TECHNICAL SHEET

LIFITING ACCESSORY

“GJM STEEL - COMB”

DIRETTIVA 2006/42/CE DEL PARLAMENTO EUROPEO E DEL CONSIGLIO

del 17 maggio 2006, relativa alle macchine

JANNUARY 2016

INDEX:

1. DATA OF THE MANUFACTURER OF THE AUTHORIZED PERSON TO DRAW UP THE TECHNICAL FILE AND THE TESTING LABORATORY:

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2. STANDARD REGULATION:

This technical file concerns "... lifting accessories: components or equipment not connected to the lifting machines, which allows the load grip to be taken, placed between the machine and the load or on the load itself, or destined to become an integral part of the load and to be placed on the market separately ... "(art.2.d. of Directive 2006/42 / EC) and has been drafted up according to the Directive 2006/42 / EC of 17 May 2006 (called the new machinery directive), which is been acknowledged and applied in Italy through the Legislative Decree of the 27th January 2010, n. 17 (publication dated 19-2-2010 Ordinary Supplement No. 36 / L to OFFICIAL JOURNAL General Series - No. 41). This directive entered into force throughout Europe the 29th December 2009.

The calculation necessary for the sizing of the lifting accessory have been performed in compliance with the **Technical standards for buildings, D. M. 14/01/2008** and subsequent updates.

The Directive 2006/42 / EC must be applied to the lifting accessories as indicated in article 1 paragraph d. The obligations laid down in the Articles of the Machinery Directive are applied therefore both to the machines in the strict sense referred to in Article 1 (1) (a) and to the products referred to in Article 1 (1) from (b) to (f): interchangeable equipments, safety components, lifting accessories, chains, wires and belts and removable mechanical transmission devices. Considered the variety of shapes, dimensions and nature of the loads to be lifted, the equipment are often placed between the load-sealing device of the lifting machines and the load itself, or on the load itself, to keep it in the lifting phase. Such gears are defined as lifting accessories. The Products, which are placed separately on the market, are also considered as lifting accessories. The device positioned between the load-sealing device of the lifting machine and the load itself is considered a lifting accessory, even if supplied with the lifting machine or with the load. This documentation will be archived and available for 10 years from the release of the accessory on the market.

3. DESCRIPTION OF THE LIFTING ACCESSORY "*ML COMB* ":

The lifting accessory called "GJM Comb" has been designed to handle structural cages composed of steel rod panels with horizontal and vertical mesh and variable pitch (fig.1).

Fig.1 – Example of the usage of the lifting accessory "GJM COMB" –

The *GJM Comb* is composed of an 8 mm thick S355JR steel sheet, folded, perforated and cut. The three holes with a diameter of 50 mm (fig.2) are used to connect the GJM Comb with the lifting hooks. The distance between the extremity of the holes and the stressed edge are 30 mm, which makes it possible to use lifting hooks with a minimum g_1 of 30 mm (fig.3) and a variable flow not less than 850 kg

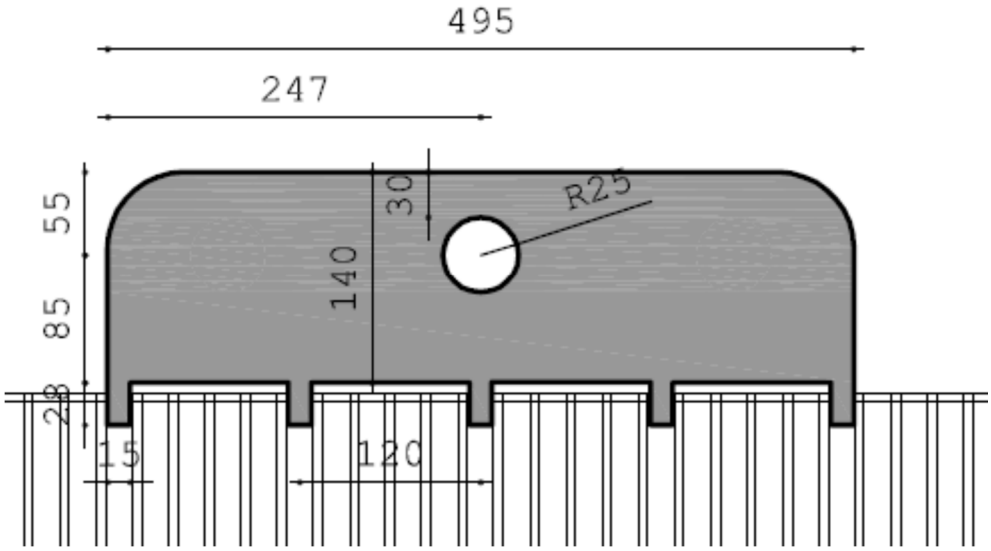


Fig.2 - Front view of the GJM COMB –

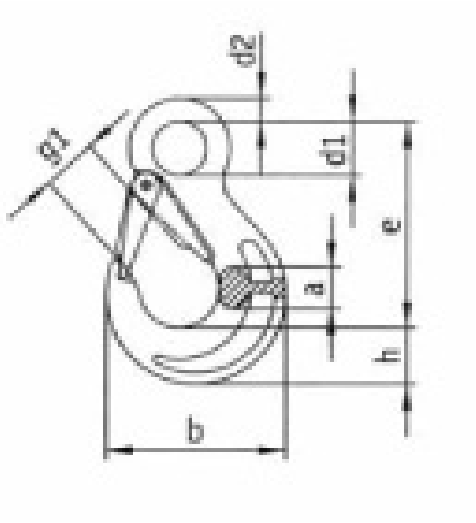


Fig.3 - Lifting hook –

The resistance of the *GJM Comb* in correspondence of the connection to the lifting hook is verified in the calculation report, Annex A. On the opposite side to the drilled one, the plate has been bent at 90 ° in two points (fig.4) and cut. The double fold is necessary to create the accommodation of the horizontal wire of the structural cage, to which the ML Comb must be fixed during the movement. The external measurement of the horizontal section that is formed is of 38 mm, the internal one is 22 mm.

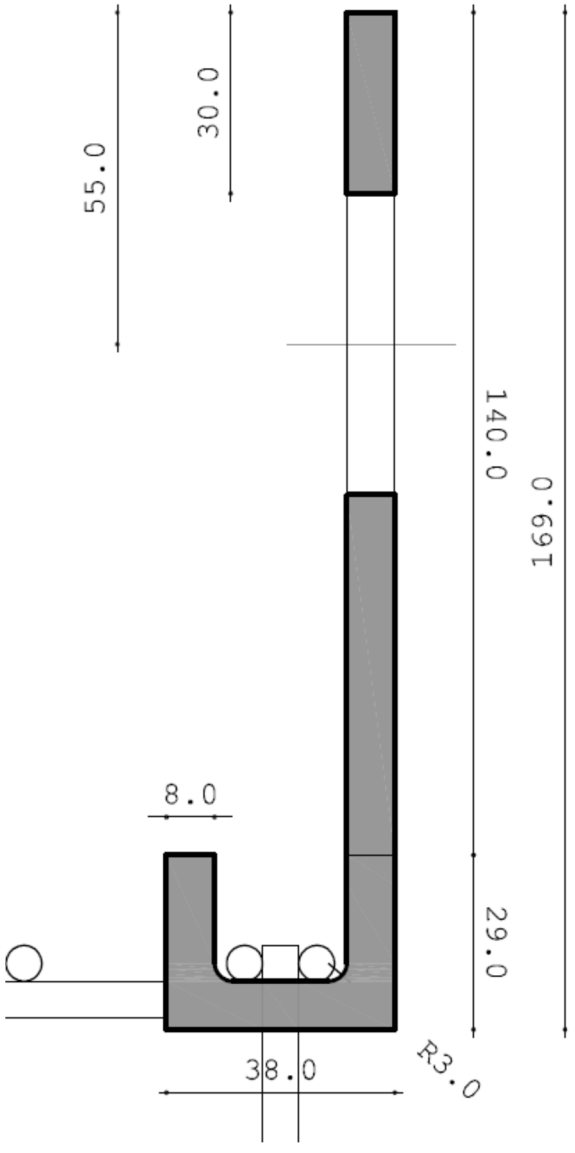


Fig.4 - Sezione Pettine Jm –

The short vertical side of the " *GJM Comb* " is 29 mm high to contain the possible escape of the horizontal wire of the cage. The cuts in the " *ML Comb* " have been realized with a width of 105 mm, every 15 mm, starting from the base of the vertical side for a height of 29 mm up to the end of the short vertical side (fig.2). In this way, at the base of the " *ML Comb* ", have been created 5 "teeth", 15 mm wide, 8 mm thick, with a 120 mm center distance which allow the lifting accessory to be inserted into the vertical mesh of the side panel of the cage. The resistance of the "teeth" is verified in the calculation report, Annex A, and tested by the Trentino Laboratory, Annex B.

4. OPERATING INSTRUCTION FOR THE LIFTING ACCESSORY “GJM COMB”:

The "ML Comb" has been designed for the handling of cages with a volume equal to 0,5 cubic meters, with the only limit due to the deformation and / or breaking of the cage itself during the movement phase. In fact the " *GJM Comb* " is 49,5 cm long and a 0.5 m3 cage is 2 m long; this implies that by fixing the " *ML Comb* " in a barycentric position with respect to the long side, 75 cm of cantilevered cage remain at both ends. It is therefore recommended to use one pair of "*GJM Combs*" to move a 0.25 mc cage and two pairs to move a 0.5 m3 cage. The lifting accessory called *"GJM Comb"* can be used both with the "teeth" inserted from the outside towards to the inside (fig.1) of the vertical panel of the cage as that with the "teeth" inserted from the inside towards to the external (fig.5).

The pair of "*ML Combs"* must be previously secured by the operator to the lifting hooks and then the "*GJM Combs"* must be placed in a barycentric position in the two parallel vertical panels (fig.1+5-6), in order to adhere the horizontal side of the lifting accessory to the highest horizontal wire of the abovementioned panels .

In this phase it has to be taken extreme care:

- to the barycentric position of the " GJM Combs " compared to the vertical panels to avoid the risk of the overturning of the cage;
- to the position of the GJM Combs that allozs a good distribution of the loads on the vertical panels by dividing evely the areas that are not bound be the teeth.
- to the perfect adherence of all the "teeth" with the horizontal wire of the cage, to ensure optimal load distribution.

- Fig.5 – using of the combs with te teeth facing outwards –

At this point the lifting chains must be tensioned so as to rotate the *" GJM Combs "* upwards, slightly raise the cage from the ground and check that their positioning is optimal. The cage can now be moved safely, taking care not to make sudden movements and to avoid any obstacles.
The operator must stay at a safe distance from the load suspended during handling and can approach only when the cage is lowered to ensure optimal positioning of the cage. When the lifting chains are no longer tensioned, the operator can detach the *"GJM Combs"* from the cage.

Fig.6 – Distribution of the combs –

5. SECURITY EVALUATIONS:

We want to indicate some essential rules for the safety of the operator during the handling of loads:

- the operator must be equipped with appropriate DPI including safety shoes, helmet, gait jacket and gloves;
- before handling the loads, the wear of the *"GJM Combs"* and of the cage panels must be checked;
- the indications referred to in paragraph 4 must be followed;
- during the handling of the load the workplace must allow a perfect visibility of the field of action;
- the maneuvers for lifting and lifting - transporting the loads must be arranged in such a way as to avoid the passage of suspended cages over workers and over the places for which the possible fall of the load may constitute danger;
- the suspended load have never to be guided with hands but only with ropes and hooks.

6. CRITERI DI VERIFICA DEL *"PETTINE GJM STEEL"*:

Directive 2006/42 / EC provides that the lifting accessories undergo a static test:
"4.1.1 Definitions

…….

e) « 'static test' means a check which consists of checking the lifting machine or lifting accessory and subsequently applying a force corresponding to the maximum working load multiplied by an appropriate static test coefficient; then, after the load has been suppressed, carrying out an inspection of the machine or lifting accessory again to check that no damage has occurred*)*

……"

In the design and testing phase, a static test coefficient is indicated in the Directive 2006/42 / EC in paragraph 4.1.2.3. It must be multiplied by the maximum utilization load to provide a safety margin for use. The utilization coefficient of a carrier component is the ratio between the maximum load to which the component can be submitted without breaking and the specified maximum working load which should not be exceeded during use. The coefficient is indicated equal to 1.5:

"4.1.2.3. Mechanical resistance

The machine, the lifting accessories and the relative components must be able to withstand the stresses to which they are subject during operation and, where appropriate, even when they are out of service, in the foreseen installation and operating conditions and in all the relative configurations, taking into account possibly the effects of atmospheric agents and the efforts exerted by people. ... The machine and lifting accessories must be designed and constructed in such a way as to avoid fatigue and wear failure, taking into account the intended use. The materials used must be chosen taking into account the expected operating environments, especially with regard to corrosion, abrasion, impacts, extreme temperatures, fatigue, fragility and aging.

The machine and the lifting accessories must be designed and constructed in such a way as to withstand the overloads applied in static tests without presenting permanent deformations or obvious malfunctions. The calculation of the resistance must take into account the value of the static test coefficient which is chosen in such a way as to guarantee an adequate level of safety; in general, this coefficient has the following values:

a) machines driven by human force and ***lifting accessories: 1,5;***

b) …

La The machine must be designed and constructed in such a way as to perfectly support the dynamic tests carried out with the maximum working load multiplied by the dynamic test coefficient. The dynamic test coefficient is chosen so as to guarantee an adequate level of safety; this coefficient is, in general, equal to 1.1. The tests are generally performed at the nominal rated speeds...."

The Directive 2006/42 / EC finally indicates in paragraph 4.1.2.5:

"4.1.2.5. Lifiting accessories and related componentsi

Lifting accessories and related components must be sized taking into account the phenomena of fatigue and aging for a number of operating cycles in accordance with the expected service life under the operating conditions specified for the intended application.

Furthermore:

) ***the utilization coefficient*** *of the metallic and terminal wire assemblies must be chosen in such a way as to guarantee an adequate level of safety; this coefficient is, in general,* ***equal to 5****. The ropes must not involve any weave or ring different from those of the ends; ……..*

in order to verify that the appropriate utilization coefficient has been reached, the manufacturer or his authorized representative must perform or have performed the appropriate tests for each type of component referred to in points (a), (b), (c) and (d).

Based on the above:

- the calculation report has been drawn up considering the load of a cage of 0.47 cubic meter, Annex A;

- the tests, Annex B, made by the Trentino Laboratory, a body recognized by the Ministry of Public Works, were of three types:
  - static test with a utilization coefficient 1.5 and load of use equal to that of a cage of 0.47 cubic meter;
  - static breaking test, considering the breaking point of the tooth to be broken;
  - dynamic test, not necessary according to the 2006/42 / CE Directive for lifting accessories, but considered essential to ensure the good operation of the "GJM Comb" over time. The test was carried out with a coefficient of use 1.5, instead of 1.1 as indicated in the paragraph
    4.1.2.3. of Directive 2006/42 / EC and load of use equal to that of a 0.47 cubic meter cage.

The results shows that:

- the static test with usage coefficient 1.5 leads to a maximum deformation of the comb, after 1 minute, of 0.32 mm and a residual deformation of 0.11 mm;
- the static breaking test shows a resistance value for each individual tooth equal to 410 Kg and therefore of 2050 Kg for the whole “GJM-comb”. This entails a maximum load of use, according to Directive 2006/42 / EC in paragraph 4.1.2.3, equal to 2050 kg: 1.5 = 1366,67 kg and a maximum load of use, according to Directive 2006/42 / EC in paragraph 4.1.2.5, equal to 2050 Kg: 4 = 512,5 Kg;

- the dynamic test shows that after 20000 cycles of loading and unloading of the *" ML Comb ",* with a frequency of 1 Hz there was no sign of failure.

This last test was certainly more probable than the real stress that will be applied to the *" GJM Comb ",* given the high frequency with which the load was applied, and therefore the impossibility on the part of the "teeth" of the *"GJM Comb",* to completely recover the deformation.

7. MAINTENANCE OF THE *" GJM COMB "*:

The " GJM COMB" must not be used during rains or snowfall because it is not protected by galvanizing or painting. At least quarterly, as recommended by Presidential Decree 547/55, checks must be performed on the efficiency and good maintenance of the materials making up these accessories. In particular, the controls must include the detection of deformations, crushing, cuts and elongations. Furthermore, on the basis of the foregoing, when a reduction in the section of the components constituting the accessories for values exceeding 10% has been detected, the same accessory must be replaced. This substitution must be carried out also in the presence of solicitation effects, which have made the elastic limit of the material with permanent effect exceeded.

8. MARKING OF THE *"GJM COMB"*:

The Directive 2006/42 / EC provides that the lifting accessories are marked indicating:

"4.3.2. liftin accessories

Lifting accessories must bear the following indications:

- identification of the material, if such information is necessary for the safety of use:
-identification of the material, if such information is necessary for the safety of use;
- maximum load of use.

For lifting accessories on which the marking is physically impossible, the indications referred to in the first paragraph must be shown on a plate or other equivalent means firmly attached on the accessory. The indications must be legible and located in a point where they do not risk disappearing due to wear or compromising the strength of the accessory. "

The " GJM Comb " has been marked indicating:

- manufacturer;
- legislation;
- material;
- maximum load of use and coefficient of use;
- CE marking and year of marking.

9. “ANNEX A” - CALCULATION REPORT:

- The 0.47 m3 standard cage weighs 900 Kg;
- Rod diam. 6 mm has R_{sner} = 1930 Kg;
- Welding knot gap between the rods = 890 Kg.

If I work with an GJM comb I do not have evident resistance limits of the cage but I have to consider the stability during the handling phase and the distribution of the loads in such a way as not to stress the ends too much.

Resistence to rebound of the bolted union plate:

From the 2008 Technical Regulations:

“…the computation resistance $F_{b,Rd}$ of the union plate, bolted or nailed, can be assumed equal to

$F_{b,Rd} = k \alpha f_{tk} d t / \gamma_{M2}$, *(4.2.61)*

where:

d is the nominal diameter of the shank of the bolt,

t is the thickness of the connected plate,

f_{tk} *is the breaking strength of the material of the connected plate,*

$\alpha = min \{e_1/(3 d_0) ; ftb/f_t; 1\}$ *for edge bolts in the direction of the applied load;*

$\alpha = min \{p_1/(3 d_0) – 0,25 ; f_{tb}/f_t ; 1\}$ *for internal bolts in the direction of the applied load*

$k = min \{2,8 e_2/d_0 – 1,7 ; 2,5\}$ *for edge bolts in the direction perpendicular to the applied load ,*

$k = min \{1,4 p_2 / d_0 – 1,7 , 2,5\}$ *for internal bolts in the direction perpendicular to the applied loa,*

being e_1 , e_2 , p_1 and p_2 indicated in Fig. 4.2.3 and d_0 the nominal diameter of the bolt housing hole….

The holes must have a diameter equal to that of the bolt increased to maximum of 1 mm, for bolts up to 20 mm in diameter, and 1.5 mm for bolts with a diameter greater than 20 mm It is possible to derogate from these limits when any settlements under the service loads do not result in exceeding

the limits of deformability or service. When necessary, it is possible to adopt "precision couplings" in which the bolt-hole clearance must not exceed 0.3 mm for bolts up to 20 mm in diameter and 0.5 mm for bolts with a larger diameter, or other devices of recognized validity ... "

Tabella 11.3.IX – Laminati a caldo con profili a sezione aperta

Norme e qualità degli acciai	Spessore nominale dell'elemento			
	$t \leq 40$ mm		40 mm $< t \leq 80$ mm	
	f_{yk} [N/mm^2]	f_{tk} [N/mm^2]	f_{yk} [N/mm^2]	f_{tk} [N/mm^2]
UNI EN 10025-2				
S 235	235	360	215	360
S 275	275	430	255	410
S 355	355	510	335	470
S 450	440	550	420	550

e_1 = 80 mm

e_2 = 30 mm

p_1 = 168 mm

Knowing that:

d_0 = 50 mm; t = 8 mm; f_{tk} = 510 N/mm^2; γ_{M2} = 1,25;

k= min {2,8 e_2/d_0 – 1,7 ; 2,5} = min {2,8 x 115 mm / 50 mm – 1,7 ; 2,5} =

= min {4,74 ; 2,5} = 2,5

α= min {$e_1/(3\ d_0)$; f_{tb}/f_{tk}; 1} = min {55 mm / (3 x 50 mm) ;

;355 N/mm^2 : 510 N/mm^2; 1} = min {0,366 ; 0,696; 1} = 0,366

$F_{b,Rd}$ = k α f_{tk} d t / γ_{M2} = (2,5 x 0,366 x 510 N/mm^2 x 33 mm x 8 mm) :

1,25 = 98,556 KN > $F_{v,Ed}$

Checking the vertical plate:

V_{crd} = A_v x fyk : ($\sqrt{3}$ x γ_{m0}) = 30 mm x 8 mm x 355 N/mm^2 : ($\sqrt{3}$ x 1,05) =

46847 N = 4684 daN > 800 : 4 = 200 daN

Resistence of the single teeth of the GJM comb:

- The cage weighs 900 Kg;
- For each tooth I have 900 Kg : (4 x 5) = 45 Kg

1 Dente JM Geometria

Nome Trave: Dente JM	Lunghezza totale: 0,03 m
Numero di campate: 1	Numero di appoggi: 2
Materiale della sezione: S 355	

Schema statico

Geometria

Campata			Caratteristiche della sezione			
Nome	**Lunghezza** [m]	**Sezione**	**B max** [cm]	**H max** [cm]	**Area A** [cm^2]	**Inerzia I** [cm^4]
C1	0,03	R 1,5 x 0,8	1,5	0,8	1,2	0,1

Appoggi e vincoli

Nome	Larghezza [m]	Tipo di Vincolo	Parametro caratteristico
A	0,00	Libero	-
B	0,01	Incastro	Percentuale incastro 30,0 %

Carichi agenti

Campata	Tipo di carico	Categoria	Ascissa [m]	Val. iniz. P_1	Lung. [m]	Val. fin. P_2
C1	Carico distribuito asse Y globale	Peso proprio	0,00	1 daN/m	0,03	1 daN/m
C1	Carico concentrato lungo asse Y globale	Permanenti non strutturali	0,00	45 daN	0,00	45 daN

2 Scheda tecnica del materiale

Descrizione

Nome: **S 355**

Tipologia del materiale: acciaio per strutture metalliche

Descrizione:

Caratteristiche dell'acciaio

Tensione caratteristica di snervamento fyk : 3.618,76 kg/cm²

Tensione caratteristica di rottura ftk : 5.198,78 kg/cm²

Modulo elastico Es : 2.140.672,78 kg/cm²

Modulo di elasticità trasversale G : 823.335,69 kg/cm²

Coefficiente di Poisson ν : 0,30

Densità ρ : 0 kg/cm³

Coefficiente di dilatazione termica lineare αt : 1,2E-05

Tensione ammissibile σs : 2.400,00 kg/cm²

3 Sollecitazioni agenti - Combinazione SLU

Diagramma del Momento Flettente

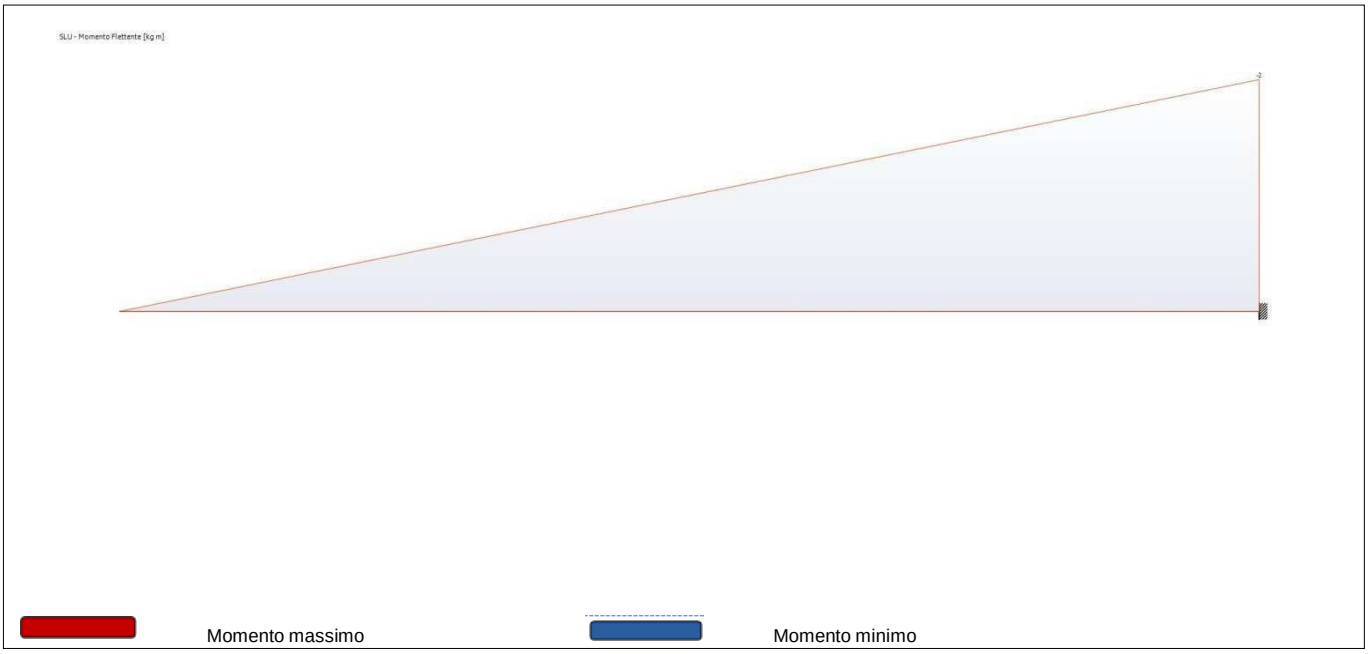


Diagramma del Taglio

Reazioni vincolari

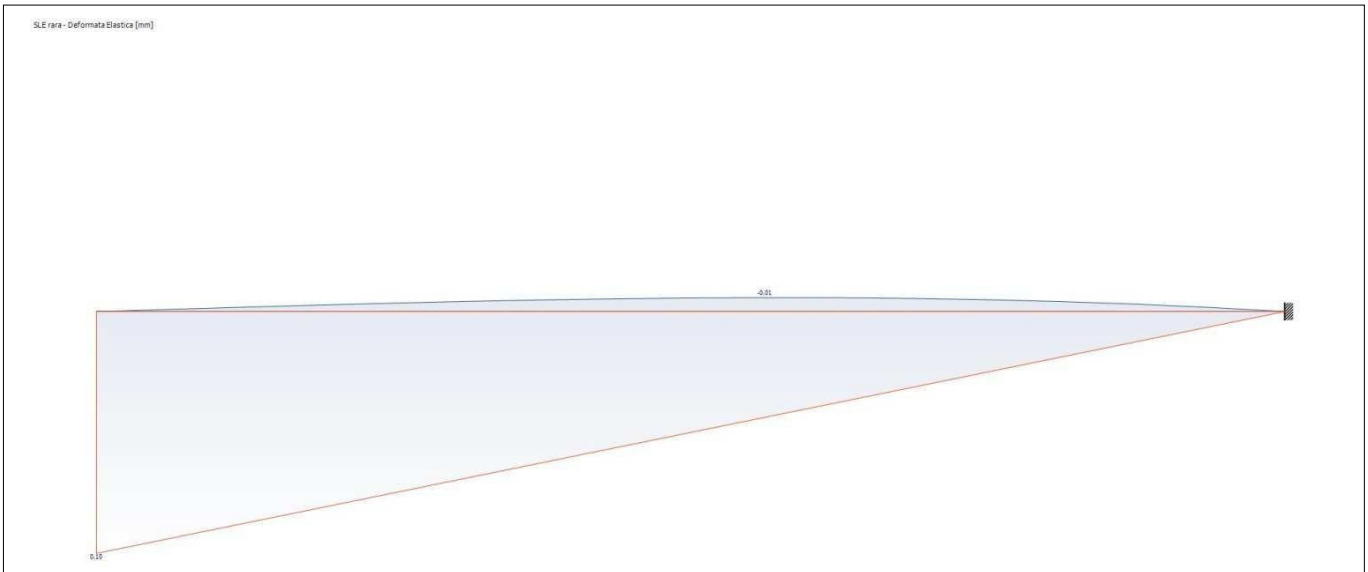
Appoggio	Reazione Max [daN]	Reazione Min [daN]
B	68	0

Azioni

Campata	Ascissa [m]	Momento Max [kg m]	Momento Min [kg m]	Taglio Max [daN]	Taglio Min [daN]
C1	0,03	0	-2	68	0

4 Sollecitazioni agenti - Combinazione SLE rara

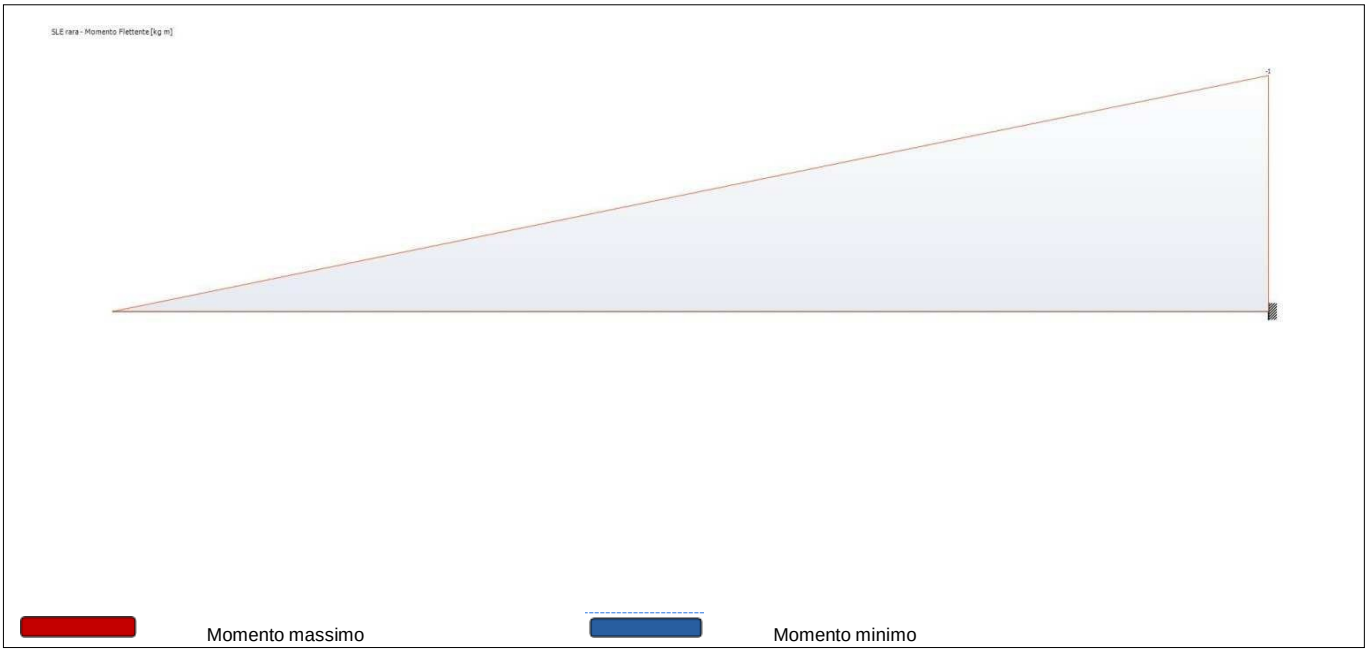
Diagramma della Deformata Elastica



Deformata massima

Deformata minima

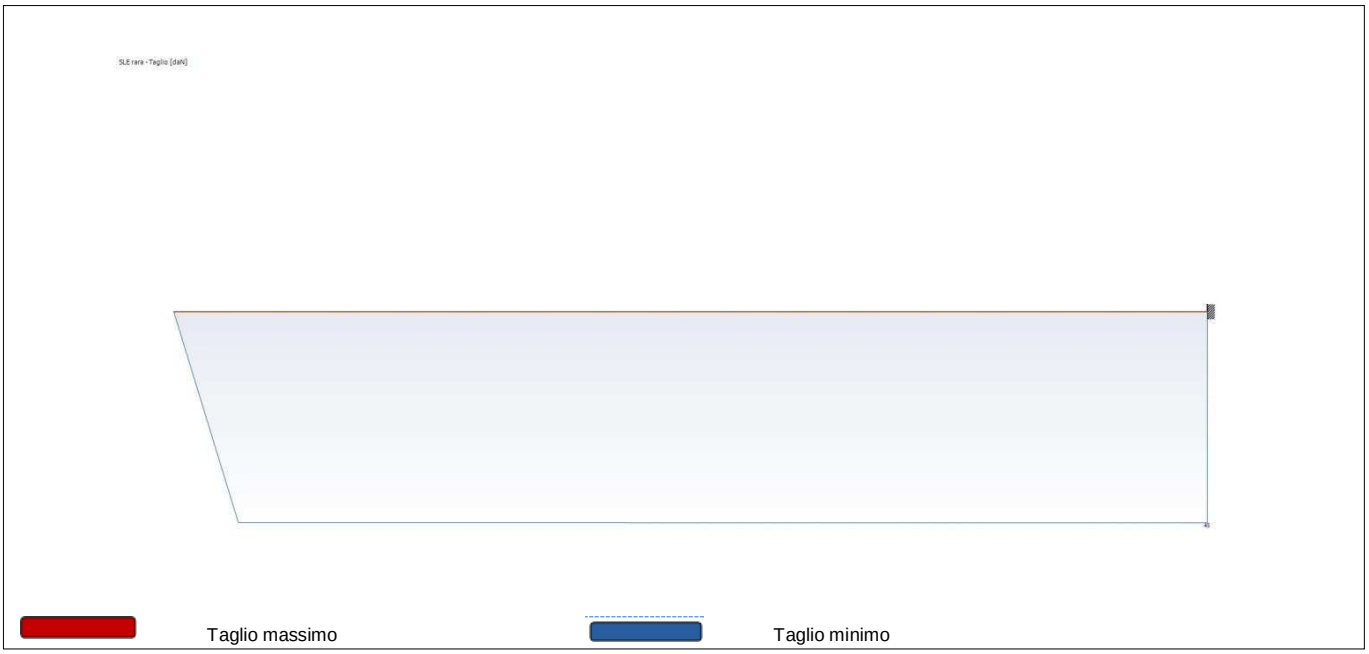
Diagramma del Momento Flettente



Momento massimo

Momento minimo

Diagramma del Taglio



Reazioni vincolari

Appoggio	Reazione Max [daN]	Reazione Min [daN]
B	45	0

Azioni

Campata	Ascissa [m]	Momento Max [kg m]	Momento Min [kg m]	Taglio Max [daN]	Taglio Min [daN]
C1	0,03	0	-1	45	0

Deformata

Campata	Ascissa [m]	Deformata Massima [mm]
C1	0	0,10

5 Sollecitazioni agenti - Combinazione SLE frequente

Reazioni vincolari

Appoggio	Reazione Max [daN]	Reazione Min [daN]
B	45	0

Azioni

Campata	Ascissa [m]	Momento Max [kg m]	Momento Min [kg m]	Taglio Max [daN]	Taglio Min [daN]
C1	0,03	0	-1	45	0

Deformata

Campata	Ascissa [m]	Deformata Massima [mm]
C1	0	0,10

6 Sollecitazioni agenti - Combinazione SLE quasi permanente

Reazioni vincolari

Appoggio	Reazione Max [daN]	Reazione Min [daN]
B	45	0

Azioni

Campata	Ascissa [m]	Momento Max [kg m]	Momento Min [kg m]	Taglio Max [daN]	Taglio Min [daN]
C1	0,03	0	-1	45	0

Deformata

Campata	Ascissa [m]	Deformata Massima [mm]
C1	0	0,10

ORDINE DEGLI INGEGNERI
DELLA PROV. DI TRENTO
Dott. ing. SIMONE GRAFFER
ISCRIZIONE ALBO N° 3472

10. “ANNEX B” – TEST REPORT:

LABORATORIO TRENTINO s.r.l. Via degli Artigiani, 34- Z.I. Cirè 38057 PERGINE VALSUGANA (TN) Tel. 0461/509040 – Fax 0461/509020 E-mail: info@laboratoriotrentino.it	RAPPORTO DI PROVA	N. 007/16 Foglio Sheet 1 di of 5 Data Date 14/01/2016

CLIENTE: **UFFICIO COMMERCIO PORFIDO s.a.s**
Via Innsbruck, 23
38121 – TRENTO

OGGETTO: **PROVE SU ATTREZZATURA DI SOLLEVAMENTO GABBIA PER PIETRAME**

1.0 PREMESSA

1.1 Il giorno 08 gennaio 2016 abbiamo ricevuto una attrezzatura in acciaio per il sollevamento di gabbie per pietrame, avente dimensioni di 494 x 140 mm spessore 8 mm e composta da 5 ganci (vedi foto 1) sui quali effettuare delle prove di trazione con carico definito, a rottura e a fatica.

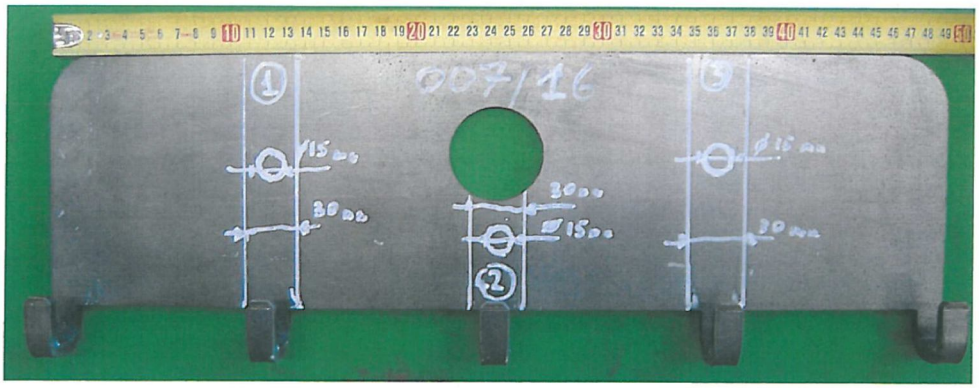


Foto 1: Campione in esame

2.0 PROVE EFFETTUATE

2.1 Prova di trazione su un gancio fino al carico di 67,5 kg con rilievo della deformazione
2.2 Prova di trazione su un gancio fino a rottura
2.3 Prova di trazione a fatica alternata su un gancio

Prove eseguite da Test conducted by	Controllato da Controlled by	Ispettori Ispectors
LABORATORIO TRENTINO s.r.l. ORZES dott. ing. ANDREA	LABORATORIO TRENTINO s.r.l. SIGHEL per ind. SERGIO	
Firma Signature	Firma Signature	Firma Signature

3.0 MODALITA DI PROVÀ E RISULTATI OTTENUTI

3.1 Prova di trazione su un gancio fino al carico di 67,5 kg con rilievo della deformazione

3.1.1 Dal campione è stato ricavato un gancio su cui è stata effettuata la prova di trazione con un precarico di 10 kg, fino ad un carico di 67,5 kg registrando, dopo un minuto, la deformazione del gancio stesso sotto sforzo e successivamente la deformazione residua.

3.1.2 Il gancio è stato fissato in macchina nella parte inferiore a mezzo di una forcella, avente una larghezza di circa 50 mm e con un perno Ø 16 mm posto all'estremità del gancio (vedi foto 2).

3.1.3 Il gancio è stato posizionato in macchina nella parte superiore a mezzo di una forcella e la rotazione dello stesso è stata impedita posizionando un distanziale nella forcella stessa.

3.1.4 La prova è stata effettuata con macchina Zwick/Roell Z250.
I risultati ottenuti sono riportati di seguito.

Provino	Precarico [kg]	Carico max [kg]	Deformazione sotto carico dopo 1 minuto [mm]	Deformazione residua [mm]
007-1	10	67,5	0,32	0,11

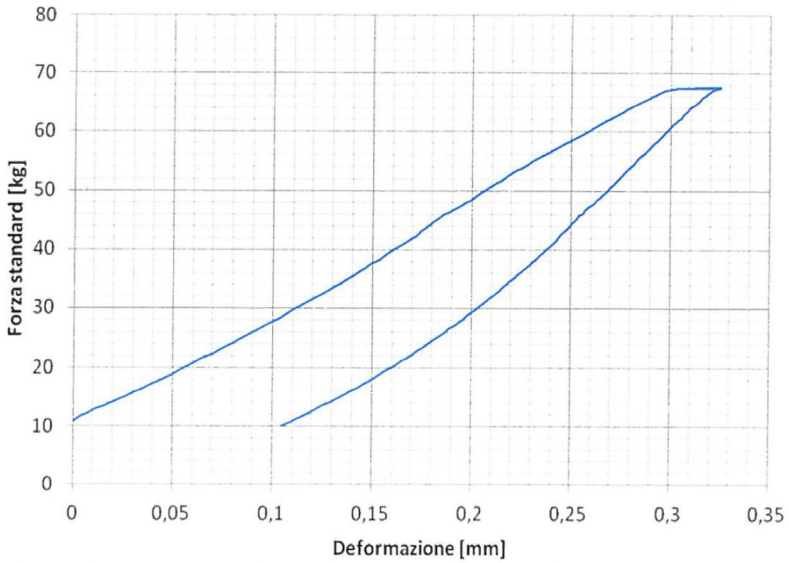


Grafico 1: Grafico carico – deformazione del gancio presso piegato sottoposto a trazione fino ad un carico di 67,5 kg e successivo scarico con rilievo della deformata totale e residua

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Foto 2: Prova di trazione dei un gancio fino a 67,5 kg con registrazione della deformazione

3.2 Prova di trazione su un gancio fino a rottura

3.2.1 Dal campione è stato ricavato un gancio su cui è stata effettuata la prova di trazione, con un precarico di 10 kg e fino ad apertura del gancio registrando il grafico carico - deformazione (vedi grafico 2).

3.2.2 Il posizionamento del provino è stato eseguito come al punto 3.1.2 e 3.1.3.

3.2.3 La prova è stata effettuata con macchina Zwick/Roell Z250.
I risultati ottenuti sono riportati di seguito.

Provino	Carico a rottura [kg]	Deformazione finale [mm]	Tipo rottura
007-2	410	3,4	Apertura gancio

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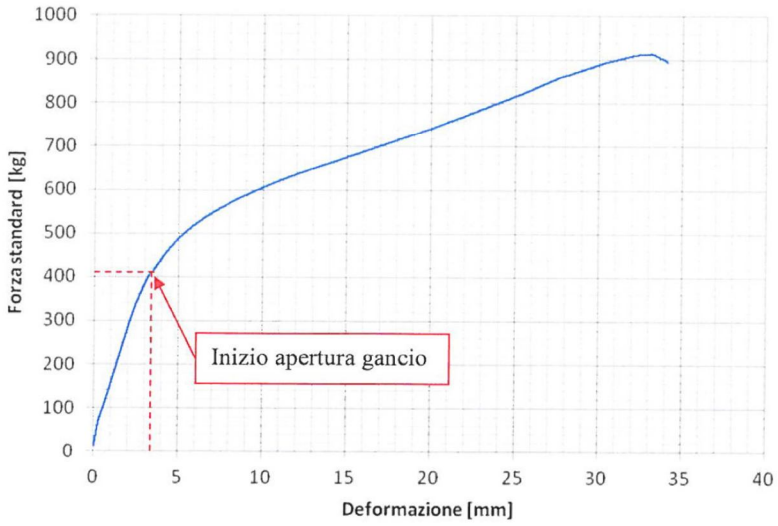

Grafico 2: Grafico carico – deformazione del gancio presso piegato sottoposto a trazione. Il gancio ha iniziato ad aprirsi ad un carico di 410 kg (linea rossa)

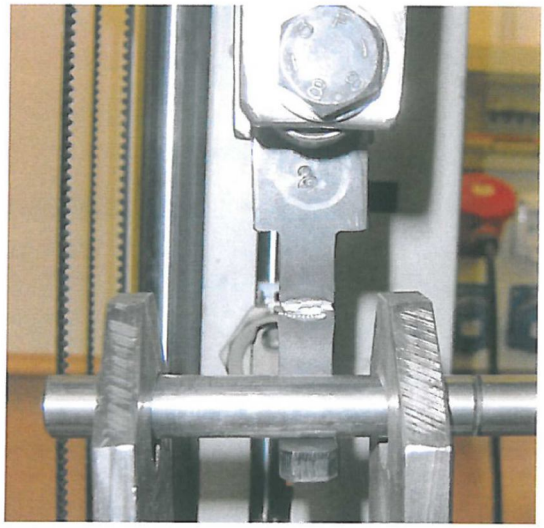

Foto 3: Prova di trazione fino ad apertura del gancio – Deformazione subita dal gancio presso piegato ad interruzione della prova

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3.3 Prova di trazione a fatica alternata su un gancio

3.3.1 Dal campione è stato ricavato un gancio su cui è stata effettuata una prova di trazione a fatica alternata con i seguenti parametri:
- Carico minimo: 10 kg;
- Carico massimo: 67,5 kg;
- Frequenza: 1 Hz;
- Numero cicli: 20.000.

3.3.2 Il gancio è stato fissato in macchina nella parte inferiore a mezzo di una forcella, avente una larghezza di circa 50 mm e con un tondino Ø 6 mm posto all'estremità del gancio (vedi foto 4).

3.1.3 Il gancio è stato posizionato in macchina nella parte superiore a mezzo di una forcella e la rotazione dello stesso è stata impedita posizionando un distanziale nella forcella stessa.

3.3.3 La prova è stata effettuata con macchina Zwick/Roell Z250.
I risultati ottenuti sono riportati di seguito.

Provino	Carico minimo - massimo [kg]	Frequenza [Hz]	N cicli [mm]	Esito
007-3	10 ÷ 67,5	1	20˙000	Nessun cedimento

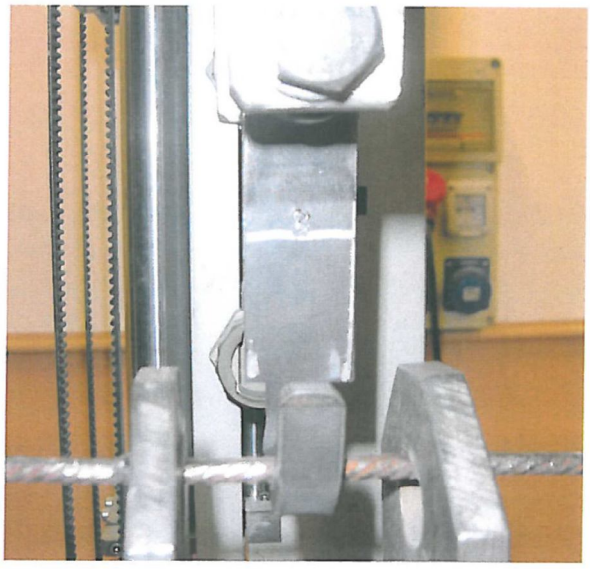

Foto 4: Prova di trazione a fatica – Schema di ancoraggio.

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DECLARATION OF CONFORMITY

CE

For the maufacturer

UFFICIO COMMERCIO PORFIDO s.a.s.

via Innsbruck, 23 - 38121 – Trento -

tel. 0461950991 – fax 0461950983

the technician

ing. Simone Graffer

via Villa Maria, 57 -38123 – Povo – TN -

tel. 3408928082

declare that the divice

GJM COMB

- Complies with the provisions of Directive 2006/42/CE
- Is identical to the device tested by the Laboratorio Trentino

Povo, 18.01.2016

U.C.P.
di Dalla Costa Alessandro & C.
Via Innsbruck, 23 - 38121 TRENTO
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ORDINE DEGLI INGEGNERI
DELLA PROV. DI TRENTO
Dott. Ing. SIMONE GRAFFER
ISCRIZIONE ALBO N° 3472

(il fabbricante)

(ing. Simone Graffer)