Copper & Copper Alloy

SHEETS & STRIPS

POONGSAN

The best technology and the best choice

Sheets & Strips

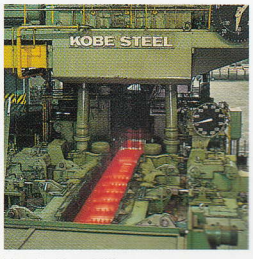
Since it was established in 1968, Poongsan has remained the leading company in the Korean copper manufacturing industry and a major player in the global copper industry. With its extensive experience, advanced technology, first-class experts and new production facilities, Poongsan has contributed to a higher quality of life through the supply of materials to a diverse range of industries.

Poongsan operates one of the largest copper processing facilities in the world, the Onsan Plant. The Onsan Plant produces a total of more than 300,000 tons of products annually. After 1990, Poongsan began constructing production bases overseas in the United States, Thailand, Malaysia and China.
The combined production capacity of these overseas affiliates is 165,000tons, which these products are destined for their respective local markets.

Onsan Mill

Contents

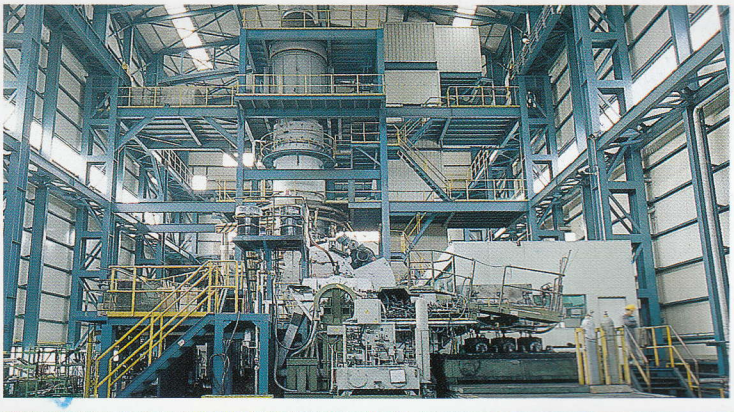
Poongsan's **Facilities**



Hot Rolling Mill

Poongsan copper & copper alloy sheets and strips are used for a diverse range of purposes from semiconductor leadframes to durable goods. Industries such as construction, machinery, automotive, electrical and electronic devices and telecommunications rely on the solid foundation provided by our copper and copper alloy products. Customers worldwide recognize the quality of our sheet and strip products.


Continuous Annealing- Pickling Line


Shaft Furnace


20-High Cold Rolling Mill

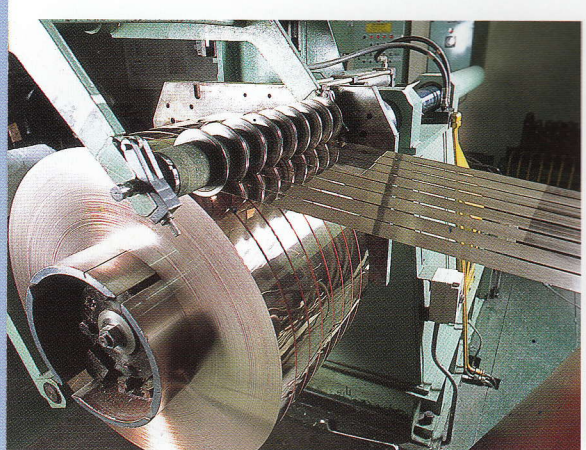

Traverse Winder

Alloys Technical Characteristics

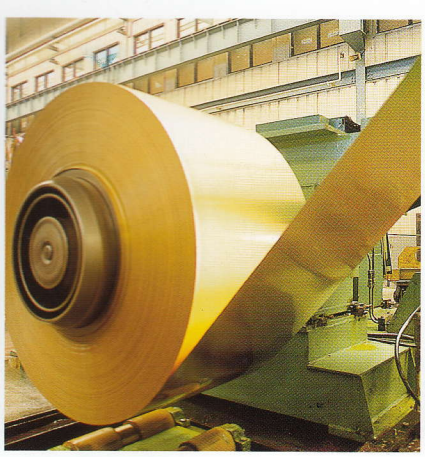
Poongsan has developed a full-scale production system in each mill that begins with melting & casting and continues through to final slitting & servicing. The system includes a broad range of facilities. Noteable equipment and facilities within our Korean, Thailand and China operations include the world's largest shaft furnace, a hot rolling mill that can continually roll 6 tons of slabs, and a 20-high cold rolling mill. Hot and cold rolling mills produce rolled strips of varying grades up to 630mm wide, thicknesses of 0.03mm and tolerances of 2/1000mm. State-of-the-art testing facilities at the plant ensure that the products accurately satisfy dimensional specifications, maintain consistent, targeted physical properties, and possess outstanding surface qualities

COMMERCIAL SHEET AND STRIP PRODUCTS

Poongsan produces various sheet and strip products including pure copper, brass, nickel silver, phosphorus deoxidized copper and phosphor bronze strips, using optimal metal compositions and production methods. Phosphor bronze strips and nickel silver sheets, which are used in electrical and electronic devices, are produced under a meticulous quality management system in order to meet the strict quality standards of the electrical and electronics industries. Poongsan has increased the elongation and formability of its spring products using advanced tension annealing treatments thereby enhancing customer confidence through improved product performance.



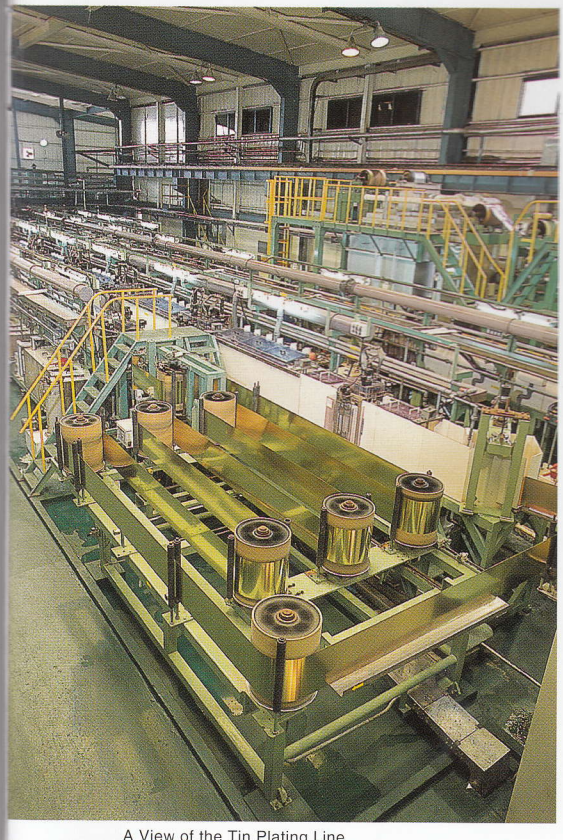
Copper Strip



Brass Strip

Phosphor Bronze Strip

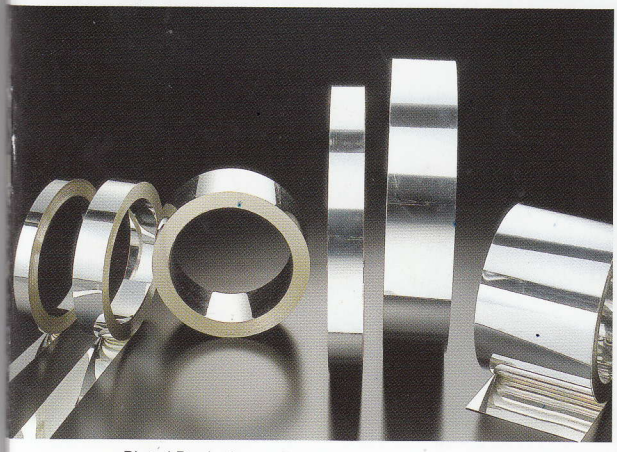
Tin plated **Strips**



A View of the Tin Plating Line

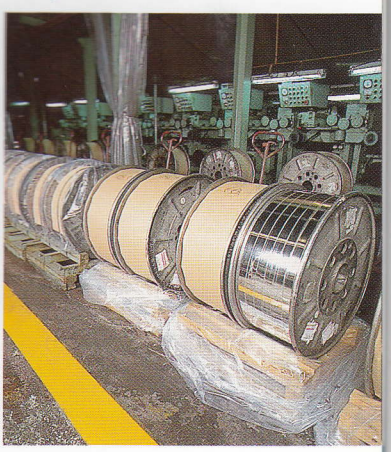
Poongsan produces tin plated strips for electrical, electronic and telecommunications devices. Strips are specially tin-plated to offer higher performance in all applications. Poongsan upgraded its production technology and product quality through the establishment of PNT Corporation in association with Nippon Mining & Metals, a globally recognized leader in tin plating technology.

Located at the Onsan Mill, the PNT joint venture makes products of outstandingly uniform plating thickness and superior, highly reflective surface luster through the Coil-to-Coil (CTC) type electro plate reflow line. Highly reflective premium coatings are combined with Poongsan's top quality brass strip and other copper alloys. Coatings produced using this technique are whisker free, ensuring maximum long-term reliability and shelf life. Barrier coatings can also be applied under this high performance reflow tin coating. Copper and other layers can be added which reduce zinc migration and other deleterious effects of base materials on contact performance. Strips can be used directly and stamped to final form for assembly, molding or packaging without post-plating operations. Products produced from these reflow plated strips have superior contact resistance and corrosion resistance qualities, low insertion-withdrawal forces, and show resistance to surface degradation at temperatures up to 200℃.



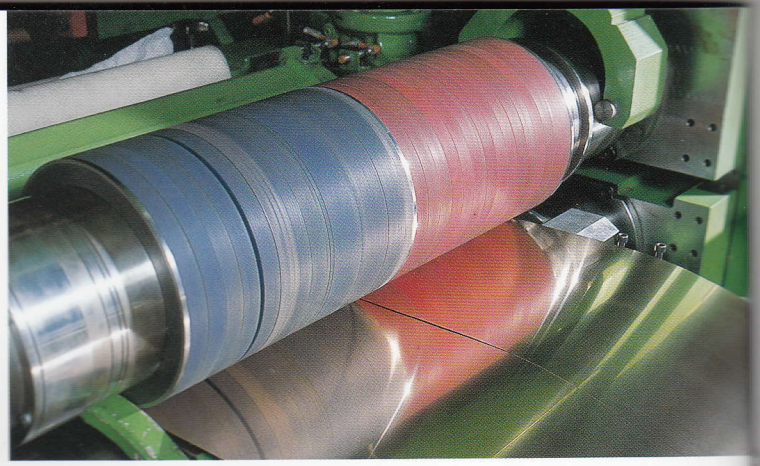
Plated Products

View of Plating



Product Packaging

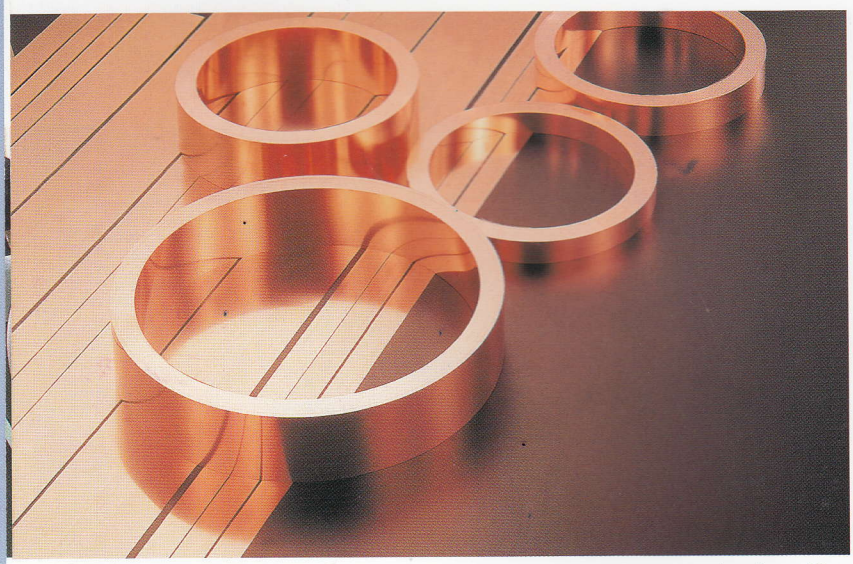
Leadframe Alloys



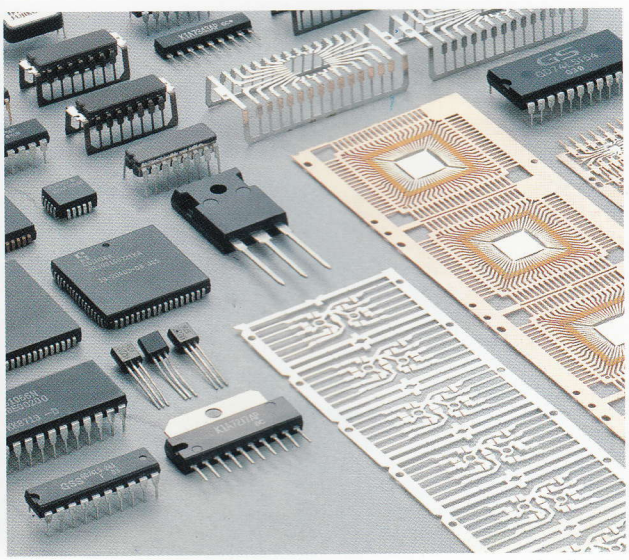
CNC Slitter

With its extensive production experience and accumulated technology, Poongsan has been supplying new alloy products that are specifically designed for use in semiconductor leadframes and connector applications. These alloys include PMC102, PMC102M, C194 and PMC90. These new copper materials have been registered in both Japan and the US. US designations (CDA) are C19010, C19015, C194, and C19210. These alloys all possess outstanding electrical and thermal conductivity, and their design properties remain stable at temperatures up to 150 ℃, which is significantly higher than previous materials used in the industry.

For the production of high quality leadframes, Poongsan invested in a specialized production facility that includes tension leveling, tension annealing and a dedicated casting unit designed specifically for leadframe alloys. Poongsan has strengthened its research and development capabilities in the areas of chemicals and electronics and has applied these technical advances to leadframe manufacturing with rigorous quality control practices.



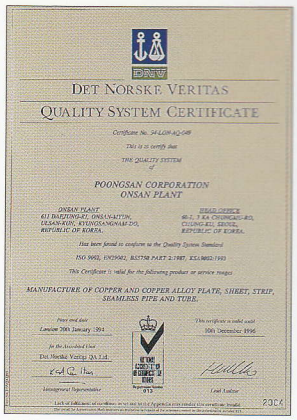
Leadframe Alloys



Leadframes

Examining Structure through a scanning Electron Microscope (SEM)

R&D, Certification



DET NORSKE VERITAS

QUALITY SYSTEM CERTIFICATE

POONGSAN CORPORATION
ONSAN PLANT

MANUFACTURE OF COPPER AND COPPER ALLOY PLATE, SHEET, STRIP, SEAMLESS PIPE AND TUBE.

ISO 9002 Certification

Poongsan's first-class research and development team has developed specialized technology and new materials for the copper materials sector, remaining focused on the development of high-performance and environmentally friendly copper materials.

Since the 1980s the company has been introducing new product technology such as PMC102 for lead-frames. As part of our Global Vision, we have licensed this and other similar products to companies in the United States and Germany. The Company received domestic and overseas patents in 1998 for the development of a new high performance connector alloy, known as PMC26. We also developed an environmentally friendly (no lead) nickel silver for car keys and other machinable applications in 1999. Moreover, in the coin blank sector, Poongsan developed manufacturing expertise for a coin alloy referred to as Nordic Gold. Nordic Gold is the primary alloy used for the smaller denomination eurocurrency coins. Poongsan has and continues to actively supply coin blanks in Nordic gold as well as clad materials for the European Union, bringing high recognition overseas for the Company's technical skill.

Poongsan's high standards of quality were recognized when it became the first company in Korea to receive ISO9002 certification for its copper products. The Company continues to adhere to its strict quality control system and strives for excellence in all that it does.

Product Packaging

General Availabilities & Tolerances

Thickness, Width and Length

(Unit: mm)

Alloy No.	Tempers	Thickness	Width				Length (Width) Max.
			Incl. 0.04 to 1.0 incl.	Over 1.0 to 1.5 incl.	Over 1.5 to 2.0 incl.	Over 2.0 to 3.0 incl.	
C1020 C1100 C1220 C2100 C2200 C2300	Annealed and As Rolled	Incl. 0.04 to 3.0 incl.	10 to 635 incl.	30 to 635 incl.	30 to 635 incl.	40 to 600 incl.	1,000~6,000 (600)
C2600 C2680	Annealed and As Rolled	Incl. 0.10 to 3.0 incl.	10 to 635 incl.	30 to 635 incl.	30 to 635 incl.	40 to 635 incl.	1,000~6,000 (600)
C2801			10 to 600 incl.	30 to 600 incl.	30 to 600 incl.	40 to 600 incl.	
C5102 C5191 C5210 C5212	Annealed and As Rolled	Incl. 0.08 to 3.0 incl.	10 to 600 incl.	30 to 600 incl.	30 to 600 incl.	40 to 600 incl.	1,000~6,000 (600)
C7451 C7521 C7701	Annealed and As Rolled	Incl. 0.08 to 3.0 incl.	10 to 550 incl.	30 to 550 incl.	30 to 550 incl.	40 to 550 incl.	1,000~6,000 (600)
PMC1240		Incl. 1.5 to 3.0 incl.	-	-	30 to 570 incl.	40 to 570 incl.	
PMC26 PMC102	Annealed and As Rolled	Incl. 0.1 to 3.0 incl.	10 to 600 incl.	30 to 600 incl.	30 to 600 incl.	40 to 600 incl.	-
C194			10 to 480 incl.	30 to 480 incl.	30 to 480 incl.	40 to 480 incl.	
PMC90			10 to 615 incl.	30 to 615 incl.	30 to 615 incl.	40 to 615 incl.	

Width Tolerances

(Unit: mm)

Thickness \ Width	Up to 50 incl.	Over 50 to 100 incl.	Over 100 to 200 incl.	Over 200 to 300 incl.	Over 300 to 400 incl.	Over 400 to 650 incl.
Incl. 0.08 to 0.2 incl.	±0.05	±0.10	±0.15	±0.20	±0.20	±0.25
Over 0.2 to 0.5 incl.	±0.08	±0.15	±0.15	±0.20	±0.25	±0.25
Over 0.5 to 1.0 incl.	±0.15	±0.20	±0.20	±0.25	±0.30	±0.30
Over 1.0 to 2.0 incl.	±0.20	±0.20	±0.30	±0.30	±0.35	±0.35
Over 2.0 to 3.0 incl.	±0.25	±0.30	±0.40	±0.40	±0.45	±0.45
Over 3.0	±0.30	±0.40	±0.40	±0.40	±0.45	±0.50

Thickness Tolerances

(Unit: mm)

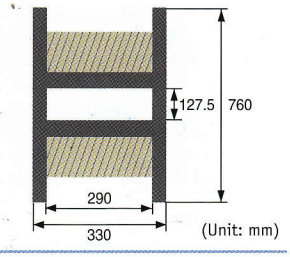
Thickness \ Width	Up to 300 incl.	Over 300 to 600 incl.
Up to 0.08 incl.	±0.005	±0.008
Over 0.08 to 0.15 incl.	±0.008	±0.010
Over 0.15 to 0.25 incl.	±0.008	±0.010
Over 0.25 to 0.35 incl.	±0.010	±0.012
Over 0.35 to 0.45 incl.	±0.012	±0.015
Over 0.45 to 0.55 incl.	±0.015	±0.018
Over 0.55 to 0.70 incl.	±0.018	±0.020
Over 0.70 to 1.0 incl.	±0.020	±0.025
Over 1.0 to 1.3 incl.	±0.025	±0.030
Over 1.3 to 2.0 incl.	±0.030	±0.035
Over 2.0 to 3.0 incl.	±0.035	±0.040

Tin Plated Copper & Copper Alloy Strips

Description	Available Range			Specification		
	Base Metal	Size		Tin Plated Type	Plated Material	
		Thickness	Width		Underplating	Tin Plating
Content	Copper, Brass Phosphor Bronze High Performance Alloy	0.15~0.80mm	Max 400mm (Nor. 305mm)	Reflow Type	Cu: 0.5~1.5㎛	Sn: 0.8~2.0㎛
Others			As per specific agreement with customer		Application to brass only	

Traverse Wound (T/W) Coil

Production Range		Bobbin Material, Weight & T/W Coil Weight			Standard Bobbin Dimension
		Description	Domestic	Overseas	
Thickness	0.2~0.8mm	Bobbin Material	Stainless	Wooden	
		Bobbin Weight	About 50kg/EA	About 18kg/EA	
Width	10~40mm	T/W Coil Weight	400~500kg/Coil	400~500kg/Coil	



(Unit: mm)

Poongsan's Sheets & Strips Copper Alloy Guide

	Copper			Brass					
Alloy No.	C1020	C1100	C1220	C2100	C2200	C2300	C2600	C2680	C2801
Alloy Name	Oxygen Free (OFC)	Tough Pitch (TP)	Phosphorus Deoxidized, High Residual Phosphorus (DHP)	Gilding, 95%	Commercial Bronze, 90%	Red Brass, 85%	Cartridge Brass, 70%	Yellow Brass, 65%	Muntz Metal, 60%
Nominal Composition (%)	Cu 100	Cu 99.9 min. O2 0.05 max.	Cu 99.9 min P0.015-0.040	Cu 95 Zn 5	Cu 90 Zn 10	Cu 85 Zn 15	Cu 70 Zn 30	Cu 65 Zn 35	Cu 60 Zn 40

Tensile Strength (N/mm2)

Alloy No.	C1020	C1100	C1220	C2100	C2200	C2300	C2600	C2680	C2801
0 (Annealed)	205 min.	205 min.	205 min.	215~275	235~295	250~325	290~375	290~375	320~440
1/4H	235~275	235~275	235~275	255~325	270~335	300~355	350~415	350~415	350~440
1/2H	250~315	250~315	250~315	295~365	290~365	330~385	370~445	370~445	410~490
3/4H	270~335	270~335	270~335	–	–	–	390~470	390~470	–
H	290~365	290~365	290~365	340~415	360~450	390~510	440~520	440~520	470~540
EH	340~415	340~415	340~415	–	–	–	515~600	515~600	–
SH	–	–	–	–	–	–	625~690	625~690	–
ESH	–	–	–	–	–	–	655~715	655~715	–

Elongation (%)

Alloy No.	C1020	C1100	C1220	C2100	C2200	C2300	C2600	C2680	C2801
0 (Annealed)	35 min.	35 min.	35 min.	40 min.	42 min.	44 min.	50 min.	50 min.	25 min.
1/4H	25 min.	25 min.	25 min.	23 min.	25 min.	28 min.	35 min.	35 min.	25 min.
1/2H	15 min.	15 min.	15 min.	18 min.	20 min.	23 min.	28 min.	28 min.	15 min.
3/4H	15 min.	15 min.	15 min.	–	–	–	18 min.	18 min.	–
H	–	–	–	–	–	–	12 min.	12 min.	–
EH	–	–	–	–	–	–	–	–	–
SH	–	–	–	–	–	–	–	–	–
ESH	–	–	–	–	–	–	–	–	–

Phosphor Bronze				Cupro-nickel and Nickel Silver				High Performance Alloy			
C5102	C5191	C5210	C5212	C7451	C7521	C7701	PMC1240	C19010	C64750	C19210	C19400
Phosphor Bronze, 5%	Phosphor Bronze, 6%	Phosphor Bronze, 8%	Phosphor Bronze, 8%	Nickel Silver 65-10	Nickel Silver 65-18	Nickel Silver 55-18	Nickel Silver 51-8	PMC102	PMC26	PMC90	C194
Cu 94.8 Sn 5.0 P 0.2	Cu 93.8 Sn 6.0 P 0.2	Cu 91.8 Sn 8.0 P 0.2	Cu 91.8 Sn 8.0 P 0.2	Cu 65 Zn 25 Ni 10	Cu 65 Zn 17 Ni 18	Cu 55 Zn 27 Ni 18	Cu 48.0 Zn 39.5 Ni 8.0 Pb 0.5	Cu 98.5 Ni 1.0 Si 0.2 P 0.03	Cu 97.4 Ni 2.0 Si 0.3 P 0.3	Cu 99.9 Fe 0.1 P 0.032	Cu 97.4 Fe 2.4 Zn 0.13 P 0.04

C5102	C5191	C5210	C5212	C7451	C7521	C7701	PMC1240	C19010	C64750	C19210	C19400
310~385	310~415	–	340~415	320~395	370~445	–	–	–	–	–	–
390~460	390~480	–	390~470	–	–	–	–	360~430	–	295~375	–
490~560	490~560	510~580	490~570	410~490	440~550	535~620	–	430~490	–	355~430	365~430
–	–	–	–	–	–	–	–	–	–	–	–
585~660	585~660	585~660	585~670	–	535~610	625~705	490~590	480~550	590~660	390 min.	410~480
635~705	665~735	685~735	695~765	–	–	705~805	–	520~600	590 min.	–	–
–	–	745~815	–	–	–	760~865	–	590 min.	–	–	480~520
–	–	–	–	–	–	–	–	–	–	–	500~550

C5102	C5191	C5210	C5212	C7451	C7521	C7701	PMC1240	C19010	C64750	C19210	C19400
40 min.	50 min.	–	45 min.	20 min.	20 min.	–	–	–	–	–	–
28 min.	42 min.	–	40 min.	–	–	–	–	10 min.	–	15 min.	–
15 min.	30 min.	35 min.	30 min.	5 min.	5 min.	11 min.	–	6 min.	–	6 min.	6 min.
–	–	–	–	–	–	–	–	–	–	–	–
7 min.	18 min.	20 min.	8 min.	–	3 min.	6 min.	10 min.	4.5 min.	–	4 min.	4 min.
4 min.	5 min.	14 min.	5 min.	–	–	–	–	4.5 min.	8 min.	–	–
–	–	9 min.	–	–	–	–	–	4 min.	6 min.	–	4 min.
–	–	–	–	–	–	–	–	–	–	–	–