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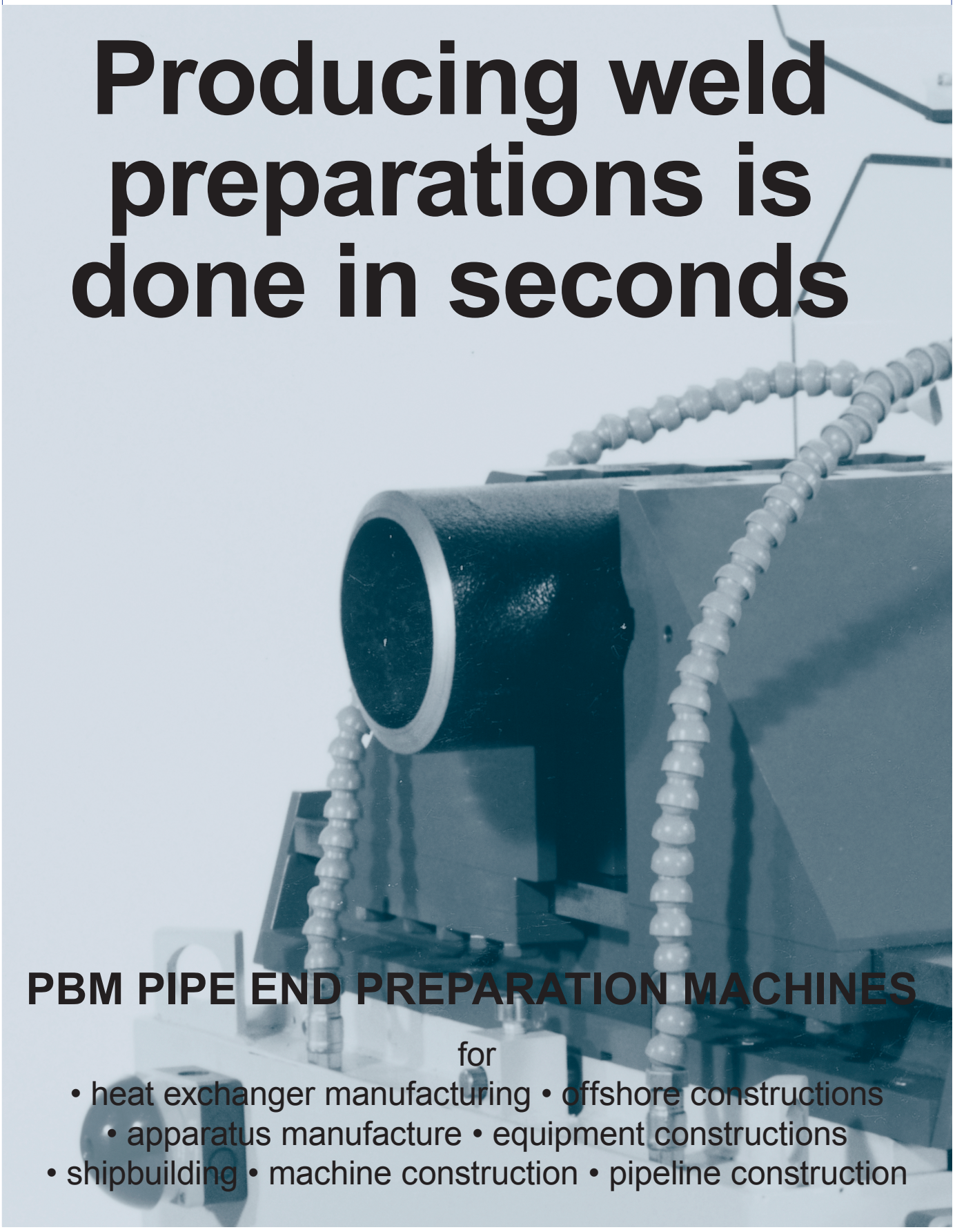
Producing weld preparations is done in seconds



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 old style 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.

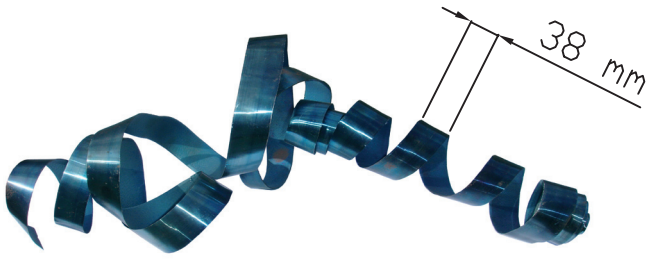
Th. Wortelboer BV is continually developing new machines for machining (thick-walled) tubes and pipes.

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.

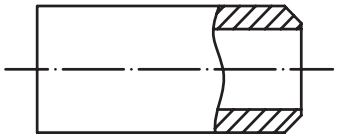
PRECISION
The robust and rigid construction of the machine in combination with the heavy guides makes the PBM series one of the most stable and precise machines on the market. This helps the welding process and is of the greatest importance when using a welding robot.

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°.

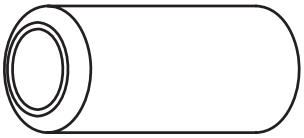


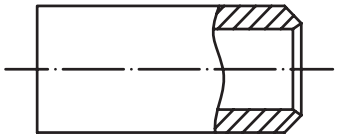
pipe diameter in inches (mm)	wall thickness (mm)	material	approx. machining time
4” (114,3)	6 mm	St 37	15 sec.
6” (168,3)	12 mm	St 37	30 sec.
6” (168,3)	25 mm	St 37	2 min.
10” (273,0)	19 mm	Duplex stainless steel	2 min.
12” (323,8)	12 mm	Duplex stainless steel	1 min.
16” (406,4)	13 mm	St 37	45 sec.
20”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

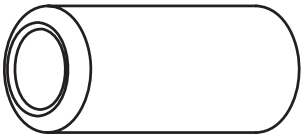


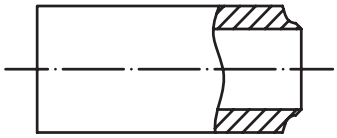
V-joint welding edge
(various angles bevelling and facing possible simultaneously)



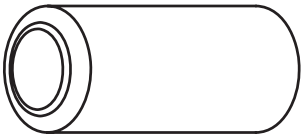


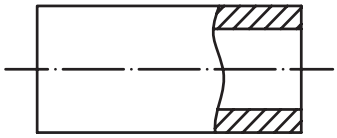
V-joint welding edge with internal bevelling
(various angles bevelling and facing possible simultaneously)



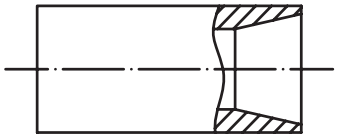


“Compound” welding edge with two different angles (various combinations of bevelling angles possible)

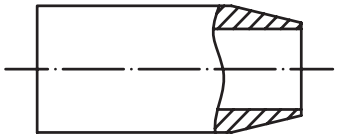




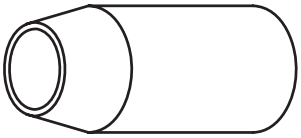
Facing
(100% square)

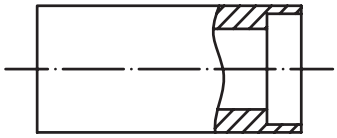


Internal taper
(various taper angles and facing possible simultaneously)

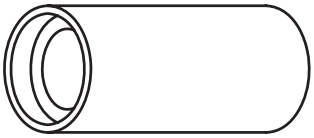


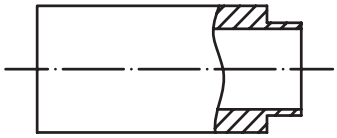
External taper
(various taper angles and facing possible simultaneously)



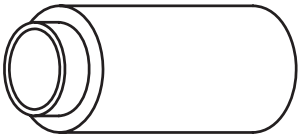


Internal straight chamber
(facing possible simultaneously)





External straight chamber
(facing possible simultaneously)

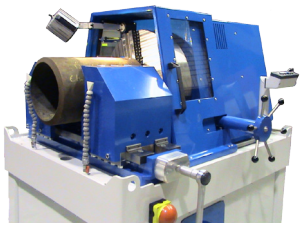


The end preparations shown as examples are just a few of the many possibilities. Four grooves are available in the tool head of the PBM machines that can each accommodate one insert holder. The possibility of combining different insert holders (so different machinings) with each other means that it is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

PBM-4, PBM-6-SCR, PBM-6, PBM-8 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” (435 mm). A complete overview with specifications of all PBM machines can be found in the middle of this brochure.

PBM-8



PBM-16

PBM-4

PBM-6(-SCR)

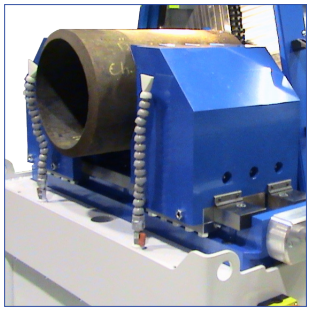
MAKING WELD PREPARATIONS IS A MATTER OF SECONDS

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. All PBM machines have an optional electric drive for the prism-clamp.

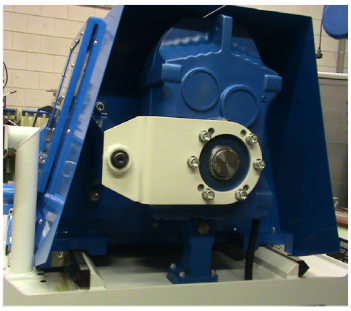


LARGE CHIP TRAY

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 motor of the PBM-4 has two speeds and can be operated very simply. As well as the adequate motor, the PBM-6(-SCR), PBM-8 and PBM-16 have a frequency regulator that makes that all speeds in the range are available.



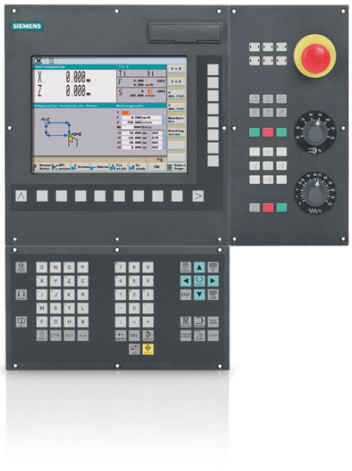
PBM-30

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 because it is made in a very economical way it is especially suited for pipes up to 20 mm wall thickness.
The PBM-30 is also exdcuted with a frequency regulator.

The insert holders of the largest PBM machine is suitable for carbide inserts with a cutting length of 16 mm. Thanks to the robust way in which this PBM machine is constructed this machine is still one of the fastest available.

PBM-30

PBM-16/PBM-30 CNC-controlled



The newest developement is to execute these two models with a CNC-control. The consequence of this is that the machine will have an easy to operate screen. In this screen you can choose the bevel form you want to make (e.g. V-J-compound form). Then you fill in your dimensions and the machining is done automatically.

Becasue of the CNC-control, the two models have an axial as well as radial feeding system. Also because of the way it is controlled the speed can go up and consequentially the chips will be smaller, but the machining time wil be similar and as fast as always.

Another advantage is that these machines will have an unlimited capacity in wall thickness. Also special internal turning (complex forms as well) can be done easily with this system.

	PBM-4	PBM-6-SCR	PBM-6
clamp range[1] (mm)	20 - 116	20 - 170	46 - 180
clamp range[1] (pipe in inches)	½" - 4"	½" - 6"	1 ½" - 6"
turning range (mm)	10 - 116	10 - 170	30 - 180
voltage [2] (Volt)	400V - 3ph - 50Hz	400V - 3ph - 50Hz	400V - 3ph - 50Hz
motor power (kW)	3,0	5,5	5,5
clamping	prism-clamp	prism-clamp	prism-clamp
clamp operation	manual	manual	manual
machining	carbide inserts	carbide inserts	carbide inserts
max. wall thickness[3] (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.	100 - 250	40 - 100	40 - 100
size LxWxH (mm)	1100 x 900 x 1500	1250 x 980 x 1650	1250 x 980 x 1650
weight (kg)	900	1.450	1.450

options

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

PBM-8	PBM-16	PBM-30	CNC-models
21 - 225 / 280	60 - 435	215 - 780	60 - 435 / 215 - 780
1/2” - 8” / 10"	2” - 16”	8” - 30”	2” - 16” / 8” - 30”
10 - 225 / 280	40 - 435	170 - 780	
400V - 3ph - 50Hz	400V - 3ph - 50Hz	400V - 3ph - 50Hz	400V - 3ph - 50Hz
5,5	5,5	7,5	5,5 / 7,5
prism-clamp	prism-clamp	prism-clamp	prism-clamp
manual	manual	manual	axial / radial electric
carbide inserts	carbide inserts	carbide inserts	carbide inserts
20 (in 1 machining)	20 (in 1 machining)	20 (in 1 machining)	unlimited
manual	manual	manual	manual
100	100	100	150
40 - 100	35 - 100	35 - 100	75 - 225 / 50 - 150
1250 x 980 x 1650	1790 x 1380 x 1660	2000 x 1600 x 1800	
1.450	2.800	4.500	

PBM-8	PBM-16	PBM-30
●	●	●
●	●	●
●	●	●
●	●	●
standard	standard	standard
●	●	●
●	●	●
●	●	●

(¹) Clamping range and turning range can be reduced using optional insert jaws.

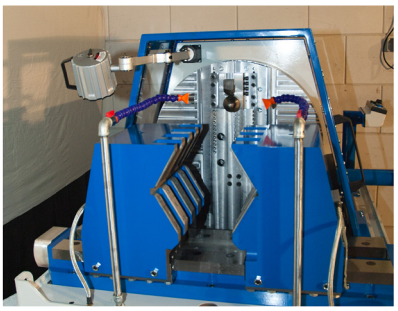
(²) Other voltages/frequencies can be supplied on request.

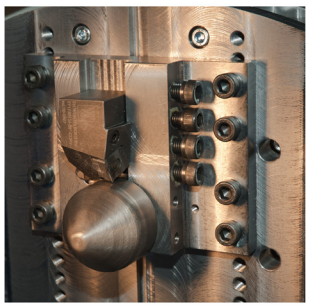
(³) The maximum wall thickness is unrestricted by machining the pipe several times in succession.

● = optionally available

Copying system for PBM machines

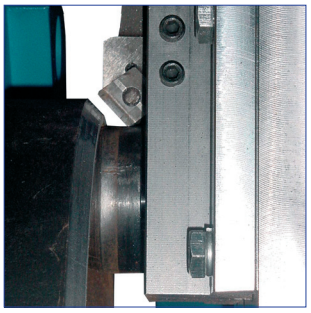
A copying system can be supplied for the PBM-16 and PBM-30. The copying system allows thin-walled and/or non-round pipes to be machined very precisely and the desired end preparation edge can be made despite the fact that the material is not round.

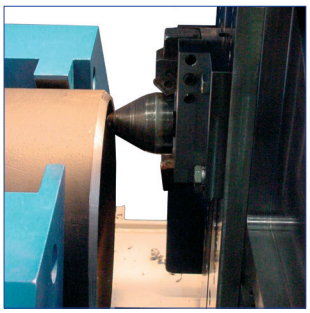




The copying system can be fitted to existing machines (PBM-16 or PBM-30). The original tool head is replaced in that case by a tool head with the copying system that is mounted directly on the main shaft.

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



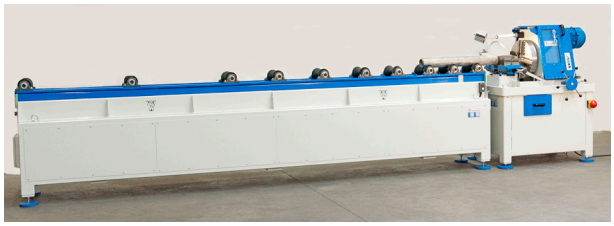


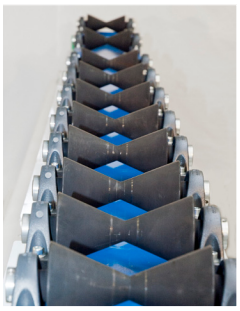
The copying roll runs against the inside of the pipe while the pipe is being machined. A spring-loaded and carriage construction applies a continuous force to the copying roll. The carbide insert holder is connected to the copying roll through a sledge so following its movement exactly and, therefore, 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 diabolo 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 other models, for example with stainless steel rollers or completely turneable through 180°, are available on request.

All PBM machines are provided with an extra connection in the electrical box in which the roller bench cable can be connected.

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-3000	TRB-5000	TRB-7000	TRB-3016	TRB-5016	TRB-7016	TRB-4030	TRB-5030	TRB-7030
PBM-4	●	●	●	–	–	–	–	–	–
PBM-6-SCR	●	●	●	–	–	–	–	–	–
PBM-6	●	●	●	–	–	–	–	–	–
PBM-8	●	●	●	–	–	–	–	–	–
PBM-16	–	–	–	●	●	●	–	–	–
PBM-30	–	–	–	–	–	–	●	●	●
bench length (mm)	3000	5000	7000	3000	5000	7000	4000	5000	7000
bench width (mm)	300	300	300	400	400	400	700	700	700
capacity (kg)	2000	2000	2000	3000	3000	3000	10000	10000	10000
weight (kg)	1100	1400	1600	1400	1700	2000	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 30º and 37,5º for the PBM-4 machines consists of 2 inserts holders each with two carbide inserts.

INSERT HOLDER SETS FOR THE PBM-6-SCR AND PBM-6 AND PBM-8

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.

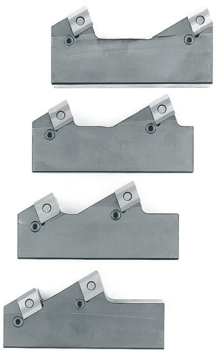
INSERT HOLDER SETS FOR THE PBM-8

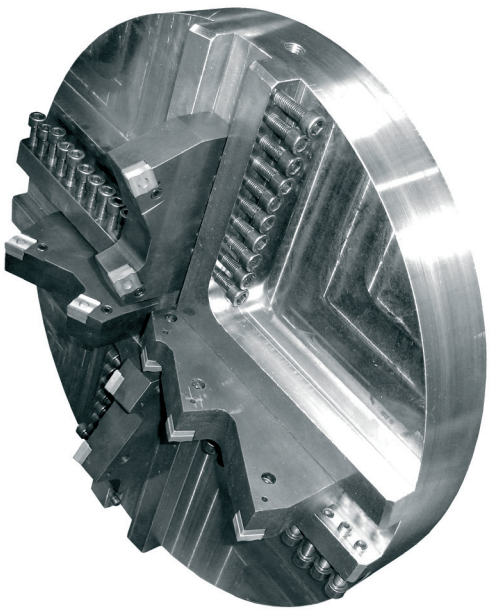
The insert holder sets for the PBM-8 machines consist of four insert holders each with two inserts. The drawing (of the old PBM-12) gives an overview of the insert holders and the pipe sizes that can be machined with the particular set. Each separate insert is positioned in such a way that it can machine a particular size of pipe while the other inserts in effect rotate without doing any work.

INSERT HOLDER SETS FOR THE PBM-16

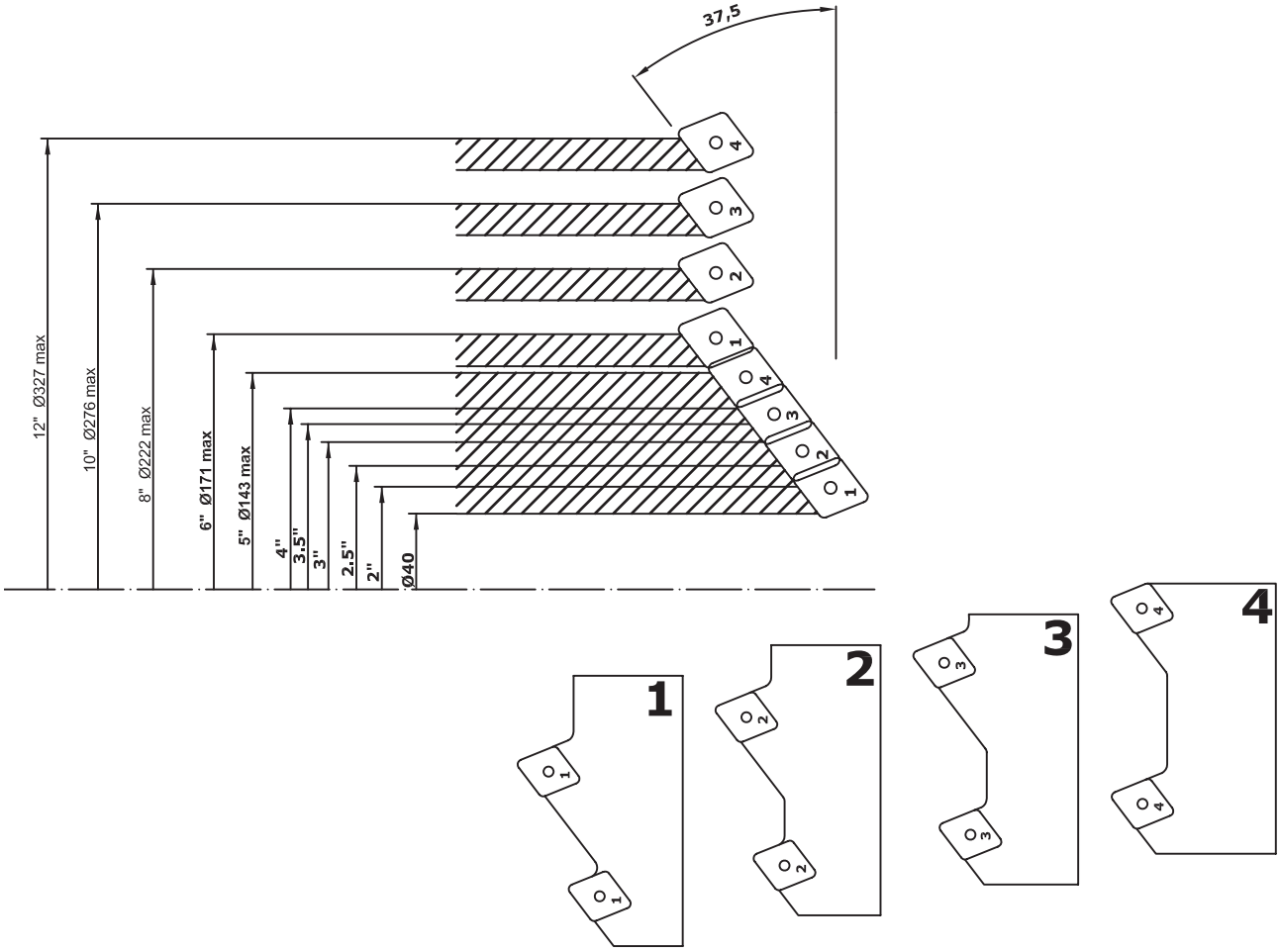
The insert holder sets for the PBM-16 machines consist of three insert holders each with two inserts and one insert holder with three inserts.

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.

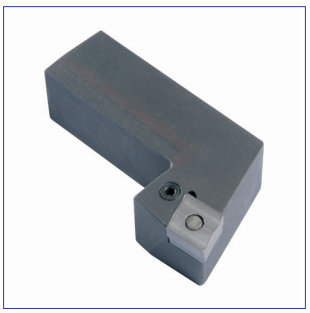




Insert holder sets for PBM machines

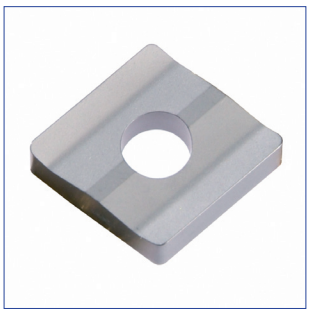


Below some possibilities of insert holders and (special) inserts.

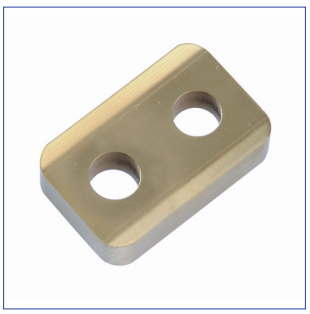


Insert holder for facing

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

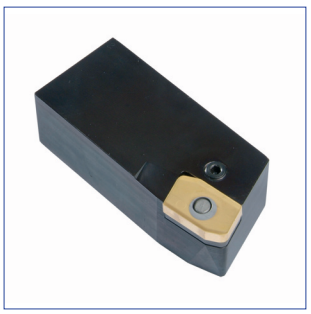


Standard insert with cutting length of 16 mm



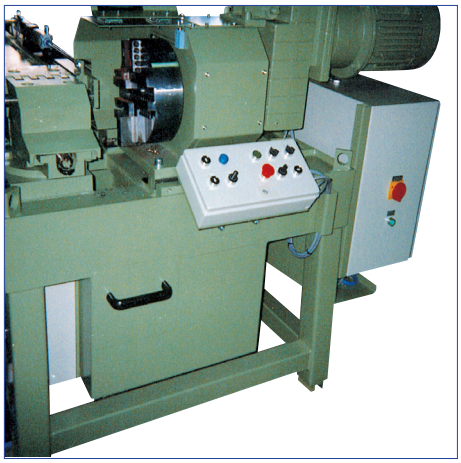
Insert 50 mm for beveling 30° en 37,5°

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 an older version of the 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.