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HOLLAND

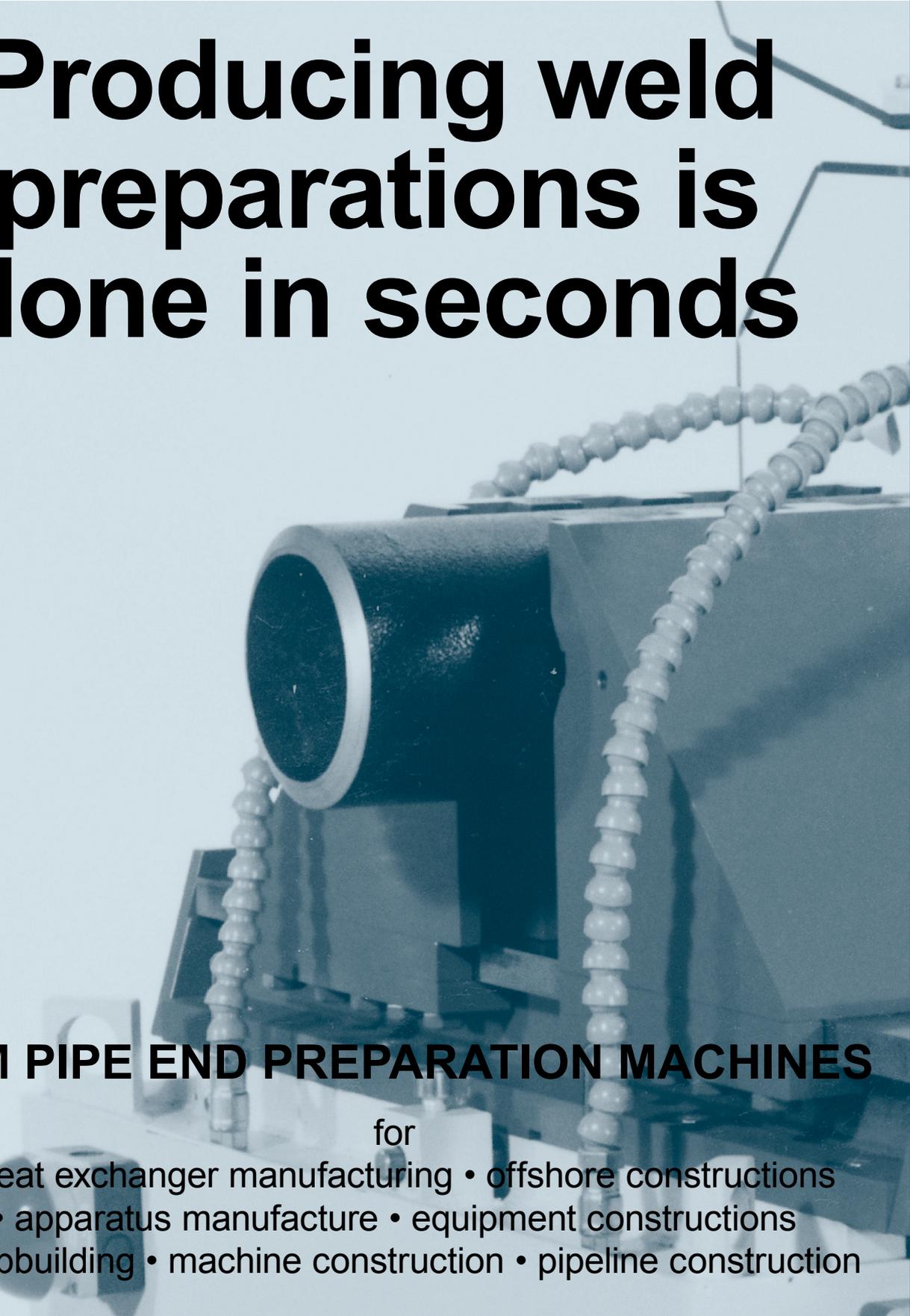
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# Producing weld preparations is done in seconds



## **PBM PIPE END PREPARATION MACHINES**

for

- heat exchanger manufacturing • offshore constructions
- apparatus manufacture • equipment constructions
- shipbuilding • machine construction • pipeline construction

# History of Th. Wortelboer BV

Th. Wortelboer BV was established in 1946 as a technical trading company. The delivery programme developed more and more in the direction of pipe constructions from 1965. Since then Th. Wortelboer BV has specialised in supplying and later manufacturing of the required tools and machines for piping constructions and pipe end preparation.



The PBM-6 pipe end preparation machine was introduced in 1993 under the motto "If it isn't available on the market then we will make it ourselves". The increasing demand for larger machines led successively to the development of the PBM-12 (1995), the PBM-16 (1996), the PBM-24 (1999) and the small PBM-4 (2005). The largest machine yet constructed was delivered at the beginning of 2006. This is the PBM-30 that is suitable for thick-walled pipes with a diameter of no less than 30".

Since the export of the first PBM machines, Th. Wortelboer BV has grown into a dynamic organisation where the interests of the customer are foremost. The development and production of (special) machines for pipe end preparation now form part of the core activities. Th. Wortelboer BV is the world market leader in the field of stationary pipe end preparation machines.

Th. Wortelboer BV is continually developing new machines for machining (thick-walled) tubes and pipes.

Quality, a long lifetime, ease of operation and naturally the wishes of the customer are the most important design requirements. Machines that are designed by Th. Wortelboer BV are characterised by their enormous operational reliability and very low maintenance costs. In short, simplicity, precision and speed.

## SIMPLICITY

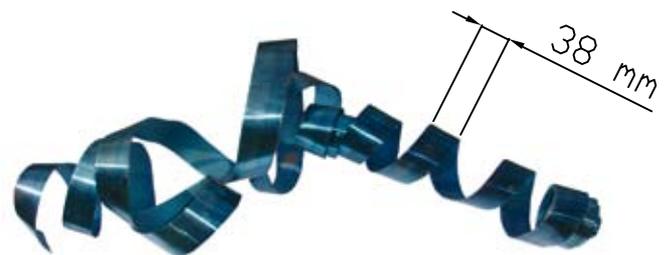
The pipe can be clamped rapidly in the prism-clamp. There is no need to use different parts etc. for different sizes. The robust prism-clamp fits all pipe sizes within the range of the machine. The machines have restricted speeds and the cutting tool head can easily be moved by means of a large hand wheel or an (optional) electric motor drive.

## PRECISION

The robust and rigid construction of the machine in combination with the heavy guides makes the PBM series one of the most stable and precise machines on the market. This helps the welding process and is of the greatest importance when using a welding robot.

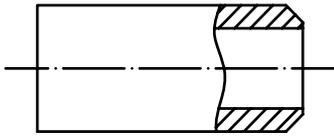
## SPEED

The prism-clamp and the unique insert-holders mean that there is no need for setting time. The minimal handling of materials required and the simple operation of the machine restricts machining time to an absolute minimum. The table below gives examples of machining times on various PBM machines. The times apply to preparation for a weld joint at 30°.

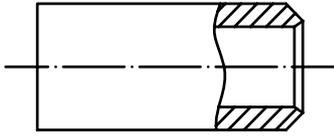
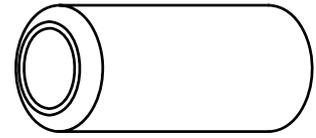


pipe diameter in inches (mm)	wall thickness (mm)	material	approx. machining time
4" (114,3)	6 mm	St 37	15 sec.
6" (168,3)	12 mm	St 37	30 sec.
6" (168,3)	25 mm	St 37	2 min.
10" (273,0)	19 mm	Duplex stainless steel	2 min.
12" (323,8)	12 mm	Duplex stainless steel	1 min.
16" (406,4)	13 mm	St 37	45 sec.
20" (508,0)	20 mm	Duplex stainless steel	1 min.
24" (609,6)	25 mm	Duplex stainless steel	1 1/2 min.

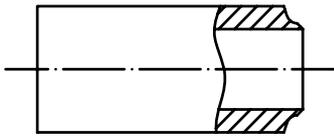
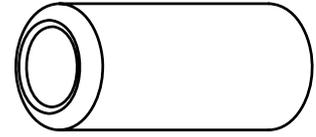
# Machining examples for end preparation/beveling



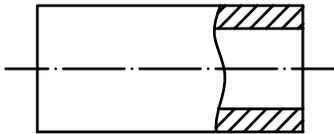
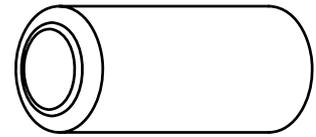
V-joint welding edge  
(various angles beveling and facing  
possible simultaneously)



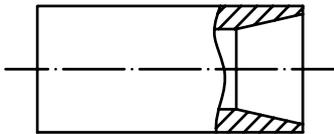
V-joint welding edge with internal beveling  
(various angles beveling and facing  
possible simultaneously)



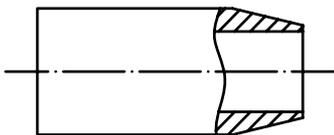
"Compound" welding edge with two different  
angles (various combinations of beveling  
angles possible)



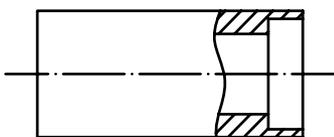
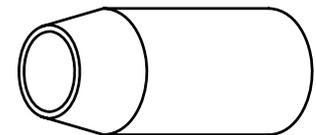
Facing  
(100% square)



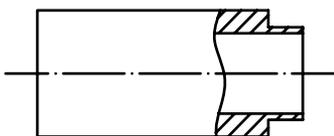
Internal taper  
(various taper angles and facing possible  
simultaneously)



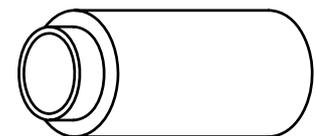
External taper  
(various taper angles and facing possible  
simultaneously)



Internal straight chamber  
(facing possible simultaneously)



External straight chamber  
(facing possible simultaneously)



The end preparations shown as examples are just a few of the many possibilities. Four grooves are available in the tool head of the PBM machines that can each accommodate one insert holder. The possibility of combining different insert holders (so different machinings) with each other means that it is possible to create near enough every desired welding and end-preparation form.

# PBM-4, PBM-6, PBM-12 and PBM-16

The basis of the PBM series is formed by the new PBM-4 with clamping range from 1/2" to 4" (20 mm - 116 mm outside diameter). The number in the title of the machine refers to the maximum clamping range in inches for that particular machine. For example, the PBM-16 has a clamping range up to 16" (410 mm). A complete overview with specifications of all PBM machines can be found in the middle of this brochure.



PBM-4



PBM-6



PBM-12



PBM-16

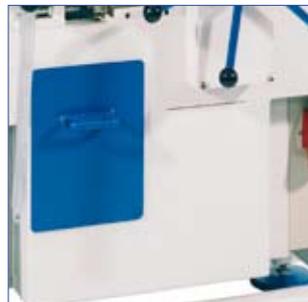
## MAKING WELD PREPARATIONS IS A MATTER OF SECONDS

The performance determines the choice of a machine. Th. Wortelboer BV supplies the fastest working machine for machining (thick-walled) pipes made from duplex steel, stainless steel or hasteloy, for example.

The minimal handling of materials required and the very short machining time make the PBM end preparation machines to some of the fastest on the market.

## SELF-CENTRING PRISM-CLAMP

A self-centring prism-clamp holds the pipe firmly in place. The clamp can be manually opened and closed rapidly using a large ratchet. The PBM-24 and PBM-30 have an electric drive as standard for the prism-clamp.



## LARGE CHIP TRAY

The large chip tray has a separator to filter the chips out of the coolant. All PBM machines have a built-in pump for cooling fluid.

## POWERFULL ELECTRIC MOTORS

The more than adequate electric motors of the PBM-4 and PBM-6 have two speeds and can be operated very simply. As well as the two speed motor, the PBM-12 and PBM-16 also have a gearbox allowing simple switching to a total of four speeds.



# PBM-24 and PBM-30

The PBM-30 pipe end preparation machine is (at present) the largest in the range of PBM machines. Because of the size of the machine and the weight of the clamp both the PBM-24 and the PBM-30 are supplied standard with both an electrically driven feed and an electrically operated clamp.

The insert holders of the largest PBM machines are suitable for carbide inserts with a cutting length of 45 mm. Thanks to the robust way in which these heavy PBM machines are constructed a feed of no less than 0.4 mm (or even more) per revolution is not the slightest problem. This reduces the machining time to a minimum.



PBM-24



## MULTIFUNCTIONAL CONTROL PANEL

The control panel has all the important functions for operating the machine: start machine - stop machine - coolant pump on / off - pulse action tool head - rapid feed left - rapid feed right - start feed - feed speed control - stop feed - safety cap open / close (pneumatic).

## ELECTRICALLY DRIVEN PRISM-CLAMP

The PBM-24 and PBM-30 pipe end preparation machines are fitted with electrically driven prism-clamps for which the clamping force can be adjusted by a potentiometer. One push on the button is enough to open or close the clamp. The control panel for the clamp is positioned next to the clamp on the side where the material is fed in. The control lamp lights on when the set maximum clamping force has been reached.



## INSERT HOLDER SET FOR THE PBM-24 AND PBM-30

This insert-holder set consists of four insert-holders (see the photo) each with one or two carbide inserts. Once set it is possible to machine all pipe sizes within the range of the machine without continuously having to reset the cutting tools. More details on page 10. The cutting insert holder sets are supplied standard as a 30° or a 37.5° model (others optional).

## CONTINUOUSLY VARIABLE FEED

The standard electrically operated feed is continuously variable by means of a potentiometer situated on the control panel. This allows the feed to be regulated very easily and efficiently.





**PBM-4**



**PBM-6**



**PBM-12**

clamp range <sup>1</sup> (mm)	20 - 116	46 - 180	60 - 330
clamp range <sup>1</sup> (pipe in inches)	½" - 4"	1 ½" - 6"	2" - 12"
turning range (mm)	10 - 116	30 - 180	40 - 330
voltage <sup>2</sup> (Volt)	400V - 3ph - 50Hz	400V - 3ph - 50Hz	400V - 3ph - 50Hz
motor power (kW)	2,6 / 3,2	4,5 / 5,5	4,5 / 5,5
clamping	prism-clamp	prism-clamp	prism-clamp
clamp operation	manual	manual	manual
machining	carbide inserts	carbide inserts	carbide inserts
max. wall thickness <sup>3</sup> (mm)	13 (in 1 machining)	25 (in 1 machining)	25 (in 1 machining)
feed operation	manual	manual	manual
feed stroke (mm)	100	100	100
speed (r.p.m.) at 50 Hz.	96 and 195	48 and 96	36, 48, 72 and 96
size LxWxH (mm)	900 x 740 x 1300	1300 x 900 x 1450	1400 x 1100 x 1800
weight (kg)	700	1.250	2.200

## options

	PBM-4	PBM-6	PBM-12
electrically operated clamp	●	●	●
electrically operated feed	●	●	●
electrically operated pipe-stop	●	●	●
semi-automatic	●	●	●
built-in cooling pump	standard	standard	standard
mist cooling system	-	-	-
copying system	-	-	●
TRB roller bench	●	●	●
maintenance contract	●	●	●



## PBM-16

## PBM-24

## PBM-30

80 - 410	215 - 620	215 - 780
3" - 16"	8" - 24"	8" - 30"
60 - 410	170 - 620	170 - 780
400V - 3ph - 50Hz	400V - 3ph - 50Hz	400V - 3ph - 50Hz
4,5 / 5,5	15	18,5
prism-clamp	prism-clamp	prism-clamp
manual	electric	electric
carbide inserts	carbide inserts	carbide inserts
20 (in 1 machining)	35 (in 1 machining)	35 (in 1 machining)
manual	electrically-driven	electrically-driven
100	100	100
36, 48, 72 and 96	25, 38 and 50	20, 40 and 70
1400 x 1100 x 1900	3000 x 2300 x 1800	3500 x 2400 x 1800
2.250	11.000	12.000

(<sup>1</sup>) Clamping range and turning range can be reduced using optional insert jaws.

(<sup>2</sup>) Other voltages/frequencies can be supplied on request.

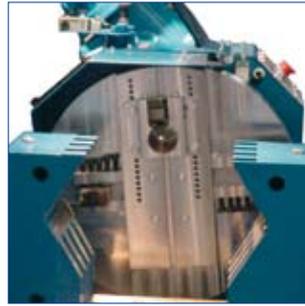
(<sup>3</sup>) The maximum wall thickness is unrestricted by machining the pipe several times in succession.

PBM-16	PBM-24	PBM-30
●	standard	standard
●	standard	standard
●	●	●
●	●	●
standard	standard	standard
-	●	●
●	●	●
●	●	●
●	●	●

● = optionally available

# Copying system for PBM machines

A copying system can be supplied for the PBM-12, PBM-16, PBM-24 and PBM-30. The copying system allows thin-walled and/or non-round pipes to be machined very precisely and the desired end preparation edge can be made despite the fact that the material is not round.



The copying system can be fitted to existing machines (PBM-12, PBM-16, PBM-24 or PBM-30). The original tool head is replaced in that case by a tool head with the copying system that is mounted directly on the main shaft.



The tool head with copying system for the PBM-12 and PBM-16 has a single carriage with one copying roll and one insert holder. The copying systems for the PBM-24 and PBM-30 have two carriages, each fitted with a copying roll and one insert holder.



The copying roll runs against the inside of the pipe while the pipe is being machined. A spring-loaded and carriage construction applies a continuous force to the copying roll. The carbide insert holder is connected to the copying roll through a sledge so following its movement exactly and, therefore, the contours of the pipe. The result is an end preparation that has an equal face/land all around. This is necessary if a J or Y bevel has to be made whereby the face/land has to be exactly the same all the way round. There is also a copying system available that runs against the outside of the pipe.

# Roller benches type TRB

The TRB roller benches have been especially designed for use in combination with the PBM pipe end preparation machines. The trough system with steel rollers makes it possible to roll the pipe easily by hand into the machine.

Just as the PBM machines the TRB roller benches are extra strong and robust and exceptionally suitable for heavy work.



Unusual sizes or modified models, for example with stainless steel rollers or completely turnable through 180°, are available on request.

All PBM machines are provided with an extra 400 Volt socket in which the roller bench cable can be connected, so that there is always a powered socket available for the TRB.

The height can easily be adjusted electrically with one push on the button. The top part with the V-rolls then moves up or down in its entirety. The desired height can be seen on the scale.



	TRB-3004	TRB-5004	TRB-3000	TRB-5000	TRB-7000	TRB-3016	TRB-5016	TRB-7016	TRB-4024	TRB-5024	TRB-7024	TRB-4030	TRB-5030	TRB-7030
PBM-4	●	●	-	-	-	-	-	-	-	-	-	-	-	-
PBM-6	-	-	●	●	●	-	-	-	-	-	-	-	-	-
PBM-12	-	-	●	●	●	-	-	-	-	-	-	-	-	-
PBM-16	-	-	-	-	-	●	●	●	-	-	-	-	-	-
PBM-24	-	-	-	-	-	-	-	-	●	●	●	-	-	-
PBM-30	-	-	-	-	-	-	-	-	-	-	-	●	●	●
bench length (mm)	3000	5000	3000	5000	7000	3000	5000	7000	4000	5000	7000	4000	5000	7000
bench width (mm)	300	300	300	300	300	400	400	400	600	600	600	700	700	700
capacity (kg)	1000	1000	2000	2000	2000	3000	3000	3000	8000	8000	8000	10000	10000	10000
weight (kg)	450	600	700	1000	1300	900	1200	1500	2500	4000	5500	4000	5000	7000

● = roller benches for combination with the named PBM machine

# Insert holder sets for PBM machines

Th. Wortelboer BV has developed unique carbide insert holders and carbide inserts for the PBM machines.

A set of four insert holders, called an insert holder set, makes it possible to machine all pipe sizes in the range of the PBM machine. This means that the time-consuming resetting of insert holders is now definitely a thing of the past.

An insert holder set consists of 2-4 insert holders each having one or more carbide inserts. These inserts are suitable for machining almost all materials, including stainless steel, duplex steel and hasteloy.

An aluminium setting cone is supplied with the set in order to position the insert holders set correctly and easily. Apart from this setting cone and an Allen key you do not need anything else in order to set the insert holders rapidly and precisely.

The insert holder sets are supplied standard as a 30° or a 37.5° model. Other angles or models are available on request.

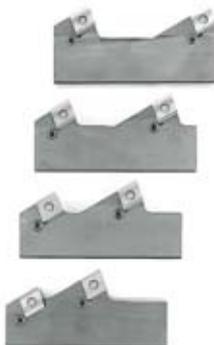
## INSERT HOLDER SETS FOR THE PBM-4

The insert holder set 30° and 37,5° for the PBM-4 machines consists of 2 insert holders each with two carbide inserts.

## INSERT HOLDER SETS FOR THE PBM-6

The insert holder set 30° for the PBM-6 machines consists of three insert holders each with one insert and one insert holder with two inserts.

The insert holder set 37.5° for the PBM-6 machines consists of two insert holders each with one insert and two insert holders each with two inserts.



## INSERT HOLDER SETS FOR THE PBM-12

The insert holder sets for the PBM-12 machines consist of four insert holders each with two inserts. The drawing gives an overview of the insert holders and the pipe sizes that can be machined with the particular set. Each separate insert is positioned in such a way that it can machine a particular size of pipe while the other inserts in effect rotate without doing any work.

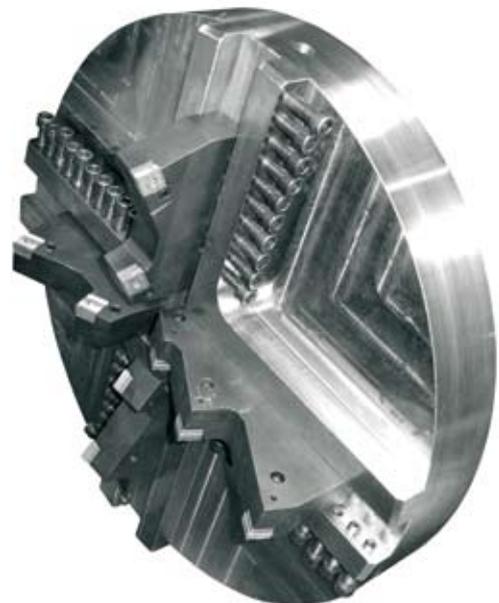
## INSERT HOLDER SETS FOR THE PBM-16

The insert holder sets for the PBM-16 machines consist of three insert holders each with two inserts and one insert holder with three inserts.

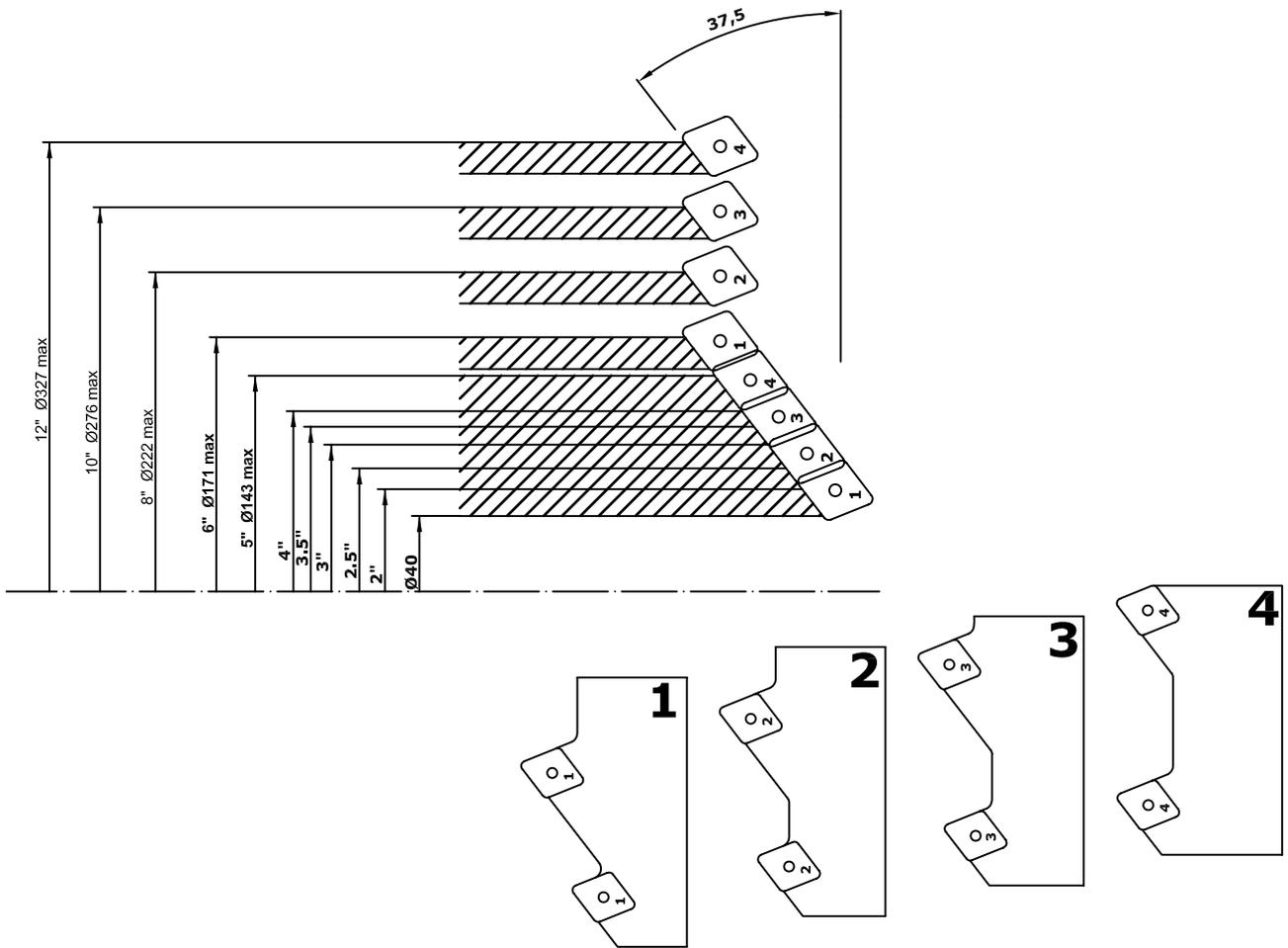
## INSERT HOLDER SET FOR THE PBM-24 AND PBM-30

The insert holder set for the PBM-24 machine consists of two insert holders each with one insert and two insert holders each with two inserts. Because the inserts overlap each other directly the set can be used for machining all pipes with diameters in the range of the machine. This insert holder set is also suitable for machining pipes with wall thickness up to a maximum of 35 mm (in one working-cycle). For use of this insert holder set, a special tool head is needed for these models.

The “standard / single” insert holders are available in a large number of different models, event. even with special made carbide inserts. Th. Wortelboer BV can advise you about the choice of cutting tools for your required end preparations.



# Insert holder sets for PBM machines



Below some possibilities of insert holders and (special) inserts.



Insert holder for facing



Insert holders for beveling "above" each other (wall max. 25 mm)



Standard insert with cutting length of 16 mm



Insert 50 mm for beveling 30° en 37,5°



Insert for J-bevel



Custom made insert holder and special insert

# PBM specials



As well as the standard series of PBM machines Th. Wortelboer BV also supplies special models designed according to specific customer wishes and requirements.

The photo on the left shows a PBM-6 machine that has been designed as a semi-automatic machine. The pipes are positioned in the machine manually up to the pipe-stop. One push on the button causes the pipe to be clamped, the stop to slide back and the rotating cutting head to move towards the material. Once the end preparation has been made the cutting head moves back to its starting position, the machine stops, the pipe-stop slides forward again and the machine is ready for the next pipe.

The KPBM-16 (see the illustration on the right) is based on the standard PBM-16 machine. This 'pipe shaving machine' is used to machine the outside of glass fibre reinforced pipes (also conical), in order to fit a sleeve over the pipe-end. The KPBM-16 machine has an automatic feed and an automatic clamping system. The length to be machined can be set beforehand on the machine.

These examples are just a few of the many possibilities. With more than 60 year's experience in pipe end preparation Th. Wortelboer BV is the expert partner for discussions about custom-made machines.

