Operation Instructions Welding Torches TIG

EN 60 974-7

Rohrman Schweisstechnik GmbH
Kränkelsweg 34 a · D-41748 Viersen
Tel. +49(0)2162/106065-0
Fax +49(0)2162/106065-55
www.rohrman.de
info@rohrman.de

Table of Contents

1 General . . . 3
1.1 Information regarding this operation manual . . . 3
1.2 Accompanying documents . . . 3
1.3 Copyright . . . 3
1.4 Explanation of symbols . . . 4
1.5 Warning notices . . . 5
1.6 Limitation of liability . . . 6
1.7 Warranty . . . 7
2 Security . . . 8
2.1 General . . . 8
2.2 Intended use . . . 8
2.3 Safety Instructions . . . 9
2.4 Hazard sources . . . 10
2.5 Users responsability . . . 14
2.6 Requirements for personnel . . . 15
2.7 Personal protective equipment . . . 16
3 Technical data . . . 17
3.1 General data . . . 17
3.2 Electrical control elements . . . 18
3.3 Torch specific data . . . 18
4 Construction and funktion . . . 19
4.1 Functional description . . . 19
4.2 Scope of delivery . . . 19
4.3 Principle construction . . . 20
5 Starting the operation . . . 22
5.1 Assembly of gasnozzle and electrode . . . 22
5.2 Connection to the welding powersource . . . 23
5.3 Connection to the cooling unit . . . 23
6 Operation . . . 25
6.1 Checks prior to start welding . . . 25
6.2 Welding process . . . 25
6.3 Interruption of the welding process . . . 25
7 Maintenance/cleaning . . . 26
7.1 Visual check . . . 26
7.2 Cleaning of welding torch . . . 26
7.3 Electrode grinding . . . 26
7.4 Replace of wearing parts . . . 27
8 Trouble remedy . . . 28
9 Storage . . . 29
10 Disposal . . . 29

1 General

1.1 Informations to this operation manual

This operation manual contains important instructions for the treatment of TIG welding torches during the instalation, setting up and the operation, about the maintenance and care as also of the disposal.

The precondition for secure, intended and economic operation is the compliance with all safety instructions and treatment instructions.

The notice of the instructions helps avoiding hazards, deminishes repair-cost and downtime and increases lifetime of the welding torch.

Moreover the actual accident prevention regulations and safety rules of the welding location must be observed.

This operation manual should be read carefully before beginning of all work! It is part of the product performance and should be kept near the welding torch accessible for the personel at any time.

1.2 Further applicable documents

Each torch will be delivered with a specific data sheet. This data sheet contains torch specific informations and is part of this operation manual. If no data sheet is attached please ask your distributor.

Because the welding torch operates with a power source, a wire feeder and optionally a cooling unit, the operation manuals of these equipments should also be observed.

1.3 Copyright

1.4 Explanation of symbols

Warning notices are additionally noticed by warning symbols.
In this operation manual the following warning symbols are used:

SYMBOL	SIGNIFICATION
	General warning notice
	Danger of electrical power
	Explosion danger
	Danger of fire
	Burning danger
	Risk of inhalation of toxic substances
	Danger of strong UV-radiation
	Danger of radioactive substances
	General notices and useful advices for handling

1.5 Warning notices

The warning notices as used in this operation manual are introduced by signalwords which bring to express the extend of the hazard. The warning symbol points additionally to the kind of hazard.

In this operation manual the following warning notices are used:

DANGER

Danger for life!

Consequences of ignoring …

▸ notices for avoidance

A warning notice of this kind of danger level signalizes a threadning dangerous situation. If the dangerous situation will not be avoided, this leads to death or to serious injuries. These instructions must be followed in order to avoid the danger of death or of serious injuries of personnel.

PRECAUTION

Risk of injury!

Consequences of ignoring …

▸ notices for avoidance

A warning notice of this kind of danger level signalizes a possible dangerous situation. If the the dangerous situation will not be avoided this could lead to death or to serious injuries. These instructions must be complied in order to avoid the danger of death or of serious injuries of personel.

CAUTION

Risk of personelx damage … !

Consequences of ignoring …

▸ notices for avoidance

A warning notice of this kind of danger level signalises a possible dangerous situation. If this situation will not be avoided it could lead to slight or moderate injuries. These instructions must be complied in order to avoid personal injuries.

REFERENCE

Text of reference …

A reference signifies additional informations, important for the later treatment, or for easier adaptation of the described work step.

1.6 Limited liability

All disclosures and notices in this operation manual have been collected taking in account of all valid standards and regulations, the state of art as well as our long standing knowledge and experience.

We reserve alterations of the discussed welding torches in the context of further devellopments. From the notices, pictures and descriptions in this operation manual claims cannot be derived.

The manufacturer does not accept liability for damages and operational disruptions caused by:

- non-compliance of this operation manual,
- improper use,
- use of inadaquately trained personnel,
- use of improper operating materials,
- faulty connection,
- non use of original **Rohrman components**,
- technical alterations not corresponded with **Rohrman Schweißtechnik**,
- non-implementation of required maintenance.

Rohrman Schweißtechnik is liable for any of his errors or omissions, excluded further claims which do not reflect the context of the duties from the in the contract entered warrenty obligations. Damage compensation regardless on whatever legal grounds they derive are excluded.

1.7 Warranty

We, Rohrman Schweißtechnik GmbH, deliver a tested quality product. At the time of delivery we warrant for an error free product, free from material- or processing errors and suitable for the intented use to the state of art and to the legal regulations.

Warranty claims can be raised only for fabrication errors, but not for damages caused by natural wear or improper use. No warranty will be taken for poor work results. Wear parts are excluded from the warranty.

The Warranty policy covers no damages or functional defects caused by improper use as there are:

- not following the notices in this operation manual,
- improper installation or -assembly,
- inadequate maintenance,
- altering of product against original state,
- overloading, misuse or improper use,
- mechanical damages caused by collision or accident.

2 Safety

2.1 General

This chapter serves for important references of all safety aspects for the optimal security of personel as well as the secure and trouble-free use.

WARNING

Danger for not following the security notices!!

Substancial danger can arise if the security notices and handling instructions in this operation manual will not be followed.

- ▸ All warning notices and – instructions must be observed.
- ▸ Also must be observed the security notices in the aplicable documents.

2.2 The intended use

The welding torches of the series TIG are meant exclusively for welding with inert gas (Argon) of low- and high alloyed steel and light alloys. They meet EN 60 974-7. They do not represent a device as having individual functions of performance. The TIG-arc welding will only be possible in connection with a power source.

The application may only be performed by trained, professional personel in complyance with the relevant regulations. Any other use byond its intended purpose does not comply with these regulations.

WARNING

Danger when non complied use!

Any use beyond the intended purpose can lead to dangerous situations.

- ▸ Use the welding torch only for the intended purpose.
- ▸ Follow all notices and instructions of this operation manual.

Claims of any kind due to damage of non-intented use are excluded. The risk bears only the operator.

2.3 Security notices

For safe handling of the welding torch the following security notices should be noted:

- Welding operations should only be performed and performed by professional personel who have knowledge of the relevant regulations of arc welding.
- Personel should wear dry protective cloth and eye protection.
- Welding operations should not be performed in potential explosive environment.
- Personel with pacemaker or other medical implant should not perform operations with TIG-arc welding equipment.
- The TIG-welding torch and – hose and cable package should be checked on outside visible damages. A damaged welding torch should not be put in operation.
- Check the orderly state of the power source and the cooling unit as well as the function of the remote control elements before starting the operation.
- Repair of the welding torch or of the connection lead should only be made by an authorized professional shop or by the factory service. Substancial dangers for the user might occur by inexpertly repairs.
- Defect parts should only be exchanged by original Rohrman components. Only these parts may garantee the security requirements.
- The welding torch should be put aside so that no contact with current conducting parts may occur.
- During maintenance and cleaning the power source should be turned off.
- The torch package should not be put over hot or sharp edges.

2.4 Sources of danger

In the following the direct and indirect sources of danger, which may lead to accidents with TIG-arc welding, are listed.

2.4.1 Electric current

DANGER

Danger for life by electrical current!

By contact with leads or loaded workpieces danger for life exists! Pay attention to the following notices in order to avoid hazards by contact with electrical power:

- ▸ Wear dry protective cloth.
- ▸ Take insulation precautions when distance to conductive parts is less than 2 meters.
- ▸ Switch off the power source during all maintenance on the welding torch.

2.4.2 Radioactive substances

DANGER

Danger for life by radioactive substances!

With welding and grinding of thorium containing tungsten electrodes radioactive substances are set free.

- ▸ Use appropriate grinding machine with exhausting facility.

2.4.3 Strong heat devellopment

DANGER

Burning hazard!

The TIG-torch head, the workpiece, flying sparks and spatters are hot and may cause burning. The following references should be noted to avoid burnings:

- ▸ Protect the eyes for flying sparks and spatters.
- ▸ Wear suitable protective cloth.
- ▸ With overhead welding carry additional head protection.

2.4.4 Strong radiation

WARNING

Danger of strong radiation during welding!

During the welding procedure emerges a strong radiation in the area of the arc!

Please obey the following notices in order to avoid injuries by strong radiation:

- ▸ Wear eye protection with radiation safeguard filter.
- ▸ Protect open skin against UV-radiation.
- ▸ Protect other people by shielding the welding area.

2.4.5 Harmful subtances in the breathing air

WARNING

Danger by harmful substances!

Harmful smoke and gases may occur during the welding procedure!

Please note the following notices in order to avoid harmful substances in the breathing air:

- ▸ Workpieces degreased with chlorine containing x
- ▸ Solvents should be rinsed thoroughly with water in order to avoid toxic phosgene gas.
- ▸ Extract smoke and gases by a suitable exhausting.
- ▸ Wear a respirator when exhausting may not be possible.
- ▸ Pay attention to the wind direction when welding outside.

2.4.6 Danger of injury by the welding wire

PRECAUTION

Possible engraving injury by the welding electrode!

By the scharp pointed tungsten electrode engraving injuries may occur.

- ▸ Put a protective cap on the electrode or recess the electrode in the nozzle.

2.4.7 Explosion danger

DANGER

Explosion danger during welding!

Welding on containers, apparatus or pipelines may lead to explosions. Please obey the following directions in order to avoid the unleash of explosions:

- Please obtain the approval for welding operations. Never weld in areas marked as potentially explosive .
- Make sure that no explosive atmosphere existst in the welding area.
- Empty the container, clean and fill with protective atmosphere.
- Make sure that no excess pressure arises.

2.4.8 Fire hazard

WARNING

Fire hazard while welding!

Fire may occur during and after welding! Please obey the following notices in order to avoid the arising of fire:

- Remove or cover flamable materials from the working area or from the workwear.
- Seal or shield areas with incombustible materials.
- Provide extinguishing agent.
- Organise before and after welding fire posts or fire guards.

2.4.9 Dangers of the work area

WARNING

Various dangers of the work area!

Depending on the nature of the work area indirect dangers may occur! Please note the following references in order to avoid injuries:

- Use an adaquate welding unit in the case of increased danger by humid enviroment or humid wear and place the welding unit beyond the dangerous area. Secure the welding unit by an RCD (FI interruptor)
- Use additional insulation against contact of electrical leads in confined areas (distance of less than 2 meters).
- Please remove additional equipment from the work area in order to prevent stray current or burning of the safety line.
- Secure gasbottles against overthrowing.
- In work areas with a noise level > 80 db(A) please wear ear-protection.

2.5 Reponsability of the operator

As the welding torch is used in the comercial sector, the operator is subject of the legal duties of occupational health and safety regulations. Additional to the work safety regulations in this operational manual safety, accident prevention and enviromental regulations must be adhered to.

The operator must ...

- must inform himself re the valid work security regulations and must determine specific dangers which arise from special work circumstances at the location. If the work place is permanently installed he should execute in form of operating instructions.
- set the unambiguous competence of personell for installation, operation, maintenance and cleaning.
- ensure that all cooperaters dealing with the TIG-welding torch read and understand this operation manual. Moreover he should retrain personell and inform them re the dangers arising from TIG-welding torches.
- supervise the security- and danger concious work of personnel in accordance with this operation manual and valid regulations.
- ensure the accessability of this operation manual and all further regulations to operation- and maintenance personel.
- set the operation responsability and allow the operater to refuse adverse safety instructions from third party !
- provide necessary protection equipment.

Moreover the operator is reponsable for faultless condion of the welding torch. Therefore the operator must ...

- ensure that the maintenance- and cleaning interval as described will be respected.
- verify regulary the security provisions on functional competence and completeness.
- Ensure that combination of welding torch and power source match according EMV- regulation 2004/108/EG.

2.6 Personel requirements

2.6.1 Qualification of personel

WARNING

Danger of injury with inadaquate qualification.

Improper handling could lead to significant personal- or property damage.

▸ All work should be carried out by qualified peronel.

In this operation manual the following qualifications for the different field activities will be described:

- **Technical personel**

  is on account of its technical education, knowledges and experierences as well of his familiarity with relevant provisions in the situation to carry out the work entrusted to him and rekognise and avoid independently possible dangers.

Personel with limited reaction capability for instance by drugs, alcohol or medicine are not licened.

Personel in training, teaching or instructing position or in the context of education should only be active under supervision of experienced Personel!

NOTICE

With selection of personel, please pay attention to the age- and occupation-specific regulations on the work location.

2.7 Personel protection equipment

WARNING

Danger of injuries by the use of faulty or missing protection equipment!

It is mandatory to wear personel protection equipment in order to minimize health impairments.

- ▸ Always wear the neccesary protection equipment for the respective job.
- ▸ Follow the attached notices for the personel protection equipment in the work area.

Wear the following protection equipment with all work with the TIG-welding torch:

Tight, flame retardant safety cloth
Additional leather apron to protect for burning with certain jobs

Welding gloves to protect for burnings, radiation and electrical contact

Safety shoes with steel noses and insulating, oilrestent security sole

Face protection with suitable filter to protect the eyes and sight against flashes, burnings and strong UV-radiation

Please, wear the following protection when working with the TIG-welding torch depending on the work area.:

Safety helmet to protect the head for falling objects.
Suitable head protection when overhead welding

Ear protection in enviroments with a noise level of > 80 db(A)

3 Technical Data

3.1 General data

Welding process:	TIG	
Electrode:	Tungsten electrode acc EN 6848 depending on torch type	
Max. electrode length:	(see datasheet)	
Welding position:	all	
	acc DIN EN 439	
Protective gas:		
Guidance:	handguided	machineguided
Type of protection:	IP3X	IP2X
Voltage demensioning (peak value):	113 V_{SS}	141 V_{SS}
Current type:	DC or AC (see data sheet)	
Polarity of electrode (bei DC):	regulary negative	
Max. ignition tension:	10 kV	
Breakdown voltage:	50 Hz	
Enviroment temperature at work place:	–10 ... +40 °C	
Temperature in store:	–25 ... +55 °C	
Relative humidity:	< 90 % (at 20 °C)	
Cooling:	Air or Water	
With watercooled torches:		
Flow rate (min.):	0.7 l/min	
Entrance pressure (min.):	2.5 bar	
Entrance pressure (max.):	3.5 bar	
Entrance temperature (max.):	40 °C	
Exit temperature (max.):	60 °C	
Cooling capacity (min.) (depending on application)	800 W	

All informations are valid for hose and cable packag of 4 m.

3.2 Remote control

Switch tension	0,02 – 42 V (DC and AC)
Switch current	0,01 – 100 mA
Switch-performance max.	1 W (resistive load)
Potentiometer	linear 1 W at 40 °C

3.3 Torch specific data

NOTICE

The TIG-torch specific data are listed in the attached data sheet. This datasheet is part of this operation manual.

The datasheets contain informations on the capacity rating of the TIG-torch. The drawings show the assembly and application of the respective wear parts and components.

4 Structure and function

4.1 Description of structure

With TIG-welding an arc is generated between tungsten electrode and the work piece which melts the work piece. The arc and the weld puddle are protected by inert gas (Argon). Eventually filler metal can be added.

The welding power is transferred by the collet or guide to the tungsten electrode.

The cooling takes place by the ambient air (air cooled) or by cooling liquid (water cooled).

NOTICE

Take the cooling method from the enclosed datasheet

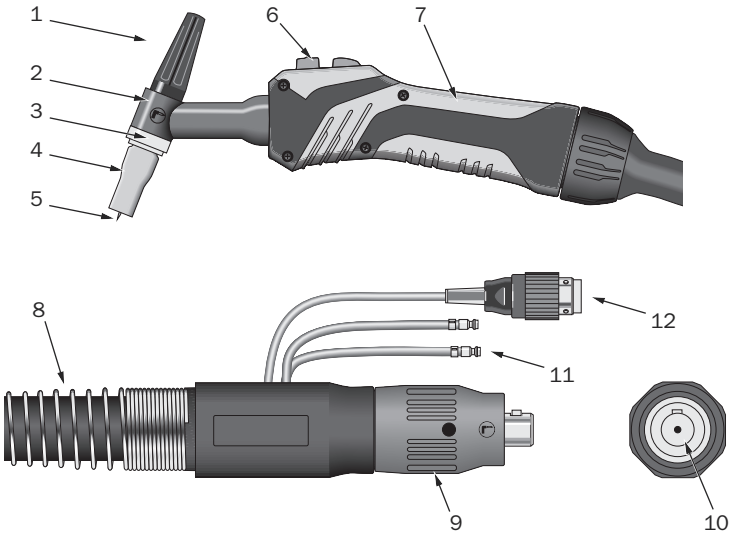
4.2 Scope of supply

NOTICE

The scope of supply may vary to the type of TIG-torch. Take the exact scope as described on the attached datasheet and compair with the delivery note.

Check the supply on comleteness and on visible damages. report and write an incomplete or damaged supply immediately to your distributor or supplier and to your forwarding agent.

4.3 Principle construction



1	Back cap
2	Torchbody
3	Gasket (optional)
4	Ceramic Nozzle
5	Tungtsten Electrode
6	Switch
7	Handle (optional with additional remote controls)
8	Kink protection
9	Connection nut
10	Central connection (alternativ connections available)
11	Connection cooling (optional)
12	Control connection power source (optional)

NOTICE

With the standard torch 2-stroke operating mode is possible.

Depending on the execution of the power-source further remote controls may be integrated in the handle of the TIG-torch. The type of connection is adapted to the type of power source. For further information, please look in the data sheet of the torch and in the operation manual of the power source.

4.3.1 Operation

NOTICE

With the standard TIG-torch 2-stroke operation is possible. Further operating modes are dependent on the type of power source and will be served by the TIG-torch execution.

2-Stroke operation:

- Keep pressing switch:start of operation
- Release switch: end of operation, wait for post flow of gas.

5 Starting the operation

WARNING

Danger of injury during start-up!

With faulty procedure during the start-up of the welding torch danger of injury exists.

▸ Shut off the additional units and close gas entrance before starting-up the power-source.

5.1 Assembly of gasnozzle and tungsten electrode

- Eventually shorten the tungsten and grind it pointed, as described in ***chapter 7.3 grinding of electrode***.

NOTICE

The alloy of tungsten electrode should be determinated acc. EN ISO 6848. The length of electrode is dependent on the torchtype see datasheet.

- Electrode assembly as described in ***chapter 7.4.2 Exchange of electrode***.
- Select and assemble gasnozzle as described in ***chapter 7.4.1 gasnozzle exchange***.

5.2 Connection to the power-source

NOTICE

Before connecting the torch package to the power-source please check the contacts on cleanliness and damage.

▸ Eliminate soiling or damage and exchange parts if needed.

- Check connections for welding current, gas and control cord acc manual of the power-source.
- Assure that all gas connections are gas-tight.

5.3 Connection of cooling unit

NOTICE

Before connecting the cooling-unit, check if the cooling unit has the proper connections for water inlet (blue) and -outlet (red). In most cases these connections are of the type 21NW5.

▸ The connecting tubes should not kink.

▸ If the length of tubes is not sufficient, extension hoses can be obtained in specialised shops.

▸ Use Rohrman coolant liquid, to avoid corrosion and frost. This coolant may extend the life-time of the torch substancially.

- Put water-inlet and -outlet on the power-source. Make sure that quick connectors will be put-in water tight.
- Check operational readiness of cooling unit acc. the fabrication manual.

5.3.1 Bleeding of cooling unit

On each initial use of the unit or respective torch exchange the cooling system must be bleeded:

- Connect water entrance (blue) to the cooling unit.
- Release water return (red) from the cooling unit and keep it over a container.
- Turn-on cooling unit.
- Alternately close and open the water-return.

NOTICE

- ▸ Repeat the procedure until coolant flows continuesly without bubbles.
- ▸ Check minimum quantity of coolant in cooling-unit.

- Shut of cooling unit.
- Put connector water return (red) again on cooling unit.

6 Operation

6.1 Initial to the operation

Before operation check the following:

- correct protection gas?
- enough quantity of gas?
- minimum quantity of coolant?
- no damages on torch and package?
- correct tungsten alloy and diameter and in good condition?
- personal protection equipment available and not damaged?
- no danger in the work area?

6.2 Welding procedure

- Put earth cable (generally positiv) to work piece, so that direct return flow of current to power-source is garanteed.
- Adjust protection xgas quantity at pressure regulator. Quantity of protectiongas is dependent of weldingprocess and geometry of nozzle. In exceptional cases other gases than argon may be used.
- Set type of current (AC or DC), amperage and in the case of automatic welding wire, speed according the given application.
- Switch-on power-source and cooling unit.
- Enter TIG-torch to work piece and start welding.

6.3 Work interruptions

- wait for post-flow of protection gas.
- remove torch from work piece.
- lay-off torch insulated.
- after working end switch-off power-source and cooling unit and close gasbottle.

7 Maintenance/Cleaning

NOTICE

Before beginning the maintenance and cleaning of the TIG-torch, switch-off the power-source and the other units and close gasbottle.

7.1 Visual check

- Carry-out the following visual checks before any use:
- Check the TIG-welding torch and package visually before any use. Do not use a damaged welding torch.
- Check gasnozzle on possible spatter bridge. If needed clean gas x nozzle. If heavily worn, exchange nozzle.
- Check right seat of connections on the power-source and cooling unit.

7.2 Cleaning of torch

- Release gasnozzle and remove spatter or exchange gasnozzle.
- Remove impurities on torch body and handle with a rag.
- Check wear parts, clean or replace if worn-out.

7.3 Pointing of electrode

DANGER

Danger of death by radioactive substances!

During welding and grinding of thorium containing tungsten electrodes,x radioactive substances are set free.

▸ Use an appropriate grinding machine with exhausting facility.

For optimal welding condition a smooth striation free radial ground is required.

- Use grinder with diamant disc to grind the tungsten electrode.

7.4 Exchange of wear parts

7.4.1 Exchange of gasnozzle

- To exchange of gasnozzle proceed as follows:
- Pull of worn-out gasnozzle or unscrew.
- Put-on new gasnozzle or screw-on.

7.4.2 Exchange of electrode

To exchange the tungsten electrode proceed as follows:

- Loosen back-cap.
- Take-out electrode.
- Put-in newly ground electrode in TIG-torch head and turn fix with back-cap.

8 Troubleshooting

Trouble	Cause	Remedy
Torch gets too hot	Electrode loose	Fasten electrode
	Lack of cooling flow	Check cooling system
Arc does not ignite.	Power source shut off	Switch on power source
	Control lead broken	Check control lead and connector on the power source
Unsteady arc	Electrode worn-out	Grind elektrode or exchange
	Wrong setting of power source	Change setting of power source
Porosity	Lack of gasprotection	Check gas quantity and bottle containment
	Draught air	Protect work place against draught air

NOTICE

Please notice the operation manual of the power source. If the trouble cannot be resolved by the mentioned remedies, call for the service support of your distributor.

9 Storage

Clean the welding torch, if the torches will not be needed for a longer periode, as described in ***Chapter 7.2 Cleaning***.

Store the welding torch and additional parts in a dry, clean and frost free place with compliance under the technical data specified enviroment conditions.

10 Disposal

Disposal of the packing material

The packing material protects the welding torch against transportation damages and is selected to enviromental- and disposal compatible criteria thus recyclable. Recycling of packing material saves recources and deminishes the amount of waste.

Dispose not needed packing materials according local regulations.

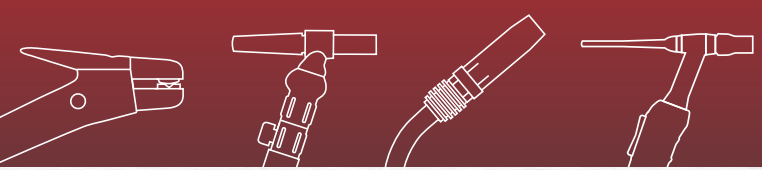
Disposal of worn out torches

The welding torch contains mainly recyclable materials.

- Scrap metals.
- Recycle plastics.
- Sort out the other materials and dispose.

The local authorities or specialised recycling plants may give information for enviromental sound disposal.

Notes



ROHRMAN
SCHWEISSTECHNIK

For more information contact your local welding supply distributor.

10/2014

Rohrman Schweisstechnik GmbH
Kränkelsweg 34 a · D-41748 Viersen
Tel. +49(0)2162/106065-0
Fax +49(0)2162/106065-55
www.rohrman.de
info@rohrman.de