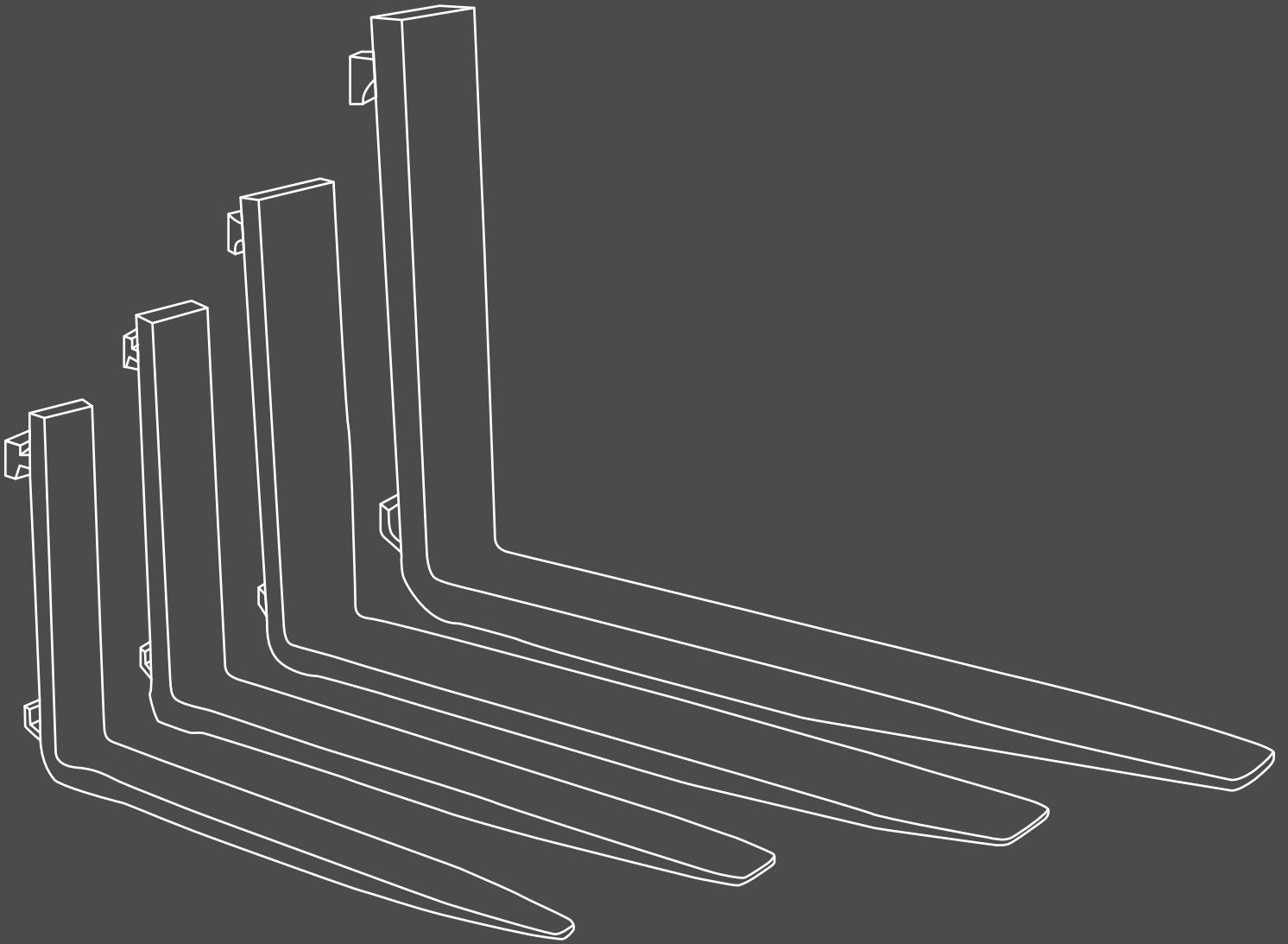


FORK GUIDE 2013

ENGLISH





With a brand which is synonymous with specialists in forest products handling attachments, BOLZONI AURAMO offers its expertise and market leading attachments for all requirements, from large paper rolls to pulp bales and cardboard packaging, from home appliances and beverage products to construction materials.

BOLZONI AURAMO is the world's leading supplier to the main lift truck manufacturers of factory installed products.

**BOLZONI AURAMO IS
A BOLZONI GROUP'S BRAND**



**BOLZONI IS ONE OF THE
WORLDWIDE LEADING
MANUFACTURERS OF LIFT TRUCK
ATTACHMENTS, FORKS AND
LIFT TABLES, WITH THE MOST
EXTENSIVE PRODUCT RANGE IN
THE MARKET.**

**WE ARE BOLZONI,
THE MATERIAL HANDLING GROUP**

Quality, safety, efficiency

Bolzoni Auramo offers complete range of forks for lift trucks, construction and agricultural material handling machines, in many different capacities, sections and lengths, ISO and special mountings.

Advanced production process

Production standards for all Bolzoni Auramo forks are based on common key- features:

- Innovative and highly automated production process.
- Prime quality steel offering good welding characteristics and strong resistance to wear.
- Automated welding of upper and lower hooks with a robotic system, granting better quality of the welding, quality repeatability and higher process speed.
- Complete heat treatment with hardening and tempering on the entire fork, providing the best quality and reliability characteristics.



Certified quality

Certified quality of chemical composition and of the heat treatment applied on raw material used. Bar coding allowing for the tracking of raw material back to source. All forks produced comply with the parameters outlined in ISO 2328 and 2330. In order to satisfy these standards, each different type of forks is subjected to the following tests:

- 1 fatigue test of 1,000,000 cycles at 25% overload.
- 1 static test of 2 cycles with triple nominal capacity.
- 1 resilience test at -20°C with a resulting value higher than 27 Joules.

FORK GUIDE



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03 Tips and Tapers page 18

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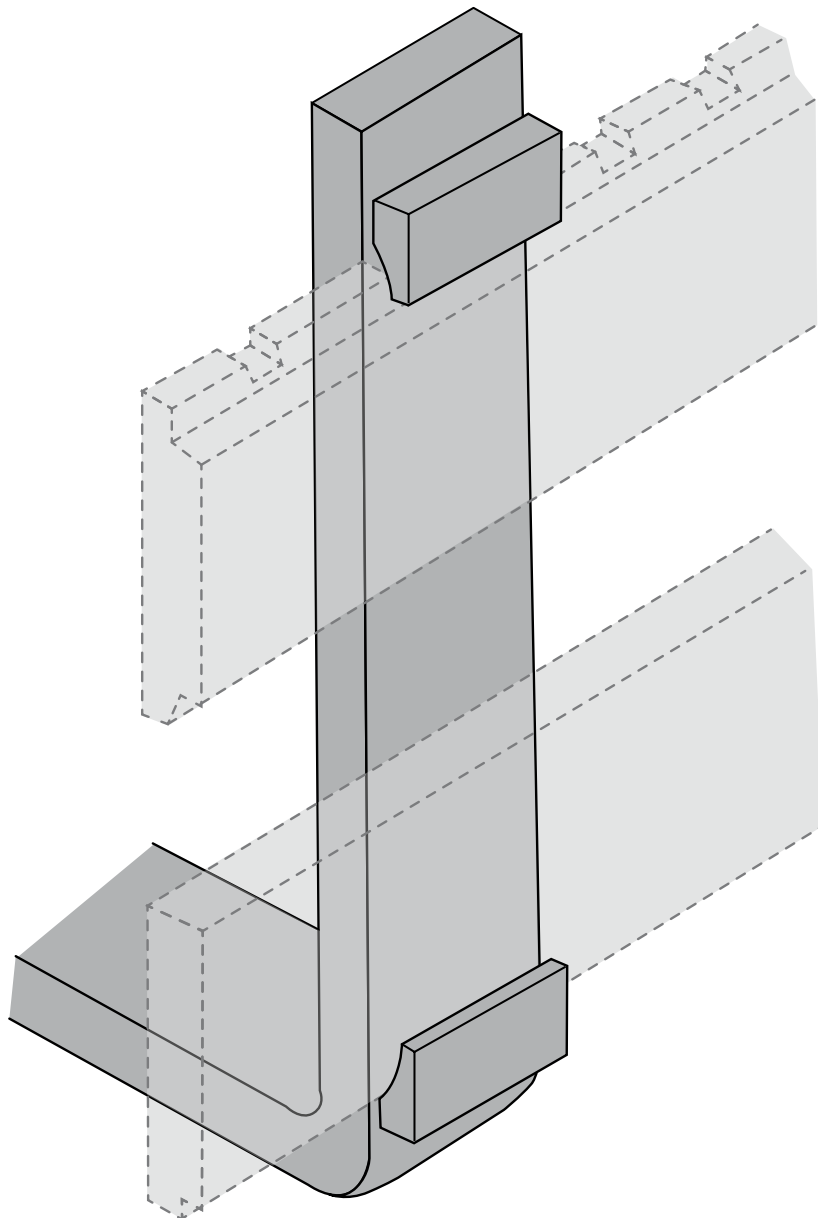
Note

The purpose of this FORK GUIDE is to:

- Inform on the range of Bolzoni Auramo forks suitable for different fork applications.
- Drive on the choice of the correct fork type and dimensioning
- Support on fork safety maintenance procedures

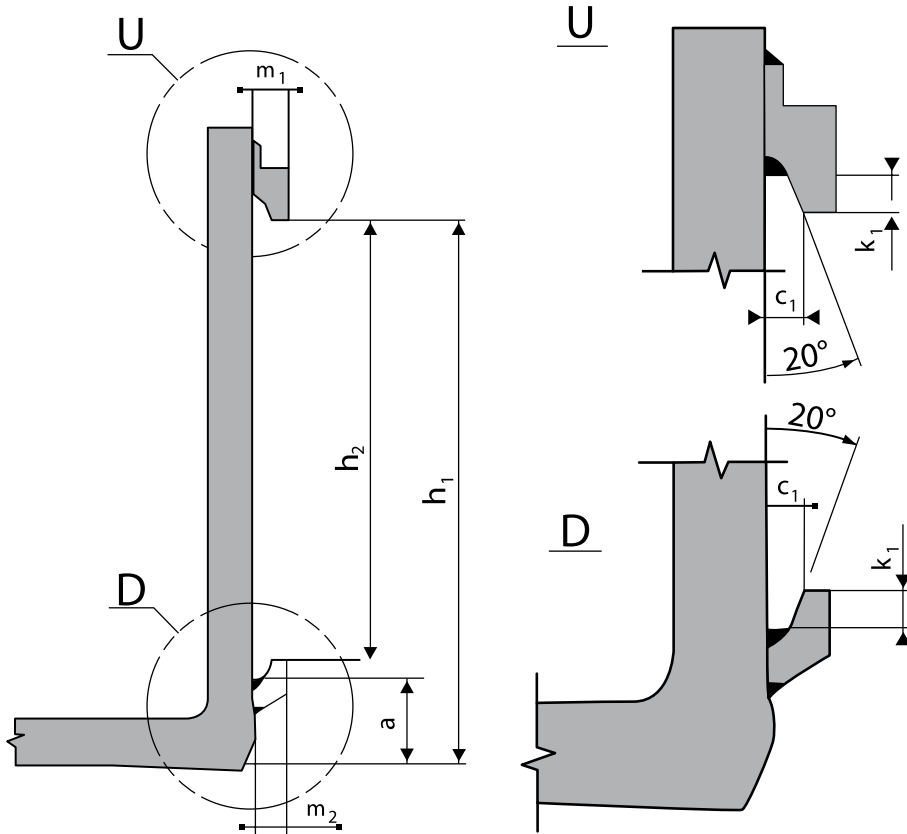
Fork models and features included in this guide are informative only, shown as examples of the possible supply. For any additional version, please consult Bolzoni Auramo concerning correctness of use and technical feasibility, supplying technical specifications and drawings.

FEM/ISO Mounting Standards



The FEM / ISO mounting is the most common way of connecting forks to the lift-truck. According to the lift truck capacity, the ISO standards are divided into 5 classes, each of them having a „A“ and „B“ version. The difference between version „A“ and „B“ is the clearance from the lower hook to the floor. Measurements are defined by the International Standard ISO 2328.

Main measurements are listed in the following chart:

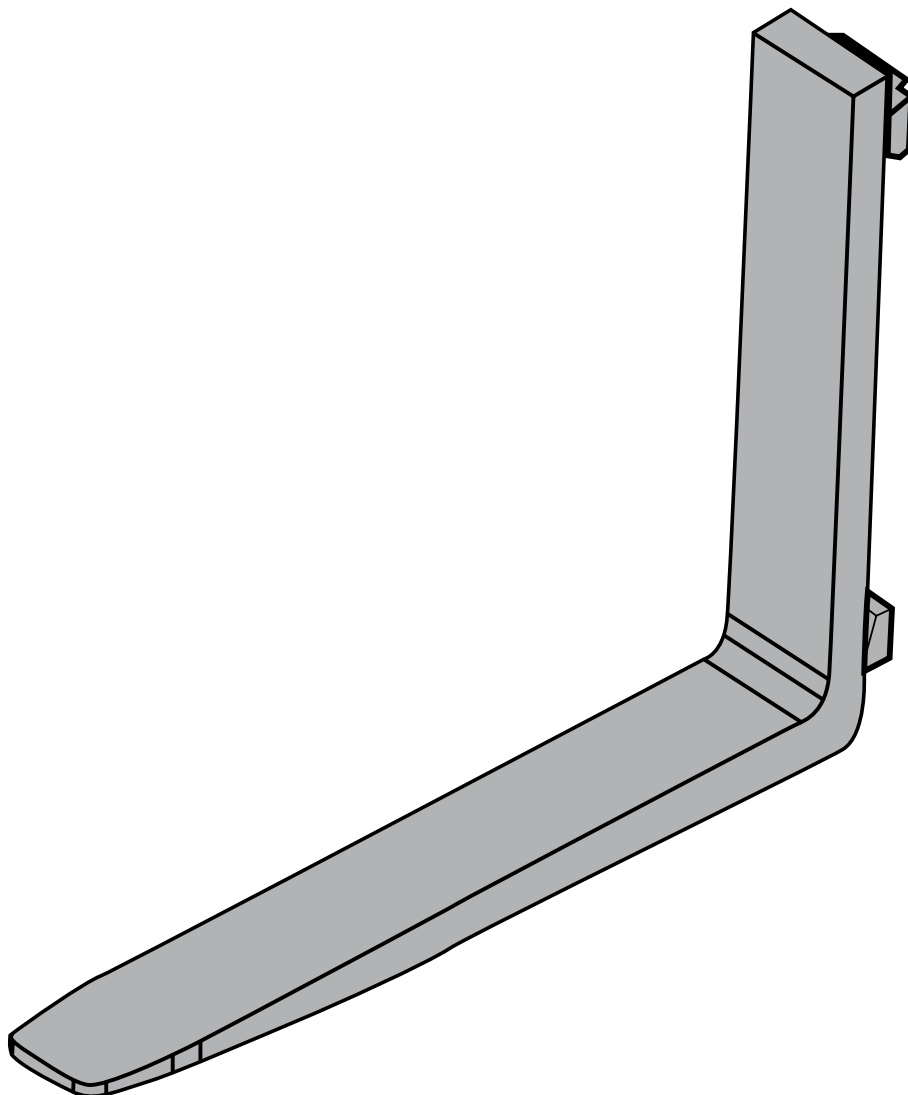


Class	Truck Rated capacity	Rated load center distance	Fork arm type	a	c ₁	h ₁	h ₂		m ₁	m ₂	k ₁
	kg						mm	mm			
1	0-999	400	A	76	+1,0/0	± 3,0	306	+1,0/0	28	26	14
			B	114		432					
2	1000-2500	500	A	76	+1,0/0		382	+1,0/0	31	29	14
			B	152		546					
3	2501-4999	500	A	76	+1,5/0		477	+1,5/0	40	38	17
			B	203		695					
4	5000-8000	600	A	127	+1,5/0		598	+1,5/0	47	45	20
			B	254		870					
5*	8001-10999	600	A	127	+1,5/0		680	+1,5/0	65	63	26
			B	257		960					

* Capacity ISO 5 are still often included in ISO 4.

Hook Forks FEM/ISO Mounting

02



Chapter Description

Page

Class 2A	page 10
Class 3A	page 13
Class 4A	page 15
Fork Extensions	page 17



General Information

Hook FEM / ISO mounting forks for forklift trucks of all brands, in many different capacities, sections and lengths.

For dimensions not included in the present Fork Guide, please consult Bolzoni Auramo.

Lock pin assembly included on all FEM / ISO 2328 hook forks.

On request:

- ISO 2328 Class B mounting
- Different fork section and lengths
- Forks for special applications

Capacity of fork couple Q Kg	Load Center BP mm	Mounting Class ISO 2328	Fork Section AxE mm	Fork Length L mm	Weight of single fork W Kg
2000	500	2A	80x40	800	30
				900	33
				1000	34
				1100	37
				1200	39
				1300	41
				1400	44
				1500	46
				1600	49
				1800	52
				2000	57
1900	500	2A	100x35	800	32
				900	35
				1000	37
				1100	40
				1200	41
				1300	44
				1400	47
				1500	50
				1600	52
				1700	55
				1800	56
				2000	62
				2200	67
				2400	73
2500	500	2A	100x40	800	37
				900	40
				1000	42
				1100	45
				1200	47
				1300	50
				1400	53
				1500	56
				1600	60
				1700	63
				1800	64
				2000	70
				2200	77
				2400	83
3000	500	2A	100x45	800	41
				900	45

Capacity of fork couple	Load Center	Mounting Class	Fork Section	Fork Length	Weight of single fork
Q	BP	ISO	AxE	L	W
Kg	mm	2328	mm	mm	Kg
3000	500	2A	100x45	1000	47
				1100	51
				1200	53
				1300	57
				1400	60
				1500	64
				1600	67
				1700	71
				1800	72
				1900	76
				2000	79
				2100	83
				2200	86
				2300	90
2400	93				
2000	500	2A	120x35	800	39
				900	42
				1000	44
				1100	48
				1200	50
				1300	53
				1400	56
				1500	60
				1600	63
				1700	66
				1800	68
				1900	71
				2000	74
				2200	81
2400	88				
3000	500	2A	120x40	800	44
				900	48
				1000	50
				1100	54
				1200	57
				1300	60
				1400	64
				1500	68
				1600	72
				1700	75
				1800	77
				1900	81

Capacity of fork couple	Load Center	Mounting Class	Fork Section	Fork Length	Weight of single fork
Q	BP	ISO	AxE	L	W
Kg	mm	2328	mm	mm	Kg
3000	500	2A	120x40	2000	85
				2100	88
				2200	92
				2300	96
				2400	100
2500	500	2A	130x35	1000	49
				1100	53
				1200	55
				1300	59
				1400	62
				1500	66

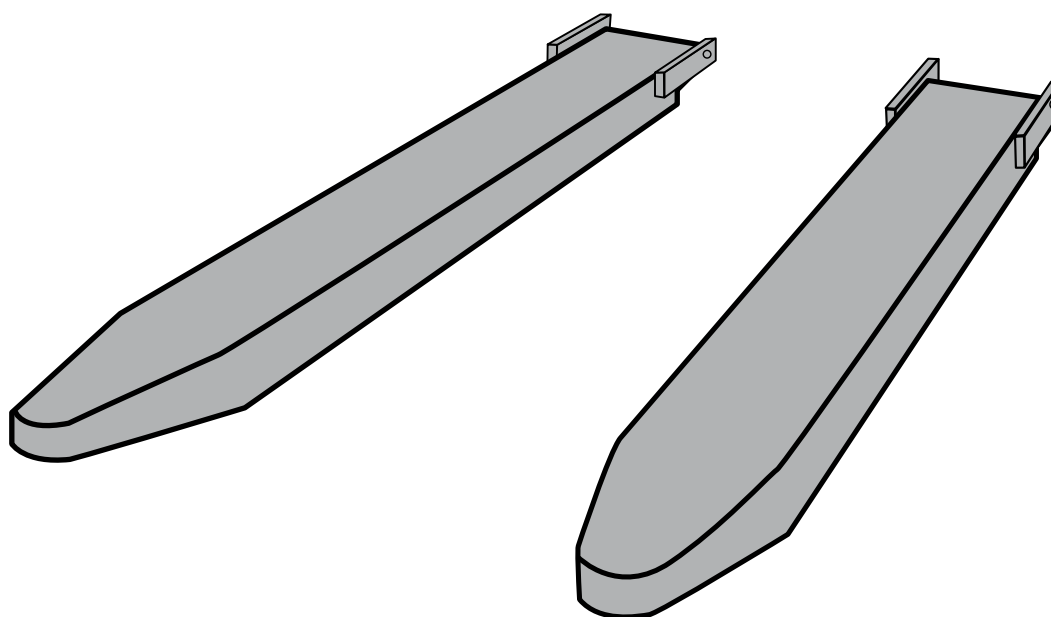
Capacity of fork couple	Load Center	Mounting Class	Fork Section	Fork Length	Weight of single fork
Q	BP	ISO	AxE	L	W
Kg	mm	2328	mm	mm	Kg
3200	500	3A	100x45	800	47
				900	51
				1000	53
				1100	56
				1200	59
				1300	62
				1400	66
				1500	69
				1600	73
				1700	76
				1800	78
				1900	82
				2000	85
				2100	89
2200	92				
2300	96				
2400	99				
4400	500	3A	120x50	800	62
				900	67
				1000	70
				1100	75
				1200	78
				1300	83
				1400	87
				1500	92
				1600	97
				1700	102
				1800	104
				1900	109
				2000	113
				2100	118
2200	123				
2300	127				
2400	132				
4200	500	3A	125x45	1000	64
				1100	69
				1200	72
				1300	76
				1400	80
				1500	85
				1600	89
1700	93				

Capacity of fork couple	Load Center	Mounting Class	Fork Section	Fork Length	Weight of single fork
Q	BP	ISO	AxE	L	W
Kg	mm	2328	mm	mm	Kg
4200	500	3A	125x45	1800	96
				1900	100
				2000	104
				2100	109
				2200	113
				2300	118
				2400	122
5000	500	3A	130x60	1000	90
				1100	96
				1200	100
				1300	106
				1400	112
				1500	119
3000	500	3A	150x35	1000	62
				1100	66
				1200	69
				1300	73
				1400	77
				1500	81
5800	500	3A	150x50	1000	83
				1100	89
				1200	93
				1300	99
				1400	105
				1500	111
				1600	117
				1700	123
				1800	126
				1900	132
				2000	137
				2100	143
				2200	149
				2300	155
2400	161				

Capacity of fork couple Q Kg	Load Center BP mm	Mounting Class ISO 2328	Fork Section AxE mm	Fork Length L mm	Weight of single fork W Kg
7000	600	4A	150x60	1200	125
				1300	132
				1400	139
				1500	146
				1600	153
				1700	160
				1800	163
				1900	170
				2000	177
				2100	184
				2200	191
				2300	198
2400	205				
7000	600	4A	200x50	1200	141
				1300	148
				1400	156
				1500	164
				1600	172
				1700	180
				1800	184
				1900	192
				2000	199
				2100	207
				2200	215
				2300	223
2400	230				
8000	600	4A	200x60	1200	168
				1300	177
				1400	186
				1500	196
				1600	205
				1700	214
				1800	219
				1900	228
				2000	238
				2100	247
				2200	256
				2300	266
2400	275				
12000	600	4A	200x70	1200	196
				1300	207

Capacity of fork couple	Load Center	Mounting Class	Fork Section	Fork Length	Weight of single fork
Q	BP	ISO	AxE	L	W
Kg	mm	2328	mm	mm	Kg
12000	600	4A	200x70	1400	218
				1500	228
				1600	240
				1700	251
				1800	256
				1900	267
				2000	278
				2100	289
				2200	300
				2300	311
				2400	322

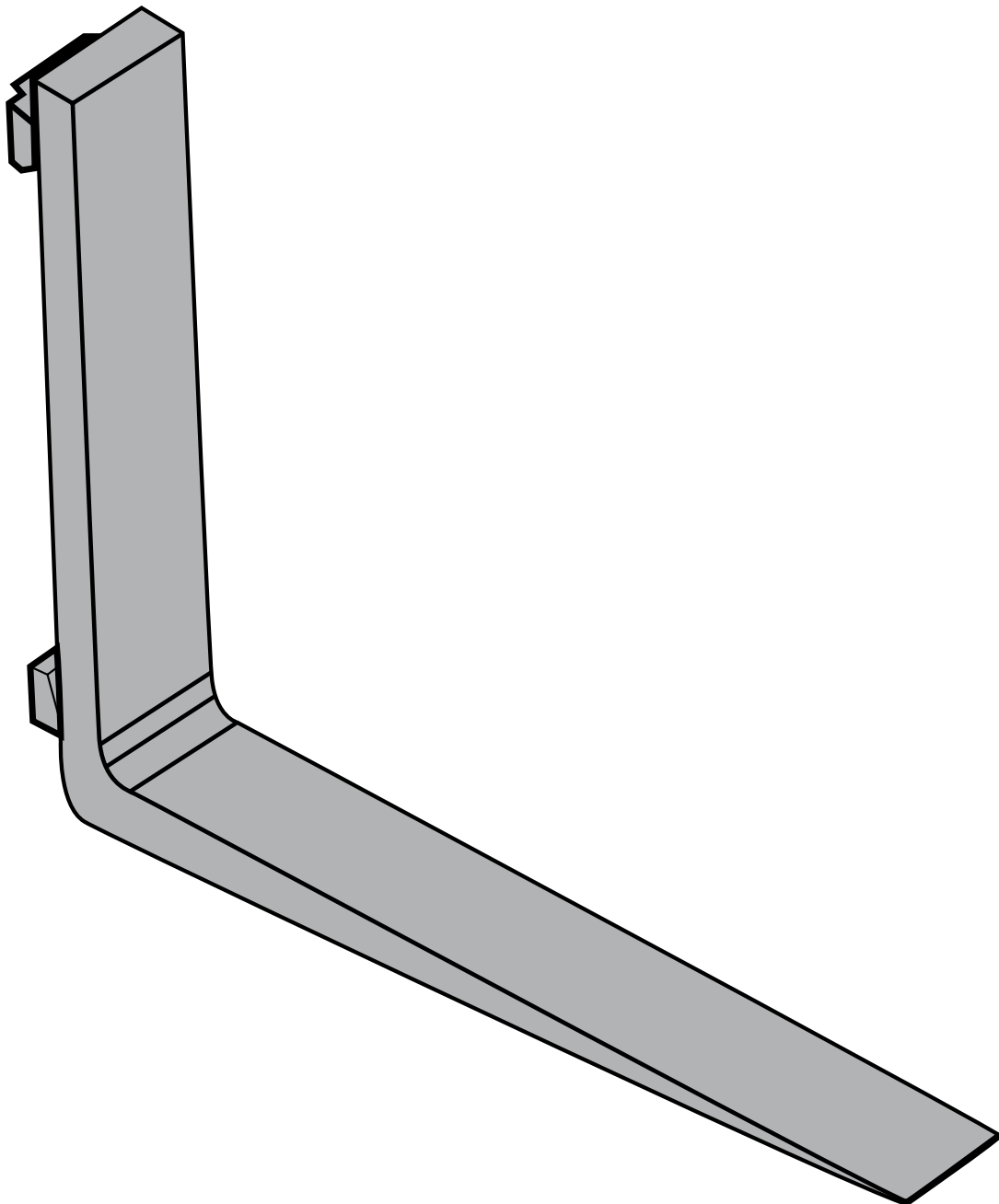
Fork extensions are used on the original lift truck forks for picking up or depositing pallets in positions where the normal forks are too short to reach.



Model	Length	Fork Section	Weight	Mounting
	L	AxE	W	Class
	mm	mm	Kg	ISO-2328
DXX2F8M	1500	100x35	44	1
DXX3F8M	1500	100x40	47	2
DXX4F8M	1500	100x40	53	2
DXX5F1M	2000	100x45	74	3
DXX6F1M	2000	100x50	112	3
DXX7F1M	2000	100x60	137	4

Tips and Tapers

03



Chapter Description

Page

Tips

page 20

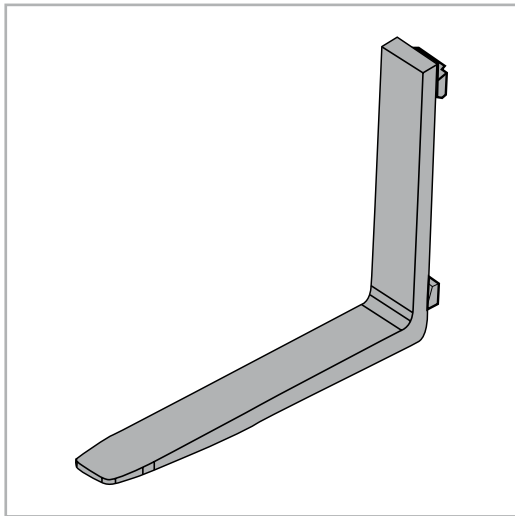
Tapers

page 21

03

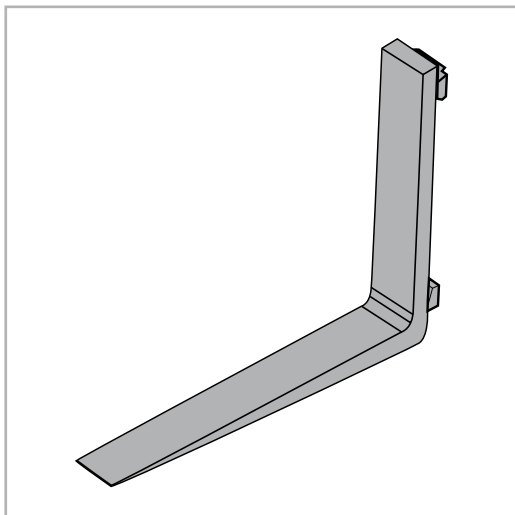


Fork tips are suitable to make the insertion into loads easier.

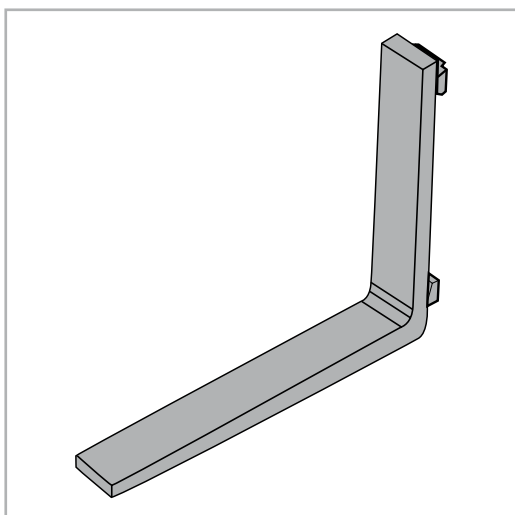


Standard tip

03



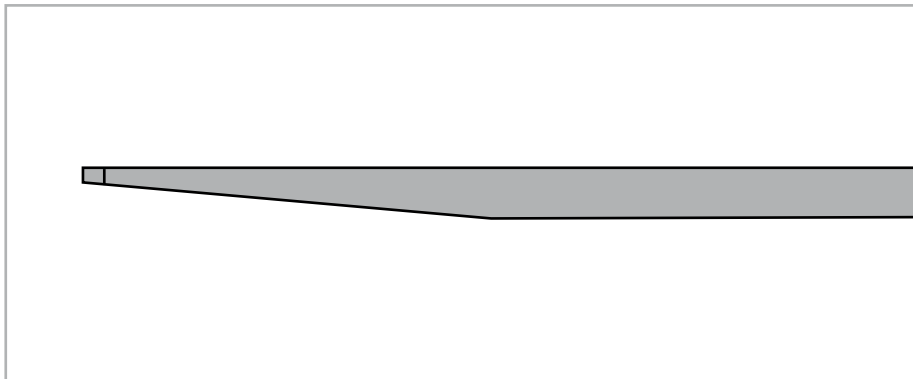
Square tip with reduced thickness
for easier penetration into loads



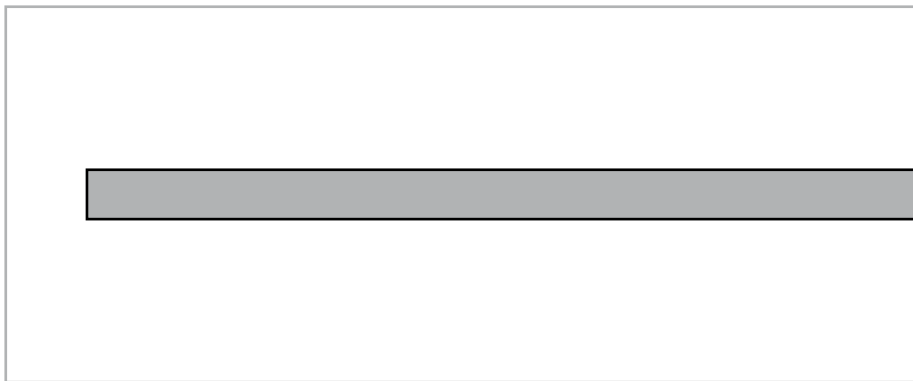
Square tip for special applications

For any further tip versions, please consult Bolzoni Auramo, providing specifications and drawings.

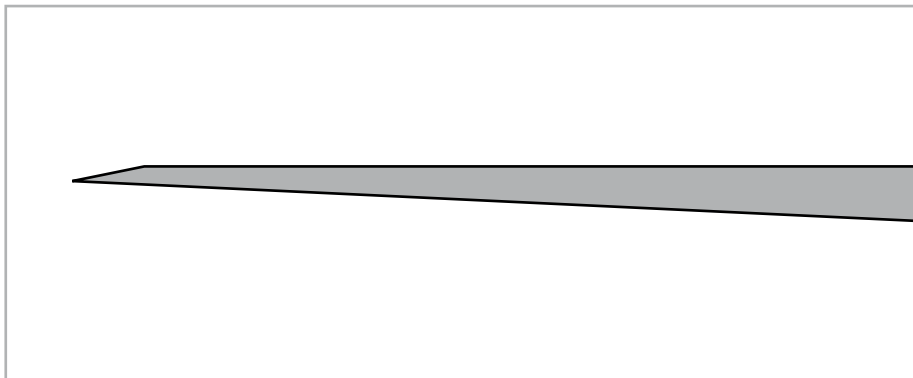
Fork tapers are suitable to make fork use easier when forks are loaded.



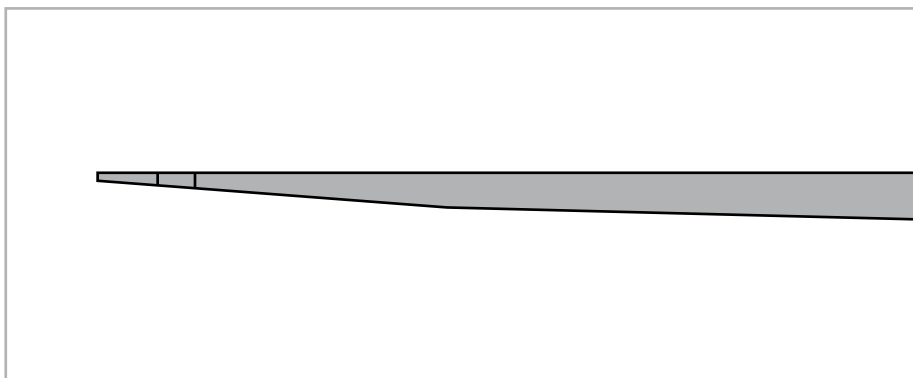
Standard taper,
no bevel



No taper



Full taper with top bevel

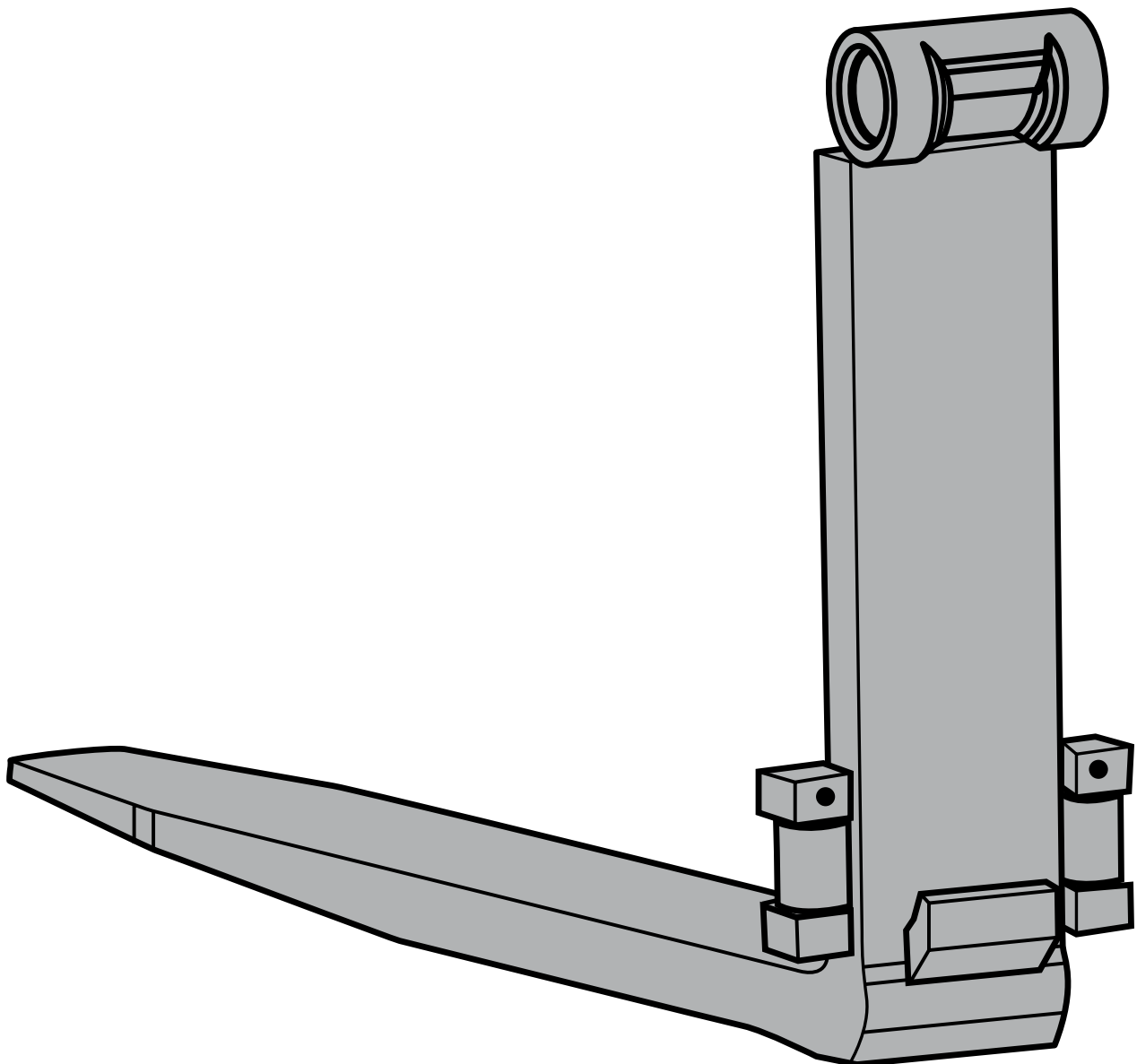


Two stage taper

For any further taper versions, please consult Bolzoni Auramo, providing specifications and drawings.

Special Application Forks

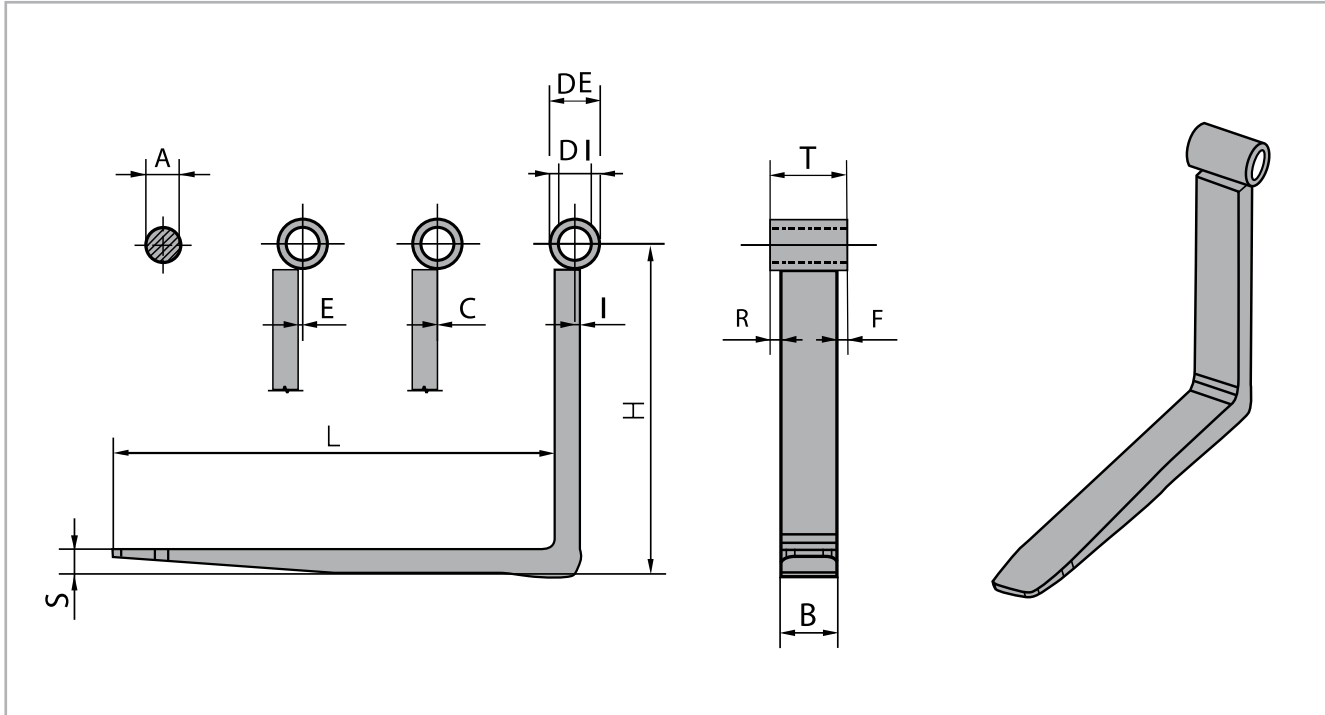
04



Chapter Description	Page
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Pin-Type Forks with lower hooks	page 25
Pin-Type Forks for Bolzoni Auramo fork positioners FP-FN Series	page 26
Pin-Type Forks with lower hook sliding on rollers for Bolzoni Auramo fork positioners FP-FN Series	page 27
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Bolt-on Forks	page 36
Blank Forks	page 37
Terminal West Forks	page 38
Peek-A-Boo Forks	page 39
Lumber Forks	page 40

For any further fork versions, please consult Bolzoni Auramo, providing specifications and drawings.

Pin-type forks are guided on a shaft. Mainly used on larger lift trucks and on industrial and construction machines.

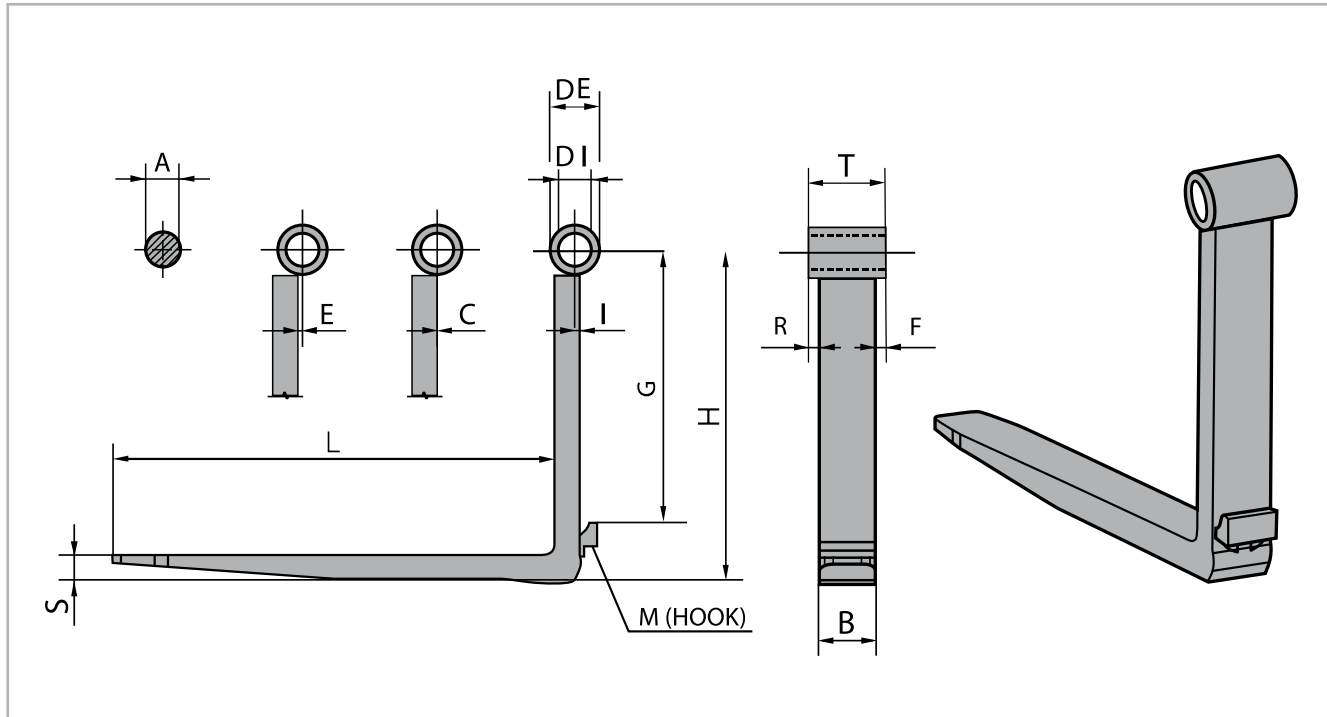


04

Customer reference
Company:
Address:
Phone-office:
Fax:
Mobile:
E-mail address:
Contact:
Other info:

Technical Data		
Length (L)	mm	
Width (W)	mm	
Thickness (S)	mm	
Back height (H)	mm	
Tube width (T)	mm	
Tube int. diameter (DI)	mm	
Tube ext. diameter (DE)	mm	
Bar pin diameter (A)	mm	
Tube inset (I)	mm	
Tube offset (E)	mm	
Tube inline (C)	mm	
Tube position right (R)	mm	
Tube position left (F)	mm	

Pin-type forks are guided on a shaft. Mainly used on larger lift trucks and on industrial and construction machines, this model is suitable for Bolzoni Auramo fork positioner FP-FN series.



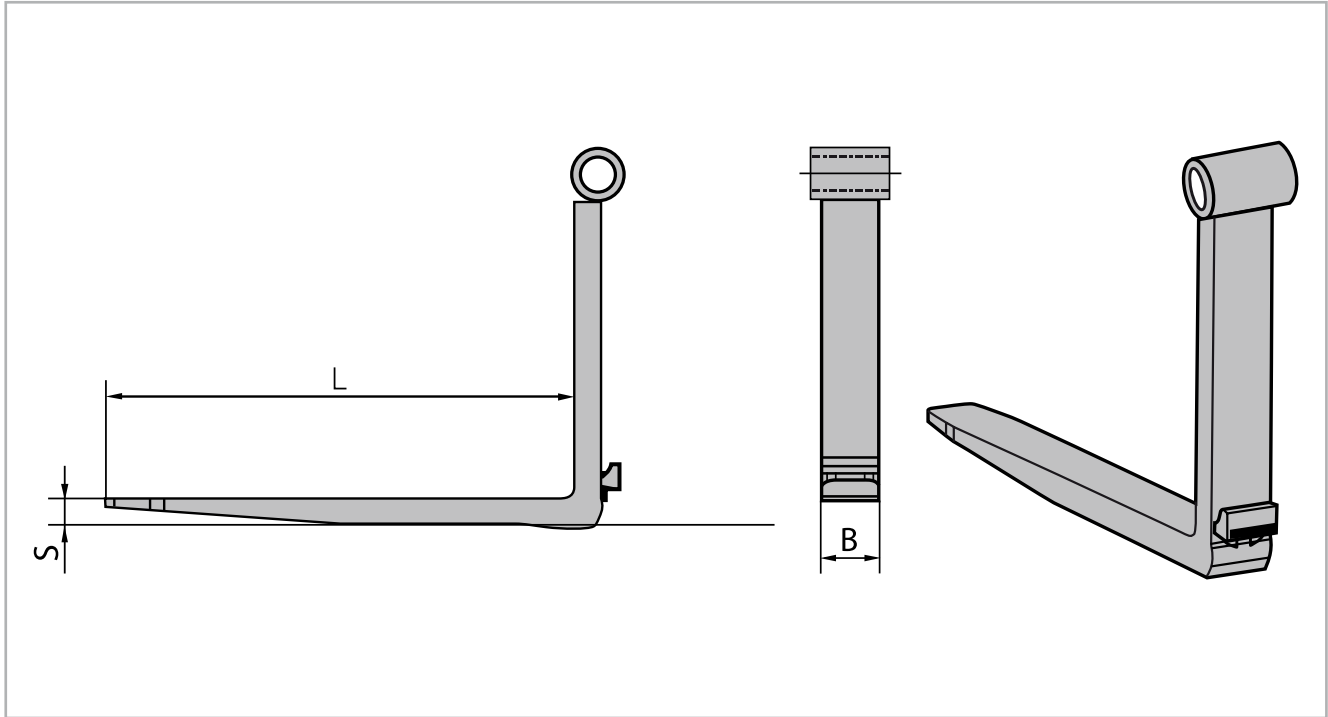
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Other info:

Technical Data		
Length (L)	mm	
Width (W)	mm	
Thickness (S)	mm	
Back height (H)	mm	
Lower hook position (G)	mm	
Tube width (T)	mm	
Tube int. diameter (DI)	mm	
Tube ext. diameter (DE)	mm	
Bar pin diameter (A)	mm	
Tube inset (I)	mm	
Tube offset (E)	mm	
Tube inline (C)	mm	
Tube position right (R)	mm	
Tube position left (F)	mm	
ISO 2328 hook type (M)	mm	

Pin-Type Forks with lower hook for Bolzoni Auramo fork positioners FP-FN Series

Pin-type forks are guided on a shaft. Mainly used on larger lift trucks and on industrial and construction machines, this model is suitable for Bolzoni Auramo fork positioner FP-FN series.



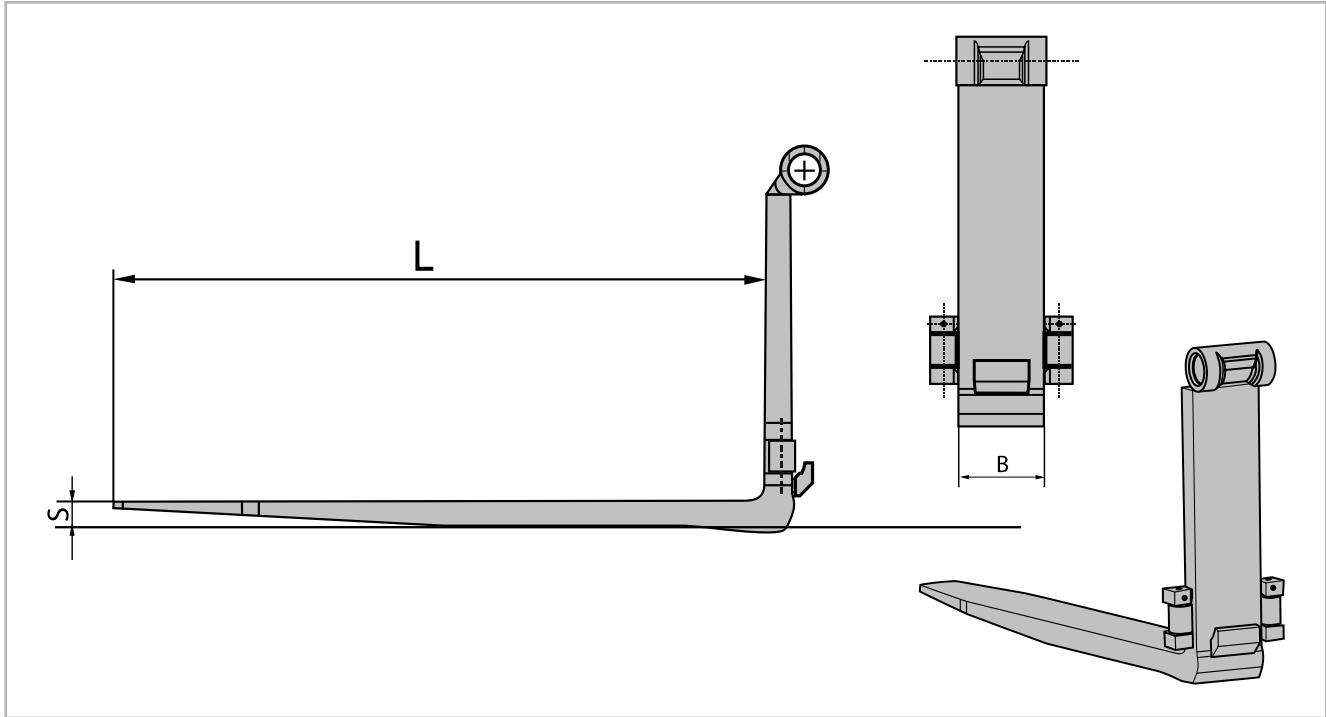
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Other info:

Technical Data		
Length (L)	mm	
Width (B)	mm	
Thickness (S)	mm	
ISO 2328 Class		

Pin-Type forks with lower hook sliding on rollers for Bolzoni Auramo fork positioners FP-FN Series

Pin-type forks are guided on a shaft. Mainly used on larger lift trucks and on industrial and construction machines, this model is suitable for Bolzoni Auramo fork positioner FP-FN series.

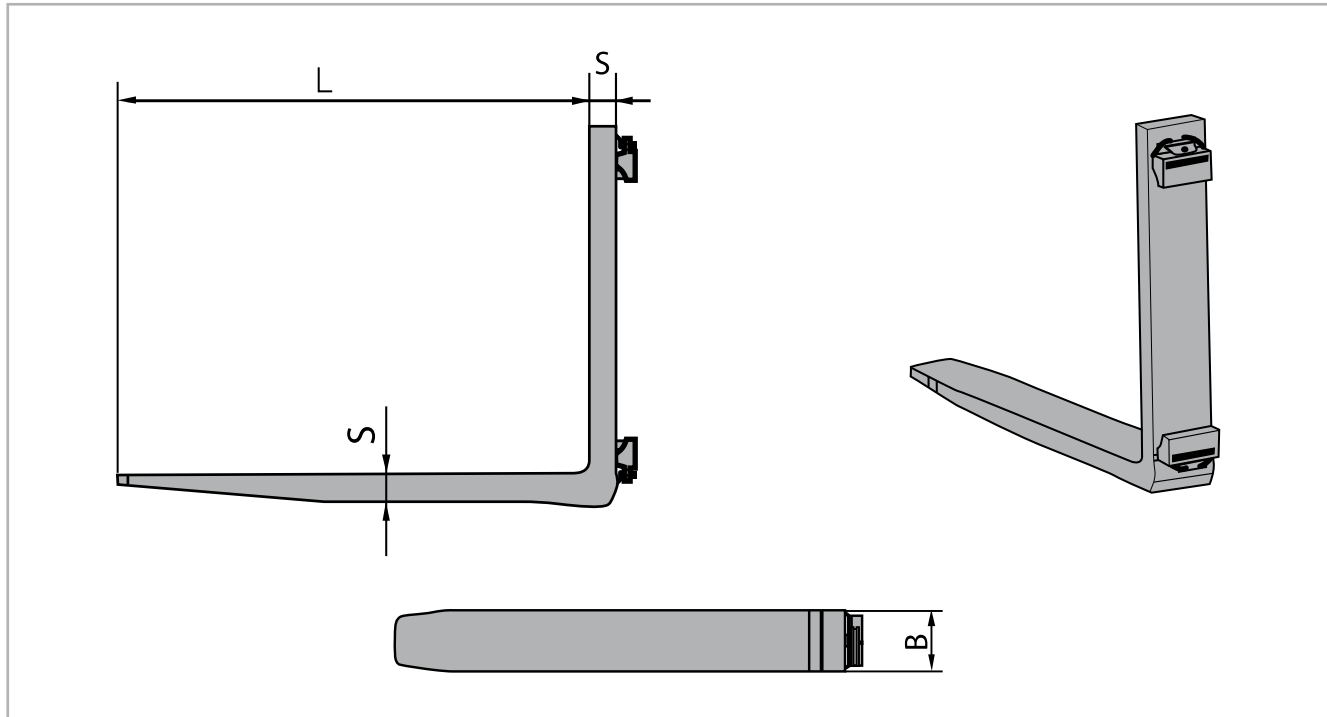


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E-mail address:
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Other info:

Technical Data		
Length (L)	mm	
Width (B)	mm	
Thickness (S)	mm	
ISO 2328 Class		

Forks with load-bearing lower hook are used with a rotator for container rotating or emptying.

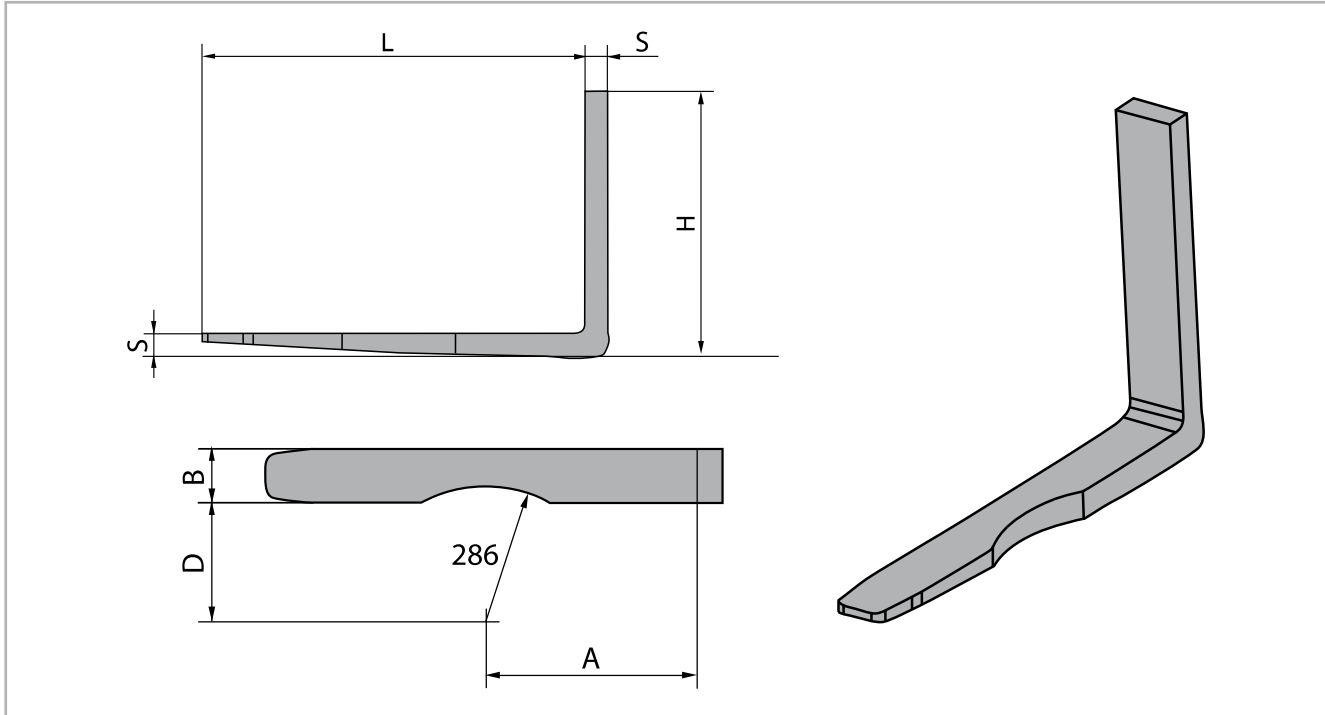


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E-mail address:
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Other info:

Technical Data		
Length (L)	mm	
Width (B)	mm	
Thickness (S)	mm	
ISO 2328 Class		

Drum handling forks are used for lifting one or two drums at one time.

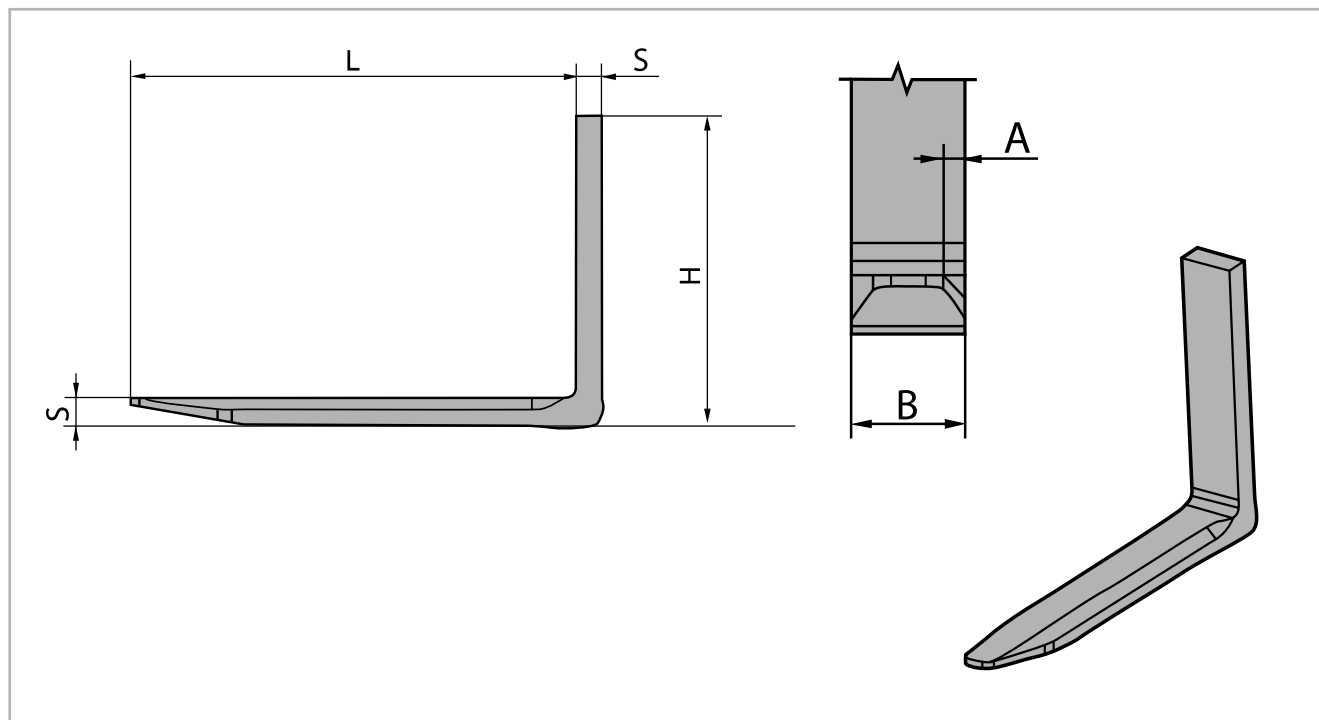


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Customer reference
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Phone-office:
Fax:
Mobile:
E-mail address:
Contact:
Other info:

Technical Data		
Length (L)	mm	
Width (B)	mm	
Thickness (S)	mm	
Back height (H)	mm	
Drum position in depth (A)	mm	
Drum inset in the fork blade (D)	mm	

Coil handling forks are used to handle steel coils, reels etc

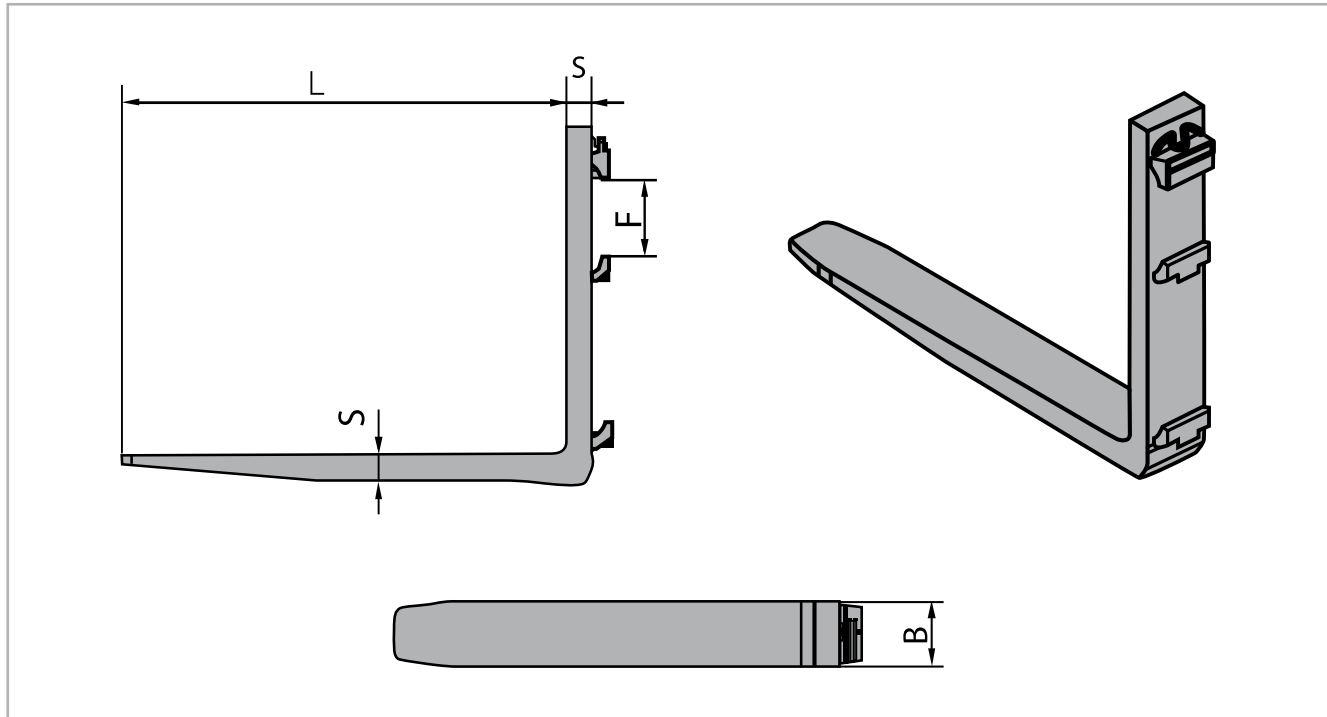


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Mobile:
E-mail address:
Contact:
Other info:

Technical Data		
Length (L)	mm	
Width (B)	mm	
Thickness (S)	mm	
Back Height (H)	mm	
Chamfer depth 45 degree (A)	mm	

Forks with 3rd hook are used with a rotator for container rotating or emptying.

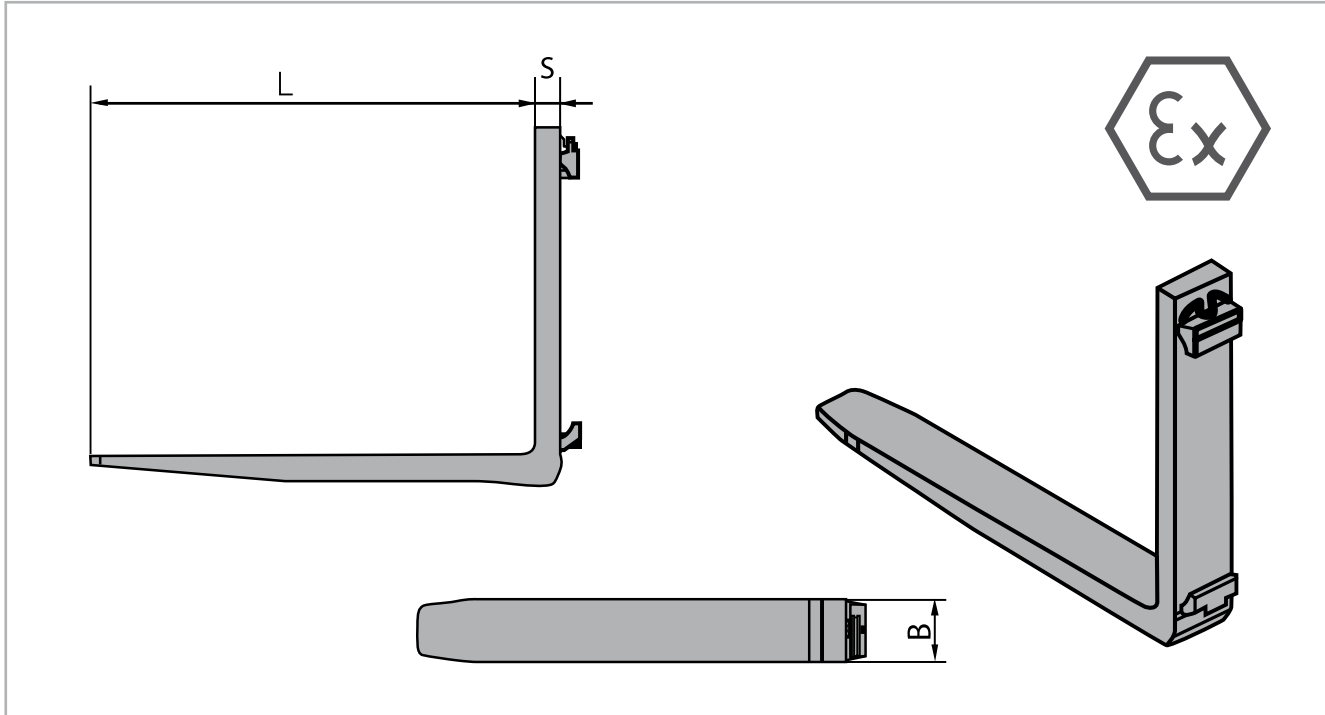


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Phone-office:
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E-mail address:
Contact:
Other info:

Technical Data		
Length (L)	mm	
Width (B)	mm	
Thickness (S)	mm	
Third hook (F)	mm	
ISO 2328 Class		

Forks with explosion proof stainless steel cladding are used on lift trucks operating in dangerous environments that must be kept spark free such as chemical and painting plants, weapons and munitions manufacturing plants, mines etc.. Fixed cladding of fork blade and / or fork shank. Stainless steel coating 2 mm.

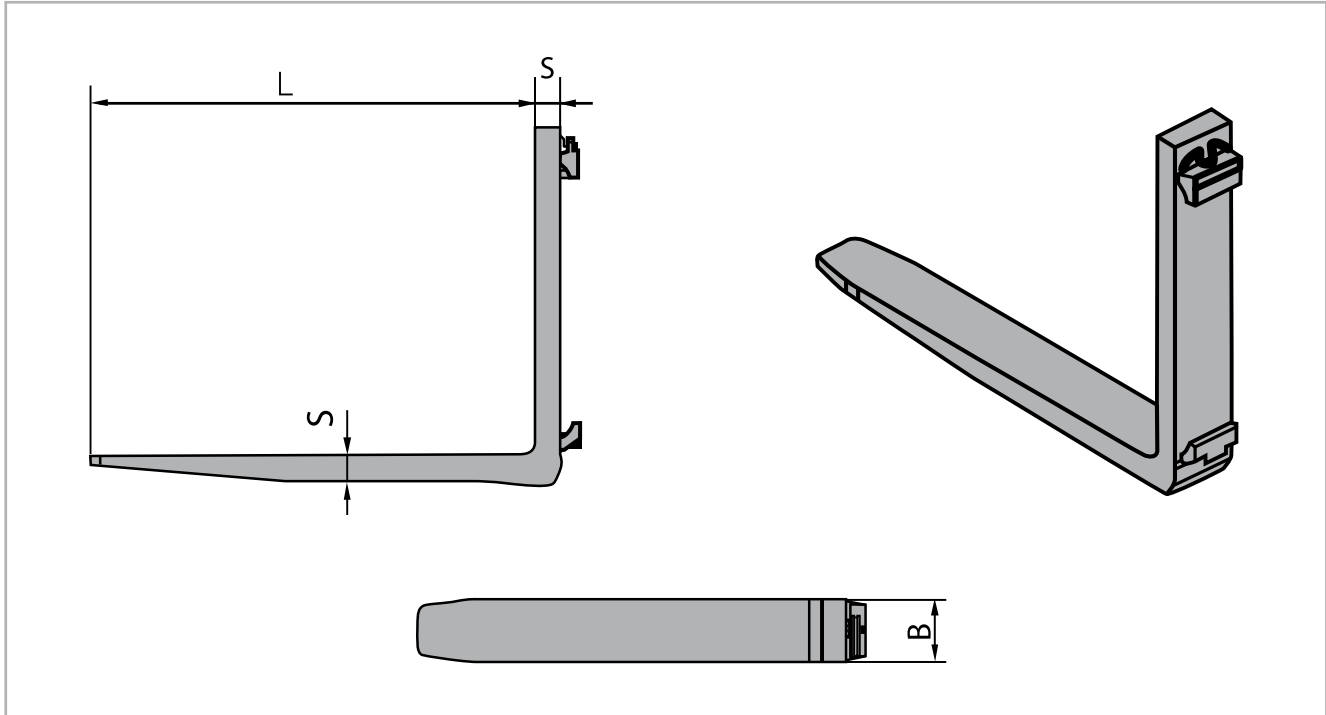


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Fax:
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E-mail address:
Contact:
Other info:

Technical Data		
Length (L)	mm	
Width (B)	mm	
Thickness (S)	mm	
ISO 2328 Class		

Forks with stainless steel cladding for food industry are used on lift trucks for applications requiring sanitary wash down for constant cleanliness typical in food and pharmaceutical industries. Fixed cladding of fork blade and / or fork shank. Stainless steel coating 2 mm.

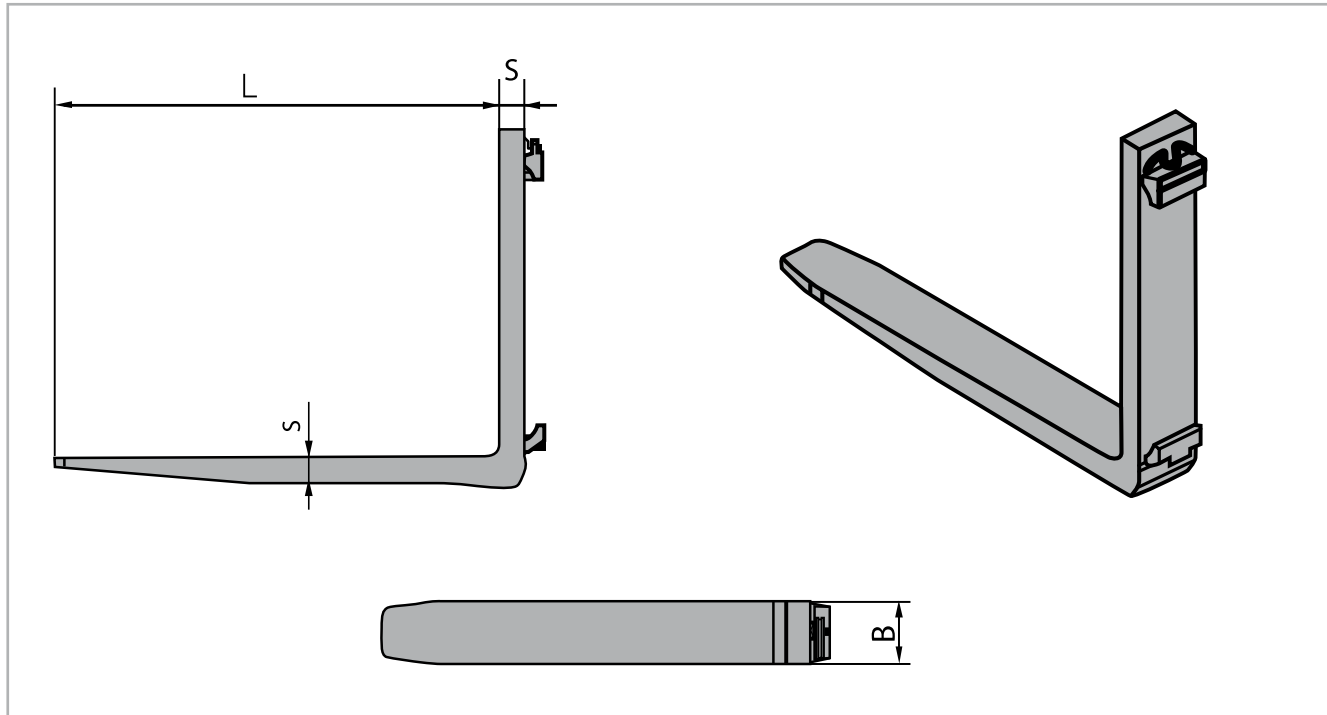


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Customer reference
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Address:
Phone-office:
Fax:
Mobile:
E-mail address:
Contact:
Other info:

Technical Data		
Length (L)	mm	
Width (B)	mm	
Thickness (S)	mm	
ISO 2328 Class		

Forks having the top of the blade polished to reduce friction when handling a load.

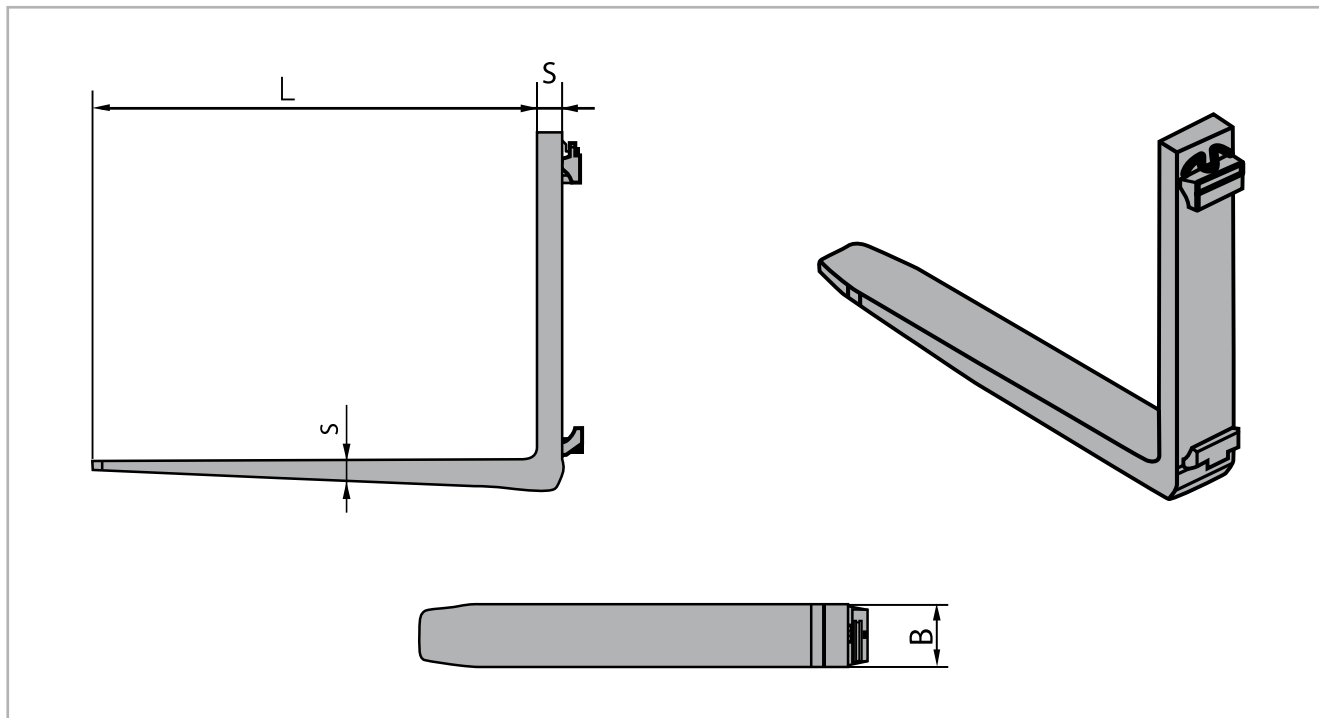


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Customer reference
Company:
Address:
Phone-office:
Fax:
Mobile:
E-mail address:
Contact:
Other info:

Technical Data		
Length (L)	mm	
Width (B)	mm	
Thickness (S)	mm	
ISO 2328 Class		

Forks having the top of the blade polished to reduce friction when handling a load, and full bottom taper for easier insertion into a load.

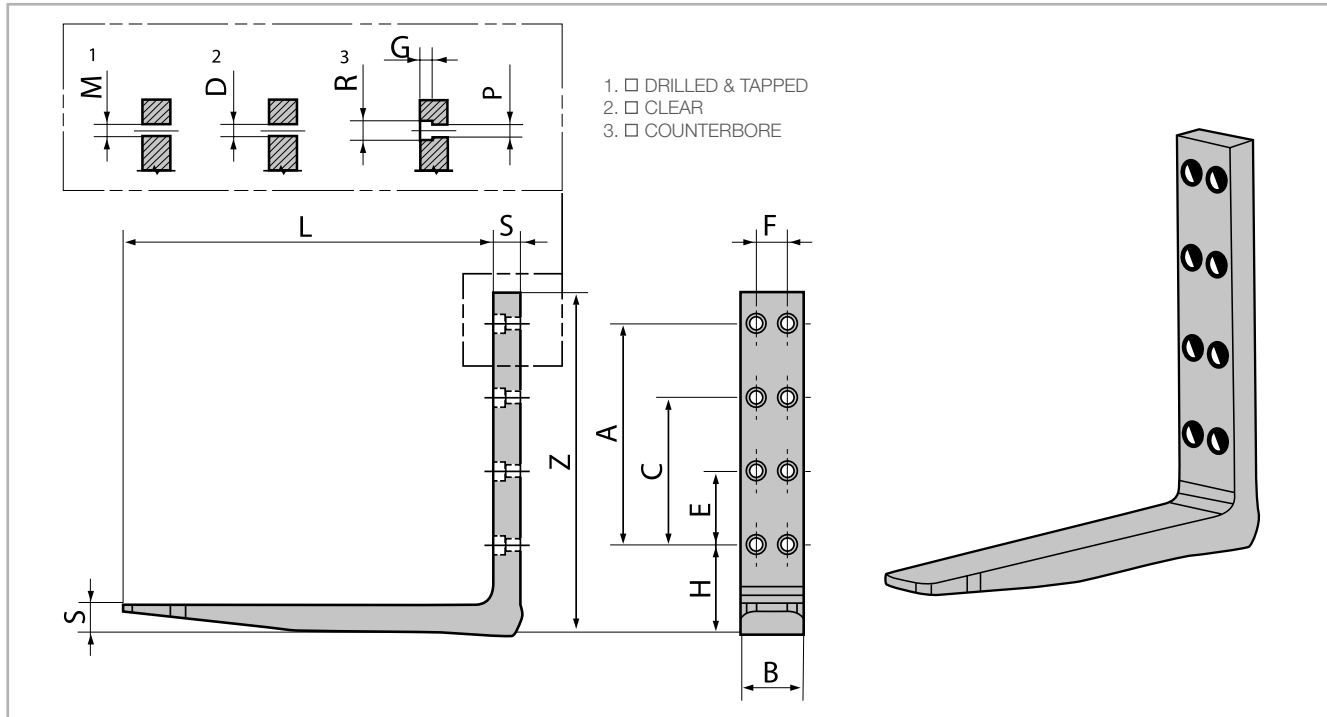


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Customer reference
Company:
Address:
Phone-office:
Fax:
Mobile:
E-mail address:
Contact:
Other info:

Technical Data		
Length (L)	mm	
Width (B)	mm	
Thickness (S)	mm	
ISO 2328 Class		

Bolt-on forks are fixed to the lift truck carriage/fork carrier with bolts.

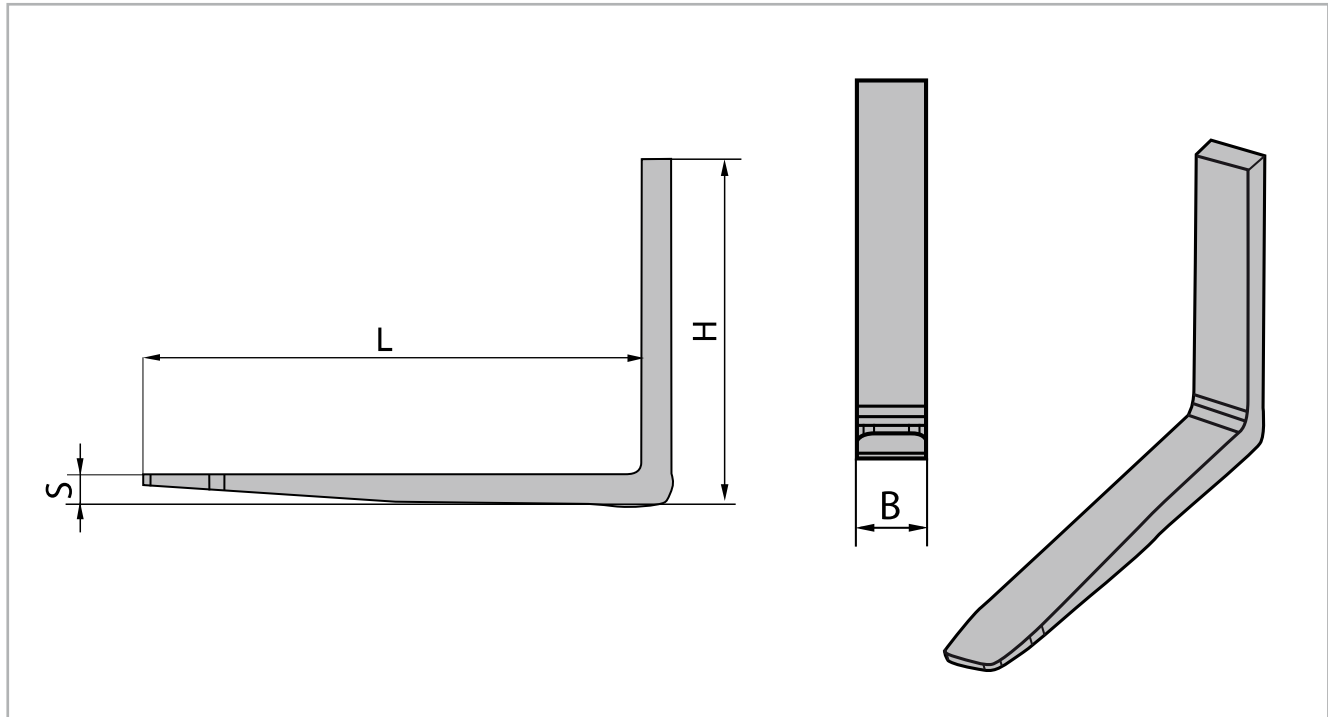


04

Customer reference
Company:
Address:
Phone-office:
Fax:
Mobile:
E-mail address:
Contact:
Other info:

Technical Data		
Length (L)	mm	
Width (B)	mm	
Thickness (S)	mm	
Back height (Z)	mm	
Drilling height (H)	mm	
Drilling height (E)	mm	
Drilling height (C)	mm	
Drilling height (A)	mm	
Drilling c/c position (F)	mm	
Thread (M)	mm	
Drilling diameter (D)	mm	
Head diameter (R)	mm	
Head height (G)	mm	
Drilling diameter (P)	mm	

Blank forks are without hooks. Welded or bolt-on, they are used on clamping or fork positioning attachment or for special mounting applications.

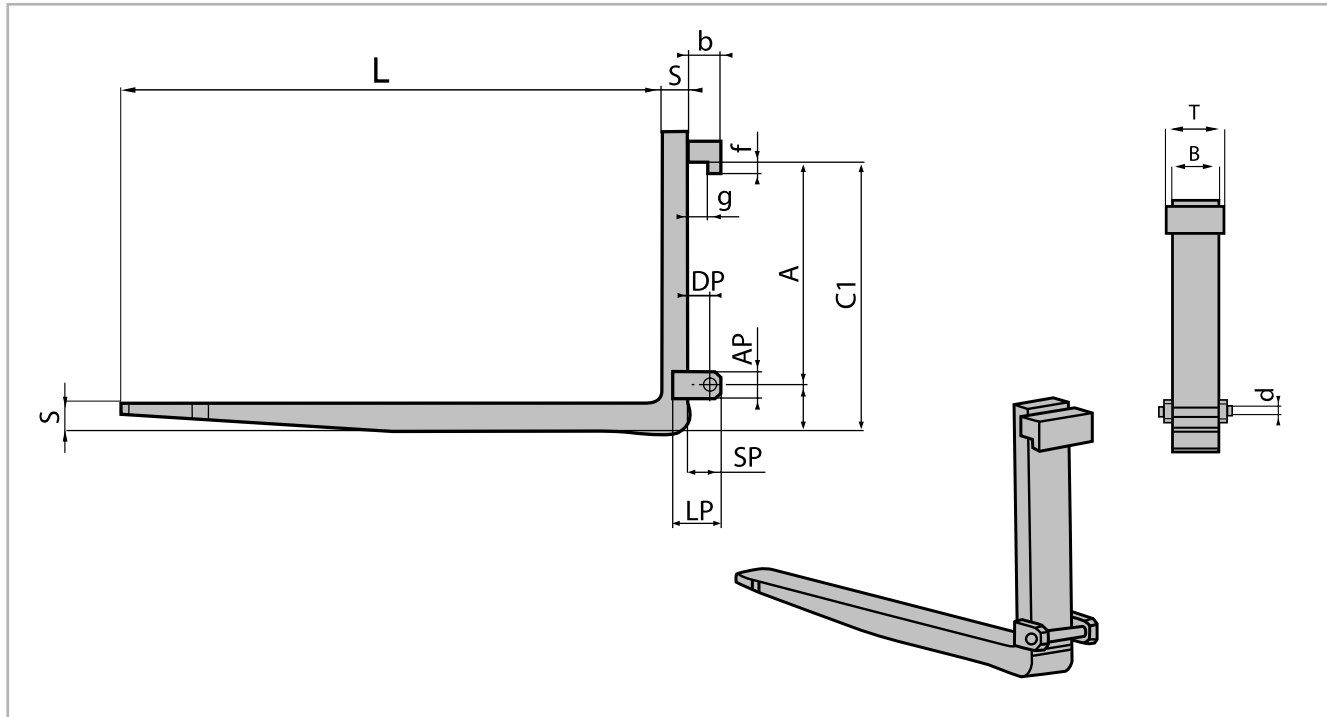


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Customer reference
Company:
Address:
Phone-office:
Fax:
Mobile:
E-mail address:
Contact:
Other info:

Technical Data		
Length (L)	mm	
Width (B)	mm	
Thickness (S)	mm	
Back height (H)	mm	

Terminal West forks are suitable for quick interchangeability between forks and attachments. The system allows the driver to change forks quickly on his own during a shift without any additional equipment.

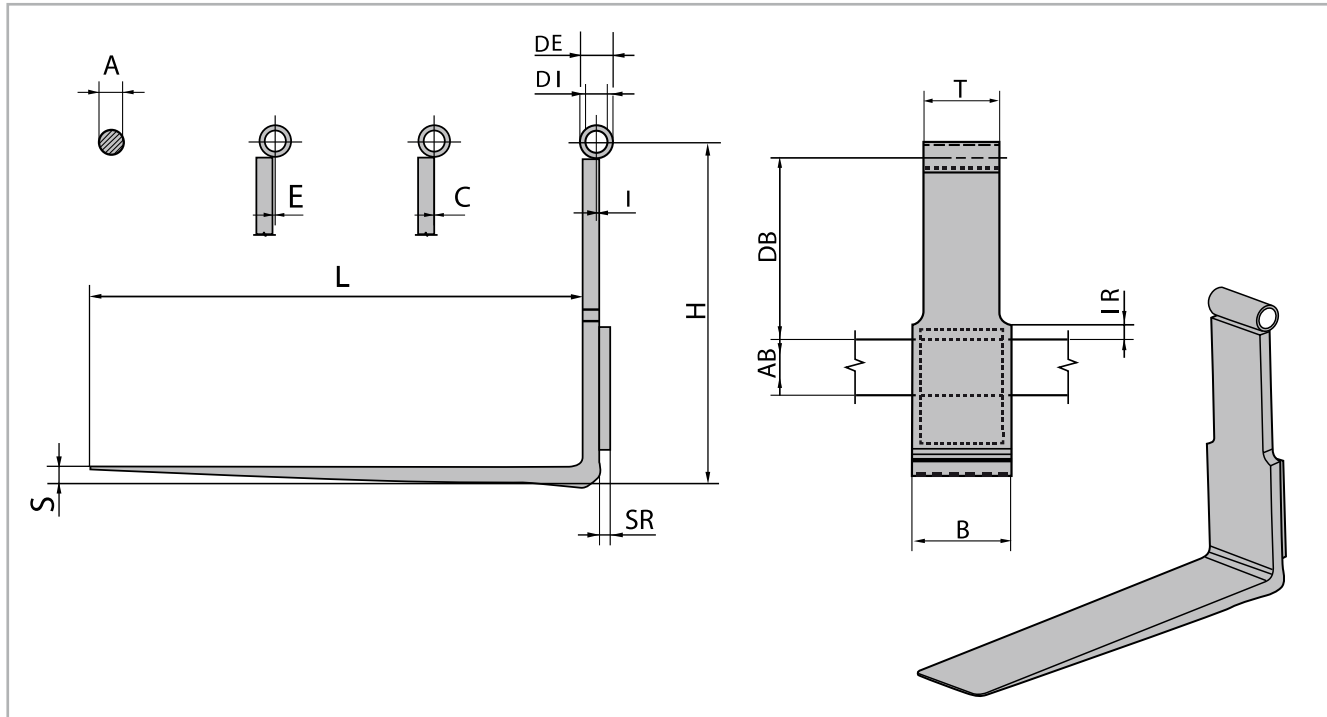


04

Customer reference
Company:
Address:
Phone-office:
Fax:
Mobile:
E-mail address:
Contact:
Other info:

Technical Data		
Length (L)	mm	
Width (B)	mm	
Thickness (S)	mm	
Hook width (T)	mm	
Upper hook thickness (b)	mm	
Hook height from ground (C1)	mm	
Hook and pin distance (A)	mm	
Tooth height (f)	mm	
Tooth width (g)	mm	
Plate height (AP)	mm	
Plate length (LP)	mm	
Plate overhang (SP)	mm	
Pin diameter (d)	mm	
Pin distance (DP)	mm	

Peek-A-Boo forks are mainly used in lumber industry and are specifically designed for increasing the truck driver visibility.

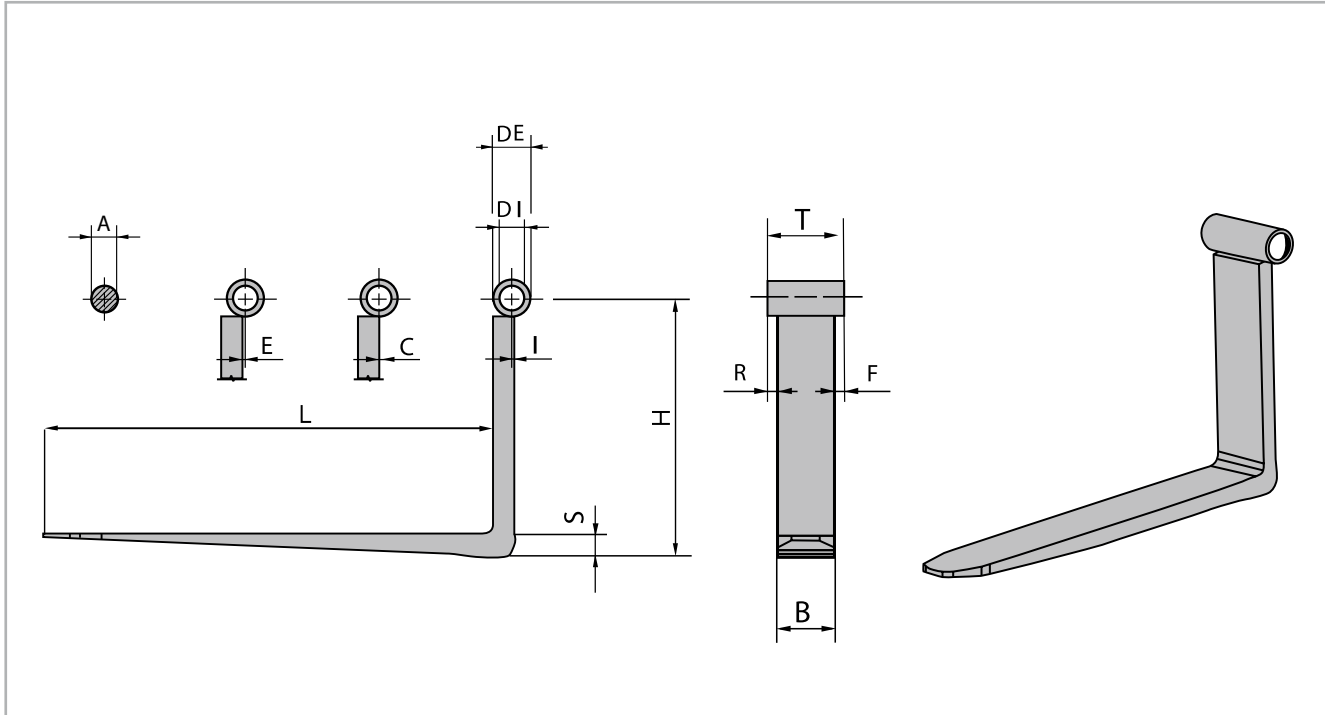


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Customer reference
Company:
Address:
Phone-office:
Fax:
Mobile:
E-mail address:
Contact:
Other info:

Technical Data		
Length (L)	mm	
Width (B)	mm	
Thickness (S)	mm	
Back height (H)	mm	
Tube width (T)	mm	
Tube int. diameter (DI)	mm	
Tube ext. diameter (DE)	mm	
Bar pin diameter (A)	mm	
Tube inset (I)	mm	
Tube offset (E)	mm	
Tube inline (C)	mm	
Thickness reinforcement (SR)	mm	
Bar height (AB)	mm	
Bar distance (DB)	mm	
Tapering starting point (IR)	mm	

Lumber forks are suitable for handling in lumber industry thanks to wide and thin horizontal blade.

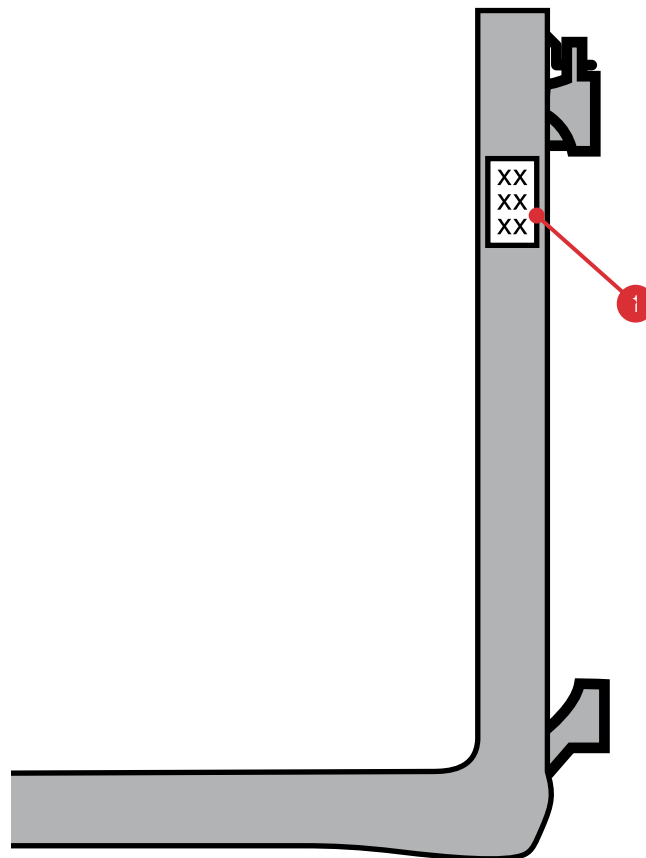


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Customer reference
Company:
Address:
Phone-office:
Fax:
Mobile:
E-mail address:
Contact:
Other info:

Technical Data		
Length (L)	mm	
Width (B)	mm	
Thickness (S)	mm	
Back height (H)	mm	
Tube width (T)	mm	
Tube int. diameter (DI)	mm	
Tube ext. diameter (DE)	mm	
Bar pin diameter (A)	mm	
Tube inset (I)	mm	
Tube offset (E)	mm	
Tube inline (C)	mm	
Tube position right (R)	mm	
Tube position left (F)	mm	

Marking/Stamping

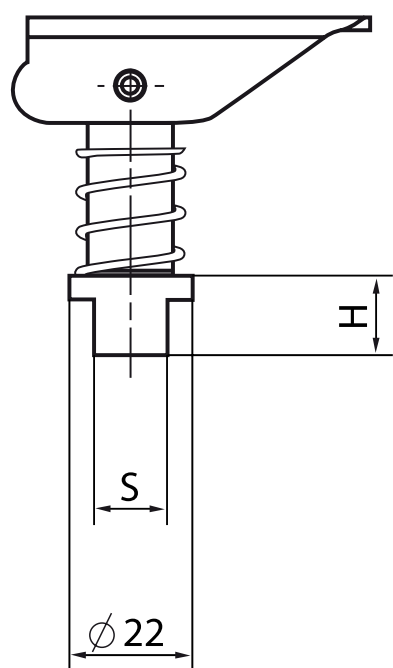


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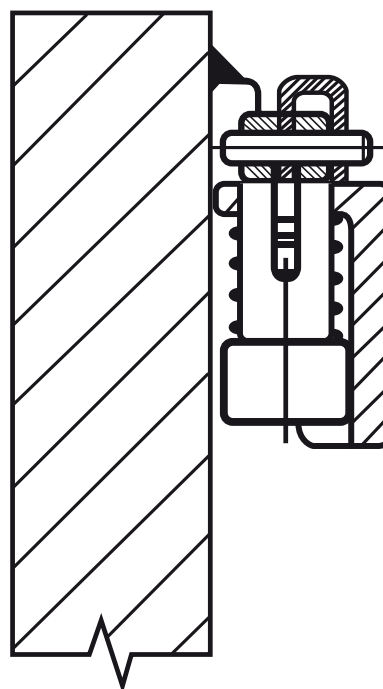
- 1 The following features are written on one side of the fork shank:
- Capacity
 - Load center
 - Manufacturer
 - Year
 - Month
 - Day

According to ISO 2330, forks have to be permanently marked, in order to allow their identification. If marking is not clearly legible, forks shall be withdrawn from service.

Hook Pin Kits



Kit assembly



Kit fit on fork

06

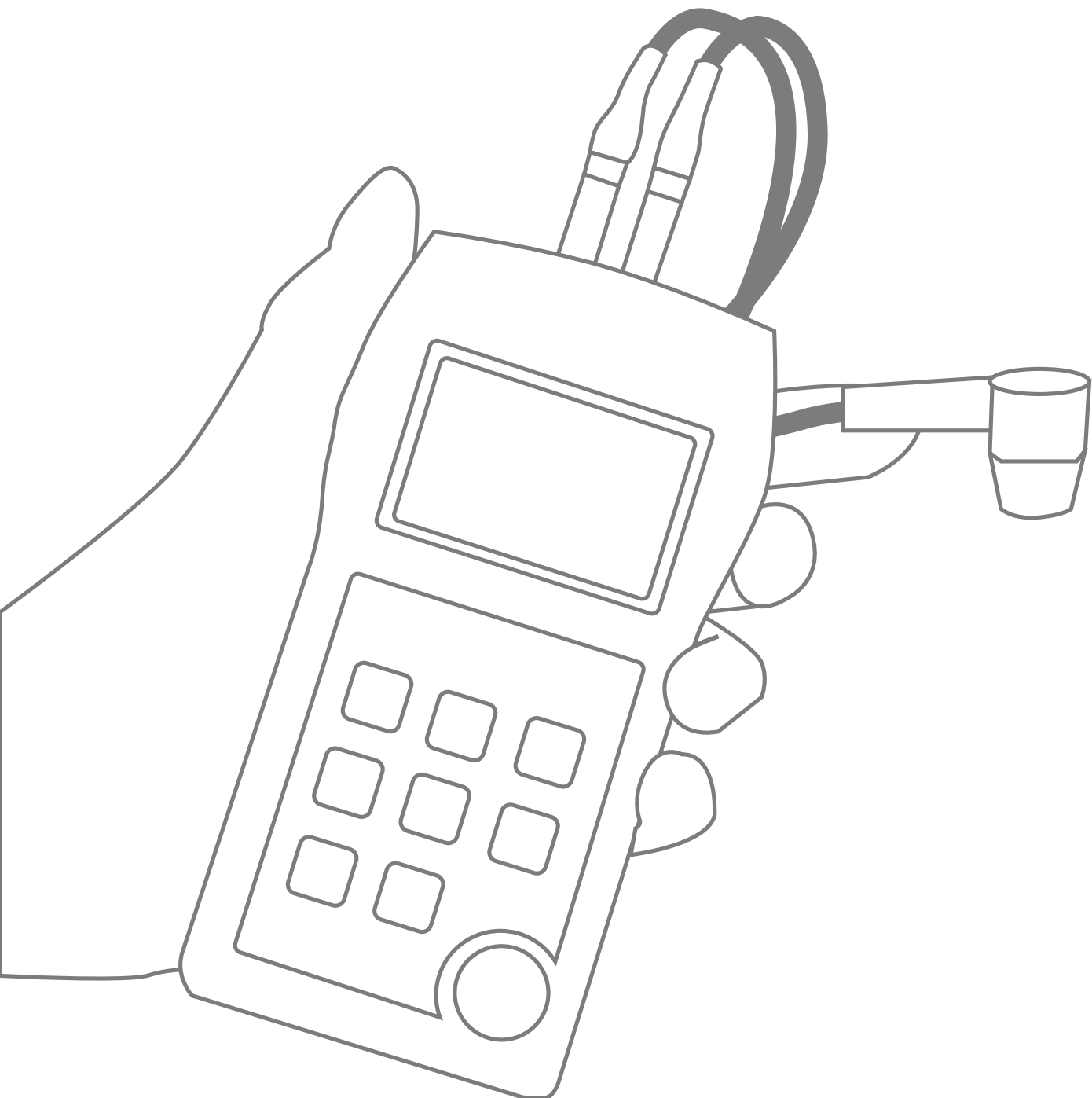
Hook pin is a mandatory locking device which prevents the fork from sliding off the carriage.

It is supplied as a kit, including the following components:

- n. 1 pin
- n. 1 lever
- n. 1 spring pin
- n. 1 spring

When ordering Pin Kits, please provide all stamping information available on fork shoulder side.

Inspection and maintenance



07

Chapter Description

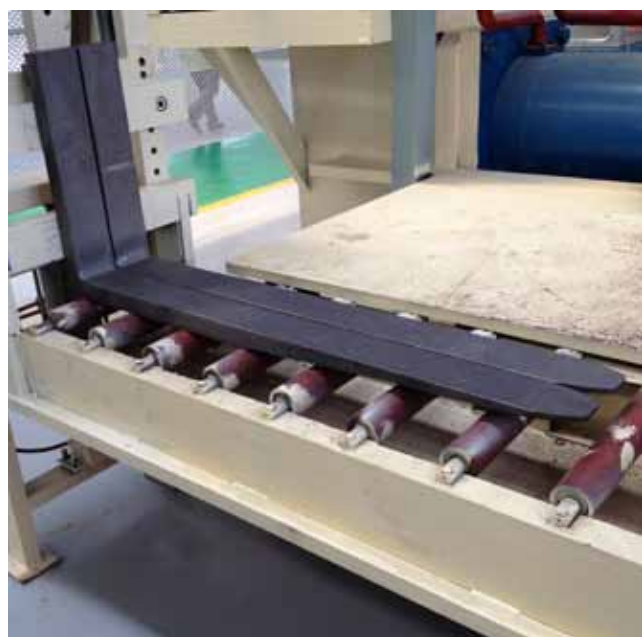
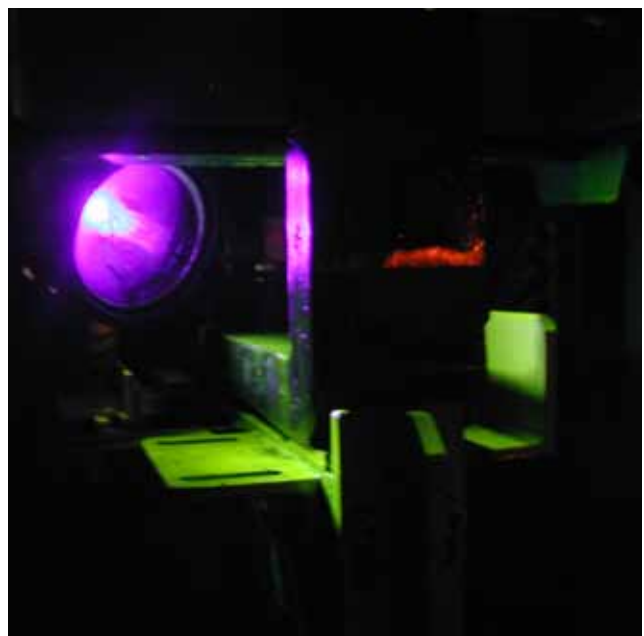
Page

Forks in service on forklift trucks

page 45

Inspection

page 46



General

Fork correct dimensioning and conditions are essential for safe, cost-effective and damage-free pallet handling operations. Therefore, a regular fork inspection system should be put in place to ensure perfect operating conditions. Inspections, repairs or replacements shall be carried out as a pair.

Inspections

Forks in use shall be inspected at intervals of 12 months or less depending on possible severe application, multi-shift operation and fork conditions. Regular inspections should be carried out by trained personnel. In case of detected damage, failures, deformations etc. forks shall be withdrawn from service and not be returned to service unless satisfactorily repaired or rerated.

Cracks

Check visually inner heel and top and bottom hook areas to detect possible cracks. Apply non-destructive crack detection tests if necessary. If surface cracks are detected, forks should be withdrawn from service.

Straightness

Check the straightness of the upper face of the blade and the front face of the shank. If deviation exceeds 0,5% of blade length or shank height, fork shall be withdrawn from service.

Angle

Check the fork upper face of the blade to load face of the shank. If fork has a deviation greater than 3 degrees from original specifications, fork shall be withdrawn from service

Height difference in fork tips

Check a pair of forks mounted on the fork carrier to detect difference in tip heights. If difference in tip heights exceeds 3% of the blade length, the pair of forks shall be withdrawn from service.

Locking devices

Check the fork positioning locking to ensure their normal operation and wear conditions. If any fault is found, fork shall be withdrawn from service.

Marking

Forks shall be marked with the nominal capacity and load center – according to ISO 2330. If marking is not clearly legible, fork shall be withdrawn from service.

Hooks

Check the fork hooks for possible wear, damage and cracks. If clearance between fork and fork carrier is visually excessive, forks shall be withdrawn from service.

Wear

Forks must be checked regularly to ensure the heel thickness is not less than 10% of the original thickness as per ISO 5057. If the fork thickness is less than 10%, the fork must be replaced or rerated.

Repairs and tests

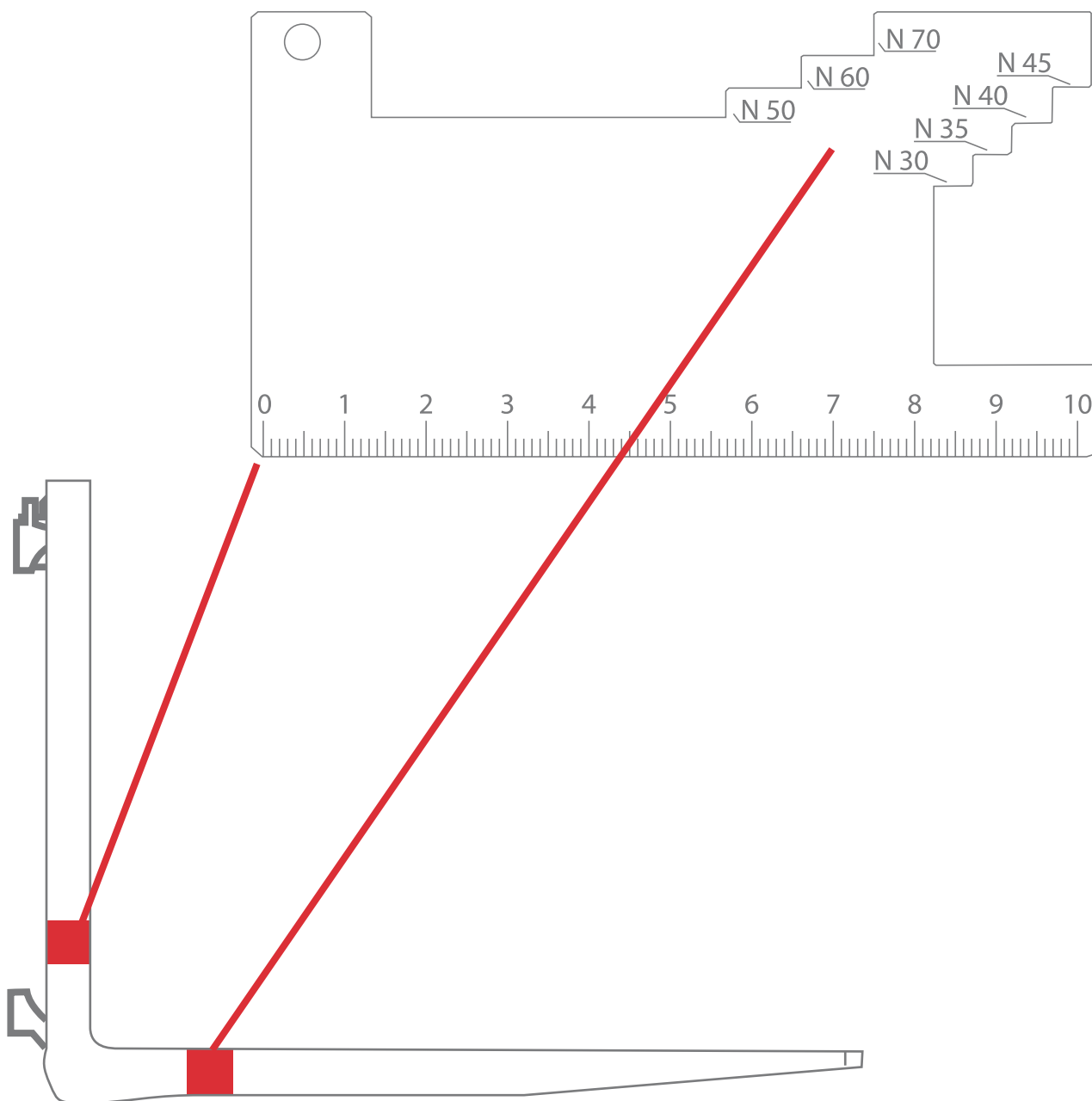
Repairs should be decided or carried out by authorized, expert personnel only, in accordance with recommendations of fork manufacturer. Do not repair surface cracks or wear by welding.

In case of repairs requiring fork re-setting, forks should be subjected to an appropriate heat-treatment.

Fork subjected to repairs different from repairs or replacements of the positioning lock and/or marking, can only return to service after having passed a yield test as described in ISO 2330.

The best way to inspect forks is to use a fork caliper.

1. Determine the nominal thickness of "N" of the fork. Measurement has to be done on the fork shank using the caliper ruler.
2. Position the caliper at the end of the heel internal radius with the opening corresponding to the nominal dimension "N" (eg. for N 45 use 45 mm thickness), where the wear is higher.
3. If the fork enters the opening, it is mandatory to replace it. **DANGER OF BREAKING.** Furthermore, a 10% reduction in fork blade thickness results in 20% reduction in operating capacity.





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