WAGNER MODEL L609
HANDHELD MOISTURE METER

INSTRUCTIONS & SPECIES ADJUSTMENTS

Reference Calibrated For Douglas Fir

FCC COMPLIANCE STATEMENT This equipment has been tested and found to comply within the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in residential installations. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television equipment reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Move the equipment away from the receiver.
- Plug the equipment into an outlet on a circuit different from that to which the receiver is powered.
- If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions.

CAUTION: Only equipment certified to comply with Class B (computer input/output devices, terminals, printers, etc.) should be attached to this equipment. Finally, any changes or modifications to the equipment by the user not expressly approved by the grantee or manufacture could void the user's authority to operate such equipment.

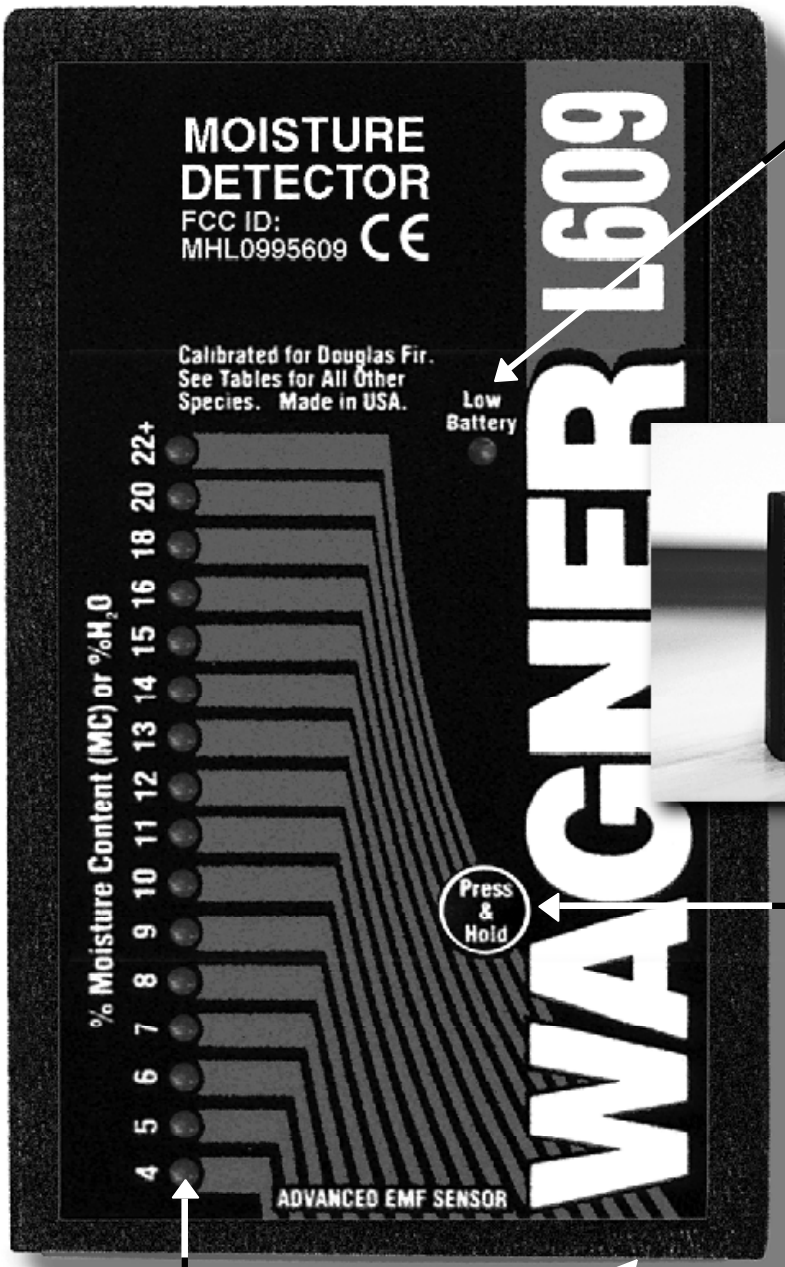
This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: **(1)** This device may not cause harmful interference, and **(2)** this device must accept any interference received, including interference that may cause undesired operation.

Canadian Department of Communications Compliance Statement This Class B digital apparatus meets all requirements of the Canadian Interference Causing Equipment Regulations.

Avis de conformité aux normes du ministère des Communications du Canada Cet appareil numérique de la classe B respecte toutes les exigences du Réglement sur le material broilleur du Canada.

1 FAMILIARIZATION

"LOW BATTERY" LIGHT WILL ILLUMINATE WHEN ACTUATION BUTTON IS PRESSED AND BATTERY VOLTAGE IS BELOW PROPER OPERATING LIMITS. REPLACE BATTERY WHEN LIGHT ILLUMINATES.



ACTUATION BUTTON. TO OPERATE UNIT, PRESS AND HOLD DOWN.

SENSING SURFACE. MUST BE HELD IN FULL CONTACT WITH THE WOOD WHEN TAKING A READING.

INDICATOR LIGHTS. SENSOR ELECTRONICALLY MEASURES MOISTURE OF THE WOOD AND ILLUMINATES ONE OF THESE LIGHTS. READ % MOISTURE ON THE SCALE ADJACENT TO THE ILLUMINATED LIGHT.

1. Grasp the meter from the side, with your thumb on the actuation button. Make sure your fingers are not near the blue sensor plate. Point the blue sensor plate toward open air and depress actuation button. None of the indicator lights should illuminate. With the button still depressed, check the Low Battery light to make sure it is not illuminated.

2. Set the blue sensor plate firmly on the surface of the wood, making sure the blue sensor is in full contact with the wood. For greatest accuracy orientate the long dimension of the sensor parallel to the wood grain. Depress the actuation button. One of the indicator lights will illuminate.

3. Read the % MC on the scale next to the illuminated light. If the wood is Douglas Fir, the scale reading indicates the % MC in the wood.

4. If the wood is not Douglas Fir, you must make a species correction.

On the table, find the row for the species you are using. Across the top of the table find the column for the meter reading you obtained. Where the row and column intersect, you will find the reading for the species of wood you are using.

Example:

Your meter reading is 13%.
Your species is Basswood, American.
Find the species in the appropriate row.
Find the meter reading in the appropriate column.
Where row and column intersect is the actual reading for Basswood, American—16%.

QUESTIONS & ANSWERS

Q: I'm nervous about buying a new technology. How long has Wagner Electronic Products been building this type of moisture meter?

A: For over 30 years Wagner Electronic Products has been building quality moisture detection equipment. They remain the leading supplier of moisture detection equipment for the primary forest products industry. Closely scrutinized and approved by numerous university studies and used for years by professional wood-grading associations, Wagner's meters continue to prove reliable and consistent, with unsurpassed convenience and ease-of-use.

Q: How can I take accurate moisture readings with Wagner Hand-Held Moisture Meters?

A: Wagner Hand-Held Moisture Meters send technologically advanced electro magnetic radio waves 1/2", 3/4", or 1" deep into the wood (depending on the model)—without leaving destructive holes. Known around the world for speed and accuracy, Wagner meters supply instant readings, scanning large amounts of board feet in seconds. Virtually unaffected by temperature,* humidity, and chemicals.

*For frozen wood with a suspected moisture content over 15%, correction is needed. Contact Wagner technical support for guidance.

Q: How accurate is the Wagner Hand-Held Meter?

A: Verified by numerous university studies and National Forestry Labs, the Wagner Moisture Meter is as accurate, or more accurate, than any other moisture detector on the market.

Q: What about gradients and wet pockets?

A: Although the various drying processes for green lumber can leave wet cores and pockets, moisture continues to pass from fiber to fiber within the wood until is has equalized through the whole board, and then to surrounding humidity levels. Determining if a board or load of lumber will equalize within tolerance levels can be difficult and tricky, but Wagner Moisture Meters provide this information automatically. Penetrating deep into the wood, they mathematically determine equalized moisture content and are capable of checking truck loads of board feet for specified moisture content in minutes. For even more convenience, many companies use their Wagner Hand-Held Meters to read right through the plastic wrapping around the wood on new deliveries before they allow unloading!

Q: Where is the reading taken with a Wagner Hand-Held Meter?

A: Wagner Hand-Held Moisture Meters generate a three-dimensional field that measures from the surface of the wood to a depth of 1/2", 3/4", or 1" (depending on the model)—under the entire sensor. The unit can be held in one place or slid rapidly along the entire length of the wood product, on both finished and unfinished wood, for a stable, accurate reading.

Q: Are the Wagner Moisture Meters affected by surface moisture?

A: Most moisture meters can be affected by standing water or visible water on the board. You should always wipe off as much excess water as possible. Once the standing water is removed, Wagner Hand-Held Meters will read

slightly higher than normal, whereas other types of meters can show greatly exaggerated readings.

**NOTE:* If water is allowed to soak into the wood, it will naturally show a higher moisture content. If a piece of wood is quite rough, it will soak up the water quite readily, affecting readings for all meters.

Q: What is the narrowest piece of lumber I can measure accurately with the Wagner Hand-Held Moisture Meter?

A: Models L601-3 and L612/712 measure boards as narrow as 2-1/2"; Models L606 and L607DD measure boards 2" in width. The L609 measures boards as narrow as 1".

Q: What board thickness can I measure?

A: You can accurately measure boards as thin as 1/2" and up to 2" thick or more.

**NOTE*: Wood-grading agencies are generally not concerned about the moisture content in the center of thicker beams and posts. They usually consider 1"-deep scanning more than adequate.

Q: What about the orientation of the meter on the wood?

A: For greatest accuracy orientate the long dimension of the sensor parallel to the wood grain. The sensor must be completely covered by wood.

Q: How rugged are the Wagner Hand-Held Moisture Meters? Are they too delicate to be used on an abusive production line?

A: The Wagner L601-3 and L612 Moisture Meters are tough production-line models. The Models L606, L607, and L609 are designed for compact convenience. They can all be damaged by being dropped or slammed down hard on wood surfaces, as can any meter. If a large volume of wood is to be measured, an in-line system should be used.

Q: Is the Wagner Moisture Meter safe to use?

A: Wagner's Hand-Held Meters produce less electro-magnetic radiation than standard house wiring.

Q: What is proper moisture content in wood? What moisture content is considered too high or too low?

A: There is no right answer for this question. As a rule, different woods and their uses determine the moisture content. For instance, if the wood is to be used in construction as a stud for building, the moisture-content requirement could be under 15% or 19%. If the wood is to be glued and it is too dry, it will not bond; If it is too wet, it will not hold. Ideally, the moisture content of wood to be used for indoor furniture is between 6% and 8%.

To determine the proper moisture for your application, contact your local university's forestry department or one of the associations supporting your industry's professionals. You may also call the Forest Products Research Laboratory in Madison, WI: (608) 231-9200.

WAGNER
ELECTRONICS

7 HARDWOOD SPECIES

SG	METER READS =>	4	5	6	7	8
0.41	Alder, Red	6	7	8	9	10
0.61	Apple	3	4	4	5	6
0.49	Ash, Black	5	6	7	8	9
0.58	Ash, Blue	3	4	5	6	7
0.56	Ash, Green	4	5	5	6	7
0.55	Ash, Oregon	4	5	6	7	7
0.60	Ash, White	3	4	5	5	6
0.39	Aspen, Bigtooth	7	8	9	10	11
0.38	Aspen, Quaking	7	8	9	10	11
0.37	Basswood, American	7	8	9	10	11
0.64	Beech, American	2	3	4	5	6
0.55	Birch, Paper	4	5	6	7	7
0.65	Birch, Sweet	2	3	4	4	5
0.62	Birch, Yellow	2	3	4	5	6
0.38	Butternut	7	8	9	10	11
0.50	Cherry, Black	5	6	7	8	8
0.43	Chestnut, American	6	7	8	9	10
0.34	Cottonwood, Balsam Poplar	8	9	10	11	12
0.35	Cottonwood, Black	7	8	10	11	12
0.40	Cottonwood, Eastern	7	8	9	10	11
0.64	Dogwood, Flowering	2	3	4	5	6
0.50	Elm, American	5	6	7	8	8
0.63	Elm, Rock	2	3	4	5	6
0.53	Elm, Slippery	4	5	6	7	8
0.53	Hackberry	4	5	6	7	8
0.66	Hickory (Pecan), Bitternut	2	3	3	4	5
0.60	Hickory (Pecan), Nutmeg	3	4	5	5	6
0.66	Hickory, Pecan	2	3	3	4	5
0.62	Hickory (Pecan), Water	2	3	4	5	6
0.72	Hickory (True), Mockernut	1	1	2	3	4
0.75	Hickory (True), Pignut	0	1	2	2	3
0.72	Hickory (True), Shagbark	1	1	2	3	4
0.69	Hickory (True), Shellbark	1	2	3	4	4
0.50	Holly, American	5	6	7	8	8

9	10	11	12	13	14	15	16	18	20	22
11	12	13	14	15	16	17	18	20	22	24
7	8	9	10	11	11	12	13	15	17	18
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13	14	15	16	17	18	19	20	22	24	26
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5	5	6	7	8	9	9	10	12	14	15
4	5	6	6	7	8	9	10	11	13	14
5	5	6	7	8	9	9	10	12	14	15
5	6	7	8	9	9	10	11	13	14	16
9	10	11	12	13	14	15	16	18	20	22

HARDWOOD SPECIES *(continued)*

SG	METER READS =>	4	5	6	7	8
0.63	Hophornbeam, Eastern	2	3	4	5	6
0.51	Laurel, California	5	5	6	7	8
0.69	Locust, Black	1	2	3	4	4
0.58	Madrone, Pacific	3	4	5	6	7
0.50	Magnolia, Southern	5	6	7	8	8
0.48	Maple, Bigleaf	5	6	7	8	9
0.57	Maple, Black	3	4	5	6	7
0.54	Maple, Red	4	5	6	7	8
0.47	Maple, Silver	5	6	7	8	9
0.63	Maple, Sugar	2	3	4	5	6
0.64	Oak, Red (1)	2	3	4	5	6
0.61	Oak (Red), Black	3	4	4	5	6
0.51	Oak, California Black	5	5	6	7	8
0.68	Oak (Red), Cherrybark	1	2	3	4	5
0.63	Oak (Red), Laurel	2	3	4	5	6
0.63	Oak (Red), Northern	2	3	4	5	6
0.63	Oak (Red), Pin	2	3	4	5	6
0.67	Oak (Red), Scarlet	2	2	3	4	5
0.59	Oak (Red), Southern	3	4	5	6	7
0.63	Oak (Red), Water	2	3	4	5	6
0.69	Oak (Red), Willow	1	2	3	4	4
0.64	Oak (White), Bur	2	3	4	5	6
0.66	Oak (White), Chestnut	2	3	3	4	5
0.63	Oak (White), Overcup	2	3	4	5	6
0.67	Oak (White), Post	2	2	3	4	5
0.67	Oak (White), Swamp Chestnut	2	2	3	4	5
0.72	Oak (White), Swamp White	1	1	2	3	4
0.66	Oak, White	2	3	3	4	5
0.64	Persimmon, Common	2	3	4	5	6
0.46	Sassafras	5	6	7	8	9
0.52	Sweetgum	4	5	6	7	8
0.49	Sycamore, American	5	6	7	8	9
0.58	Tanoak	3	4	5	6	7
0.50	Tupelo, Black	5	6	7	8	8

9	10	11	12	13	14	15	16	18	20	22
7	7	8	9	10	11	12	13	14	16	18
9	10	11	12	13	14	15	16	18	19	21
5	6	7	8	9	9	10	11	13	14	16
8	9	9	10	11	12	13	14	16	17	19
9	10	11	12	13	14	15	16	18	20	22
10	11	12	13	14	15	16	16	18	20	22
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6	7	8	9	10	11	12	12	14	16	17
7	8	9	10	11	11	12	13	15	17	18
9	10	11	12	13	14	15	16	18	19	21
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7	7	8	9	10	11	12	13	14	16	18
7	7	8	9	10	11	12	13	14	16	18
7	7	8	9	10	11	12	13	14	16	18
6	7	7	8	9	10	11	12	13	15	17
7	8	9	10	11	12	13	14	15	17	19
7	7	8	9	10	11	12	13	14	16	18
5	6	7	8	9	9	10	11	13	14	16
6	7	8	9	10	11	12	12	14	16	17
6	7	8	8	9	10	11	12	14	15	17
7	7	8	9	10	11	12	13	14	16	18
6	7	7	8	9	10	11	12	13	15	17
6	7	7	8	9	10	11	12	13	15	17
5	5	6	7	8	9	9	10	12	14	15
6	7	8	8	9	10	11	12	14	15	17
6	7	8	9	10	11	12	12	14	16	17
10	11	12	13	14	15	16	17	19	21	23
9	10	11	12	13	14	15	15	17	19	21
10	11	12	12	13	14	15	16	18	20	22
8	9	9	10	11	12	13	14	16	17	19
9	10	11	12	13	14	15	16	18	20	22

HARDWOOD SPECIES *(continued)*

SG	METER READES =>	4	5	6	7	8
0.50	Tupelo, Water	5	6	7	8	8
0.55	Walnut, Black	4	5	6	7	7
0.39	Willow, Black	7	8	9	10	11
0.42	Yellow, Poplar	6	7	8	9	10

SOFTWOOD SPECIES

SG	METER READS =>	4	5	6	7	8
0.46	Bald Cypress	5	6	7	8	9
0.44	Cedar, Alaska	6	7	8	9	10
0.32	Cedar, Atlantic White	8	9	10	11	12
0.47	Cedar, Eastern Red	5	6	7	8	9
0.37	Cedar, Incense	7	8	9	10	11
0.31	Cedar, Northern White	8	9	10	11	12
0.43	Cedar, Port Orford	6	7	8	9	10
0.32	Cedar, Western Red	8	9	10	11	12
	Douglas Fir	4	5	6	7	8
0.35	Fir, Balsam	7	8	10	11	12
0.38	Fir, California Red	7	8	9	10	11
0.37	Fir, Grand	7	8	9	10	11
0.39	Fir, Noble	7	8	9	10	11
0.43	Fir, Pacific Silver	6	7	8	9	10
0.32	Fir, Subalpine	8	9	10	11	12
0.39	Fir, White	7	8	9	10	11
0.40	Hemlock, Eastern	7	8	9	10	11
0.45	Hemlock, Mountain	6	7	8	9	9
0.45	Hemlock, Western	6	7	8	9	9
0.52	Larch, Western	4	5	6	7	8
0.35	Pine, Eastern White	7	8	10	11	12
0.43	Pine, Jack	6	7	8	9	10
0.51	Pine, Loblolly	5	5	6	7	8
0.41	Pine, Lodgepole	6	7	8	9	10
0.59	Pine, Longleaf	3	4	5	6	7

9	10	11	12	13	14	15	16	18	20	22
9	10	11	12	13	14	15	16	18	20	22
8	9	10	11	12	13	14	15	16	18	20
12	13	14	15	16	17	18	19	21	23	25
11	12	13	14	15	16	17	18	20	22	24

ADJUSTMENT TABLES

9	10	11	12	13	14	15	16	18	20	22
10	11	12	13	14	15	16	17	19	21	23
11	12	13	14	15	16	17	18	19	21	23
13	14	15	16	17	19	20	21	23	25	27
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12	13	14	15	16	17	18	19	21	23	25
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13	14	15	16	17	18	19	20	22	24	26
11	12	13	14	15	16	17	18	20	22	24
9	10	11	12	13	14	15	16	18	19	21
11	12	13	14	15	16	17	18	20	22	24
7	8	9	10	11	12	13	14	15	17	19

SOFTWOOD SPECIES *(continued)*

SG	METER READS =>	4	5	6	7	8
0.52	Pine, Pitch	4	5	6	7	8
0.56	Pine, Pond	4	5	5	6	7
0.40	Pine, Ponderosa	7	8	9	10	11
0.46	Pine, Red	5	6	7	8	9
0.48	Pine, Sand	5	6	7	8	9
0.51	Pine, Shortleaf	5	5	6	7	8
0.59	Pine, Slash	3	4	5	6	7
0.44	Pine, Spruce	6	7	8	9	10
0.36	Pine, Sugar	7	8	9	10	11
0.48	Pine, Virginia	5	6	7	8	9
0.38	Pine, Western White	7	8	9	10	11
0.40	Redwood, Old-growth	7	8	9	10	11
0.35	Redwood, Young-growth	7	8	10	11	12
0.42	Spruce, Black	6	7	8	9	10
0.35	Spruce, Engelmann	7	8	10	11	12
0.40	Spruce, Red	7	8	9	10	11
0.40	Spruce, Sitka	7	8	9	10	11
0.36	Spruce, White	7	8	9	10	11
0.53	Tamarack	4	5	6	7	8

IMPORTED SPECIES

SG	METER READS =>	4	5	6	7	8
0.61	Afrormosia	3	4	4	5	6
0.48	Albarco	5	6	7	8	9
0.54	Andiroba	4	5	6	7	8
0.60	Angelique	3	4	5	5	6
0.69	Apitong	1	2	3	4	4
0.48	Avodire	5	6	7	8	9
0.42	Banak	6	7	8	9	10
0.65	Benge	2	3	4	4	5
0.71	Bubinga	1	2	2	3	4
0.68	Caribbean Pine	1	2	3	4	5

9	10	11	12	13	14	15	16	18	20	22
9	10	11	12	13	14	15	15	17	19	21
8	9	10	11	12	13	14	14	16	18	20
12	13	14	15	16	17	18	19	21	23	25
10	11	12	13	14	15	16	17	19	21	23
10	11	12	13	14	15	16	16	18	20	22
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12	13	14	15	16	17	18	19	21	23	25
12	13	14	15	17	18	19	20	22	24	26
9	10	11	12	12	13	14	15	17	19	21

ADJUSTMENT TABLES

9	10	11	12	13	14	15	16	18	20	22
7	8	9	10	11	11	12	13	15	17	18
10	11	12	13	14	15	16	16	18	20	22
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11	12	13	14	15	16	17	18	20	22	24
6	7	8	9	10	10	11	12	14	15	17
5	6	7	7	8	9	10	11	12	14	15
6	6	7	8	9	10	10	11	13	15	16

15 IMPORTED SPECIES *(continued)*

SG	METER READS =>	4	5	6	7	8
0.40	Cativo	7	8	9	10	11
0.71	Courbaril	1	2	2	3	4
0.31	Cuangare	8	9	10	11	12
0.67	Degame	2	2	3	4	5
0.52	Determa	4	5	6	7	8
0.70	Ebony, East Indian	1	2	3	3	4
0.41	Gmelina	6	7	8	9	10
0.38	Hura	7	8	9	10	11
0.40	Ilomba	7	8	9	10	11
0.53	Imbuya	4	5	6	7	8
0.54	Iroko	4	5	6	7	8
0.67	Jarrah	2	2	3	4	5
0.36	Jelutong	7	8	9	10	11
0.64	Kapur	2	3	4	5	6
0.71	Kempas	1	2	2	3	4
0.69	Keruing	1	2	3	4	4
0.34	Lauan, Red	8	9	10	11	12
0.55	Lauan, White	4	5	6	7	7
0.38	Limba	7	8	9	10	11
0.42	Mahogany, African	6	7	8	9	10
0.45	Mahogany, True	6	7	8	9	9
0.58	Manni	3	4	5	6	7
0.64	Merbau	2	3	4	5	6
0.52	Mersawa	4	5	6	7	8
0.30	Obeche	8	9	10	12	13
0.55	Ocote Pine	4	5	6	7	7
0.33	Okoume	8	9	10	11	12
0.63	Opepe	2	3	4	5	6
0.46	Parana Pine	5	6	7	8	9
0.63	Peroba de Campos	2	3	4	5	6
0.66	Peroba Rosa	2	3	3	4	5
0.40	Primavera	7	8	9	10	11
0.67	Purpleheart	2	2	3	4	5
0.52	Ramin	4	5	6	7	8

9	10	11	12	13	14	15	16	18	20	22
12	13	14	15	16	17	18	19	21	23	25
5	6	7	7	8	9	10	11	12	14	15
13	15	16	17	18	19	20	21	23	25	27
6	7	7	8	9	10	11	12	13	15	17
9	10	11	12	13	14	15	15	17	19	21
5	6	7	8	8	9	10	11	12	14	16
11	12	13	14	15	16	17	18	20	22	24
12	13	14	15	16	17	18	19	21	23	25
12	13	14	15	16	17	18	19	21	23	25
9	10	11	12	12	13	14	15	17	19	21
9	9	10	11	12	13	14	15	17	19	20
6	7	7	8	9	10	11	12	13	15	17
12	13	14	15	17	18	19	20	22	24	26
6	7	8	9	10	11	12	12	14	16	17
5	6	7	7	8	9	10	11	12	14	15
5	6	7	8	9	9	10	11	13	14	16
13	14	15	16	17	18	19	20	22	24	26
8	9	10	11	12	13	14	15	16	18	20
12	13	14	15	16	17	18	19	21	23	25
11	12	13	14	15	16	17	18	20	22	24
10	11	12	13	14	15	16	17	19	21	23
8	9	9	10	11	12	13	14	16	17	19
6	7	8	9	10	11	12	12	14	16	17
9	10	11	12	13	14	15	15	17	19	21
14	15	16	17	18	19	20	21	23	25	28
8	9	10	11	12	13	14	15	16	18	20
13	14	15	16	17	18	19	20	22	25	27
7	7	8	9	10	11	12	13	14	16	18
10	11	12	13	14	15	16	17	19	21	23
7	7	8	9	10	11	12	13	14	16	18
6	7	8	8	9	10	11	12	14	15	17
12	13	14	15	16	17	18	19	21	23	25
6	7	7	8	9	10	11	12	13	15	
9	10	11	12	13	14	15	15	17	19	21

IMPORTED SPECIES *(continued)*

SG	METER READS =>	4	5	6	7	8
0.70	Roble, (Quercus)	1	2	3	3	4
0.52	Roble, (Tabebuia)	4	5	6	7	8
0.49	Rubberwood	5	6	7	8	9
0.49	Sande	5	6	7	8	9
0.52	Santa Maria	4	5	6	7	8
0.55	Sapele	4	5	6	7	7
0.56	Sepetir	4	5	5	6	7
0.41	Spanish Cedar	6	7	8	9	10
0.55	Teak	4	5	6	7	7

PLYWOOD AND OSB

Southern Yellow Pine CDX Plywood (2)
Douglas Fir CDx Plywood (2)
Southern Yellow Pine OSB (2)
Douglas Fir OSB (2)

SPECIFIC GRAVITY CORRECTION

(1) This SG correction value was developed by Wagner Electronic Products, Inc.

(2) This SG correction value was developed by Wagner Electronic Products, Inc.

The above numbers are based on our research and have been developed to give users a general correction factor for the above-mentionedplywoods and OSB. Please keep in mind that plywood and OSB manufacturing processes can differ slightly and some plywood & OSB pf the same species may vary slightly.

9	10	11	12	13	14	15	16	18	20	22
5	6	7	8	8	9	10	11	12	14	16
9	10	11	12	13	14	15	15	17	19	21
10	11	12	12	13	14	15	16	18	20	22
10	11	12	12	13	14	15	16	18	20	22
9	10	11	12	13	14	15	15	17	19	21
8	9	10	11	12	13	14	15	16	18	20
8	9	10	11	12	13	14	14	16	18	20
11	12	13	14	15	16	17	18	20	22	24
8	9	10	11	12	13	14	15	16	18	20

CORRECTION FACTORS

Deduct 1% from Meter Reading
Deduct 1% from Meter Reading
Deduct 4% from Meter Reading
Deduct 4% from Meter Reading

Determining the Adjustment Factor for an Unknown Species

The adjustment table based on specific gravity of solid wood is provided. If you don't know the species of the wood you are using, or the specific gravity differs from the handbook because of a different growing region, use the following procedure.

Determining the Specific Gravity

1. Select a sample of wood with all edges being true. Carefully measure the dimensions of the sample using a caliper. You will need the length, width, and thickness.

2. Convert these measurements to feet.

3. Carefully measure the weight of the sample.

4. Convert the weight to pounds.

5. Calculate specific gravity.

An example is provided on the facing page.

Example

Length = 10 in.	10 in. / 12 in. = 0.833 ft.
Width = 7.5 in.	7.5 in. / 12 in. = 0.625 ft.
Thickness = 1.5 in.	1.5 in. / 12 in. = 0.125 ft.
Weight = 20 oz.	20 oz. / 16 oz. = 1.25 lb.

Specific Gravity:

(Weight / Volume) / Specific Gravity of water

(1.25 lb. / 0.065 cu. ft.) / 62.34 lb. / cu. ft. = **0.31**

In order to ensure that the value obtained for the specific gravity is statistically significant, a number of pieces must be measured and the average determined. Use this value of specific gravity with the table

19 SPECIFIC GRAVITY vs. MOISTURE CONTENT

SG / % MC	4	5	6	7	8	9	10	11
0.30	8	9	10	12	13	14	15	16
0.31	8	9	10	11	12	13	15	16
0.32	8	9	10	11	12	13	14	15
0.33	8	9	10	11	12	13	14	15
0.34	8	9	10	11	12	13	14	15
0.35	7	8	10	11	12	13	14	15
0.36	7	8	9	10	11	12	13	14
0.37	7	8	9	10	11	12	13	14
0.38	7	8	9	10	11	12	13	14
0.39	7	8	9	10	11	12	13	14
0.40	7	8	9	10	11	12	13	14
0.41	6	7	8	9	10	11	12	13
0.42	6	7	8	9	10	11	12	13
0.43	6	7	8	9	10	11	12	13
0.44	6	7	8	9	10	11	12	13
0.45	6	7	8	9	9	10	11	12
0.46	5	6	7	8	9	10	11	12
0.47	5	6	7	8	9	10	11	12
0.48	5	6	7	8	9	10	11	12
0.49	5	6	7	8	9	10	11	12
0.50	5	6	7	8	8	9	10	11
0.51	5	5	6	7	8	9	10	11
0.52	4	5	6	7	8	9	10	11
0.53	4	5	6	7	8	9	10	11
0.54	4	5	6	7	8	9	9	10
0.55	4	5	6	7	7	8	9	10
0.56	4	5	5	6	7	8	9	10
0.57	3	4	5	6	7	8	9	10
0.58	3	4	5	6	7	8	9	9
0.59	3	4	5	6	7	7	8	9
0.60	3	4	5	5	6	7	8	9
0.61	3	4	4	5	6	7	8	9
0.62	2	3	4	5	6	7	8	9
0.63	2	3	4	5	6	7	7	8
0.64	2	3	4	5	6	6	7	8
0.65	2	3	4	4	5	6	7	8
0.66	2	3	3	4	5	6	7	8
0.67	2	2	3	4	5	6	7	7
0.68	1	2	3	4	5	6	6	7
0.69	1	2	3	4	4	5	6	7
0.70	1	2	3	3	4	5	6	7

12	**13**	**14**	**15**	**16**	**18**	**20**	**22**
17	18	19	20	21	23	25	28
17	18	19	20	21	23	25	27
16	17	19	20	21	23	25	27
16	17	18	19	20	22	25	27
16	17	18	19	20	22	24	26
16	17	18	19	20	22	24	26
15	17	18	19	20	22	24	26
15	16	17	18	19	21	23	25
15	16	17	18	19	21	23	25
15	16	17	18	19	21	23	25
15	16	17	18	19	21	23	25
14	15	16	17	18	20	22	24
14	15	16	17	18	20	22	24
14	15	16	17	18	20	22	24
14	15	16	17	18	19	21	23
13	14	15	16	17	19	21	23
13	14	15	16	17	19	21	23
13	14	15	16	17	19	21	22
13	14	15	16	16	18	20	22
12	13	14	15	16	18	20	22
12	13	14	15	16	18	20	22
12	13	14	15	16	18	19	21
12	13	14	15	15	17	19	21
12	12	13	14	15	17	19	21
11	12	13	14	15	17	19	20
11	12	13	14	15	16	18	20
11	12	13	14	14	16	18	20
11	11	12	13	14	16	18	20
10	11	12	13	14	16	17	19
10	11	12	13	14	15	17	19
10	11	12	13	13	15	17	19
10	11	11	12	13	15	17	18
9	10	11	12	13	15	16	18
9	10	11	12	13	14	16	18
9	10	11	12	12	14	16	17
9	10	10	11	12	14	15	17
8	9	10	11	12	14	15	17
8	9	10	11	12	13	15	17
8	9	10	10	11	13	15	16
8	9	9	10	11	13	14	16
8	8	9	10	11	12	14	16

21 COMMENTARY ON SPECIES ADJUSTMENT TABLES

In 1992, a study was conducted at the Forest Research Laboratory of Oregon State University on species correction for the Wagner Hand-Held Moisture Meters. The species tested were Douglas Fir, Lodgepole Pine, Western Red Cedar, Western Hemlock, White Fir, Western Larch, Engelmann Spruce, and White Oak. Three to four 40-piece samples of each species were tested. Specific gravity was found to be the primary factor on species adjustment. A species equation as a function of specific gravity and the meter reading was obtained using multiple-regression technique (R-square = 0.95) as follows:

$$AF = 8.87 + (0.25 * MM) - (15.86 * SG) - (0.62 * SG * MM)$$

in which

AF = Species Adjustment

MM = Meter Reading

SG = Specific Gravity in oven dry weight and 12% moisture-content volume basis.

The species adjustment tables provide the adjusted moisture measurements that are based on the species adjustment determined using the species adjustment equation, with rounding to the nearest 1.0.

Wood is not a uniform material. Specific gravity of solid-sawn lumber varies within the piece and among pieces. In the OSU study, the average specific gravity for each species differed from the individual sample by plus or minus 1% to plus or minus 8%. For general applications, average specific gravity values can be found in the Wood Handbook at http://www.fpl.fs.fed.us/documnts/fplgtr/fplgtr113/fplgtr113.htm (USDA Agriculture Handbook ’72, 1987). Except for one species for which the experimental value is 7% higher, the species’ overall average specific gravity values obtained in the OSU study are comparable with

those in the Wood Handbook. The exception may be caused by unknown biases in the sampling scheme. The Wood Handbook values are used in the tables.

Species adjustment can be determined for lumber sorted, or otherwise known, to have specific gravity different from the species' average. One example is lumber graded under the Dense rules. If the specific gravity of a lumber sample is known, species adjustment can be determined by the species adjustment equation.

The species adjustment equation provides a way to expand the use of the Wagner Hand-Held Moisture Meters for lumber of any species groups having similar species-specific gravity values. One example is Hem-Fir. For a species group, one way to determine the species adjustment is by the use of a weighted average of the individual species' average specific gravity values. The weighing procedure used in the ASTM D2555 by standing timber volume can be used. Species adjustment is not recommended for any species group having a broad range of species-specific gravity values. There are no recognized limits on species group species adjustment. Species adjustment for species groups should be used with knowledge on the variability on species involved and the affect of it on species adjustment. If the species mix in the lumber production of a species group is controlled or known to have specific gravity different from that used for the species group, a better estimation of species adjustment can be determined using the known specific gravity in the above species correction equation.

WARRANTY

Wagner Electronic Products, Inc., warrants this product against defects in material and workmanship for ninety (90) days from the date of purchase, subject to the following terms and conditions:

Wagner's liability under this warranty shall be limited, at Wagner's option, to the repair or replacement of this product or any part thereof which is demonstrated to be defective. To exercise this warranty, customer must send the instrument to Wagner's plant. This limited warranty does not apply if the product has been damaged by accident, negligent handling, misuse, alteration, damage during shipment, or improper service. Wagner Electronic Products, Inc., shall in no event be liable for any breach of warranty or defect in this product, which exceeds the amount of purchase price of the product. Wagner Electronic Products, Inc., shall not be liable for incidental or consequential damages for the breach of any express or implied warranty with respect to this product or its calibration.

With proper care and maintenance, the meter should stay in calibration; however, because Wagner Electronic Products, Inc., has no control over the manner in which the unit will be used, it makes no warranty that the meter will stay in calibration for any specific period of time.

This warranty is in lieu of all other warranties, whether oral or written, express or implied. Any implied warranties, including implied warranties of merchantability and fitness for a particular purpose, are excluded. Agents and employees of Wagner Electronic Products, Inc., are not authorized to make modifications to this warranty or additional warranties binding on Wagner Electronic Products, Inc. Accordingly, additional statements, whether oral or written, except written statements from an officer of Wagner Electronic Products, Inc., do not constitute warranties and should not be relied upon by the customer. This warranty is personal to the customer purchasing the product from Wagner Electronic Products, Inc., and is not transferrable.

Repair Service—In the event of damage or failure, return for repair to:

Wagner Electronic Products, Inc.
326 Pine Grove Road
Rogue River, Oregon 97537
(541) 582-0541 Fax (541) 582-4138

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