

# LASER INTERFEROMETER GRAVITATIONAL WAVE OBSERVATORY

- LIGO -

CALIFORNIA INSTITUTE OF TECHNOLOGY  
MASSACHUSETTS INSTITUTE OF TECHNOLOGY

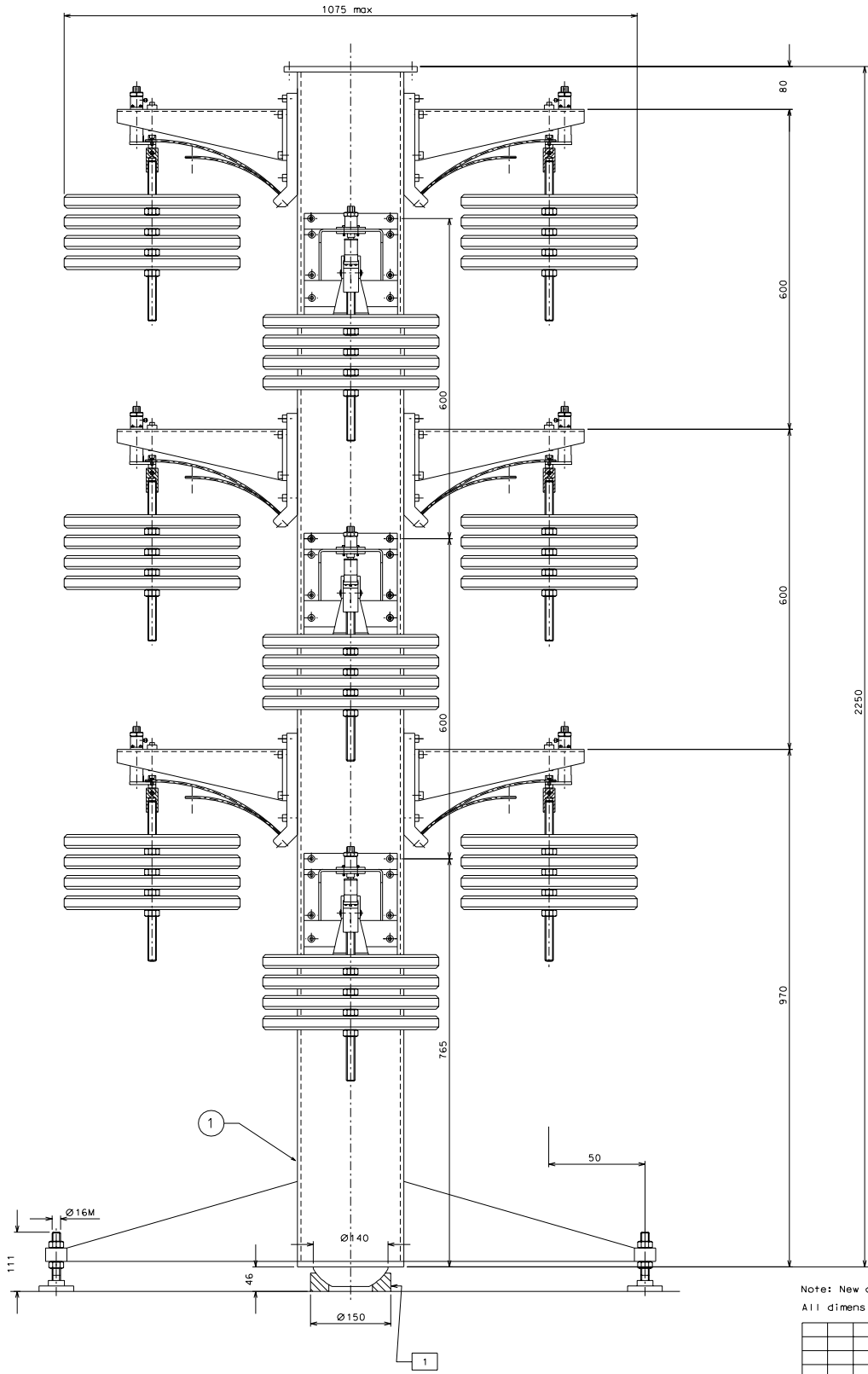
Document Type <b>Technical Note</b>	DCC Number <b>LIGO-D010252-00-R</b>	Date 30 <sup>th</sup> October 2001
<b>TOTEM, blade's creep measuring facility</b>		
<b>Mechanical drawings</b>		
<b>Gianni Gennaro, Tatiana Zelenova (PROMEC), Riccardo DeSalvo (LIGO)</b>		

Distribution of this draft: TBD  
This is an internal working note  
of the LIGO Project.

California Institute of Technology  
LIGO Laboratory - MS 18-34  
Pasadena CA 91125  
Phone (626) 395-212  
Fax (626) 304-9834  
E-mail: [info@ligo.caltech.edu](mailto:info@ligo.caltech.edu)

Massachusetts Institute of Technology  
LIGO Laboratory - MS 16NW-145  
Cambridge, MA 01239  
Phone (617) 253-4824  
Fax (617) 253-7014  
E-mail: [info@ligo.mit.edu](mailto:info@ligo.mit.edu)

www: <http://www.ligo.caltech.edu/>

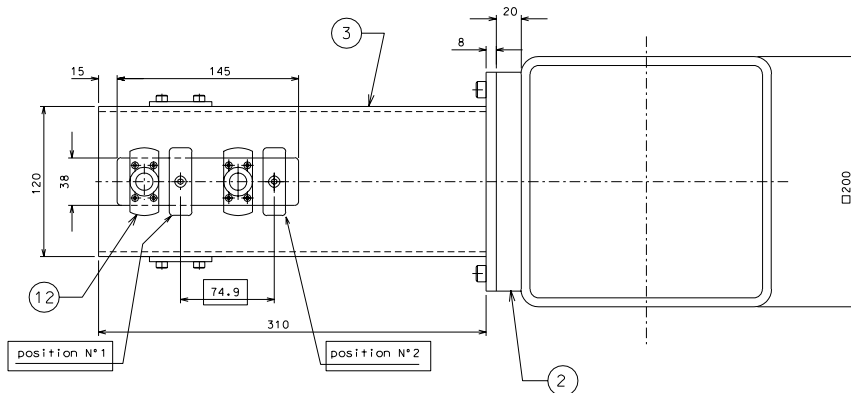
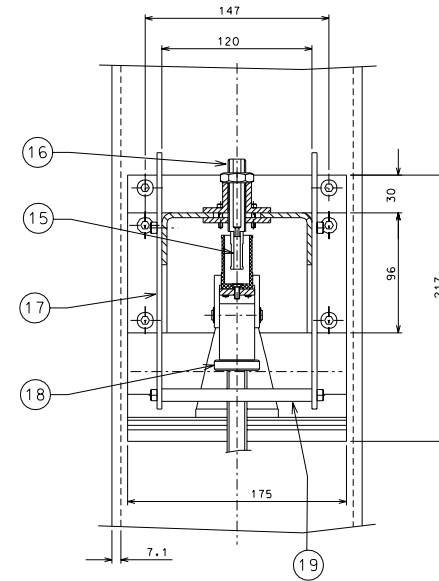
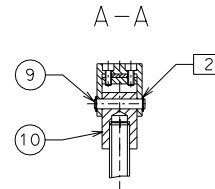
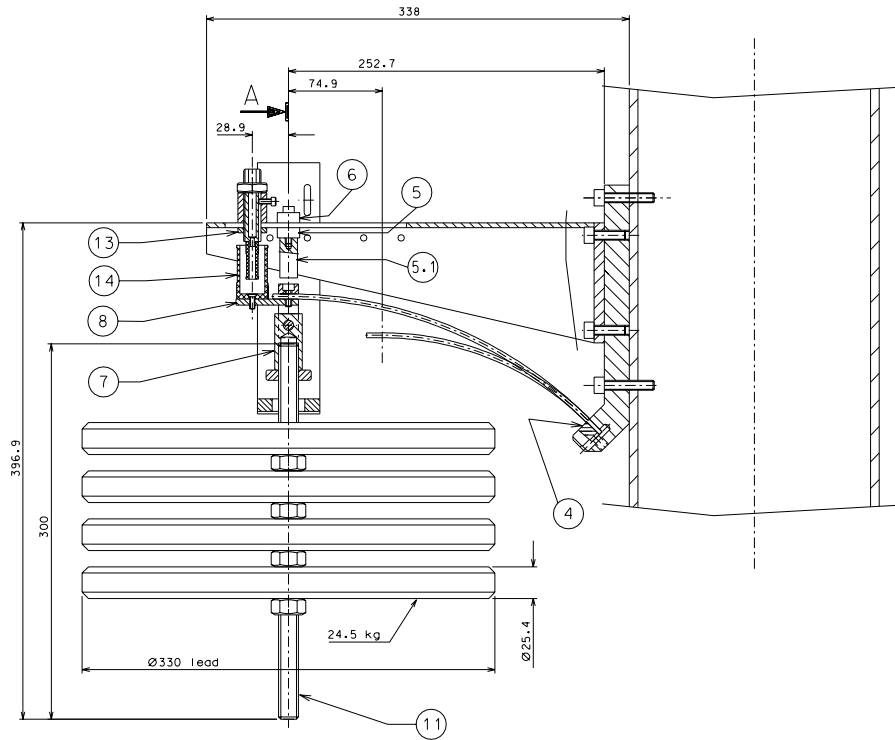


Note: New dimensions inside the frame  
All dimensions in millimeters

1	005				
ref.	dim.	prob.	ref.	dim.	prob.

Commercial:  
1 - Snodo sferico assiale AT1 GX6DF/n°1 pz.

	<b>LIGO PROJECT</b>	disegno per R. De Salvo
		dis. num. Totem.000
titolo	<b>TOTEM</b>	dim. PRGMEC 9-5-99
		scala 1:4
		realizzato da:

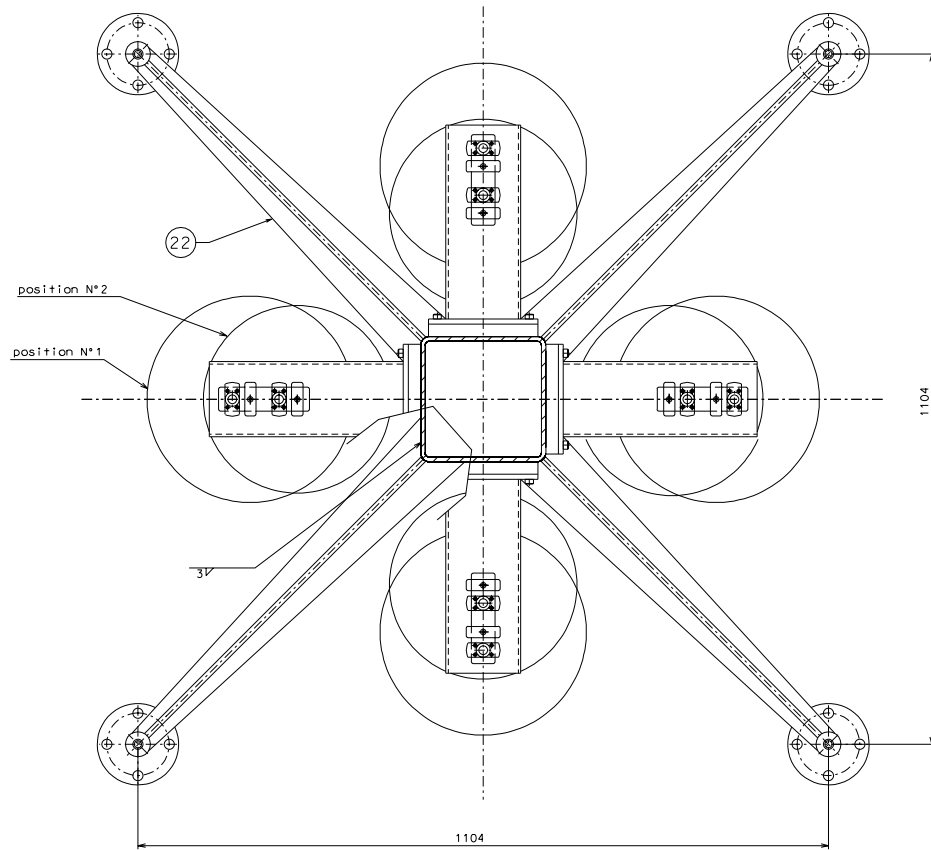
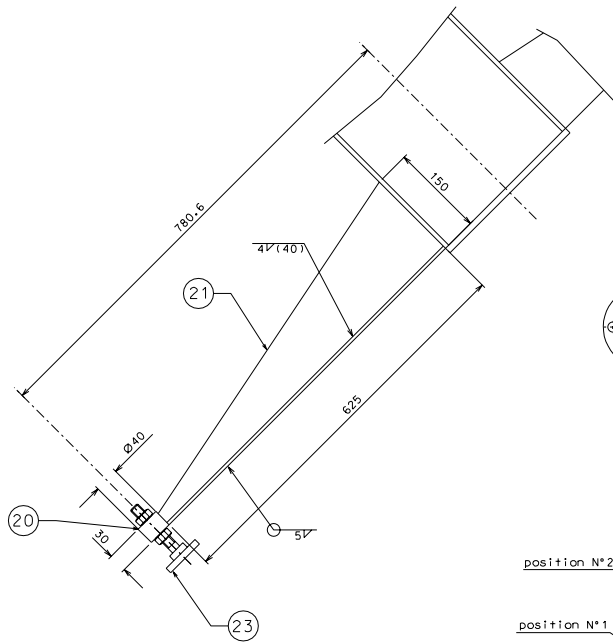


Commerciali  
2 - Anello elastico UNI 7434-10 D1= 6/n°2 pz.

Note: New dimensions inside the frame  
All dimensions in millimeters

10	006			19	008		
9	006			18	008		
8	006			17	008		
7	006			16	008		
6	006			15	008		
5.1	006			14	008		
5	006			13	006		
4	003			12	006		
3	004			11	006		
2	003						
ref.	qta.	grao		ref.	qta.	grao	

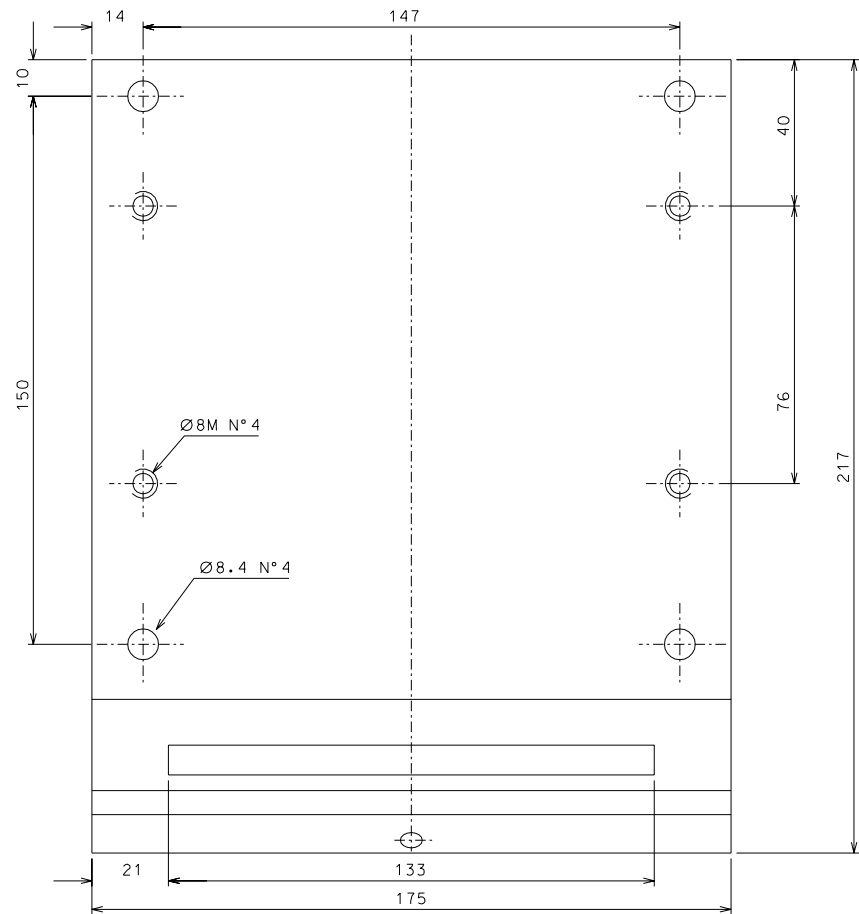
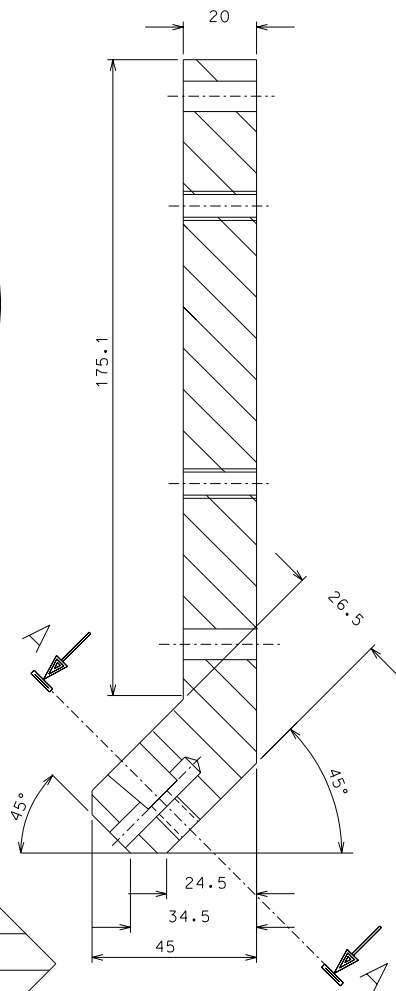
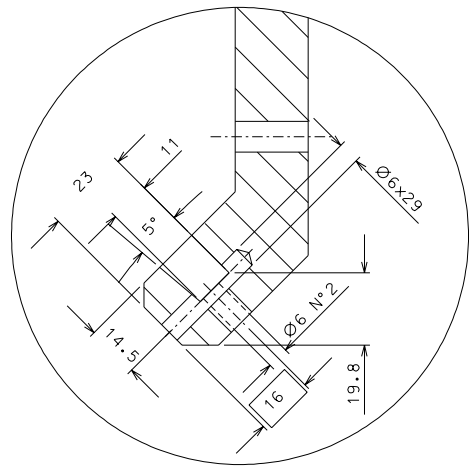
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	TOTEM	ass. num. TOTem.001
1114		pro. PROMEC 9-5-99
		scala 1:2
		registro n. Num.



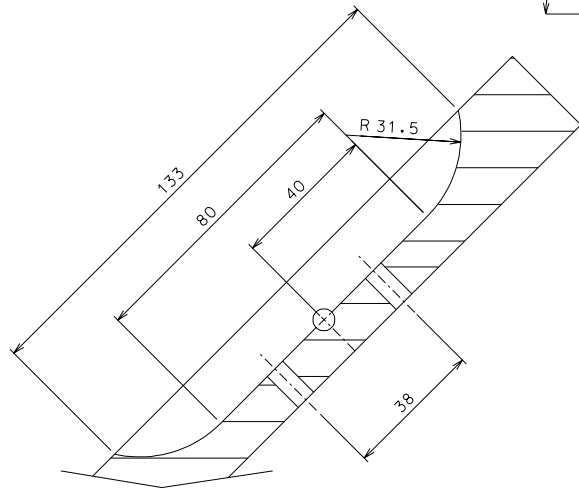
Note: New dimensions inside the frame

23	007						
22	007						
21	007						
20	007						
ref.	qnt.	grao	ref.	qnt.	grao		

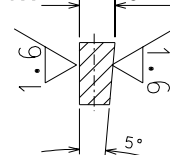
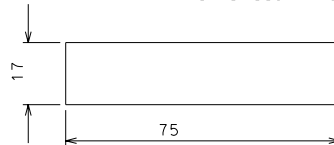
	<b>LIGO PROJECT</b>	designed for R. De Salvo
	TOTEM	des. num. Totem.002
1114		grao. PROMEC 9-5-99
		scale 1:4
		revision or. Num.



2



- for blade thickness 3 → 8.7 N°12 pieces (4)
- for blade thickness 3.5 → 9.2 N°12 pieces (4.1)
- for blade thickness 4 → 9.7 N°12 pieces (4.2)

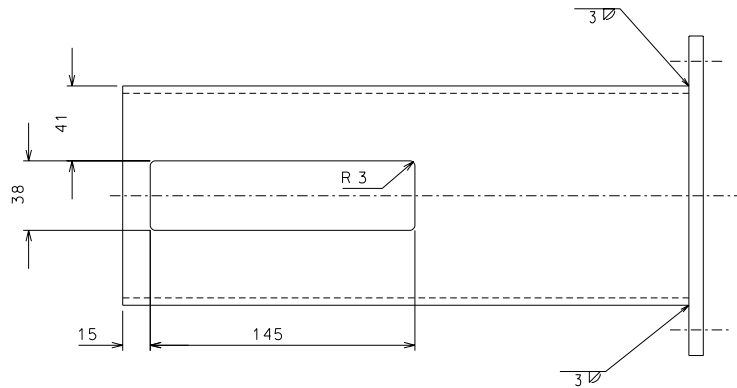
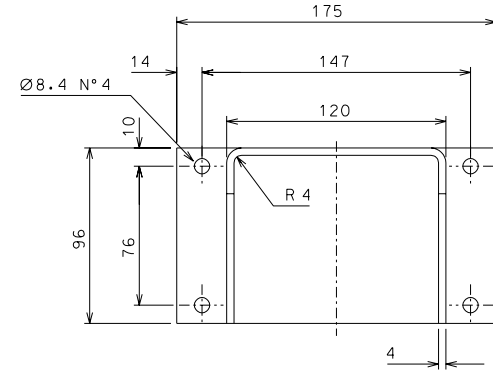
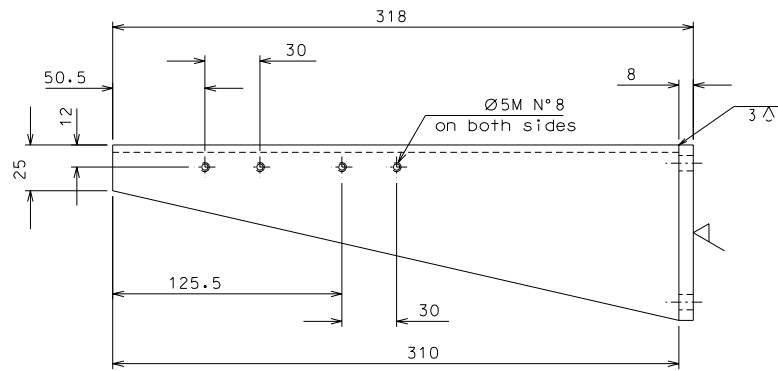


Note: New dimensions inside the frame

4.2	12	ground steel	1:1				
4.1	12	ground steel	1:1				
4	12	ground steel	1:1				
2	12	nickel plated steel	1:1				
ref.	pieces	mat. and treatments	scale	ref.	pieces	mat. and treatments	scale

General machining tolerances UNI 5307-63							
Dimensions	< 6	> 6-30	> 30-120	> 120-315	> 315-1000	> 1000-2000	> 2000-4000
Linear Toli.	± 0.1	± 0.2	± 0.3	± 0.5	± 0.8	± 1.2	± 3
angular Toli.	± 1	± 30'	± 20'	± 10' referred to the shortest side			

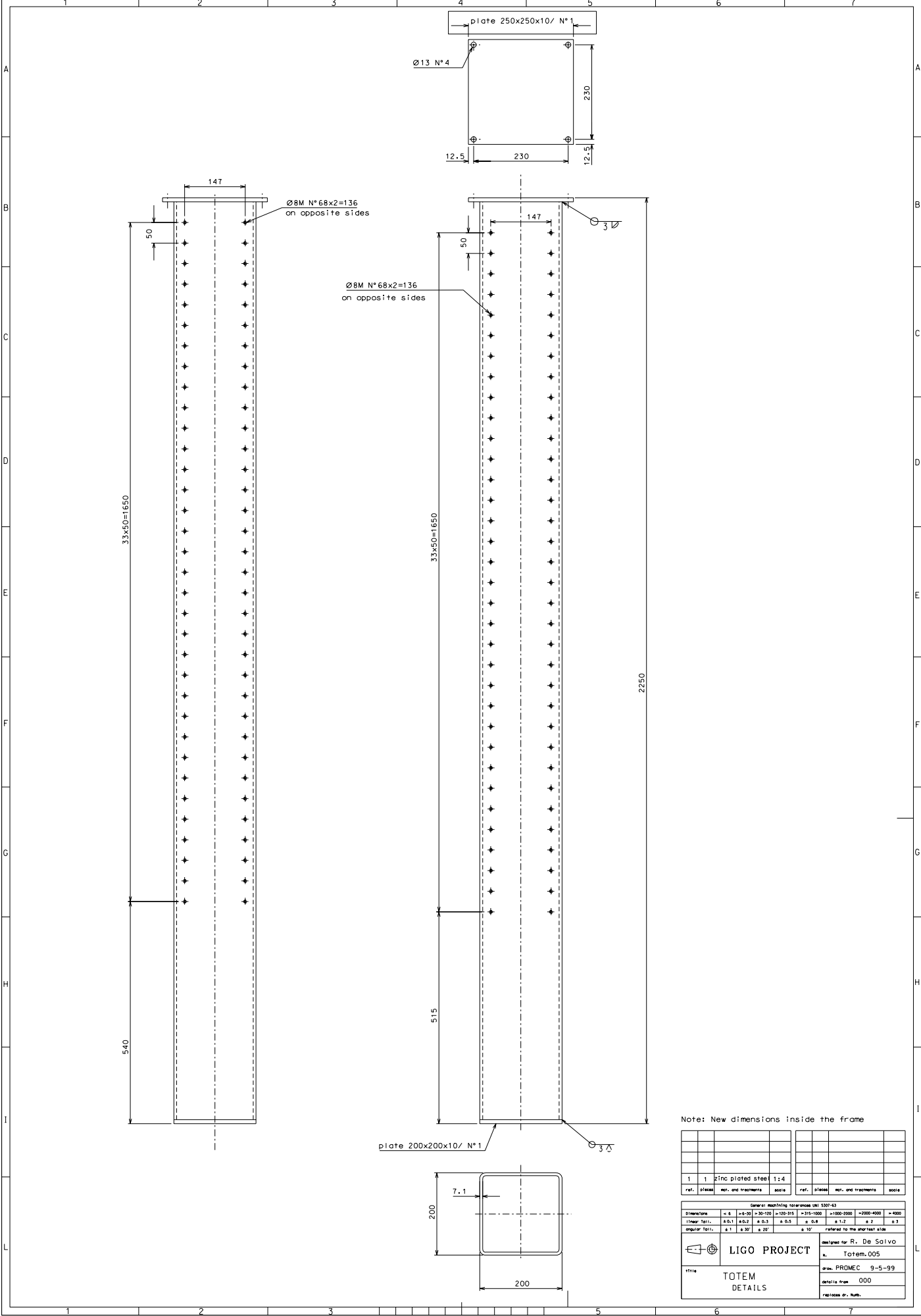
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		N. Totem.003
title	<b>TOTEM DETAILS</b>	draw. PROMEC 9-5-99
		details from 001
		replaces dr. Numb.



3	12	stainless steel	1:2				
ref.	pieces	mat. and treatments	scale	ref.	pieces	mat. and treatments	scale

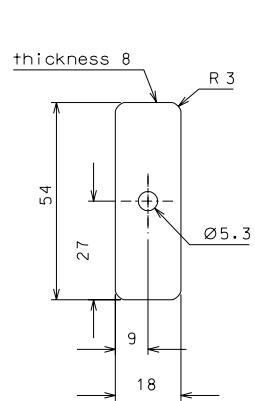
General machining tolerances UNI 5307-63							
Dimensions	< 6	> 6-30	> 30-120	> 120-315	> 315-1000	> 1000-2000	> 2000-4000
Linear Toli.	± 0,1	± 0,2	± 0,3	± 0,5	± 0,8	± 1,2	± 3
angular Toli.	± 1'	± 30'	± 20'	± 10' referred to the shortest side			

	<b>LIGO PROJECT</b>	designed for R. De Salvo
		N. Totem.004
title <b>TOTEM          DETAILS</b>	draw. PROMEC 9-5-99	
	details from 001	
		replaces dr. Num.

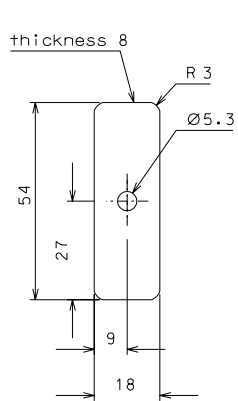


Note: New dimensions inside the frame

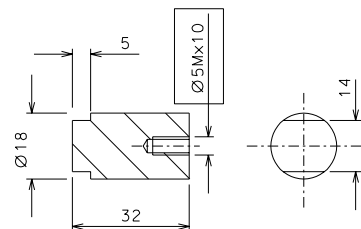
1	1	Zinc plated steel	1:4						
ref.	pieces	mat. and treatment	scale	ref.	pieces	mat. and treatment	scale		
General machining tolerances UNI 5307-63									
Dimensione	< 6	6-30	30-120	120-315	315-1000	1000-2000	2000-4000	> 4000	
Linear tol.	±0.1	±0.2	±0.3	±0.5	±0.8	±1.2	±2	±3	
Angular tol.	±1'	±30"	±20"	±10"	referred to the shortest side				
		designed for R. De Saivo n. Totem.005							
Title <b>TOTEM          DETAILS</b>		draw. PRIMEC 9-5-99		details from 000		not used for built.			



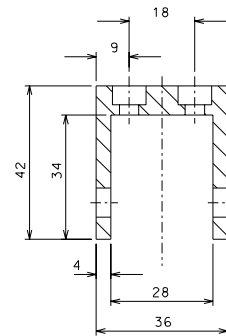
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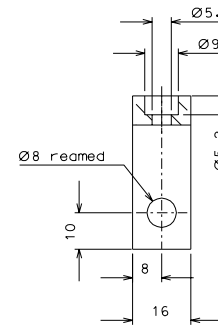
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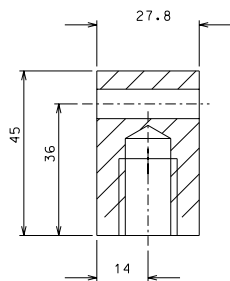
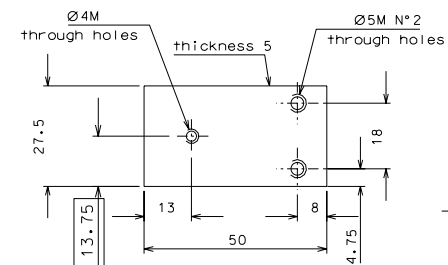
5.1



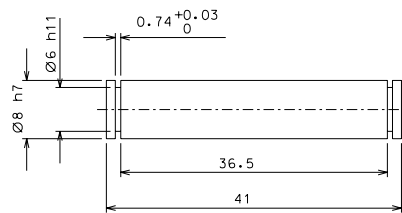
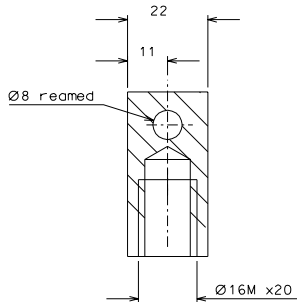
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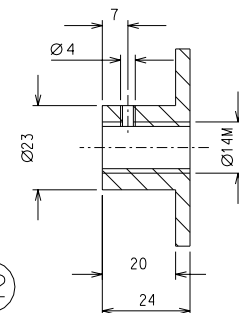
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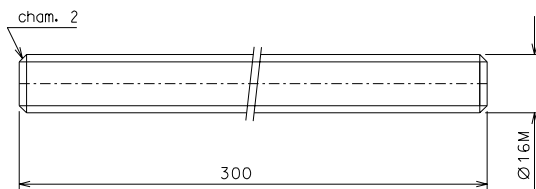
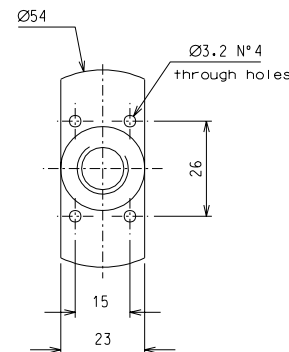
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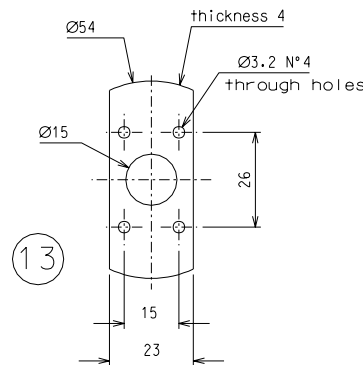
9



12



11



13

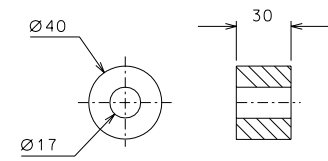
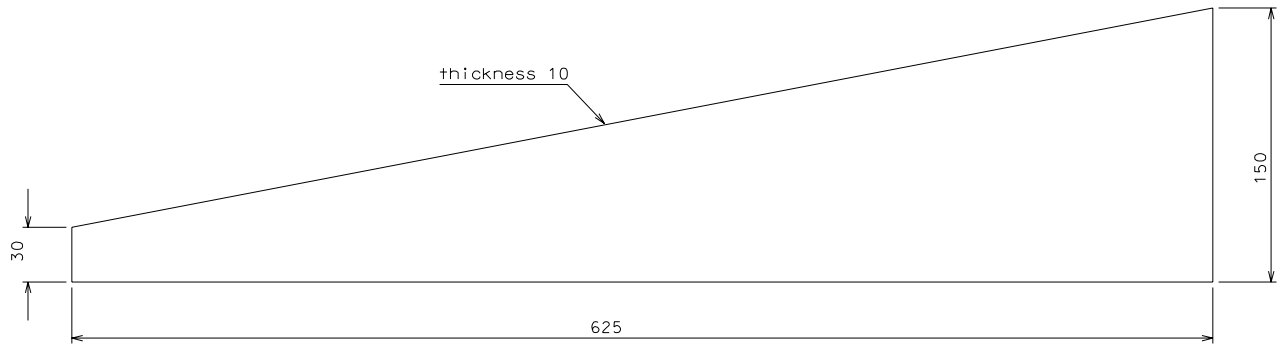
Note: New dimensions inside the frame

8	12	stainless steel	1:1	13	12	brass	1:1
7	12	"	1:1	12	12	"	1:1
6	12	nickel plated steel	1:1	11	12	stainless steel	1:1
5.1	12	"	1:1	10	12	"	1:1
5	12	"	1:1	9	12	steel	2:1
ref.	pieces	mat. and treatments	scale	ref.	pieces	mat. and treatments	scale

General machining tolerances UNI 5307-63							
Dimensions	< 6	>= 6-30	>= 30-120	>= 120-315	>= 315-1000	>= 1000-2000	>= 2000-4000
Linear Toli.	± 0.1	± 0.2	± 0.3	± 0.5	± 0.8	± 1.2	± 2
Angular Toli.	± 1'	± 30'	± 20'	± 10' referred to the shortest side			

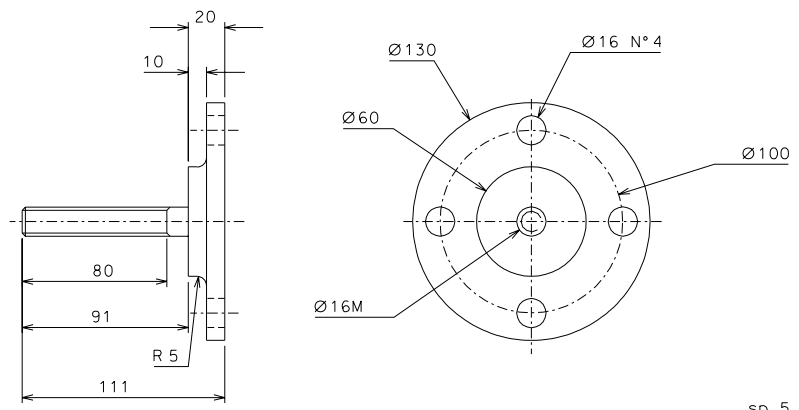
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	<b>TOTEM DETAILS</b>		N. Totem.006
title		9-5-99	details from 001
replaces dr. Num.			



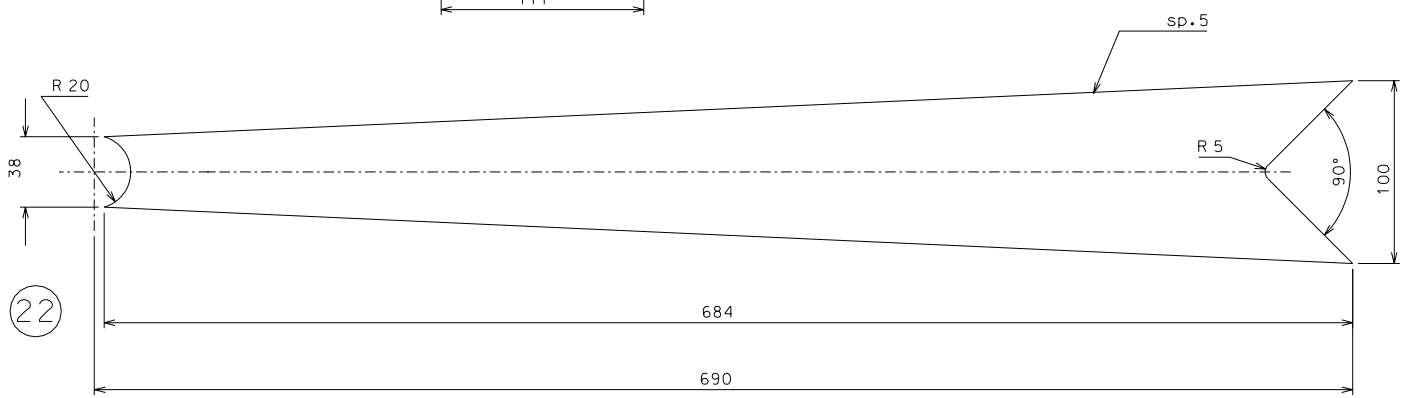


(20)

(21)



(23)



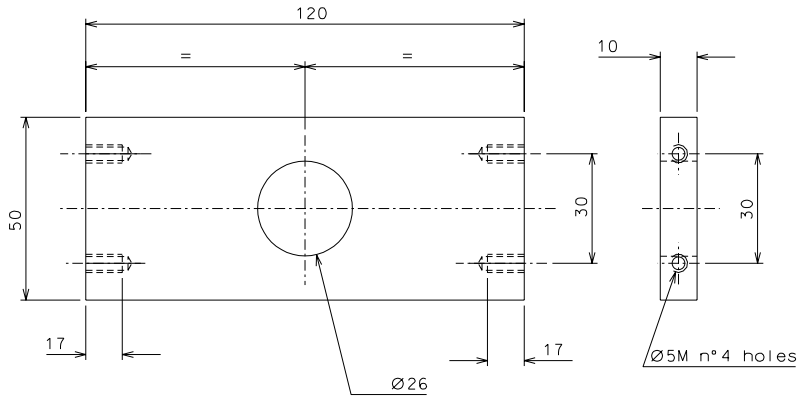
(22)

Note: New dimensions inside the frame

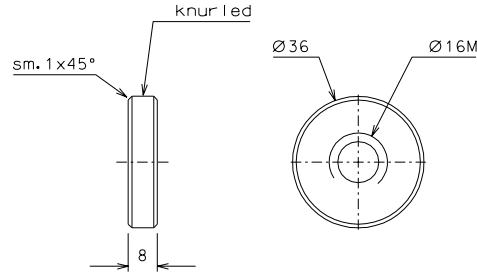
23	4	zinc plated steel	1:2				
22	4	"	1:2				
21	4	"	1:2				
20	4	"	1:2				
ref.	pieces	mat. and treatments	scale	ref.	pieces	mat. and treatments	scale

General machining tolerances UNI 5307-63							
Dimensions	< 6	> 6-30	> 30-120	> 120-315	> 315-1000	> 1000-2000	> 2000-4000
Linear Toli.	± 0,1	± 0,2	± 0,3	± 0,5	± 0,8	± 1,2	± 3
angular Toli.	± 1'	± 30'	± 20'	± 10' referred to the shortest side			

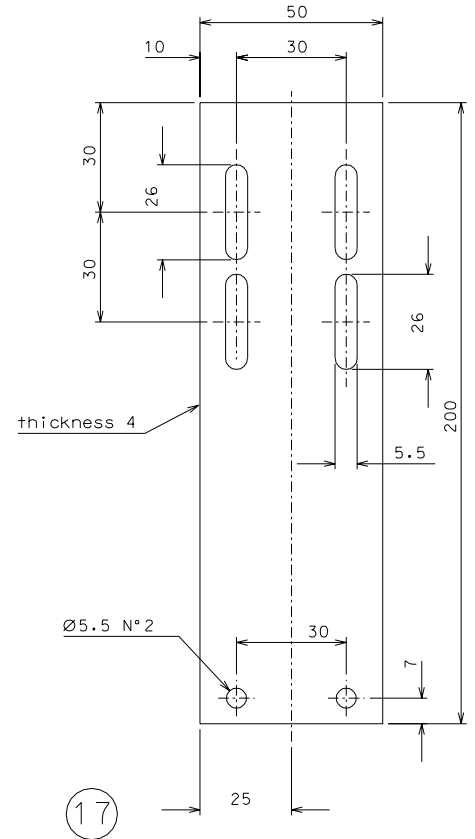
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		N. Totem.007
title	<b>TOTEM DETAILS</b>	draw. PROMEC 9-5-99
		details from 002
		replaces dr. Num.



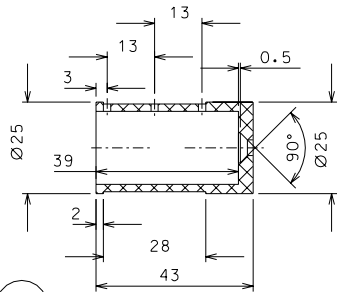
19



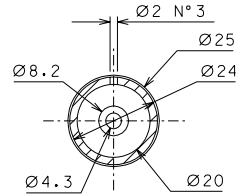
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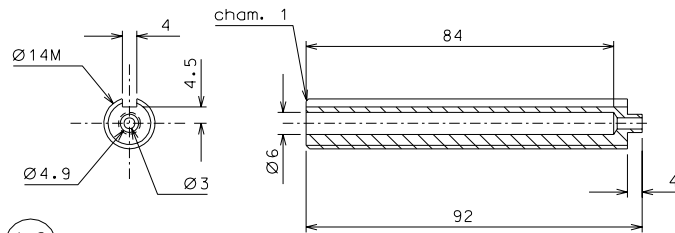
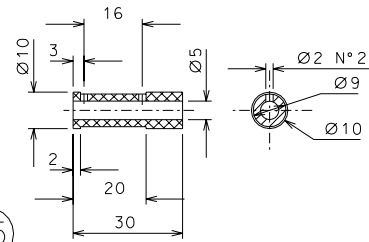
17



14



15



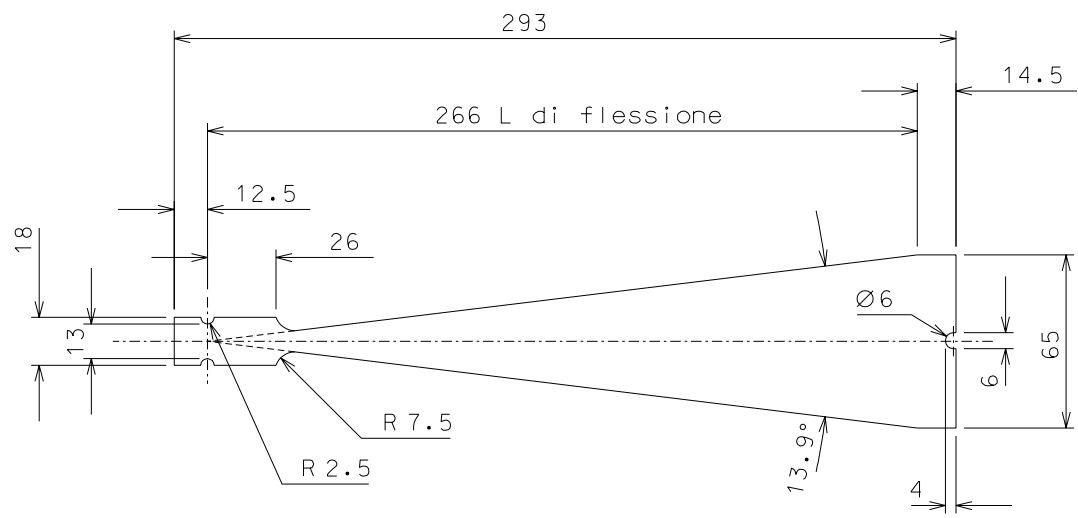
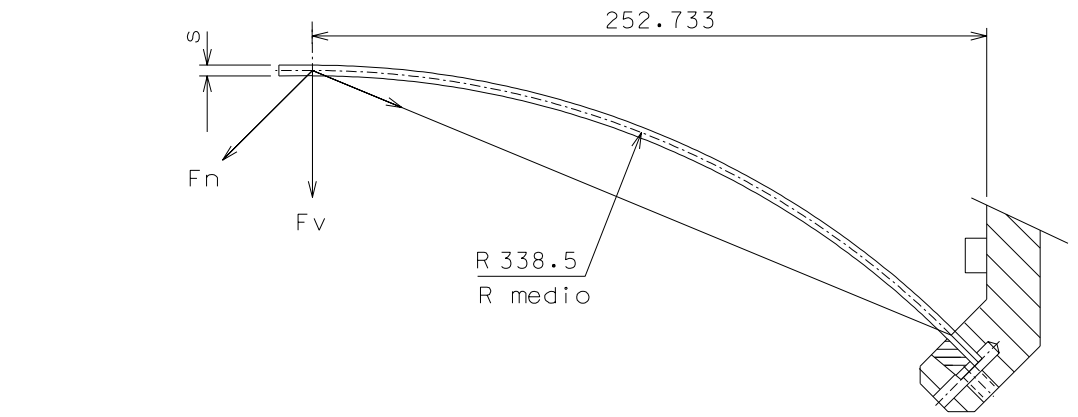
16

Note: New dimensions inside the frame

18	24	brass	1:1				
17	24	stainless steel	1:1				
16	12	stainless steel	1:1				
15	12	PVC	1:1				
14	12	PVC	1:1	19	12	stainless steel	1:1
ref.	pieces	mat. and treatments	scale	ref.	pieces	mat. and treatments	scale

General machining tolerances UNI 5307-63							
Dimensions	< 6	> 6-30	> 30-120	> 120-315	> 315-1000	> 1000-2000	> 2000-4000
Linear Toli.	± 0,1	± 0,2	± 0,3	± 0,5	± 0,8	± 1,2	± 2
angular Toli.	± 1	± 30'	± 20'	± 10'			

	<b>LIGO PROJECT</b>		designed for R. De Salvo
			N. Totem.008
title	TOTEM		draw. PROMEC 9-5-99
	DETAILS		details from 001
			replaces dr. Num.



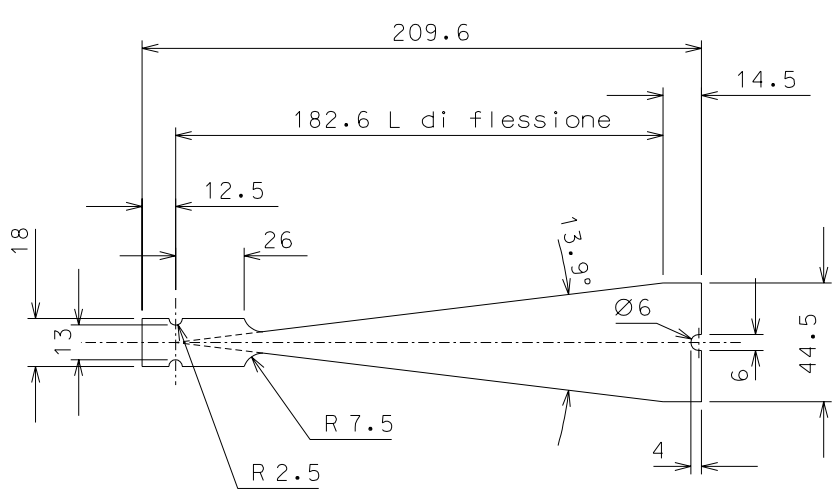
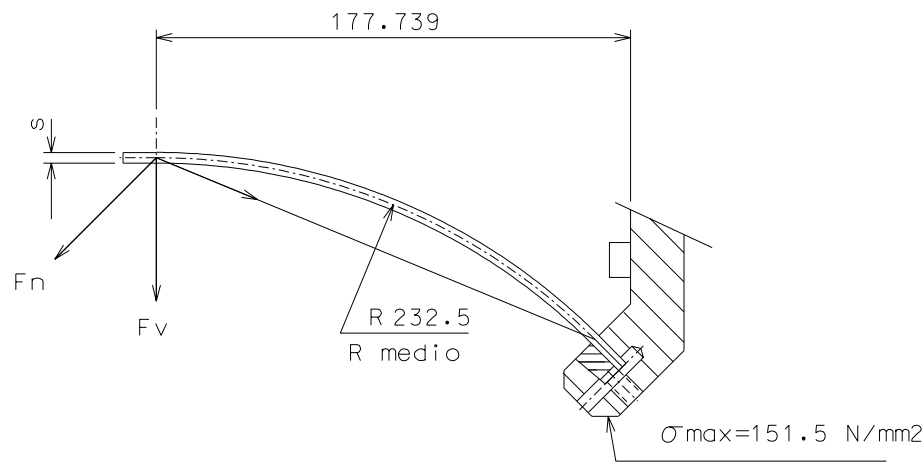
$s=3 \quad \sigma = 824.2 \text{ N/mm}^2 \quad F_n = F_v = 302.1 \text{ N}$   
 $S=3.5 \quad \sigma = 961.6 \text{ N/mm}^2 \quad F_n = F_v = 479.7$   
 $s=4 \quad \sigma = 1099 \text{ N/mm}^2 \quad F_n = F_v = 716 \text{ N}$

Lama tipo "A"

rif.	pezzi	mat. e trattamento	scale	rif.	pezzi	mat. e trattamento	scale

Tolleranze generali di lavorazione UNI 5307-63								
Dimensioni	< 6	> 6-30	> 30-120	> 120-315	> 315-1000	> 1000-2000	> 2000-4000	> 4000
Toll. lineari	± 0.1	± 0.2	± 0.3	± 0.5	± 0.8	± 1.2	± 2	± 3
Toll. angolari	± 1	± 30'	± 20'	± 10' riferito al lato più corto				

	<p><b>PROMEC S.A.S.</b> Bientina (Pisa)-Italia</p>	cliente Caltech-LIGO
		N. Totem.009
		dis. Zelenova 9-5-99
		part. dal
titolo <b>TOTEM          DETTAGLI</b>		sost. il N.



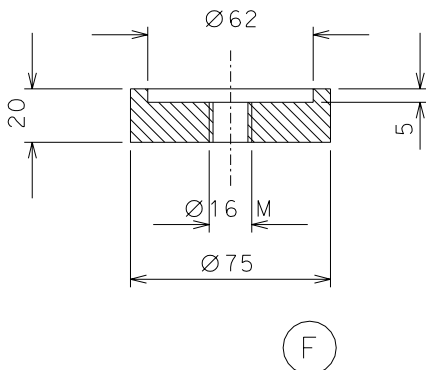
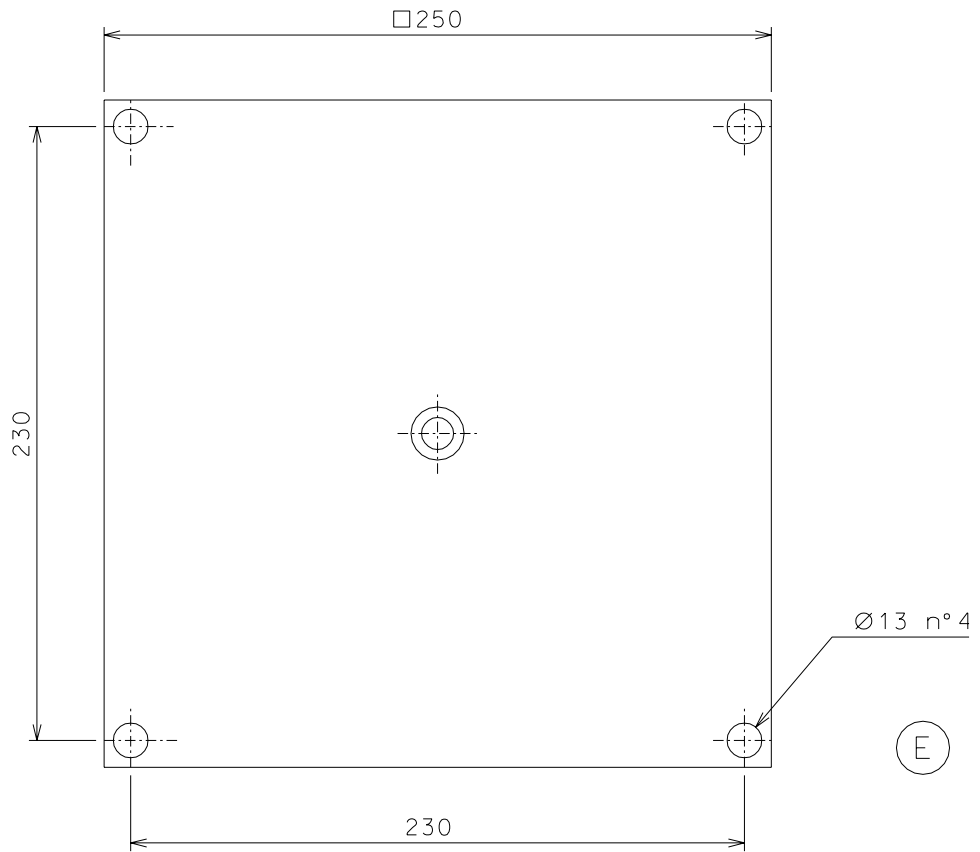
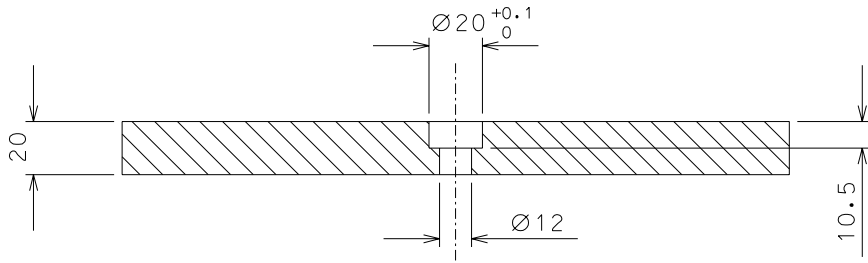
$s=3 \quad \sigma=1200 \text{ N/mm}^2 \quad F_n=F_v=448 \text{ N}$   
 $s=3.5 \quad \sigma=1400 \text{ N/mm}^2 \quad F_n=F_v=710.6 \text{ N}$   
 $s=4 \quad \sigma=1600 \text{ N/mm}^2 \quad F_n=F_v=1061.3 \text{ N}$

Lama tipo "B"

rif.	pezzi	mat. e trattamento	scale	rif.	pezzi	mat. e trattamento	scale

Tolleranze generali di lavorazione UNI 5307-63								
Dimensioni:	< 6	> 6-30	> 30-120	> 120-315	> 315-1000	> 1000-2000	> 2000-4000	> 4000
Toll. lineari	± 0.1	± 0.2	± 0.3	± 0.5	± 0.8	± 1.2	± 2	± 3
Toll. angolari	± 1	± 30'	± 20'	± 10' riferito al lato piu corto				

	<p><b>PROMEC S.A.S.</b> Bientina (Pisa)-Italia</p>	cliente Caltech-LIGO	
		N. Totem.010	
titolo <b>TOTEM</b> <b>DETTAGLI</b>		dis. Zelenova 9-5-99	
		part. dal	
		sost. il N.	

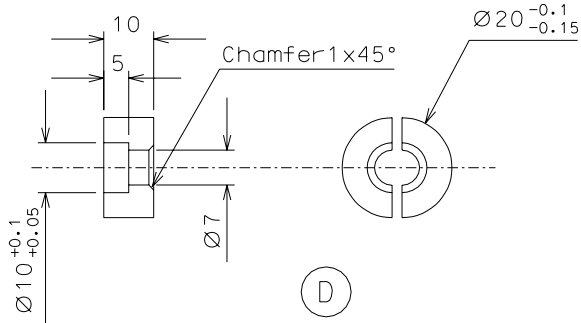
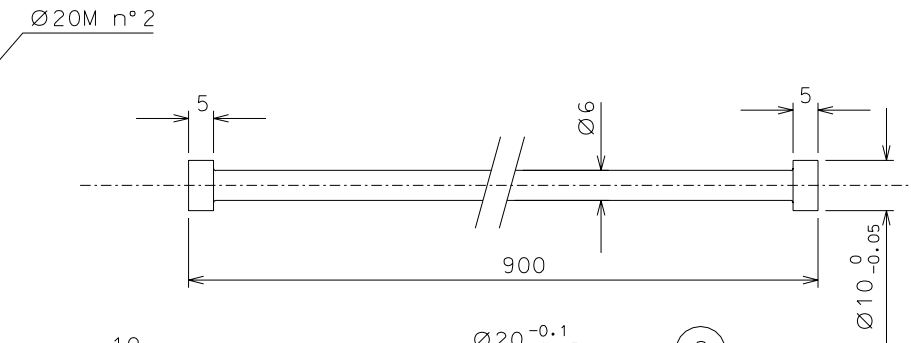
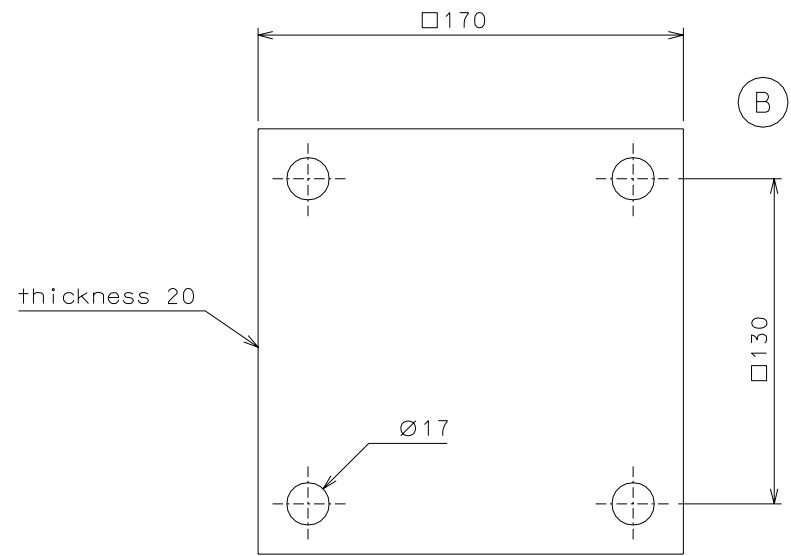
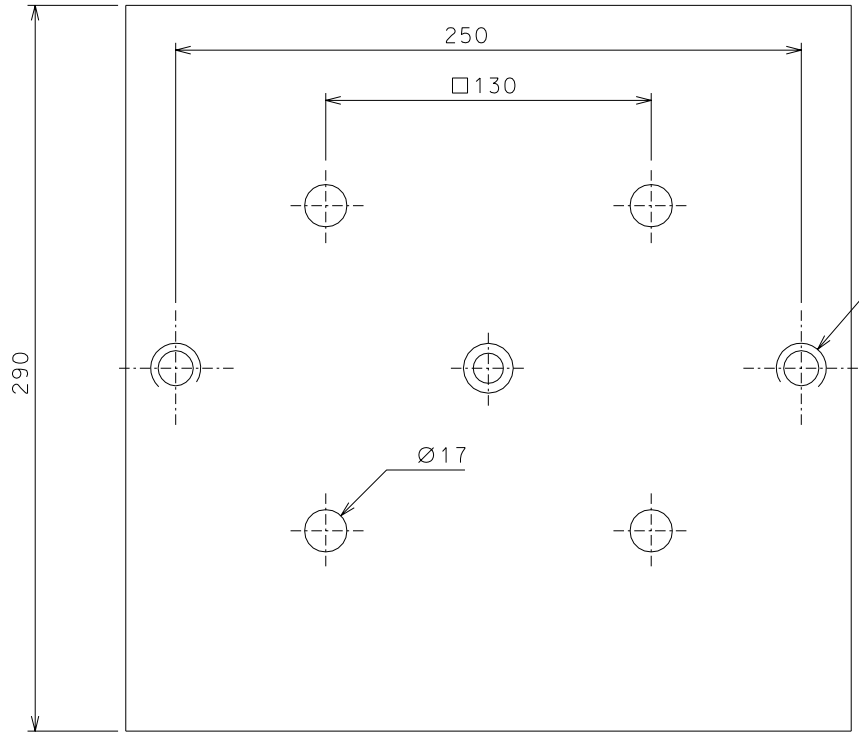
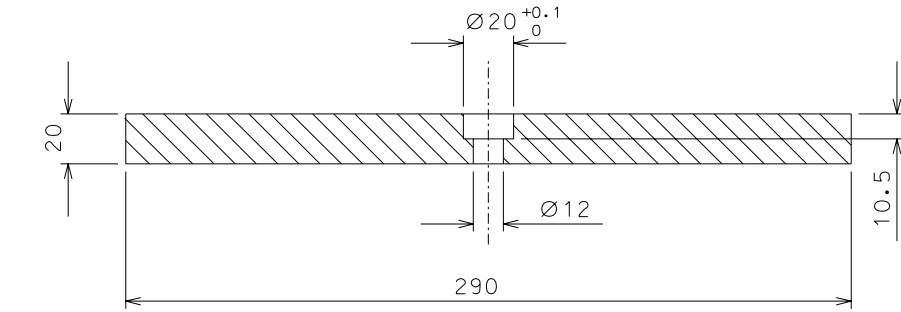


F	4	AISI 304	1:2
E	1	AISI 304	1:2
ref.	pieces	mat. and treatments	scale

ref.	pieces	mat. and treatments	scale

General machining tolerances UNI 5307-63								
Dimensions	< 6	> 6-30	> 30-120	> 120-315	> 315-1000	> 1000-2000	> 2000-4000	> 4000
linear Toli.	± 0.1	± 0.2	± 0.3	± 0.5	± 0.8	± 1.2	± 2	± 3
angular Toli.	± 1	± 30'	± 20'	± 10' referred to the shortest side				

	LIGO PROJECT		designed for R. De Salvo	
	title		N. Totem 011	
TOTEM		draw. PROMEC 1-10-01		
DETTAGLI		details from		
replaces dr. Numb.			A 3	



D	1	margining	2:1				
C	1	C. 40	2:1				
B	2	AISI 304	1:1				
A	1	AISI 304	1:1				
ref.	piece	mat. and treatments	scale	ref.	piece	mat. and treatments	scale

General machining tolerances UNI 5007-63							
Dimensione	< 6	6-30	30-120	120-315	315-1000	1000-5000	> 5000
Linear Toli.	± 0.1	± 0.2	± 0.3	± 0.5	± 0.8	± 1.2	± 2
Angular Toli.	± 1'	± 30"	± 20"	± 10"	related to the shortest side		
LIGO PROJECT				designed for R. De Salvo			
TOTEM				n. Totem 012			
DETTAGLI				prov. PROMEC 2-10-01			
drawing nr.				details from			
revision nr.				scale			
				A 1			