TEN 2

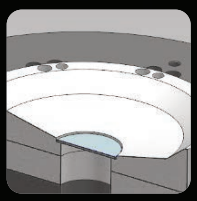
BY CELESTION

A New Standard in Low Frequency Loudspeaker Performance

Ten Key Features

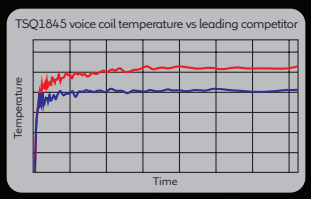
That add up to a new standard in LF driver performance

The result of a specialist development program at Celestion's UK R&D facility, Ten Squared (Ten²) is a range of low frequency professional audio drivers, designed and engineered without compromise to deliver consistently superior levels of performance in the most demanding sound reinforcement applications, even after hundreds of hours of use. Revisiting every detail of driver design, Ten² encompasses a series of incremental improvements that combine to redefine standards of performance and durability in professional low frequency loudspeakers.



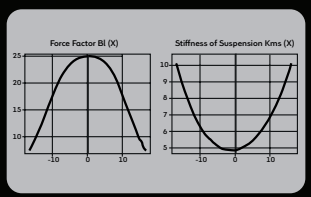
Precision Tuned Venting

Precision Tuned Venting (PTV) harnesses the cooling effects of constant airflow in a set of precisely dimensioned vents, enabling cooling around the coil and magnet assembly to be significantly improved - by up to 80C compared to conventional designs.



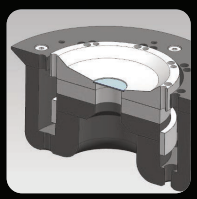
Reduced Power Compression

Highly efficient PTV cooling delivers additional reduction in power compression (loss of driver efficiency), as well as lower thermal stress on the voice coil, leading to improved performance, endurance and longevity.



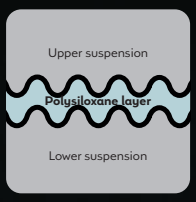
Convergent Motor Strength & Mechanical Compliance

Electrical motor strength Bl and mechanical compliance Cms reach their defined Xprotection limit at practically the same point: achieving a low distortion performance even during high excursion.



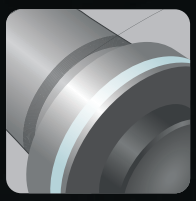
Reconfigured Magnet Assembly For Greater Excursion

A re-configured magnet assembly allows much greater cone excursion before damage occurs (Xmech) and best-in-class Xprotection figures (the distance the coil and cone move, measured to the point where both Bl and Cms have both reduced to 30% of their resting value).



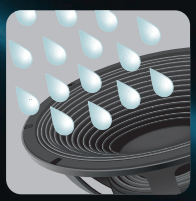
Polysiloxane Laminated Dual Suspension

Polysiloxane (a silicone polymer) is sandwiched between two resin-impregnated layers which enables the laminated suspension to be worked much harder without losing stiffness, giving better coil control, making DC shift less likely and increasing speaker longevity.



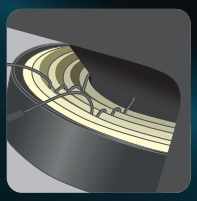
Custom Voice Coil Structure

Celestion winds its own voice coils using proprietary adhesion and voice coil structure solutions to maximise product lifespan and performance longevity.



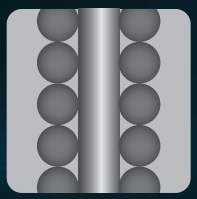
Enhanced Moisture Protection

A water-resistant coating is applied to one or both sides of the loudspeaker's cone (depending on speaker model and desired application). This significantly improves the driver's ability to resist direct exposure to water and higher levels of humidity, and also improves product durability.



Laser-Cauterized Lead Out Wire Holes

Weaving lead out wires into the suspension through laser cut holes reduces 'whipping' and lessens the fatigue on wires and joints caused by high power and cone excursion.



Multi-layer Inside/Outside Coil Windings

Celestion's voice coils are wound inside/outside in multiple layers, to maximise cooling potential with the greatest amount of surface area exposed to free air. This further contributes to the reduction of both power compression and thermal stress.

Precision built in the UK

TSQ drivers are built on the newly-commissioned, robotically-assisted production line at Celestion's UK-based loudspeaker research and manufacturing facility, and rigorously tested in line with an exacting list of performance criteria.

TEN2 BY CELESTION

TSQ1230

12-inch cast aluminium chassis neodymium magnet low frequency loudspeaker

1400W
continuous power rating

98dB
sensitivity

3-inch
copper clad aluminium voice coil

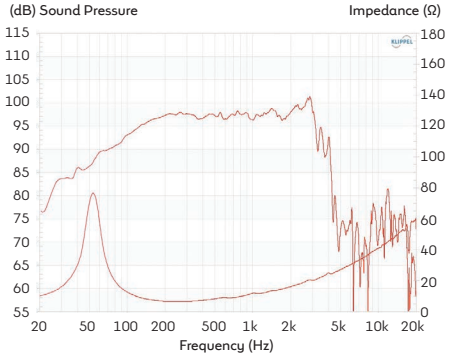
General Specifications	
Nominal diameter	305mm / 12in
Power rating[1]	700W
Continuous power rating[2]	1400W
Rated impedance	8Ω
Sensitivity[3]	98dB
Frequency range	50-3,000Hz
Chassis type	Cast aluminium
Magnet type	Neodymium
Voice coil diameter	75mm / 3in
Voice coil material	Copper clad aluminium
Former material	Glass Fibre
Cone material	Glass loaded cellulose
Surround material	Triple roll, cloth sealed
Suspension	Single
Gap height (H_g)	10mm / 0.39in
VC winding height (H_{vc})	18.5mm / 0.73in

Mounting Information	
Overall diameter	315mm / 12.4in
Overall depth	140.5mm / 5.53in
Cut-out diameter	282mm / 11.1in
Mounting hole dimensions	10x6.5mm / 0.39x0.26in
Number of mounting holes	8
Mounting hole PCD	294-300mm / 11.6-11.8in
Flange & gasket thickness	10.4mm / 0.41in
Unit weight	4.9kg / 10.8lb

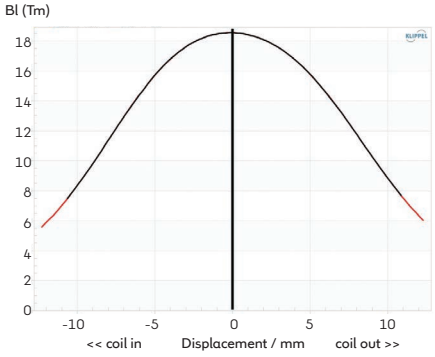
Parameters[4]	
Sd	530.93cm² / 82.29in²
Fs	55Hz
Mms	66.4g / 2.34oz
Qms	8.163
Qes	0.35
Qts	0.336
Re	5.3Ω
Vas	51.63l / 1.8ft³
Bl	18.6Tm
Cms	0.129mm/N
Rms	2.775kg/s
Le (at 1kHz)	0.762mH
Xmax[5]	6.75mm / 0.27in
Xmech[6]	32mm / 1.26in

Packed Dimensions & Weights	
Single pack size (WxDxH)	350mm x 350mm x 180mm 13.8in x 13.8in x 7.1in
Single pack weight	5.8kg / 12.8lb

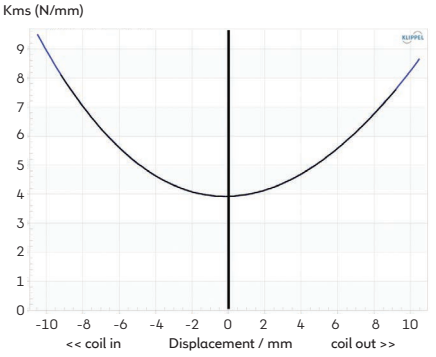
Frequency response and impedance



Force factor (Bl) symmetry



Stiffness (K) symmetry



1. Tested for two hours using a continuous, band-limited pink noise signal as per AES standard. Power calculated on minimum impedance. Loudspeaker tested in free air. 2. Defined as 3dB greater than the AES rating. 3. Measured on axis at 1W, 1m in 2π anechoic environment. 4. Measured after unit subjected to pre-conditioning signal. 5. 0.5*(Hvc-Hg) + 0.25*Hg. 6. Maximum peak-to-peak excursion before damage.

TEN 2 BY CELESTION

TSQ1535

15-inch cast aluminium chassis neodymium magnet low frequency loudspeaker

1800W continuous power rating

98.5dB sensitivity

3.5-inch copper clad aluminium voice coil

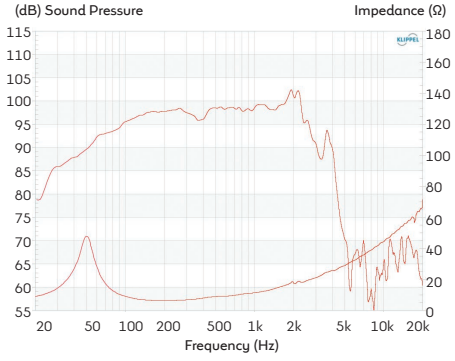
General Specifications	
Nominal diameter	381mm / 15in
Power rating[1]	900W
Continuous power rating[2]	1800W
Rated impedance	8Ω
Sensitivity[3]	98.5dB
Frequency range	45-3,000Hz
Chassis type	Cast aluminium
Magnet type	Neodymium
Voice coil diameter	90mm / 3.5in
Voice coil material	Copper clad aluminium
Former material	Glass Fibre
Cone material	Glass loaded cellulose
Surround material	Triple roll, cloth sealed
Suspension	Single
Gap height (H_g)	10mm / 0.39in
VC winding height (H_{vc})	21mm / 0.83in

Mounting Information	
Overall diameter	393mm / 15.4in
Overall depth	173.5mm / 6.83in
Cut-out diameter	354mm / 13.9in
Mounting hole dimensions	10x7mm / 0.39x0.28in
Number of mounting holes	8
Mounting hole PCD	367-374mm / 14.4-14.72in
Flange & gasket thickness	11.9mm / 0.47in
Unit weight	5.7kg / 12.6lb

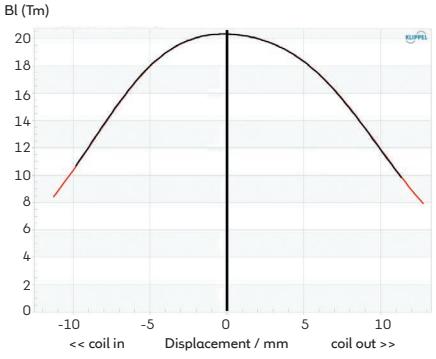
Parameters[4]	
Sd	855.3cm² / 33.7in²
Fs	55Hz
Mms	111.7g / 3.94oz
Qms	7.710
Qes	0.497
Qts	0.467
Re	5.00Ω
Vas	77.9l / 2.75ft³
Bl	19.7Tm
Cms	0.075mm/N
Rms	5.00kg/s
Le (at 1kHz)	0.88mH
Xmax[5]	8.0mm / 0.31in
Xmech[6]	44mm / 1.73in

Packed Dimensions & Weights	
Single pack size (WxDxH)	435mm x435mm x 200mm 17.1in x 17.1in x 7.9in
Single pack weight	7kg / 15.4lb

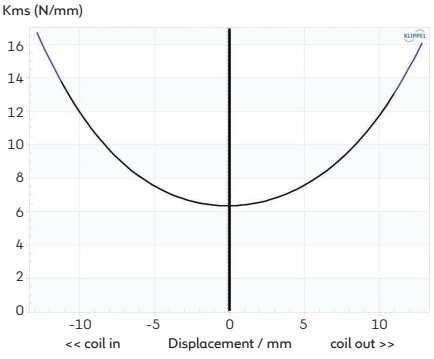
Frequency response and impedance



Force factor (Bl) symmetry



Stiffness (K) symmetry



1. Tested for two hours using a continuous, band-limited pink noise signal as per AES standard. Power calculated on minimum impedance. Loudspeaker tested in free air. 2. Defined as 3dB greater than the AES rating. 3. Measured on axis at 1W, 1m in 2n anechoic environment. 4. Measured after unit subjected to pre-conditioning signal. 5. 0.5*(Hvc-Hg) + 0.25*Hg. 6. Maximum peak-to-peak excursion before damage.

TEN2 BY CELESTION

TSQ1545

15-inch cast aluminium chassis, neodymium magnet low frequency loudspeaker

3600W
continuous power rating

96dB
sensitivity

4.5-inch
copper clad aluminium voice coil

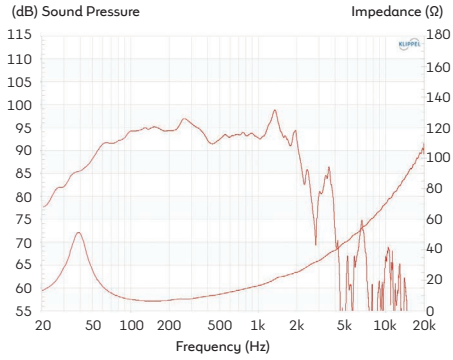
General Specifications	
Nominal diameter	381mm / 15in
Power rating[1]	1800W
Continuous power rating[2]	3600W
Rated impedance	8Ω
Sensitivity[3]	96dB
Frequency range	38-1,000Hz
Chassis type	Cast aluminium
Magnet type	Neodymium
Voice coil diameter	115m / 4.5in
Voice coil material	Copper clad aluminium
Former material	Glass Fibre
Cone material	Glass loaded cellulose
Surround material	Triple roll, cloth sealed
Suspension	Dual-laminated
Gap height (H_g)	12mm / 0.47in
VC winding height (H_{vc})	38mm / 1.5in

Mounting Information	
Overall diameter	393mm / 15.5in
Overall depth	210mm / 8.27in
Cut-out diameter	354mm / 13.95in
Mounting hole dimensions	10x7mm / 0.39x0.28in
Number of mounting holes	8
Mounting hole PCD	367-374mm / 14.45-14.72in
Flange & gasket thickness	11.9mm / 0.47in
Unit weight	11.35kg / 25lb

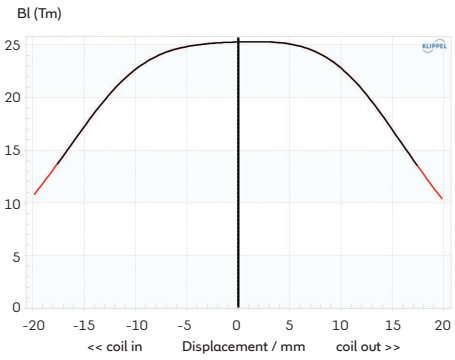
Parameters[4]	
Sd	855.3cm² / 132.57in²
Fs	39Hz
Mms	187.8g / 6.42oz
Qms	5.612
Qes	0.372
Qts	0.349
Re	5.05Ω
Vas	92.03l / 3.26ft³
Bl	25Tm
Cms	0.88mm/N
Rms	8.19kg/s
Le (at 1kHz)	1.83mH
Xmax[5]	16mm / 0.63in
Xmech[6]	76mm / 3in
Efficiency η_0	1.5%

Packed Dimensions & Weights	
Single pack size (WxDxH)	435mm x 435mm x 235mm 17.13in x 17.13in x 9.25in
Single pack weight	12kg / 26.2lb

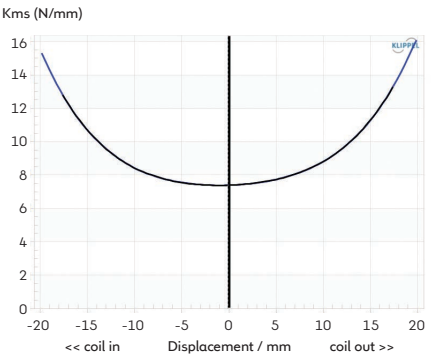
Frequency response and impedance



Force factor (Bl) symmetry



Stiffness (K) symmetry



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TEN 2 BY CELESTION

TSQ1845

18-inch cast aluminium chassis neodymium magnet low frequency loudspeaker

3600W continuous power rating

96.5dB sensitivity

4.5-inch round copper voice coil

General Specifications	
Nominal diameter	457mm / 18in
Power rating[1]	1800W
Continuous power rating[2]	3600W
Rated impedance	8Ω
Sensitivity[3]	96.5dB
Frequency range	30-1,000Hz
Chassis type	Cast aluminium
Magnet type	Neodymium
Voice coil diameter	115mm / 4.5in
Voice coil material	Round copper
Former material	Glass Fibre
Cone material	Glass loaded cellulose, water-resistant coating front & back
Surround material	Triple roll, cloth sealed
Suspension	Dual, polysiloxane-laminated
Gap height (H_g)	12mm / 0.46in
VC winding height (H_{vc})	36mm / 1.42in

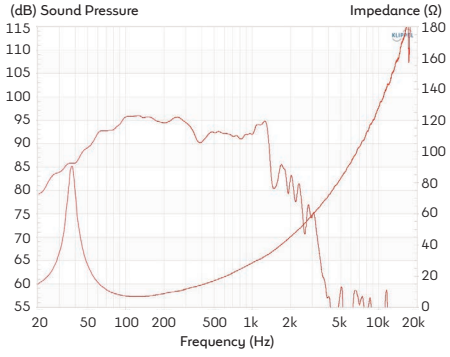
Mounting Information	
Overall diameter	460mm / 18.1in
Overall depth	235mm / 9.5in
Cut-out diameter	414mm / 16.29in
Mounting hole dimensions	7x11mm / 0.28x0.43in
Number of mounting holes	8
Mounting hole PCD	432-441mm / 17.04-17.36in
Flange & gasket thickness	17mm / 0.67in
Unit weight	11.8kg / 26lb

Also available in 4Ω

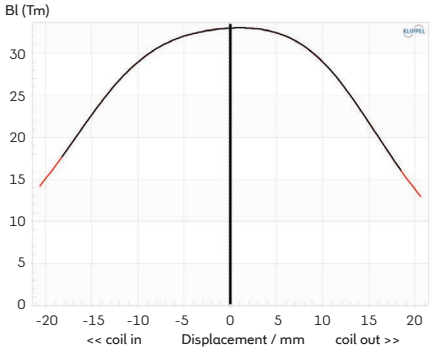
Parameters[4]	
Sd	1134cm² / 175.8in²
Fs	35Hz
Mms	316g / 11.18oz
Qms	8.712
Qes	0.300
Qts	0.290
Re	5.0Ω
Vas	119.3l / 4.21ft³
Bl	33.8Tm
Cms	0.065mm/N
Rms	7.99kg/s
Le (at 1kHz)	3.06mH
Xmax[5]	15mm / 0.47in
Xmech[6]	76mm / 3in
Efficiency η_0	1.8%

Packed Dimensions & Weights	
Single pack size (WxDxH)	500mm x 500mm x 280mm 19in x 19in x 11in
Single pack weight	12.3kg / 27.1lb

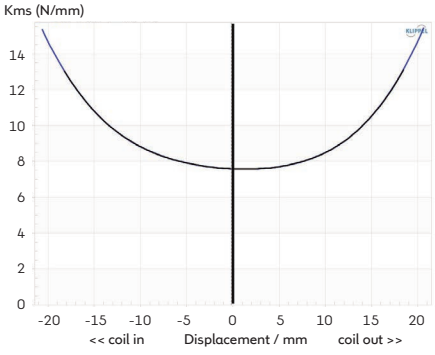
Frequency response and impedance



Force factor (Bl) symmetry



Stiffness (K) symmetry



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TEN 2 BY CELESTION

TSQ2145

21-inch cast aluminium chassis neodymium magnet low frequency loudspeaker

3600W
continuous power rating

97dB
sensitivity

4.5-inch
round copper voice coil

General Specifications	
Nominal diameter	530mm / 21in
Power rating[1]	1800W
Continuous power rating[2]	3600W
Rated impedance	8Ω
Sensitivity[3]	97dB
Frequency range	30-1,000Hz
Chassis type	Cast aluminium
Magnet type	Neodymium
Voice coil diameter	115mm / 4.5in
Voice coil material	Round copper
Former material	Glass fibre
Cone material	Glass loaded cellulose, water-resistant coating front & back
Surround material	Triple roll, cloth sealed
Suspension	Triple, polysiloxane-laminated
Gap height (H_g)	12mm / 0.46in
VC winding height (H_{vc})	36mm / 1.42in

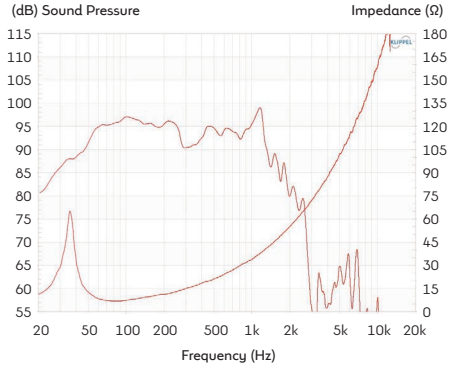
Mounting Information	
Overall diameter	547mm / 21.5in
Overall depth	255mm / 10.04in
Cut-out diameter	508mm / 20in
Mounting hole dimensions	8.5x10mm / 0.33x0.39in
Number of mounting holes	8
Mounting hole PCD	525-528mm / 20.61-20.79in
Flange & gasket thickness	19.3mm / 0.76in
Unit weight	13.8kg / 30.4lb

Also available in 4Ω

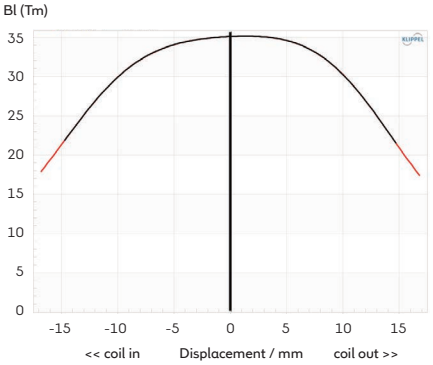
Parameters[4]	
Sd	1661.9cm² / 257.9in²
Fs	30Hz
Mms	435.2g / 15.35oz
Qms	8.393
Qes	0.359
Qts	0.344
Re	5.0Ω
Vas	253.8l / 8.96ft³
Bl	33.8Tm
Cms	0.065mm/N
Rms	9.77kg/s
Le (at 1kHz)	3.91mH
Xmax[5]	15mm / 0.46in
Xmech[6]	76mm / 3in
Efficiency η_0	1.9%

Packed Dimensions & Weights	
Single pack size (WxDxH)	575mm x 575mm x 280mm 22.6in x 22.6in x 11in
Single pack weight	14.5kg / 32lb

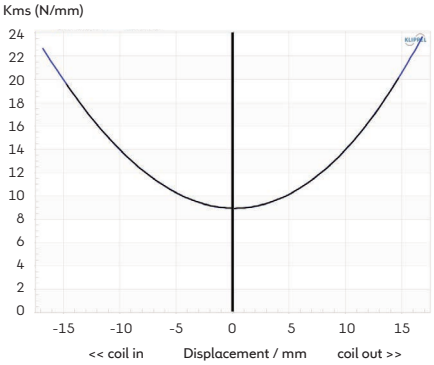
Frequency response and impedance



Force factor (Bl) symmetry



Stiffness (K) symmetry



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TEN 2 BY CELESTION

TSQ2160

21-inch cast aluminium chassis neodymium magnet low frequency loudspeaker

5000W continuous power rating

97.5dB sensitivity

6-inch round copper voice coil

Preliminary Information

General Specifications	
Nominal diameter	530mm / 21in
Power rating[1]	2500W
Continuous power rating[2]	5000W
Rated impedance	8Ω
Sensitivity[3]	97.5dB
Frequency range	30-300Hz
Chassis type	Cast aluminium
Magnet type	Neodymium
Voice coil diameter	152mm / 6in
Voice coil material	Round copper
Former material	Glass Fibre
Cone material	Glass loaded cellulose, water-resistant coating front & back
Surround material	Triple roll, cloth sealed
Suspension	Dual, polysiloxane-laminated
Gap height (H_g)	15mm / 0.59in
VC winding height (H_{vc})	45mm / 1.77in

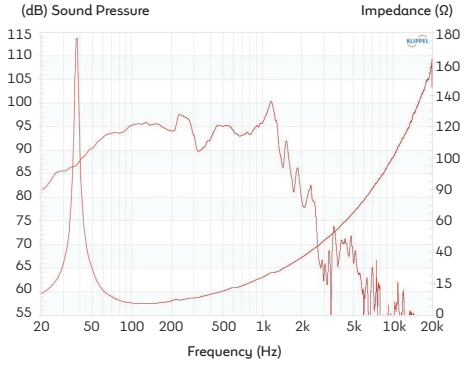
Mounting Information	
Overall diameter	547mm / 21.54in
Overall depth	253.1mm / 9.96in
Cut-out diameter	505mm / 19.88in
Mounting hole dimensions	8.5x12mm / 0.33x0.47in
Number of mounting holes	8
Mounting hole PCD	521.5-528.5mm / 20.53-20.81in
Flange & gasket thickness	17mm / 0.67in
Unit weight	21kg / 46.2lb

Also available in 4Ω

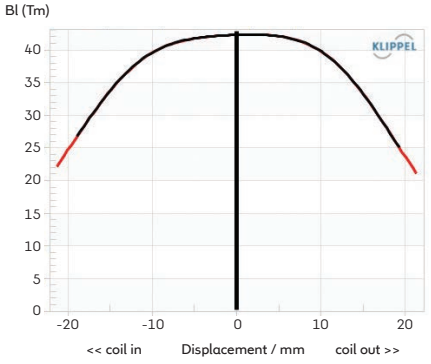
Parameters[4]	
Sd	1684cm² / 261in²
Fs	30Hz
Mms	482.7g / 17.03oz
Qms	10.29
Qes	0.264
Qts	0.257
Re	5.4Ω
Vas	234.8l / 8.29ft³
Bl	43.15Tm
Cms	0.058mm/N
Rms	8.84kg/s
Le (at 1kHz)	2.5mH
Xmax[5]	18.75mm / 0.73in
Xmech[6]	71mm / 2.8in
Efficiency η_0	2.2%

Packed Dimensions & Weights	
Single pack size (WxDxH)	575mm x 575mm x 280mm 22.6in x 22.6in x 11in
Single pack weight	24.5kg / 54lb

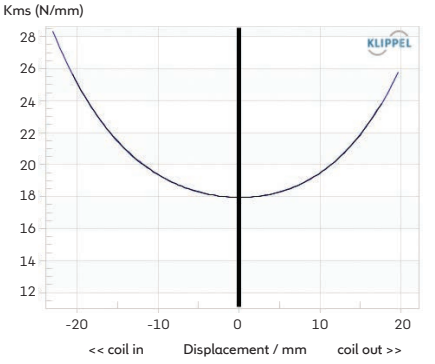
Frequency response and impedance



Force factor (Bl) symmetry



Stiffness (K) symmetry



1. Tested for two hours using a continuous, band-limited pink noise signal as per AES standard. Power calculated on minimum impedance. Loudspeaker tested in free air. 2. Defined as 3dB greater than the AES rating. 3. Measured on axis at 1W, 1m in 2π anechoic environment. 4. Measured after unit subjected to pre-conditioning signal. 5. 0.5*(Hvc-Hg) + 0.25*Hg. 6. Maximum peak-to-peak excursion before damage.

TEN2 BY CELESTION

TSQ2460

24-inch cast aluminium chassis neodymium magnet low frequency loudspeaker

5000W
continuous power rating

98dB
sensitivity

6-inch
round copper voice coil

General Specifications	
Nominal diameter	610mm / 24in
Power rating[1]	2500W
Continuous power rating[2]	5000W
Rated impedance	4Ω
Sensitivity[3]	98dB
Frequency range	20-200Hz
Chassis type	Cast aluminium
Magnet type	Neodymium
Voice coil diameter	152mm / 6in
Voice coil material	Round copper
Former material	Glass Fibre
Cone material	Glass loaded cellulose, water-resistant coating front & back
Surround material	Triple roll, cloth sealed
Suspension	Triple, polysiloxane-laminated
Gap height (H_g)	15mm / 0.59in
VC winding height (H_{vc})	45mm / 1.77in

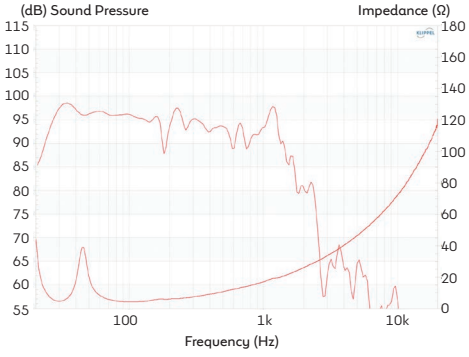
Mounting Information	
Overall diameter	627mm / 24.7in
Overall depth	281mm / 11in
Cut-out diameter	571mm / 22.5in
Mounting hole dimensions	8.5x9mm / 0.33x0.35in
Number of mounting holes	8
Mounting hole PCD	596.3-606mm / 23.47-23.86in
Flange & gasket thickness	21mm / 0.83in
Unit weight	22.4kg / 49.2lb

Also available in 8Ω

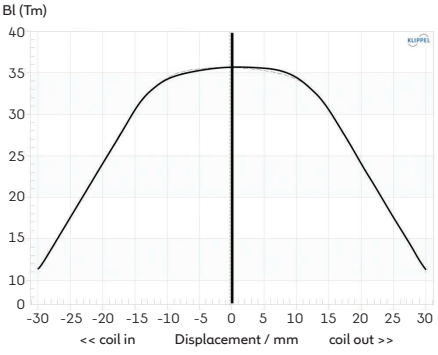
Parameters[4]	
Sd	2239cm² / 347in²
Fs	27Hz
Mms	717.2g / 25.3oz
Qms	10.89
Qes	0.312
Qts	0.303
Re	3.17Ω
Vas	344.5l / 12.17ft³
Bl	35.23Tm
Cms	0.048mm/N
Rms	11.089kg/s
Le (at 1kHz)	2.05mH
Xmax[5]	18.75mm / 0.73in
Xmech[6]	74mm / 2.91in
Efficiency η_0	2%

Packed Dimensions & Weights	
Single pack size (WxDxH)	745mm x 745mm x 415mm 29.3in x 29.3in x 16.3in
Single pack weight	27kg / 59.5lb

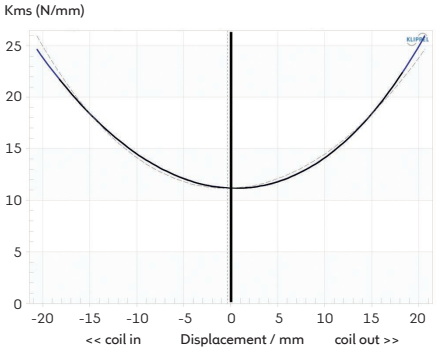
Frequency response and impedance



Force factor (Bl) symmetry



Stiffness (K) symmetry



1. Tested for two hours using a continuous, band-limited pink noise signal as per AES standard. Power calculated on minimum impedance. Loudspeaker tested in free air. 2. Defined as 3dB greater than the AES rating. 3. 383 litre ported cabinet tuned to 29 Hz, measured on axis at 1W, 1m in 2π anechoic environment. 4. Measured after unit subjected to pre-conditioning signal. 5. 0.5*(Hvc-Hg) + 0.25*Hg. 6. Maximum peak-to-peak excursion before damage.

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