

Forgeweld

DIE WELDING TECHNOLOGY FOR THE FORGING INDUSTRY



FW8

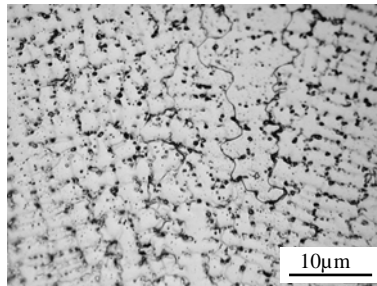
A Nickel based gas-shielded flux-cored welding wire designed for the reclamation of forging hammers.

DIN 8555 : MF23-GW300 CKPTZ

Nominal Composition

Cr	Mo	Co	W	Ti	Al	Ni
18	3	15	0.7	2.5	1.5	Bal

Microstructure



Welding Parameters – for guidance only

Ø, mm	Pre heat °C	Process	Polarity	Current (A)	Volts (V)	Stick Out, (mm)	Gas Type (L/min)
2.4	450	Manual	DC+ve	200-340	30-40	35	Ar/20%CO ₂ M21 (15)
2.4	450	Forgeweld Machine	DC+ve	350-650+	28-44	35	Ar/20%CO ₂ M21 (25)

Heat Treatment Guidelines

1	Pre heating	~100°C
2	Post weld heat treatment	Not required

Availability

2.4 mm Ø 25kg coil. 250kg pay-off pack.

Health and Safety

Welding produces fumes and gases which can be dangerous to your health. Arc rays can injure eyes and burn skin. Electric shock can kill. It is important to take suitable precautions when welding and follow safe working practices. These should be based on the Welding Manufacturers Association leaflets 236, 237 and 239.

The information contained in this document is typical of the product described but is not guaranteed.
Specification may change without notice

Doc. No.	Doc. Name: FW8 Standard data sheet	Issue: 1	Issue date: 2 / 7 / 2009	page 1 of 1
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FW7

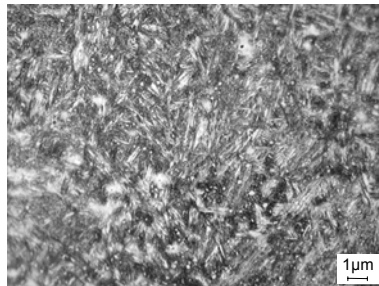
A gas-shielded flux-cored welding wire designed for the reclamation of hot forging dies.

Nominal Composition

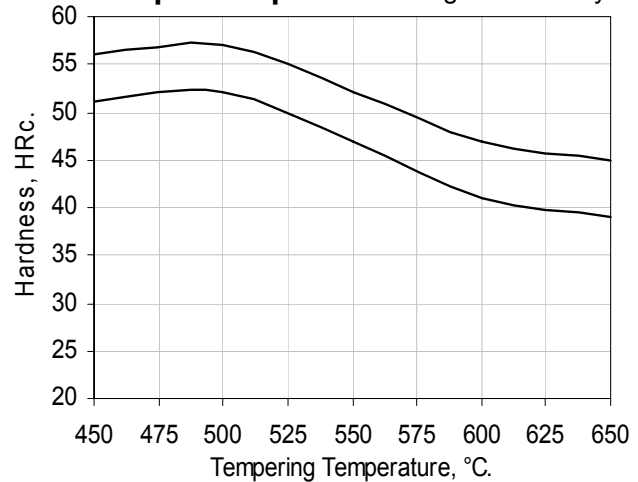
C	Mn	Si	Cr	Mo	Nb
0.6	1	0.6	5	0.5	>3

Microstructure

Martensitic matrix



Temper Response – For guidance only

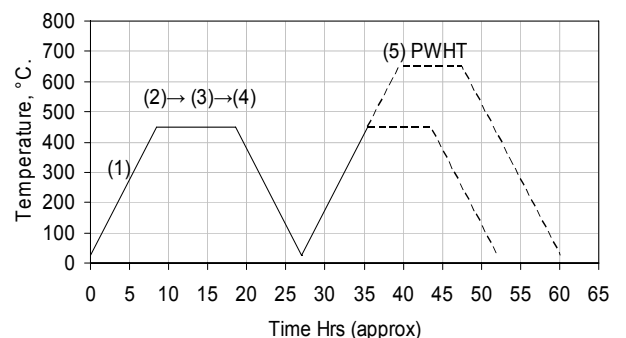


Welding Parameters – for guidance only

Ø, mm	Pre heat °C	Process	Polarity	Current (A)	Volts (V)	Stick Out, (mm)	Gas Type (L/min)
1.2	450	Manual	DC+ve	160-240	26-30	35	Ar/20%CO ₂ M21 (15)
1.6	450	Manual	DC+ve	200-350	28-30	35	Ar/20%CO ₂ M21 (15)
2.4	450	Manual	DC+ve	240-450	29-32	35	Ar/20%CO ₂ M21 (15)
1.6	450	Forgeweld Machine	DC+ve	200-450	28-36	35	Ar/20%CO ₂ M21 (25)
2.4	450	Forgeweld Machine	DC+ve	350-650+	28-44	35	Ar/20%CO ₂ M21 (25)

Heat Treatment Guidelines

1	All heating and cooling rates	<50°C/hr
2	Preheat	450°C
3	Interpass temperature	450°C-650°C
4	Temperature equalisation after welding	450°C/2hrs
5	Post weld heat treat	~450-650°C/8hrs



Availability

1.2mm Ø	13Kg spool
1.6mm Ø	13kg spool
2.4 mm Ø	25kg coil. 250kg pay-off pack.

Health and Safety

Welding produces fumes and gases which can be dangerous to your health. Arc rays can injure eyes and burn skin. Electric shock can kill. It is important to take suitable precautions when welding and follow safe working practices. These should be based on the Welding Manufacturers Association leaflets 236, 237 and 239.

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Doc. No.	Doc. Name: FW7 Standard data sheet	Issue: 1	Issue date: 1 / 4 / 2009	page 1 of 1
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FW6

A gas-shielded flux-cored welding wire designed for the reclamation of hot forging dies subject to wear.

Nominal Composition

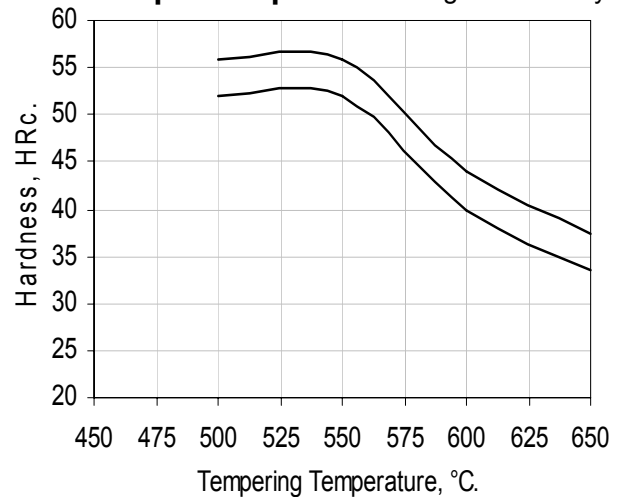
C	Mn	Si	Cr	Mo
0.25	1	0.6	8	1.6

Microstructure

Martensitic matrix



Temper Response – For guidance only

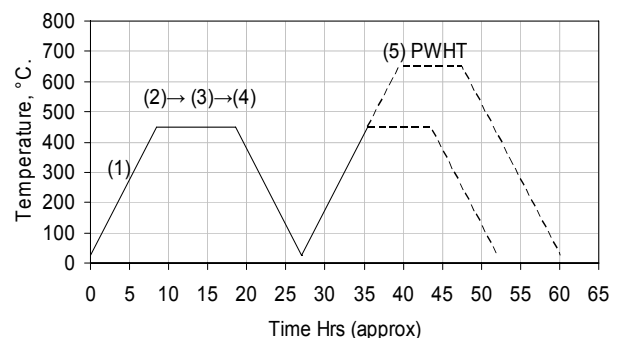


Welding Parameters – for guidance only

Ø, mm	Pre heat °C	Process	Polarity	Current (A)	Volts (V)	Stick Out, (mm)	Gas Type (L/min)
1.2	450	Manual	DC+ve	160-240	26-30	35	Ar/20%CO ₂ M21 (15)
1.6	450	Manual	DC+ve	200-350	28-30	35	Ar/20%CO ₂ M21 (15)
2.4	450	Manual	DC+ve	240-450	29-32	35	Ar/20%CO ₂ M21 (15)
1.6	450	Forgeweld Machine	DC+ve	200-450	28-36	35	Ar/20%CO ₂ M21 (25)
2.4	450	Forgeweld Machine	DC+ve	350-650+	28-44	35	Ar/20%CO ₂ M21 (25)

Heat Treatment Guidelines

1	All heating and cooling rates	<50°C/hr
2	Preheat	450°C
3	Interpass temperature	450°C-650°C
4	Temperature equalisation after welding	450°C/2hrs
5	Post weld heat treat	~450-650°C/8hrs



Availability

1.2mm Ø	13Kg spool
1.6mm Ø	13kg spool
2.4 mm Ø	25kg coil. 250kg pay-off pack.

Health and Safety

Welding produces fumes and gases which can be dangerous to your health. Arc rays can injure eyes and burn skin. Electric shock can kill. It is important to take suitable precautions when welding and follow safe working practices. These should be based on the Welding Manufacturers Association leaflets 236, 237 and 239.

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Doc. No.	Doc. Name: FW6 Standard data sheet	Issue: 1	Issue date: 1 / 4 / 2009	page 1 of 1
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FW5

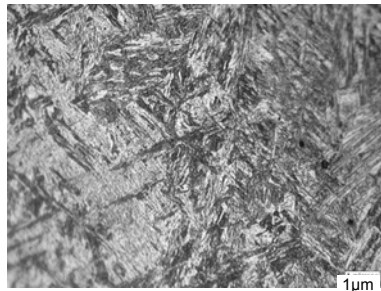
A gas-shielded flux-cored welding wire designed for the reclamation of hot forging furniture and can be used without post weld heat treatment.

Nominal Composition

C	Mn	Si	Cr	Ni	Mo
0.17	0.7	0.7	0.7	2.0	0.6

Microstructure

Martensitic matrix with limited delta ferrite content.



Typical Mechanical Properties

Room temperature, as welded,

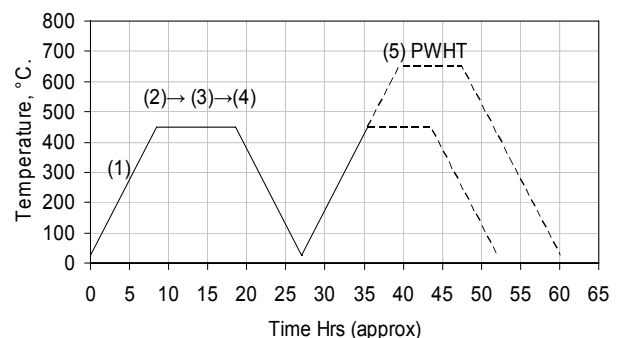
Rp0.2 MPa	Rm MPa	El5 %	RA %	CVN, Joules	Hardness HV
600	770	10	26	>10	250

Welding Parameters – for guidance only

Ø, mm	Pre heat °C	Process	Polarity	Current (A)	Volts (V)	Stick Out, (mm)	Gas Type (L/min)
1.2	450	Manual	DC+ve	160-240	26-30	35	Ar/20%CO ₂ M21 (15)
1.6	450	Manual	DC+ve	200-350	28-30	35	Ar/20%CO ₂ M21 (15)
2.4	450	Manual	DC+ve	240-450	29-32	35	Ar/20%CO ₂ M21 (15)
1.6	450	Forgeweld Machine	DC+ve	200-450	28-36	35	Ar/20%CO ₂ M21 (25)
2.4	450	Forgeweld Machine	DC+ve	350-650+	28-44	35	Ar/20%CO ₂ M21 (25)

Heat Treatment Guidelines

1	All heating and cooling rates	<50°C/hr
2	Preheat	450°C
3	Interpass temperature	450°C-650°C
4	Temperature equalisation after welding	450°C/2hrs
5	Post weld heat treat	~450-650°C/8hrs



Availability

1.2mm Ø	13Kg spool
1.6mm Ø	13kg spool
2.4 mm Ø	25kg coil. 250kg pay-off pack.

Health and Safety

Welding produces fumes and gases which can be dangerous to your health. Arc rays can injure eyes and burn skin. Electric shock can kill. It is important to take suitable precautions when welding and follow safe working practices. These should be based on the Welding Manufacturers Association leaflets 236, 237 and 239.

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Doc. No.	Doc. Name: FW5 Standard data sheet	Issue: 1	Issue date: 1 / 4 / 2009	page 1 of 1
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FW4

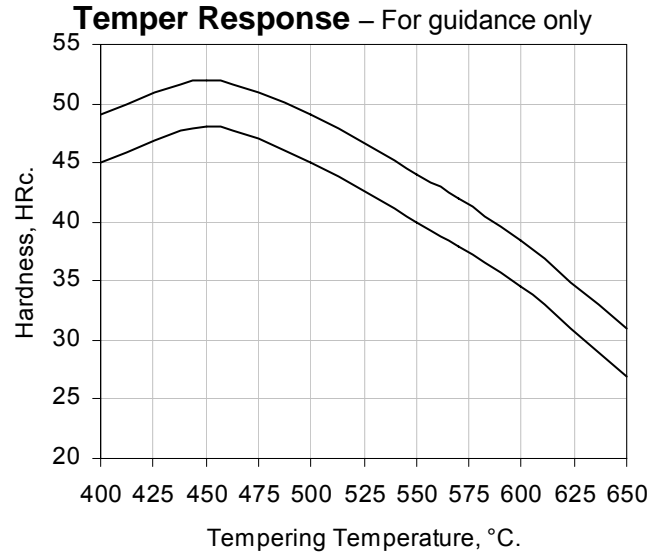
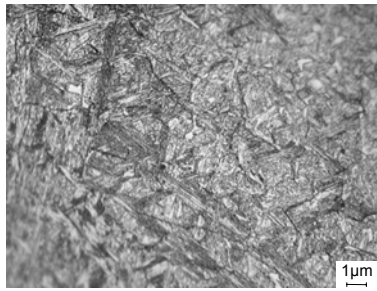
A gas-shielded flux-cored welding wire designed for the reclamation of hot forging dies: including: connecting rods, crankshafts, axle beams, suspension components.

Nominal Composition, wt%.

C	Mn	Si	Cr	Ni	Mo
0.13	1.0	0.6	9	1.7	3

Microstructure

Martensitic matrix

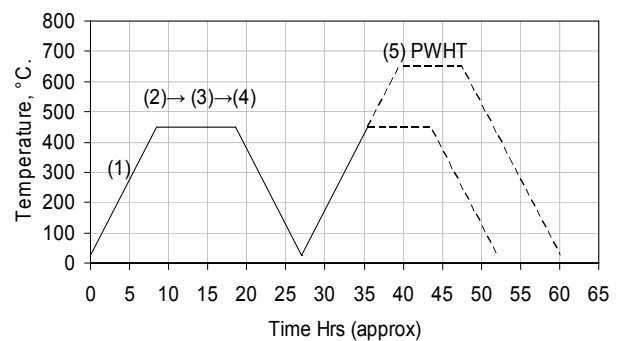


Welding Parameters – for guidance only

Ø, mm	Pre heat °C	Process	Polarity	Current (A)	Volts (V)	Stick Out, (mm)	Gas Type (L/min)
1.2	450	Manual	DC+ve	160-240	26-30	35	Ar/20%CO ₂ M21 (15)
1.6	450	Manual	DC+ve	200-350	28-30	35	Ar/20%CO ₂ M21 (15)
2.4	450	Manual	DC+ve	240-450	29-32	35	Ar/20%CO ₂ M21 (15)
1.6	450	Forgeweld Machine	DC+ve	200-450	28-36	35	Ar/20%CO ₂ M21 (25)
2.4	450	Forgeweld Machine	DC+ve	350-650+	28-44	35	Ar/20%CO ₂ M21 (25)

Heat Treatment Guidelines

1	All heating and cooling rates	<50°C/hr
2	Preheat	450°C
3	Interpass temperature	450°C-650°C
4	Temperature equalisation after welding	450°C/2hrs
5	Post weld heat treat	~450-650°C/8hrs



Availability

1.2mm Ø	13Kg spool
1.6mm Ø	13kg spool
2.4 mm Ø	25kg coil. 250kg pay-off pack.

Health and Safety

Welding produces fumes and gases which can be dangerous to your health. Arc rays can injure eyes and burn skin. Electric shock can kill. It is important to take suitable precautions when welding and follow safe working practices. These should be based on the Welding Manufacturers Association leaflets 236, 237 and 239.

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Doc. No.	Doc. Name: FW4 Standard data sheet	Issue: 1	Issue date: 1 / 4 / 2009	page 1 of 1
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FW3

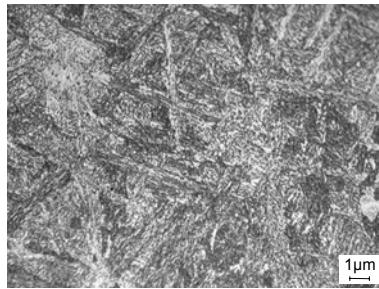
A gas-shielded flux-cored welding wire designed for the repair of forging plant including hammer die dovetail repair. Suitable for rebuilding hot forging hammer die impressions susceptible to cracking or where machining capabilities are limited.

Nominal Composition

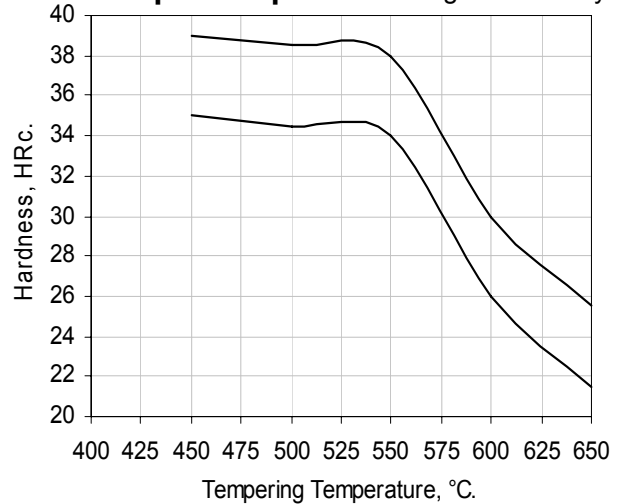
C	Mn	Si	Cr	Ni	Mo
0.1	1.0	1.0	2.5	-	1.0

Microstructure

Martensitic matrix with limited delta ferrite content.



Temper Response – For guidance only

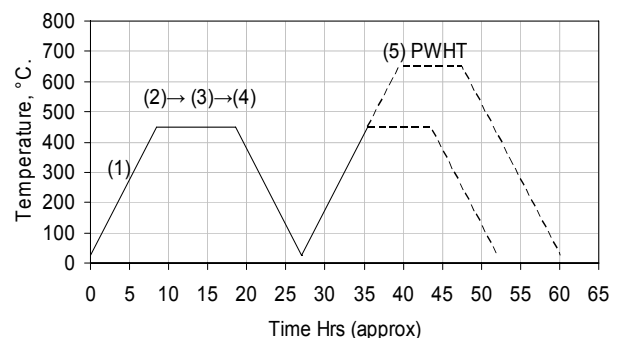


Welding Parameters – for guidance only

Ø, mm	Pre heat °C	Process	Polarity	Current (A)	Volts (V)	Stick Out, (mm)	Gas Type (L/min)
1.2	450	Manual	DC+ve	160-240	26-30	35	Ar/20%CO ₂ M21 (15)
1.6	450	Manual	DC+ve	200-350	28-30	35	Ar/20%CO ₂ M21 (15)
2.4	450	Manual	DC+ve	240-450	29-32	35	Ar/20%CO ₂ M21 (15)
1.6	450	Forgeweld Machine	DC+ve	200-450	28-36	35	Ar/20%CO ₂ M21 (25)
2.4	450	Forgeweld Machine	DC+ve	350-650+	28-44	35	Ar/20%CO ₂ M21 (25)

Heat Treatment Guidelines

1	All heating and cooling rates	<50°C/hr
2	Preheat	450°C
3	Interpass temperature	450°C-650°C
4	Temperature equalisation after welding	450°C/2hrs
5	Post weld heat treat	~450-650°C/8hrs



Availability

1.2mm Ø	13Kg spool
1.6mm Ø	13kg spool
2.4 mm Ø	25kg coil. 250kg pay-off pack.

Health and Safety

Welding produces fumes and gases which can be dangerous to your health. Arc rays can injure eyes and burn skin. Electric shock can kill. It is important to take suitable precautions when welding and follow safe working practices. These should be based on the Welding Manufacturers Association leaflets 236, 237 and 239.

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Doc. No.	Doc. Name: FW3 std data sheet	Issue: 1	Issue date: 1 / 4 / 2009	page 1 of 1
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FW2

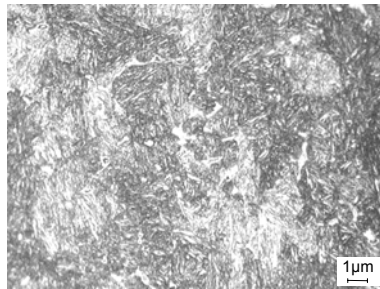
A gas-shielded flux-cored welding wire designed for the reclamation of hot forging press dies and the re-edging of clipping and forming tools.

Nominal Composition

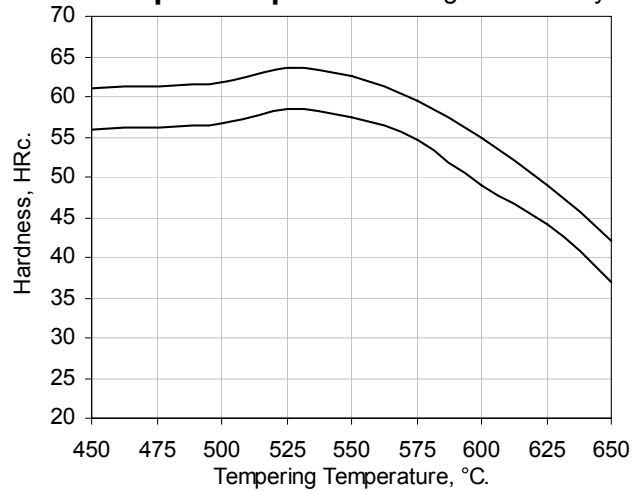
C	Mn	Si	Cr	Ni	Mo
0.35	0.6	1.0	5.25		3.0

Microstructure

Martensitic matrix



Temper Response – For guidance only

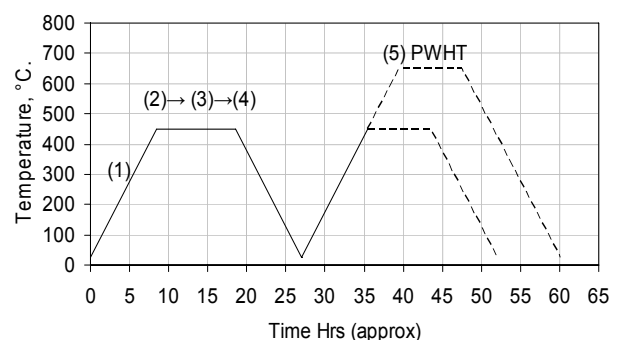


Welding Parameters – for guidance only

Ø, mm	Pre heat °C	Process	Polarity	Current (A)	Volts (V)	Stick Out, (mm)	Gas Type (L/min)
1.2	450	Manual	DC+ve	160-240	26-30	35	Ar/20%CO ₂ M21 (15)
1.6	450	Manual	DC+ve	200-350	28-30	35	Ar/20%CO ₂ M21 (15)
2.4	450	Manual	DC+ve	240-450	29-32	35	Ar/20%CO ₂ M21 (15)
1.6	450	Forgeweld Machine	DC+ve	200-450	28-36	35	Ar/20%CO ₂ M21 (25)
2.4	450	Forgeweld Machine	DC+ve	350-650+	28-44	35	Ar/20%CO ₂ M21 (25)

Heat Treatment Guidelines

1	All heating and cooling rates	<50°C/hr
2	Preheat	450°C
3	Interpass temperature	450°C-650°C
4	Temperature equalisation after welding	450°C/2hrs
5	Post weld heat treat	~450-650°C/8hrs



Availability

1.2mm Ø	13Kg spool
1.6mm Ø	13kg spool
2.4 mm Ø	25kg coil. 250kg pay-off pack.

Health and Safety

Welding produces fumes and gases which can be dangerous to your health. Arc rays can injure eyes and burn skin. Electric shock can kill. It is important to take suitable precautions when welding and follow safe working practices. These should be based on the Welding Manufacturers Association leaflets 236, 237 and 239.

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Doc. No.	Doc. Name: FW2 std data sheet	Issue: 1	Issue date: 1 / 4 / 2009	page 1 of 1
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The Forgeweld brand from Corewire delivers the consumables, the equipment and the know how to enable cost effective reclamation of hot forging dies, tools and equipment.

The Forgeweld Process

The Forgeweld process overcomes the limitations of conventional die repair practices by delivering **consistent** results. The use of the high quality Forgeweld welding consumables and the Forgeweld process deliver consistent weld deposit chemistry, microstructure and mechanical properties. Full training and ongoing technical support are provided as part of the Forgeweld **Technology Transfer** package, with focus on material selection, block preparation, welding procedure and heat treatment.

Hot Forging Dies

Forgeweld welding consumables are used extensively around the world for the repair of hot forging dies used in both **hammer** and **press** forges. Automotive dies (including connecting rod, axle beams and crank shaft), aerospace and general engineering dies have all benefited from the improved life and reduced cost attainable with the Forgeweld process.

Open Dies

Forgeweld consumables have also been exploited successfully for the refurbishment of forging hammers used in open-die forging applications, where nickel based materials are often warranted. The reduced cost of refurbishment compared to replacement can significantly reduce the tooling cost of the open forging process.

Forging Furniture

The benefits of the Forgeweld process are not limited to dies and hammers. The Forgeweld process is also an effective tool for the repair and refurbishment of forging furniture and auxiliary equipment, such as **rams**, **bolsters** and die **dovetails**.



Total Cost Saving

The application of the Forgeweld process can result in improved die life, reduced tooling cost and a **reduction in the total tooling cost per component**. For example: the weld reclamation of die inserts for a 2.5kg connecting rod using the FW4 consumable increased die life by 85%, reduced tooling cost by 43% and resulted in an overall reduction in the tooling cost / component of ~69%.

Forgeweld Consumable Range

The Forgeweld welding consumables are a range of high quality flux-cored gas-shielded wires that are designed to maximise protection of the weld deposit without compromising usability. The Forgeweld product range extends from low-alloy products suitable for localised repair of forging furniture, through tool steels for the repair of premium quality hot forging steels, to nickel-based materials for the reclamation of open-forging hammers.

The Forgeweld welding machines designed and manufactured by Corewire Ltd enable consistent high quality weld reclamation of hot forging dies and equipment.

Forgeweld Machines

Forgeweld welding machines, an integral part of the Forgeweld process, have been exploited by major forges around the world to reduce the cost of tooling and **optimise performance**.

The Forgeweld welding machines can achieve weld deposition rates of up to 18kg/hr. The highly efficient welding compares very favourably with manual welding rates of 4 to 5Kg/hr, whilst ensuring the quality of the deposit. The fully enclosed welding cell protects the operator and environment from the heat, ultraviolet radiation and fumes generated by the welding process.

Touch Screen Control

The Forgeweld machine welding parameters are controlled by a touch screen interface for simplicity. The control system incorporates **pre-programmed welding parameters** and remote control of the welding torch movement in three axes to ensure consistent high quality weld deposits.

A Flexible Approach

The flexibility of the Forgeweld Welding Machines allows the reclamation of dies ranging from small connecting rod inserts to large axle beam die blocks to the same high quality. Powered die loading systems, manipulators and rotators can be incorporated into the machine as required.

Total Technology Package

The Forgeweld consumables, Forgeweld welding machines, and the Forgeweld process together enable the cost effective reclamation of high quality dies. However, to realise the full benefits of the Forgeweld technology, Corewire provide full technical support to our customers including material selection, block preparation, welder training, weld procedure qualification and consultation.



Established in 1976, Corewire Ltd is amongst the world's leading producers of flux-cored welding consumables and machines for hardfacing and maintenance. Following considerable development, Corewire products are now offered under the Corewire, Weldclad and Forgeweld brands in recognition of the underlying technology and demands of client industries.



COREWIRE

Corewire branded products are designed for general hardfacing, repair and maintenance. The Corewire range of welding consumables includes low-alloy, tool steel, chrome carbide and complex carbide products. Corewire products are used extensively in the mining, quarrying, cement, agriculture and rail industries amongst others.

Weldclad

Weldclad is recognised as a world leader in the manufacture of submerged arc welding consumables and machines for the cladding of rolls, and associated components, used in steel making and non-ferrous industries. The product range includes proprietary tool steels and stainless steels designed to provide resistance to corrosion, wear and thermal fatigue.

Forgeweld

The Forgeweld range of welding consumables and machines are designed specifically for the repair and reclamation of dies, tools and auxiliary equipment used in the forging industry. The product range extends from low-alloy products for local repair of forging furniture to nickel based materials for the repair of open-forging hammers.

The product is only part of the service

Corewire Ltd endeavour to provide all our customers with a complete package of technical support, from welding procedures through to on-site training and consultation. Therefore, if you

would like to discuss our products and services or your application further then please do not hesitate to contact us.

www.corewire.com

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