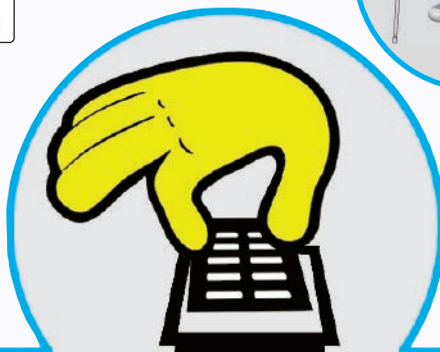


ITALIFTERS by DOA

EQUIPMENT FOR OPENING IN SAFE CONDITIONS
MANHOLE COVERS OF UNDERGROUND UTILITIES NETWORKS



Made in Italy



WE RAISE THE PROBLEM



No more fatigue and waste of time
End of accidents to the back

THE EQUIPEMENT ALLOWS EMPLOYER TO FULFIL AND REDUCE RISKS OF ACCIDENTS DERIVING FROM
THE MANUAL HANDLING AS PRESCRIBED BY: ISO 11228-1, ISO 11228-2 and ISO 11228-3,
ERGONOMICS - APPLICATION DOCUMENT FOR ISO STANDARDS ON MANUAL LOADS HANDLING

SAFE

LIGHT

VERSATILE

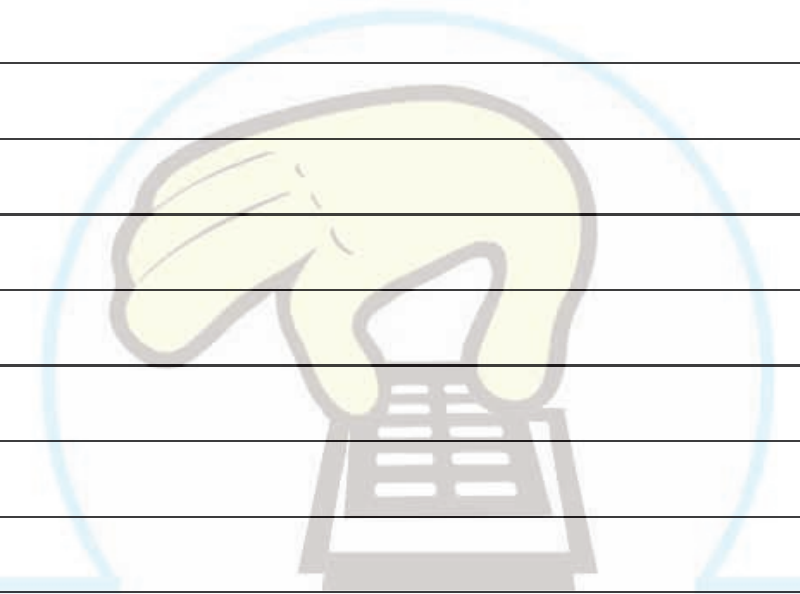
ROBUST

EFFECTIVE

EXCLUSIVE

The best results guaranteed in all conditions
with most of covers, grids of any size and weight

NOTE



WE RAISE THE PROBLEM

LIFTING A MANHOLE COVER QUICKLY AND SAFELY? NOT A PROBLEM ANY MORE!!!

The magnetic cover lifters **XT1 NANO, CL10, CL11, CL9, PM500** and their accessories represent the most modern help in operations of opening/repositioning manhole covers and grilles, **the system is a synthesis of versatility, effectiveness, simplicity and above all warranty of maximum operators safety!**

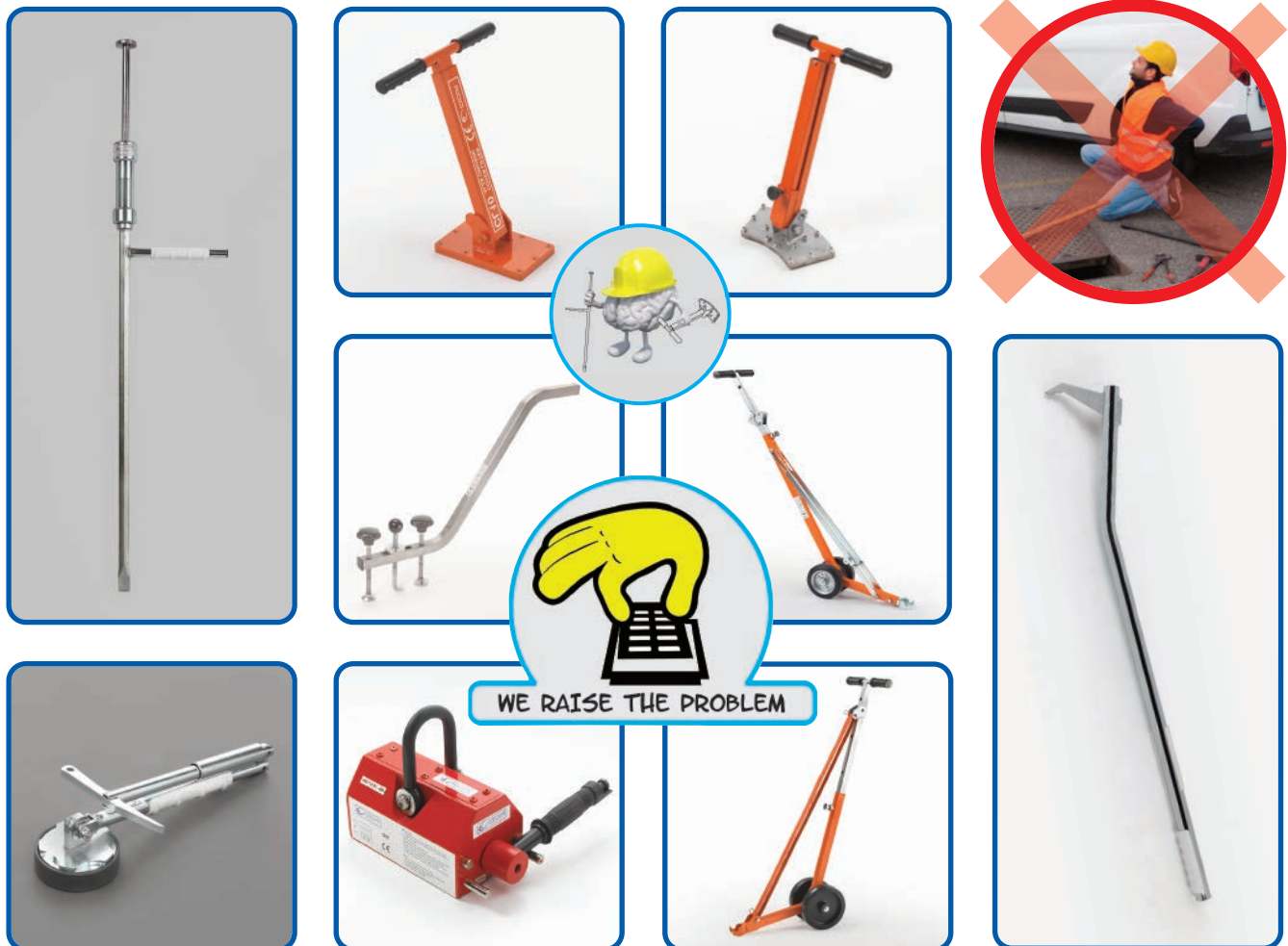
This tools range have been designed on principle to have an equipment compact, light, easy transportable even on the smallest vehicles that never have space left for transporting bulky and complex similar products.

Operators know well the problems associated with an action just apparently simple like lifting a manhole cover: weight and possible accidents to the back, covers blocked by rust, dirt, asphalt, stones etc, often located in high transit roads, successive difficult repositioning and all this complicated by the huge covers variety visible on streets that obliges to keep available many locking devices to grab the cover with screws, hooks and lifting eyes to be connected to the lifting systems.

All these problems are solved with the **XT1 NANO, CL10, CL11, CL9, PM500, APS90, APS80** that are an exclusive multifunctional lifting system that fits majority of conditions being usable in different ways.

*The combined lifting system formed by **CL10, CL11, PM500, MECHANICAL CLAMPS AND HOOK, APS 90, APS80 folding LEVERS** is probably the more complete, versatile and easy transportable in its type and cannot miss today in the equipment of modern utilities maintenance crews.*

THE EQUIPMENT COMPLIES AND ALLOWS THE EMPLOYER TO SATISFY AND REDUCE TO MINIMUM RISKS DERIVING FROM THE MANUAL MOVEMENTS OF LOADS AS PRESCRIBED BY THE :
Ergonomics - Application document for Standards on manual handling ISO 11228-1, ISO 1128-2, ISO 11228-3.



Technical, functional, weight and dimensions characteristics can vary any moment, DOA reserves the right to make improvements without obligations on products previously sold

XT1 NANO

FOLDING MAGNETIC COVER LIFTER FOR MEDIUM/HEAVY MANHOLE COVERS



Light, ultra-compact magnetic lifter ideal for quick and multiple lifting of medium/heavy weight covers. With a weight of just 2 Kg has an incredible lifting force thanks to the latest neodymium type magnets.

Opens and folds with one hand, attaches very strongly to the metal lids and can be easily detached with a lateral stroke.

The handle foldability makes it really tiny for easy handling and transportation, can be stored anywhere even under vehicles seats.

XT1 NANO upper handle has double function, can be used as lifting hook to grab the slots of the covers, with the acute beak made in hard resharpended steel can be used as chisel for chipping and breaking the hard incrustations that always clog the covers slots and allow grabbing and lifting asphalted or non-metallic covers where the magnet cannot be used.

In case the cover is extremely heavy, so above the weight lifting limit of safety rules, is possible to lift by using 2 units XT1 NANO in parallel with 2 operators.

The plastic protection cap provided with tool insulates the magnetic to prevent unwanted contact with metal object during storage.

XT1 NANO represents the "state of the art" in its application, is a concentrate of effectiveness and practicality, cannot miss in the equipment of modernly equipped teams.



• SHOULDER POUCH FOR XT1 NANO

Cod. A221013

Shoulder bag in robust fabric for the protection and transport.

The pouch is not anti magnetic so tool have to be transported with its plastic protection cap to avoid unwanted contacts with metal objects.
(Protection cap code D301056)

ADVISABLE

TECHNICAL CHARACTERISTICS

WEIGHT	Kg 2,5
DIAMETER OF BASE	cm 11
LENGTH IN EXTENSION	cm 70
DIMENSION FOLDED	cm 40 x 8 x 15 (flat handle)
LIFTING POWER	Kg 230 in ideal conditions
MATERIAL OF BEAK	38NCD4 Hardened Steel



XT3 COMPASS

**MANHOLE MAGNETIC COVER LIFTER
WITH COMPASS LIKE STEMS**

Code K0437



XT3 COMPASS is magnetic cover lifter with two powerful separate magnets designed for lifting cast iron manhole covers with two operators, maximum lifting capacity is Kg 460 , its use is necessary to divide the effort into two operators and obtain maximum magnetic contact and lifting capacity, law provisions on manual handling of loads requires that no more than 25 kg per operator can be lifted, which is often not quantifiable especially due to the initial upward separation of the lid which is the moment that requires the highest effort as covers are always blocked by rust and dirt.

XT3 COMPASS is completely foldable and has adjustable span of the compass, this allows to find the most favorable points of metal contact on the cover and the best position of the magnets for a firm grab, also the wide and handles offer ergonomic and comfort for both movement and side positioning the lid.

To detach tool after lifting action is enough to give a quick side stroke;

Tool is delivered with two hard plastic anti magnetic protection caps to avoid accidental contacts with objects successively difficult to detach

The tool is really effective in ensuring function and safety, cannot miss in the equipment of modern crews.

TECHNICAL CHARACTERISTICS

LIFTING CAPACITY	Kg 460 in ideal conditions
MAGNET TYPE	14 neodimium magnetic pads
WEIGHT	Kg 6
LENGTH	cm 67
WIDTH WITH STEMS CLOSED	cm 24
WIDTH WITH STEMS ALL OPEN	cm43
DIAMETER OF MAGNETIC BASES	cm11
Delivered with two plastic antimagnetic caps to avoid contact with metallic objects	



CL10

MAGNETIC COVER LIFTER

unique on the market usable in 4 different ways!

**LIFE
GUARANTEE**



Cod. K0265

Universal model with rectangular base ideal for lifting, moving and repositioning of the majority of covers and grilles in cast iron and ferrous materials, the handle is telescopic and folding to allow ergonomics and minimal space for transport and stocking.

The exclusive configuration gives versatility of use in four ways to lift the majority of lifting/repositioning operations. The plate with 16 powerful neodinium magnets assures a lifting force of 300 Kg with a weight of only Kg 7. **The use is simple, fast and intuitive.**

TECHNICAL CHARACTERISTICS

WEIGHT Kg 7 BASE DIMENSION cm 21 x 16

LENGTH IN EXTENSION cm 70 - RETRACTED cm 55 x 16

LIFTING POWER Kg 400 in ideal conditions



• **ANTI MAGNETIC PROTECTIVE SACK** Code A221006

Accessory of the magnetic cover lifters, prevents unwanted contacts between the magnetic plate with ferrous objects that could be difficult to separate and render normally manageable the tools. (data sheet at pag. 11)

ADVISABLE

1



MANUAL LIFTING WITH MAGNETIC PLATE

CL10 is placed on the cover in the position nearest to the frame giving a solid blockage, the telescopic handle allows to manually lift and move the majority of covers, to detach the tool is enough to give a strong side stroke.

The operation is simple and fast.

2

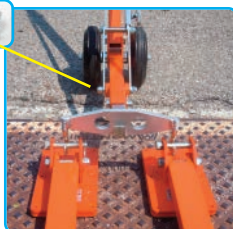


LIFTING WITH APS90 - APS80 LEVERS

Lifting using CL10 with the folding levers the efforts and possible accidents on the back are totally eliminated, the operator weight becomes "friend" thanks to the downward push action that stretches the vertebrae and back muscles,

The operations are simple, fast and safe.

3



LIFTING WITH TWO MAGNETIC PLATES BLOCKED IN PARALLEL AND APS90 - APS80 LEVERS

If cover is too heavy or too blocked by dirt or too grooved with minimal magnetic contact is possible to use two CL10 in parallel united by a small connection "bridge", the contact force is doubled, the operator weight becomes "friend" thanks to the downward push action that stretches the vertebrae and back muscles, the plates will be then detached one at a time.

The operations are simple, safe and fast.

4



MANUAL LIFTING WITH HANDLE BLOCKED HORIZONTALLY TO LIFT HINGED ROUND COVERS

By simply changing the position of a pin is possible to block in horizontal position the telescopic handle. In this configuration the magnetic plate becomes a practical rigid long handle to lift and reverse the covers that are hinged to the frame.

The operation is simple, fast and safe.

CL11

MAGNETIC COVER LIFTER WITH "BANANA" BASE

**LIFE
GUARANTEE**



Magnetic lifter with curved base, the rounded shape gives ideal contact with round covers having external frame in cast iron and centre disc in concrete/asphalt/stones, tool can lift also any other common cover or grille in cast iron and ferrous materials, **CL11** features an extensible side foot (A) that gives right lifting geometry and assures full up force when lifting hinged covers with the handle blocked in horizontal position (see the side foot extended in below operation 3). The handle is telescopic and folding to allow ergonomics and minimal space for transport and stocking. The particular tool configuration assures an exclusive versatility of use in 3 different ways. The plate with 18 powerful neodinium magnets gives 420 Kg lifting force with a weight of only Kg 7.

TECHNICAL CHARACTERISTICS

WEIGHT Kg 7 BASE DIMENSION cm 28 x 12

LENGHT IN ESTENSION cm 70 - RETRACTED cm 55 x 12

LIFTING POWER Kg 420 in ideal conditions



• **ANTI MAGNETIC PROTECTIVE SACK** Code A221006

Accessory of the magnetic cover lifters, prevents unwanted contacts between the magnetic plate with ferrous objects that could be difficult to separate and render normally manageable the tools. (data sheet at pag. 11)

ADVISABLE

1



MANUAL LIFTING WITH MAGNETIC PLATE

CL11 is placed on the cover in the position nearest to the frame giving a solid blockage, the telescopic handle allows to manually lift and move the majority of covers, to detach the tool is enough to give a strong side stroke.

The operation is simple and fast.

2

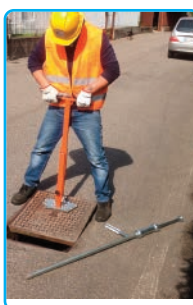


LIFTING WITH APS90 - APS80 LEVER

Lifting using **CL11** with the folding levers the efforts and possible accidents on the back are totally eliminated, the operator weight becomes "friend" thanks to the downward push action that stretches the vertebrae and back muscles.

The operations are simple, fast and safe.

3



MANUAL LIFTING WITH HANDLE BLOCKED HORIZONTALLY TO LIFT HINGED ROUND COVERS

By simply changing the position of a pin is possible to block in horizontal position the telescopic handle, the ideal lifting geometry is obtained by extending the back foot, in this configuration the tool will become a handy long rigid handle that will ease the lift and overthrow of hinged round covers.

In this configuration the magnetic plate becomes a practical rigid long handle to lift and reverse the covers that are hinged to the frame.

The operations are simple, safe and fast.

MAGNETIC COVER LIFTERS IN ANTI SPARK CONFIGURATION FOR CAST IRON COVERS



XT1 NANO ATEX, CL10 ATEX, CL11 ATEX are **ANTI SPARK** magnetic cover lifters which are recommended to lift in total safety covers of gas networks, fuel refill stations, petrochemical plants, refineries, port oil terminals, depurators and digesters and in all zones and situations potentially explosive.

In the manhole cavity where are stocked or transported fuels, gas or other fluids potentially flammable and explosive for a total safety are needed cover lifters in configuration **ANTI SPARK, ANTI EXPLOSION**, therefore products ATEX certified, as a matter of fact gas, vapours, petrochemical fluids and other fluids potentially flammable can accumulate in the cavity (even with a certain pressure) and cause explosions or dangerous fire blaze ignited by sparks generated by the impact between two ferrous objects or even worst by a free flame.

XT1 NANO ATEX, CL10 ATEX, CL11 ATEX are equipped with a "sole" in soft nonferrous metal that completely wraps also the edges and cannot generate sparks even if violently beaten on cast iron covers.

The tools are of **CATEGORY 3 ATEX**, so adequate to be used in zone classified: ZONE 2.

ATEX CATEGORY/CLASS: II 3G c IIB T6 -20°C ≤ Tamb ≤ +50°C

Use, performances, general characteristics are the same of those of standard models XT1 NANO, CL10, CL11
CONTACT DOA FOR MORE INFORMATIONS.



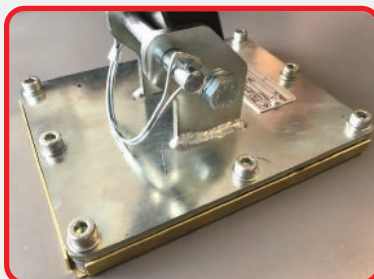
XT1 NANO ATEX
MINI MAGNETIC FOLDABLE LIFTER
Manual use only



Details of "sole" in ANTI SPARK metal.



CL10 ATEX
UNIVERSAL COVER LIFTER
Manual use and with wheeled lever



CL11 ATEX
UNIVERSAL COVER LIFTER
FOR SQUARE AND ROUND COVERS
Manual use and with wheeled lever

ADVISABLE
ANTI MAGNETIC PROTECTIVE SACK
Prevents unwanted contacts between the magnetic plate with ferrous objects that could be difficult to separate and render normally manageable the tools. **Code A221006**
For CL10 and CL11 only





Cod. K0436

XT2 is a powerful manhole cover lifter with two separate magnets pads, tool is designed for lifting cast iron covers obtaining maximum magnetic contact and lifting capacity, thanks of the large handle allows operations from two operators together dividing effort and limiting risks of back accidents, the safety laws on manual handling of loads prescribe that cannot be lifted more then 25 Kg per operator, load often not quantifiable especially due to the initial vertical separation of the lid which is the moment that needs higher effort.

XT2 can be also quickly separated into two parts and have two independent and separate tools.

To detach tool after lifting action is enough to give a quick side stroke.

Delivered with two hard plastic anti magnetic protection cups that avoid accidental contacts with objects successively difficult to detach.

Tool is really ingenious and effective in ensuring function and safety, cannot miss in the equipment of modern crews.



TECHNICAL CHARACTERISTICS

LIFTING CAPACITY	Kg 460 in ideal conditions
MAGNET TYPE	14 neodimium magnetic pads
WEIGHT	Kg 5
WIDTH	cm 40
HEIGHT	cm 70
DIAMETER OF MAGNETIC BASE	cm 11
Delivered with two plastic antimagnetic caps to avoid contact with metallic objects	



CL9

MAGNETIC COVER LIFTERS - Ultra light model



Cod. K0310

CL9 is a magnetic cover lifter designed to manually open metallic covers with medium/heavy weight or covers that are frequently maneuvered so are not excessively blocked or difficult to lift, the weight of only Kg 4 and the foldability of the handle allow easy transport on the smaller vehicles or in situations where operator must walk long distances carrying tool by hands (example in historical city centers with limited traffic access), the base plate has 9 powerful magnets pads that assure an high lifting capacity up to Kg 230. Tool is compact, efficient, simple and fast to use, cannot miss today in the modernly equipped crews.

ADVISABLE



• ANTI MAGNETIC PROTECTIVE SACK

Code A221006

Accessory of the magnetic cover lifters, prevents unwanted contacts between the magnetic plate with ferrous objects that could be difficult to separate and render normally manageable the tools. (data sheet at pag. 11)

TECHNICAL CHARACTERISTICS

WEIGHT	Kg 4
DIMENSION LxH	cm 12 x 12,5
LENGHT RETRACTED/FOLDED	cm 50
LENGHT IN EXTENSION	Kg 230
LIFTING POWER	Kg 230 in ideal conditions



LB5

MAGNETIC LIFTER FOR LIGHT AND HEAVY METALLIC MANHOLE COVERS



LB5 is a small and effective magnetic cover lifter designed to lift, move and reposition light and heavy covers and grilles in cast iron and ferrous materials.

ADVANTAGES AND CHARACTERISTICS

- Tool bar has double function of handle and pointed chisel to be used as chipping hammer to break incrustations that always clog the slots, or as a hook to engage the slots and manually lift covers. (fig.1)
- Simple and fast use, it is enough to place the lifter above covers and its magnetic force of 70 Kg (in ideal conditions) will allow to lift also heavy covers.
- Handle and hammer in galvanized steel.
- The magnetic plate is foldable to allow easy storage. (fig.2)



TECHNICAL CHARACTERISTICS

WEIGHT	Kg 2
LENGTH	cm 65
BASE DIMENSION	cm 8 x 4 cm
LIFTING FORCE	Kg 70 in ideal condition
N° MAGNETS	5 neodimium pads

Technical characteristics can vary any moment. DOA reserves the right to make improvements without obligations on products previously sold. Characteristics can vary also on customer specifications or to fit tenders particular specifications.

SHOULDER POUCH FOR XT1 NANO



Shoulder bag in robust fabric for the protection and transport of the magnetic cover lifter **XT1 NANO**. The pouch is intended only for the integrity of the tool when not in use but it is not anti magnetic, so not sufficient to guarantee that the tool base will not attach to ferrous object, the **XT1 NANO** to be completely neutralized in its magnetic effects will always need its anti magnetic plastic cap supplied with new tool and functional part of the it.

PROTECTIVE SACK FOR CL10 - CL11 - CL9



Sack made in robust "cordura" fabric is a useful accessory for the **CL10** and **CL11** cover lifters that prevents that during transport or stocking the magnetic plate get accidentally stuck to ferrous objects or to shelves or walls of vans making them difficult to separate or that could even get damaged when detached, in particular the sack eliminates accidental contacts to electronic devices that could be irreparably damaged. The high attraction force of the plate is annulled by an internal rigid panel that shuts off the magnets and render neutral and normally manageable the cover lifters.

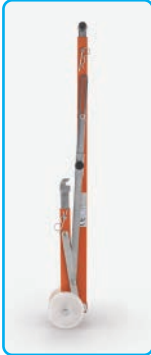
APS90

FOLDING LEVER FOR COVER LIFTERS

5 different ways of use



- Small, light, strong, easy to transport



Cod. K0262



- Upper arm telescopic and inclinable to guarantee ideal ergonomics in any use



- Telescopic lower arm extensible in 3 lengths
- Detail of the tool hinge and wheels axle



APS90 is a multipurpose wheeled folding lever designed for use in combination with the DOA cover lifter tools: CL10, CL11, PM500 and with mechanical clamps, the lever guarantees fast, easy and safe operations in lifting, moving, repositioning manhole covers of underground networks of water, sewage, gas, telecommunications etc.

Tool is "operator friendly" as these operations can be done in **total safety pushing down and not lifting**, so the spine is released and not compressed, this eliminates possible accidents to the back. **APS90** is a clever accessory that **allows the employer to fulfil and reduce risks of accidents deriving from the manual movements of loads as prescribed by ISO 11228-1 - 2 - 3, Ergonomics - Application document for ISO standards on manual handling.**

Thanks to its light weight, robustness and compactness can be handled and operated even by female personnel and transported occupying minimal space on board vehicles.

TECHNICAL CHARACTERISTICS

WEIGHT	10 Kg	WEIGHT LIFTABLE	600 Kg
LENGTH OF UPPER ARM RETRACTED	108 cm	LENGTH OF UPPER ARM EXTENDED	160 cm
LENGTH OF LOWER ARM RETRACTED	40 cm	LENGTH OF LOWER ARM EXTENDED	56 cm

ADVANTAGES

- Extremely versatile can be used in five different ways to fit the majority of cover lifting operations
- Both arms are telescopic and extendable to give the needed favourable leverage
- Opening, adjustments and folding operations can be done in few seconds
- **With the lever in total extension a man with weight 75 Kg can lift without effort 300 Kg**
- Quality construction, all parts are manufactured with best materials and best treatments of galvanisation and painting
- Unlike similar product it is really light and easily transportable, when folded can be stored everywhere
- Use is real simple and meets the operators need that only want practical, quick working systems

APS90

UNIQUE ON THE MARKET
Usable in 5 different ways

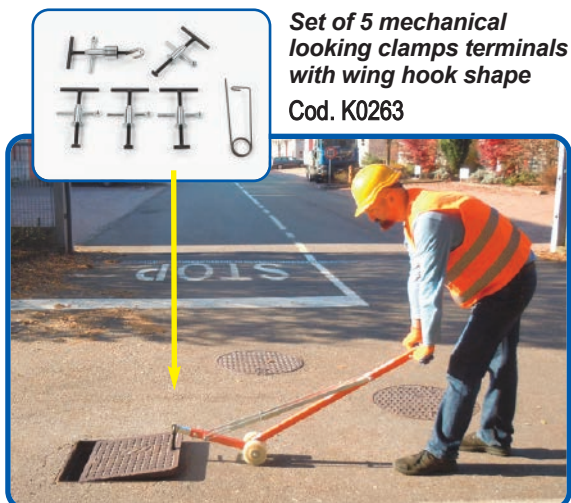
1 Magnetic lifting with single CL10 o CL11



2 Lifting with two CL10 blocked in parallel by connection bridge when cover is too heavy



3 Lifting with mechanical locking clamps inserted in the cover apertures or slots



4 Magnetic lifting with permanent magnet for very heavy/blocked covers



5 Lifting bar BT95



Lifting bar BT95
Cod. K0279



Set of 5 mechanical locking clamps terminals with wing hook shape
Cod. K0263



APS80

FOLDING LEVER FOR COVER LIFTERS

5 different ways of use



**LIFE
GUARANTEE**

Cod. K0363



- APS80 completely folded is extremely compact and light can be easily transported

Accessories APS80 - APS90



CL10



CL11



SET CLAMPS



PM500



BT95

Versatile folding lever with wheels designed for use with DOA cover lifters: CL10, CL11, PM500 and with mechanical clamps, the lever is a simplified version of the APS90 and is ideal for crews that must pull up every day many covers that do not give particular opening problems, the upper long arm is telescopic to allow bending in minimal space and an easy transportation on small vehicles, the connection that forms a closed triangle with the two arms is a robust, light pliable belt. Beside the maximum lifting capacity the other functions are the same as the APS90.

The lifting action is done by pushing down so the operator back bone is relaxed and not subject to dangerous compression guaranteeing safety and function.

APS80 is a clever tool that allows the employer to fulfil and reduce risks of accidents deriving from the manual movements of loads as prescribed by ISO 11228 -1 - 2 - 3, Ergonomics - Application document for ISO standards on manual handling.

Thanks to the light weight and compactness can also be used by female personnel and transported occupying minimal space.

TECHNICAL CHARACTERISTICS

WEIGHT	7 Kg	WEIGHT LIFTABLE	600 Kg
LENGTH OF UPPER ARM RETRACTED	110 cm	LENGTH OF UPPER ARM EXTENDED	160 cm
LENGTH OF LOWER ARM RETRACTED	40 cm	LENGTH OF LOWER ARM EXTENDED	56 cm

ADVANTAGES

- Extremely versatile can be used in five different ways to fit the majority of cover lifting operations
- Opening, adjustments and folding operations can be done in few seconds
- With the lever in total extension a man with weight 75 Kg can lift without effort 300 Kg
- All parts are manufactured with best materials and treatments of galvanisation and painting
- Unlike similar product it is really light and easily transportable, when folded can be stored everywhere
- Use is real simple and meets the operators need that only want practical, quick working systems

SET OF CLAMPS FOR THE MECHANICAL LIFTING OF COVERS



Cod. K0263

The set is formed by five clamps, four with wings and one with hook, mechanical clamps are used in combination with the **APS90 - APS80** folding levers to lift/move/reposition covers and grilles that cannot be lifted with the magnetic lifters **CL10, CL11, PM500**.

The wings have different dimension to fit the insertion into the majority of the covers slots and apertures, the use is simple, fast and functional: it is enough to insert and turn by 90° the wings in the slot to get the engagement, then firmly fix the cross bar in the convenient position to allow the clamping with **APS90 - APS80** levers and the lifting operation is ready.

The wings dimension and the hook shape can be changed and machined on customer specification to fit particular apertures and slots of covers.

The five clamps are delivered inserted in a brooch that keeps parts united, ready for use and prevent losses.



- If necessary the clamps can be used also in "tandem" inserted in the slots in opposite position as double grabbing point for the vertical lifting of deep covers.
- Contact DOA if special configuration/dimension clamp are needed.



APS90
APS80



Fixing cross bar
blocked in right
position ready to lift



Clamp ready for
lifting action



Engagement of the lever
in the clamp

PM500

PERMANENT MAGNET FOR LIFTING COVERS TO BE USED WITH LEVERS APS90 - APS80



Cod. K0360

PM500 is a high power magnet used in combination with the DOA wheeled folding levers APS90 - APS80 when is needed to lift very heavy ferrous covers or covers that are firmly blocked by incrustations, rust and time.

The magnet use guarantees easy, fast operations in total safe conditions. The magnetic action is activated and deactivated by an ON/OFF lever that gives instant control and an easy detachment after the use, **PM500** is used with the folding levers engaged in the upper lifting ring but magnet **PM500** can also be used lifted by mini excavators or cranes particularly when the combination weight/incrustation and metal dilatation in summer firmly block the covers.

- Folding lever APS90 is not included with PM500.

TECHNICAL CHARACTERISTICS

WEIGHT	Kg 18
DIMENSION	cm 25 x 15 x H 13
LIFTING FORCE	Kg 500 in ideal condition



- PM500 can also be lifted by mini excavators or cranes
- In case of extremely heavy blocked covers is possible use as grabbing point two PM500 in parallel to double the lifting magnetic force



Kg 300



- APS90 Lever
- Image shows the lifting of a steel cylinder with weight 300 Kg



BT95

LIFTING BAR FOR WHEELED LEVERS APS90 - APS80 IN COMBINATION WITH MECHANICAL LOCKING CLAMPS



Cod. K0279

Robust cross bar with side slots to allow regulation of the distance of the locking clamps, accessory of the wheeled levers APS90, APS80. To be used in combination with mechanical locking clamps (code K0263)
Construction in galvanized steel with slots laser cut. Allows to grab center to center distance of slots mm 400-920, total length mm 980.
LIFE GUARANTEE.



Mechanical locking clamps



CARATTERISTICHE

WEIGHT	Kg 5
LENGTH	cm 98
SLOT DISTANCE CAPACITY	cm 40 - 92

CONNECTION BRIDGE FOR CL10 - CL11



Cod. K0264



Connection bridge that allows to lift with the levers **APS90 - APS80** in a parallel action and with double lifting force two **CL10**. The use of two cover lifters **CL10** in parallel is needed when the magnetic contact on the cover is minimal or when the cover is too heavy.



Cod. K0384



Practical cover lifter for covers with hooking slots, tools use is simple, fast and all operations can be done standing up, the lower key must be inserted in the cover slot then turned by 90° to allow hooking and the lifting action is ready. The dimension of the key can be easily changed or modified adaptind it to the various slots dimension, depth and direction.

Tool can be used alone or in combination with another **LB2** lifting by two man on large and very heavy covers. Unlike similar tools **LB2** is fabricated in high tensile steel laser cut and thanks to its robustness has life warranty.



● Insertion of the key of the slot



● 90° rotation of the key and hooking of the slot



● Lifting - Pulling
The long dimension of the lever limits the lifting effort

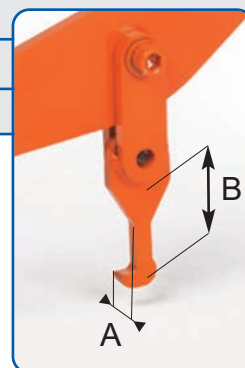


● Use with 2 tools - 2/4 operators lifting very large, deep and heavy covers

TECHNICAL CHARACTERISTICS

WEIGHT	5 Kg
LENGTH	110 cm
CONSTRUCTION MATERIAL	Steel 38 NCD4

- The covers can have different depth, width, shape and direction of the slot, the key dimension A and B can be adapted or changed according to necessity.





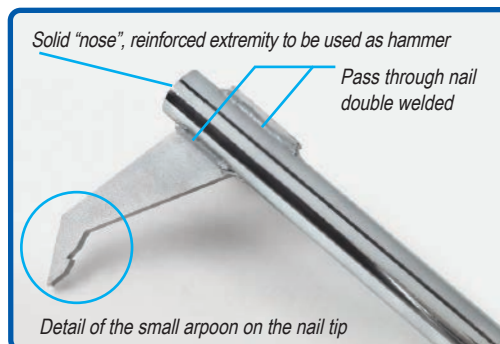
Cod. K0359



Versatile and practical tool designed to grab and manually lift covers and grilles of underground pipes of water, gas, sewage, telecommunications etc, tool can be defined as modern, ergonomic and technical improvement of the traditional pick hammers and "timber pullers" that are used improperly in these operations. Its characteristics and simplicity assure a function fast, easy, secure.

TECHNICAL CHARACTERISTICS

WEIGHT	Kg 2,5
LENGTH	cm 120



ADVANTAGES

- The tool "nail" is laser cut in hard steel and is opportunely shaped to enter/grab/lift the majority of slots and apertures of the covers
- Very strong and durable, the handle has convenient shape for the ideal ergonomy and "stand up" operations lifting with legs and not with the back
- Tool "nail" can be used as strong scraper/ cleaner to eliminate incrustations on the frame bottom
- The plastic handles gives excellent firm grip, completely galvanized against rust
- The nail tip can be easily modified by the customer grinding it to reduce width and allow insertion in small apertures or slots
- The lower extremity feature a solid "nose" usable as hammer to bit covers and break incrustations



LB7

LIGHT COVER LIFTER LEVER



Cod. K0266

Robust, light & versatile lever with beaks ideal in the operations of lifting small and light weight covers and grilles, the flat double beaks with tip in hard tempered steel can be inserted into the contact slot between covers and frame and resist to strong leverages, torsions and hammering, the beaks are configured also to scrape and clean the lifting cavity of covers from asphalt crusts and dirt.

LB7 is manufactured with the best materials and treatment and is life guaranteed.

CHARACTERISTICS

WEIGHT	Kg 1,2
LENGTH	cm 75

ADVANTAGES

- Construction in 38NCD4 steel with zinc galvanisation
- The plastic handles guarantee a firm grip also with gloves
- The back of the "D" handle gives a "fulcrum point" to ease the lifting leverage
- For characteristics and function tool is the modern alternative to the crudely use of the pickaxes





Typical, effective and versatile tool designed for opening the majority of covers, grilles, decanters that have slots, apertures or holes that allow hooking and grabbing.

The tool allows the employer to fulfil and reduce risks of accidents deriving from the manual movements of loads as prescribed by: ISO 11228-1-2-3 Ergonomics - Application document for ISO standards on manual load handling.

LB8 is really versatile as can be used in different ways, the lifting operations are simple and intuitive.

Tool is in substance a robust lever/handle that has on the lower part two adjustable side studs (A) and a central threaded puller rod (B) that can move in a slot with an hooked end, the hook must be inserted in the cover apertures then rotated to block cover and forming a solid firm unit with the tool to allow lifting.

LB8 is life guaranteed, is fabricated with the best materials to assure robustness and a long lasting use problems free.

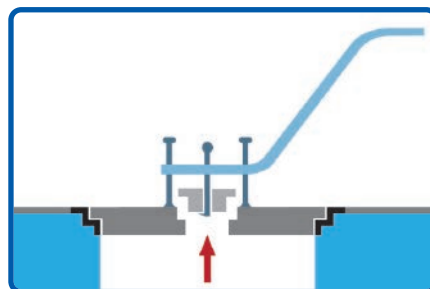
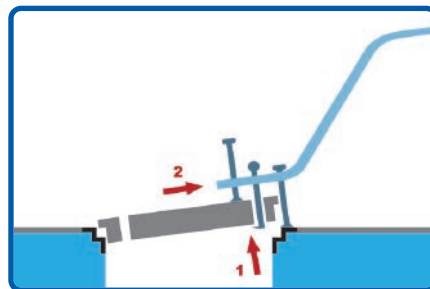
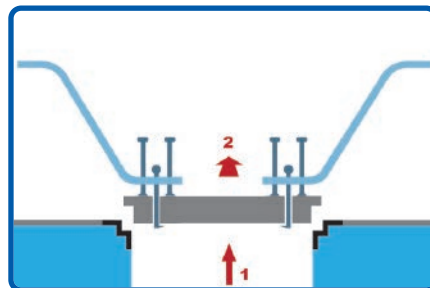
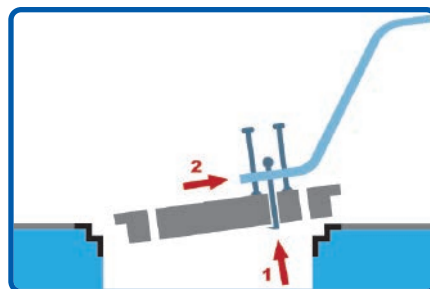
WEIGHT Kg 4,5

LENGTH cm 100

HANDLE Stainless steel STUDS Steel 38 NCD4

ADVANTAGES

- Construction is Stainless steel without vulnerable plastic parts
- The two feet of the side rods are flexible to assure a perfect backing with covers
- The two side threaded studs (A) are fabricated in hard steel 38 NCD4, unlike similar product that have these parts in normal steel
- Robust and resistant to rust and impacts



LK70

LIFTING KART FOR VERY HEAVY MANHOLE COVERS



LK70 is a kart designed to lift very heavy cast iron covers that are very heavy, deeply inserted in the frame or very blocked by incrustations, jamming, bad installation and metal expansion due to high summer temperature.

Operators know well the complications involved in lifting very heavy covers that cannot be lifted with traditional systems: down time, costs, difficulty to clamp and hook up the cover and often is necessary to have a mini excavator to pull up **LK70** system solves the majority of these problems, it is used in combination with two **PM500** permanent magnets or also with mechanical hooks and clamps.

The magnets **PM500** are quickly placed on the cover surface assuring a very strong contact force, the kart hooks up the magnets and thanks to the long lever a normal size operator can deliver a very high lifting power that can open and move aside very blocked covers. The central stud forms a contact triangle that during the lifting keeps firm the group kart/cover avoiding rocking or unwanted movements allowing the perfect control of operation. Kart can be completely disassembled to reduce the size, all is stored in a "cordura" sack for transport and integrity.

GROUP COMPOSITION

- **KART GROUP** can be disassembled to ease stocking and transport, is formed by central cross bar, two sliding hooks and wheels, lever
- **PM500 PERMANENT MAGNET** are not included in the price of the LK70 and must be purchased separately at more price

ADVANTAGES

- Group can be assembled in few minutes , wheels and hooks are adjustable and sliding
- It is the more easily transportable in its type, unbeatable weight/size/power/function
- Can be used with one or two magnets or with simple mechanical clamps and hooks
- **CAN BE REALIZED ON CUSTOMER SPECIFICATIONS**

TECHNICAL CHARACTERISTICS (! can vary depending on version !)

WEIGHT OF THE KART GROUP COMPLETELY ASSEMBLED	21 Kg (or depending on realization)
WEIGHT OF MAGNETS	18 Kg cad.
MAGNET LIFTING FORCE	500 Kg each magnet (1000 Kg total)
DIMENSION BETWEEN WHEELS	130 cm



PLASTIC SOUNDPROOFING SHIMS FOR ELIMINATION OF NOISE OF MANHOLES COVERS AND GRILLERS



Cod. K0366

Special soundproofing shims designed with shape and material to lock in firm position, safe and especially silent, unstable manholes cover of underground networks and urban services.

Everyone is familiar with the annoying problem of the strong, continuous noise emitted from the manhole covers as a result of the passage of vehicles.

Age, wear, bad support and the great impact force of the wheels cause this problem that was solved with improvised and primitive systems by inserting between the cover and frame pieces of rubber or segments of old tires inner tubes etc,

The shims are not simple "nooks of plastic" but are manufactured in a polyurethane of high quality with particular non symmetrical configuration and a wedge-shaped plan designed to stop the excursion in every direction.

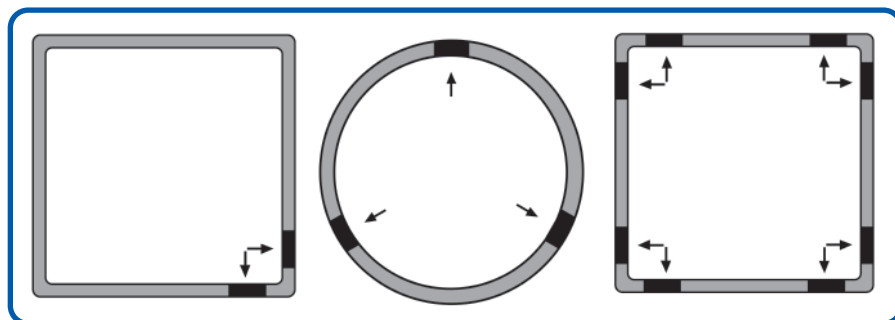
Shims are the modern solution to eliminate the flicker, and completely avoid the noise, the cover "floats" resting on the plastic shims and ensuring the best function and respect for the environment.

ADVANTAGES

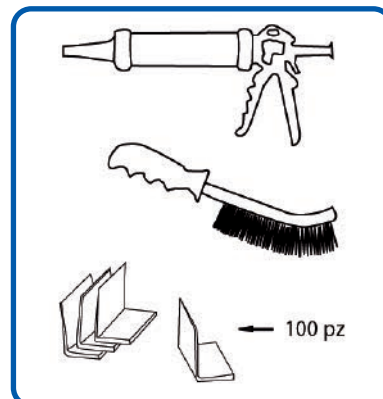
- *Molded injection in special polyurethane resistant to compression, time, sun, moisture, wear and temperature excursions (+60 °C / -40 °C)*
- *Are reusable and have die cuts for cutting in two half and double thickness*
- *Installation quick and without complications*



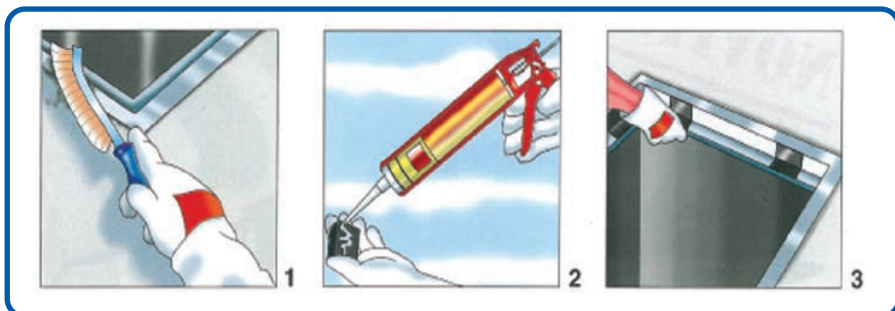
EXAMPLE OF SHIMS POSITIONING



THE COMPLETE KIT



THE MOUNTING PROCEDURE



MZ120

SLIDING HAMMER FOR BREAKING INCRUSTATIONS THAT BLOCK THE COVERS ON THE FRAME OF MANHOLES PREVENTING REMOVAL



Practical and versatile tool designed to ease the removal of the cover from the manholes frame that are stuck by rust, ice, stones, asphalt incrustations and inactivity. The wedge penetration effect of the tip, between the frame and the cover, creates a strong lateral pushing force that splits easily the incrustations formed by sediments that block the opening, just a couple blows and the separation/detachment is done, fast, powerful and safe.

MZ120 offers ergonomic "Standing Up" operations (no more needed to get on the ground on your knees to bit the cover with hammers like usually can be seen, this is an uncomfortable/unsafe operation with possible chippings and splinters that can strike the worker face), the tapered tip is in hardened steel and it is the same used on pneumatic demolition breakers.

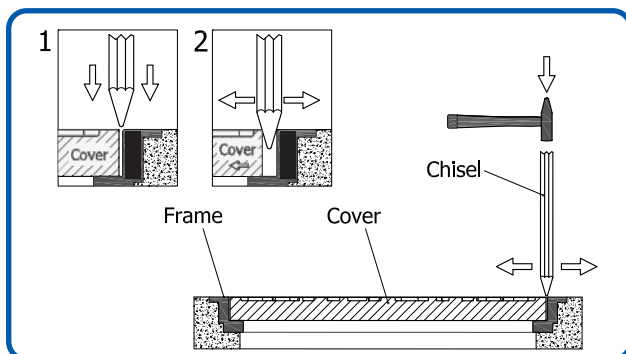
MAXIMUM VERSATILITY - Other uses of the tool are:

- ❶ **Scraper** to strongly erase the hard layer of dirt that remains in the lower surface between the cover and frame to clean up and re obtain a plan contact surface.
- ❷ **Cutter** to easily cut the asphalt layer that often cover the edge and reopen the contact line between the manhole cover and the frame to allow lifting
- ❸ **Lever** to release the latch that blocks the round hinged covers and then to leverage for lifting like a pickaxe

MZ120 is a modern accessory that simplifies a seemingly simple operation like lifting a manhole cover, its use is ideal in combination with the magnetic cover lifters **CL10 - CL11 - PM500** and the other lifting tools.

MZ120 is an exclusive product of DOA srl with LIFE TIME WARRANTY

WEIGHT	Kg 8	LENGTH	cm 130
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- **Asphalt cutting action to liberate the cover and allow lifting**

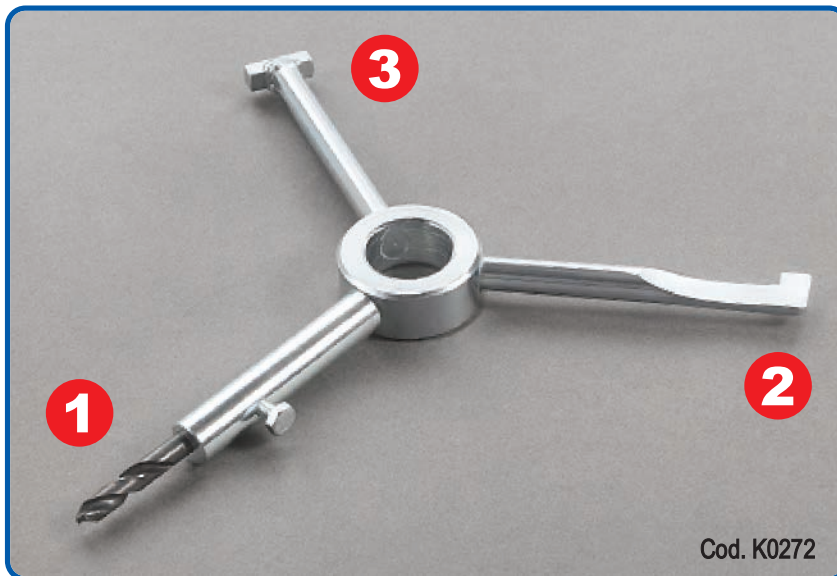


Safety locking pin when tool not used



T3 POLY TOOL

MULTI PURPOSE TOOL
For opening manhole covers



T3 POLY TOOL is a clever multi purpose implement designed to make the typical operations needed to open manhole covers the three extremities have different configurations that allow to drill and scrap, to grab, to open the latches that lock some covers and allow to engage, lift and remove covers.

Tool is delivered in a robust "cordura" pouch, studied to ease the operations **T3 POLY TOOL** is an effective and sometimes irreplaceable help in operations of manoeuvring manhole covers.

TECHNICAL CHARACTERISTICS

WEIGHT	Kg 0,5
DIMENSION	cm 27 x 27 x 27

- 1** Use the extremity with drill bit to energetically and deeply clean the slots of the covers that are always closed by hard incrustations that do not allow the insertion of the lifting keys, the bit can be changed and or re sharpened with a grinder.



- 2** Use the "L" extremity as rotary cleaner to erase in the internal aperture of the slots to liberate completely the internal rotation space and allow the insertion of the key, can also be used as lever to unlock the latch that blocks some covers before opening. The extremity is screwed and can be replaced.



- 3** Use the "T" extremity as insertion hooking key in the slots, grabbing then tool as handle to lift by hands or using a chocking belt to lift standing up.





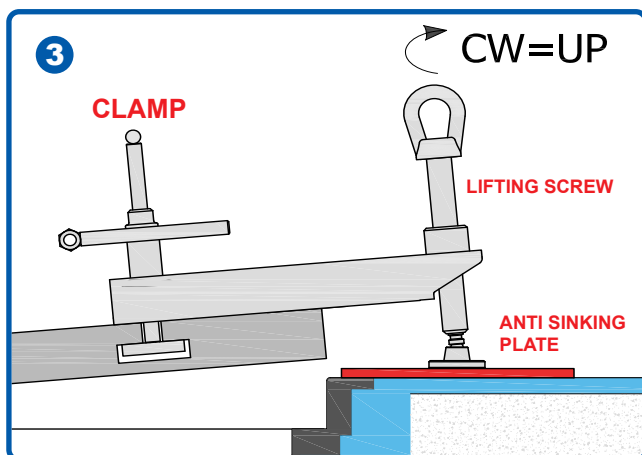
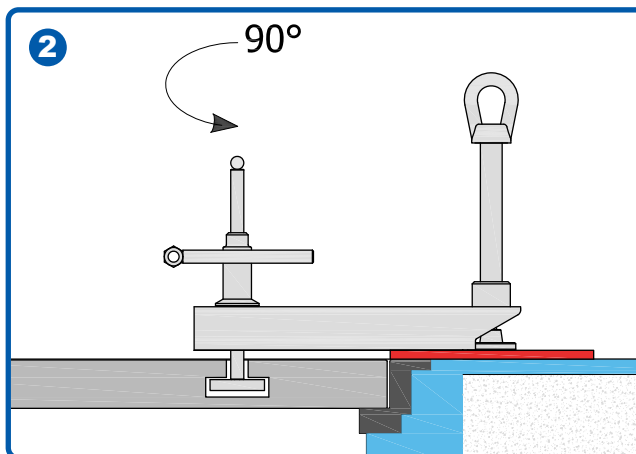
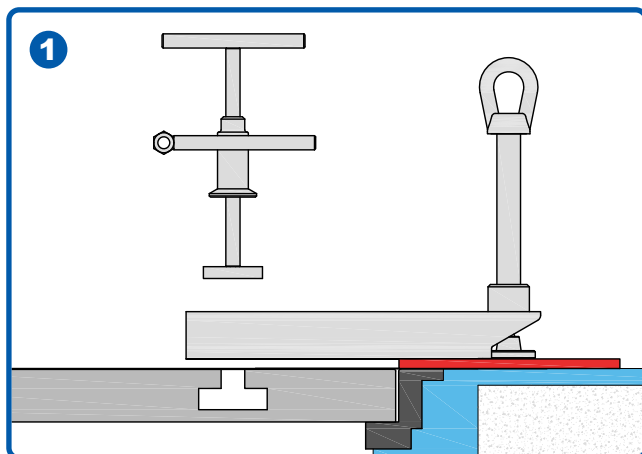
*Mechanical locking clamps
are not supplied with ES1*

Cod. K0278

CHARACTERISTICS

WEIGHT without clamp	Kg 2,3
LENGTH	cm 30

This accessory avoids potential dangerous operations such as hammering the covers before lifting, the covers not lifted from long time can be so blocked by inactivity, rust, dirt, encrustation and deformation to prevent it from opening even if subjected to strong hammering, hammering is an operation that can be dangerous for possible splinters projection, **for causing sparks potentially very dangerous when lifting covers of gas and petrochemical fluids**, and also for the **risk of breakage of the cover** (cast iron is fragile), this accessory must be used in conjunction with an appropriate ITALIFTERS clamp that will be inserted into the catch latch and locked on the adjustable drag of the extractor, then the clock wise rotation of the screw exerts a great upstream force that will easily breaks the incrustations and allows the initial opening of the first millimeters of the lid which can then be lifted with the normal systems, the lifting screw is rotated by inserting into the upper ring a screwdriver or a lever, the fulcrum that will be placed immediately on the outside of the frame and above the small metal plate that will offer a solid foundation to prevents possible sunken on asphalt of the screw foot.



AC90

ANTI FALL SAFETY DEVICE FOR OPEN MANHOLE COVERS



AC90 is a simple and effective anti fall system designed to prevent that people, tools and materials can fall into open manholes. The falling objects in open manholes is not something so rare and can cause the imaginable problems but can be very dangerous if inside there are operators.

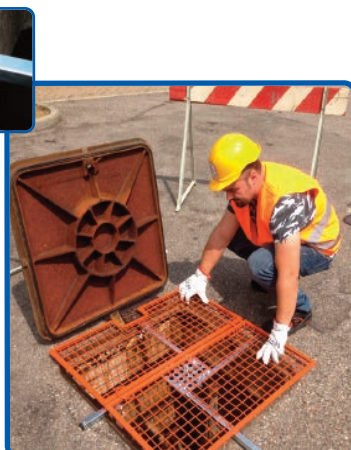
The use is practical and intuitive, the equipment consists of a light but sturdy cross folding frame in Stainless Steel with 4 arms that is placed on the manholes opening, no matter if with square or round shape, the 4 sliding studs will be adjusted on top of the apertures in the correct position to prevent side movement, then above the cross is placed a self-centring and folding metal grille that prevents falls but allows passage of air and light, the grille can also be moved in a convenient position if there is a ladder. In the event of sudden emergency escape of the operator from inside the manhole all group can be quickly removed with a light push up. **AC90** improves safety, is a must in today modern equipped crews as integration to the prescribed isolation barriers and road works warning signs.

CHARACTERISTICS

WEIGHT OF THE CROSS	5 Kg
WEIGHT OF GRILLE	7 Kg
DIMENSION OF GRILLE OPEN	cm 90x90
DIMENSIONS PROTECTABLE OPEN AREA	cm 90x90
POSSIBILITY OF CUSTOM MADE ON SPECIFIC	YES

ADVANTAGES

- *Cross construction in galvanised steel tubes*
- *Fast installation and relocation*
- *Lightweight, robust can withstand without deforming a weight of over 200 Kg*
- *Stowed in a bag made in strong "cordura" fabric*
- *Compact and easily transportable*





Cod. K0270



← m 2,30 →

FLEXXY is a modern extensible high-visibility safety barrier designed to give easy transportability and simple use in reporting warning on road works and closing access of restricted areas.

Barrier is made in hard plastic, is very compact and light, can be placed in operation in few second as it is rapidly extensible in opening and folding, the side "shell type" shoulders have the double function of ground support and transportation case.



CHARACTERISTICS AND ADVANTAGES

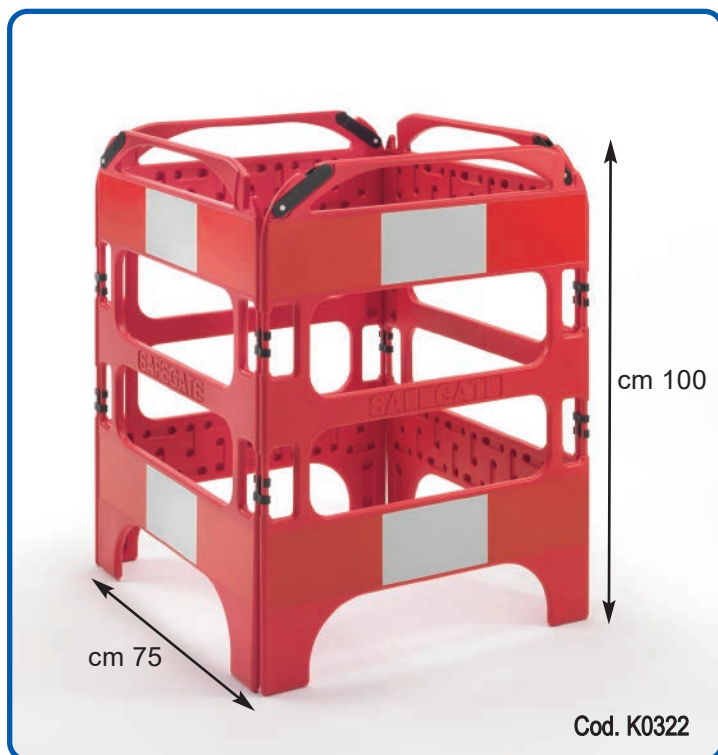
- For greater stability the shoulders can be filled with water or sand from the caps, this doubles the FLEXXY weight (fig. 1), can be easily stored and transported even on the smaller vehicles
- Two latches keep the barrier firmly closed when transported or stored (fig. 2)
- The side shoulders have the double function of case containment and ground support, the shoulders feature also upper holes to allow insertion of signalization flags, luminous bulbs or warning signs (fig. 3), the luminous bulb is sold separately (code k0274)
- Can be easily carried manually also when walking long distances in city restricted traffic areas, ideal also for indoor use in department stores, hospitals, airports, large communities or in upper floors of buildings
- The high quality plastic material assures durability, it is resistant to rust, UV rays and is washable, invulnerable to impacts, chips, sharp burrs of steel, rust and deformation typical of metal barriers, the vivid color, the phosphorescent bands and the large exposed surfaces mean maximum visibility and safety
- FLEXXY is ideal in all situations, it is aesthetically impeccable and give to the work site an image of professionalism and modernity
- For characteristics and practicality of use is irreplaceable for fast and multiple interventions, it is "operator friendly" and once operated will become irreplaceable



TECHNICAL CHARACTERISTICS

DIMENSION IN COMPLETE EXTENSION	cm 230	DIMENSION COMPLETELY FOLDED	cm 47 x 13 x H 107
BASE	cm 47	WEIGHT DRY	Kg 6,5
WIDTH	cm 13	WEIGHT FULL OF WATER	Kg 14
HEIGHT	cm 107	PACKAGING	delivered in hard cardboard box





SAFEGATE is a practical, compact and lightweight security gate ideal for signaling and securing open manholes during the maintenance of underground utilities networks, the modularity of the product allows to compose many configuration of closures, can be put in action in few seconds usable also in open linear extension.





ADVANTAGES AND CHARACTERISTICS

- Maximum safety + Maximum visibility + Easy to use, to store and transport
- Practically Eternal Life + Impact Resistance + No Rust + UV Insensitivity
- No sharp edges means no fingers cut from cross segment bars of the classic pantograph barriers, no dangerous "shear" effect
- Produced in robust, non deformable, washable and recyclable plastic material
- Practical, easy to use and folds in seconds
- Lightweight and stable, when "packed" can be stored anywhere
- The basic 4 pieces safe gate can be used not only as a square closed gate but also as a LINEAR BARRIER by bending the two lateral sections slightly to give stability
- Integral locking clips assure fast fastening of the sides and allows to open close the man passage when needed
- If joined with other gates elements using the clips can form an extended barrier, long as needed, to close accesses
- Once used, you will no longer be using traditional metal pantograph type gates (which can be easily get rusted and deformed making them unusable and can cut and shred

TECHNICAL CHARACTERISTICS

SIDE DIMENSION (in square closure)	cm 75 x 75	HEIGHT	cm 100
WEIGHT (of the basic module of 4 elements)	Kg 8	WEIGHT OF ONE SIDE ELEMENT	Kg 2
DIMENSION PACKED	cm 75 x 100 x 8	MATERIAL	HPDE High density polyethylene
LINEAR EXTENSION max (of 4 elements module) cm 300			



● Detail of the locking clip



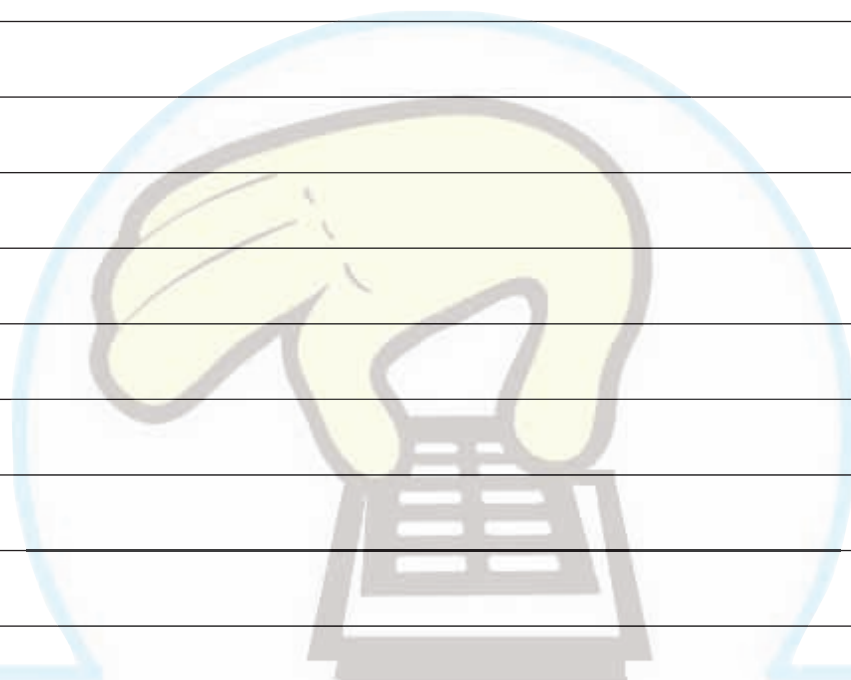
● Detail of the fastening of the sides



● Light, compact and easy to handle



NOTE



NOI SOLLEVIAMO IL PROBLEMA

FACTS AND INFORMATIONS ON MANHOLES AND MANHOLES OPENING

FACTS ABOUT MANHOLES

The manhole covers present on the streets are million with hundreds of shapes, configurations, depth of cover, type of grates, openings or slots for the hook, weights and different conditions of placement.

Opening a manhole seem apparently an easy and primitive operation that instead involves a number of technical and operational problems, safety and a loss of time that experts know well.

In any case is imperative for safety reasons regulated by specific laws for the protection from damage to skeletal muscle that operators cannot lift more than 25 Kg.

**Decree 81 / 08 for the LOADS MOVEMENT consolidated Safety ISO 11228
Ergonomics - Application document for ISO standards on manual handling ISO 11228-1-2-3.**

**DOA EQUIPMENT COMPLIES AND ALLOWS THEN THE EMPLOYER TO MEET AND
MINIMIZE RISKS ARISING FROM THE MANUAL HANDLING OF LOADS AS SPECIFIED
IN ARTICLE 168 COM.- 2 - COM. 3 OF DECREE 8108 E S.M.**

Not rarely happens that covers are so blocked that in lifting operations also the frame is drag with the result of road damage, often the lifting requires the arm of a mini excavators.

IN GENERAL

Especially do not exist, and cannot exist, a single system that has all the typical features desired by users that are: the simplicity, the minimum weight, compactness, economy, versatility and total functionality, all above features are impossible to obtain from a single equipment as are all characteristics conflicting with each other.

The DOA cover lifter range is a summary of the above characteristics and is definitely the most complete and versatile on the market today, this is demonstrated by the numerous tests done also in difficult situations, our system will solve most lifting situations.

The traditional opening system with hammering and pickaxe can solve only a few operations almost always not in line with the safety rules (weight lifted, little control, little chance of hooking, difficult relocation, lifting only in oblique inclined, cannot open covers with depth gauge, danger with square covers and the possibility of dropping the cover diagonally in the opening.

THE 5 OPERATIONS OF MANOUVRING THE MANHOLE COVERS

The following instructions are for describing and avoid common misuses and dangerous operations of opening of manhole covers. Being impossible to predict every dangerous situation, the rules are not sufficient to guarantee total safety, it is therefore recommended to always use extreme caution at all times.

The work in internal manholes has to be done by trained and responsible personnel that knows exactly what to do and how to operate safely. Work on pressurized pipes, electrical cables, sewers and generally work to internal manholes can hide unpredictable dangers, this manual can not be considered a complete course for professionals.

IN CASE OF DOUBT DO NOT RISK BUT ASK YOUR SUPERVISOR

OPERATIONS:

Before lifting make a small intervention plan foreseeing dangers and to anticipate problems, predict even where to leave the cover after moved, in a favorable and secure position. Always follow the steps carefully and cautiously to avoid accidents and injuries, Almost always a cover not opened for a long time will require an effort of lifting higher than 25 kg, in manual lifting it is almost always certain that the 'lift will require more' than 25 kg upper force, since we do not have an integrated scale in our arms avoid if possible hand lifting weights that would always be higher than what is prescribed by safety norms.

THE MANOUVRING OPERATIONS OF MANHOLES COVERS ARE CLASSIFIED IN FIVE MODES :

- **PREPARATION OF WORKING SITE, WITH BARRIERS OF OPERATIONS**
- **CLEANING AND BEATING OF THE COVER TO BREAK INCRUSTATIONS**
- **BLOCKING AND HOOKING OF THE COVER**
- **LIFTING AND MOVING OF THE COVER**
- **REPOSITIONING OF THE COVER**

ALL THE OPERATIONS HIDE PROBLEMS AND HAZARDS

THE 5 OPERATIONS OF MANOUVRING THE MANHOLE COVERS

1 - PREPARATION AND REPORTING OF THE SITE AND OF OPERATIONS IN PROGRESS

- The area of operations must be properly marked as required by law with trestles and barriers to report work in progress, which protect from traffic and avoid the presence unauthorized people .
- Provide that the working area has appropriately wide room to allow good viability of operations and prevent operators to walk too close to open cover .
- If the opening is left uncovered for long, breaks or interruptions, always cover the' open with various apparatus anti fall, do not use improvised covers solution with grills and plates .
- Keep objects, tools and materilas away from the edges of the cover to prevent their involuntary dangerous falls into the aperture or worse on the operators heads inside the manhole
- In operations with workers inside the manholes always leave a safe escape and the lader active and free to provide a safe escape route
- In transactions with internal manholes operators, before operating use the appropriate security apparatus as tester to ensure the presence of oxygen and that there are no gas or other mixtures, fumes, vapors, toxic or explosive .

2 - BEATING AND CLEANING THE COVER

The covers are always blocked by incrustations that firmly block down the covers, these incrustations must be broken to allow a easier lifting, incrustations are often extremely tough, and are caused by: Inactivity, lack of movement for long time, Dirt, gravel, stones, Rust, Frost, Conical connection between frame and cover that create the blocking effect, Strong cover expansion due by high temperatures forcing the cast iron in the frame in summer months.

Asphalt and concrete that often cover the joints of the entire cover.

Then the junction between frame/cover will be released by beating and cleaning the cover surface with brum and brush to avoid that dir twill fall in the manhole and, very important, to allow a good adhesion of lifting magnets to the covers surface.

The slots and cavity that allows the mechanical lifting must be free from dirt and crusts sometimes very tough, that prevent the coupling or the entry of the terminals or lifting hooks .

The cavity can be clean with the specific tool DOA TR3 which is a cleaning brush in tough steel with a rotation solution is ideal and fast for breaking perforation of the incrustations.

RISKS: Flying of dangerous iron splinters by hammering - Covers breaking by hammering - Risk of explosions if the hammering action is done on covers of gas networks or in petrochemical and fuel reservoirs covers - Laborious operations and potentially risky done on your knees - Danger of being run over if not properly reported their position

PROTECTION AND SOLUTION: Keep away spectators and curious, alert colleagues of current operation - Protect yourself always with individual defenses of the head, face, hands, feet and ears - Keep your face away and turned from the beating hammer - Use the most safe method for breaking incrustations beating with the sliding hammer bat DOA model MZ120 - Report clearly and visibly your working position.

3 - COVER LOCKING / HOOKING

The cover must be grasped to allow lifting, the locking can be done with two main modes:

- Locking with magnets DOA models CL10 - CL11 - PM500 and levers APS90 and APS80.
- Mechanical locking with clamps with wings or hook or DOA hooks raised with levers APS90 and APS80.

THE **MAGNETIC LOCKING** is simple and fast but is only possible if there is an adequate possibility of good contact of the magnet with the manhole cover cast iron surface .

The enemy of lifting covers with a magnet are surfaces that are blocked, very grilled, curved, asphalted or dirty etc.

THE **MECHANICAL LOCKING** is less simple and fast than the magnetic and occurs by hooking the slots or opening of the cover by inserting a locking clamp and hook systems, (DOA produces a set of 5 practical clamps and hook).

The slots or openings varied according to the various models and brands of manhole covers, are placed in the middle or near the border, often are clogged by dirt calcified that does not allows the insertion, once prepared the appropriate safe hooking the cover will then be raised manually or with different levers.

RISKS ASSOCIATED WITH MAGNETIC LIFTING:

- Possibility of sudden detachment of the magnet from the lid, and the lid fall into 'manhole ' s opening due to stress riser "oblique" or insufficient magnetic contact (the magnet holds well if he gets up vertically, holds less if you raise it obliquely or you drag it sideways)
- Risk of damage to skeletal muscle if the lifting is done by hand and with weights greater than those that are required by the rules on accidents.
- Possibility to stuck the hands, when in contact, between the magnet and magnetic lid .
- Possibility that magnets CL10 and CL11 which magnet will stick involuntarily walls or shelves, or metal objects in vans then difficult to remove or may be damaged in the detachment .
- If left unattended in the ON position with the magnet active the model PM500, a colleague with an unintended action may cause the PM500 , with a very powerful force, attracts metal objects causing damage and injuries .
- Risks of close contact between the magnet and objects such as pacemakers, credit cards, cell phones, electronic equipment, welding heat sealing to PE that could be permanently damaged by the magnet

PROTECTION AND SOLUTIONS:

- Store the magnets CL10 and CL11 only with appropriate protective anti-magnetic sack that insulates the magnet from inadvertent contact.
- Never leave unattended in the ON position with the magnet active model PM500, it may launch itself on ferrous objects or violently attract an ferrous object.
- Clean the cover from dirt, asphalt, concrete, sand to ensure the best possible contact between the lid and magnet.
- Perform only raised vertical and perpendicular lifting to the surface of the magnet .
- Keep away from possible contact of the magnet objects such as pacemakers, credit cards, cell phones, electronic equipment, welding machines, heat welding sealing for PE .

- Keep away from spectators and curious, alert colleagues of current operation .
- Report well and visibly your position

RISKS ASSOCIATED WITH MECHANICAL LOCKING, NOT IN LINE FISHBOLTS:

- Possibility of breaking wings or hooks with cover's fall result .
- Risk of accidents to the back or to skeletal muscle if the lifting is done by hand and with weights greater than those that are required by the rules on accidents
- Poor balance or not well inserted hooks or wings into the slots or openings could cause dangerous detachment of the cover and also could falls into 'manhole' s opening
- When lifting with more than one engagement, with lifting eyelets not equal with different heights, not symmetrical which does not allow a precise vertical lift straight, it could cause a raised lopsided whose effort is entrusted primarily to only one hooking, this may break and could be dangerous with the possibility of accidental fall in the manhole of the cover
- Danger of been run over by cars if your position is not properly reported

PROTECTION AND SOLUTIONS:

- Always keep in good condition hooks, clamps and terminals
- Discard immediately terminals hooks and wing clamps that are damaged and deformed, to prevent them from being recklessly reused
- If possible carry out lifting pulling vertically as possible relative to the cover face to avoid twisting and lateral to the terminals, the terminals pull upward vertically, but may be damaged if the effort is horizontal or oblique
- Do not give strong violent efforts to clamps when lifting, but always lift with progression starting with minimum lifting force and then increase
- Keep away bystanders and curious, alert colleague of current operation
- Report with visibly signs your working position

4 - COVERS LIFTING AND MOVING ASIDE

This is an operation to be performed after obviously having locked the cover with magnets or with mechanical hooks

This is an operation to be performed with care and caution to avoid accidents and injuries

Almost always a cover not operated for a long time will require an effort of lifting greater than 25 kg. so before lifting prepare a small action plan foreseeing dangers and predict where leave the lid after removed

After breaking cover incrustations by hammering, unlock (if the cover is round and with the latch) the safety locks that keep the cover secure to the frame

If manually lifting the effort appear more than 25kg you should regulate:

Use the wheeled lever APS90 o APS80 and press using your body weight as ally stretching the vertebrae (not compressing)

Lift with two people sharing the effort .

Ensure that the lid is raised only in a perfectly vertical upward position (avoiding that edges get stuck is lifted obliquely)

RISKS:

- Possibility of broken clamps or hooks with ruinous danger of cover's fall into the manhole opening, this can happen in operations with square lids that can fall in diagonal in the opening .
- Press (to raise) the lever down and push and pull at the same time may not make it easy if the lid is very heavy .
- When lifting with more than one engagement with lifting wings note with different heights, not symmetrical which does not allow a straight vertical lift, it could cause a lopsided lift which will be dangerous and difficult with the possibility for the lid to fall diagonally into the manhole's opening for square shape lids
- Danger of been run over if your working position is not properly reported with adequate signs .
- Danger that an unwary passerby or colleague or even objects can fall into the manhole if this is left open and unattended for a time break or else always cover the manhole with ADJUSTABLE ANTI FALL APPARATUS produce by DOA

PROTECTION AND SOLUTIONS:

- Use only suitable and safe hooks, well placed and blocked .
- Keep away spectators and curious, alert colleagues of current operation
- Use the DOA anti fall safety system AC90 that is robust and light mobile grille that is placed above the aperture of the manhole and prevents that persons, materials, tools may fall inside, the grille is done to allow air and light to pass through, this helps when personnel is inside working
- Show clearly and visible your position
- If you are lifting with a APS90 or APS80 lever a heavy cover, once moved from the frame will be better place it and then drag it instead of struggle in pushing and pulling at the same time .

5- THE COVER REPOSITIONING

This is the less difficult task, the considerable danger is to drop the cover in the manhole opening when working with square or rectangular manholes that could fall in the opening when in diagonal dimension .

To reposition the cover, is possible to use the lever or the manual lift or drag the cover in place making it seat on the frame, in case the cover has a unique position on the frame indicated by the presence of a joint or a key that will have to be centered in its side.

Consider that the magnets have strong lifting capacity if lifted vertically, the magnetic force is reduced if the lift is oblique or if drag horizontally

RISKS:

- Falling objects and dirt dragged in the operations of relocation .
- If you place the shims anti noise between the cover and frame, keep your hands away from the falling cover to avoid crushing fingers or cause accidents .
- The relocation using wheeled levers APS 90 or APS 80 consider that the pushing operation is more difficult than pulling/dragging

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