

UL Evaluation Report

UL ER8477-01

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DIVISION: 03 00 00 CONCRETE

Sub-level 2: 03 50 00 – Cast Decks and Underlayment

Sub-level 2: 03 54 00 – Cast Underlayment

Sub-level 3: 03 54 13 – Gypsum Cement Underlayment

DIVISION: 09 00 00 – FINISHES

Sub-level 2: 09 60 00 – Flooring

Sub-level 3: 09 60 13 – Sound control Underlayment

COMPANY:

MAXXON CORPORATION

920 HAMEL ROAD

HAMEL, MN 55340

www.maxxon.com

1. SUBJECT:

**MAXXON STANDARD and MAXXON HIGH STRENGTH UNDERLAYMENTS, and
ENCAPSULATED SOUND MAT FLOOR MAT.**



The manufacturer may also indicate the following tradenames and/or abbreviated tradenames as follows:

UNDERLAYMENTS

UL Product Designation	Tradename Abbreviation	Tradename
Maxxon Standard	GC	Gyp-Crete
	GC 2000	Gyp-Crete 2000/3.2K
	T-F	Therma-Floor
	RF	Rapid Floor
	RFP	Rapid Floor Plus
Maxxon High Strength	D-C	Dura-Cap
	D-CM	Dek C-ment
	L-R	Level Right
	CT	Commercial Topping
	-	Level EZ

SOUND MATS

UL Product Designation	Tradename
Encapsulated Sound Mat	Acousti-Mat 1/8
	Acousti-Mat 1/4
	Acousti-Mat 1/4 Premium
	Acousti-Mat 3/8
	Acousti-Mat 3/8 Premium
	Acousti-Mat 3/4
	Acousti-Mat 3/4 Premium
	Acousti-Top
	Maxxon SDF

2. SCOPE OF EVALUATION

Compliance with the following codes:

- 2012, 2009 International Building Code® (IBC)
- 2012, 2009 International Residential Code® (IRC)
- 2012 International Green Construction Code® (IgCC)

The products were evaluated for the following properties:

- Fire-resistance-rated construction
- Sound transmission

3. REFERENCED DOCUMENTS

- ANSI/UL263 (ASTM E119), Fire Tests of Building Construction and Materials.
- ASTM E-90, Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
- ASTM E413, Classification for Rating Sound Insulation
- ASTM E492, Standard Test Method for Laboratory Measurement of Impact Sound Transmission Through Floor-Ceiling Assemblies Using the Tapping Machine
- ASTM C472, Standard Test Methods for Physical Testing of Gypsum, Gypsum Plasters and Gypsum Concrete
- ASTM C109, Standard Test Method for Compressive Strength of Hydraulic Mortars (Using 2 inch or 50 mm cube specimens)

4. USES

Maxxon Standard and Maxxon High Strength gypsum concrete underlayments are used as floor toppings and leveling agents. The underlayments are used in fire-resistance-rated construction in accordance with [IBC Section 703](#) and [IRC Section R302](#) when installed and used in accordance with Section 6.2. Maxxon Encapsulated Sound Mat sound control mats may be used in combination with the underlayments in sound rated floor-ceiling assemblies in accordance with [IBC Section 1207](#), [IRC Appendix K](#), and [IgCC Section 807](#) when installed and used in accordance with Section 6.3.

Therma-Floor® underlayments are used in radiant heating applications using embedded hot water tubes or electric heating cables.

5. PRODUCT DESCRIPTION

5.1 Maxxon Standard and Maxxon High Strength products are gypsum concrete floor underlayments for use as floor toppings. These floor toppings may be mixed for use at densities between 110 and 120 pcf (1.7 – 1.9 kg/m³) and compressive strengths in accordance with manufacturer’s specifications.

5.2 Therma-Floor® is for radiant heating applications in both commercial and residential construction.

5.3 Level-Right is a self-leveling cementitious underlayment that can be used to cap concrete or wood subfloors.

5.4 Encapsulated Sound Mat are sound control mats which may be used in combination with the underlayments described in Section 5.1 – 5.3 in sound-rated and/or fire-resistance-rated floor-ceiling assemblies.

5.5 Expanded galvanized steel diamond mesh or fiberglass reinforcement may be used with the products described in sections 5.1 through 5.4 to reduce the amount cracking that may occur.

6. INSTALLATION

6.1 General

6.1.1 Installation of the underlayments and sound control mats shall comply with this report and the manufacturer’s published installation instructions. The installation instructions shall be available at the jobsite during installation.

6.1.2 Unless otherwise specified in the individual fire resistive designs or sound assemblies, when the underlayments are used in combination with the sound control mats, the minimum underlayment depth is as specified in manufacturer’s installation instructions regarding the minimum thickness of floor topping over each floor mat material. A minimum 3/4 inch underlayment may be used when metal lath is used.

6.2 Fire Resistive Assemblies

6.2.1 The products described in this section have only been evaluated for fire resistance when used as a part of UL Fire Resistive Rated Designs. Refer to the UL Fire Resistance Certification information for UL File R8477 and File R18169 for applicable design coverage and details of the Floor-Ceiling fire-resistance-rated assemblies covered by this report. Fire resistance ratings are only applicable when the assemblies are constructed in accordance with the published designs.

6.2.2 Underlayments are applied at a minimum of 3/4 inch over the subfloor or optionally over the sound control mats described in section 5.4. Refer to Table 2 for associated UL Fire Resistive Rated designs.

6.2.3 Sound control mats are optionally installed under the underlayments described in sections 5.1 – 5.3 by laying loosely over the subfloor. Refer to Table 3 for associated UL Fire Resistive Rated designs.

6.2.4 Metal lath is optionally installed with the underlayments and sound control mats to reduce cracking and minimize pour depth.

Table 2 – Underlayments
(May or may not be used in combination with one or more products described in Table 3)

Product Designation	Applicable UL Fire Resistive Rated Designs
Maxxon Standard	D938 , G230 , G516 , G524 , G551 , G553 , G560 , G561 , G563 , G566 , G574 , G587 , G592 , G597 , H502 , H511 , J917 , J919 , J920 , J924 , J927 , J931 , J957 , J958 , J991 , J994 , L006 , L201 , L202 , L206 , L208 , L209 , L210 , L211 , L212 , L501 , L502 , L503 , L504 , L505 , L506 , L507 , L508 , L509 , L510 , L511 , L512 , L513 , L514 , L515 , L516 , L517 , L518 , L519 , L520 , L522 , L523 , L524 , L525 , L526 , L527 , L528 , L529 , L530 , L532 , L533 , L534 , L535 , L536 , L537 , L538 , L539 , L540 , L541 , L542 , L543 , L545 , L546 , L547 , L549 , L551 , L556 , L557 , L558 , L560 , L562 , L563 , L564 , L565 , L567 , L569 , L570 , L573 , L574 , L576 , L577 , L579 , L581 , L583 , L585 , L587 , L588 , L589 , L590 , L592 , L593 , L901 , M500 , M502 , M503 , M504 , M505 , M506 , M508 , M510 , M511 , M513 , M514 , M515 , M517 , M518 , M519 , M530 , M531 , M533 , M534 , M535 , M536 , M538 , M544 , M545 , M546 , and M550 .
Maxxon High Strength	D938 , G230 , G516 , G524 , G551 , G553 , G560 , G561 , G563 , G566 , G574 , G587 , G592 , G597 , H502 , H511 , J917 , J919 , J920 , J924 , J927 , J931 , J957 , J958 , J991 , J994 , L006 , L201 , L202 , L206 , L208 , L209 , L210 , L211 , L212 , L501 , L502 , L503 , L504 , L505 , L506 , L507 , L508 , L509 , L510 , L511 , L512 , L513 , L514 , L515 , L516 , L517 , L518 , L519 , L520 , L522 , L523 , L524 , L525 , L526 , L527 , L528 , L529 , L530 , L532 , L533 , L534 , L535 , L536 , L537 , L538 , L539 , L540 , L541 , L542 , L543 , L545 , L546 , L547 , L549 , L551 , L556 , L557 , L558 , L560 , L562 , L563 , L564 , L565 , L567 , L569 , L570 , L573 , L574 , L576 , L577 , L579 , L581 , L583 , L585 , L587 , L588 , L589 , L590 , L592 , L593 , L901 , M500 , M502 , M503 , M504 , M505 , M506 , M508 , M510 , M511 , M513 , M514 , M515 , M517 , M518 , M519 , M530 , M531 , M533 , M534 , M535 , M536 , M538 , M544 , M545 , M546 , and M550 .

Table 3 – Sound Control Mats
(Optional – may be used in combination with the products described in Table 2)

Product Designation	Applicable UL Fire Resistive Rated Designs
Encapsulated Sound Mat	D938 , G230 , G516 , G524 , G551 , G553 , G560 , G561 , G563 , G566 , G574 , G587 , G592 , G597 , H502 , H511 , J917 , J919 , J920 , J924 , J927 , J931 , J957 , J958 , J991 , J994 , L006 , L201 , L202 , L206 , L208 , L209 , L210 , L211 , L212 , L501 , L502 , L503 , L504 , L505 , L506 , L507 , L508 , L509 , L510 , L511 , L512 , L513 , L514 , L515 , L516 , L517 , L518 , L519 , L520 , L522 , L523 , L524 , L525 , L526 , L527 , L528 , L529 , L530 , L532 , L533 , L534 , L535 , L536 , L537 , L538 , L539 , L540 , L541 , L542 , L543 , L545 , L546 , L547 , L549 , L551 , L556 , L557 , L558 , L560 , L562 , L563 , L564 , L565 , L567 , L569 , L570 , L573 , L574 , L576 , L577 , L579 , L581 , L583 , L585 , L587 , L588 , L589 , L590 , L592 , L593 , L901 , M500 , M502 , M504 , M505 , M506 , M508 , M510 , M511 , M513 , M514 , M515 , M517 , M518 , M519 , M530 , M531 , M533 , M534 , M535 , M536 , M538 , M544 , M545 , M546 , and M550 .

6.3 Sound Transmission:

6.3.1 General

The products described in this section have been evaluated for use as a part of Sound Transmission and/or Impact Insulation Rated Assemblies. If these assemblies have also been evaluated for fire resistance, they will be described under section 6.2.

6.3.1.1 The sound assemblies described in Sections 6.3.2 and 6.3.3 may also use any of the sound control mats described in Section 5.4 of this Report unless an assembly already specifies one or more individual sound control mats as a part of the construction.

6.3.2 Sound Transmission Classification (STC) Rated and/or Impact Insulation Classification Rated Assemblies

6.3.2.1 Sound transmission classification (STC) rating for the following floor-ceiling assembly is a minimum of 50.

Wood I-Joist (See Figure 1):

1. One layer of 3/4 in. (19 mm) thick Maxxon Standard or Maxxon High Strength underlayment weighing 111 pcf (1778 kg/m³) applied over any Maxxon Encapsulated Sound Mat described in section 5.4 (optional) and/or applied over 5/8 in. (16 mm) thick sheathing grade plywood, nailed 6 in. (152 mm) apart along edges and 12 in. (305 mm) apart at intermediate support locations to wood joists measuring 13 ft - 3/4 in. (4 m) long and spaced 16 in. (406 mm) on center. The joists were nailed to headers and 1 in. (25.4 mm) wood cross bridges reinforced the joists at the e -7 ft (2 m) centerline and 12 in. (305 mm) from each end of the existing joist cavity. Unfaced fiberglass insulation measuring 3-1/2 in. (89 mm) thick and weighing 0.2 lbs./sq. ft. (0.977 kg/m²) installed within the cavities. RC-1 resilient channels installed 24 in. (610 mm) on center across the joists. One layer of 1/2 in. (13 mm) thick Type X gypsum board attached to resilient channels and taped.

6.3.2.2 Sound transmission classification (STC) ratings for the following floor-ceiling assemblies is a minimum of 50 and an Insulation impact classification (IIC) is a minimum of 50.

Wood I-Joist (See Figure 1):

2. One layer of class 3 rated ceramic tiles measuring 12 in. by 12 in. by 1/2 in. (305 mm by 305 mm by 13 mm) installed with thinset mortar and grout, installed over a 1 inch (25.4 mm) thick layer of Maxxon Standard or Maxxon High Strength underlayment, applied over any Maxxon Encapsulated Sound Mat described in section 5.4 installed over 3/4 in. (19 mm) thick plywood floor weighing 36 pcf (577 kg/m³) and screwed 8 in. (203 mm) on center to NASCOR NJ 10 I-joists measuring 9-1/2 in. (241 mm) high and spaced 24 in. (610 mm) on center. Fiberglass insulation 3-1/2 in. (89 mm) thick and weighing 0.46 pcf installed within the cavities. RC-1 resilient channels installed 16 in. on center perpendicular and screwed to joists. Two layers of 1/2 in. (13 mm) thick gypsum board weighing 36.8 pcf (589 kg/m³) screwed to resilient channels, taped and finished with 2 coats of compound.

Wood Trusses (See Figure 2):

1. One layer of Maxxon Standard or Maxxon High Strength underlayment ranging in thickness from 0.34 in (8.7 mm) to 0.94 in. (24 mm) with an average thickness of 0.69 in. (17.4 mm), and weighed an average of 8.3 lb/ft². (40.4 kg/m²) applied over any Maxxon Encapsulated Sound Mat described in section 5.4 (optional), installed over one layer of 0.7 in. (18 mm) thick tongue-and-grooved Sturd-I-Floor plywood attached to parallel cord open web wood trusses measuring 14 in. (35.6 mm) high by 166.5 in. (4 m) long spaced 24 in. (610 mm) on center with 8d nails spaced 12 in. (30 mm) on center and construction adhesive. Cross support measuring 2 in. (50 mm) by 4 in. (10 mm) attached to trusses with two 16d nails. A strongback measuring 2 in. (50 mm) by 6 in. (15 mm) placed through truss webs down the centerline and attached to the vertical web of the respective truss with two 16 d nails. One layer of Manville R-11 fiberglass insulation measuring 3.6 in. (92 mm) thick placed into each cavity. Resilient channels, type RC-1 by USG measuring 20 ft (6 m) long and spaced 24 in. (610 mm) on center installed perpendicular to the trusses with 1.25 in. (32 mm) long type W screws. One layer of USG type X gypsum board measuring 5/8 in. (16 mm) thick attached to resilient channels and spaced 12 in. (31 mm) on center. All joints taped and sealed.

Steel Deck with Joists (See Figure 4):

1. One layer of 44 oz., 7/16 in. (11 mm) thick carpet weighing 0.56 psf (2.74 kg/m²) over one layer of 3/8 in. (9.5 mm) thick foam underlayment weighing 0.48 psf (2.3 kg/m²), over one layer of 1-9/16 in. (38 mm) thick Maxxon Standard or Maxxon High Strength underlayment measured to the bottom of the flute and weighing 12.5 psf (61 kg/m²), applied over any Maxxon Encapsulated Sound Mat described in section 5.4 (optional), installed over one layer of 0.56 in. (14 mm) deep 22 MSG galvanized corrugated fluted steel decking weighing 1.5 psf (7 kg/m²) attached to Marino-WARE 16 gauge steel C-Joists measuring 137 in. wide by 9-1/4 in. high by 1-15/16 in. wide (3480 mm by 235 mm by 49 mm) and spaced 24 in. (610 mm) on center, fastened to Marino-WARE 16 gauge steel C-Rim Boards measuring 185 in. by 9-3/8 in. by (1-1/2 in. by 2-1/4 in.) wide (4700 mm by 238 mm by (38 mm by 57 mm)). Marino WARE metal cross bracing located on the centerline of the assembly and measuring 21-7/8 in. by 9-3/8 in. by 1-1/4 in. (555 mm by 238 mm by 32 mm). Unfaced fiberglass insulation measuring 3-1/2 in. (89 mm) thick and weighing 0.23 psf (1 kg/m²) placed in cavity. Marino-WARE RC-1 resilient metal furring channel measuring 1-15/16 in. wide by 144 in. long by 1/2 in. deep (49 mm by 3658 mm by 13 mm) and weighing 0.12 psf (0.58 kg/m²) and spaced 16 in. (406 mm) on center, attached perpendicular to joists with 5/8 in. (16 mm) #10 tek screws, attached perpendicular to one layer of 5/8 in. (16 mm) thick Type C gypsum board weighing 2.6 psf (13 kg/m²) with 1 in. (25 mm) fine thread bugle head screws. Screw spacing 12 in. (305 mm) on center throughout.

6.3.2.3 Impact Insulation Class (IIC) ratings for the following floor-ceiling assemblies is a minimum of 60.

Wood I-Joist (See Figure 1):

1. One layer of textured Saxony nylon carpet weighing 37 oz. (1.1 kg) over a 40 oz. (1.14 kg) felt pad, installed over a 3/4 in. (19 mm) thick layer of Maxxon Standard or Maxxon High Strength underlayment weighing 112 pcf (1794 kg/m³), applied over any Maxxon Encapsulated Sound Mat described in section 5.4 (optional) installed over 3/4 in. (19 mm) thick plywood floor weighing 36 pcf (577 kg/m³) and screwed 8 in. (203 mm) on center to NASCOR NJ 10 I-joists measuring 9-1/2 in. (241 mm) high and spaced 24 in. (610 mm) on center. Fiberglass insulation measuring 3-1/2 in. (89 mm) thick and weighing 0.46 pcf (7.4 kg/m³) installed within the cavities. RC-1 resilient channels installed 16 in. (406 mm) on center perpendicular and screwed to joists. Two layers of 1/2 in. (13 mm) thick gypsum board weighing 36.8 pcf (589.5 kg/m³) screwed to resilient channels, taped and finished with 2 coats of compound.

Wood 2 x 10 Joist (See Figure 3):

1. One layer of 1/2 in. (13 mm) thick carpet weighing 72 oz/yd² installed over a 3/8 in. (9.5 mm) thick foam pad weighing 46 oz/yd², installed over 3/4 in. (19 mm) thick Maxxon Standard or Maxxon High Strength underlayment weighing 105 lb/ft³ (1683 kg/m³) applied over any Maxxon Encapsulated Sound Mat described in section 5.4 (optional), installed over a 5/8 in. thick (16 mm) thick plywood subfloor attached to 2 in. (51 mm) by 10 in. (254 mm) wood joists spaced 16 in. (406 mm) on center. Fiberglass insulation measuring 2-1/2 in. (64 mm) thick and weighing 1.5 pcf (24 kg/m³) installed in the cavity between joists. Gypsum board measuring 5/8 in. (16 mm) thick attached to resilient channels attached to the joists.

Concrete (See Figure 5):

1. One layer of 1/2 in. (13 mm) thick Maxxon Standard or Maxxon High Strength underlayment weighing 108 pcf (1730 kg/m³) applied over any Maxxon Encapsulated Sound Mat described in section 5.4 (optional), installed directly over an 8 in. (203 mm) thick precast, pretensioned, hollow core slab with keyways grouted and ceiling side joints caulked. A 24 in. by 36 in. by 0.65 in. (610 mm by 914 mm by 17 mm) section of 91 Oz/sq yd (3 kg/m²) carpeting applied to floor under tapping device. Textured paint applied directly to the bottom side of the pre-case members.

7. CONDITIONS OF USE

The underlayments and sound control mats described in this report comply with, or are suitable alternatives to what is specified in, those codes listed in Section 2.0 of this report, subject to the following conditions:

- 7.1 Installation must comply with this report, the manufacturer's published instructions and the applicable code. In the event of a conflict between the manufacturer's published installation instructions and this report, this report governs.
- 7.2 Installation is by applicators authorized by Maxxon Corporation.
- 7.3 See UL's Product iQ™ database for Floor and Roof Topping Mixtures ([CCOX](#)) and Floor Mat Materials ([CCQU](#)).

7.4 The underlayments described in sections 5.1 through 5.3 are manufactured by the following locations under the UL LLC Classification and Follow-Up Service Program, which includes inspections in accordance with the quality elements of ICC-ES Acceptance Criteria for Quality Documentation, AC10.

Manufacturer	Location
GP Industrial Plasters LLC	North Las Vegas, NV
GP Industrial Plasters LLC	Blue Rapids, KS

7.5 The sound control mats described in section 5.4 are manufactured by the following locations under the UL LLC Classification and Follow-Up Service Program, which includes inspections in accordance with the quality elements of ICC-ES Acceptance Criteria for Quality Documentation, AC10.

Manufacturer	Location
GP Industrial Plasters LLC	North Las Vegas, NV
GP Industrial Plasters LLC	Blue Rapids, KS
Low & Bonar Inc.	Enka, NC

8. SUPPORTING EVIDENCE

8.1 Manufacturer's product literature and quality documentation.

8.2 UL Classification reports in accordance with UL263 (ASTM E 119). See UL Product Certification Categories, Floor and Roof Topping Mixtures ([CCOX](#)) and Floor Mat Materials ([CCQU](#)).

8.3 Reports of sound transmission testing in accordance with ASTM E413, ASTM E 90 and ASTM E492.

8.4 Reports of compressive strength tests in accordance with ASTM C472.

8.5 Reports of compressive strength test in accordance with ASTM C109.

9. IDENTIFICATION

The underlayments and sound mats shown in Section 1 of this Report, are identified by a marking bearing the report holder's name (Maxxon Corp.), the plant identification, the UL Classification Mark, and the evaluation report number, UL ER8477-01. The validity of the evaluation report is contingent upon this identification appearing on the products described in this evaluation report.

10. USE OF UL EVALUATION REPORT

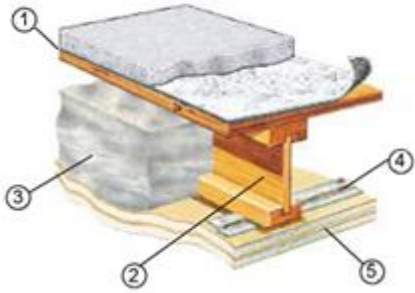
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FIGURE 1 — SOUND RATED ASSEMBLY INCORPORATING WOOD I-JOISTS



1. Flooring system as described in section 6.3.2
2. Wood I-Joists.
3. Insulation.
4. Resilient channels.
5. Gypsum board.
6. Finish system (not shown).

FIGURE 2 — SOUND RATED ASSEMBLY INCORPORATING WOOD TRUSSES



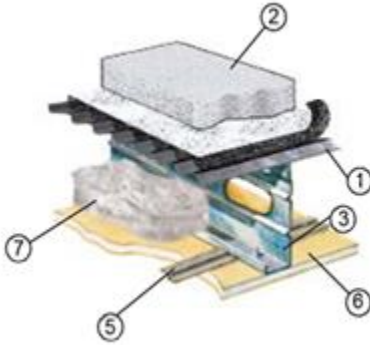
1. Flooring system as described in section 6.3.2
2. Wood Trusses.
3. Insulation.
4. Resilient channels.
5. Gypsum board.
6. Finish system (not shown).

FIGURE 3 — SOUND RATED ASSEMBLY INCORPORATING WOOD JOISTS



1. Flooring system as described in section 6.3.2
2. Cross bridging (not shown).
3. Wood joists.
4. Insulation.
5. Resilient channels.
6. Gypsum board.
7. Finish system (not shown).

FIGURE 4 — SOUND RATED ASSEMBLY INCORPORATING STEEL JOISTS



1. Steel deck.
2. Floor topping and floor mat.
3. Steel joists.
4. Joist bridging (not shown).
5. Resilient channels.
6. Gypsum board.
7. Insulation.
8. Finish system (not shown).

FIGURE 5 — SOUND RATED ASSEMBLY INCORPORATING PRECAST CONCRETE UNITS



1. Floor topping.
2. Precast concrete units.
3. Grouted full length expansion joint.

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