter capacity, filter monitoring, serial interface for remote control)

Both systems can be configured with two filter modules. Suspended matter filter for dusts/fine particles and all particles that arise in mechanical processing sequences.

The activated charcoal filter is used wherever solvents, adhesive vapours, soldering vapour, smoke and similar gaseous pollutions arise. It eliminates or reduces them to a minimum.

Owing to the high density of the filters used, a very high level of separation of the particles and contaminants to be aspirated is achieved. The filters can be combined as individual modules and are easy to replace. Consequently, if replacement is required, you only actually need to change the saturated filter, whereas the remainder can continue to be used.

The turbine cooling (bypass cooling) inside the devices ensures very long services lives of the turbine units, even during constant use. The modular construction allows effective adaptation to individual requirements.

### Suction arm for mounting on device

**JF 5 Compact**  
Order No. 0 200 185

**JF 10 Compact**  
Order No. 0 200 242-3

**AFD Premium**  
Order No. 0 200 266

**Suction hood**  
Order No. 0 200 248

**Suction tube**  
Order No. 0 200 243



**Suction arm for table mounting**  
Order No. 0 200 268



### Suction unit

**JF 5 Compact**  
Order No. 0 200 225

**JF 10 Compact**  
Order No. 0 200 230-3

**AFD Premium**  
Order No. 0 200 250-1



### Things to know about contaminants at the workplace and use of suction units

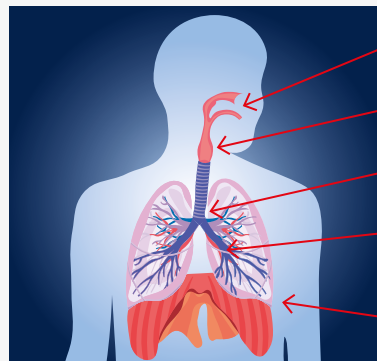
Aerolsols consist of a large number of dust and smoke particles of different diameters. They occur during production processes such as milling, drilling, laser work, cutting, soldering and engraving, etc. The particle size is indicated in micrometres ( $\mu\text{m} = 10^{-6}\text{m}$ ). Contamination of the respiratory tracts depending on the particle size is shown in the diagram opposite.

#### Maintenance intervals of the filters

With a properly dimensioned unit, the following intervals result for the individual filter types, depending on the contamination:

- Z-line filter: 4 – 8 months
- suspended matter filters: 4 – 8 months
- activated charcoal filters: 6 – 12 months

#### Without a change of filter, no protection of your health exists!



Nasal mucosa and pharynx 10  $\mu\text{m}$

Larynx 4,7 – 5,8  $\mu\text{m}$

Trachea and main bronchi 3,3 – 4,7  $\mu\text{m}$


Secondary and terminal bronchi 1,1 – 3,3  $\mu\text{m}$

Alveoli 1  $\mu\text{m}$


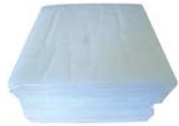


Designed by Alvaro\_cabrera/FreePik

# Suction units

## joke JF 10 Compact

		Design	Order No.	Price from 1 piece
<b>Suction unit joke JF 10 Compact</b>				
	<p>Suction device with initial filter equipment, infinitely adjustable, operating hour counter, 4 castors for mobile use, not including accessories</p> <p>Technical data:                      Suction output, free blowing: 250 m³/h                      Effective suction output: 20 – 200 m³/h                      Max. compression: 6,000 Pa                      Motor: continuous running                      Connection: 120 – 230 V, 50/60 Hz                      Motor output: 0.65 kW                      Sound level: approx. &lt; 62 dB(A)                      Weight: approx. 24 kg                      Dimensions (W x H x D): 300 x 510 x 300 mm                      Colour: RAL 7035                      Suction connectors: 2 (rear)                      Suction connector for arm: 1 (top)</p>	with suspended matter filter	<b>0 200 230-3</b>	1957.00 €
		with activated charcoal filter	<b>0 200 230-ZA1</b>	2163.00 €
	Filter (0 200 230-3):	Filter (0 200 230-3): Prefilter F5 + suspended particle filter H 13		
	Filter (0 200 230-ZA1):	Filter (0 200 230-ZA1): Prefilter F5 + suspended particle filter H 13 + activated charcoal filter		

*Accessories / spare parts*

		Order No.	Price from 1 piece
<b>Suspended matter filter H 13, 250 x 250 x 190 mm</b>			
		<b>0 200 271</b>	148.85 €
<b>Filter mats F5, 230 x 230 mm (pack: 20 pieces)</b>			
		<b>0 200 257</b>	44.90 €
<b>Combination filter suspended matter/activated charcoal, 250 x 250 x 190 mm</b>			
		<b>0 200 240-4</b>	359.00 €
<b>Suction arm for mounting on device</b>			
	850 mm long, 3 joints, without throttle valve, anodised aluminium tubes	<b>0 200 242-3</b>	294.00 €

# Suction units Accessories

		Order No.	Price from 1 piece
<b>Welding nozzle for suction arm</b>			
	310 mm long, anodised aluminium	<b>0 200 243</b>	44.00 €
<b>Connecting hose NW 44</b>			
	2.5 m incl. 2 connecting sleeves	<b>0 200 247</b>	70.15 €
<b>Suction shield for suction arm</b>			
	Ø 200 mm	<b>0 200 248</b>	89.40 €
<b>Reducing sleeve 50/63 to 40/50</b>			
	For connecting to the suction duct on connecting hose NW 44	<b>0 200 251-3</b>	25.65 €
<b>Suction arm for table mounting</b>			
	850 mm long, 3 joints, with throttle valve, anodised aluminium tubes, incl. table bracket and 2.5 m hose	<b>0 200 268</b>	426.00 €
<b>LED protective pane</b>			
	Optimum protection for your work <ul style="list-style-type: none"> <li>• ESG protective pane</li> <li>• SMD-LED lighting (daylight white)</li> <li>• Extraction via suction funnel</li> <li>• Bright and shadow-free illumination</li> <li>• incl. table stand</li> </ul> Technical data: Colour temperature: 6,000 K Luminosity: 2,500 Lux (brighter than two 60 W incandescent bulbs) Nominal voltage: AC 100–240 V, 50/60 Hz Operating voltage: 12 V Power consumption: 8 watts Dimensions, protective pane: height 205 mm, width 160 mm, thickness 4 mm	<b>0 200 510</b>	356.00 €
<b>Suction funnel</b>			
	incl. receptacle for LED protective pane <ul style="list-style-type: none"> <li>• For tabletop thickness up to 60 mm</li> <li>• Suction opening 100 x 80 mm</li> <li>• Connection for rectangular tube 80 x 30 mm</li> </ul>	<b>0 200 514</b>	194.00 €
<b>Suction duct</b>			
	Rectangular tube 80 x 30 mm for suction funnel <ul style="list-style-type: none"> <li>• Length 500 mm</li> <li>• For mounting under table</li> <li>• Suction connectors Ø 37/41mm</li> </ul>	<b>0 200 515</b>	67.10 €

## Protection equipment

### The optimal protection for your eyes with crystal clear vision

#### Automatic welding helmet Crystal 2.0, extra bright






The Crystal 2.0 automatic welding helmet, with a light transmission of 32 % in the light state (protection level 2), offers for the first time a practically unclouded and clear view of its working environment. All with a clarity that amounts to an insight into a new dimension.

		Order No.	Price from 1 piece
<b>Automatic welding helmet Crystal 2.0, extra bright</b>		<b>4 800 502-1</b>	<b>433.00 €</b>



Technical data:  
Field of vision: 50 x 100 mm  
Shade levels: DIN 4/5-9 and DIN 4/9-13  
Weight: 460 g

#### Accessories / spare parts

		Dioptres	Order No.	Price from 1 piece
<b>Magnifier</b>				
		1.0	<b>4 800 310</b>	42.45 €
		1.5	<b>4 800 315</b>	42.45 €
		2.0	<b>4 800 320</b>	42.45 €
		2.5	<b>4 800 325</b>	42.45 €
		3.0	<b>4 800 330</b>	42.45 €
<b>Replacement pane inside</b>			<b>4 800 351</b>	2.22 €
				
<b>Replacement pane outside</b>			<b>4 800 352</b>	18.35 €
				
<b>Replacement-headband with velcro</b>			<b>4 800 353</b>	6.50 €
				
<b>Backpack for automatic welding helmet</b>			<b>4 800 501</b>	23.70 €
	High quality backpack for safely storing your welding helmet. The padded inner lining prevents scratches and scuffs. The cushioned straps offer maximum carrying comfort.			




# Protection equipment



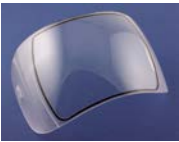


## The optimal protection for your eyes with crystal clear vision

### Automatic welding helmet e684

The welding helmet with an autopilot! Sorry, it still can't do the welding for you, but adjusts the brightness on its own. The adaptive shade level control automatically adjusts the appropriate shade level over the range S L 5 to 13. An integrated arc-extinguishing function ensures that the cartridge opens uninterruptedly from dark to light and vice versa. A further highlight is the grinding mode – if offers enhanced eye protection at the touch of a button.

		Order No.	Price from 1 piece
<b>Automatic welding helmet e684, extra light</b>			
	Technical data:		<b>4 800 500</b>
	Field of vision:	50 x 100 mm	461.00 €
	Shade levels:	DIN 4/5–9 and DIN 4/9–13	
	Weight:	490 g	

### Accessories / spare parts

		Dioptres	Order No.	Price from 1 piece
<b>Magnifier</b>				
		1.0	<b>4 800 310</b>	42.45 €
		1.5	<b>4 800 315</b>	42.45 €
		2.0	<b>4 800 320</b>	42.45 €
		2.5	<b>4 800 325</b>	42.45 €
		3.0	<b>4 800 330</b>	42.45 €
<b>Replacement pane inside</b>				
			<b>4 800 351</b>	2.22 €
<b>Replacement pane outside</b>				
			<b>4 800 352</b>	18.35 €
<b>Replacement-headband with velcro</b>				
			<b>4 800 353</b>	6.50 €
<b>Backpack for automatic welding helmet</b>				
	High quality backpack for safely storing your welding helmet. The padded inner lining prevents scratches and scuffs. The cushioned straps offer maximum carrying comfort.		<b>4 800 501</b>	23.70 €

## Hand protection

- Grained goatskin with cuff (10 cm) made of cowhide leather
- Heat-resistant yet still supple
- Good finger sensitivity
- Reinforced seams made of heatproof Kevlar®
- Elastic band on wrist for optimum fit


	Size	Order No.	Price from 1 pair
<b>TIG gloves</b>			
	7/S	<b>4 881 007</b>	19.30 €
	8/M	<b>4 881 008</b>	19.30 €
	9/L	<b>4 881 009</b>	19.30 €
	10/XL	<b>4 881 010</b>	19.30 €
	11/XXL	<b>4 881 011</b>	19.30 €

## Hand protection

- Chrome-free tanned, grained goatskin
- For sensitive skin types
- Very supple with good finger sensitivity
- Insensitive to water
- Elastic band on wrist for best fit

	Size	Order No.	Price from 1 pair
<b>Universal gloves</b>			
	9/L	<b>4 881 109</b>	20.65 €
	10/XL	<b>4 881 110</b>	20.65 €
	11/XXL	<b>4 881 111</b>	20.65 €

## Protective goggles

	Order No.	Price from 1 piece
	<b>4 910 020-1</b>	300.00 €
<p>also suitable for spectacle wearers, very light owing to plastic filter, adjustable temples, wide field of vision.</p> <p>Note: It is essential to compare before use the details concerning the operating mode, wavelength and shade level of the laser safety goggles with the safety requirements of the laser system.</p>		

## Protection equipment Anti-glare panel

	Order No.	Price from 1 piece
<b>Mobile protection wall</b>		
Extremely sturdy square tubing base frame.	<b>4 881 200</b>	649.00 €
Note: According to the Accident Prevention Regulations (UVV), workplaces for electric arc welding must be so arranged that uninvolved persons are protected against harmful effects of optical radiation on the skin and eyes.		



## Protection equipment Glare protection shield

### Flexible arm system

This flexible arm system is the ideal supplement to make your welding work even easier and at the same time optimise the achievable results. You can choose between a flexible arm for receiving the machine torch on the cross table and two flexible arms with a magnetic foot for further accessories: If for example you work with the anti-glare panel, even without a welding helmet, this provides your eyes the right protection at all times.

The stereo microscope, also available with a flexible arm, lets you place even finer weld seams and welding spots on the workpiece owing to 10x magnification.

	Order No.	Price from 1 piece
<b>Glare protection shield with flexible arm and magnetic foot</b>		
This protection shield allows you to work safely even without a welding helmet! The glare protection cassette works with variable blackness values 8–12 (DIN). Sensitivity and delay can be adjusted in two settings respectively. The power supply is provided by solar cells. Since work is performed without magnification in this case, the working distance can be variably configured.	<b>4 901 200</b>	656.00 €



### Accessories / spare parts

	Order No.	Price from 1 piece
<b>Replacement filter cassette</b>		
fits for glare protection shield and welding microscope	<b>4 938 335</b>	210.00 €





# Tungsten carbide coating

54	Tungsten carbide coating unit tucadur® 2020
55	Coating gun
55	Tungsten carbide electrodes



# Tungsten carbide coating unit

## tucadur® 2020

### Methods

Nowadays, very high demands are made on the toughness, hardness and surface wear resistance of tools, equipment and machines. Either hardness or toughness can be determined by the normal hardening process; in practice therefore a middle course is selected. The following options came to light in seeking a tough material with a more wear-resistant coating:

1. Galvanic coating with hard layers,
2. Plasma gun spraying method,
3. Electroerosive tungsten carbide coating.

The adhesive strength of the coatings in methods 1 and 2 is unsatisfactory in the case of heavy stresses since the coatings are likely to scale off. With the third method, however, it is possible to apply tungsten carbide in a very wear-resistant surface on the heavily stressed points of a workpiece.

### Properties of the tungsten carbide coat

The layer applied combines joins perfectly with the steel and adheres in such a way that it withstands almost any mechanical stress. Blows, bending, stretching or compressive strains are incapable of detaching the coating. This can only be done by grinding or special sand blasting; it can, however, be relapped with diamond or silicon carbide. The steel beneath is not softened by the coating but increases in hardness in the upper zone. In the case of certain steel alloys the tungsten carbide layer even penetrates into the base material. The coating produces a hardness of up to 82 HR 30N, without the workpiece undergoing any change or distortion since the depositing process is practically cold. The coating possesses a high degree of heat resistance. The surface is uniform and shows no directional texture. With good saturation, it achieves a mean roughness of 2-9 µm.

### Examples of applications

1. Hardness coating of tools or wear parts to extend service life.
2. Adhesion: coating of smooth surfaces in order to achieve greater adhesion through the structure of the layer.
3. Lubricating film: coating of smooth surfaces in order to maintain a lubricating film, as the lubricant remains embedded in the structure and therefore is not immediately squeezed out again.
4. Cold welding: coating of sliding surfaces in order to avoid cold weldings as a result of the structure of the layer, i.e. sticking of material.

### Materials and their pretreatment

Any soft, heat-treated and hardened unalloyed or alloyed steel is suitable as material for coating with tungsten carbide. The surface must be clean and metallurgically pure. Scale and oxide layers must be removed without fail. Ground, polished or brightly machined parts must be degreased. If the tungsten carbide coating is applied to an unclean surface, no satisfactory adhesive strength can be obtained and the coating becomes irregular and exhibits inclusions.

### Principle of operation

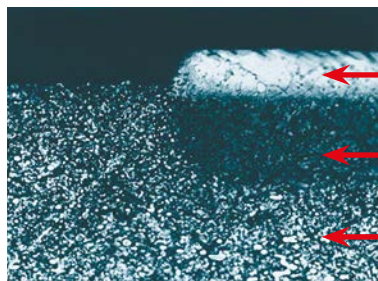
The coating device functions in accordance with the principle of electro-erosion. A tungsten carbide electrode is attached to the positive pole in a d.c. circuit with electric current and voltage regulation to which condensers of varying capacities are connected. The vibrator (coating gun) causes oscillations in the electrode and this is brought into contact with the workpiece to be treated. The workpiece is connected to the negative pole. By contact of the electrode with the workpiece, an ionised field results, which ensures that oxide-free fusion of the tungsten carbide with the base material occurs. This field is constantly re-constituted with the aid of the vibrator. With uniform to-and-fro movement of the electrode a compact hard metal layer results. The predetermined layer thickness cannot be exceeded, since no more uptake of material occurs once saturation is reached. The selected layer thickness is so precise that it does not normally need any finishing operation. It can nevertheless be lapped and polished if necessary. Coating using the tucadur® 2020 is so easy that anyone can do it.



### Micro-section magnified 250 times

uncoated

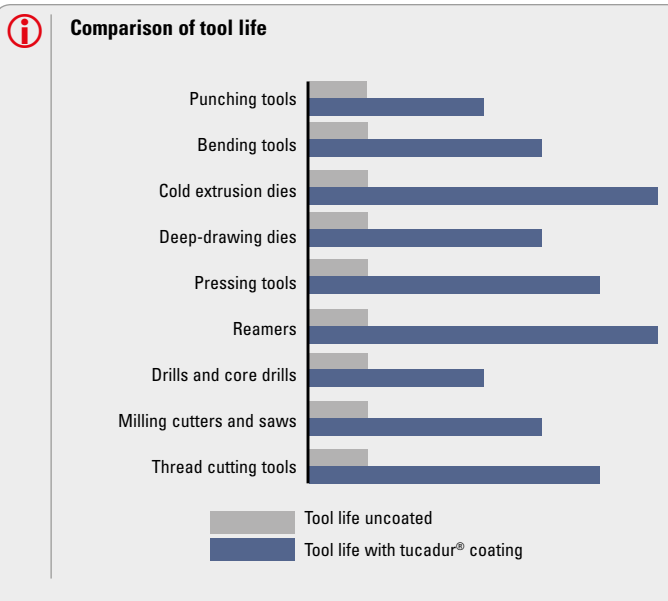
coated




Tungsten carbide layer up to 82 HR 30N hardness

Steel layer rehardened


Base material (steel) unaltered






# Tungsten carbide coating unit tucadur® 2020


		Order No.	Price from
			1 piece
<b>Tungsten carbide coating unit tucadur® 2020</b>			
	Control unit	<b>0 700 000</b>	5235.00 €
	Max. hardness of coating: 82 HR 30N Layer thickness adjustable: from 2-40 micron Vibration level: adjustable Power supply: 230 V, 50 Hz Dimensions (W x T x H): 210 x 320 x 220 mm Weight: 11 kg		
	Coating gun		
	Vibration frequency: 100 Hz		
	Illumination: built-in		
Scope of supply: Control unit, coating gun, mains cable, foot switch, contact magnet, 1 set (24 pieces) of tungsten carbide electrodes, hexagon head screwdriver			

## Accessories / spare parts

		Order No.	Price from
			1 piece
<b>Coating gun</b>			
		<b>0 700 213</b>	556.00 €

Shape	Dimensions	Order No.	Price from	
			1 piece	10 pieces
<b>Tungsten carbide electrodes, for tucadur® 2020</b>				
 square	1.1 x 50 mm	<b>0 700 039</b>	8.65 €	6.70 €
	1.6 x 50 mm	<b>0 700 040</b>	10.15 €	7.60 €
	2.1 x 50 mm	<b>0 700 041</b>	12.75 €	9.85 €
 triangular	1.95 x 50 mm	<b>0 700 042-0</b>	10.50 €	7.80 €
 round	Ø 1.0 x 50 mm	<b>0 700 036</b>	9.95 €	7.60 €
	Ø 1.3 x 50 mm	<b>0 700 046</b>	8.35 €	6.50 €
	Ø 1.8 x 50 mm	<b>0 700 047</b>	9.25 €	7.20 €
	Ø 2.3 x 50 mm	<b>0 700 048</b>	10.50 €	7.90 €

## matching set

		Order No.	Price from
			1 set 10 set
<b>Set of tungsten carbide electrodes (24 pieces)</b>			
	3 tungsten carbide electrodes respectively in each shape and size	<b>0 700 034</b>	204.00 € 157.00 €





The image shows a variety of welding filler rods. In the foreground, there is a large, dense bundle of copper-colored rods. Behind it, several individual rods are displayed, including a prominent copper rod, a silver rod, and a grey rod. The rods are arranged in a way that shows their different colors and textures. A white banner with a blue square on the left side is overlaid on the image, containing the text 'Welding filler'.

# Welding filler

# Welding filler joke Fill

## Overview

### Welding filler joke Fill

- Alloys adapted specifically for repairs and modifications in tool making and mould building
- Likewise matching alloys are available for serial production
- TIG rods in a handy length of 500 mm
- Economical and durable packaging in as little as 50 g upwards
- Effective and fair prices without any concealed surcharges
- Laser wires as straightened rods now also in a length of 500 mm for fewer remnants
- Even more economical than endless wire on large reels in quantities of 50 g and more
- Special grades or other quantities and diameter on request!
- Our wires are constantly being optimised in cooperation with well-known raw material suppliers and users

Suitable for	Application hardness	joke Fill	For materials
Steel	soft	W - 05	1.2311 • 1.2312 • 1.2738 • 1.2162 and similar
Steel	soft	W - 10	1.2311 • 1.2312 • 1.2738 • 1.2162 and similar
Steel	soft	W - 22	1.2343 • 1.2344 • 1.2082 • 1.2083 • 1.2367 • 1.2606 and similar
Steel	soft	W - 25	1.2713 • 1.2714 • 1.2740 • 1.2744 • 1.2764 • 1.2767 and similar
Steel	soft	W - 60	Nickel, nickel-based alloys, GG (grey cast iron), GGG (spheroidal graphite cast iron), GGL (lamellar graphite cast iron)
Steel	medium	M - 30	1.2343 • 1.2344 • 1.2764 • 1.2767 and similar
Steel	medium	M - 33	1.2343 • 1.2344 • 1.2764 • 1.2767 and similar
Steel	medium	M - 40	1.2343 • 1.2344 • 1.2360 • 1.2362 and similar
Steel	medium	M - 45	1.2343 • 1.2344 • 1.2362 • 1.2363 • 1.2367 and similar
Steel	medium	M - 50	1.2082 • 1.2083 • 1.2316 • 1.4115 • 1.4120 and similar
Steel	medium	M - 55	1.2343 • 1.2344 and all other hot-work steels
Steel	hard	H - 40	1.2343 • 1.2344 and all other hot-work steels
Steel	hard	H - 50	1.2842 • 1.2762 • 1.2743 • 1.2721 • 1.2710 and similar
Steel	hard	H - 55	1.2343 • 1.2344 • 1.2311 • 1.2312 • 1.2738 • 1.2767 and similar
Steel	hard	H - 60	1.2358 • 1.2363 • CARMO • CALMAX and similar
Steel	hard	H - 65	1.2379 • 1.2436 • 1.2080 • 1.2601 • and similar cold-work steels
Steel	hard	H - 80	1.2379 • 1.2436 • 1.2080 • 1.2601 • and similar cold-work steels
Steel	hard	H - 90	1.3243 • 1.3333 • 1.3340 • 1.3344 • 1.3348 and similar HSS and PM steels
Corrosion resistant		K - 16	1.4301 • 1.4401 • 1.4541 • 1.4571 and similar V2A - V4A - alloys
Corrosion resistant		K - 33	Joins and intermediate layers on almost all tool steels
Corrosion resistant		K - 35	1.2083 • 1.2085 • 1.2316 • 1.4034 • Mirrax, Corrax, Ramax and similar steels
Corrosion resistant		K - 40	universally for case-hardened, quenched and tempered and hot-work steels, nitrated steels
Corrosion resistant		K - 77	for cracks and primers on all steel types, including mixed joins
Aluminium		A - 50	very universally for the majority of aluminium alloys up to F30
Aluminium		A - 70	for high strength aluminium alloys from F28 onwards, hardened
Multi-alloy bronzes		G - 10	AMPCO® in addition to other aluminium and manganese multi-alloy bronzes, all steels
Copper		R - 80	copper alloys, bronze, steel
Copper		R - 90	copper, copper materials, AMPCOLOY®
Titanium		S - 90	titanium and titanium alloys

# Welding filler joke Fill

## Overview




Characteristics	joke Fill	Page
soft, very easily etchable	W - 05	60
similar in colour	W - 10	61
similar in colour, readily workable	W - 22	62
similar in colour, readily workable	W - 25	63
very soft, corrosion-resistant, non-hardening	W - 60	64
very crack-resistant, tough and easily polishable	M - 30	65
good wear resistance, tough and easily polishable	M - 33	66
similar in colour and structurally synchronous	M - 40	67
high wear resistance, similar in structure and colour	M - 45	68
corrosion-resistant and wear-resistant	M - 50	69
readily workable, improvement material	M - 55	70
good wear resistance, nitratable and crack-resistant	H - 40	71
flame hardenable, high wear resistance	H - 50	71
wear-resistant, hard	H - 55	72
hard, heat-resistant	H - 60	73
wear-resistant, hard	H - 65	74
wear-resistant, hard	H - 80	75
hard, heat-resistant, wear-resistant	H - 90	76
tough, corrosion-resistant and acid-resistant	K - 16	77
high strength, tough, corrosion-resistant	K - 33	78
corrosion and seawater-resistant, wear-resistant	K - 35	79
very tough, corrosion-resistant, improvement material	K - 40	80
soft and tough, heat-resistant, resistant to temperature change, rustproof	K - 77	81
very crack-resistant, anodisable to a limited extent	A - 50	82
high strength and crack resistance, polishable	A - 70	83
high thermal conductivity, good sliding characteristic	G - 10	84
high thermal conductivity and wear resistance	R - 80	85
very high thermal conductivity	R - 90	86
	S - 90	86

# Welding filler

## joke Fill W-05

Low-alloy welding wire for rapid repair of plastic injection moulds. Optimised characteristics for subsequent processing. Suitable for identical-structure etching and erosion; very easy to polish and coat. The hardness is a very favourable max. 36 HRC for easy manual reworking.

Materials: 1.2311, 1.2312, 1.2738 in addition to similar non-alloy or low-alloy steels

				Price from
Design	Weight	Dimensions	Order No.	1 pack
<b>joke Fill W-05</b>				
 Rods	50 g	Ø 0.2 x 500 mm	<b>4 152 402</b>	66.05 €
	50 g	Ø 0.3 x 500 mm	<b>4 152 403</b>	61.85 €
	50 g	Ø 0.4 x 500 mm	<b>4 152 404</b>	56.70 €
	50 g	Ø 0.5 x 500 mm	<b>4 152 405</b>	52.40 €
	50 g	Ø 0.6 x 500 mm	<b>4 152 406</b>	50.35 €
	250 g	Ø 0.2 x 500 mm	<b>4 132 402</b>	262.00 €
	250 g	Ø 0.3 x 500 mm	<b>4 132 403</b>	249.00 €
	250 g	Ø 0.4 x 500 mm	<b>4 132 404</b>	225.00 €
	250 g	Ø 0.5 x 500 mm	<b>4 132 405</b>	211.00 €
	250 g	Ø 0.6 x 500 mm	<b>4 132 406</b>	202.00 €
	1000 g	Ø 0.2 x 500 mm	<b>4 112 402</b>	774.00 €
	1000 g	Ø 0.3 x 500 mm	<b>4 112 403</b>	732.00 €
	1000 g	Ø 0.4 x 500 mm	<b>4 112 404</b>	666.00 €
	1000 g	Ø 0.5 x 500 mm	<b>4 112 405</b>	617.00 €
	1000 g	Ø 0.6 x 500 mm	<b>4 112 406</b>	595.00 €
	1000 g	Ø 0.8 x 500 mm	<b>4 312 408</b>	43.90 €
	1000 g	Ø 1.0 x 500 mm	<b>4 312 410</b>	42.25 €
	1000 g	Ø 1.2 x 500 mm	<b>4 312 412</b>	40.80 €
	1000 g	Ø 1.6 x 500 mm	<b>4 312 416</b>	39.30 €

ⓘ All welding fillers as rods and reels also available in grammages other than 100 and 500 g.

### The perfect complement

#### Welding filler holder

for weld filler metals from Ø 0.2 to 1.0 mm



Order No.	Price
<b>4 806 000</b>	8.85 €

### The perfect complement

#### Welding rod feeding pen

for weld filler metals from Ø 0.2 to 0.6 mm





Order No.	Price
<b>4 806 100</b>	103.75 €

# Welding filler joke Fill W-10

Cr-Mn alloy for synchronous- structure application and joining of injection and blow moulds made of low-alloy and medium-alloy Cr steels for plastics and rubber. Very good processing and optimum similarity of colour. Thermal and mechanical treatments are identical to the base material. Polishable, erodible, nitratable, etchable, chrome-platable, can be quenched and tempered.  
Hardness approx. 360 – 400 HB

Materials: 1.2311, 1.2312, 1.2162, 1.2738 and similar

Design	Weight	Dimensions	Order No.	Price from	
				1 pack	1 piece
<b>joke Fill W-10</b>					
 Rods	50 g	Ø 0.2 x 500 mm	<b>4 152 502</b>	91.15 €	
	50 g	Ø 0.3 x 500 mm	<b>4 152 503</b>	89.10 €	
	50 g	Ø 0.4 x 500 mm	<b>4 152 504</b>	83.85 €	
	50 g	Ø 0.5 x 500 mm	<b>4 152 505</b>	77.60 €	
	50 g	Ø 0.6 x 500 mm	<b>4 152 506</b>	71.25 €	
	250 g	Ø 0.2 x 500 mm	<b>4 132 502</b>	368.00 €	
	250 g	Ø 0.3 x 500 mm	<b>4 132 503</b>	357.00 €	
	250 g	Ø 0.4 x 500 mm	<b>4 132 504</b>	333.00 €	
	250 g	Ø 0.5 x 500 mm	<b>4 132 505</b>	309.00 €	
	250 g	Ø 0.6 x 500 mm	<b>4 132 506</b>	287.00 €	
	1000 g	Ø 0.2 x 500 mm	<b>4 112 502</b>	1092.00 €	
	1000 g	Ø 0.3 x 500 mm	<b>4 112 503</b>	1057.00 €	
	1000 g	Ø 0.4 x 500 mm	<b>4 112 504</b>	984.00 €	
	1000 g	Ø 0.5 x 500 mm	<b>4 112 505</b>	913.00 €	
	1000 g	Ø 0.6 x 500 mm	<b>4 112 506</b>	846.00 €	
	1000 g	Ø 0.8 x 500 mm	<b>4 312 508</b>	48.70 €	
	1000 g	Ø 1.0 x 500 mm	<b>4 312 510</b>	46.95 €	
	1000 g	Ø 1.2 x 500 mm	<b>4 312 512</b>	45.35 €	
	1000 g	Ø 1.6 x 500 mm	<b>4 312 516</b>	43.60 €	
	1000 g	Ø 2.4 x 500 mm	<b>4 312 524</b>	40.30 €	
 Spools	50 g	Ø 0.2 mm	<b>4 252 502</b>		89.10 €
	50 g	Ø 0.3 mm	<b>4 252 503</b>		86.00 €
	50 g	Ø 0.4 mm	<b>4 252 504</b>		78.65 €
	50 g	Ø 0.5 mm	<b>4 252 505</b>		74.45 €
	50 g	Ø 0.6 mm	<b>4 252 506</b>		68.20 €
	250 g	Ø 0.2 mm	<b>4 232 502</b>		349.00 €
	250 g	Ø 0.3 mm	<b>4 232 503</b>		339.00 €
	250 g	Ø 0.4 mm	<b>4 232 504</b>		314.00 €
	250 g	Ø 0.5 mm	<b>4 232 505</b>		292.00 €
	250 g	Ø 0.6 mm	<b>4 232 506</b>		271.00 €
	1000 g	Ø 0.2 mm	<b>4 212 502</b>		1013.00 €
	1000 g	Ø 0.3 mm	<b>4 212 503</b>		979.00 €
	1000 g	Ø 0.4 mm	<b>4 212 504</b>		913.00 €
	1000 g	Ø 0.5 mm	<b>4 212 505</b>		845.00 €
	1000 g	Ø 0.6 mm	<b>4 212 506</b>		786.00 €

ⓘ All welding fillers as rods and reels also available in grammages other than 100 and 500 g.

### The perfect complement

**Welding filler holder**  
for weld filler metals from Ø 0.2 to 1.0 mm



Order No.	Price
<b>4 806 000</b>	8.85 €

### The perfect complement

**Welding rod feeding pen**  
for weld filler metals from Ø 0.2 to 0.6 mm





Order No.	Price
<b>4 806 100</b>	103.75 €

## Welding filler joke Fill W-22

Cr-Mo-Mn alloy for repairs of injection and blow moulds made of low-alloy and medium-alloy Cr steels in addition to pressing tools for plastics. Good corrosion resistance owing to increased Cr content and reduced carbon. Tough, heat-resistant and readily workable. Very easily weldable using the TIG and LASER methods. Polishable, erodible, nitratable, etchable, chrome-platable, can be quenched and tempered. Hardness between 38 HRC and max. 56 HRC possible depending on the dilution.

Materials: 1.2343, 1.2344, 1.2082, 1.2083, 1.2367 and similar Cr alloy steels.



Design	Weight	Dimensions	Order No.	Price from	
				1 pack	1 piece
<b>joke Fill W-22</b>					
 Rods	50 g	Ø 0.2 x 500 mm	<b>4 152 602</b>	128.95 €	
	50 g	Ø 0.3 x 500 mm	<b>4 152 603</b>	125.80 €	
	50 g	Ø 0.4 x 500 mm	<b>4 152 604</b>	107.95 €	
	50 g	Ø 0.5 x 500 mm	<b>4 152 605</b>	101.70 €	
	50 g	Ø 0.6 x 500 mm	<b>4 152 606</b>	96.50 €	
	250 g	Ø 0.2 x 500 mm	<b>4 132 602</b>	512.00 €	
	250 g	Ø 0.3 x 500 mm	<b>4 132 603</b>	501.00 €	
	250 g	Ø 0.4 x 500 mm	<b>4 132 604</b>	429.00 €	
	250 g	Ø 0.5 x 500 mm	<b>4 132 605</b>	405.00 €	
	250 g	Ø 0.6 x 500 mm	<b>4 132 606</b>	383.00 €	
	1000 g	Ø 0.2 x 500 mm	<b>4 112 602</b>	1519.00 €	
	1000 g	Ø 0.3 x 500 mm	<b>4 112 603</b>	1485.00 €	
	1000 g	Ø 0.4 x 500 mm	<b>4 112 604</b>	1274.00 €	
	1000 g	Ø 0.5 x 500 mm	<b>4 112 605</b>	1202.00 €	
	1000 g	Ø 0.6 x 500 mm	<b>4 112 606</b>	1129.00 €	
	1000 g	Ø 0.8 x 500 mm	<b>4 312 608</b>	83.15 €	
	1000 g	Ø 1.0 x 500 mm	<b>4 312 610</b>	77.60 €	
	1000 g	Ø 1.2 x 500 mm	<b>4 312 612</b>	71.35 €	
1000 g	Ø 1.6 x 500 mm	<b>4 312 616</b>	67.15 €		
 Spools	50 g	Ø 0.2 mm	<b>4 252 602</b>		123.65 €
	50 g	Ø 0.3 mm	<b>4 252 603</b>		120.55 €
	50 g	Ø 0.4 mm	<b>4 252 604</b>		102.75 €
	50 g	Ø 0.5 mm	<b>4 252 605</b>		97.50 €
	50 g	Ø 0.6 mm	<b>4 252 606</b>		91.25 €
	250 g	Ø 0.2 mm	<b>4 232 602</b>		486.00 €
	250 g	Ø 0.3 mm	<b>4 232 603</b>		473.00 €
	250 g	Ø 0.4 mm	<b>4 232 604</b>		406.00 €
	250 g	Ø 0.5 mm	<b>4 232 605</b>		384.00 €
	250 g	Ø 0.6 mm	<b>4 232 606</b>		360.00 €
	1000 g	Ø 0.2 mm	<b>4 212 602</b>		1410.00 €
	1000 g	Ø 0.3 mm	<b>4 212 603</b>		1375.00 €
	1000 g	Ø 0.4 mm	<b>4 212 604</b>		1180.00 €
	1000 g	Ø 0.5 mm	<b>4 212 605</b>		1114.00 €
	1000 g	Ø 0.6 mm	<b>4 212 606</b>		1047.00 €

ⓘ All welding fillers as rods and reels also available in grammages other than 100 and 500 g.

# Welding filler joke Fill W-25

Ni-Mn alloys with additions of Cr and Mo for similar-structure applications and joining of low-alloy steels in plastic mould building. Also readily workable in the transitions in case of cavity repairs. Coordinated in colour with the alloys containing approx. 2 – 5 % nickel. Very tough and resistant to temperature change. Polishable, erodible, nitratable, etchable, chrome-platable, can be quenched and tempered. Hardness approx. 360 – 420 HB depending on the dilution.

Materials: 1.2764, 1.2767, 1.2713, 1.2714 and similar alloys.


Design	Weight	Dimensions	Order No.	Price from	
				1 pack	1 piece
<b>joke Fill W-25</b>					
 Rods	50 g	Ø 0.2 x 500 mm	<b>4 152 702</b>	92.30 €	
	50 g	Ø 0.3 x 500 mm	<b>4 152 703</b>	89.10 €	
	50 g	Ø 0.4 x 500 mm	<b>4 152 704</b>	83.85 €	
	50 g	Ø 0.5 x 500 mm	<b>4 152 705</b>	77.60 €	
	50 g	Ø 0.6 x 500 mm	<b>4 152 706</b>	71.25 €	
	250 g	Ø 0.2 x 500 mm	<b>4 132 702</b>	368.00 €	
	250 g	Ø 0.3 x 500 mm	<b>4 132 703</b>	357.00 €	
	250 g	Ø 0.4 x 500 mm	<b>4 132 704</b>	333.00 €	
	250 g	Ø 0.5 x 500 mm	<b>4 132 705</b>	309.00 €	
	250 g	Ø 0.6 x 500 mm	<b>4 132 706</b>	287.00 €	
	1000 g	Ø 0.2 x 500 mm	<b>4 112 702</b>	1092.00 €	
	1000 g	Ø 0.3 x 500 mm	<b>4 112 703</b>	1057.00 €	
	1000 g	Ø 0.4 x 500 mm	<b>4 112 704</b>	984.00 €	
	1000 g	Ø 0.5 x 500 mm	<b>4 112 705</b>	913.00 €	
	1000 g	Ø 0.6 x 500 mm	<b>4 112 706</b>	846.00 €	
	1000 g	Ø 0.8 x 500 mm	<b>4 312 708</b>	50.55 €	
	1000 g	Ø 1.0 x 500 mm	<b>4 312 710</b>	48.30 €	
	1000 g	Ø 1.2 x 500 mm	<b>4 312 712</b>	45.85 €	
	1000 g	Ø 1.6 x 500 mm	<b>4 312 716</b>	41.45 €	
 Spools	50 g	Ø 0.2 mm	<b>4 252 702</b>		89.10 €
	50 g	Ø 0.3 mm	<b>4 252 703</b>		86.00 €
	50 g	Ø 0.4 mm	<b>4 252 704</b>		79.65 €
	50 g	Ø 0.5 mm	<b>4 252 705</b>		74.45 €
	50 g	Ø 0.6 mm	<b>4 252 706</b>		69.20 €
	250 g	Ø 0.2 mm	<b>4 232 702</b>		349.00 €
	250 g	Ø 0.3 mm	<b>4 232 703</b>		338.00 €
	250 g	Ø 0.4 mm	<b>4 232 704</b>		314.00 €
	250 g	Ø 0.5 mm	<b>4 232 705</b>		292.00 €
	250 g	Ø 0.6 mm	<b>4 232 706</b>		271.00 €
	1000 g	Ø 0.2 mm	<b>4 212 702</b>		1013.00 €
	1000 g	Ø 0.3 mm	<b>4 212 703</b>		980.00 €
	1000 g	Ø 0.4 mm	<b>4 212 704</b>		913.00 €
	1000 g	Ø 0.5 mm	<b>4 212 705</b>		845.00 €
	1000 g	Ø 0.6 mm	<b>4 212 706</b>		787.00 €

① All welding fillers as rods and reels also available in grammages other than 100 and 500 g.

# Welding filler joke Fill W-60

Nickel wire with special additives for synchronous-structure application and joining of moulds, tools and apparatus made of pure or low-alloy nickel. Colour and thermal conductivity in addition to corrosion resistance are adapted to the commonly available nickel alloys. Also suitable for very elastic and soft application, joining and buffering on crackprone GG (grey cast iron), GGG (spheroidal graphite cast iron), GGL (lamellar graphite cast iron) and similar types.

Materials: nickel, nickel-based alloys, grey cast iron

	Design	Weight	Dimensions	Order No.	Price from 1 pack
<b>joke Fill W-60</b>					
	Rods	50 g	Ø 0.2 x 500 mm	<b>4 152 802</b>	151.00 €
		50 g	Ø 0.3 x 500 mm	<b>4 152 803</b>	148.85 €
		50 g	Ø 0.4 x 500 mm	<b>4 152 804</b>	141.50 €
		50 g	Ø 0.5 x 500 mm	<b>4 152 805</b>	135.20 €
		50 g	Ø 0.6 x 500 mm	<b>4 152 806</b>	127.85 €
		250 g	Ø 0.2 x 500 mm	<b>4 132 802</b>	602.00 €
		250 g	Ø 0.3 x 500 mm	<b>4 132 803</b>	594.00 €
		250 g	Ø 0.4 x 500 mm	<b>4 132 804</b>	565.00 €
		250 g	Ø 0.5 x 500 mm	<b>4 132 805</b>	541.00 €
		250 g	Ø 0.6 x 500 mm	<b>4 132 806</b>	511.00 €
		1000 g	Ø 0.2 x 500 mm	<b>4 112 802</b>	1786.00 €
		1000 g	Ø 0.3 x 500 mm	<b>4 112 803</b>	1757.00 €
		1000 g	Ø 0.4 x 500 mm	<b>4 112 804</b>	1679.00 €
		1000 g	Ø 0.5 x 500 mm	<b>4 112 805</b>	1599.00 €
		1000 g	Ø 0.6 x 500 mm	<b>4 112 806</b>	1511.00 €
		1000 g	Ø 1.0 x 500 mm	<b>4 312 810</b>	106.85 €
		1000 g	Ø 1.2 x 500 mm	<b>4 312 812</b>	105.50 €
		1000 g	Ø 1.6 x 500 mm	<b>4 312 816</b>	103.85 €

ⓘ All welding fillers as rods and reels also available in grammages other than 100 and 500 g.

### The perfect complement

**Welding filler holder**  
for weld filler metals from Ø 0.2 to 1.0 mm



Order No.	Price
<b>4 806 000</b>	8.85 €

### The perfect complement

**Welding rod feeding pen**  
for weld filler metals from Ø 0.2 to 0.6 mm



Order No.	Price
<b>4 806 100</b>	103.75 €





# Welding filler joke Fill M-30

High-alloy Cr-Mo-Mn filler with very good properties. Extremely tough and highly abrasion-resistant. Suitable for moderately hard repair of plastic moulds, pressing and embossing tools, in addition to die-casting moulds; also for elastic high-strength intermediate layers in case of a harder top layer.

Hardness of between 36 HRC and 44 HRC achievable depending on the dilution.

Materials: hot-work steels such as 1.2343, 1.2344, 1.2367 and similar.

Design	Weight	Dimensions	Order No.	Price from	
				1 pack	1 piece
<b>joke Fill M-30</b>					
 Rods	50 g	Ø 0.2 x 500 mm	<b>4 151 602</b>	112.15 €	
	50 g	Ø 0.3 x 500 mm	<b>4 151 603</b>	105.90 €	
	50 g	Ø 0.4 x 500 mm	<b>4 151 604</b>	99.55 €	
	50 g	Ø 0.5 x 500 mm	<b>4 151 605</b>	92.30 €	
	50 g	Ø 0.6 x 500 mm	<b>4 151 606</b>	84.90 €	
	250 g	Ø 0.2 x 500 mm	<b>4 131 602</b>	446.00 €	
	250 g	Ø 0.3 x 500 mm	<b>4 131 603</b>	423.00 €	
	250 g	Ø 0.4 x 500 mm	<b>4 131 604</b>	399.00 €	
	250 g	Ø 0.5 x 500 mm	<b>4 131 605</b>	366.00 €	
	250 g	Ø 0.6 x 500 mm	<b>4 131 606</b>	338.00 €	
	1000 g	Ø 0.2 x 500 mm	<b>4 111 602</b>	1324.00 €	
	1000 g	Ø 0.3 x 500 mm	<b>4 111 603</b>	1253.00 €	
	1000 g	Ø 0.4 x 500 mm	<b>4 111 604</b>	1180.00 €	
	1000 g	Ø 0.5 x 500 mm	<b>4 111 605</b>	1086.00 €	
	1000 g	Ø 0.6 x 500 mm	<b>4 111 606</b>	999.00 €	
 Spools	50 g	Ø 0.2 mm	<b>4 251 602</b>	106.95 €	
	50 g	Ø 0.3 mm	<b>4 251 603</b>	101.70 €	
	50 g	Ø 0.4 mm	<b>4 251 604</b>	95.45 €	
	50 g	Ø 0.5 mm	<b>4 251 605</b>	89.10 €	
	50 g	Ø 0.6 mm	<b>4 251 606</b>	81.80 €	
	250 g	Ø 0.2 mm	<b>4 231 602</b>	422.00 €	
	250 g	Ø 0.3 mm	<b>4 231 603</b>	400.00 €	
	250 g	Ø 0.4 mm	<b>4 231 604</b>	377.00 €	
	250 g	Ø 0.5 mm	<b>4 231 605</b>	347.00 €	
	250 g	Ø 0.6 mm	<b>4 231 606</b>	319.00 €	
	1000 g	Ø 0.2 mm	<b>4 211 602</b>	1199.00 €	
	1000 g	Ø 0.3 mm	<b>4 211 603</b>	1161.00 €	
	1000 g	Ø 0.4 mm	<b>4 211 604</b>	1093.00 €	
	1000 g	Ø 0.5 mm	<b>4 211 605</b>	1007.00 €	
	1000 g	Ø 0.6 mm	<b>4 211 606</b>	926.00 €	

ⓘ All welding fillers as rods and reels also available in grammages other than 100 and 500 g.

### The perfect complement

**Welding filler holder**  
for weld filler metals from Ø 0.2 to 1.0 mm



Order No.	Price
<b>4 806 000</b>	8.85 €

### The perfect complement

**Welding rod feeding pen**  
for weld filler metals from Ø 0.2 to 0.6 mm





Order No.	Price
<b>4 806 100</b>	103.75 €

## Welding filler joke Fill M-33

Cr-Mo-Mn wire with special additives for the harder and highly wear-resistant repair of hot and cold-work steel, particularly in case of heavily stressed aluminium die-cast moulds and for plastic moulds. Very easy to polish and corrosion-resistant.

Moderate hardness of 40 – 48 HRC achievable with optimum toughness.

Materials: 1.2343, 1.2344, 1.2367 and also for tough application to 12 %-Cr steel.

Design	Weight	Dimensions	Order No.	Price from	
				1 pack	1 piece
<b>joke Fill M-33</b>					
 Rods	50 g	Ø 0.2 x 500 mm	<b>4 151 702</b>	126.80 €	
	50 g	Ø 0.3 x 500 mm	<b>4 151 703</b>	120.55 €	
	50 g	Ø 0.4 x 500 mm	<b>4 151 704</b>	109.00 €	
	50 g	Ø 0.5 x 500 mm	<b>4 151 705</b>	100.70 €	
	50 g	Ø 0.6 x 500 mm	<b>4 151 706</b>	97.50 €	
	250 g	Ø 0.2 x 500 mm	<b>4 131 702</b>	503.00 €	
	250 g	Ø 0.3 x 500 mm	<b>4 131 703</b>	481.00 €	
	250 g	Ø 0.4 x 500 mm	<b>4 131 704</b>	436.00 €	
	250 g	Ø 0.5 x 500 mm	<b>4 131 705</b>	401.00 €	
	250 g	Ø 0.6 x 500 mm	<b>4 131 706</b>	389.00 €	
	1000 g	Ø 0.2 x 500 mm	<b>4 111 702</b>	1490.00 €	
	1000 g	Ø 0.3 x 500 mm	<b>4 111 703</b>	1425.00 €	
	1000 g	Ø 0.4 x 500 mm	<b>4 111 704</b>	1289.00 €	
	1000 g	Ø 0.5 x 500 mm	<b>4 111 705</b>	1188.00 €	
	1000 g	Ø 0.6 x 500 mm	<b>4 111 706</b>	1152.00 €	
	 Spools	50 g	Ø 0.2 mm	<b>4 251 702</b>	
50 g		Ø 0.3 mm	<b>4 251 703</b>		115.35 €
50 g		Ø 0.4 mm	<b>4 251 704</b>		104.25 €
50 g		Ø 0.5 mm	<b>4 251 705</b>		96.50 €
50 g		Ø 0.6 mm	<b>4 251 706</b>		93.30 €
250 g		Ø 0.2 mm	<b>4 231 702</b>		493.00 €
250 g		Ø 0.3 mm	<b>4 231 703</b>		455.00 €
250 g		Ø 0.4 mm	<b>4 231 704</b>		412.00 €
250 g		Ø 0.5 mm	<b>4 231 705</b>		379.00 €
250 g		Ø 0.6 mm	<b>4 231 706</b>		367.00 €
1000 g		Ø 0.2 mm	<b>4 211 702</b>		1355.00 €
1000 g		Ø 0.3 mm	<b>4 211 703</b>		1275.00 €
1000 g		Ø 0.4 mm	<b>4 211 704</b>		1195.00 €
1000 g		Ø 0.5 mm	<b>4 211 705</b>		1101.00 €
1000 g		Ø 0.6 mm	<b>4 211 706</b>		1068.00 €

ⓘ All welding fillers as rods and reels also available in grammages other than 100 and 500 g.

### The perfect complement

**Welding filler holder**  
for weld filler metals from Ø 0.2 to 1.0 mm



Order No.	Price
<b>4 806 000</b>	8.85 €

### The perfect complement

**Welding rod feeding pen**  
for weld filler metals from Ø 0.2 to 0.6 mm





Order No.	Price
<b>4 806 100</b>	103.75 €

# Welding filler joke Fill M-40

Filler for hot-work steels. Hardenable and annealable similarly to the base material. Structurally synchronous or similar to many hot-work steels. Equalises tension in the martensitic range. Chrome-platable, nitratable, etchable and can be quenched and tempered. Hardness of the weld metal approx. 34 to 44 HRC, depending on the blend, in relation to the base materials. Hardenable up to 58 HRC.

Predominately for hot-work steels such as 1.2343 – 1.2344 and similar.



	Design	Weight	Dimensions	Order No.	Price from	
					1 pack	1 piece
<b>joke Fill M-40</b>						
	Rods	50 g	Ø 0.2 x 500 mm	<b>4 151 802</b>	119.55 €	
		50 g	Ø 0.3 x 500 mm	<b>4 151 803</b>	113.20 €	
		50 g	Ø 0.4 x 500 mm	<b>4 151 804</b>	101.70 €	
		50 g	Ø 0.5 x 500 mm	<b>4 151 805</b>	95.45 €	
		50 g	Ø 0.6 x 500 mm	<b>4 151 806</b>	89.10 €	
		25 g	Ø 0.2 x 500 mm	<b>4 131 802</b>	475.00 €	
		25 g	Ø 0.3 x 500 mm	<b>4 131 803</b>	451.00 €	
		25 g	Ø 0.4 x 500 mm	<b>4 131 804</b>	405.00 €	
		25 g	Ø 0.5 x 500 mm	<b>4 131 805</b>	381.00 €	
		25 g	Ø 0.6 x 500 mm	<b>4 131 806</b>	356.00 €	
		1000 g	Ø 0.2 x 500 mm	<b>4 111 802</b>	1411.00 €	
		1000 g	Ø 0.3 x 500 mm	<b>4 111 803</b>	1339.00 €	
		1000 g	Ø 0.4 x 500 mm	<b>4 111 804</b>	1202.00 €	
		1000 g	Ø 0.5 x 500 mm	<b>4 111 805</b>	1129.00 €	
		1000 g	Ø 0.6 x 500 mm	<b>4 111 806</b>	1057.00 €	
		1000 g	Ø 0.8 x 500 mm	<b>4 311 808</b>	76.10 €	
		1000 g	Ø 1.0 x 500 mm	<b>4 311 810</b>	72.80 €	
		1000 g	Ø 1.2 x 500 mm	<b>4 311 812</b>	68.50 €	
		1000 g	Ø 1.6 x 500 mm	<b>4 311 816</b>	65.95 €	
	Spools	50 g	Ø 0.2 mm	<b>4 251 802</b>		114.20 €
		50 g	Ø 0.3 mm	<b>4 251 803</b>		109.00 €
		50 g	Ø 0.4 mm	<b>4 251 804</b>		97.50 €
		50 g	Ø 0.5 mm	<b>4 251 805</b>		91.25 €
		50 g	Ø 0.6 mm	<b>4 251 806</b>		86.00 €
		250 g	Ø 0.2 mm	<b>4 231 802</b>		451.00 €
		250 g	Ø 0.3 mm	<b>4 231 803</b>		428.00 €
		250 g	Ø 0.4 mm	<b>4 231 804</b>		385.00 €
		250 g	Ø 0.5 mm	<b>4 231 805</b>		361.00 €
		250 g	Ø 0.6 mm	<b>4 231 806</b>		339.00 €
		1000 g	Ø 0.2 mm	<b>4 211 802</b>		1309.00 €
		1000 g	Ø 0.3 mm	<b>4 211 803</b>		1243.00 €
		1000 g	Ø 0.4 mm	<b>4 211 804</b>		1114.00 €
		1000 g	Ø 0.5 mm	<b>4 211 805</b>		1047.00 €
		1000 g	Ø 0.6 mm	<b>4 211 806</b>		980.00 €

ⓘ All welding fillers as rods and reels also available in grammages other than 100 and 500 g.

## Welding filler joke Fill M-45

Cr-Mo-V-W filler with stabilising elements. Dense structure. Aircuring and shock-curable. High edge strength and heat-resistant. Chrome-platable to a limited extent, yet polishable, erodible, nitratable, etchable and can be quenched and tempered. Good thermal conductivity. Particularly for rapid repairs to aluminium, magnesium and zinc die-cast moulds, punches and sliders. Hardness in the 1st layer up to 58 HRC depending on the dilution.

Materials: 1.2343 • 1.2344 • 1.2362 • 1.2363 • 1.2367 ans similar



Design	Weight	Dimensions	Order No.	Price from	
				1 pack	1 piece
<b>joke Fill M-45</b>					
 Rods	50 g	Ø 0.2 x 500 mm	<b>4 151 902</b>	118.40 €	
	50 g	Ø 0.3 x 500 mm	<b>4 151 903</b>	113.20 €	
	50 g	Ø 0.4 x 500 mm	<b>4 151 904</b>	101.70 €	
	50 g	Ø 0.5 x 500 mm	<b>4 151 905</b>	98.55 €	
	50 g	Ø 0.6 x 500 mm	<b>4 151 906</b>	95.45 €	
	250 g	Ø 0.2 x 500 mm	<b>4 131 902</b>	472.00 €	
	250 g	Ø 0.3 x 500 mm	<b>4 131 903</b>	453.00 €	
	250 g	Ø 0.4 x 500 mm	<b>4 131 904</b>	406.00 €	
	250 g	Ø 0.5 x 500 mm	<b>4 131 905</b>	394.00 €	
	250 g	Ø 0.6 x 500 mm	<b>4 131 906</b>	381.00 €	
	1000 g	Ø 0.2 x 500 mm	<b>4 111 902</b>	1397.00 €	
	1000 g	Ø 0.3 x 500 mm	<b>4 111 903</b>	1339.00 €	
	1000 g	Ø 0.4 x 500 mm	<b>4 111 904</b>	1202.00 €	
	1000 g	Ø 0.5 x 500 mm	<b>4 111 905</b>	1166.00 €	
	1000 g	Ø 0.6 x 500 mm	<b>4 111 906</b>	1129.00 €	
	1000 g	Ø 0.8 x 500 mm	<b>4 311 908</b>	93.50 €	
	1000 g	Ø 1.0 x 500 mm	<b>4 311 910</b>	90.20 €	
	1000 g	Ø 1.2 x 500 mm	<b>4 311 912</b>	82.55 €	
1000 g	Ø 1.6 x 500 mm	<b>4 311 916</b>	77.40 €		
 Spools	50 g	Ø 0.2 mm	<b>4 251 902</b>		113.20 €
	50 g	Ø 0.3 mm	<b>4 251 903</b>		109.00 €
	50 g	Ø 0.4 mm	<b>4 251 904</b>		97.50 €
	50 g	Ø 0.5 mm	<b>4 251 905</b>		94.30 €
	50 g	Ø 0.6 mm	<b>4 251 906</b>		91.25 €
	250 g	Ø 0.2 mm	<b>4 231 902</b>		446.00 €
	250 g	Ø 0.3 mm	<b>4 231 903</b>		428.00 €
	250 g	Ø 0.4 mm	<b>4 231 904</b>		385.00 €
	250 g	Ø 0.5 mm	<b>4 231 905</b>		372.00 €
	250 g	Ø 0.6 mm	<b>4 231 906</b>		360.00 €
	1000 g	Ø 0.2 mm	<b>4 211 902</b>		1295.00 €
	1000 g	Ø 0.3 mm	<b>4 211 903</b>		1243.00 €
	1000 g	Ø 0.4 mm	<b>4 211 904</b>		1114.00 €
	1000 g	Ø 0.5 mm	<b>4 211 905</b>		1080.00 €
	1000 g	Ø 0.6 mm	<b>4 211 906</b>		1047.00 €

ⓘ All welding fillers as rods and reels also available in grammages other than 100 and 500 g.

# Welding filler joke Fill M-50

This chrome material has stabilising additives and is very well suited for corrosion-resistant steels in mould building. Can be quenched and tempered and is likewise rust and wear-resistant owing to an increased Cr content. Polishable, erodible and nitratable. Etchable to a limited extent, non-chrome-platable. Particularly suited for moulds and tools when GRP is being processed. Hardness of the weld material: 45 – 50 HRC.

Materials: 1.2082, 1.2083, 1.2316, 1.4115, 1.4120, STAVAX and similar Cr steels.

Design	Weight	Dimensions	Order No.	Price from	
				1 pack	1 piece
<b>joke Fill M-50</b>					
 Rods	50 g	Ø 0.2 x 500 mm	<b>4 152 002</b>	134.20 €	
	50 g	Ø 0.3 x 500 mm	<b>4 152 003</b>	131.00 €	
	50 g	Ø 0.4 x 500 mm	<b>4 152 004</b>	125.80 €	
	50 g	Ø 0.5 x 500 mm	<b>4 152 005</b>	119.55 €	
	50 g	Ø 0.6 x 500 mm	<b>4 152 006</b>	113.20 €	
	250 g	Ø 0.2 x 500 mm	<b>4 132 002</b>	535.00 €	
	250 g	Ø 0.3 x 500 mm	<b>4 132 003</b>	524.00 €	
	250 g	Ø 0.4 x 500 mm	<b>4 132 004</b>	502.00 €	
	250 g	Ø 0.5 x 500 mm	<b>4 132 005</b>	478.00 €	
	250 g	Ø 0.6 x 500 mm	<b>4 132 006</b>	451.00 €	
	1000 g	Ø 0.2 x 500 mm	<b>4 112 002</b>	1584.00 €	
	1000 g	Ø 0.3 x 500 mm	<b>4 112 003</b>	1549.00 €	
	1000 g	Ø 0.4 x 500 mm	<b>4 112 004</b>	1485.00 €	
	1000 g	Ø 0.5 x 500 mm	<b>4 112 005</b>	1413.00 €	
	1000 g	Ø 0.6 x 500 mm	<b>4 112 006</b>	1339.00 €	
	1000 g	Ø 0.8 x 500 mm	<b>4 312 008</b>	202.00 €	
	1000 g	Ø 1.0 x 500 mm	<b>4 312 010</b>	173.00 €	
	1000 g	Ø 1.2 x 500 mm	<b>4 312 012</b>	103.55 €	
 Spools	50 g	Ø 0.2 mm	<b>4 252 002</b>		128.95 €
	50 g	Ø 0.3 mm	<b>4 252 003</b>		125.80 €
	50 g	Ø 0.4 mm	<b>4 252 004</b>		119.55 €
	50 g	Ø 0.5 mm	<b>4 252 005</b>		114.20 €
	50 g	Ø 0.6 mm	<b>4 252 006</b>		109.00 €
	250 g	Ø 0.2 mm	<b>4 232 002</b>		506.00 €
	250 g	Ø 0.3 mm	<b>4 232 003</b>		495.00 €
	250 g	Ø 0.4 mm	<b>4 232 004</b>		474.00 €
	250 g	Ø 0.5 mm	<b>4 232 005</b>		451.00 €
	250 g	Ø 0.6 mm	<b>4 232 006</b>		428.00 €
	1000 g	Ø 0.2 mm	<b>4 212 002</b>		1469.00 €
	1000 g	Ø 0.3 mm	<b>4 212 003</b>		1437.00 €
	1000 g	Ø 0.4 mm	<b>4 212 004</b>		1375.00 €
	1000 g	Ø 0.5 mm	<b>4 212 005</b>		1309.00 €
	1000 g	Ø 0.6 mm	<b>4 212 006</b>		1243.00 €

ⓘ All welding fillers as rods and reels also available in grammages other than 100 and 500 g.

### The perfect complement

#### Welding filler holder

for weld filler metals from Ø 0.2 to 1.0 mm



Order No.	Price
<b>4 806 000</b>	8.85 €

### The perfect complement

#### Welding rod feeding pen

for weld filler metals from Ø 0.2 to 0.6 mm





Order No.	Price
<b>4 806 100</b>	103.75 €

## Welding filler joke Fill M-55

Ni-Co-Mo special alloy specifically for the aluminium and zinc die-cast field. The martensitic weld material is extremely crack-resistant and tough with minimal preheating. Particularly suitable for highly stressed hot-working tools, highly resistant to temperature change and corrosion-proof. Hardness approx. 30 – 35 HRC; hardnesses of approx. 50 – 54 HRC are achieved through artificial aging in addition to pressure and hammering.


Materials: improving for all hot-work steels

	Design	Weight	Dimensions	Order No.	Price from	
					1 pack	1 piece
<b>joke Fill M-55</b>						
	Rods	50 g	Ø 0.2 x 500 mm	<b>4 152 102</b>	161.00 €	
		50 g	Ø 0.3 x 500 mm	<b>4 152 103</b>	156.00 €	
		50 g	Ø 0.4 x 500 mm	<b>4 152 104</b>	143.65 €	
		50 g	Ø 0.5 x 500 mm	<b>4 152 105</b>	137.25 €	
		50 g	Ø 0.6 x 500 mm	<b>4 152 106</b>	131.00 €	
		250 g	Ø 0.2 x 500 mm	<b>4 132 102</b>	637.00 €	
		250 g	Ø 0.3 x 500 mm	<b>4 132 103</b>	618.00 €	
		250 g	Ø 0.4 x 500 mm	<b>4 132 104</b>	570.00 €	
		250 g	Ø 0.5 x 500 mm	<b>4 132 105</b>	547.00 €	
		250 g	Ø 0.6 x 500 mm	<b>4 132 106</b>	523.00 €	
		1000 g	Ø 0.2 x 500 mm	<b>4 112 102</b>	1888.00 €	
		1000 g	Ø 0.3 x 500 mm	<b>4 112 103</b>	1832.00 €	
		1000 g	Ø 0.4 x 500 mm	<b>4 112 104</b>	1694.00 €	
		1000 g	Ø 0.5 x 500 mm	<b>4 112 105</b>	1621.00 €	
		1000 g	Ø 0.6 x 500 mm	<b>4 112 106</b>	1549.00 €	
		1000 g	Ø 1.0 x 500 mm	<b>4 312 110</b>	213.00 €	
		1000 g	Ø 1.2 x 500 mm	<b>4 312 112</b>	193.00 €	
		1000 g	Ø 1.6 x 500 mm	<b>4 312 116</b>	169.00 €	
		1000 g	Ø 2.4 x 500 mm	<b>4 312 124</b>	157.00 €	
	Spools	50 g	Ø 0.2 mm	<b>4 252 102</b>		153.00 €
		50 g	Ø 0.3 mm	<b>4 252 103</b>		147.85 €
		50 g	Ø 0.4 mm	<b>4 252 104</b>		137.25 €
		50 g	Ø 0.5 mm	<b>4 252 105</b>		131.00 €
		50 g	Ø 0.6 mm	<b>4 252 106</b>		125.80 €
		250 g	Ø 0.2 mm	<b>4 232 102</b>		602.00 €
		250 g	Ø 0.3 mm	<b>4 232 103</b>		585.00 €
		250 g	Ø 0.4 mm	<b>4 232 104</b>		541.00 €
		250 g	Ø 0.5 mm	<b>4 232 105</b>		517.00 €
		250 g	Ø 0.6 mm	<b>4 232 106</b>		495.00 €
		1000 g	Ø 0.2 mm	<b>4 212 102</b>		1750.00 €
		1000 g	Ø 0.3 mm	<b>4 212 103</b>		1697.00 €
		1000 g	Ø 0.4 mm	<b>4 212 104</b>		1571.00 €
		1000 g	Ø 0.5 mm	<b>4 212 105</b>		1503.00 €
		1000 g	Ø 0.6 mm	<b>4 212 106</b>		1437.00 €

ⓘ All welding fillers as rods and reels also available in grammages other than 100 and 500 g.

## Welding filler joke Fill H-40

Cr-Mo alloy for repair to hot-work steels with good thermal conductivity. The weld material is nitratable and highly crack-resistant and tough owing to a reduced carbon content. Achievable hardnesses 42 – 48 HRC depending on preheating.


				Price from	
Design	Weight	Dimensions	Order No.	1 pack	
<b>joke Fill H-40</b>					
 Rods	1000 g	Ø 0.8 x 500 mm	<b>4 310 508</b>	98.55 €	
	1000 g	Ø 1.0 x 500 mm	<b>4 310 510</b>	93.10 €	
	1000 g	Ø 1.2 x 500 mm	<b>4 310 512</b>	85.90 €	
	1000 g	Ø 1.6 x 500 mm	<b>4 310 516</b>	83.05 €	

ⓘ Alle Schweißzusätze in Stäben und Spulen auch in weiteren Grammaturen wie 100 und 500 g erhältlich.

## Welding filler joke Fill H-50

Cr-Mn filler for case-hardened and heat treatable steels. The weld material is very hardenable, nitratable and highly abrasionresistant. Also highly crack-resistant in several layers for welding. Optimum sliding properties versus high-alloy materials. Also well suited for facings and pinched edges of plastic injection and blow moulds.

Hardness of the weld material: approx. 50 – 56 HRC; up to approx. 64 HRC after flame hardening.

				Price from	
Design	Weight	Dimensions	Order No.	1 pack	
<b>joke Fill H-50</b>					
 Rods	50 g	Ø 0.2 x 500 mm	<b>4 150 602</b>	120.55 €	
	50 g	Ø 0.3 x 500 mm	<b>4 150 603</b>	114.20 €	
	50 g	Ø 0.4 x 500 mm	<b>4 150 604</b>	107.95 €	
	50 g	Ø 0.5 x 500 mm	<b>4 150 605</b>	101.70 €	
	50 g	Ø 0.6 x 500 mm	<b>4 150 606</b>	95.45 €	
	250 g	Ø 0.2 x 500 mm	<b>4 130 602</b>	444.00 €	
	250 g	Ø 0.3 x 500 mm	<b>4 130 603</b>	454.00 €	
	250 g	Ø 0.4 x 500 mm	<b>4 130 604</b>	423.00 €	
	250 g	Ø 0.5 x 500 mm	<b>4 130 605</b>	413.00 €	
	250 g	Ø 0.6 x 500 mm	<b>4 130 606</b>	402.00 €	
	1000 g	Ø 0.2 x 500 mm	<b>4 110 602</b>	1408.00 €	
	1000 g	Ø 0.3 x 500 mm	<b>4 110 603</b>	1345.00 €	
	1000 g	Ø 0.4 x 500 mm	<b>4 110 604</b>	1273.00 €	
	1000 g	Ø 0.5 x 500 mm	<b>4 110 605</b>	1201.00 €	
	1000 g	Ø 0.6 x 500 mm	<b>4 110 606</b>	1128.00 €	
	1000 g	Ø 1.0 x 500 mm	<b>4 310 610</b>	54.25 €	
	1000 g	Ø 1.2 x 500 mm	<b>4 310 612</b>	51.60 €	
1000 g	Ø 1.6 x 500 mm	<b>4 310 616</b>	48.40 €		

ⓘ All welding fillers as rods and reels also available in grammages other than 100 and 500 g.

### The perfect complement

#### Welding filler holder

for weld filler metals from Ø 0.2 to 1.0 mm



Order No.	Price
<b>4 806 000</b>	8.85 €

### The perfect complement

#### Welding rod feeding pen

for weld filler metals from Ø 0.2 to 0.6 mm





Order No.	Price
<b>4 806 100</b>	103.75 €

## Welding filler joke Fill H-55

Cr-Mo-Si-W-Mn-V filler for plastic moulds in case of edge wear, if hardness and toughness are desired. Non-etchable, only chrome-platable to a limited extent. The weld material is highly resistant to temperature change and similar to thermally conductive hot-work steels, yet superior in terms of service life. Hardness 52 – 58 HRC, depending on blend and preheating of the base material. Hardenable up to approx. 62 HRC.

Materials: 1.2343, 1.2344, 1.2311, 1.2312, .2738, 1.2767, 1.2764 and similar.

	Design	Weight	Dimensions	Order No.	Price from	
					1 pack	1 piece
<b>joke Fill H-55</b>						
	Rods	50 g	Ø 0.2 x 500 mm	<b>4 150 702</b>	118.40 €	
		50 g	Ø 0.3 x 500 mm	<b>4 150 703</b>	113.20 €	
		50 g	Ø 0.4 x 500 mm	<b>4 150 704</b>	107.95 €	
		50 g	Ø 0.5 x 500 mm	<b>4 150 705</b>	101.70 €	
		50 g	Ø 0.6 x 500 mm	<b>4 150 706</b>	95.45 €	
		250 g	Ø 0.2 x 500 mm	<b>4 130 702</b>	471.00 €	
		250 g	Ø 0.3 x 500 mm	<b>4 130 703</b>	453.00 €	
		250 g	Ø 0.4 x 500 mm	<b>4 130 704</b>	429.00 €	
		250 g	Ø 0.5 x 500 mm	<b>4 130 705</b>	405.00 €	
		250 g	Ø 0.6 x 500 mm	<b>4 130 706</b>	383.00 €	
		1000 g	Ø 0.2 x 500 mm	<b>4 110 702</b>	1397.00 €	
		1000 g	Ø 0.3 x 500 mm	<b>4 110 703</b>	1339.00 €	
		1000 g	Ø 0.4 x 500 mm	<b>4 110 704</b>	1274.00 €	
		1000 g	Ø 0.5 x 500 mm	<b>4 110 705</b>	1202.00 €	
		1000 g	Ø 0.6 x 500 mm	<b>4 110 706</b>	1129.00 €	
		1000 g	Ø 0.8 x 500 mm	<b>4 310 708</b>	113.50 €	
		1000 g	Ø 1.0 x 500 mm	<b>4 310 710</b>	90.65 €	
		1000 g	Ø 1.2 x 500 mm	<b>4 310 712</b>	86.65 €	
		1000 g	Ø 1.6 x 500 mm	<b>4 310 716</b>	83.05 €	
1000 g	Ø 2.4 x 500 mm	<b>4 310 724</b>	82.75 €			
	Spools	50 g	Ø 0.2 mm	<b>4 250 702</b>		113.20 €
		50 g	Ø 0.3 mm	<b>4 250 703</b>		109.00 €
		50 g	Ø 0.4 mm	<b>4 250 704</b>		103.75 €
		50 g	Ø 0.5 mm	<b>4 250 705</b>		97.50 €
		50 g	Ø 0.6 mm	<b>4 250 706</b>		91.25 €
		250 g	Ø 0.2 mm	<b>4 230 702</b>		446.00 €
		250 g	Ø 0.3 mm	<b>4 230 703</b>		427.00 €
		250 g	Ø 0.4 mm	<b>4 230 704</b>		407.00 €
		250 g	Ø 0.5 mm	<b>4 230 705</b>		385.00 €
		250 g	Ø 0.6 mm	<b>4 230 706</b>		361.00 €
		1000 g	Ø 0.2 mm	<b>4 210 702</b>		1295.00 €
		1000 g	Ø 0.3 mm	<b>4 210 703</b>		1243.00 €
		1000 g	Ø 0.4 mm	<b>4 210 704</b>		1180.00 €
		1000 g	Ø 0.5 mm	<b>4 210 705</b>		1114.00 €
		1000 g	Ø 0.6 mm	<b>4 210 706</b>		1047.00 €

ⓘ All welding fillers as rods and reels also available in grammages other than 100 and 500 g.





# Welding filler

## joke Fill H-60

Cr-Mo-Mn-W-V filler with extremely wear-resistant, tensile properties. Suitable for hard applications on cold-work steels with a chrome content exceeding 5%. Crack-free and rapidly hardening, high edge strength. Can be thermally treated like the base material. The weld material is nitratable, erodible, chrome-platable and can be quenched and tempered.

Hardness of approx. 56 – 62 HRC possible depending on the method, blend and layers.

Materials: medium and high-alloy chrome cold-work steels, CARMO, CALMAX

Ausführung	Gewicht [g]	Maße	Bestell-Nr	1 Pack.	Preis ab 1 Stück
<b>joke Fill H-60</b>					
 Stäbe	50 g	Ø 0,2 x 500 mm	<b>4 150 802</b>	136,25 €	
	50 g	Ø 0,3 x 500 mm	<b>4 150 803</b>	131,00 €	
	50 g	Ø 0,4 x 500 mm	<b>4 150 804</b>	125,80 €	
	50 g	Ø 0,5 x 500 mm	<b>4 150 805</b>	119,55 €	
	50 g	Ø 0,6 x 500 mm	<b>4 150 806</b>	113,20 €	
	250 g	Ø 0,2 x 500 mm	<b>4 130 802</b>	544,00 €	
	250 g	Ø 0,3 x 500 mm	<b>4 130 803</b>	524,00 €	
	250 g	Ø 0,4 x 500 mm	<b>4 130 804</b>	502,00 €	
	250 g	Ø 0,5 x 500 mm	<b>4 130 805</b>	478,00 €	
	250 g	Ø 0,6 x 500 mm	<b>4 130 806</b>	451,00 €	
	1000 g	Ø 0,2 x 500 mm	<b>4 110 802</b>	1613,00 €	
	1000 g	Ø 0,3 x 500 mm	<b>4 110 803</b>	1549,00 €	
	1000 g	Ø 0,4 x 500 mm	<b>4 110 804</b>	1485,00 €	
	1000 g	Ø 0,5 x 500 mm	<b>4 110 805</b>	1413,00 €	
	1000 g	Ø 0,6 x 500 mm	<b>4 110 806</b>	1339,00 €	
	1000 g	Ø 1,0 x 500 mm	<b>4 310 810</b>	101,50 €	
	1000 g	Ø 1,2 x 500 mm	<b>4 310 812</b>	98,00 €	
1000 g	Ø 1,6 x 500 mm	<b>4 310 816</b>	96,15 €		
 Spools	50 g	Ø 0,2 mm	<b>4 250 802</b>		131,00 €
	50 g	Ø 0,3 mm	<b>4 250 803</b>		125,80 €
	50 g	Ø 0,4 mm	<b>4 250 804</b>		120,55 €
	50 g	Ø 0,5 mm	<b>4 250 805</b>		114,20 €
	50 g	Ø 0,6 mm	<b>4 250 806</b>		109,00 €
	250 g	Ø 0,2 mm	<b>4 230 802</b>		515,00 €
	250 g	Ø 0,3 mm	<b>4 230 803</b>		495,00 €
	250 g	Ø 0,4 mm	<b>4 230 804</b>		474,00 €
	250 g	Ø 0,5 mm	<b>4 230 805</b>		451,00 €
	250 g	Ø 0,6 mm	<b>4 230 806</b>		428,00 €
	1000 g	Ø 0,2 mm	<b>4 210 802</b>		1496,00 €
	1000 g	Ø 0,3 mm	<b>4 210 803</b>		1438,00 €
	1000 g	Ø 0,4 mm	<b>4 210 804</b>		1375,00 €
	1000 g	Ø 0,5 mm	<b>4 210 805</b>		1308,00 €
	1000 g	Ø 0,6 mm	<b>4 210 806</b>		1243,00 €

ⓘ All welding fillers as rods and reels also available in grammages other than 100 and 500 g.

### The perfect complement

#### Welding filler holder

for weld filler metals from Ø 0.2 to 1.0 mm



Order No.	Price
<b>4 806 000</b>	8.85 €

### The perfect complement

#### Welding rod feeding pen

for weld filler metals from Ø 0.2 to 0.6 mm





Order No.	Price
<b>4 806 100</b>	103.75 €

## Welding filler joke Fill H-65

Cr-Mn-Si-V welding filler with structurestabilising elements for the repair and modification of highalloy cold-work steels. Chrome-platable to a limited extent, nitratable and erodible. The weld material is closely similar to the 12 % Cr steels.

Pay attention to appropriate preheating in case of application to hardened tools. Hardenable and annealable up to approx. 62 HRC like the base material.

Materials: 1.2080, 1.2379, 1.2436, 1.2601 and similar cold-work steels.

	Design	Weight	Dimensions	Order No.	Price from	
					1 pack	1 piece
<b>joke Fill H-65</b>						
	Rods	50 g	Ø 0.2 x 500 mm	<b>4 150 902</b>	128.95 €	
		50 g	Ø 0.3 x 500 mm	<b>4 150 903</b>	125.80 €	
		50 g	Ø 0.4 x 500 mm	<b>4 150 904</b>	113.20 €	
		50 g	Ø 0.5 x 500 mm	<b>4 150 905</b>	107.95 €	
		50 g	Ø 0.6 x 500 mm	<b>4 150 906</b>	101.70 €	
		250 g	Ø 0.2 x 500 mm	<b>4 130 902</b>	512.00 €	
		250 g	Ø 0.3 x 500 mm	<b>4 130 903</b>	501.00 €	
		250 g	Ø 0.4 x 500 mm	<b>4 130 904</b>	451.00 €	
		250 g	Ø 0.5 x 500 mm	<b>4 130 905</b>	431.00 €	
		250 g	Ø 0.6 x 500 mm	<b>4 130 906</b>	406.00 €	
		1000 g	Ø 0.2 x 500 mm	<b>4 110 902</b>	1519.00 €	
		1000 g	Ø 0.3 x 500 mm	<b>4 110 903</b>	1485.00 €	
		1000 g	Ø 0.4 x 500 mm	<b>4 110 904</b>	1339.00 €	
		1000 g	Ø 0.5 x 500 mm	<b>4 110 905</b>	1274.00 €	
		1000 g	Ø 0.6 x 500 mm	<b>4 110 906</b>	1202.00 €	
		1000 g	Ø 0.8 x 500 mm	<b>4 310 908</b>	103.15 €	
		1000 g	Ø 1.0 x 500 mm	<b>4 310 910</b>	98.30 €	
		1000 g	Ø 1.2 x 500 mm	<b>4 310 912</b>	95.45 €	
		1000 g	Ø 1.6 x 500 mm	<b>4 310 916</b>	88.40 €	
	Spools	50 g	Ø 0.2 mm	<b>4 250 902</b>		123.65 €
		50 g	Ø 0.3 mm	<b>4 250 903</b>		120.55 €
		50 g	Ø 0.4 mm	<b>4 250 904</b>		109.00 €
		50 g	Ø 0.5 mm	<b>4 250 905</b>		103.75 €
		50 g	Ø 0.6 mm	<b>4 250 906</b>		97.50 €
		250 g	Ø 0.2 mm	<b>4 230 902</b>		485.00 €
		250 g	Ø 0.3 mm	<b>4 230 903</b>		473.00 €
		250 g	Ø 0.4 mm	<b>4 230 904</b>		428.00 €
		250 g	Ø 0.5 mm	<b>4 230 905</b>		406.00 €
		250 g	Ø 0.6 mm	<b>4 230 906</b>		384.00 €
		1000 g	Ø 0.2 mm	<b>4 210 902</b>		1409.00 €
		1000 g	Ø 0.3 mm	<b>4 210 903</b>		1376.00 €
		1000 g	Ø 0.4 mm	<b>4 210 904</b>		1242.00 €
		1000 g	Ø 0.5 mm	<b>4 210 905</b>		1180.00 €
		1000 g	Ø 0.6 mm	<b>4 210 906</b>		1115.00 €



ⓘ All welding fillers as rods and reels also available in grammages other than 100 and 500 g.

# Welding filler joke Fill H-80

Cr-Mo-Mn-V filler with rapid hardening properties. Very high toughness and excellent cutting properties. Particularly suited for TIG rapid repair of chipped or worn cut edges. Nitratable, erodible and chromeplatable, hardenable like the base material. Buffer with joke Fill K-33 for multilayer welding.

Hardness following cooling in air approx. 58 – 61 HRC depending on preheating.

Materials: 1.2080, 1.2379, 1.2436, 1.2601 and similar cold-work steels.

Design	Weight	Dimensions	Order No.	Price from	
				1 pack	1 piece
<b>joke Fill H-80</b>					
 Rods	50 g	Ø 0.2 x 500 mm	<b>4 151 002</b>	142.50 €	
	50 g	Ø 0.3 x 500 mm	<b>4 151 003</b>	137.25 €	
	50 g	Ø 0.4 x 500 mm	<b>4 151 004</b>	125.80 €	
	50 g	Ø 0.5 x 500 mm	<b>4 151 005</b>	116.35 €	
	50 g	Ø 0.6 x 500 mm	<b>4 151 006</b>	107.95 €	
	250 g	Ø 0.2 x 500 mm	<b>4 131 002</b>	568.00 €	
	250 g	Ø 0.3 x 500 mm	<b>4 131 003</b>	547.00 €	
	250 g	Ø 0.4 x 500 mm	<b>4 131 004</b>	502.00 €	
	250 g	Ø 0.5 x 500 mm	<b>4 131 005</b>	464.00 €	
	250 g	Ø 0.6 x 500 mm	<b>4 131 006</b>	429.00 €	
	1000 g	Ø 0.2 x 500 mm	<b>4 111 002</b>	1686.00 €	
	1000 g	Ø 0.3 x 500 mm	<b>4 111 003</b>	1622.00 €	
	1000 g	Ø 0.4 x 500 mm	<b>4 111 004</b>	1485.00 €	
	1000 g	Ø 0.5 x 500 mm	<b>4 111 005</b>	1375.00 €	
	1000 g	Ø 0.6 x 500 mm	<b>4 111 006</b>	1274.00 €	
	1000 g	Ø 0.8 x 500 mm	<b>4 311 008</b>	122.10 €	
	1000 g	Ø 1.0 x 500 mm	<b>4 311 010</b>	112.45 €	
	1000 g	Ø 1.2 x 500 mm	<b>4 311 012</b>	105.90 €	
1000 g	Ø 1.6 x 500 mm	<b>4 311 016</b>	101.90 €		
 Spools	50 g	Ø 0.2 mm	<b>4 251 002</b>		136.25 €
	50 g	Ø 0.3 mm	<b>4 251 003</b>		131.00 €
	50 g	Ø 0.4 mm	<b>4 251 004</b>		120.55 €
	50 g	Ø 0.5 mm	<b>4 251 005</b>		111.15 €
	50 g	Ø 0.6 mm	<b>4 251 006</b>		103.75 €
	250 g	Ø 0.2 mm	<b>4 231 002</b>		539.00 €
	250 g	Ø 0.3 mm	<b>4 231 003</b>		518.00 €
	250 g	Ø 0.4 mm	<b>4 231 004</b>		475.00 €
	250 g	Ø 0.5 mm	<b>4 231 005</b>		441.00 €
	250 g	Ø 0.6 mm	<b>4 231 006</b>		406.00 €
	1000 g	Ø 0.2 mm	<b>4 211 002</b>		1563.00 €
	1000 g	Ø 0.3 mm	<b>4 211 003</b>		1504.00 €
	1000 g	Ø 0.4 mm	<b>4 211 004</b>		1375.00 €
	1000 g	Ø 0.5 mm	<b>4 211 005</b>		1275.00 €
	1000 g	Ø 0.6 mm	<b>4 211 006</b>		1180.00 €


ⓘ All welding fillers as rods and reels also available in grammages other than 100 and 500 g.

## Welding filler joke Fill H-90

Mo-Cr-W-V filler, high-alloy. The hot hardness corresponds to that of a high speed steel (HSS). Pressure, abrasion and impact resistant. Also extremely crack-resistant, even in case of applications of several layers. For hard repair of cutting and punching tools or for increasing service life with simple cold-work steels. Hardness approx. 57 – 62 HRC, hardened up to 66 HRC.

Observe preheating: high speed steels approx. 400 – 500 °C, Cr tools steels approx. 300 – 400 °C

Materials: 1.3243, 1.3245, 1.3344, 1.3346, 1.3348 and similar

					Price from
Design		Weight	Dimensions	Order No.	1 pack
<b>joke Fill H-90</b>					
	Rods	50 g	Ø 0.2 x 500 mm	<b>4 151 102</b>	148.85 €
		50 g	Ø 0.3 x 500 mm	<b>4 151 103</b>	143.65 €
		50 g	Ø 0.4 x 500 mm	<b>4 151 104</b>	128.95 €
		50 g	Ø 0.5 x 500 mm	<b>4 151 105</b>	122.60 €
		50 g	Ø 0.6 x 500 mm	<b>4 151 106</b>	115.35 €
		250 g	Ø 0.2 x 500 mm	<b>4 131 102</b>	593.00 €
		250 g	Ø 0.3 x 500 mm	<b>4 131 103</b>	573.00 €
		250 g	Ø 0.4 x 500 mm	<b>4 131 104</b>	513.00 €
		250 g	Ø 0.5 x 500 mm	<b>4 131 105</b>	488.00 €
		250 g	Ø 0.6 x 500 mm	<b>4 131 106</b>	460.00 €
		1000 g	Ø 0.2 x 500 mm	<b>4 111 102</b>	1758.00 €
		1000 g	Ø 0.3 x 500 mm	<b>4 111 103</b>	1700.00 €
		1000 g	Ø 0.4 x 500 mm	<b>4 111 104</b>	1519.00 €
		1000 g	Ø 0.5 x 500 mm	<b>4 111 105</b>	1447.00 €
		1000 g	Ø 0.6 x 500 mm	<b>4 111 106</b>	1360.00 €
		1000 g	Ø 1.0 x 500 mm	<b>4 311 110</b>	130.90 €
		1000 g	Ø 1.2 x 500 mm	<b>4 311 112</b>	118.00 €
1000 g	Ø 1.6 x 500 mm	<b>4 311 116</b>	113.00 €		

ⓘ All welding fillers as rods and reels also available in grammages other than 100 and 500 g.

### The perfect complement

**Welding filler holder**  
for weld filler metals from Ø 0.2 to 1.0 mm



Order No.	Price
<b>4 806 000</b>	8.85 €

### The perfect complement

**Welding rod feeding pen**  
for weld filler metals from Ø 0.2 to 0.6 mm





Order No.	Price
<b>4 806 100</b>	103.75 €

# Welding filler joke Fill K-16

Rust and acid-resistant Cr-Ni-Mo filler for joining and buffering when high corrosionresistance and toughness are required. The ductile weld material is non-hardenable and very readily polishable. No hard carbide layers form at the periphery owing to an extremely reduced carbon content. Cannot be nitrated or quenched and tempered.

Materials: 1.4301, 1.4306, 1.4401, 1.4404, 1.4541, 1.4571 and similar V2A and V4A alloys.



Design	Weight	Dimensions	Order No.	Price from	
				1 pack	1 piece
<b>joke Fill K-16</b>					
 Rods	50 g	Ø 0.2 x 500 mm	<b>4 151 202</b>	41.95 €	
	50 g	Ø 0.3 x 500 mm	<b>4 151 203</b>	32.50 €	
	50 g	Ø 0.4 x 500 mm	<b>4 151 204</b>	31.50 €	
	50 g	Ø 0.5 x 500 mm	<b>4 151 205</b>	30.45 €	
	50 g	Ø 0.6 x 500 mm	<b>4 151 206</b>	28.30 €	
	250 g	Ø 0.2 x 500 mm	<b>4 131 202</b>	167.00 €	
	250 g	Ø 0.3 x 500 mm	<b>4 131 203</b>	128.95 €	
	250 g	Ø 0.4 x 500 mm	<b>4 131 204</b>	124.75 €	
	250 g	Ø 0.5 x 500 mm	<b>4 131 205</b>	119.55 €	
	250 g	Ø 0.6 x 500 mm	<b>4 131 206</b>	112.15 €	
	1000 g	Ø 0.2 x 500 mm	<b>4 111 202</b>	493.00 €	
	1000 g	Ø 0.3 x 500 mm	<b>4 111 203</b>	386.00 €	
	1000 g	Ø 0.4 x 500 mm	<b>4 111 204</b>	369.00 €	
	1000 g	Ø 0.5 x 500 mm	<b>4 111 205</b>	355.00 €	
	1000 g	Ø 0.6 x 500 mm	<b>4 111 206</b>	333.00 €	
	1000 g	Ø 0.8 x 500 mm	<b>4 311 208</b>	45.75 €	
	1000 g	Ø 1.0 x 500 mm	<b>4 311 210</b>	35.30 €	
	1000 g	Ø 1.2 x 500 mm	<b>4 311 212</b>	34.65 €	
	1000 g	Ø 1.6 x 500 mm	<b>4 311 216</b>	32.00 €	
	1000 g	Ø 2.4 x 500 mm	<b>4 311 224</b>	30.45 €	
 Spools	50 g	Ø 0.2 mm	<b>4 251 202</b>	39.90 €	
	50 g	Ø 0.3 mm	<b>4 251 203</b>	31.50 €	
	50 g	Ø 0.4 mm	<b>4 251 204</b>	30.45 €	
	50 g	Ø 0.5 mm	<b>4 251 205</b>	28.30 €	
	50 g	Ø 0.6 mm	<b>4 251 206</b>	27.30 €	
	250 g	Ø 0.2 mm	<b>4 231 202</b>	159.00 €	
	250 g	Ø 0.3 mm	<b>4 231 203</b>	122.60 €	
	250 g	Ø 0.4 mm	<b>4 231 204</b>	117.40 €	
	250 g	Ø 0.5 mm	<b>4 231 205</b>	113.20 €	
	250 g	Ø 0.6 mm	<b>4 231 206</b>	105.90 €	
	1000 g	Ø 0.2 mm	<b>4 211 202</b>	458.00 €	
	1000 g	Ø 0.3 mm	<b>4 211 203</b>	357.00 €	
	1000 g	Ø 0.4 mm	<b>4 211 204</b>	343.00 €	
	1000 g	Ø 0.5 mm	<b>4 211 205</b>	331.00 €	
	1000 g	Ø 0.6 mm	<b>4 211 206</b>	310.00 €	

ⓘ All welding fillers as rods and reels also available in grammages other than 100 and 500 g.

## Welding filler joke Fill K-33

High-alloy Cr-Ni wire for joining and buffering all low, medium and highalloy cold work steels. For mixed joints when increased strength and toughness are required. The corrosion-resistant weld material increases the hardness by pressure and hammering, very tough, crackresistant and rustproof. Excellent weldability by all methods.

Strength up to approx. 850 N/mm<sup>2</sup>.

Design	Weight	Dimensions	Order No.	Price from	
				1 pack	1 piece
<b>joke Fill K-33</b>					
 Rods	50 g	Ø 0.2 x 500 mm	<b>4 151 302</b>	94.30 €	
	50 g	Ø 0.3 x 500 mm	<b>4 151 303</b>	89.10 €	
	50 g	Ø 0.4 x 500 mm	<b>4 151 304</b>	77.60 €	
	50 g	Ø 0.5 x 500 mm	<b>4 151 305</b>	69.20 €	
	50 g	Ø 0.6 x 500 mm	<b>4 151 306</b>	59.80 €	
	250 g	Ø 0.2 x 500 mm	<b>4 131 302</b>	376.00 €	
	250 g	Ø 0.3 x 500 mm	<b>4 131 303</b>	357.00 €	
	250 g	Ø 0.4 x 500 mm	<b>4 131 304</b>	309.00 €	
	250 g	Ø 0.5 x 500 mm	<b>4 131 305</b>	277.00 €	
	250 g	Ø 0.6 x 500 mm	<b>4 131 306</b>	238.00 €	
	1000 g	Ø 0.2 x 500 mm	<b>4 111 302</b>	1115.00 €	
	1000 g	Ø 0.3 x 500 mm	<b>4 111 303</b>	1057.00 €	
	1000 g	Ø 0.4 x 500 mm	<b>4 111 304</b>	912.00 €	
	1000 g	Ø 0.5 x 500 mm	<b>4 111 305</b>	819.00 €	
	1000 g	Ø 0.6 x 500 mm	<b>4 111 306</b>	702.00 €	
	1000 g	Ø 0.8 x 500 mm	<b>4 311 308</b>	92.30 €	
	1000 g	Ø 1.0 x 500 mm	<b>4 311 310</b>	81.10 €	
	1000 g	Ø 1.2 x 500 mm	<b>4 311 312</b>	78.65 €	
	1000 g	Ø 1.6 x 500 mm	<b>4 311 316</b>	76.70 €	
 Spools	50 g	Ø 0.2 mm	<b>4 251 302</b>		90.10 €
	50 g	Ø 0.3 mm	<b>4 251 303</b>		86.00 €
	50 g	Ø 0.4 mm	<b>4 251 304</b>		74.45 €
	50 g	Ø 0.5 mm	<b>4 251 305</b>		66.05 €
	50 g	Ø 0.6 mm	<b>4 251 306</b>		56.60 €
	250 g	Ø 0.2 mm	<b>4 231 302</b>		356.00 €
	250 g	Ø 0.3 mm	<b>4 231 303</b>		339.00 €
	250 g	Ø 0.4 mm	<b>4 231 304</b>		293.00 €
	250 g	Ø 0.5 mm	<b>4 231 305</b>		263.00 €
	250 g	Ø 0.6 mm	<b>4 231 306</b>		225.00 €
	1000 g	Ø 0.2 mm	<b>4 211 302</b>		1034.00 €
	1000 g	Ø 0.3 mm	<b>4 211 303</b>		979.00 €
	1000 g	Ø 0.4 mm	<b>4 211 304</b>		846.00 €
	1000 g	Ø 0.5 mm	<b>4 211 305</b>		758.00 €
	1000 g	Ø 0.6 mm	<b>4 211 306</b>		652.00 €

ⓘ All welding fillers as rods and reels also available in grammages other than 100 and 500 g.

# Welding filler

## joke Fill K-35



Corrosion and seawater resistant Cr-Mo alloy, wear-resistant and machinable.

Also for heat resistant repairs and changes to forms and tools of plastic, rubber and glass industry, stamping and pressing tools.

Especially suitable for martensitic steels with a chromium content of 13% – 18%, martensitic, ferritic and austenitic.

By lowered carbon content very crack resistant, polishes well, color synchronous on similar alloyed alloys. Hardness depending on composition about 40 – 46 HRC.

For materials: 1.2083, 1.2085, 1.2316, 1.4034, M333, M340, Mirrax, Corrax, Ramax and similar steels

Design	Weight	Dimensions	Order No.	Price from	
				1 pack	1 piece
<b>joke Fill K-35</b>					
 Rods	50 g	Ø 0.2 x 500 mm	<b>4 152 902</b>	69.20 €	
	50 g	Ø 0.3 x 500 mm	<b>4 152 903</b>	65.00 €	
	50 g	Ø 0.4 x 500 mm	<b>4 152 904</b>	41.95 €	
	50 g	Ø 0.5 x 500 mm	<b>4 152 905</b>	37.75 €	
	50 g	Ø 0.6 x 500 mm	<b>4 152 906</b>	33.65 €	
	250 g	Ø 0.2 x 500 mm	<b>4 132 902</b>	273.00 €	
	250 g	Ø 0.3 x 500 mm	<b>4 132 903</b>	259.00 €	
	250 g	Ø 0.4 x 500 mm	<b>4 132 904</b>	167.00 €	
	250 g	Ø 0.5 x 500 mm	<b>4 132 905</b>	148.85 €	
	250 g	Ø 0.6 x 500 mm	<b>4 132 906</b>	132.05 €	
	1000 g	Ø 0.2 x 500 mm	<b>4 112 902</b>	811.00 €	
	1000 g	Ø 0.3 x 500 mm	<b>4 112 903</b>	767.00 €	
	1000 g	Ø 0.4 x 500 mm	<b>4 112 904</b>	493.00 €	
	1000 g	Ø 0.5 x 500 mm	<b>4 112 905</b>	442.00 €	
	1000 g	Ø 0.6 x 500 mm	<b>4 112 906</b>	392.00 €	
	1000 g	Ø 1.0 x 500 mm	<b>4 312 910</b>	51.15 €	
	1000 g	Ø 1.2 x 500 mm	<b>4 312 912</b>	48.80 €	
	1000 g	Ø 1.6 x 500 mm	<b>4 312 916</b>	44.10 €	
	1000 g	Ø 2.4 x 500 mm	<b>4 312 924</b>	42.45 €	
 Spools	50 g	Ø 0.2 mm	<b>4 252 902</b>		66.05 €
	50 g	Ø 0.3 mm	<b>4 252 903</b>		61.85 €
	50 g	Ø 0.4 mm	<b>4 252 904</b>		39.90 €
	50 g	Ø 0.5 mm	<b>4 252 905</b>		35.70 €
	50 g	Ø 0.6 mm	<b>4 252 906</b>		31.50 €
	250 g	Ø 0.2 mm	<b>4 232 902</b>		260.00 €
	250 g	Ø 0.3 mm	<b>4 232 903</b>		245.00 €
	250 g	Ø 0.4 mm	<b>4 232 904</b>		158.00 €
	250 g	Ø 0.5 mm	<b>4 232 905</b>		140.45 €
	250 g	Ø 0.6 mm	<b>4 232 906</b>		124.75 €
	1000 g	Ø 0.2 mm	<b>4 212 902</b>		752.00 €
	1000 g	Ø 0.3 mm	<b>4 212 903</b>		712.00 €
	1000 g	Ø 0.4 mm	<b>4 212 904</b>		457.00 €
	1000 g	Ø 0.5 mm	<b>4 212 905</b>		409.00 €
	1000 g	Ø 0.6 mm	<b>4 212 906</b>		363.00 €

ⓘ All welding fillers as rods and reels also available in grammages other than 100 and 500 g.



## Welding filler joke Fill K-40

High-alloy Co-Cr-Mo- Mn-W-Fe filler for many heat treatable, case-hardened and hot-work steels with universal properties. Very tough and resistant to temperature change.

Optimum poreless fusion to nitrated steels, high edge strength at high temperatures, acid proof. Non-chromeplatable. Polishable, only delayed erodibility. Structure hardly thermally modifiable.

Hardness approx. 26 – 38 HRC

Materials: 1.4841, 1.2294

Design	Weight	Dimensions	Order No.	Price from	
				1 pack	1 piece
<b>joke Fill K-40</b>					
 Rods	50 g	Ø 0.2 x 500 mm	<b>4 151 402</b>	168.00 €	
	50 g	Ø 0.3 x 500 mm	<b>4 151 403</b>	162.00 €	
	50 g	Ø 0.4 x 500 mm	<b>4 151 404</b>	156.00 €	
	50 g	Ø 0.5 x 500 mm	<b>4 151 405</b>	147.85 €	
	50 g	Ø 0.6 x 500 mm	<b>4 151 406</b>	143.65 €	
	250 g	Ø 0.2 x 500 mm	<b>4 131 402</b>	663.00 €	
	250 g	Ø 0.3 x 500 mm	<b>4 131 403</b>	641.00 €	
	250 g	Ø 0.4 x 500 mm	<b>4 131 404</b>	618.00 €	
	250 g	Ø 0.5 x 500 mm	<b>4 131 405</b>	594.00 €	
	250 g	Ø 0.6 x 500 mm	<b>4 131 406</b>	570.00 €	
	1000 g	Ø 0.2 x 500 mm	<b>4 111 402</b>	1967.00 €	
	1000 g	Ø 0.3 x 500 mm	<b>4 111 403</b>	1903.00 €	
	1000 g	Ø 0.4 x 500 mm	<b>4 111 404</b>	1832.00 €	
	1000 g	Ø 0.5 x 500 mm	<b>4 111 405</b>	1759.00 €	
	1000 g	Ø 0.6 x 500 mm	<b>4 111 406</b>	1694.00 €	
	1000 g	Ø 0.8 x 500 mm	<b>4 311 408</b>	131.35 €	
	1000 g	Ø 1.0 x 500 mm	<b>4 311 410</b>	121.60 €	
	1000 g	Ø 1.2 x 500 mm	<b>4 311 412</b>	111.85 €	
	1000 g	Ø 1.6 x 500 mm	<b>4 311 416</b>	103.85 €	
 Spools	50 g	Ø 0.2 mm	<b>4 251 402</b>		160.00 €
	50 g	Ø 0.3 mm	<b>4 251 403</b>		155.00 €
	50 g	Ø 0.4 mm	<b>4 251 404</b>		148.85 €
	50 g	Ø 0.5 mm	<b>4 251 405</b>		142.50 €
	50 g	Ø 0.6 mm	<b>4 251 406</b>		137.25 €
	250 g	Ø 0.2 mm	<b>4 231 402</b>		628.00 €
	250 g	Ø 0.3 mm	<b>4 231 403</b>		608.00 €
	250 g	Ø 0.4 mm	<b>4 231 404</b>		586.00 €
	250 g	Ø 0.5 mm	<b>4 231 405</b>		561.00 €
	250 g	Ø 0.6 mm	<b>4 231 406</b>		542.00 €
	1000 g	Ø 0.2 mm	<b>4 211 402</b>		1825.00 €
	1000 g	Ø 0.3 mm	<b>4 211 403</b>		1765.00 €
	1000 g	Ø 0.4 mm	<b>4 211 404</b>		1698.00 €
	1000 g	Ø 0.5 mm	<b>4 211 405</b>		1631.00 €
	1000 g	Ø 0.6 mm	<b>4 211 406</b>		1570.00 €

ⓘ All welding fillers as rods and reels also available in grammages other than 100 and 500 g.





# Welding filler joke Fill K-77

Particularly versatile nickel-based alloy with special elements to avoid hard carbide areas. The weld material is extremely resistant to rust, acid, heat and cold; non-nitratable, hardenable and chromeplatable, non-etchable!

Particularly suited for very crack-resistant, extremely elastic and corrosion-resistant base and intermediate layers on all types of steel in addition to all mixed joins of different steels, including GG (grey cast iron), GGG (spheroidal graphite cast iron) and GS (cast steel).

Materials: for joining and buffering all grades of steel and cast iron



Design	Weight	Dimensions	Order No.	Price from	
				1 pack	1 piece
<b>joke Fill K-77</b>					
 Rods	50 g	Ø 0.2 x 500 mm	<b>4 151 502</b>	152.00 €	
	50 g	Ø 0.3 x 500 mm	<b>4 151 503</b>	147.85 €	
	50 g	Ø 0.4 x 500 mm	<b>4 151 504</b>	143.65 €	
	50 g	Ø 0.5 x 500 mm	<b>4 151 505</b>	137.25 €	
	50 g	Ø 0.6 x 500 mm	<b>4 151 506</b>	131.00 €	
	250 g	Ø 0.2 x 500 mm	<b>4 131 502</b>	605.00 €	
	250 g	Ø 0.3 x 500 mm	<b>4 131 503</b>	594.00 €	
	250 g	Ø 0.4 x 500 mm	<b>4 131 504</b>	570.00 €	
	250 g	Ø 0.5 x 500 mm	<b>4 131 505</b>	547.00 €	
	250 g	Ø 0.6 x 500 mm	<b>4 131 506</b>	523.00 €	
	1000 g	Ø 0.2 x 500 mm	<b>4 111 502</b>	1793.00 €	
	1000 g	Ø 0.3 x 500 mm	<b>4 111 503</b>	1758.00 €	
	1000 g	Ø 0.4 x 500 mm	<b>4 111 504</b>	1694.00 €	
	1000 g	Ø 0.5 x 500 mm	<b>4 111 505</b>	1623.00 €	
	1000 g	Ø 0.6 x 500 mm	<b>4 111 506</b>	1549.00 €	
	1000 g	Ø 0.8 x 500 mm	<b>4 311 508</b>	123.95 €	
	1000 g	Ø 1.0 x 500 mm	<b>4 311 510</b>	115.35 €	
	1000 g	Ø 1.2 x 500 mm	<b>4 311 512</b>	103.25 €	
	1000 g	Ø 1.6 x 500 mm	<b>4 311 516</b>	95.15 €	
 Spools	50 g	Ø 0.2 mm	<b>4 251 502</b>	145.70 €	
	50 g	Ø 0.3 mm	<b>4 251 503</b>	142.50 €	
	50 g	Ø 0.4 mm	<b>4 251 504</b>	137.25 €	
	50 g	Ø 0.5 mm	<b>4 251 505</b>	131.00 €	
	50 g	Ø 0.6 mm	<b>4 251 506</b>	125.80 €	
	250 g	Ø 0.2 mm	<b>4 231 502</b>	573.00 €	
	250 g	Ø 0.3 mm	<b>4 231 503</b>	561.00 €	
	250 g	Ø 0.4 mm	<b>4 231 504</b>	542.00 €	
	250 g	Ø 0.5 mm	<b>4 231 505</b>	518.00 €	
	250 g	Ø 0.6 mm	<b>4 231 506</b>	496.00 €	
	1000 g	Ø 0.2 mm	<b>4 211 502</b>	1663.00 €	
	1000 g	Ø 0.3 mm	<b>4 211 503</b>	1631.00 €	
	1000 g	Ø 0.4 mm	<b>4 211 504</b>	1570.00 €	
	1000 g	Ø 0.5 mm	<b>4 211 505</b>	1504.00 €	
	1000 g	Ø 0.6 mm	<b>4 211 506</b>	1438.00 €	

ⓘ All welding fillers as rods and reels also available in grammages other than 100 and 500 g.

## Welding filler joke Fill A-50

Aluminium special alloy with very good connection to all aluminium grades, Si, Pb, Cu or Mg alloy. Clean application and joining to types that are difficult to weld and for improving fusion in case of subsequently application with highstrength alloys. Excellent LASER weldability, anodisable to a limited extent!

Materials: Aluminium case and wrought alloys, ZAMAG


	Design	Weight	Dimensions	Order No.	Price from	
					1 pack	1 piece
<b>joke Fill A-50</b>						
	Rods	50 g	Ø 0.3 x 500 mm	<b>4 150 103</b>	56.60 €	
		50 g	Ø 0.4 x 500 mm	<b>4 150 104</b>	53.65 €	
		50 g	Ø 0.5 x 500 mm	<b>4 150 105</b>	51.40 €	
		50 g	Ø 0.6 x 500 mm	<b>4 150 106</b>	48.30 €	
		250 g	Ø 0.3 x 500 mm	<b>4 130 103</b>	226.00 €	
		250 g	Ø 0.4 x 500 mm	<b>4 130 104</b>	213.00 €	
		250 g	Ø 0.5 x 500 mm	<b>4 130 105</b>	203.00 €	
		250 g	Ø 0.6 x 500 mm	<b>4 130 106</b>	190.00 €	
		1000 g	Ø 0.3 x 500 mm	<b>4 110 103</b>	666.00 €	
		1000 g	Ø 0.4 x 500 mm	<b>4 110 104</b>	630.00 €	
		1000 g	Ø 0.5 x 500 mm	<b>4 110 105</b>	601.00 €	
		1000 g	Ø 0.6 x 500 mm	<b>4 110 106</b>	564.00 €	
		1000 g	Ø 1.0 x 500 mm	<b>4 310 110</b>	72.60 €	
		1000 g	Ø 1.6 x 500 mm	<b>4 310 116</b>	62.75 €	
		1000 g	Ø 2.4 x 500 mm	<b>4 310 124</b>	54.15 €	
	Spools	50 g	Ø 0.3 mm	<b>4 250 103</b>		54.55 €
		50 g	Ø 0.4 mm	<b>4 250 104</b>		51.40 €
		50 g	Ø 0.5 mm	<b>4 250 105</b>		48.30 €
		50 g	Ø 0.6 mm	<b>4 250 106</b>		46.15 €
		250 g	Ø 0.3 mm	<b>4 230 103</b>		214.00 €
		250 g	Ø 0.4 mm	<b>4 230 104</b>		201.00 €
		250 g	Ø 0.5 mm	<b>4 230 105</b>		193.00 €
		250 g	Ø 0.6 mm	<b>4 230 106</b>		181.00 €
		1000 g	Ø 0.3 mm	<b>4 210 103</b>		618.00 €
		1000 g	Ø 0.4 mm	<b>4 210 104</b>		585.00 €
		1000 g	Ø 0.5 mm	<b>4 210 105</b>		557.00 €
		1000 g	Ø 0.6 mm	<b>4 210 106</b>		523.00 €

ⓘ All welding fillers as rods and reels also available in grammages other than 100 and 500 g.

# Welding filler joke Fill A-70

Al-Mg-Mn aluminium wire with special additives for crack-resistant application and joining of the common aluminium wrought alloys in mould building; anodisable and polishable, artificially and naturally ageable. Fumigate zincbased alloys by multiple overmelting or buffer with A-50. Also easily weldable in multiple layers. The hardness values depend on the blend in relation to the base material and are approx. 300 – 450 N/mm<sup>2</sup> depending on condition.

Materials: highstrength aluminium wrought alloys

	Design	Weight	Dimensions	Order No.	Price from 1 pack
<b>joke Fill A-70</b>					
	Rods	50 g	Ø 0.3 x 500 mm	<b>4 150 303</b>	51.40 €
	Rods	50 g	Ø 0.4 x 500 mm	<b>4 150 304</b>	49.35 €
	Rods	50 g	Ø 0.5 x 500 mm	<b>4 150 305</b>	46.15 €
	Rods	50 g	Ø 0.6 x 500 mm	<b>4 150 306</b>	43.10 €
	Rods	250 g	Ø 0.3 x 500 mm	<b>4 130 303</b>	203.00 €
	Rods	250 g	Ø 0.4 x 500 mm	<b>4 130 304</b>	198.00 €
	Rods	250 g	Ø 0.5 x 500 mm	<b>4 130 305</b>	183.00 €
	Rods	250 g	Ø 0.6 x 500 mm	<b>4 130 306</b>	172.00 €
	Rods	1000 g	Ø 1.0 x 500 mm	<b>4 310 310</b>	50.85 €
	Rods	1000 g	Ø 0.3 x 500 mm	<b>4 110 303</b>	601.00 €
	Rods	1000 g	Ø 0.4 x 500 mm	<b>4 110 304</b>	587.00 €
	Rods	1000 g	Ø 0.5 x 500 mm	<b>4 110 305</b>	544.00 €
	Rods	1000 g	Ø 0.6 x 500 mm	<b>4 110 306</b>	507.00 €
	Rods	1000 g	Ø 2.4 x 500 mm	<b>4 310 324</b>	34.05 €
	Rods	1000 g	Ø 1.6 x 500 mm	<b>4 310 316</b>	43.30 €

ⓘ All welding fillers as rods and reels also available in grammages other than 100 and 500 g.

### The perfect complement

#### Welding filler holder

for weld filler metals from Ø 0.2 to 1.0 mm



Order No.	Price
<b>4 806 000</b>	8.85 €

### The perfect complement

#### Welding rod feeding pen

for weld filler metals from Ø 0.2 to 0.6 mm





Order No.	Price
<b>4 806 100</b>	103.75 €

## Welding filler joke Fill G-10

Al-Mn-Cu-Fe composite bronze for application, joining and repair on most AMPCO® bronzes. Similar in colour and structure, very easily weldable, very good sliding properties in case of metal-against-metal friction, e. g. on drawing and bending tools. No hardened transitions when directly applied to steel. Very little shrinkage. Also suitable for crack weldings on the temperature control channels of plastic moulds. Hardness up to approx. 300 HB

Materials: bronze, AMPCO®, steel

	Design	Weight	Dimensions	Order No.	Price from	
					1 pack	1 piece
<b>joke Fill G-10</b>						
	Rods	50 g	Ø 0.3 x 500 mm	<b>4 150 403</b>	119.55 €	
		50 g	Ø 0.4 x 500 mm	<b>4 150 404</b>	113.20 €	
		50 g	Ø 0.5 x 500 mm	<b>4 150 405</b>	107.95 €	
		50 g	Ø 0.6 x 500 mm	<b>4 150 406</b>	101.70 €	
		250 g	Ø 0.3 x 500 mm	<b>4 130 403</b>	478.00 €	
		250 g	Ø 0.4 x 500 mm	<b>4 130 404</b>	451.00 €	
		250 g	Ø 0.5 x 500 mm	<b>4 130 405</b>	431.00 €	
		250 g	Ø 0.6 x 500 mm	<b>4 130 406</b>	406.00 €	
		1000 g	Ø 0.3 x 500 mm	<b>4 110 403</b>	1411.00 €	
		1000 g	Ø 0.4 x 500 mm	<b>4 110 404</b>	1339.00 €	
		1000 g	Ø 0.5 x 500 mm	<b>4 110 405</b>	1274.00 €	
		1000 g	Ø 0.6 x 500 mm	<b>4 110 406</b>	1202.00 €	
		1000 g	Ø 1.0 x 500 mm	<b>4 310 410</b>	98.20 €	
		1000 g	Ø 1.2 x 500 mm	<b>4 310 412</b>	96.50 €	
		1000 g	Ø 1.6 x 500 mm	<b>4 310 416</b>	88.60 €	
1000 g	Ø 2.4 x 500 mm	<b>4 310 424</b>	83.65 €			
	Spools	50 g	Ø 0.2 mm	<b>4 250 402</b>		116.35 €
		50 g	Ø 0.3 mm	<b>4 250 403</b>		114.20 €
		50 g	Ø 0.4 mm	<b>4 250 404</b>		109.00 €
		50 g	Ø 0.5 mm	<b>4 250 405</b>		103.75 €
		50 g	Ø 0.6 mm	<b>4 250 406</b>		97.50 €
		250 g	Ø 0.2 mm	<b>4 230 402</b>		460.00 €
		250 g	Ø 0.3 mm	<b>4 230 403</b>		451.00 €
		250 g	Ø 0.4 mm	<b>4 230 404</b>		428.00 €
		250 g	Ø 0.5 mm	<b>4 230 405</b>		406.00 €
		250 g	Ø 0.6 mm	<b>4 230 406</b>		384.00 €
		1000 g	Ø 0.2 mm	<b>4 210 402</b>		1336.00 €
		1000 g	Ø 0.3 mm	<b>4 210 403</b>		1308.00 €
		1000 g	Ø 0.4 mm	<b>4 210 404</b>		1243.00 €
		1000 g	Ø 0.5 mm	<b>4 210 405</b>		1180.00 €
		1000 g	Ø 0.6 mm	<b>4 210 406</b>		1114.00 €

ⓘ All welding fillers as rods and reels also available in grammages other than 100 and 500 g.

### The perfect complement

**Welding filler holder**  
for weld filler metals from Ø 0.2 to 1.0 mm



Order No.	Price
<b>4 806 000</b>	8.85 €

### The perfect complement

**Welding rod feeding pen**  
for weld filler metals from Ø 0.2 to 0.6 mm




Order No.	Price
<b>4 806 100</b>	103.75 €

# Welding filler joke Fill R-80

„Beryllium copper wire with special additives for the repair of molds and dies, where a very high conductivity of heat or electricity is required. High hardness and good wear resistance, polishable, nonmagnetic. When welding use fume extractor!  
Hardness approx 250 – 300 HB. By temperature treatments hardness up to 40 HRC are possible.

Materials: copper alloys, bronze, steel.

Design	Weight	Dimensions	Order No.	Price from 1 pack
<b>joke Fill R-80</b>				
 Rods	50 g	Ø 0.2 x 500 mm	<b>4 153 002</b>	97.50 €
	50 g	Ø 0.3 x 500 mm	<b>4 153 003</b>	84.90 €
	50 g	Ø 0.4 x 500 mm	<b>4 153 004</b>	79.65 €
	50 g	Ø 0.5 x 500 mm	<b>4 153 005</b>	76.60 €
	50 g	Ø 0.6 x 500 mm	<b>4 153 006</b>	73.40 €
	250 g	Ø 0.2 x 500 mm	<b>4 133 002</b>	389.00 €
	250 g	Ø 0.3 x 500 mm	<b>4 133 003</b>	340.00 €
	250 g	Ø 0.4 x 500 mm	<b>4 133 004</b>	317.00 €
	250 g	Ø 0.5 x 500 mm	<b>4 133 005</b>	306.00 €
	250 g	Ø 0.6 x 500 mm	<b>4 133 006</b>	294.00 €
	1000 g	Ø 0.2 x 500 mm	<b>4 113 002</b>	1151.00 €
	1000 g	Ø 0.3 x 500 mm	<b>4 113 003</b>	1006.00 €
	1000 g	Ø 0.4 x 500 mm	<b>4 113 004</b>	941.00 €
	1000 g	Ø 0.5 x 500 mm	<b>4 113 005</b>	907.00 €
1000 g	Ø 0.6 x 500 mm	<b>4 113 006</b>	869.00 €	
1000 g	Ø 1.0 x 500 mm	<b>4 313 010</b>	238.00 €	

ⓘ All welding fillers as rods and reels also available in grammages other than 100 and 500 g.

### The perfect complement

#### Welding filler holder

for weld filler metals from Ø 0.2 to 1.0 mm



Order No.	Price
<b>4 806 000</b>	8.85 €

### The perfect complement

#### Welding rod feeding pen

for weld filler metals from Ø 0.2 to 0.6 mm



Order No.	Price
<b>4 806 100</b>	103.75 €

# Welding filler joke Fill R-90

Cu-Ag-Cr-Fe filler for beryllium-free application and joining of pure copper and bronze with a very high copper content. Very good electrical and thermal conduction properties, identical in colour. An increase in hardness of up to 30 % is possible by deep freezing at -20 °C and more. Hardness approx. 90 HB, up to 130 HB after deep freezing.

Materials: copper, copper materials, AMPCOLOY®

					Price from
Design	Weight	Dimensions	Order No.	1 pack	
<b>joke Fill R-90</b>					
	Rods	50 g	Ø 0.2 x 500 mm	<b>4 152 202</b>	82.85 €
		50 g	Ø 0.3 x 500 mm	<b>4 152 203</b>	71.25 €
		50 g	Ø 0.4 x 500 mm	<b>4 152 204</b>	65.00 €
		50 g	Ø 0.5 x 500 mm	<b>4 152 205</b>	61.85 €
		50 g	Ø 0.6 x 500 mm	<b>4 152 206</b>	58.75 €
		250 g	Ø 0.2 x 500 mm	<b>4 132 202</b>	330.00 €
		250 g	Ø 0.3 x 500 mm	<b>4 132 203</b>	283.00 €
		250 g	Ø 0.4 x 500 mm	<b>4 132 204</b>	259.00 €
		250 g	Ø 0.5 x 500 mm	<b>4 132 205</b>	248.00 €
		250 g	Ø 0.6 x 500 mm	<b>4 132 206</b>	234.00 €
		1000 g	Ø 0.2 x 500 mm	<b>4 112 202</b>	977.00 €
		1000 g	Ø 0.3 x 500 mm	<b>4 112 203</b>	977.00 €
		1000 g	Ø 0.4 x 500 mm	<b>4 112 204</b>	839.00 €
		1000 g	Ø 0.5 x 500 mm	<b>4 112 205</b>	731.00 €
		1000 g	Ø 0.6 x 500 mm	<b>4 112 206</b>	694.00 €
		1000 g	Ø 1.0 x 500 mm	<b>4 312 210</b>	93.80 €
	1000 g	Ø 1.6 x 500 mm	<b>4 312 216</b>	90.75 €	
	1000 g	Ø 2.4 x 500 mm	<b>4 312 224</b>	77.60 €	

ⓘ All welding fillers as rods and reels also available in grammages other than 100 and 500 g.

# Welding filler joke Fill S-90

Titanium welding filler for joint and build-up weldings on titanium and titanium alloys. Most frequently used filler for components from the fields of medical and dental engineering in addition to aerospace technology. Its essential components correspond to material no. 3.7025.

					Price from
Design	Dimensions	Order No.	1 piece		
<b>joke Fill S-90</b>					
	Spools	Ø 0.3 x 1000 mm	<b>4 252 303</b>	4.82 €	
		Ø 0.5 x 1000 mm	<b>4 252 305</b>	4.50 €	

ⓘ All welding fillers as rods and reels also available in grammages other than 100 and 500 g.

### The perfect complement

**Welding filler holder**  
for weld filler metals from Ø 0.2 to 1.0 mm



Order No.	Price
<b>4 806 000</b>	8.85 €

### The perfect complement

**Welding rod feeding pen**  
for weld filler metals from Ø 0.2 to 0.6 mm



Order No.	Price
<b>4 806 100</b>	103.75 €

## Conversion table for hardness values according to DIN 50150

Rockwell hardness HRC	Brinell hardness HB	Vickers hardness HV	HV tensile strength N/mm <sup>2</sup> or MPa
25	253	266	854
26	254	273	873
27	265	279	897
28	272	286	914
29	274	294	944
30	287	302	970
31	295	310	995
32	302	318	1024
33	311	327	1052
34	320	336	1082
35	329	345	1111
36	337	355	1139
37	346	364	1168
38	354	373	1198
39	363	382	1227
40	373	392	1262
41	382	402	1296
42	392	412	1327
43	402	423	1362
44	413	434	1401
45	424	446	1442
46	436	459	1481
47	448	471	1524
48	460	484	1572
49	474	499	1625
50	488	513	1668
51	502	528	1733
52	518	545	1793
53	532	560	1845
54	548	578	1912
55	566	596	1979
56	585	615	2050
57	603	634	2121
58	-	654	-
59	-	675	-
60	-	698	-

An extensive topic is sometimes  
a source of enquiry - contact us!  
**We will be pleased to help you!**

Your welding expert team



**Fabian Bickenbach**  
Product manager Welding technology  
**Tel.** + 49 (0) 22 04 / 839-548  
**Fax** + 49 (0) 22 04 / 839-540  
**Mail:** f.bickenbach@joke.de



**Frank Westerhoff**  
Head of export  
**Tel.** + 49 (0) 22 04 / 839-300  
**Fax** + 49 (0) 22 04 / 839-62  
**Mail:** f.westerhoff@joke.de



**joke Technology GmbH**  
Asselborner Weg 14 -16  
D-51429 Bergisch Gladbach  
**Tel.** +49 (0) 22 04 / 8 39-0  
**Fax** +49 (0) 22 04 / 8 39-60  
**Mail** sales@joke.de  
**Web** www.joke.de