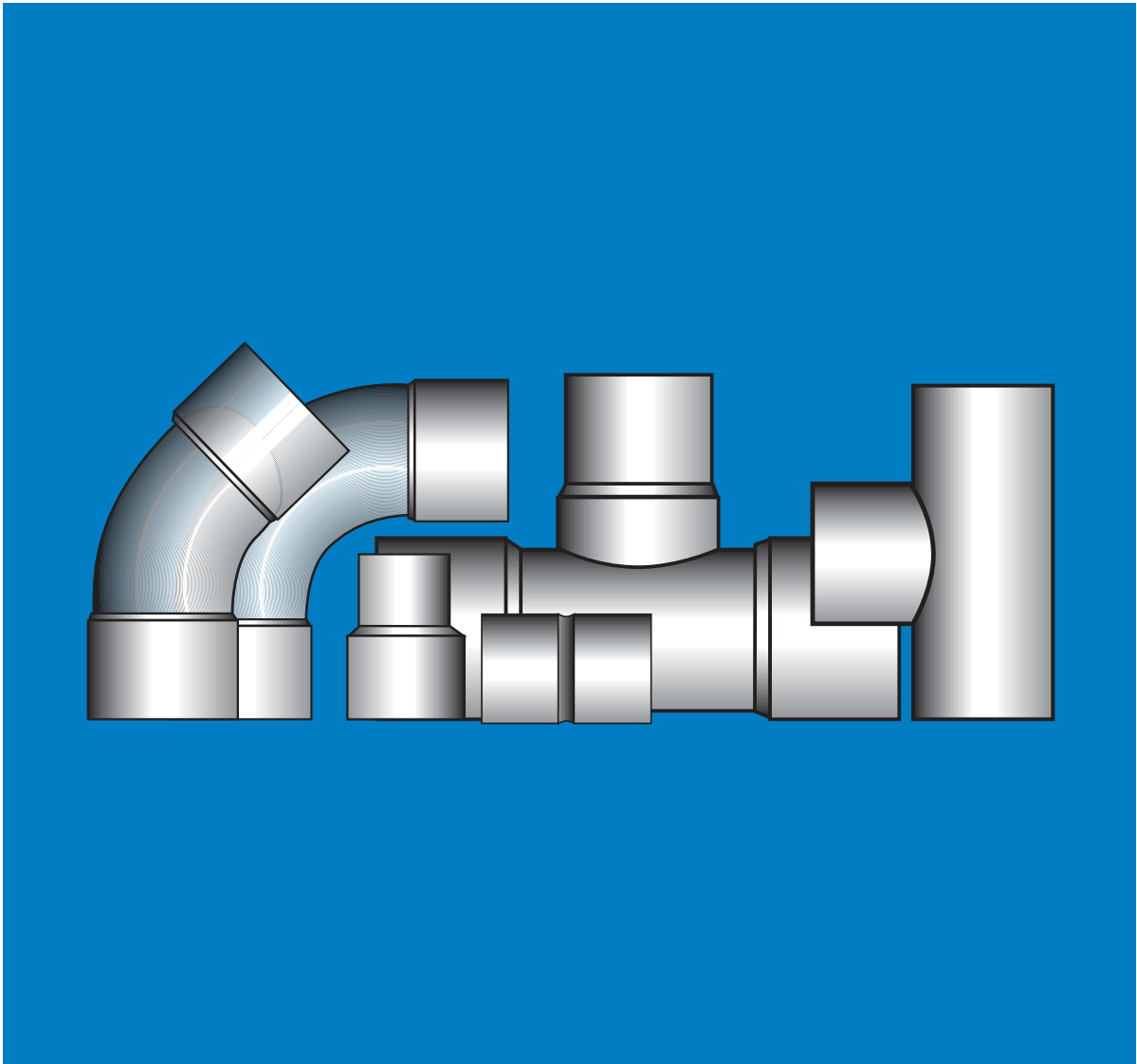


COPPER BRAZE-JOINT PRESSURE FITTINGS





COPPER BRAZE-JOINT PRESSURE FITTINGS

APPLICATIONS

All the fittings, shown in this chapter, are excluded from the scope of Directive 97/23/EC, as specified in the Guidelines 1/8 and 1/9, because they are piping components.

They are designed for installation on commercial refrigerating systems and on civil and industrial conditioning plants, made of seamless copper tube specified in EN 12735-1 : 2001 Standard, which use refrigerant fluids proper to the Group II (as defined in Article 9, Section 2.2 of Directive 97/23/EC and referred to in Directive 67/548/EEC).

PRODUCTS RANGE

Series 77 show the following selection of copper braze-joint fittings, with ODS / IDS millimeters connections, practically in all diameter dimensions:

- 7700 Female to female couplings
- 7702 Female to female reducing couplings
- 7703 Male to female reducing couplings
- 7708 90° female to female elbows – short radius
- 7709 90° male to female elbows – short radius
- 7716 45° female to female elbows
- 7717 45° male to female elbows
- 7718 90° female to female elbows – long radius
- 7719 90° male to female elbows – long radius
- 7732 Tees and reducing tees

Series 78 show a the following selection of copper braze-joint fittings, with ODS / IDS inch connections, limited to few diameter dimensions:

- 7832 Tees and reducing tees

Reinforced series 79 show the following selection of copper braze-joint fittings, with ODS / IDS millimeters connections, limited to some dimensions:

- 7900 Female to female couplings
- 7902 Female to female reducing couplings
- 7903 Male to female reducing couplings
- 7916 45° female to female elbows
- 7917 45° male to female elbows
- 7918 90° female to female elbows – long radius
- 7919 90° male to female elbows – long radius
- 7932 Tees and reducing tees

CONSTRUCTION

Dimensions and tolerances of the ODS / IDS connections ends in copper braze-joint fittings series 77, 78 and 79 are in compliance with the EN 1254-1 : 1998 Standard.

All copper braze-joint fittings series 77, 78 and 79 are made of seamless copper tube EN 12735-2 – CW024A, soft annealed. Technical characteristics of copper fittings series 77 and 78, depending on tube nominal diameters, are given in table 1, while technical characteristics of copper fittings series 79, always depending on nominal diameters, are given in table 2. Copper braze-joint fittings series 77, 78 and 79, if submitted to ambient-temperature burst test, guarantee a pressure strength at least equal to 3 x PS (30 °C rated working-pressure as shown in tables 1 and 2) according to ASME B16.50 : 2001 Standard.

INSTALLATION

The internal working pressure-temperature rating for a copper fitting, is dependent upon, not only fitting strength, but also the adopted joining process and the used filler metal. The working pressure-temperature values given in tables 1 and 2 are referred to a brazing process, performed in accordance with the sound engineering practice.

We wish to remember the definition of brazing process, given in EN 13133 : 2000 Standard.

“The process of joining generally applied to the joining of materials by a heating process during which the parent materials do not melt and the filler metal is drawn into the joint by capillary action. It is generally applicable to joining systems where the filler metal melts at 450 °C or above”.

In actual practice brazing is done at temperatures ranging from 630 to 820 °C and there are two general types of brazing filler metals, normally used for joining copper tube:

- Copper – Phosphorus alloys (the so called B-CuP), proper to CP Class of EN 1044 : 1999 Standard, that are normally used without fluxes;
- Silver alloys (the so called B-Ag), proper to AG Class of EN 1044 : 1999, that must be used with their specific fluxes.

Tube Nominal Diameter		Working Pressure PS [bar], depending on temperature		
		-40 / 30 °C	95 °C	150 °C
[mm]	[in.]			
6	–	90	72	63
–	1/4"	90	72	63
8	–	70	56	49
–	3/8"	60	48	42
10	–	60	48	42
12	–	50	40	35
–	1/2"	50	40	35
14	–	45	36	32
15	–	45	36	32
16	5/8"	45	36	32
18	–	40	32	28
22	7/8"	40	32	28
–	1"	35	28	24
28	–	30	24	21
–	1.1/8"	30	24	21
35	1.3/8"	30	24	21
–	1.5/8"	25	20	18
42	–	25	20	18
54	2.1/8"	20	16	14
64	–	20	16	14
–	2.5/8"	20	16	14
67	–	20	16	14
76	–	18	14	13
–	3.1/8"	18	14	13
80	–	18	14	13
89	3.1/2"	18	12	11
106	–	15	12	11

Note: working pressures shown in this table are in comparison with rated working pressures established in ASME B16.50 : 2001 Standard.

Tube Nominal Diameter		Working Pressure PS [bar], depending on temperature					
		-40 / 30 °C		150 °C		95 °C	
[mm]	[in.]	(1)	(2)	(1)	(2)	(1)	(2)
22	7/8"	60	80	50	67	45	60
3/4	1"	55	73	45	60	41	55
28	3/4	50	67	40	53	37	49
3/4	1.1/8"	50	67	40	53	37	49
35	1.3/8"	50	67	40	53	37	49
3/4	1.5/8"	40	53	35	47	30	40
42	3/4	40	53	35	47	30	40
54	2.1/8"	35	47	30	40	26	35

(1) PS values listed in this column are referred to a safety coefficient 4, according to ASME B16.50 : 2001 Standard

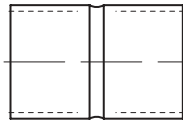
(2) PS values listed in this column are referred to a safety coefficient 3, minimum value warranted by Castel for all its products



TABLE 3: General Characteristics

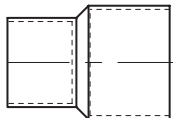
	Catalog Number	International Code	Connections		Weight [g]	Note
			IDS Ø [mm]	ODS Ø [mm]		

Female to female couplings (metric tubing)



7700/M6	5270/6	-	-	6	6	2
7700/M8	5270/8	-	-	8	8	3
7700/M10	5270/10	-	-	10	10	4
7700/M12	5270/12	-	-	12	12	5
7700/M14	5270/14	-	-	14	14	8
7700/M16	5270/16	-	-	16	16	8
7700/M18	5270/18	-	-	18	18	13
7700/M22	5270/22	-	-	22	22	20
7700/M28	5270/28	-	-	28	28	39
7700/M35	5270/35	-	-	35	35	71
7700/M42	5270/42	-	-	42	42	89
7700/M54	5270/54	-	-	54	54	138
7700/M76	5270/76	-	-	76	76	220
7700/M89	5270/89	-	-	89	89	350

Female to female reducing couplings (metric tubing)

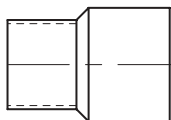


7702/M10.6	5240/10.6	-	-	10	6	3
7702/M10.8	5240/10.8	-	-	10	8	6
7702/M12.8	5240/12.8	-	-	12	8	6
7702/M12.10	5240/12.10	-	-	12	10	8
7702/M14.10	5240/14.10	-	-	14	10	9
7702/M14.12	5240/14.12	-	-	14	12	9
7702/M16.10	5240/16.10	-	-	16	10	12
7702/M16.12	5240/16.12	-	-	16	12	9
7702/M16.14	5240/16.14	-	-	16	14	11
7702/M18.12	5240/18.12	-	-	18	12	12
7702/M18.16	5240/18.16	-	-	18	16	13
7702/M22.12	5240/22.12	-	-	22	12	22
7702/M22.14	5240/22.14	-	-	22	14	19
7702/M22.16	5240/22.16	-	-	22	16	23
7702/M22.18	5240/22.18	-	-	22	18	23
7702/M28.12	5240/28.12	-	-	28	12	34
7702/M28.18	5240/28.18	-	-	28	18	29
7702/M28.22	5240/28.22	-	-	28	22	33
7702/M35.22	5240/35.22	-	-	35	22	56
7702/M35.28	5240/35.28	-	-	35	28	56
7702/M42.28	5240/42.28	-	-	42	28	66
7702/M42.35	5240/42.35	-	-	42	35	88
7702/M54.35	5240/54.35	-	-	54	35	166
7702/M54.42	5240/54.42	-	-	54	42	160
7702/M67.54	5240/67.54	-	-	67	54	246
7702/M76.54	5240/76.54	-	-	76	54	314

TABLE 4: General Characteristics

	Catalog Number	International Code	Connections		Weight [g]	Note
			IDS Ø [mm]	ODS Ø [mm]		

Male to female reducing couplings (metric tubing)



7703/M8.6	5243/8.6	8		6	2	= 7700/M6
7703/M10.6	5243/10.6	10		6	3	
7703/M10.8	5243/10.8	10		8	3	= 7700/M8
7703/M12.6	5243/12.6	12		6	3	= 7702/M10.6
7703/M12.8	5243/12.8	12		8	6	= 7702/M10.8
7703/M12.10	5243/12.10	12		10	4	= 7700/M10
7703/M14.10	5243/14.10	14		10	8	= 7702/M12.10
7703/M14.12	5243/14.12	14		12	5	= 7700/M12
7703/M16.10	5243/16.10	16		10	9	= 7702/M14.10
7703/M16.12	5243/16.12	16		12	9	= 7702/M14.12
7703/M16.14	5243/16.14	16		14	8	= 7700/M14
7703/M18.10	5243/18.10	18		10	12	= 7702/M16.10
7703/M18.12	5243/18.12	18		12	9	= 7702/M16.12
7703/M18.14	5243/18.14	18		14	11	= 7702/M16.14
7703/M18.16	5243/18.16	18		16	8	= 7700/M16
7703/M22.12	5243/22.12	22		12	23	
7703/M22.14	5243/22.14	22		14	20	
7703/M22.16	5243/22.16	22		16	20	
7703/M22.18	5243/22.18	22		18	21	
7703/M28.12	5243/28.12	28		12	32	
7703/M28.14	5243/28.14	28		14	31	
7703/M28.16	5243/28.16	28		16	33	
7703/M28.18	5243/28.18	28		18	29	
7703/M28.22	5243/28.22	28		22	32	
7703/M35.18	5243/35.18	35		18	50	
7703/M35.22	5243/35.22	35		22	65	
7703/M35.28	5243/35.28	35		28	50	
7703/M42.22	5243/42.22	42		22	90	
7703/M42.28	5243/42.28	42		28	102	
7703/M42.35	5243/42.35	42		35	93	
7703/M54.28	5243/54.28	54		28	125	
7703/M54.42	5243/54.42	54		42	146	
7703/M67.42	5243/67.42	67		42	197	
7703/M67.54	5243/67.54	67		54	246	
7703/M76.42	5243/76.42	76		42	270	
7703/M80.42	5243/80.42	80		42	306	
7703/M106.54	5243/106.54	106		54	784	



TABLE 5: General Characteristics

	Catalog Number	International Code	Connections		Weight [g]	Note
			IDS Ø [mm]	ODS Ø [mm]		

90° female to female elbows - short radius (metric tubing)

	7708/M6	5090/6	-	-	6	6	4
	7708/M8	5090/8			8	8	5
	7708/M14	5090/14			14	14	12
	7708/M16	5090/16			16	16	13
	7708/M18	5090/18			18	18	22
	7708/M22	5090/22			22	22	34
	7708/M28	5090/28			28	28	56
	7708/M35	5090/35			35	35	119
	7708/M42	5090/42			42	42	163
7708/M54	5090/54	54	54	298			

90° male to female elbows - short radius (metric tubing)

	7709/M16	5092/16	16	-	-	16	18
	7709/M18	5092/18	18			18	26
	7709/M22	5092/22	22			22	34
	7709/M28	5092/28	28			28	67
	7709/M35	5092/35	35			35	114
	7709/M42	5092/42	42			42	184
	7709/M54	5092/54	54			54	304

45° female to female elbows (metric tubing)

	7716/M16	5041/16	-	-	16	16	16
	7716/M18	5041/18			18	18	21
	7716/M22	5041/22			22	22	35
	7716/M28	5041/28			28	28	61
	7716/M35	5041/35			35	35	119
	7716/M54	5041/54			54	54	231
	7716/M80	5041/80			80	80	740

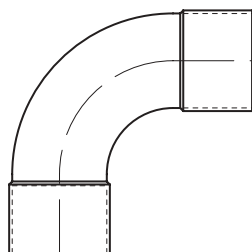
45° male to female elbows (metric tubing)

	7717/M22	5040/22	22	-	-	22	33
	7717/M28	5040/28	28			28	57
	7717/M35	5040/35	35			35	124
	7717/M42	5040/42	42			42	167
	7717/M54	5040/54	54			54	288
	7717/M80	5040/80	80			80	800

TABLE 6: General Characteristics

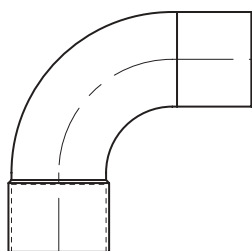
	Catalog Number	International Code	Connections		Weight [g]	Note
			IDS Ø [mm]	ODS Ø [mm]		

90° female to female elbows - long radius (metric tubing)



7718/M10	5002/10			10	10	7
7718/M12	5002/12			12	12	11
7718/M14	5002/14			14	14	15
7718/M16	5002/16			16	16	20
7718/M18	5002/18			18	18	29
7718/M22	5002/22			22	22	46
7718/M28	5002/28			28	28	79
7718/M35	5002/35	-	-	35	35	146
7718/M42	5002/42			42	42	216
7718/M54	5002/54			54	54	353
7718/M64	5002/64			64	64	420
7718/M67	5002/67			67	67	505
7718/M76	5002/76			76	76	880
7718/M80	5002/80			80	80	1340
7718/M89	5002/89			89	89	1670

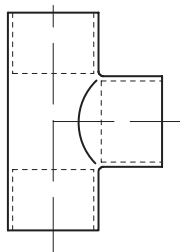
90° male to female elbows - long radius (metric tubing)



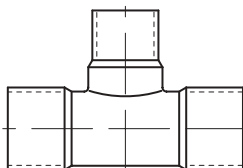
7719/M12	5001/12	12		12		11
7719/M14	5001/14	14		14		16
7719/M16	5001/16	16		16		20
7719/M18	5001/18	18		18		30
7719/M22	5001/22	22		22		47
7719/M28	5001/28	28		28		86
7719/M35	5001/35	35	-	-	35	144
7719/M42	5001/42	42		42		210
7719/M54	5001/54	54		54		390
7719/M64	5001/64	64		64		470
7719/M67	5001/67	67		67		550
7719/M76	5001/76	76		76		915
7719/M80	5001/80	80		80		1006


TABLE 7: General Characteristics

	Catalog Number	International Code	Connections			Weight [g]	Note
			IDS Ø [mm]	ODS Ø [mm]			

Tees (metric tubing)


7732/M6	5130/6		6	6	6	5
7732/M8	5130/8		8	8	8	7
7732/M10	5130/10		10	10	10	17
7732/M12	5130/12	-	12	12	12	14
7732/M14	5130/14		14	14	14	22
7732/M16	5130/16		16	16	16	25
7732/M18	5130/18		18	18	18	36
7732/M22	5130/22		22	22	22	59
7732/M28	5130/28		28	28	28	101
7732/M35	5130/35		35	35	35	185
7732/M42	5130/42		42	42	42	269
7732/M54	5130/54		54	54	54	465
7732/M64	5130/64		64	64	64	510
7732/M67	5130/67		67	67	67	658
7732/M80	5130/80		80	80	80	1084

Reducing tees (metric tubing)


7732/M8.6.8	5130/8.6.8		8	6	8	7
7732/M8.10.8	5130/8.10.8		8	10	8	12
7732/M10.6.10	5130/10.6.10		10	6	10	10
7732/M10.8.8	5130/10.8.8	-	10	8	8	13
7732/M10.8.10	5130/10.8.10		10	8	10	10
7732/M10.12.10	5130/10.12.10		10	12	10	17
7732/M12.8.12	5130/12.8.12		12	8	12	12
7732/M12.10.12	5130/12.10.12		12	10	12	13
7732/M12.14.12	5130/12.14.12		12	14	12	17
7732/M12.16.12	5130/12.16.12		12	16	12	22
7732/M14.12.14	5130/14.12.14		14	12	14	34
7732/M14.22.14	5130/14.22.14		14	22	14	57
7732/M16.12.16	5130/16.12.16		16	12	16	22
7732/M16.14.16	5130/16.14.16		16	14	16	20
7732/M16.16.12	5130/16.16.12		16	16	12	30
7732/M16.22.16	5130/16.22.16		16	22	16	58
7732/M18.12.18	5130/18.12.18		18	12	18	27
7732/M18.16.18	5130/18.16.18		18	16	18	28
7732/M18.22.18	5130/18.22.18		18	22	18	45
7732/M22.12.22	5130/22.12.22		22	12	22	37
7732/M22.16.22	5130/22.16.22		22	16	22	45
7732/M22.18.22	5130/22.18.22		22	15	22	43
7732/M22.28.22	5130/22.28.22		22	18	22	93
7732/M28.22.28	5130/28.22.28	28	22	28	75	
7732/M35.28.35	5130/35.28.35	35	28	35	110	
7732/M42.22.42	5130/42.22.42	42	22	42	154	
7732/M42.28.42	5130/42.28.42	42	28	42	170	
7732/M54.42.54	5130/54.42.54	54	42	54	354	

TABLE 8: General Characteristics

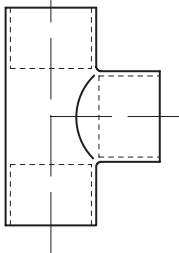
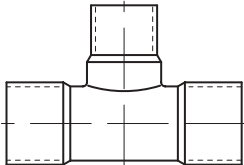
	Catalog Number	International Code	Connections			Weight [g]	Note
			IDS Ø [mm]	ODS Ø [mm]			
Tees (inch tubing)							
	7832/222	5130/222	-	1/4"	1/4"	1/4"	8
	7832/333	7832/333	-	3/8	3/8	3/8	8
Reducing tees (inch tubing)							
	7832/232	5130/232	-	1/4"	3/8"	1/4"	11
	7832/323	7832/323	-	3/8	1/4"	3/8	14



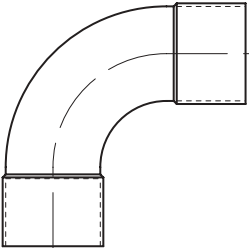
TABLE 9: General Characteristics

	Catalog Number	International Code	Connections		Note	
			IDS Ø [mm]	ODS Ø [mm]		
Female to female couplings, reinforced series (metric tubing)						
	7900/M22	-	-	-	22	22
	7900/M28				28	28
	7900/M35				35	35
	7900/M42				42	42
	7900/M54				54	54
Female to female reducing couplings, reinforced series (metric tubing)						
	7902/M28.22	-	-	-	28	22
	7902/M35.22				35	22
	7902/M35.28				35	28
	7902/M42.28				42	28
	7902/M42.35				42	35
	7902/M54.35				54	35
	7902/M54.42				54	42
Male to female reducing couplings, reinforced series (metric tubing)						
	7903/M28.22	-	28	-	-	22
	7903/M35.22		35			22
	7903/M35.28		42			28
	7903/M42.28		42			28
	7903/M42.35		42			35
	7903/M54.35		54			35
	7903/M54.42		54			42
45° female to female elbows, reinforced series (metric tubing)						
	7916/M22	-	-	-	22	22
	7916/M28				28	28
	7916/M35				35	35
	7916/M42				42	42
	7916/M54				54	54
45° male to female elbows, reinforced series (metric tubing)						
	7917/M22	-	22	-	-	22
	7917/M28		28			28
	7917/M35		35			35
	7917/M42		42			42
	7917/M54		54			54

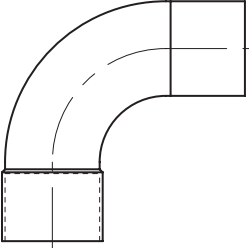
TABLE 10: General Characteristics

	Catalog Number	International Code	Connections		Note
			IDS Ø [mm]	ODS Ø [mm]	

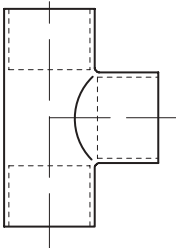
90° female to female elbows - long radius, reinforced series (metric tubing)

	7918/M22	-	-	-	22	22	
	7918/M28				28	28	
	7918/M35				35	35	
	7918/M42				42	42	
	7918/M54				54	54	

90° male to female elbows - long radius, reinforced series (metric tubing)

	7919/M22	-	-	-	22	22	
	7919/M28				28	28	
	7919/M35				35	35	
	7919/M42				42	42	
	7919/M54				54	54	

Tees, reinforced series (metric tubing)

	7932/M22	-	-	22	22	22	
	7932/M28			28	28	28	
	7932/M35			35	35	35	
	7932/M42			42	42	42	
	7932/M54			54	54	54	

