PANDROL



WEL-D'STRESS® Hammer

OPERATION MAINTENANCE MANUAL REF: 519612001

PANDROL

WEL-D'STRESS®

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Issue 2 June 2019

Partners in excellence

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1. Safety labels explanation

CAUTION

Please follow all instructions provided in the operating instructions before using or working on the equipment.

The characteristics and descriptions of the products are subject to change without notice from us.

This product is designed for :

- Hammering aluminothermic welds.
- Clean aluminothermic welds by removing materials such as sand or metal burrs.

Pandrol declines all responsibility if this product is used outside the conditions mentioned in this manual, i.e. cleaning and hammering aluminothermic welds.

This product is for professional use only.

Before working on the product, make sure to stop the compressed air supply.

Comply with current procedures and standards for disposing of parts, grease, oil, etc.

Always make sure that there is a chisel in the hammer before operating it, otherwise it may deteriorate.

Read and understand the safety instructions before installing, operating, changing accessories on or working near the hammer. Failure to comply with these instructions may result in serious personal injury.

The hammer should only be used by qualified and experienced operators.

Do not modify the hammer. Modifications can reduce the effectiveness of safety measures and increase the risks to the operator.

Do not neglect the safety instructions, leave them to the operator.

Do not use the hammer if it has been damaged.

The hammer must be checked periodically to ensure that the nominal characteristics, the marking, required by ISO 11148, are legibly marked on the hammer. The employer/user must contact the manufacturer to obtain replacement of the labels if necessary.

A failure of the chisel, tool holder or other parts can generate projectiles at high speed.

Always wear impact-resistant eye protection equipment when operating the hammer. The degree of protection appropriate for each use should be assessed.

It is necessary to assess the risks incurred by third parties.

Never operate the hammer until the tool is retained by the device provided for this purpose.

To avoid injury, worn, cracked or deformed parts of the restraint system must be replaced.

Hold the tool firmly on the work surface before starting the hammer.

Pressurized air can cause serious injuries:

- Always close the air supply, drain the pneumatic pressure hose and disconnect the hammer from the air supply when it is no longer in use, before changing accessories or carrying out any repairs.
- Never direct the air flow towards yourself or another person.

Hose whipping can cause serious injury. Always check that hoses and connections are tight and in good condition.

Cold air should be directed away from hands.

Do not exceed the maximum pneumatic pressure prescribed for the hammering.

Never carry the hammer by the hose.





2. Product identity sheet

Manufacturer	Pandrol	Inserted tool	Chisel
Model Number	519612001	Capacity	110mm
Туре	Pneumatic Hammer	Frequency Hz	67 Max
Serial number	001	Operating pressure, bar	4 Max
Year of manufacture	2019	Air flow rate I.s ⁻¹	3 Max



3. General description of the installation

3.1 Objectives

The purpose of the hammering operation is to increase the field life of the welds when the holding problems have been identified as being related to fatigue stresses:

- To the web/head connection (Fig. 1).
- Above the foot (Fig. 2).

The initiation of the fatigue spot is always located at the junction between the weld collar and the rail. This is the reason why the hammering is located at this change of section, on the whole profile.

Figure 1: Fatigue at the connection head/web







3.2 Hammering case

Material provided in the case (Fig. 3):

- 1 hammer directly connected to a 1m long hose equipped with a quick coupling (1).
- 1 5m hose with 2 quick couplings (2).
- A magnetic telescopic lamp (3).
- 2 13 & 26 wrenches for tightening and loosening the tool holder (4), with a template to assist in checking the geometry of the chisels
- 2 chisel boxes (5 & 6) containing:
 - 5 short chisels for hammering (see §7. Equipment, nomenclature).
 - 2 long chisels for cleaning the weld and removing metal burrs (see §7. Equipment, nomenclature).
- 2 tool holders (7).

A material label with the required information is attached to the hammer's bell (Fig. 5)



Figure 4: 13 & 26 key with the template to help control the geometry of small chisels



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The long or short chisels that can be used in the pneumatic hammer must have the technical characteristics indicated in point 7, Equipment, Nomenclature for references 548401208 and 531110424.

3.3 Commissioning and use

- Check the condition of the hoses before use.
- Connect the hammer to a compressed air supply using the 5m 27 hose.
- Switch on the compressed air.
- Place one hand on handle 4 and the other on the back of the hammer.
- Press the bell 23.

3.4 Caution for use

The aluminothermic welding can be hammered at room temperature, up to 300°C.

The manufacturer recommends the use of Personal Protective Equipment to prevent the following risks:

Risks	PPE
Ingestion	Mask
Burns	Protective clothing, fireproof gloves, helmet
Projection of particles into eyes	Glasses or protective visor
Hearing loss	Hearing protection

The hammer must be supplied with dry and clean compressed air.



When the hammer is used with a compressor, the compressor should be used and maintained according to the manufacturer's recommendations (refer to the operating instructions).

It is advisable to purge the compressed air supply systems upstream of the hammer (tank, Filter Regulator Lubricator, drying system, etc.) very regularly.

The hammer must be slightly lubricated (1 drop/min) to allow proper operation.

NOTE:

Experience shows that, depending on the climatic conditions (temperature, humidity) and the equipment used to obtain compressed air, water condensation could occur. It is imperative that this water is not transferred to the hammer or it will be blocked.

4. Functional description of weld hammering

4.1 Clean welding

- Before hammering a weld, it is essential to clean it to make the boss/rail connection as clean as possible (Fig. 6). The use of long flat chisels facilitates this cleaning operation to remove sand (Fig. 7) and flashing (Fig. 8).
- The lower the temperature of the weld, the easier it is to remove sand whose adhesion to the steel decreases.
- To ensure maximum efficiency of hammering and, if possible, it is preferable to remove metal burr (flashing) before hammering.

Figure 6: Cleaned before hammering



Figure 7: Hot cleaning removal



Figure 8: Cleaning: Removal of burrs Metal sand (flashing)



4.2 Hammering operation

A hammering operation requires a minimum of 4 minutes per weld and can be performed:

- Hot: so on a weld during cooling.
- Cold: so on a completely cooled weld.

4.2.1 Hot Hammering

- Hot hammering is only effective and efficient when it is carried out on a weld that has dropped below 300°C. From this moment on, up to room temperature, it is possible to hammer a weld.
- The temperature, targeting a maximum of 300°C, is the only criterion that defines whether or not hammering can be carried out. It must be controlled on the mushroom.
- The requirement to wait 300°C before hammering allows operators time to correctly carry out all finishing operations (unmoulding, slicing, cleaning, grinding, roughing, etc.) and finally fixing the rail to the sleepers.
- It is recommended to use a thermocouple or pyrometer to control the temperature of the weld to ensure that it has dropped below 300°C.

TEMPERATURE MEASUREMENTS

Temperature measurements must be carried out with care because:

With a thermocouple, the temperature indicated may vary depending on the type of thermocouple, the contact pressure and the contact surface.

With a pyrometer, the temperature indication may be incorrect if the target surface is bright (e. g. polished surface after grinding).



4.2.2 Cold Hammering

- Cold hammering should be carried out as soon as possible after the welding process has been completed. The longer the time between the casting of the weld and cold hammering, the greater the risk of fatigue spots being initiated.
- It is impossible to define a maximum time limit for cold hammering. Depending on the severity of operating conditions, this time can vary from a few weeks to several years.
- If cold hammering is performed on a weld already affected by a sufficiently developed fatigue stain, this treatment will have no effect on the weld's strength.

The hammering is carried out from the edge of the head fitting (Fig. 9) to the end of the foot (Fig. 10) following a hammering line (Fig. 11) which corresponds to the change in cross-section between the boss of the weld and the rail. Between these 2 extreme points the operator is free to make the number of round trips he wishes. It is recommended to carry out this operation in at least one minute in order to hammer the entire hammering line evenly. A weld can therefore be hammered in at least 4 minutes.

Figure 9: Chisel under the head

Figure 10: Chisel at the foot

Figure 11: Hammering line









The hammering line is easily definable when the weld head is used as a guide. The chisel can thus be adjusted to the change of the tamping/rail section. An angle of nearly 45° (Fig. 12) to the rail provides good guidance, but this orientation can be adjusted by the operator according to accessibility and comfort (Fig. 13).

Figure 12: Orientation of the chisel near 45°



Figure 13: Reduced accessibility due to proximity to a crossbar with saddle and bottom panel



The 2 areas from which fatigue spots leave are the most important to hammer:

- Web/head connection (Fig. 14).
- above the foot (Fig. 15).

Figure 14: Important area of the connection web/head



Figure 15: Important area above



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4.3 Dimensions and geometries of the chisels

The end of the small chisels has an angle and is rounded:

- Over the width (Fig. 16), in order to maintain continuous contact with the hammering line.
- On the thickness (Fig. 17), to allow contact as close as possible to the fillet of the boss/rail section change.

Figure 16: Rounded to width





The chisels are supplied as standard with a suitable radius. However, they must be regularly checked by the operator as they are used. The higher the hammering temperature (300°C maximum), the faster the wear of the chisels.

When the geometry of the chisel is no longer adequate, a transfer of the hammering point can occur very locally, resulting in a cut in the hammering line (Fig. 18). The operator must therefore constantly check the morphological integrity of the hammering line and reposition the chisel or change it if he notices that the chisel/rail contact is no longer properly ensured.

The geometric conformity of the chisel must be restored using a suitable tool (e. g. grinder).

Figure 18: Discontinuity of hammering to the web/head connection



4.4 Storage

The hammer must be stored away from moisture.

Purge the hoses to clean them before each use.

Use clean compressed air. Avoid the introduction of moisture, grease or any other pollutant into the hammer, as this may affect its operation.

4.5 Appearance of the weld after hammering

After hammering, the weld has a concave trace along the hammering line (fig 19)

Figure 19: Concave trace left by the impact



It is recommended to punch an "M" on the pipe base to indicate hammered welds (Fig. 20). In case some welds are hammered hot and others cold, in the same area, it is recommended to differentiate between the punches, "MF" for cold hammering and "MC" for hot hammering.





5. Product usage

5.1 Before leaving for the construction site

- Make sure that all the necessary equipment to carry out the hammering operations is present in the case and in good condition:
 - Hammer works correctly.
 - Chisels with the right dimensions and geometries.
 - Undrilled and clean pipes.
- Ensure that a compressed air supply will be available on site.

5.2 Safety

- Hammering involves risks inherent in construction site work. During all work, it is essential to wear Personal Protective Equipment:
 - Fireproof work clothing (for hot hammering).
 - Gloves (flame retardant for hot hammering).
 - Safety shoes.
 - White glass safety glasses with side shields.
 - Adapted protection.

5.3 Reminder of the main instructions

	Cold Hammering	Hot Hammering
Pressure	4 bars	
Temperature	Ambient temperature	From ambient temperature to 300°C
Time	1 minute minimum per hammering line 4 minutes minimum for a soldering (4×1min.)	
Turnaround time	As soon as possible after welding is completed	Wait until the weld has dropped below 300°C. Temperature to be controlled with a thermocouple or pyrometer.
Operation and control	Visually check the hammering lines. They must not have geometric discontinuities synonymous with no contact between the rail and the chisel. If there is a lack of contact between the chisel and the rail, re-sharpen the chisel or use another chisel of suitable geometry.	

5.4 Power supply and connection of the hammer



Equipment not provided by PANDROL Materials available in the case WEL D'STRESS

It is recommended to connect the hammer to a compressed air supply equipped with adequate filtration, regulation and lubrication systems.

The components are linked as described in the diagram above.

The installation is intended for operation under a compressed air pressure of 4 bar.

Failure to observe this operating pressure may cause early damage to the hammer.

6. Noise and vibration emission values

Table 2:

Use pressure	Declared vibration emission value	Measurement uncertainty	Sound pressure level of A-weighted emission at the workstation	A-weighted sound power level
	ahd	К	LpA	LWA
bar	m.s-2	m.s-2	dB(A)	dB(A)
4	4.55	0.84	84.8	95.8

Reference

7. Equipment, nomenclature

Complete pneumatic hammer	519612001

Name

Pneumatic hammer only	529612003

	Long burin. Ø=9.5mm / L=150 ^{±1} mm	548401208
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mannum	Plastic case	542005003
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	Supply hose with embouts. Øint=6mm / L=5m	529612002
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	Magnetic telescopic LED lamp	548704002
--	------------------------------	-----------

	Operating manual	549612001
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PANDROL WEL-D'STRESS*	Suitcase	542002030
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SUITCASE		L	I	н
CHARACTERISTICS		Longueur	largeur	Hauteur
	mm	360	420	194
Dimensions external	in	14 3/16	16 9/16	7 5/8
Empty weight		3.4 kg		
Loaded weight	6.4 kg			
Certification	IP67 – STANAG 4280 (ed. 2) – DEF STAN 81- 41 (lev. J)			

Figure 21: Hammer



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31 twin coupling Staubli RBE06-1806

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8. Possible failures

Failures	Causes	Actions
Hammering blockage	Dirty pneumatic circuit	Use a filter compressor
	Poor quality introduced air Presence of water	Use filtration systems at the compressor outlet
	Break of the hammer bell hose	Service return
	Break of the supply hose	Change the hose
Uncoupling the tool holder	Incorrect tightening Loosening due to vibrations	Tighten the tool holder again

In case of failure, return the product to the supplier:

Pandrol Technical support ZI du Bas Pré 59590 Raismes - France

9. Maintenance procedure

The hammer must be maintained when the hammer is disconnected from the compressed air supply, without any possibility of operation.

The chisels must be serviced when the chisels are disengaged from the tool holder.

Maintenance of chisels: see point 4.3.

Please check all the following points before each use:

- Keep hoses and connections clean.
- Ensure the cleanliness of filtration systems.

In the event of a malfunction or breakage of the hammering line, make sure to order parts with technical characteristics that perfectly match the components supplied by the manufacturer.



FICHE DE CONTROLE CLIENT CONTROL CARD CUSTOMER'S COPY

MARTELEUR WEL-D'STRESS

WEL D'STRESS HAMMERING

N°		Désignation des contrôles	Contrôlé	
		Description of control	Checked by	
1	Fonctionnen Hammer goo	nent du marteleur od working		
2	Vérification of Check of co	des liaisons (raccords, tuyaux) nnections (couplings, piping)		
3	Aspect géné General asp	ect		
4	Outillage Tools			
5	Accessoires Accessories			
6	Notice d'utili Operation m	sation ref. 549612001 aintenance manual		
Date de	fabrication	Date of manufacturing :		
Fait à R	aismes le	Drawn up in Raismes, the :		
Nom		Name :		
Signatu	re	Signature :		
Références à rappeler en cas de réclamation / In case of complaint, please quote these references				
N° de	e machine	Machine nbr		
Nun	néro	Number		

S.A.V. – Assistance Technique / Service Commercial

(Export) Tel +33 (0)1.46.88.17.60 -Fax. +33 (0)1.46.88.17.66



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FICHE DE CONTROLE PANDROL CONTROLCARD PANDROL COPY

MARTELEUR WEL-D'STRESS

WEL D'STRESS HAMMERING

N°		Désignation des contrôles	Contrôlé	
		Description of controls	Checked by	
1	Fonctionner Hammer go	nent du marteleur od working		
2	Vérification des liaisons (raccords, tuyaux) Check of connections (couplings, piping)			
3	Aspect géné General asp	éral vect		
4	Outillage Tools			
5	Accessoires Accessories			
6	Notice d'utili Operation m	sation ref. 549612001 naintenance manual		
Date of	de fabrication	Date of manufacturing :		
Fait à	Raismes le	Drawn up in Raismes, the :		
Nom		Name :		
Signa	ture	Signature :		
Références à rappeler en cas de réclamation / In case of complaint, please quote these references				
	N° de machi	ne Machine nbr		

Number.....

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(Export) Tel (+33) 1.46.88.17.60 - Fax. (+33) 1.46.88.17.66

Numéro

10. Compliance certificate

Le constructeur soussigné (the undersigned manufacturer)

PANDROL (Equipment division)

Z.I DU BAS PRE

59590 RAISMES

WEL-D'STRESS MARTELEUR / HAMMER

Ref 519612001

N° de machine (machine number) :

Est conforme (comply with)

- A LA CONFORME EUROPEENE NF EN 13977 (THE EUROPEENE NORM NF EN 13977)
- AUX DISPOSITIONS REGLEMENTAIRES DEFINIES PAR LA DIRECTIVE 2006/42/CE (THE INFORMATIONS STATED IN THE LEGAL DOCUMENTATION OF THE DIRECTIVE 2006/42/CE)

(the regulations of R4313-20 article – self certification procedure)

- NF EN ISO 11148-4 du 13 mars 2013 •
- NF EN ISO 15744 de décembre 2008
- NF EN ISO 28927-9 d'août 2010

Raismes, 06/2019

Bruno JOIRIS

Plant Manager

Aurélien LISINSKI

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