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Green and Environmental friendly Material  **BRASS**



GEMBRASS™



DAECHANG Co.,Ltd.

Lead-Free Brass



Lead-Free Brass

According to international environment regulations, using Bi is not harmful to human and Bi is a substitute element of Pb, added for machinability

- RoHS : electronic and automobile parts, up to 0.1% Pb
- RoHS escape clause : copper alloy containing up to 4.0% Pb
- California AB 1953 : plumbing parts, all kinds of valve, up to 0.25% Pb
- CDA and electronics industry require up to 0.09% and 0.01% each Pb

Alloy No.		Chemical Compositions, wt%					
UNS	KS	Cu	Pb	Sn	P	Bi	Zn
C49260	C4926	58~63	0.09	-	0.05~0.15	0.5~1.8	Rem.
C49340	C4934	60~63	0.09	0.5~1.5	0.05~0.15	0.5~2.0	Rem

》 Upon customer's request, Pb containing up to 0.01%, 0.10%, 0.25% is possible

Low Leaded Free-Cutting Brass, C49260

- **Property** : not including Pb, good for machining
- **Application** : electronic parts, precision machine, valves and related parts
- **Types of product** : bar, hollow bar, and ingot for casting (compositions of ingot may be discussed with customer)

Low Leaded Dezincification Resistance Brass, 49340

- **Property** : not including Pb, good for corrosion resistance
- **Application** : valve, faucet, and plumbing, especially for drinking water and food appliances
- **Types of product** : bar, hollow bar, and ingot for casting (compositions of ingot may be discussed with customer)

	C49260	C49340	C36000	C37700
Machinability rating, %	90	90	100*	80
Forgeability rating, %	90	90	-	100*
Corrosion depth, μm (max.)	400~600	100	800~1,000	800~1,000

》 Machinability rating is standard 100% for C36000(free-cutting brass), forgeability rating is standard 100% for C37700(forging brass)

Chip Shape



C49260



C36000

Dezincification-Resistance Brass



DR, Dezincification-Resistance Brass

- **Property** : corrosion resistant property as of bronze, good for forging and machining
- **Application** : machine parts, building exterior materials, polluted water in coastline and industrial area and especially plumbing for drinking water
- **Types of product** : bar, hollow bar, and ingot for casting (compositions of ingot discuss with customer)

Alloy No.		Chemical Compositions, wt%				
UNS	KS	Cu	Pb	Sn	As	Zn
C35330	C3533	59.5~64	1.5~3.5	-	0.02~0.25	Rem.
C48600	C4860	59~62	1.0~2.5	0.3~1.5	0.02~0.25	Rem.

>> C35330 : CZ132(BS), CuZn36Pb2As(EN), Alloy 352(AS), * C48600 : Alloy 486(AS)

>> Upon customer's request, Arsenic not containing is possible.

Dezincification-Resistance Property

Product type	Measurement direction	Average depth, μm (max.)
Forging and castings	All directions	100
Extruded bar	Longitudinal direction	200 or 300*
	Transverse direction	100

>> Up to 200 μm in British standards, up to 300 μm in Australian standards

>> ISO 6509-1981(E), AS 2345-2006 : Dezincification resistance of copper alloys

	C35330	C48600	C83600	C37700
Machinability rating, %	95	90	70	85
Forgeability rating, %	95	95	-	100*
Corrosion depth, μm (max.)	100	100	100	800~1,000
Corrosion type	Intergranular	Intergranular	Localized	$\alpha+\beta$ general

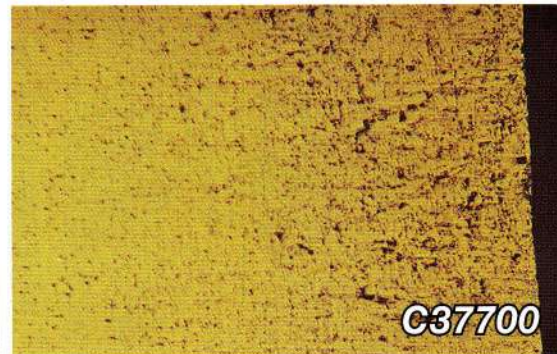
>> C83600 is a cast alloy, bronze

>> Machinability rating is standard 100% for C36000(free-cutting brass), forgeability rating is standard 100% for C37700(forging brass)

Corrosion depth



C35330 / C48600



C37700

Antimicrobial

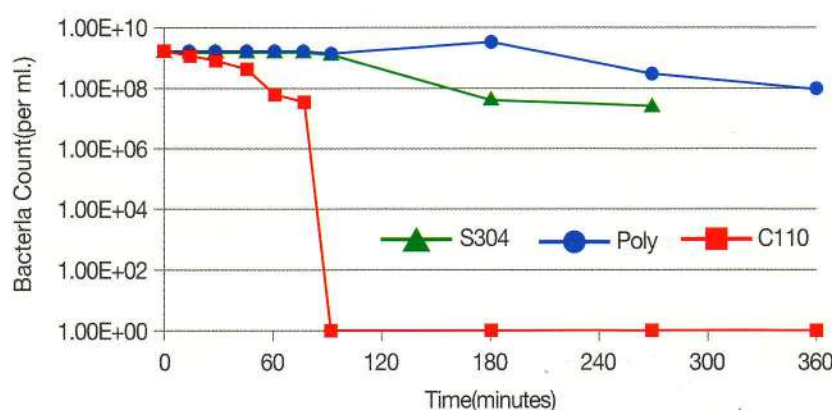


Antimicrobial of Brass Surface

Copper alloys kill Escherichia coli O157:H7, Salmonella enteric, MRSA, Influenza A virus and Novel swine-origin influenza A:H1N1, and it prevents infection and cross contamination on copper alloys. It shows an indigenous characteristic of copper alloys.

Antimicrobial evaluation by ICA, CDA

- A variety of bacteria inoculates onto Copper and then observed them with the time scale.
- Copper alloys(copper, brass, bronze, cupro-nickel, nickel silver) kill more than 99.9% of several bacteria within 1-2hours, and especially copper alloys tarnished is a more effective.
- Coated or plated aluminum, polyethylene which contains antifungal agent, and stainless steel (S30400) coated with silver ion has no sanitizing effect.



Antimicrobial application

- Frequent contact surfaces touched by human : medical appliances and building materials
- Modern buildings, HVAC(heating, ventilating and air conditioning)
- Food container, plumbing and pipe parts related to food or drinking water
- Application; door handles, bed rails, tables, faucets, plumbing, sinks, valves, switches, etc

US EPA registration

Alloy Group	Copper content, wt%	Registration number	Registration date
Group I ~ V	65.0~99.99	82012-1~5	2008/02/29
Group VI	60.0~64.50	82012-6	2009/07/12

>> Copper is the first solid surface material to receive this type of EPA registration, which is supported by extensive antimicrobial efficacy testing.

>> US EPA requires Up to 0.10% Pb, CDA requires up to 0.09% residual element(Pb, Cr, As) in reduction program



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Green and Environmental friendly
Material Brass

GEMBRASS™

Harmless materials to human & environment deals with environmental regulations and water pollution.

GEMBRASS™ Industry

- Brass rod industry where scraps are used more than 80% in producing stands for green recycling industry
- Korea Eco Label(EL, environmental labeling) and Excellent products (EM, excellent materials) certification
- Korea World-class products award certification in brass rod
- GEMBRASS™ registered in KS No. and UNS No.
- Low leaded free-cutting Brass(C49260) and low leaded DR Brass(C49340) has been registering in ASTM (B124, B249, B283, B967)

GEMBRASS™ Advantages

- Lead-free and cadmium-free
- Good machinability and forgeability
- Excellent dezincification corrosion resistance as bronze
- Excellent stress corrosion cracking resistance
- Perfect antimicrobial property

GEMBRASS™ Application

- Drinking water fixtures and fittings for California AB 1953
- Plumbing system for California AB 1953
- Automotive parts: lead-free requirements by RoHS and ELV
- Electrical and electronic parts by RoHS and WEEE
- Substitute for stainless steel, aluminum, polyethylene, PVC etc

GEMBRASS™ Classification

Name		Pb, %	Cd, ppm	reference
Lead-Free		0.01	5	Lead-free, Cd-free
Low lead		0.09	5	Pb : CDA requirement
		0.10	5	Pb : RoHS requirement
		0.25	10	Pb : AB1953 requirement
Medium Leaded		1.0	10	Eco Label
		1.5	30	for electrical cords
Leaded	DR	2.0	60	Certificate EM
	Forging	2.0	60	for general forgings
	Free-Cutting	3.0	60	for general Precision Parts
	Super Free-Cutting	4.0	100	Pb : RoHS exempt, Cd : RoHS

* % and ppm indicate maximum residual



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