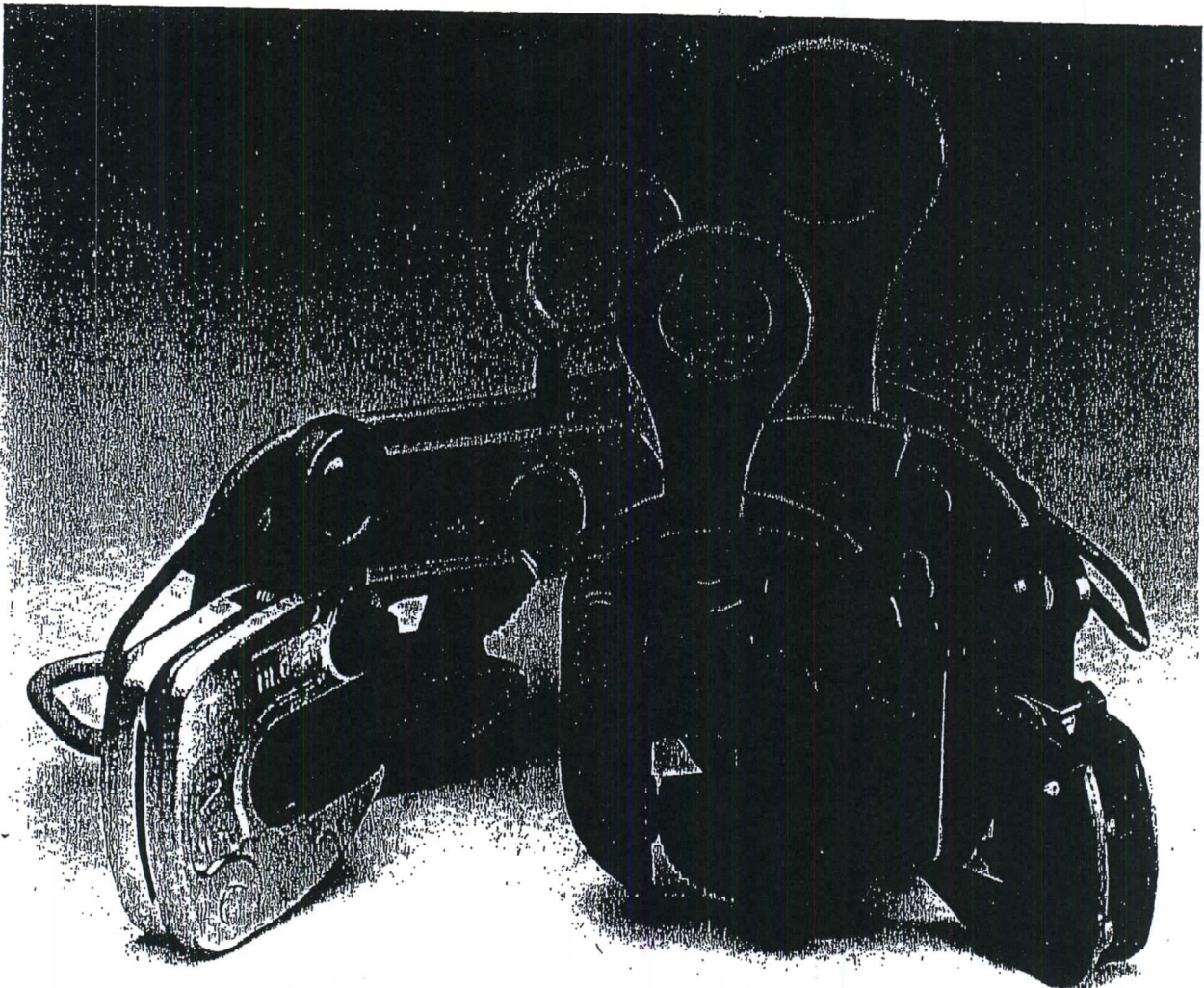


SAFETY LIFTING CLAMPS



INSTRUCTION FOR OPERATION
OF
"SUPER" BRAND
LIFTING CLAMPS
TVC 1



SUPER TOOL CO., LTD.
OSAKA, JAPAN

INSTRUCTIONS FOR USE

Keep these instructions within easy access of operators.

It is important that operators understand these warnings and instructions before using.

WARNINGS

- Select proper size clamp for the job. Determine the weight of the plate to be lifted.
Do not exceed limited working load shown on clamp.
Plate thickness must be within grip range on clamp.
- Always use slings correctly ! Pay special attention to the correlation between the lifting angle and the rated load! Use within specified angles.
- Before lifting the load, confirm that the clamps are in good condition and functioning properly! Inspect clamp. If cam or pad teeth are worn or if clamp is damaged, do not use.
All personal must stand clear of plate while it is being lifted or moved.
- Never vertically lift material that tapers down to the edge!
- Never lift more than one steel plate at a time!
- Never operate clamps unless the load is properly centered!
- After the load has been lifted a few centimeters, confirm that the load is well balanced!
- Never allow the operator's attention to be diverted when operating clamps and never leave the suspended load unattended!
- Take up slack slowly. Do not bounce or jerk load.
- Always protect the surfaces of the cam and pad from weld spatters or other damaging contaminants! The surface of the load must always be clean and free of scale, grease, paint, dirt and coatings or other foreign matters that can reduce friction!
- Do not lift if cam teeth are not bitten sufficiently on workpiece when workpiece to be lifted is hard material or light weight (less than 1/5 against capacity or less than 1/4 against maximum opening jaw).
- Note that the service life of clamps is reduced considerably when stainless steel or high-tensile steel are clamped! Do not use clamps for lifting high-tensile steel (over 300 HB) or soft steel (under 80 HB)!
- Do not weld electrically workpiece being lifted by clamp.
- Do not modify clamp by gas cutting or welding.
- Only use genuine parts when repairing clamps!
- Use clamp in the correct manner in accordance with this instruction.

LIFTING ANGLE AND SAFE LOAD OF WIRE ROPE

The maximum allowable load ((safe load)) of wire rope also varies with the lifting angle.
Therefore, select a wire rope of proper diameter in consideration of the lifting angle.
(The breakage load specified in the table below refers to No.4, 6 x 24A class of JIS G 3525.)

Correlation between Lifting Angle and Safe Load of Wire Rope (in two-point lifting)

D Wire rope dia (mm)	σ Breakage load (tons)	W Safe load (on one rope) W=σ/S (safety factor S=6) (tons)						
			(Changes in lifting efficiency due to lifting angle, %)					
			100%	96%	92%	86%	70%	50%
Max. allowable load (safe load) on two wire ropes (tons)								
8	3.21	0.54	1.08	1.04	0.99	0.93	0.76	0.54
9	4.06	0.68	1.36	1.31	1.25	1.17	0.95	0.68
10	5.02	0.84	1.68	1.61	1.55	1.44	1.18	0.84
11.2	6.29	1.05	2.1	2.02	1.93	1.81	1.47	1.05
12.5	7.84	1.31	2.62	2.52	2.41	2.25	1.83	1.31
14	9.83	1.64	3.28	3.15	3.02	2.82	2.3	1.64
16	12.8	2.13	4.26	4.09	3.92	3.66	2.98	2.13
18	16.2	2.7	5.4	5.18	4.97	4.64	3.78	2.7
20	20.1	3.35	6.7	6.43	6.16	5.76	4.69	3.35
22.4	25.2	4.2	8.4	8.06	7.73	7.22	5.88	4.2
25	31.3	5.22	10.44	10.02	9.6	8.98	7.31	5.22
28	39.3	6.55	13.1	12.58	12.05	11.27	9.17	6.55
30	45.1	7.52	15.04	14.44	13.84	12.93	10.53	7.52
31.5	49.8	8.3	16.6	15.94	15.27	14.28	11.62	8.3
33.5	56.3	9.38	18.76	18.01	17.26	16.13	13.13	9.38
35.5	63.2	10.53	21.06	20.22	19.38	18.11	14.74	10.53

Note: For four-point lifting, multiply the corresponding figure in the table by 2 to find the maximum allowable load (safe load).

Simplified calculation method of wire rope diameter and safe load (one-point lifting)

1) $D = \sqrt{W \times C}$

2) $W = \frac{D^2}{C}$

Where D : wire rope diameter(mm)

W: safe load (tons)

C : constant=120

(safety factor S=6)

★To find the diameter of wire rope for 3 tons:

① $D = \sqrt{W \times C}$

$D = \sqrt{3 \times 120} = \sqrt{360} = 19 \rightarrow 20 \text{ mm}$

★To find the service load (safe load) on 25mm diameter wire rope:

② $W = \frac{D^2}{C}$

$W = \frac{25^2}{120} = \frac{625}{120} = 5.2 \rightarrow 5.2 \text{ ton}$

Select the type and capacity best suited to the job. Check periodically, repair and replace parts, and use correctly in order to use the clamps over the full service life, safely.

Common Check Points

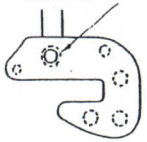
- ★ Check the main body for distortion or flaw.
- ★ Make sure the opening is normal (check if widened).
- ★ Check if the shackle is distorted.
- ★ Check the shackle pin hole for widening or looseness.
- ★ Check cam and pad teeth for defect or wear.
- ★ Check cam pin hole in main body for widening.
- ★ Check if cam pin is worn and thinned.
- ★ Check the performance of tightening lock (handle, lever), shackle, and other mechanism.

Check all the listed items. Inspect according to the Checking Standard.

Most items may be checked visually or by touching. To measure the safety point distance and opening size, use slide calipers or the like to obtain precise measurements.

DISCARD

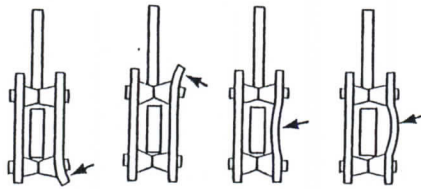
When clearance between bolt and hole exceeds 1 mm, and deflection of cam or shackle becomes excessive.



(Wear of pin or pin hole)



(Flaw of main body)



(Distortion of main body)

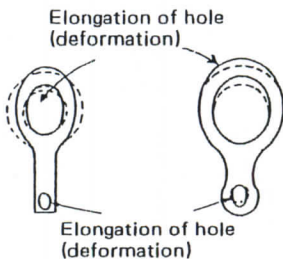


(Widening of opening)

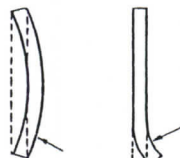
Discard the clamp if obvious flaw or distortion is found in the main body. Defects in the main body cannot be repaired in the light of safety. The main body may be cracked or deformed only after several uses if it is used incorrectly. Dent or swelling of main body, or widening of opening may be caused by overload or wrong manner of use. If the defect is repaired by welding, hardening, or pressing, the original strength is not recovered. When used and controlled correctly, the clamp may be safely used for a long time only by replacing parts.

REPLACE

(Shackle)



Elongation of hole (deformation)



Distortion (deformation)

Regard the shackle as part of body. If deformed as shown above, replace it immediately. If deformed shackle is straightening up, the initial strength is not restored.

(Cam and pad)



Clamping capacity	Wear limit width of cam, pad
0.5 ton	0.6mm or more
1 ton	0.7mm or more
2 tons	0.8mm or more
3 tons	0.9mm or more
5 tons	1.0mm or more

When worn as shown above, replace immediately. Or, if not worn, when even one tooth is missing, replace also immediately. The wear rate is accelerated when stainless steel or other hard material is clamped. Or when plates of specified thickness are continuously clamped, only particular threads will be worn in a short time. In such a case, too, replace immediately.

Besides, replace the support pins, bolts, springs, and other parts according to the Checking Standard.

Check Twice to Confirm Safety.

Check the type capacity of clamp. Is the wire rope proper? How about its size and length? Overloaded or not? Where's the center of gravity? Is the material inserted fully? Is it locked securely? Lift at two points for an object longer than a meter. Lift at three or four points where the center of gravity is hard to locate. Is the lifting angle proper? Check all these items, and confirm them once again. Lift, carry, touch down slowly. Be careful not to hit against surrounding objects while carrying. Keep off hands. Do not enter hazardous zone. Always pay attention to safety.

On the Proper Handling of Lifting Clamps with Super Tool's Mark

We are thankful to you for your selection and purchase of our Lifting Clamps with Super Tool's mark on them. Our Lifting Clamps with Super Tool's mark on them (hereinafter to be called "Lifting Clamp" or "Clamp") is energy-saving lifting tools designed and developed for transportation of U-shaped reinforced and semi-thick-walled reinforced concrete gutters, U-shaped flumes, and concrete shelf boards.

Proper use of Lifting Clamps demanded

You are kindly asked to operate the Lifting Clamps after careful reading and understanding of this instruction manual for the purpose of enhancing safety and efficiency at work.

Prime efficiency and economy

The sophisticated functions, reasonableness and wide applications of the finely and carefully designed Lifting Clamps ensure prime efficiency and economy.

Special care of safety

We have executed tensile tests with loads three times (or twice) the rated capacity according to the testing standards set forth by the National Institute of Industrial Safety of Ministry of Labor and attached inspection numbers to individual products, thus directing special attention to the aspect of safety.

Attachment of products and completed operation liability insurance

If there occur damages due to the defective qualities of the Lifting Clamps under the normal conditions of use, insurance money under the products and completed operation liability insurance will be paid for them. If the damages are, however, incurred due to intentional misbehavior or mistaken use (non-safety actions), abrasion of the clamp pads, they are not covered. Be careful. Never fail to post before use the application for registration for products and completed operation liability insurance attached with the clamp (return post card) after filling in all the required items of information.

Cautions for safety operation

Please do not fail to carefully read this instruction manual before use of the Lifting Clamps. Mistaken use of the Lifting Clamps (hereinafter to be called "Clamps") may cause troubles such as the dropping of lifted work.

Please never fail to carefully read this manual for proper operation before use.

Education of "crane safety regulations," "operation manual for lifting clamps," "in-house operation standards," etc. is to be given before actual operation not only to business owners who have purchased the Clamps but also to their operators to ensure that actual operators will have acquired enough knowledge of clamps, safety information, and cautions.

As according to the "Lifting clamp safety council," we have divided cautions in general into "Dangers" and "Cautions," which are used in this instruction manual.

◇DANGER: Indicates mistaken handling may cause a potentially hazardous situation which, if not avoided, could result in death or serious injury.

△CAUTION: Indicates mistaken handling may cause a potentially hazardous situation which, if not avoided, could result in medium damage or slight injury, or could result in property damage.

Even though only mentioned in the Cautions, those incidents may lead to a serious disaster.

So, do not fail to pay attention both to dangers and cautions which are of great importance in operating the Clamps properly.

Meanings of Signs

The signs of ◊ and △ indicate that attention is to be given to the marks indicative of dangers and cautions respectively. The signs figuratively show the contents of danger or caution. (The left-side sign indicates a caution to the pinching.)

The sign indicates prohibited actions.

The sign of ○ indicates that an action is enforced or instructed to be executed. Inside the sign or beside it is shown a concrete instruction is described. (The left-side sign requires a lifting at two points.)

* After reading of this manual, please keep it at a convenient place to which any user can gain easy access for reference.

1. About handling in general

Dangers	
<ul style="list-style-type: none"> ●Any person who is not well-informed about instruction manual, tags, and signs of cautions is not eligible for use of the Lifting Clamps. ●Any person who is not legally qualified is never to operate a crane and a lifting clamp. (Clauses 221 and 222, Crane Safety Regulations) ●While lifting or turning the work, do not enter the area where the lifted work threatens to drop off or fall over. (Clauses 28 and 29, Crane Safety Regulations) ●Do not use this lifting clamp for other purposes than lifting work. 	
<ul style="list-style-type: none"> ●Never fail to execute an inspection before use and periodical inspections. (Clauses 217 and 220, Crane Safety Regulations) 	

2. About checkings before operation

Dangers	
<ul style="list-style-type: none"> ●Do not use a clamp other than applicable to the operation method. ●Do not use an abnormal clamp with deformation, cracks, operational trouble, abrasion, etc. ●If the work to lift is under the following conditions, do not apply the clamp. (fragile material, high-hardness material, low-hardness or extremely low-hardness material, and members with the gripping part of no pitchedness and of more than 10 degrees in temperature of itself) 	
<ul style="list-style-type: none"> ●Please check on the clamp main unit the type, basically applicable load, opening diameter, and indication of periodical inspections executed. ●The load of the work to lift shall be within the allowable range of the basically applicable load of the clamp. ●The thickness of the work to lift shall be within the allowable clamping range. 	
Cautions	
<ul style="list-style-type: none"> ●Do not use the clamp with tags and signs of cautions attached to it taken away, and with them kept invisible. ●Do not use the clamp for the work under the following conditions. (The work to lift is more than 150 degrees, is less than minus 20 degrees in temperature, and acidic or alkaline chemicals.) 	
<ul style="list-style-type: none"> ●The sling to be used for the clamp shall be an appropriate one for 	

the lifting operation.	
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3. About the method of use and lifting operation

◇Dangers	
<ul style="list-style-type: none"> ●Do not use the Clamp, lifting at one point. ●Do not use the Clamp in the following way of lifting: (overlapped works, padded work, engrafted lifting, concurrent lifting, and side gripping) ●Do not use the Clamp for pulling out from among steel sheet pilings and not lift pulled-out steel sheets vertically. ●Do not use the Clamp when strong wind threatens to cause any danger. ●Do not use the Clamp for a hydraulic excavator. 	
●Install two or more Clamps in a balanced way to keep the work' balance.	
<ul style="list-style-type: none"> ●The lifting angle of the Clamp and the dividing angle are to be kept within the allowable angles according to types. ●The work is to be inserted to the innermost end of the Clamp opening. ●When you use the Clamp with a locking system, never fail to use the Clamp with the locking system on. 	
△Cautions	
<ul style="list-style-type: none"> ●If oil, paint, scales, rust, etc. are on the gripping pad, do not use the Clamp. ●Do not drop to the ground or drag along the ground the Clamp. 	

About the operation of a crane

◇Dangers	
<ul style="list-style-type: none"> ●Never lift the work weighing more than the basic working load. ●Do not operate the crane in such a way as to give an impacting load to the work or the Clamp. ●Do not allow a man to stand on the lifted work. Never use the Clamp for the purpose of carrying a man. ●Do not lift the earth itself. ●In the course of lifting the work, do not release the lock of the Clamp. ●Do not let the Clamp removed from the work collide with the work or an adjacent member. ●When you wind up the wire by the crane and notice the load at the lifting ring, stop the operation temporarily for safety checking (depth of the work into the Clamp opening; status of locking). ●Stop the operation of the crane just before the work reaches the ground, check the following items of things: (Slant and falling over of the work; security at the landing site and its surrounding) 	
<ul style="list-style-type: none"> ●When you wind up the wire by the crane and notice the load at the lifting ring, stop the operation temporarily for safety checking (depth of the work into the Clamp opening; status of locking). ●Stop the operation of the crane just before the work reaches the ground, check the following items of things: (Slant and falling over of the work; security at the landing site and its surrounding) 	
△Cautions	
<ul style="list-style-type: none"> ●Do not operate the crane in such a way as to drag the work along the ground. ●Do not step away from the crane (winder, etc.) operating position while keeping the work being lifted with the Clamp. 	
●Hoisting and lowering operation by the crane are to be made slowly and	

carefully.	
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About maintenance, storage and remodeling

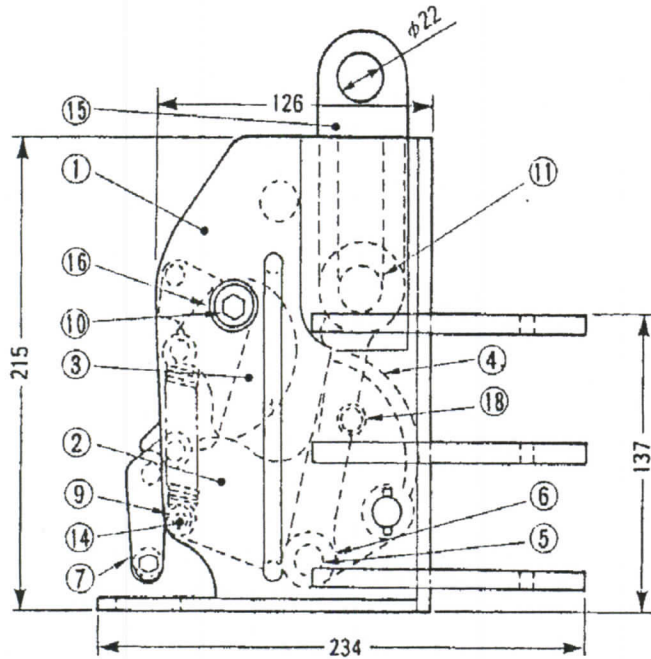
◇Dangers	
<ul style="list-style-type: none"> ●Never execute any remodeling of the Clamp and its accessories. ●Do not apply welding work or heating to the Clamp and its accessories. ●Do not use any other parts than our company's brand-name parts. ●Store at a different place Clamps requiring repairing not to be used mistakenly. 	
<ul style="list-style-type: none"> ●A person with specialized knowledge specified by the business owner is to conduct maintenance and repairing work. ●When you detect abnormality with the Clamp, do not use it and immediately repair or dispose of it. ●Remove, if any, paint or mud sticking to the moving parts of the Clamp, cams, and pads. 	
△Cautions	
<ul style="list-style-type: none"> ●Conduct maintenance and repairing with no work lifted. ●Conduct maintenance and repairing after posting a sign indicating that you're working on the maintenance work. ●Never fail to put lubricating oil on the rotating part of the Clamp (around the pin), guide groove, sliding parts, etc. ●Store Clamps inside a room. 	

Note: Please contact our company's sales agents or sales offices to make advantage of our services in respect with items of inspections and maintenance standards accompanying disassembly and assembly.

Specification & Measurement

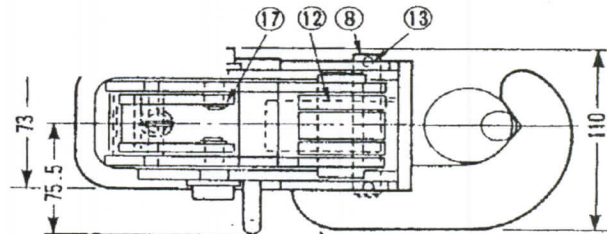
1. Specification

Product No.	Rated Capacity (kg)	Applicable Diameters (mm)	N/Weight (kg)
TVC1	1000	Φ16 to 41	6.0



2. Name of parts

No.	Name of parts	Qty
1	Main Body	1
2	Link	1
3	Lock	1
4	Cam	1
5	Link Pin	1
6	Color	2
7	Remote-Control Lever	1
8	Cam Supporting Pin	1
9	Spring	1
10	Lock Supporting Bolt	2
11	Hook Pin	1
12	Color	2
13	Spring Pin	2
14	Spring Pin	1
15	Lifting Plate	1
16	Spring Washer	2
17	Stopper Ring	2
18	Swaging Pin	1



◆ Usage

Optimal for assembling, pressure welding and extracting of reinforcing steel rods.

◆ Features

1. This clamp is for the safe vertical and handling of pre-assembled reinforcing steel rods, irregular shaped steel bars and round bars.
 2. When the clamp is high out of reach, the centre lever type open lock can be operated with the remote control rope to lock the clamp into the open position.
 3. The special alloy steel cam is high-frequency quenched for maximum strength and durability.
 4. For smooth and easy remote control operation, the components projecting from the sides of the body have been kept as small as possible.
- When clamped onto a reinforced steel rod, the curved holding plates and the cam will generate a positive clamping force to securely hold the work piece.

◆ Operation

1. Attach the shackle to the lifting plate and connect a wire rope, sling chain etc., to it.
2. Insert a steel from out side.
3. Lifting up the lever of remote control, the cam lock the steel rod.
4. The clamp is easily detached from the work piece by pulling the remote control rope to lock the clamp into open position.

◆ Cautions in Handling

1. Do not use to pull out from stacked steel rods.
2. Do not apply the clamp beyond the rated capacity or applicable diameter.
3. Please do not remodel this unit originally by a weld or others.
4. Check the each part of lifting clamp before using whether move normally or not.
5. Do not hit steel rod and clamp to others when lifting.
6. When crane hook lowering, be careful not to upthrust steel rod.
7. Check the clamping steel rod surely when lifting the steel rod.