


FANE

# 1x 18” Bass Reflex Enclosure Design

for COLOSSUS PRIME 18XS

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| PROJECT: **Legal Notice** | PART: | | | |
|---|---|---|---|---|
| NOTES: | REVISION: | SCALE: | DIMENSIONS: MM TOLERANCE LINEAR ± 0.4, HOLES +0.1/-0.0, NONE - CUMULATIVE | SHEET: |

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# Hints and Tips

### CHOICE OF TIMBER
We recommend multi-layer 18mm Birch plywood as the best material to withstand the rigours of intensive 'life on the road' or likely exposure to damp conditions. Alternatively, 18mm Medium Density Fibreboard (MDF) offers good acoustic properties with the advantage of being less expensive (although heavier ), and may be used where the cabinet will be permanently installed in a dry environment. Both materials accept any type of paint finish extremely well.

### CONSTRUCTION TECHNIQUE
All joints should be totally airtight, liberally glued with PVA adhesive and screwed at 200mm (8") centres with 4.2mm or 4.8mm (No.8 or No.10) x 50 mm (2") self-tapping screws. The bracing panels are designed to ensure rigidity of construction, making the cabinet as free as possible from panel resonances caused by the internal forces generated by the loudspeaker drive unit and resulting in unwanted vibration and colouration of the sound. Again, these joints should be glued and screwed using the same method.

### PORTING
The length and area of the ports as specified in the drawing should be strictly adhered to.

### ACOUSTIC INSULATION
To aid panel damping and prevent internal reflections and standing waves, all internal panels of the cabinet ( with the exception of the front baffle ) should be lagged with acoustically absorptive material. We recommend the use of acoustic foam wadding. This should be glued, stapled or tacked to the inside of the cabinet, taking care to ensure that port tubes are not obstructed

### CROSSOVER NETWORK
This cabinet is designed as a passive unit, and adequate external signal processing arrangements should be made to filter out high-frequency signals.

### INTERNAL WIRING
Wiring should be kept away from moving loudspeaker parts and fastened to internal panelling to avoid buzzing. We encourage the use of colour coded wiring to identify polarity (red for +ve and black for -ve), and recommend carrying out a phase check before first using the cabinet. This is achieved by applying the positive terminal of a battery to the positive cabinet input which should result in the speaker cone moving forwards if in phase (or by using a dedicated polarity checker).

### DRIVE UNIT FIXING
The drive unit should be front mounted to the baffle using T-nuts and fixing bolts, and is supplied with a length of self adhesive foam sealing strip which should be fitted around the front edge of the speaker cut-outs to guarantee airtight conditions.

### LOUDSPEAKER PROTECTION
The exposed front of all speaker drive units is of course vulnerable to damage, necessitating some means of protection which must be robust but acoustically transparent. Cloth/foam type grilles are feasible for fixed cabinets, but a metal mesh grille is certainly the preferred and superior option. It is recommended that a foam gasket material is used between the wooden cabinet and the metal grille to prevent any unwanted resonances. Please contact Penn Elcom at www.penn-elcom.com to discuss their standard and custom speaker grill solutions.

### CABINET HARDWARE
We specify Penn-Elcom hardware products as recommend components in the construction of FANE-loaded cabinets. Please visit www.penn-elcom.com to view the full range of Penn Elcom products and discuss standard and custom hardware solutions

### CABINET FINISHING
Cabinet finishing is largely a matter of personal preference and as such, detail of this is omitted from the drawing. Generally cabinets are either painted or covered in carpet or vinyl material. If a carpet material is chosen it is recommended that a very dense tight pile type is used and that metal corner protectors are fitted. Corner protectors will have a defined radius that the edges of the cabinet should be finished to. The cabinet shown on the first page of this document has all the external edges routed with a 13mm radius and coated in a hard wearing textured epoxy paint. Two steel carrying handles have been fitted. There are various types of handles and terminal panels available and again details of these have been omitted. It is recommended that these be purchased and cutouts be made in an appropriate position in the panels before final build. Be aware that handles and terminals are not necessarily airtight, which will be detrimental to performance but can be easily remedied using a silicone sealant or polyurethane mastic to seal all joints. Contact Penn Elcom at www.penn-elcom.com to discuss their spray coating, carpet and vinyl options

### WARNING!
There are safety regulations regarding the installation of loudspeaker systems. This document is intended as a guide to construct a suitable acoustic enclosure for our components. Fane Acoustics can hold no responsibility for the structural integrity of the finished system. The system will be no stronger than the material it is made from and the joinery techniques used to assemble it. Suspending the finished system will require additional hanging hardware. There are companies who specialise in the manufacture and correct use of this hardware. They are experts and must be consulted if overhead suspension of the finished system is intended.

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# COLOSSUS PRIME 18XS



The Prime 18XS is intended for use as a high-output bass driver in multi way systems and features a 4 inch 'sandwich' (inside and outside windings) voice coil, immersed in a symmetric magnetic field yielding increased linearity and lower distortion. This, coupled with laminated silicone suspensions, a large Xmax of 12mm with peak to peak travel of 60mm, ensures fast accurate bass at high levels of excursion. The cone membrane, manufactured from polycellulose, is much stronger and more durable than conventional paper pulp alternatives. This allows the driver to combine high-sensitivity with the structural integrity required to produce undistorted low frequencies at extreme sound pressure levels. The driver handles 1200 Watts (A.E.S.) continuous and can cope with peaks in excess of 4800 Watts. This is due to advanced thermal management in the form of vented die-cast chassis and increased motor system venting. These measures effectively remove heat from the voice coil, resulting in extremely low-power compression. The Prime 18XS exhibits 100 dB sensitivity and can deliver bass down to 29 Hz (-6 dB) in a 200 litre ported enclosure.



## ELECTRO ACOUSTIC SPECIFICATIONS

| | |
|---|---|
| Nominal Chassis Diameter | 18" |
| Impedance | 8 Ω |
| Power Handling | 1200 w (A.E.S.) |
| Peak Power (6dB Crest Factor) | 4800 w (A.E.S.) |
| Usable Frequency Range -6dB | 35 Hz - 500 Hz |
| Sensitivity (1 w - 1 m) | 100 dB |
| Moving Mass inc. Air Load | 177 grams |
| Minimum Impedance Zmin | 6.5 Ω |
| Effective Piston Diameter | 15.43" / 392 mm |
| Peak Displacement Volume of Cone Vd | 1.45 litres |
| Magnet Weight | 120 oz |
| Magnetic Gap Depth | 0.43" / 11 mm |
| Flux Density | 1.1 Tesla |
| Coil Winding Height | 1.18" / 30 mm |
| Voice Coil Diameter | 4.0" / 101.6 mm |

## THIELE SMALL PARAMETERS

| | |
|---|---|
| FS Hz | 33 Hz |
| RE Ohms | 5.2 Ω |
| Qms | 8.2 |
| Qes | 0.404 |
| Qts | 0.385 |
| Vas Ltr | 257 |
| Vd litres | 1.45 |
| CMS (mm/N) | 0.124 |
| BL T/m | 22.4 |
| Mms (grms) | 188 |
| Xmax (mm) | 12 |
| Sd ($cm^2$) | 1210 |
| Efficiency % | 2.2 |
| Le (1k Hz) | 1.5 mH |

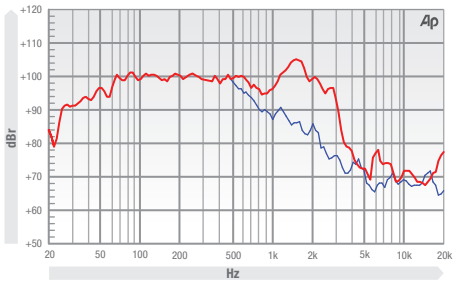
## MATERIALS OF CONSTRUCTION

| | |
|---|---|
| Former Material | Glass Fibre |
| Voice Coil | Copper 'sandwich' inside outside windings |
| Magnet Material | Ferrite |
| Chassis | Die-cast Aluminium |
| Cone | Straight polycellulose Ribbed Cone |
| Surround / Edge Termination | Polyvinyl Damped Multi Roll, Poly Cotton |
| Dust Dome | Solid Paper (Inverted) |
| Connectors | Push-button Spring Terminals |
| Polarity | Positive Voltage at Red Terminal Causes Forward Motion of Cone |

## MOUNTING / SHIPPING INFORMATION

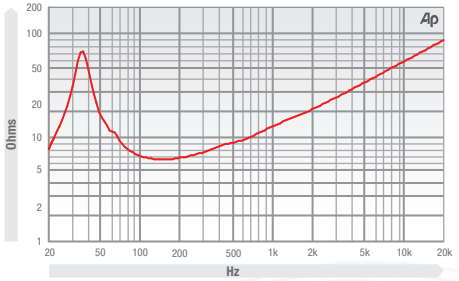
| | |
|---|---|
| Overall Diameter | 19.1" / 485 mm |
| Width Across Flats | 18" / 457 mm |
| Flange Height | 0.465" / 11.8 mm |
| Baffle Hole Diameter F/M | 16.53" / 420 mm |
| Baffle Hole Diameter R/M | 16.33" / 414 mm |
| Gasket Supplied | Front & Rear |
| Fixing Holes | 8x 0.275" diam on 18.425 PCD / 8x 0.275 diam on 17.25 PCD 8x 7 mm diam on 468 PCD / 8x 7 diam on 438.15 PCD |
| Depth | 8.50" / 216 mm |
| Weight | 33.75 lb / 15.3 kg |
| Recommended Enclosure Volume | 4.41 -1 4.12 cu ft / 125 - 400 litres |
| Shipping Weight | 37.45 lb / 17 kg |
| Packing Carton Dimensions | 250 x 520 x 520 mm |

### FREQUENCY RESPONSE DATA*

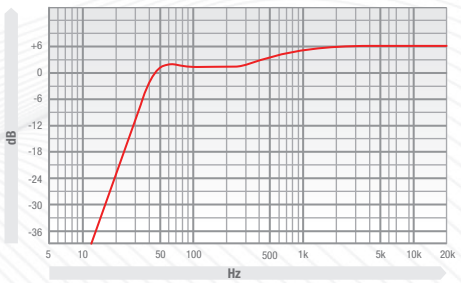



* Half space response measured in a 975 litre sealed box

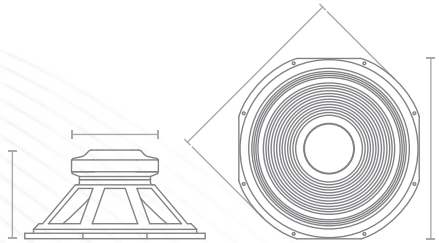
### IMPEDANCE




### PREDICTED BASS RESPONSE





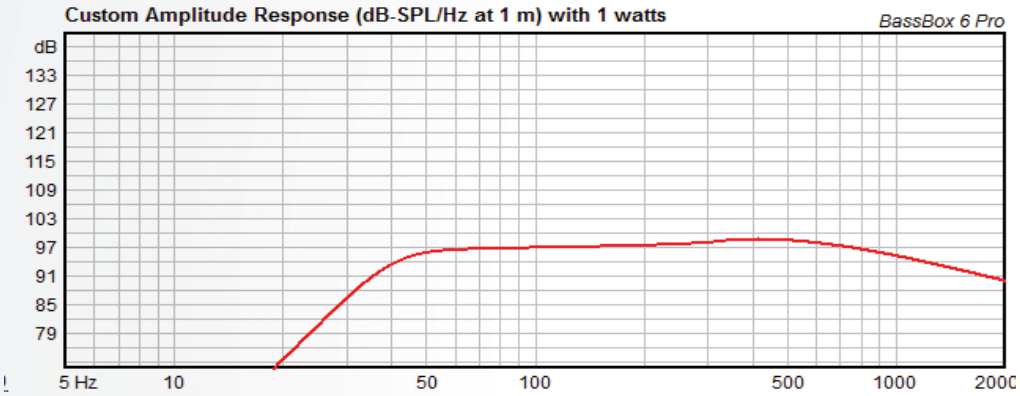



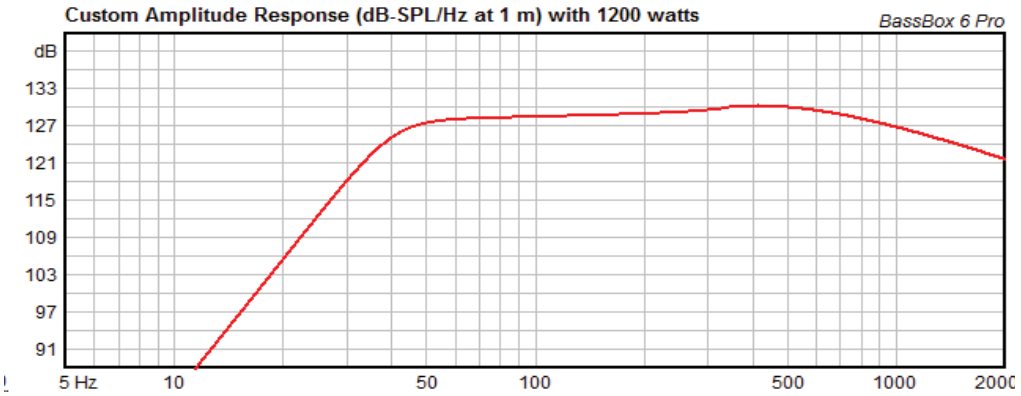
- Please enquire about alternative impedances.
- A.E.S. power handling test. Pink noise bandpass filtered at 12 dB per octave with cutoff frequencies of 30 Hz and 300 Hz. Driver mounted in free air, test signal applied at rated power for two hours.
- Please note that the frequency response measurements are supplied for comparison only and are not a measure of the low frequency performance which may be achieved in a fully optimised system.

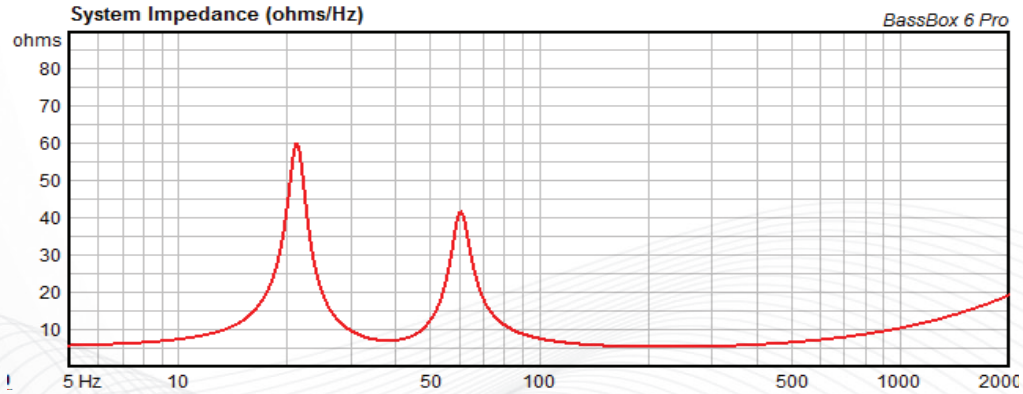
**1x 18" Bass Reflex Enclosure Design** for Colossus Prime 18XS

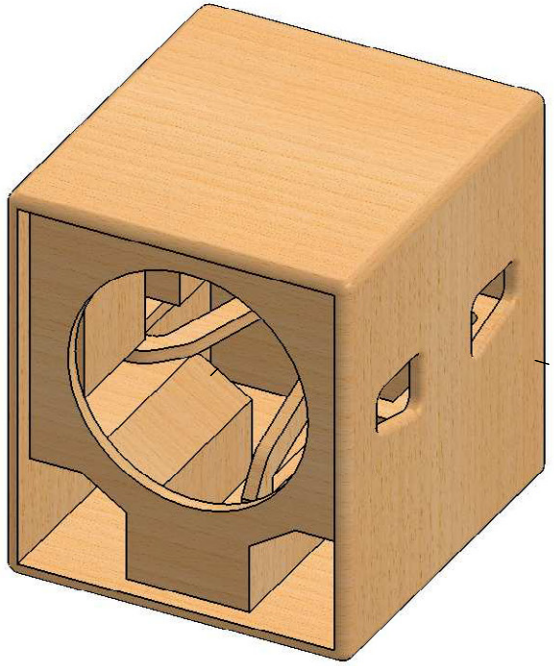
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# BR18XS Simulated Frequency Predicitions

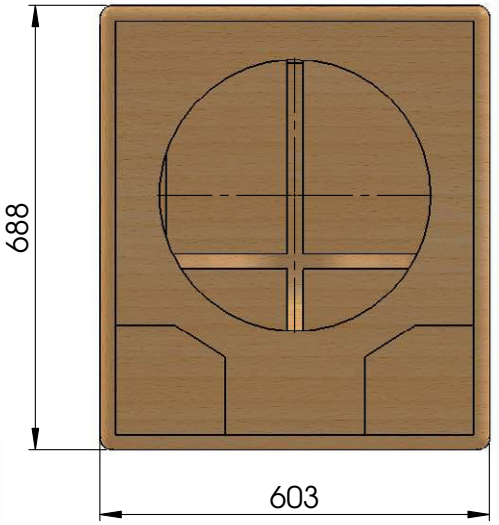




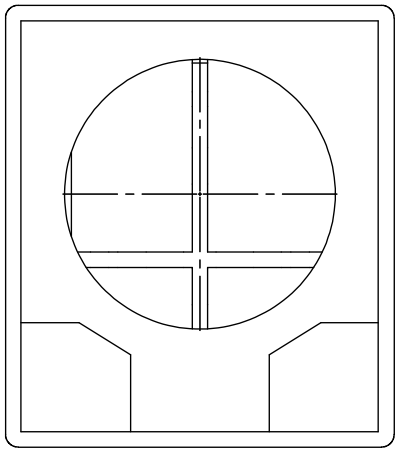


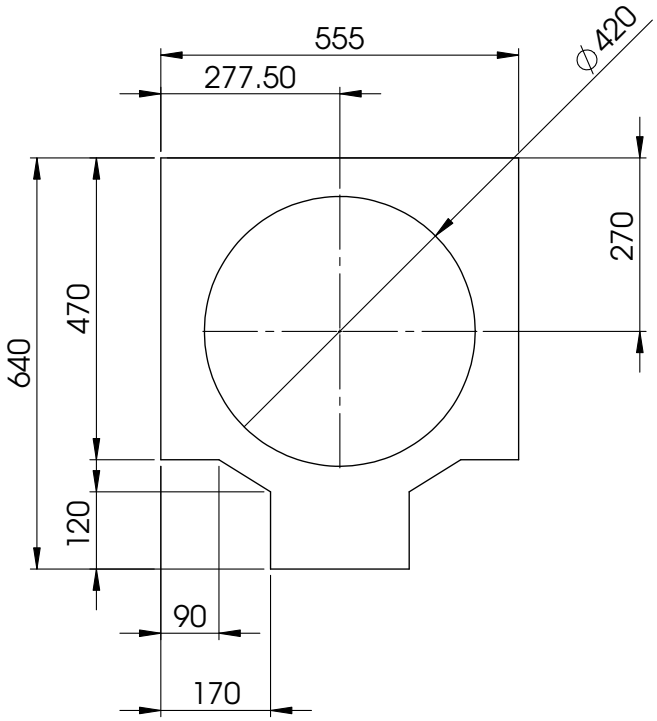




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| | | | DRAWN | | | |
| | | | CHECKED | | | |
| | | | ENG APPR. | | | |
| | | | MFG APPR. | | | |
| | | MATERIAL -- | Q.A. | | | BR18XS |
| | | | COMMENTS: | | | |
| NEXT ASSY | USED ON | FINISH -- | | | | SIZE A / DWG. NO. / REV. |
| APPLICATION | | DO NOT SCALE DRAWING | | | | SCALE:1:20 / WEIGHT: / SHEET 1 OF 5 |

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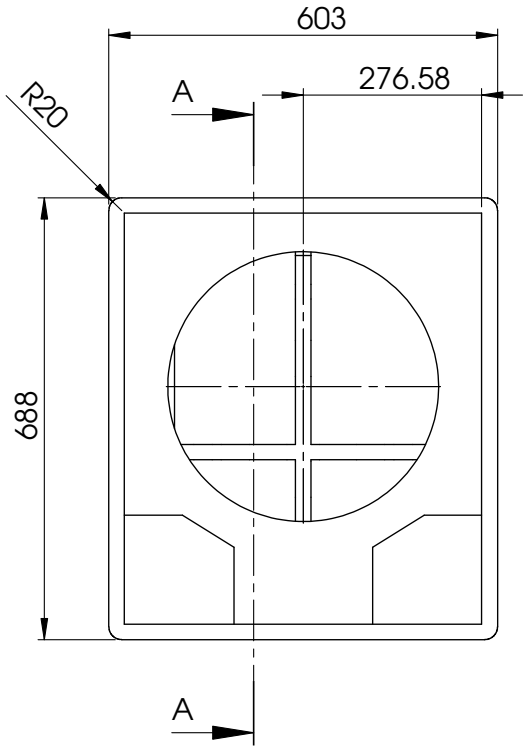

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| | | | Q.A. | | |
| | | MATERIAL<br>24mm Birch Plywood | COMMENTS: | | |
| | | FINISH<br>-- | Scale 1:10 | | |
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| APPLICATION | | DO NOT SCALE DRAWING | | | |

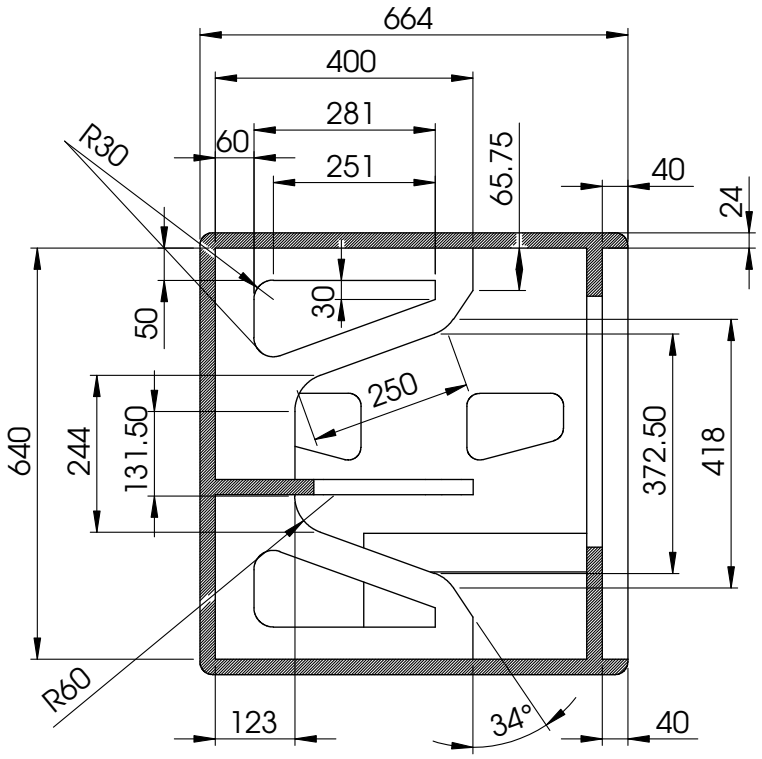
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BR18XS Baffle

| SIZE | DWG. NO. | REV. |
|---|---|---|
| A | | |
| SCALE:1:20 | WEIGHT: | SHEET 2 OF 5 |




SECTION A-A
SCALE 1 : 10

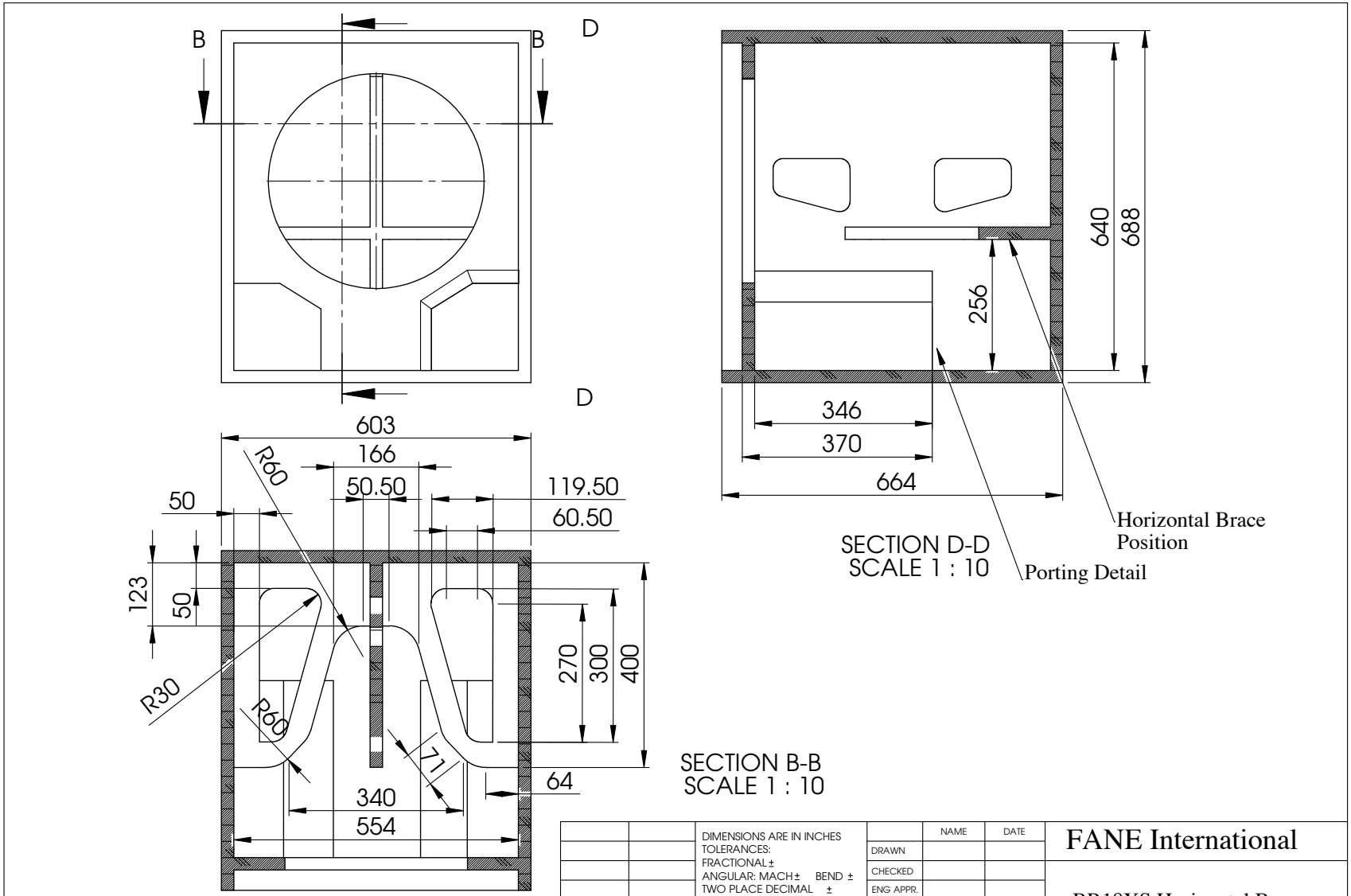
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| | | | Q.A. | | |
| | | MATERIAL<br>24mm Birch Plywood | COMMENTS:<br>20mm radius on all external corners | | |
| | | FINISH<br>-- | | | |
| NEXT ASSY | USED ON | DO NOT SCALE DRAWING | | | |
| APPLICATION | | | | | |

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BR18XS Vertical Brace
Side Elevation Section A-A

| SIZE | DWG. NO. | REV. |
|---|---|---|
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| SCALE:1:20 | WEIGHT: | SHEET 3 OF 5 |



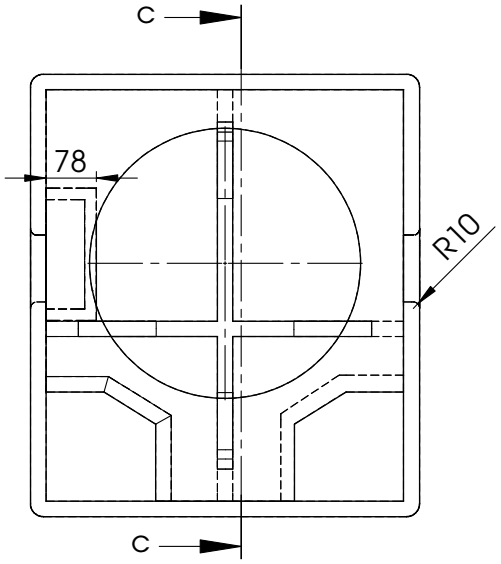

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| | | | ENG APPR. | | |
| | | | MFG APPR. | | |
| | | | Q.A. | | |
| | | MATERIAL<br>24mm Birch Plywood | COMMENTS:<br>20mm radius on all external corners | | |
| NEXT ASSY | USED ON | FINISH<br>-- | | | |
| APPLICATION | | DO NOT SCALE DRAWING | | | |

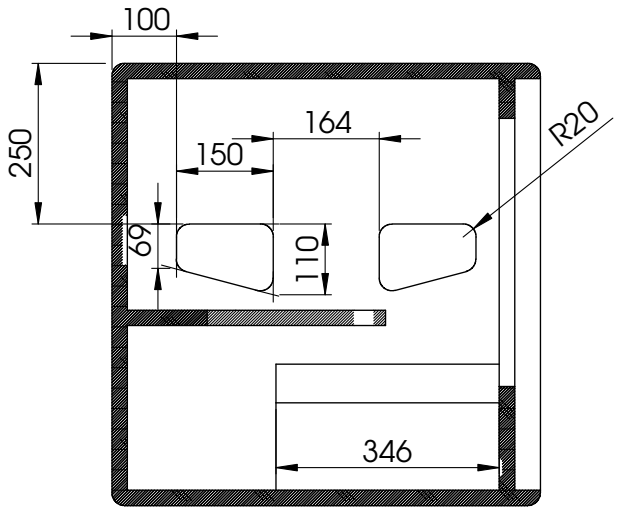
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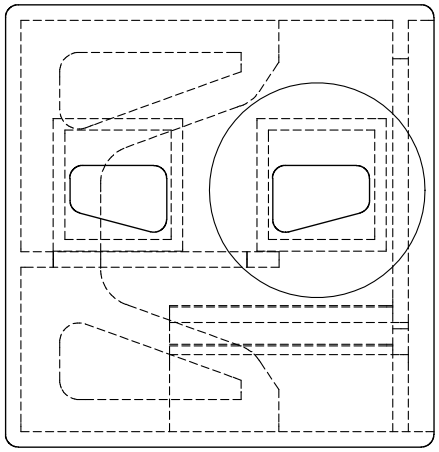
BR18XS Horizontal Brace
Top Elevation Section B-B

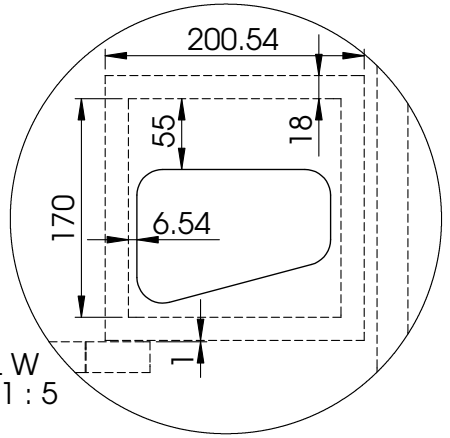
| SIZE | DWG. NO. | REV. |
|---|---|---|
| A | | |
| SCALE:1:20 | WEIGHT: | SHEET 4 OF 5 |




SECTION c-c
SCALE 1 : 10




DETAIL W
SCALE 1 : 5

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| NEXT ASSY | USED ON |
|---|---|
| APPLICATION | |

DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL ±
ANGULAR: MACH ± BEND ±
TWO PLACE DECIMAL ±
THREE PLACE DECIMAL ±

MATERIAL
24mm Birch Plywood

FINISH
--

DO NOT SCALE DRAWING

| | NAME | DATE |
|---|---|---|
| DRAWN | | |
| CHECKED | | |
| ENG APPR. | | |
| MFG APPR. | | |
| Q.A. | | |

COMMENTS:
20mm radius on all external corners

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BR18XS Handle Position (Optional)
Side Elevation Section C-C
Detailed Handle Enclosure W

| SIZE | DWG. NO. | REV. |
|---|---|---|
| A | | |
| SCALE:1:20 | WEIGHT: | SHEET 5 OF 5 |