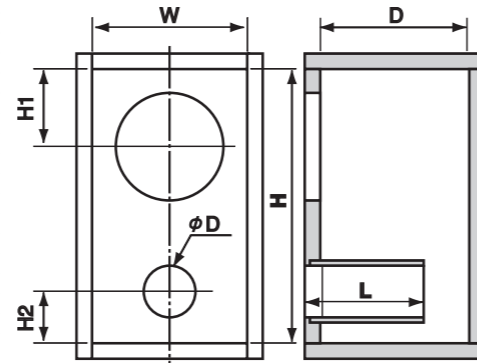


Specifications & Thiele/Small Parameters

	FF85WK	FF105WK	FF125WK	FF165WK	FF225WK
Size	80mm/3.2"	100mm/4.0"	120mm/4.8"	160mm/6.3"	200mm/7.9"
Overall diameter	83mm/3.3"	107mm/4.3"	117mm/4.7"	166mm/6.6"	208mm/8.2"
Baffle hole diameter	73mm/2.9"	93mm/3.7"	104mm/4.1"	146mm/5.8"	185mm/7.3"
Depth	46.7mm/2.0"	52.8mm/3.0"	61.3mm/3.0"	76.6mm/4.0"	91.7mm/4.0"
Voice coil diameter	16mm/0.7"	20mm/0.8"	25mm/1.0"	35mm/1.4"	50mm/2.0"
Cast / Stamped	Stamped	Stamped	Stamped	Stamped	Stamped
Impedance	8Ω	8Ω	8Ω	8Ω	8Ω
Reproduction frequency response	fs ~ 28kHz	fs ~ 25kHz	fs ~ 22kHz	fs ~ 21kHz	fs ~ 17kHz
Sound pressure level	86.5dB/W(m)	88dB/W(m)	89dB/W(m)	92dB/W(1m)	93dB/W(1m)
Rated input	5W	10W	16W	30W	34W
Music power	15W	30W	50W	90W	100W
Magnet weight	187g/0.412lb	340g/0.750lb	388g/0.855lb	848g/1.869lb	1,067g/2.352lb
Net weight	450g/0.992lb	800g/1.764lb	920g/2.028lb	1,950g/4.299lb	3,520g/7.760lb
Equivalent diaphragm radius	a	30mm	40mm	46mm	65mm
Effective cone diameter	D	60mm	80mm	92mm	130mm
Surface area of cone	Sd	0.0028m ²	0.005m ²	0.0066m ²	0.0132m ²
Nominal impedance	Zn	8Ω	8Ω	8Ω	8Ω
Resonance frequency	Fs	115Hz	75Hz	67Hz	50Hz
DC resistance	Re	7.2Ω	6.7Ω	6.7Ω	6.5Ω
Coil inductance	Le	0.032mH	0.041mH	0.044mH	0.056mH
Mechanical Q	Qms	3.298	4.203	5.091	4.19
Electromagnetic Q	Qes	0.683	0.463	0.464	0.373
Total Q	Qts	0.55	0.41	0.42	0.34
Equivalent mass	Mms	2g	3.4g	5g	9.5g
BL product (Factor force)	BL	3.93Tesla/m	4.823Tesla/m	5.596Tesla/m	7.227Tesla/m
Compliance equivalent volume	Vas	1.036L	4.848L	7.265L	27.838L
Voice coil overhang	Xmax	0.35mm	1.7mm	1.65mm	1.85mm
Reference efficiency n0	Eff/n0	0.246%	0.42%	0.451%	0.908%
Mechanical compliance of suspension	Cms	0.909m/N	1.346m/N	1.153m/N	1.068m/N
Efficiency bandwidth product	EBP	168.375	161.987	144.397	134.048

Dimensions & mounting information

	FF85WK	FF105WK	FF125WK	FF165WK	FF225WK
Standard enclosure	Bass-Reflex	Bass-Reflex	Bass-Reflex	Bass-Reflex	Bass-Reflex
Inner volume	3.5	6	9	18	28
W (inside dimension)	108	128	142	200	230
D (inside dimension)	149	192	218	237	280
H (inside dimension)	223	264	296	380	435
Height to the center of unit (H1)	65	65	70	100	110
Height to the center of duct (H2)	55	60	60	90	100
Duct length (L)	100	85	100	145	190
Duct diameter (øD)	ø40	ø40	ø40	ø65	ø65
Tuning frequency (fb)	92Hz	72Hz	57Hz	54Hz	39Hz



FULL RANGE SPEAKER UNIT



FF225WK



FF165WK



FF125WK



FF105WK



FF85WK

CAUTION
RISK OF ELECTRIC SHOCK
DO NOT OPEN

CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK,
DO NOT REMOVE COVER (OR BACK).
NO USER - SERVICEABLE PARTS INSIDE.
REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

WARNING:
To reduce the risk of fire or electric shock, do not expose apparatus to rain or moisture.

Avertissement:
Pour réduire le risque d'incendie ou de choc électrique, ne pas exposer cet appareil sous la pluie et l'humidité.

IMPORTANT SAFETY INSTRUCTIONS

- Read these instructions.
- Keep these instructions.
- Heed all warnings.
- Follow all Instructions.
- Do not use this apparatus near water.
- Clean only with dry cloth.
- Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
- Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
- Do not defeat the safety purpose of the polarized or grounding - type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
- Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
- Only use attachments/accessories specified by the manufacturer.
- Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.
- Unplug this apparatus during lightning storms or when unused for long periods of time.
- Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
- The apparatus shall be used in an open area.
Cet appareil doit être utilisé dans un endroit à aire ouverte.
- Apparatus shall not be exposed to dripping or splashing and that no objects filled with liquids, such as vases, shall be placed on apparatus.
L'appareil ne doit pas être éclaboussé et aucun objet ne contenant de liquide, tel qu'un vase, ne doit être placé sur l'objet.
- Mains plug is used as disconnect device. It shall remain readily operable and should not be obstructed during intended use. To completely disconnect the apparatus from supply mains, the mains plug of the apparatus shall be disconnected from the mains socket outlet completely.
La prise du secteur et utilisé pour déconnecter le système. La prise du secteur ne doit pas être obstruée ou doit être facilement accessible pendant son utilisation. Pour être complètement déconnecté de l'alimentation d'entrée, la prise doit être débranchée du secteur.



Thank you for purchasing our product. FF-WK series are full-range speaker units ideally and exclusively designed for a bass-reflex enclosure. The previous FF series speaker units construction has thoroughly been redesigned on the FF-WK series. With a new addition of 10-cm diameter speaker unit to the product range, new technologies such as a "double-layer" paper cone, a ridge-dome shape aluminum alloy center cap and a pocket neck damper have been employed for high-quality sound. Even with these new technologies, FF-WK series inherit the previous FF series bright and realistic sound character, and achieve a powerful low sound and non-characterized high frequency sound reproduction. Please read this manual carefully before use.

Main Features

• Double-layer cone / up-roll edge using a new material

A double-layer cone paper consists of two layers. One is a basic layer and the other is a surface layer. In the FF-WK series, a long-fibered (low freeness) wooden pulp is used for the basic layer, which has high rigidity realized by the large volume structure and appropriate internal loss. For the surface layer, the bincho charcoal powder is blended with a short-fibered (high freeness) kenaf, which allows to accelerate the propagation speed on the cone paper surface.

The up-roll edge shape realizes a long stroke. A polycarbonate series material which has opposite physicalities of high loss and high Young's modulus is specially blended with urethane foam.

※ The color tone of FF-WK series cone paper is created by the bincho charcoal and no dye is used. Due to this fact, there is a case that the color tone slightly differs from each other.

• Ridge-dome shape aluminum alloy center cap / Mechanical 2-way construction

A ridge-dome shape center cap made of aluminum alloy is employed. Dispersing and deadening a resonance occurred at a specific frequency with this cap helps to ease an unnecessary sound coloration at high frequency range. Also direct coupling with the voice coil bobbin expands the high frequency response.

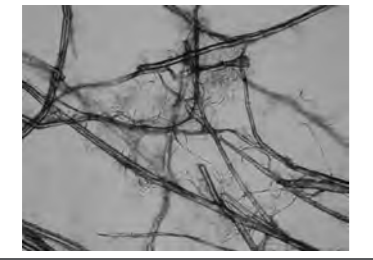
• 3-point gluing / Pocket neck damper

3-point gluing which glues the cone paper, damper and the voice coil at one point is employed on the FF-WK series. Increasing the strength of the cone neck section realizes an improved high frequency response. Employing the pocket shape at the damper neck section has realized the 3-point gluing even with the usage of junction cable.

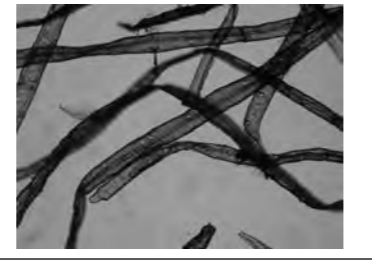
• Faston 205 gold coating connection terminal

In order to minimize the sound variation, the Faston 205 gold coating connection terminal is employed as a speaker terminal.


FF-WK New Technology Elements



Surface Layer
(kenaf: about 2 mm of fiber length)



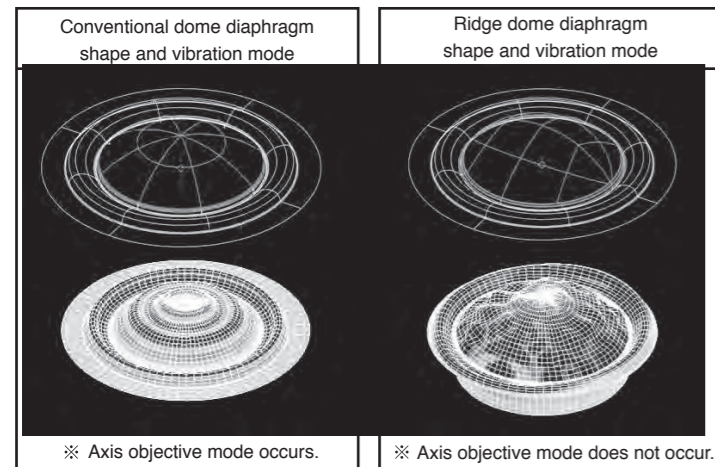
Basic Layer
(wooden pulp: about 4 mm of fiber length)



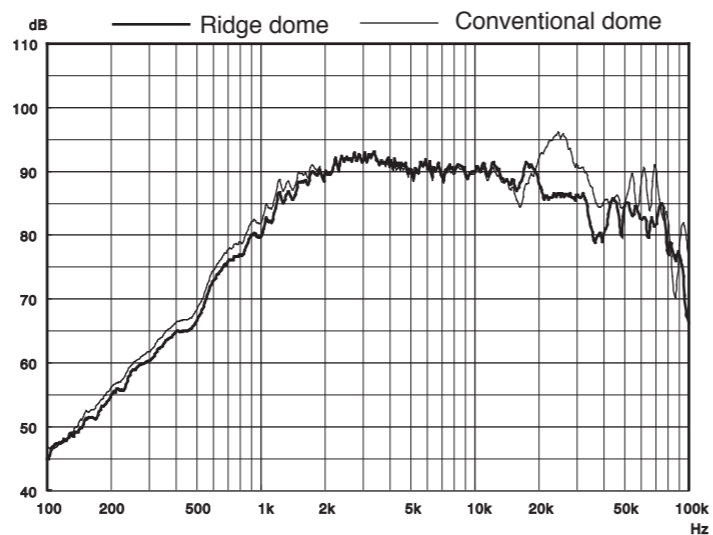
Pocket Neck Damper
(Shape Diagram)

	Surface Layer	Basic Layer
Density (g/cm ³)	0.697	0.77
Young's modulus (Gpa)	3.608	3.598
Acoustic velocity (m/s)	2273	2158
Bending rigidity	3.264	2.8
Internal loss	0.0258	0.0298

■ Comparison on ridge / conventional dome vibration mode



■ Comparison on ridge / conventional dome freq. response

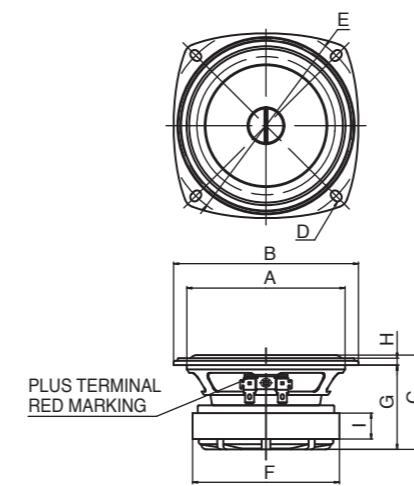


Outer Shape / Baffle Hole Dimensions List

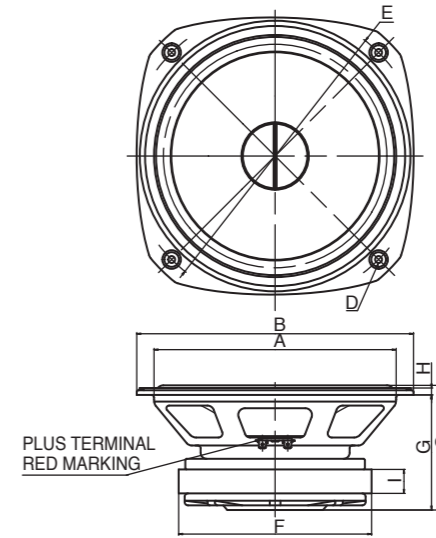
MODEL	A	B	C	D	E	F	G	H	I	J	Note
FF85WK	ø70	□82	47.5	4-4 x 6**	ø86	ø65	43.3	3.4	15	ø73	※1=38, ※2=33
FF105WK	ø92	□107	54.6	4-5 x 6**	ø115	ø85	48.8	4	15	ø93	
FF125WK	ø102.2	□117	62.4	4-ø5*	ø126	ø90	57.5	3.8	15	ø104	
FF165WK	ø143.6	□166	78.5	4-ø5*	ø174	ø120	72	4.6	20	ø146	
FF225WK	ø182	□208	93.7	4-ø5*	ø220	ø145	86.5	5.2	18	ø185	

※: Circular hole, **: Slotted hole

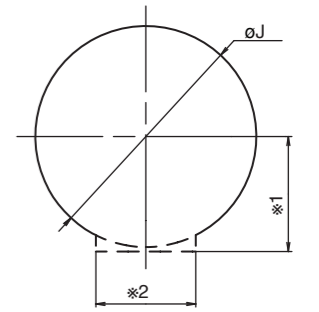
■ FF85/105/125WK outer shape drawing



■ FF165/225WK outer shape drawing

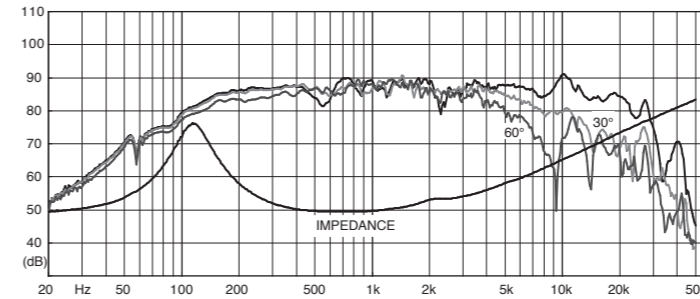


■ Baffle hole drawing

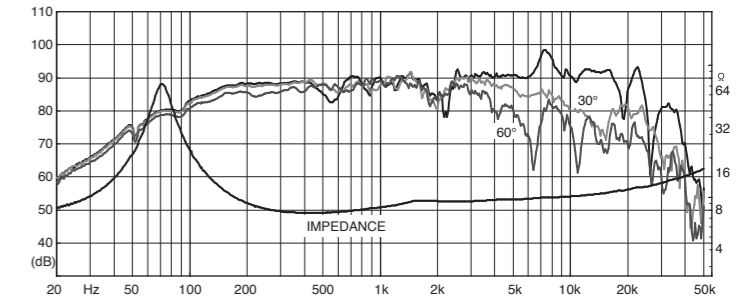


Frequency Response

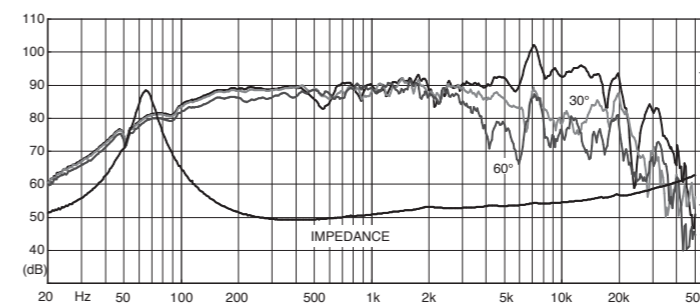
■ FF85WK



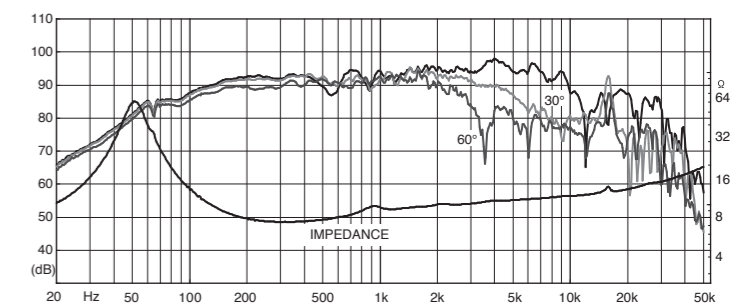
■ FF105WK



■ FF125WK



■ FF165WK



■ FF225WK

