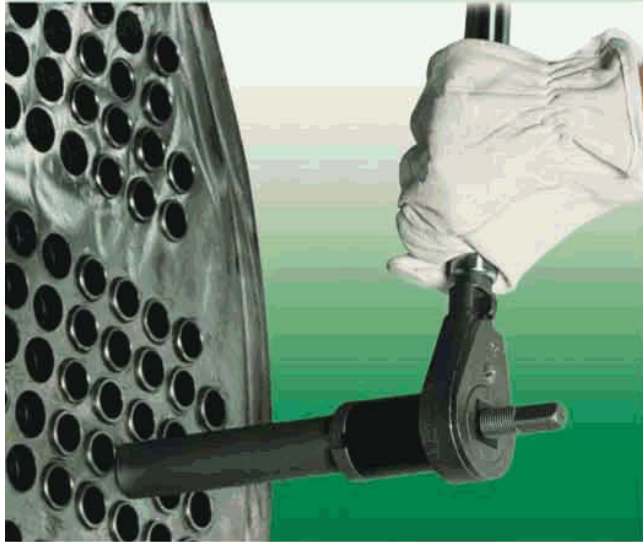


# Manual tool for tube extraction

## Cheaptool



### Equipment for the manual maintenance of the tube in heat exchangers

**Cheaptool** is the complete system of Maus Italia products for the manual, low-cost maintenance of tubes in heat exchangers in oil refineries, condensers in electric power stations, boilers, etc..

**Cheaptool** consists of various products that work in synergy to increase the effectiveness of the work on the tube being replaced. The tube reamer **F/791** starts first by reducing the thickness of the tube to enable the **F/793** to enter the part that has been reamed (therefore offering less resistance) and to expel the tube. The tube collapsing tool **F/792** is used when the thickness of the tube is not high and offers less resistance.

**Cheaptool** also includes a manual tube cutter **F/790**, a manual extractor **F/800** and a pneumatic hammer **F/789** suggested for use with the above tools.

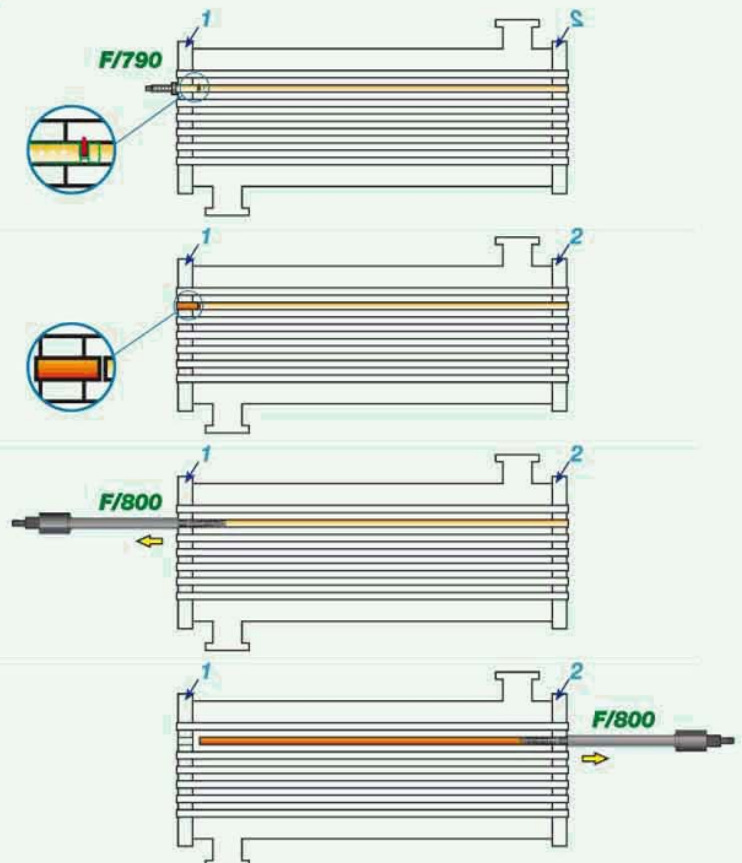
**Flexibility and economy of use**

**High quality of maintenance**

### Examples of right procedures of tube extraction by **Cheaptool**

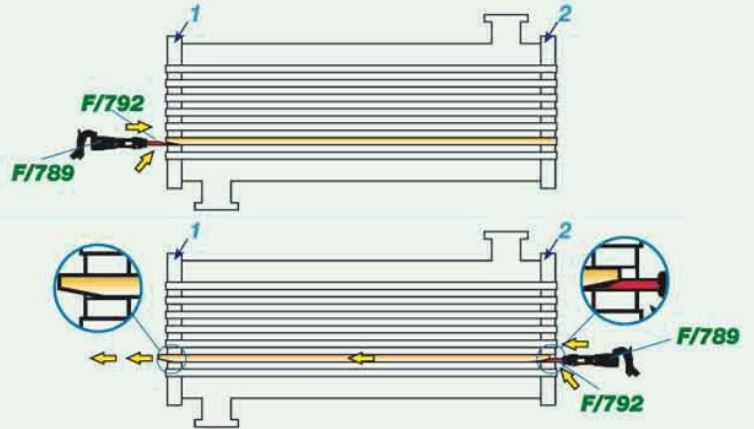
#### 1st example of use Cutting and pulling of tube stub and tube

- Work on the first tubesheet with the one-revolution tube cutter **F/790** to cut the tube to be replaced.
- After cutting the tube stub is connected to the first tubesheet and the remaining part of the tube is connected to the second tubesheet.
- Using the **F/800** manual tube puller it is easy to pull out the stub from the first tubesheet quickly and efficiently.
- By repeatedly using the **F/800** manual tube puller on the second tubesheet all the tube can be pulled out easily thus freeing the exchanger.



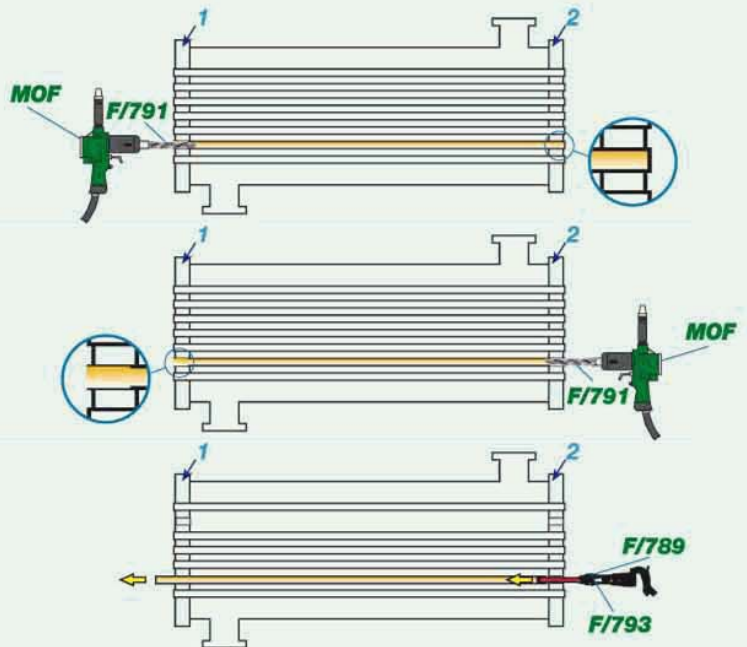
**2nd example of use**  
Initial extraction and removal  
for thin-walled tubes

- Work on the first tubesheet with the **F/792** tube collapsing tool using the **F/789** pneumatic hammer to extract the tube.
- Initial extraction on the second tubesheet with the same **F/792** using the **F/789** moves the tube out for the first few millimeters giving sufficient length for a good grip in manual pulling.



**3rd example of use**  
Initial extraction and removal

- Work on the first tubesheet with the **F/791** tube reamer with the **MOF**, reducing the tube thickness to make it easier to strip.
- Work in the same way also for the second tubesheet still using the **F/791** together with the **MOF** thus preparing the tube on both sides for removal.
- Operate the **F/793** tube expeller to move the tube out a few inches giving sufficient length for a good grip in manual pulling.



# Manual tool for tube extraction

## F/791

### Tube reamer



These are high-speed steel reamers, with Morse taper connection and rear tang with diameter ground in accordance with the BWG of the tubes. To use to reduce the thickness of tubes to be replaced, for a depth of about 80% of the thickness of the sheet.



## F/793

### Tube expeller

Use preferably with a pneumatic hammer.  
Standard tang:  $\varnothing$  17,2 mm (0.677") x 60,3 mm (2.3/8")



## F/792

### Tube collapsing tool

Used for crumpling tubes of non-ferrous alloys or ferrous alloys made lighter with the use of the reamer **F/791** and expelling them from the tube plate. To be used preferably with a pneumatic hammer.  
Standard tang:  $\varnothing$  17,2 mm (0.677") x 60,3 mm (2.3/8")

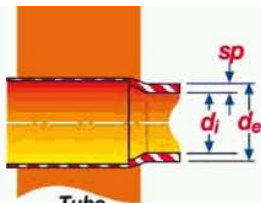


## F/789

### Pneumatic hammer specific for "Cheaptool"







Tube				F/791		L1		F/793		L3		F/792		L2	
de	B.W.G.	sp	di	Cod.	mm	"	Cod.	mm	"	Cod.	mm	"	mm	"	
1/2" (12,7)	-	-	-	-	-	-	-	-	-	-	-	-	F/792-0	196,0	7.717
5/8" (15,9)	10	3,4	0.134	9,5	0.357	F/791-1				F/793-1					
	11	3,0	0.120	9,8	0.385	F/791-2				F/793-2					
	12	2,8	0.109	10,3	0.407	F/791-3				F/793-3					
	13	2,4	0.095	11,0	0.435	F/791-4	100,0	3.937	2	F/793-4	182,0	7.165	F/792-1	192,0	7.559
	14	2,1	0.083	11,7	0.459	F/791-5				F/793-5					
	15	1,8	0.072	12,2	0.481	F/791-6				F/793-6					
	16	1,6	0.065	12,6	0.495	F/791-7				F/793-7					
	18	1,2	0.049	13,4	0.527	F/791-8				F/793-8					
3/4" (19,0)	10	3,4	0.134	12,2	0.482	F/791-9				F/793-9					
	11	3,0	0.120	12,9	0.510	F/791-10				F/793-10					
	12	2,8	0.109	13,5	0.532	F/791-11				F/793-11					
	13	2,4	0.095	14,2	0.560	F/791-12	120,0	4.724	2	F/793-12	182,0	7.165	F/792-2	194,0	7.638
	14	2,1	0.083	14,8	0.584	F/791-13				F/793-13					
	15	1,8	0.072	15,4	0.606	F/791-14				F/793-14					
	16	1,6	0.065	15,7	0.620	F/791-15				F/793-15					
	18	1,2	0.049	16,6	0.652	F/791-16				F/793-16					
7/8" (22,2)	10	3,4	0.134	15,4	0.607	F/791-17				F/793-17					
	11	3,0	0.120	16,1	0.635	F/791-18				F/793-18					
	12	2,8	0.109	16,7	0.657	F/791-19				F/793-19					
	13	2,4	0.095	17,4	0.685	F/791-20	130,0	5.118	2	F/793-20	182,0	7.165	F/792-3	190,0	7.480
	14	2,1	0.083	18,0	0.709	F/791-21				F/793-21					
	15	1,8	0.072	18,6	0.731	F/791-22				F/793-22					
	16	1,6	0.065	18,9	0.745	F/791-23				F/793-23					
	18	1,2	0.049	19,7	0.777	F/791-24				F/793-24					
1" (25,4)	8	4,2	0.165	17,0	0.670	F/791-25				F/793-25					
	10	3,4	0.134	18,6	0.732	F/791-26				F/793-26					
	11	3,0	0.120	19,3	0.760	F/791-27				F/793-27					
	12	2,8	0.109	19,9	0.782	F/791-28				F/793-28					
	13	2,4	0.095	20,6	0.810	F/791-29	155,0	6.102	3	F/793-29	182,0	7.165	F/792-4	177,0	6.969
	14	2,1	0.083	21,2	0.834	F/791-30				F/793-30					
	15	1,8	0.072	21,7	0.856	F/791-31				F/793-31					
	16	1,6	0.065	22,1	0.870	F/791-32				F/793-32					
1.1/4" (31,8)	8	4,2	0.165	23,4	0.920	F/791-34				F/793-34					
	10	3,4	0.134	24,9	0.982	F/791-35				F/793-35					
	11	3,0	0.120	25,6	1.010	F/791-36				F/793-36					
	12	2,8	0.109	26,2	1.032	F/791-37	165,0	6.496	3	F/793-37	182,0	7.165	F/792-5	164,0	6.457
	13	2,4	0.095	26,9	1.060	F/791-38				F/793-38					
	14	2,1	0.083	27,5	1.084	F/791-39				F/793-39					
	16	1,6	0.065	28,4	1.120	F/791-40				F/793-40					
	1.1/2" (38,1)	8	4,2	0.165	29,7	1.170	F/791-41				F/793-41				
10		3,4	0.134	31,3	1.232	F/791-42				F/793-42					
11		3,0	0.120	32,0	1.260	F/791-43				F/793-43					
12		2,8	0.109	32,6	1.282	F/791-44	180,0	7.087	4	F/793-44	182,0	7.165	F/792-6	165,0	6.496
13		2,4	0.095	33,3	1.310	F/791-45				F/793-45					
14		2,1	0.083	33,9	1.334	F/791-46				F/793-46					
16		1,6	0.065	34,8	1.370	F/791-47				F/793-47					

# Manual tool for tube extraction

## F/790

### One revolution tube cutter

Cheaper tube cutter, adjustable reach from 50,8 mm to 152,4 mm (2" to 6"). The **F/790** was designed for hand use with a tap wrench and its functioning is based on the eccentricity of the blade.



When the **F/790** is inserted, the blade is completely in.



At the beginning of the rotation it perforates the tube.

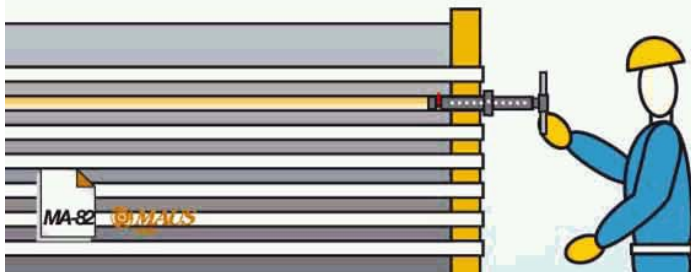


In **one revolution** the tube is completely cut.



Rotating the **F/790** anti-clockwise the blade goes back in so that the cutter can be removed.

	Tube				F/790 Cod.	Spare bit Cod.	☑ "	
	de mm	B.W.G.	sp mm	di mm				
1/2" (12,7)	18	1,2	0.049	10,2	0.402	F/790-1	BIT-F790-1-2	1/4"
	20	0,9	0.035	10,9	0.430	F/790-2		
5/8" (15,9)	14	2,1	0.083	11,7	0.459	F/790-3	BIT-F790-3 BIT-F790-4 BIT-F790-5 BIT-F790-6	3/8"
	16	1,6	0.065	12,6	0.495	F/790-4		
	18	1,2	0.049	13,4	0.527	F/790-5		
	20	0,9	0.035	14,1	0.555	F/790-6		
3/4" (19,0)	14	2,1	0.083	14,8	0.584	F/790-7	BIT-F790-7 BIT-F790-8-16	3/8" 1/2"
	16	1,6	0.065	15,7	0.620	F/790-8		
	18	1,2	0.049	16,6	0.652	F/790-9		
	20	0,9	0.035	17,3	0.680	F/790-10		
	22	0,7	0.028	17,6	0.694	F/790-11		
7/8" (22,2)	14	2,1	0.083	18,0	0.709	F/790-12	BIT-F790-8-16	1/2" 5/8"
	16	1,6	0.065	18,9	0.745	F/790-13		
	18	1,2	0.049	19,7	0.777	F/790-14		
	20	0,9	0.035	20,4	0.805	F/790-15		
	22	0,7	0.028	20,8	0.819	F/790-16		
1" (25,4)	12	2,8	0.109	19,9	0.782	F/790-17	BIT-F790-17-22	5/8" 3/4"
	14	2,1	0.083	21,2	0.834	F/790-18		
	16	1,6	0.065	22,0	0.870	F/790-19		
	18	1,2	0.049	22,9	0.902	F/790-20		
	20	0,9	0.035	23,6	0.930	F/790-21		
	22	0,7	0.028	24,0	0.944	F/790-22		
1.1/4" (31,8)	12	2,8	0.109	26,2	1.032	F/790-23	BIT-F790-23-32	3/4"
	14	2,1	0.083	27,5	1.084	F/790-24		
	16	1,6	0.065	28,4	1.120	F/790-25		
	18	1,2	0.049	29,3	1.152	F/790-26		
	20	0,9	0.035	30,0	1.180	F/790-27		
1.1/2" (38,1)	12	2,8	0.109	32,6	1.282	F/790-28	BIT-F790-23-32	1"
	14	2,1	0.083	33,9	1.334	F/790-29		
	16	1,6	0.065	34,8	1.370	F/790-30		
	18	1,2	0.049	35,6	1.402	F/790-31		
	20	0,9	0.035	36,3	1.430	F/790-32		

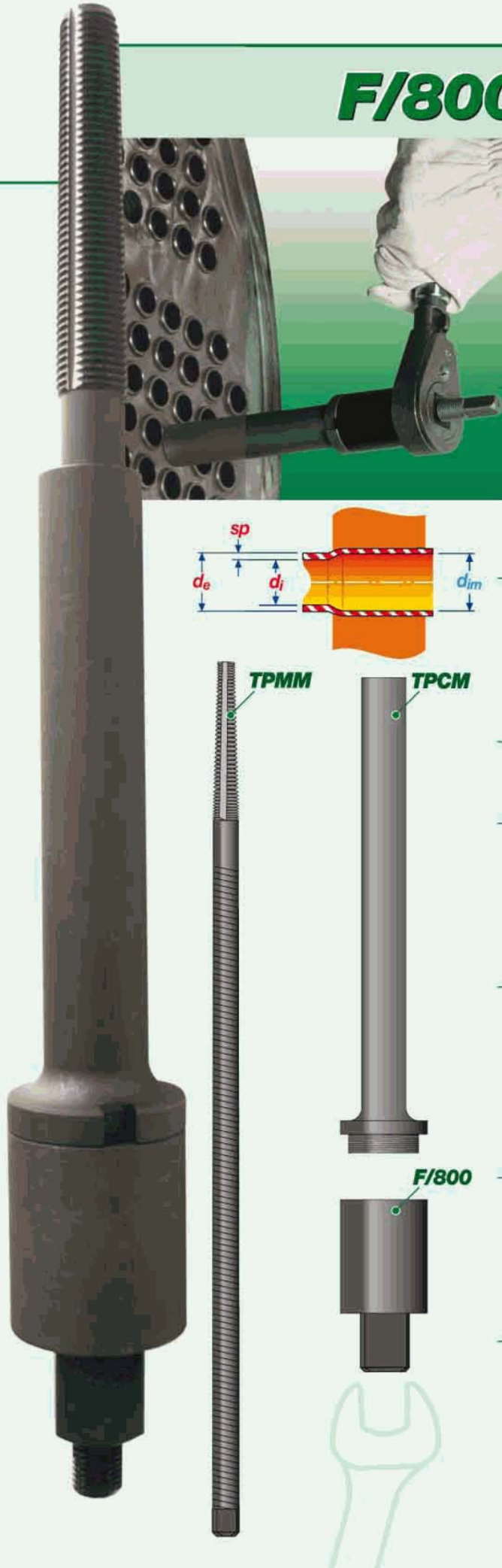




# F/800

## Manual extractor

Recommended for small maintenance jobs, the **F/800** hand extractor allows easy removal of stubs and tubes.



$d_e$ mm	sp B.W.G.	dim		TPMM	TPCM	F/800		
		mm	"	Mandrel	Collar	Manual extractor		
				Cod.	"	Cod.	"	
3/8" (9,5)	17 ÷ 19	6,5 ÷ 7,5	0.256 ÷ 0.295	TPMM-7	1/2"	TPCM-11	F/800-1	7/8"
	20 ÷ 24	7,5 ÷ 8,5	0.295 ÷ 0.335	TPMM-8				
1/2" (12,7)	14 - 16	8,5 ÷ 9,5	0.335 ÷ 0.374	TPMM-9	1/2"	TPCM-14	F/800-1	7/8"
	17 - 18	9,5 ÷ 10,5	0.374 ÷ 0.413	TPMM-10				
	19 ÷ 21	10,5 ÷ 11,5	0.413 ÷ 0.453	TPMM-11				
	24	11,5 ÷ 12,5	0.453 ÷ 0.492	TPMM-12				
5/8" (15,9)	16 - 17	12,5 ÷ 13,5	0.492 ÷ 0.531	TPMM-13	1/2"	TPCM-18	F/800-1	7/8"
	19 ÷ 21	13,5 ÷ 14,5	0.531 ÷ 0.571	TPMM-14				
	23 - 24	14,5 ÷ 15,5	0.571 ÷ 0.610	TPMM-15				
3/4" (19,0)	11	12,5 ÷ 13,5	0.492 ÷ 0.531	TPMM-13	1/2"	TPCM-21	F/800-1	7/8"
	12 - 13	13,5 ÷ 14,5	0.531 ÷ 0.571	TPMM-14				
	14 - 15	14,5 ÷ 15,5	0.571 ÷ 0.610	TPMM-15				
	16 - 17	15,5 ÷ 16,5	0.610 ÷ 0.650	TPMM-16				
	18 ÷ 20	16,5 ÷ 17,5	0.650 ÷ 0.689	TPMM-17				
	21 ÷ 24	17,5 ÷ 18,5	0.689 ÷ 0.728	TPMM-18				
7/8" (22,2)	14	17,5 ÷ 18,5	0.689 ÷ 0.728	TPMM-18	3/4"	TPCM-25	F/800-2	1.1/4"
	16 - 17	18,5 ÷ 19,5	0.728 ÷ 0.768	TPMM-19				
	18 - 19	19,5 ÷ 20,5	0.768 ÷ 0.807	TPMM-20				
1" (25,4)	10 - 11	18,5 ÷ 19,5	0.728 ÷ 0.768	TPMM-19	3/4"	TPCM-28	F/800-2	1.1/4"
	12	19,5 ÷ 20,5	0.768 ÷ 0.807	TPMM-20				
	13 - 14	20,5 ÷ 21,5	0.807 ÷ 0.846	TPMM-21				
	15 - 16	21,5 ÷ 22,5	0.846 ÷ 0.886	TPMM-22				
	18	22,5 ÷ 23,5	0.886 ÷ 0.925	TPMM-23				
	19 - 20	23,5 ÷ 24,5	0.925 ÷ 0.965	TPMM-24				
1.1/4" (31,8)	10	25,3 ÷ 25,5	0.995 ÷ 1.004	TPMM-25	1"	TPCM-34	F/800-3	1.3/4"
	11 - 12	25,5 ÷ 26,5	1.004 ÷ 1.043	TPMM-26				
	13	26,5 ÷ 27,5	1.043 ÷ 1.083	TPMM-27				
	14 - 15	27,5 ÷ 28,5	1.083 ÷ 1.122	TPMM-28				
	16 ÷ 18	28,5 ÷ 29,5	1.122 ÷ 1.161	TPMM-29				
	19 ÷ 22	29,5 ÷ 30,5	1.161 ÷ 1.201	TPMM-30				
1.1/2" (38,1)	10 - 11	31,5 ÷ 32,5	1.240 ÷ 1.280	TPMM-32	1"	TPCM-41	F/800-3	1.3/4"
	12 - 13	32,5 ÷ 33,5	1.280 ÷ 1.319	TPMM-33				
	14	33,5 ÷ 34,5	1.319 ÷ 1.358	TPMM-34				
	15 ÷ 17	34,5 ÷ 35,5	1.358 ÷ 1.398	TPMM-35				
	18 ÷ 20	35,5 ÷ 36,5	1.398 ÷ 1.437	TPMM-36				
	21 ÷ 24	36,5 ÷ 37,5	1.437 ÷ 1.476	TPMM-37				
2" (50,8)	10	43,5 ÷ 44,5	1.713 ÷ 1.752	TPMM-44	1.1/4"	TPCM-56	F/800-4	2.1/4"
	11 - 12	44,5 ÷ 45,5	1.752 ÷ 1.791	TPMM-45				
	13	45,5 ÷ 46,5	1.791 ÷ 1.831	TPMM-46				
	14 - 15	46,5 ÷ 47,5	1.831 ÷ 1.870	TPMM-47				
	16 ÷ 18	47,5 ÷ 48,5	1.870 ÷ 1.909	TPM-48				
	19 ÷ 22	48,5 ÷ 49,5	1.909 ÷ 1.949	TPM-49				