



2002-03

- TACAB OPTIMA Pickling solution
- TACAB OPTIMA Pickling paste
- TACAB NO<sub>x</sub>FREE Pickling bath
- TACAB Pickling solution
- TACAB Pickling paste
- TACAB Pickling bath
- TA FLUX Root protection
- TACAB Neutralisation Paste

## OPTIMA

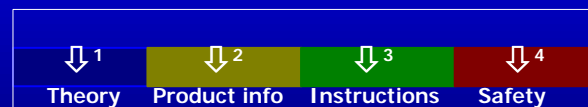


NEW!

TACAB OPTIMA

Green & more environmentally friendly  
Pickling paste & spray solution  
(please refer to pages 10-11)

### "THE FOUR STEPS IN PICKLING"



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TA Chemistry AB develops manufactures and markets chemical products for cleaning of heat-treated and welded stainless steels. The Company has the long experience of surface treatment of stainless steel constructions. The Company in 1984 started its business in Söderfors with the manufacturing of pickling paste gel. ESAB AB, AB Sandvik Steel, Wurth and Lincoln Electric are marketing the Company´s pickling paste. ESAB AB and Lincoln Electric are also marketing the pickling solution and NOXfree pickling bath. This means that TA Chemistry products are available in most parts of the world. Own sales are at a level of 30% of the total turnover.

This manual contains the theory, practice and safety aspects of pickling.  
The goal of this manual is to:

- enhance understanding of the need to clean stainless steel fabrications before and after pickling.
- provide the necessary information, to avoid the occurrence of problems during the process.
- provide information about how the pickling product should be best used to achieve optimum results.
- provide information about industrial safety equipment and other safety matters.
- function as course material (for courses organised by TA Chemistry AB).



## 2.0 Prices, service, training and ordering information

### Prices:

No prices are noted in this manual. Please phone<sup>1</sup> and order an up-to-date price list from TA Chemistry AB.

### Service:

TA Chemistry offers all customers unlimited customer support via telephone/fax and the Internet<sup>2</sup>.

TA Chemistry also does customer visits when we offer information about products and pickling (theory and practice).

The "Pickling Questions" service is available to all customers on the Internet.

### Training:

TA Chemistry also has practical pickling courses<sup>3</sup> (please request a tender).

This training is offered free of charge if you purchase an NOx-free pickling bath.

### Ordering information:

Orders/tenders can be sent via telephone<sup>1</sup>, fax<sup>1</sup> or the Internet<sup>2</sup>.

<sup>1</sup> Phone: +46 293-308 85, Fax: +46 293-308 80.

<sup>2</sup> The TA Chemistry Internet site ([www.tachemistry.com](http://www.tachemistry.com)) contains the following sections:

- request a tender
- send orders
- send questions about pickling
- download product information sheets
- product information (TACAB pickling products)
- product information (accessories)

<sup>3</sup> The course comprises (app. 4-5 hours):

- Theory
- product information
- practical pickling (usage, instructions and maintenance)
- Safety
- The course is offered free of charge if you purchase an NOx-free pickling bath.

### 2.1 TA Flux Root Protection

The flux is applied to root side before welding and protects against oxidation, which occurs during welding. TA Flux is specially developed for use in connection with GTAW-welding of low-alloy and stainless steel with a maximum 25% nickel content but can also be used with other methods. TA Flux should not be seen as a substitute for protective gas but rather is used where protective gas cannot be used. TA Flux gives a much better weld than without root-protector, but doesn't quite achieve the qualities of an argon-protected weld.

Testing (ASTM G48) revealed the following technical data:

Loss of weight with argon-protection = 100%

(100%=the loss of weight which occurs with argon-protection)

Loss of weight with TA Flux = 180%

(much better than without root-protection but not as good as argon-protection)

Loss of weight without weld-protection = 318%



Characteristics:

TA Flux root-protector is delivered in powder form, which is mixed with denatured ethanol before welding. The distinguishing quality of the flux is its ability to eliminate oxide inclusions and the formation of tempering oxides during welding. The flux replaces protective gas (especially where the construction obstructs the use of protective gas on root side), tape and ceramic backing. The flux works also as weld support by distributing the heat evenly underneath the weld. Furthermore it acts chemically by effectively cleansing the melt of contaminants.

Areas of use:

Spot welding:

TA Flux is applied to the surfaces of the joint before assembling. It works as a cleansing agent prevents the formation of tempering oxides in the vicinity of the spot welds. This process eliminates the risk of contaminating the weld joint and allows the spot weld to melt easily during the subsequent welding.

As a protective layer during welding:

TA Flux has several important functions when applied to the weld. The weld is protected against oxidation. The weld bead can be laid with a higher and constant speed. The flux's moistening and supporting effects on the melt redirects the surplus heat from the local areas in the weld and thereby prevents uncontrolled penetrations and burn-through. Pin-holes are prevented by even, uniform heating and the absence of contaminants.

Overlapping welds:

TA Flux applied to the underside of overlaps prevents uncontrolled penetrations. Even heating and lower cooling speed prevents brittleness and gives stronger, more ductile welds.

Single-V-joints with different plate thickness:

TA Flux prevents burn-throughs when welding together thin and thick materials. Because the heat is evenly distributed local areas of high temperature are avoided and the welds penetrate uniformly.

Single-V-joints welded on one side:

TA Flux applied to the weld promotes even penetration with sufficient amount of material with initial bonding. Welds which previously needed welding from both sides can be effectively joined with a weld bead on one side.

Single-V-joints welded on both sides:

When joining thick plate, or where two-sided welding is necessary for quality's sake, the flux should be applied to the weld before the first weld bead is laid. The even and strongly bound weld does not require chiselling or grinding. Brushing with a steel brush is recommended for removing slag remnants after the second weld bead.

Joining of low and high-alloy steel (composite steel):

When TA Flux is used the welder can bevel both the low-alloyed and the high-alloyed material prior to welding. This eliminates supplementary work with grinding and chiselling. When the flux is used with these alloys it should be applied to the high-alloyed side and welded beginning with the low-alloyed side.

### 2.2 TACAB Pickling paste gel

Used for cleaning and passivating of welding joints and the heat affected zone (HAZ) for welded stainless steel constructions. Pickling paste is applied with a paintbrush. After pickling and generous flushing with water (high pressure), the corrosion resistance of the weld site is restored.

TACAB pickling paste is sold in the following sizes of packages:

1, 2 and 10 kg.

Properties:

- Has a gel-like, homogenous consistency.
- Has an extraordinary good adhesive capacity and can be applied on vertical surfaces and ceilings without any risk of running or drying.
- The pickling times, which are dependent on temperature, type of steel and welding method vary between 45-240 minutes at room temperature.
- Working TACAB Optima pickling paste +5 to +40 °C.
- The pickling should as far as possible be done indoors in well ventilated rooms at room temperature. At outside work the construction is to be shielded from direct sunlight and rain.



Chemical properties.

Composition: Hydrogen fluoride acid, nitric acid, sulphuric acid and gel former.

Form: Viscous, gel-like solution with sharp odour.

Density: 1.30 kg/l.

### 2.3 TACAB Optima pickling paste.

**A more environmentally friendly, thixotropic pickling paste.**

TACAB Optima pickling paste is a new pickling paste with an entirely new formula. The paste is virtually free from formation of toxic, nitric gases.

The level of harmful nitrate and nitrite ions is also reduced.

It is used for simultaneous pickling of welded joints and free surfaces on large stainless fabrications. Pickling paste is applied with a paintbrush. After pickling and generous flushing with water (high pressure), the corrosion resistance of the weld site is restored.

TACAB Optima pickling paste is sold in the following sizes of packages:

1, 2 and 10 kg.

properties:

- The pickling times, which are dependent on temperature, type of steel and welding method vary between 45-240 minutes at room temperature.
- TACAB Optima pickling paste has a distinctive green color, making it easier to see where it has been applied. The color is also stable during long storage times.
- TACAB Optima pickling paste has a homogenous, jelly-like consistency. It has excellent adhesion and can be applied to vertical surfaces and soffits with no risk of runs or drying.
- Pickling should be done indoors if possible, in a well-ventilated building at room temperature (If work is done outdoors, avoid direct sunlight and rain). Working temperature interval is between +5° and +40°C.



Chemical properties.

Form: Viscous jelly-like solution with weak odour.

Density: 1.30 kg/l.

### 2.4 TACAB pickling solution.

Used for simultaneous pickling of welding joints and free surfaces for larger welded stainless steel construction. The pickling solution is applied by spraying with a twin membrane pump. After pickling and ample rinsing with water (high pressure) the corrosive resistance is restored in the welded area. TACAB Pickling solution is sold in the following sizes of packages: 20 and 200 kilo.

Properties.

- Has a gel-like, homogenous consistency.
- Has an extraordinary good adhesive capacity and can be applied on vertical surfaces and ceilings without any risk of running or drying.
- The pickling times, which are dependent on temperature, type of steel and welding method vary between 45-240 minutes at room temperature.
- Working temperature interval is +5 to +40 °C.
- The pickling should as far as possible be done indoors in well ventilated rooms at room temperature. At outside work the construction is to be shielded from direct sunlight and rain.



Chemical properties.

Composition: Hydrogen fluoride acid, nitric acid and gel former.

Form: Viscous, gel-like solution with sharp odour.

Density: 1.20 kg/l.

### 2.5 TACAB Optima pickling solution.

**A more environmentally friendly, thixotropic pickling solution.**

TACAB Optima pickling solution is a new pickling solution with an entirely new formula. The solution is virtually free from formation of toxic, nitric gases. The level of harmful nitrate and nitrite ions is also reduced.

It is used for simultaneous pickling of welded joints and free surfaces on large stainless fabrications. The pickling solution is applied by spraying, using a twin diaphragm pump. After pickling and generous flushing with water (high pressure), the corrosion resistance of the weld site is restored. TACAB Optima pickling solution is sold in the following sizes of packages: 20 and 200 kg.



properties:

- Pickling time is as fast as traditional pickling solutions.
- The pickling times, which are dependent on temperature, type of steel and welding method vary between 45-240 minutes at room temperature.
- TACAB Optima pickling solution has a green color, making it easier to see where it has been applied. The color is also stable during long storage times.
- TACAB Optima pickling solution has a homogenous, jelly-like consistency. It has excellent adhesion and can be applied to vertical surfaces and soffits with no risk of runs or drying.
- Pickling should be done indoors if possible, in a well-ventilated building at room temperature. (If work is done outdoors, avoid direct sunlight and rain).  
Working temperature interval is between +5° and +40°C.

Chemical properties.

Form: Viscous jelly-like solution with weak odour.

Density: 1.20 kg/l.

### 2.6 TACAB Pickling bath

Used for pickling of heat treated and welded stainless steel constructions in pickling baths. (s.c. dip pickling). At pickling the annealing scales and/or welding oxides are removed from the surface of the stainless steel. After pickling and ample rinsing with water (high pressure) the corrosion resistance is restored in the welded area. The work room and the pickling tank shall be well ventilated. There should be ramp or point ventilation above the pickling tank. TACAB pickling bath is sold in the following quantities: 25 and 200 kilo.

#### Properties:

- Is a blend of nonorganic acids and water and is delivered as a finished solution or concentrated (to be diluted 1:1 with water).
- Has good pickling effect.
- The pickling times, that are dependent on the temperature of the bath and type of steel to be pickled vary between 30-90 minutes at room temperature.
- Working temperature range: Room temperature to + 40 °C.

#### Chemical properties.

Composition: Hydrogen fluoride acid, nitric acid and water.

Form: Very liquid with sharp odour.

Density: 1.10 kg/l.

### 2.7 TACAB Noxfree pickling bath

The pickling baths used today are almost always hazardous to health and emit dangerous gases. The use thus demands very strict directives for ventilation, protective equipment etc. TACAB noxfree pickling bath is a newly developed, patented environmentally suited pickling bath for stainless steel that drastically reduces the hazardous at use without effecting the technical quality of the austenitic stainless steel. TACAB Noxfree pickling baths are free from nitric acid, which means that no dangerous nitric gases are developed during pickling. Furthermore, the wastewater is not burdened with nitrate and nitrite ions. The useful life of the noxfree pickling bath is 6-8 times longer than for a conventional nitric acid - hydrofluoric acid bath. The pickling bath is used for pickling of heat treated and welded stainless steel constructions in pickling baths. (s.c. dip pickling). At pickling the annealing scales and the welding oxides are removed from the surface of the stainless steel. After pickling and ample rinsing with water (high pressure) the corrosion resistance is restored in the stainless steel construction. Included when buying the noxfree pickling bath is, apart from condition check of bath condition by chemical analysis (once every third month), full technical service in pickling conditions also training of concerned personnel in practical pickling. TACAB noxfree pickling bath is sold in the following sizes of packages: 25 and 200 kilo, for other weight (or volume of tank) - ask for quotation.



#### Properties:

- TACAB noxfree pickling bath is a mixture of nonorganic acids and water and can be delivered as finished solution in drums or can be prepared directly at the customer in the pickling tank.
- Has good pickling effect and long lifetime.
- Pickling times, which are dependent on temperature of the pickling bath and the type of steel being treated, vary between 45 to 120 minutes at 25 °C.
- Recommended working temperature: 22-25 °C.

#### Chemical properties:

Composition: Sulphuric acid, phosphoric acid and hydrofluoric acid

Form: Very liquid with weak odour.

Density: 1.26 kg/l.



### 2.7 TACAB Neutralisation Paste

TACAB Neutralisation Paste is used on steel surfaces to neutralise and inhibit pickling paste after use. After treatment, the pickling acid residue has a pH value of >8 and the poisonous hydrofluoric acid is chemically converted into harmless fluorspar (CaF<sub>2</sub>). The neutralisation paste is mildly alkaline and does not have any poisonous constituents. Packages contain 2 kg. One package can neutralise 240 linear metres of pickled weld or 12 m<sup>2</sup> of pickled steel surface.

#### Properties:

TACAB Neutralisation Paste has a creamy consistency and relatively good adhesion. The paste is mixed in with the pickling paste, using a brush (once pickling has been completed, while the pickling paste is still in place on the structure). A reaction occurs and mild blistering occurs. When blistering ceases (after about 5-10 min), the reaction has ceased and neutralisation is complete.

Neutralisation Paste is sold in the following quantities: 2 kilo.

### 3.1 Using TA Flux root-protector

1. Mix the flux according to the following: 500 grams flux with 210-250 grams denatured ethanol.
2. Stir and add 210-250 grams denatured ethanol until a thin paste with a creamy consistency is formed.
3. Let the paste sit for a few minutes.
4. Remove all fat and oil on the steel with an organic solvent.
5. Apply the paste with a brush on the root side. The paste should be applied in an even layer on the surfaces to be joined and used according to the directions given below for respective type of welding:
6. Weld.

Areas of use:

#### Spot welding:

TA Flux is applied to the surfaces of the joint before assembling. It works as a cleansing agent prevents the formation of tempering oxides in the vicinity of the spot welds. This process eliminates the risk of contaminating the weld joint and allows the spot weld to melt easily during the subsequent welding.

#### As a protective layer during welding:

TA Flux has several important functions when applied to the weld. The weld is protected against oxidation. The weld bead can be laid with a higher and constant speed. The flux's moistening and supporting effects on the melt redirects the surplus heat from the local areas in the weld and thereby prevents uncontrolled penetrations and burn-through. Pin-holes are prevented by even, uniform heating and the absence of contaminants.

#### Overlapping welds:

TA Flux applied to the underside of overlaps prevents uncontrolled penetrations. Even heating and lower cooling speed prevents brittleness and gives stronger, more ductile welds.

#### Single-V-joints with different plate thickness:

TA Flux prevents burn-throughs when welding together thin and thick materials. Because the heat is evenly distributed local areas of high temperature are avoided and the welds penetrate uniformly.

#### Single-V-joints welded on one side:

TA Flux applied to the weld promotes even penetration with sufficient amount of material with initial bonding. Welds which previously needed welding from both sides can be effectively joined with a weld bead on one side.

#### Single-V-joints welded on both sides:

When joining thick plate, or where two-sided welding is necessary for quality's sake, the flux should be applied to the weld before the first weld bead is laid. The even and strongly bound weld does not require chiselling or grinding. Brushing with a steel brush is recommended for removing slag remnants after the second weld bead.

#### Joining of low and high-alloy steel (composite steel):

When TA Flux is used the welder can bevel both the low-alloyed and the high-alloyed material prior to welding. This eliminates supplementary work with grinding and chiselling. When the flux is used with these alloys it should be applied to the high-alloyed side and welded beginning with the low-alloyed side.

### 3.21 Pickling times with TACAB Pickling paste and pickling solution

Pickling times:

Steelgrade			Cr	Ni	Mo	Recommended pickling time in minutes (at 22° C)
18-9L	304L	2352	18.5	9.5	-	
19-11L	304L (10Ni)	2352	18.5	10	-	
18-9	304, 304DD,302	2333	18.5	9	-	
18-9LN	Hyproof 304L	2371	18.5	9.5	-	
18-10Ti	321	2337	17.5	9.5	-	
18-12	305	-	18.5	11.5	-	60-120
17-11-2L	316L Low Mo	2348	17	11.5	2.2	
17-11-2	316 Low Mo	2347	17	11	2.2	
17-11-2LN	HighProof 316L Low Mo	-	17.5	11	2.2	
17-11-2Ti	320	2350	17	11	2.2	
17-12-2.5L	316L High Mo	2353	17	11.5	2.7	
17-12-2.5L	316L (BN 2)	2353	17.5	13	2.7	
17-12-2.5	316 High Mo	2343	17	11	2.7	90-180
18-14-3L	317L	2367	18.5	13.5	3.2	
17-11-3LN	-	2373	17	11	3.2	
17-14-4LN	HyResist 317LM	-	17	13	4.2	
904L	HyResist 94L	2562	20	25	4.5	120-240
254 SMO	-	2378	20	18	6.1	
654 SMO	-	-	24	22	7.3	
SAF 2304	23/4LN	2327	23	4.5	0.3	
2205	HyResist 22/5	2377	22	5.5	3	
SAF 2507	-	2328	25	7	4	

Please note that pickling times are affected by temperature, welding method and choice of material.

Rule of thumb:

Lowering the temperature 10°C gives twice the pickling time.

Raising the temperature 10°C halves the pickling time.

### 3.22 General pickling advice (applies to all TACAB pickling products)

Brush on a relatively thick layer (1-3 mm) of TACAB pickling paste. When TACAB pickling solutions are sprayed on, the coating will be considerably thinner (app. 0.2 - 0.4 mm).

In pickling, the solution or paste is applied directly on the weld oxide (weld + HAZ). A sharp edge frequently occurs between the etched (pickled) area and the un-treated steel surface. This often occurs when the steel surface is bright (e.g. on a 2B surface). The time must be optimised to minimise the etched surface (shorter pickling time causes less etching). If you want to reduce the edge between the etched and the bright surface, you can polish the etched surface with a stainless brush or by machine. It is then very important to use stainless material in the brush/machine, to prevent corrosion from occurring later on.

It is important to continue pickling for as long as welding oxide easily disappears when you have removed the pickling paste, then treat the weld with a stainless steel wire brush and rinse with water.

With high alloy steel, it can thus be suitable to do the pickling in two sessions, to remove all the oxide. This applies to steel grade 2378 (254 SMO) for example, which has a high molybdenum content.

*Steel grades with a high molybdenum content (such as 654 SMO) can be very difficult to pickle. In this case, you should consider using a different method to remove the welding oxide (such as grinding).*

It is very important to flush with water after pickling, to give the stainless steel back its non-rusting properties. Any acid residue can cause discoloration and corrosion. For this reason, flush the entire construction with water after pickling (preferably high pressure washing).

### 3.3 Using TACAB STD, Pickling paste or TACAB Optima.

1. Remove as much slag, oxide and weld defects as possible. We recommend a stainless steel wire brush. It is considerably easier when the weld is still warm, and the welding oxide is not so hard. If necessary, wash off dirt, oil, grease and paint which could impede the pickling process.
2. Let the weld cool to room temperature (or not more than 40°C).
3. If necessary, clean again to remove dirt, oil, grease, paint and tape residue. Use a suitable detergent (degreaser).
4. Shake TACAB Pickling paste well before use, to mix the paste thoroughly in the can.
5. Apply a relatively thick layer of paste with the accompanying brush. Allow the paste to remain in place for at least 45 minutes for SS2333. Longer pickling times are needed for higher alloy steels. The pickling paste can be left on overnight with no risk of excessive pickling.
6. Remove the pickling paste (pickling residue must be neutralised to pH 7, TACAB Neutralisation paste is an excellent product to use for this purpose). Carefully brush underlying oxides away with a damp stainless steel wire brush.
7. Then flush with a generous amount of water. No pickling paste or pickling paste residue must be left after flushing.
8. Leave the pickled structure to air dry, to allow the passivated layer to be re-formed on the welded (pickled) areas.

Local regulations apply to the use of flushing water (the flushing water contains heavy metals).

Pickling time:

Steel grade	Pickling time (in minutes)	Note:

Note: Please note the pickling times you actually use in the table above (these pickling times refer to your own process).



### 3.4 Use of TACAB Pickling solution or TACAB Optima Pickling solution.

1. Remove as much slag, oxide and weld defects as possible. We recommend a stainless steel wire brush. It is considerably easier when the weld is still warm, and the welding oxide is not so hard. If necessary, wash off dirt, oil, grease and paint which could impede the pickling process.
2. Let the weld cool to room temperature (or not more than 40°C).
3. If necessary, clean again to remove dirt, oil, grease, paint and tape residue. Use a suitable detergent (degreaser).
4. Shake TACAB Pickling solution well before use, to mix the solution thoroughly in the can.
5. Apply the pickling solution with an acid-resistant pump. Then wait until the entire pickling process has been completed. Leave the solution in place for at least 45 minutes for SS2333. Longer pickling times are needed for higher alloy steels. Note the times in the table below (steel grades and pickling times, pickling times can vary depending on temperature etc.). Do not let the solution dry before washing it off, there is a risk of discoloration of the steel. At higher temperatures, or if pickling times are long, it may be necessary to apply more pickling solution.
6. Then flush with a generous amount of water. No pickling paste or pickling paste residue must be left after flushing.
7. Leave the pickled structure to air dry, to allow the passivated layer to be re-formed on the welded (pickled) areas.

*Local regulations apply to the use of flushing water (the flushing water contains heavy metals).*

Pickling time:

Steel grade	Pickling time (in minutes)	Note:

*Note: Please note the pickling times you actually use in the table above (these pickling times refer to your own process).*



**3.5 Use of TACAB Pickling bath**

1. Remove as much slag, oxide and weld defects as possible. We recommend a stainless steel wire brush. It is considerably easier when the weld is still warm, and the welding oxide is not so hard. If necessary, wash off dirt, oil, grease and paint which could impede the pickling process.
2. Let the weld cool to room temperature (or not more than 40°C).
3. If necessary, clean again to remove dirt, oil, grease, paint and tape residue. Use a suitable detergent (degreaser).
4. The pickling bath must maintain a temperature of 22-25°C to avoid making pickling times abnormally long.
5. Lower the structure/components into the pickling bath with a traversing crane or similar device. Then wait until the pickling process has been completed (please refer to the table below for times). Note the times in the table below (steel grades and pickling times, pickling times can vary depending on temperature etc.).
6. Flush carefully with a high pressure washer (water). No pickling solution or pickling solution residue must be left after flushing.
7. Leave the pickled structure to air dry, to allow the passivated layer to be re-formed on the welded (pickled) areas.

Local regulations apply to the use of flushing water (the flushing water contains heavy metals).

Pickling time:

Steel grade	Pickling time (in minutes)	Note:

Note: Please note the pickling times you actually use in the table above (these pickling times refer to your own process).



### 3.6 Use of TACAB NOXfree Pickling bath

1. Remove as much slag, oxide and weld defects as possible. We recommend a stainless steel wire brush. It is considerably easier when the weld is still warm, and the welding oxide is not so hard. If necessary, wash off dirt, oil, grease and paint which could impede the pickling process.
2. Let the weld cool to room temperature (or not more than 40°C).
3. If necessary, clean again to remove dirt, oil, grease, paint and tape residue. Use a suitable detergent (degreaser).
4. The pickling bath must maintain a temperature of 22-25°C to avoid making pickling times abnormally long.
5. Lower the structure/components into the pickling bath with a traversing crane or similar device. It is very important to ensure that the components to be pickled do not lie against each other. There must always be clearance between components. Then wait until the pickling process has been completed (please refer to the table below for times). Let the pickling liquor run off into the bath when components are taken out. This minimises spillage. Please be careful to prevent the pickling solution from drying before components are flushed clean (the steel surface can be discoloured if the solution dries). Note the times in the table below (steel grades and pickling times, pickling times can vary depending on temperature etc.).
6. Flush carefully with a high pressure washer (water). No pickling solution or pickling solution residue must be left after flushing.
7. Leave the pickled structure to air dry, to allow the passivated layer to be re-formed on the welded (pickled) areas.

Local regulations apply to the use of flushing water (the flushing water contains heavy metals).

Pickling time:

Steel grade	Pickling time (in minutes)	Note:

Note: Please note the pickling times you actually use in the table above (these pickling times refer to your own process).



Corrosive



Use Eye/face protection



Use Rubber gloves



Use Protective suit



Use Rubber High boots

**3.7 Use of TACAB Neutralisation paste**

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1. When pickling is completed, neutralisation can be done. The pickling paste is still on the structure.
2. Shake the can.
3. Mix in with the pickling paste, (stir with a brush). A reaction occurs and mild blistering occurs in the neutralisation paste. After about 5-10 min, blistering ceases and neutralisation is complete.
4. Flush with water. Use a generous amount of water, since it is important that all residues disappear (preferably high pressure washing).



### 5.1 Neutralisation and Waste Management

All waste water from high pressure flushing becomes acid and is contaminated with heavy metals, mainly chromium, iron and nickel. For this reason, the waste water must be neutralised.

Handle waste water in accordance with local regulations.

Used pickling liquor must be processed in accordance with local regulations.

### 5.2 Rules

All TACAB pickling products are hazardous chemicals which must be handled with care. The following rules must be observed (please refer to the product information sheet, MSDS for each product as well):

1. Pickling products should only be handled by persons with basic training/knowledge about the associated health risks.
2. All parts of the operator's body which could be exposed to splashes should be protected by acid-resisting material (such as polythene, polypropylene). For this reason, use a face mask, rubber gloves, rubber boots and acid-resistant overall. This also applies to flushing (high pressure washing) after pickling
3. A first aid kit must be available on site, and must contain ointment for burns (such as calcium gluconate gel, chemical burn antidote). If skin contact does occur, flush the affected area with water and then treat with the ointment. The injury must then be treated by a doctor.
4. There must be an eye shower of some kind available.
5. The premises where pickling takes place must be well ventilated.
6. All packaging must be kept closed (if possible) to prevent evaporation.
7. Pickling residue must be neutralised.
8. Personnel who handle pickling products must wash their hands and face before all meals and at the end of each working day.
9. Eating, drinking and smoking should be banned in the premises/site used for pickling.

### 5.3 Personal safety

A full-coverage protective mask should be used. The protective mask should be provided with a type B (grey) breathing filter and a type P2 dust filter, in accordance with CEN. Pickling products can cause burns if they come into contact with skin. This can be avoided by using acid-resistant clothes/gloves. Please refer to the product information sheet for each product.

#### 5.4 Storage of pickling products

TACAB pickling products should be stored indoors at room temperature (20-25°C). The packages should be kept standing up and closed. Storage should be in a restricted area, with no access for unauthorised persons. The shelf life of un-opened TACAB pickling products (pickling paste and pickling solution) is 3 years. The shelf life of an opened package is 1 year (on condition that the package is carefully closed after use). A TACAB NOx-free pickling bath has unlimited service life on condition that the specified maintenance is correctly carried out.

#### 5.5 Reservation

*TA Chemistry AB reserves the right to amend specifications or documentation without prior notice. TA Chemistry AB does not accept any responsibility for errors in this information. The descriptions and procedures in this handbook are for information only. Customers must ensure the suitability of products themselves.*

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