Migrating legacy (PMED v2) data libraries into the modern (PMED v3) software

Most XML files containing PMED library data from older versions of the PMED app (e.g. the desktop app with version series 2.x) are directly compatible with version series 3.x (the web app). However, over the course of time in the development and release of new versions, some properties have been added to some of the XML file schemas. When uploading XML files from older versions of PMED in the web interface of v3.x, these new properties will be set to their default values. It is the user's responsibility to carefully review and, if necessary, adjust these properties to ensure they correspond to the expected values for their design input profile.

This document summarizes properties that have been added to PMED's library XML data schemas since approximately version 2.2. Library schemas that have not had any properties added are not included in this document.

- 1. Library Type: Performance Criteria
- 2. Library Type: Calibration Factors
  - 2.1. AC Bottom-Up Cracking
  - 2.2. AC Top-Down Cracking
  - 2.3. AC Fatigue Cracking
  - 2.4. JPCP Friction
- 3. Library Type: Report Customization
- 4. Library Type: AC Material
  - 4.1. |E*| Prediction
  - 4.2. TDC Properties
  - 4.3. IDT Strength Properties
  - 4.4. MSCR Binder Grading Properties

1. Library Type: Performance Criteria

- XML schema: `AnalysisLimitsImport`

Two properties, a distress limit and a reliability percentage, have been added for the SJPCP-over-AC design type's performance criterion for longitudinal cracking in the PCC layer. The default limit is 15% of slabs, and the default reliability is 50%.

Here is a screenshot of the relevant UI section:

Performance Criteria	Limit	Reliability
Initial IRI (in/mi)	63 ✓	
SJPCP Longitudinal cracking (percent slabs)	15 ✓	50 ✓

2. Library Type: Calibration Factors

- XML schema: `CalibrationMain`

2.1. AC Bottom-Up Cracking

The C_2 factor was updated and has the following defaults:

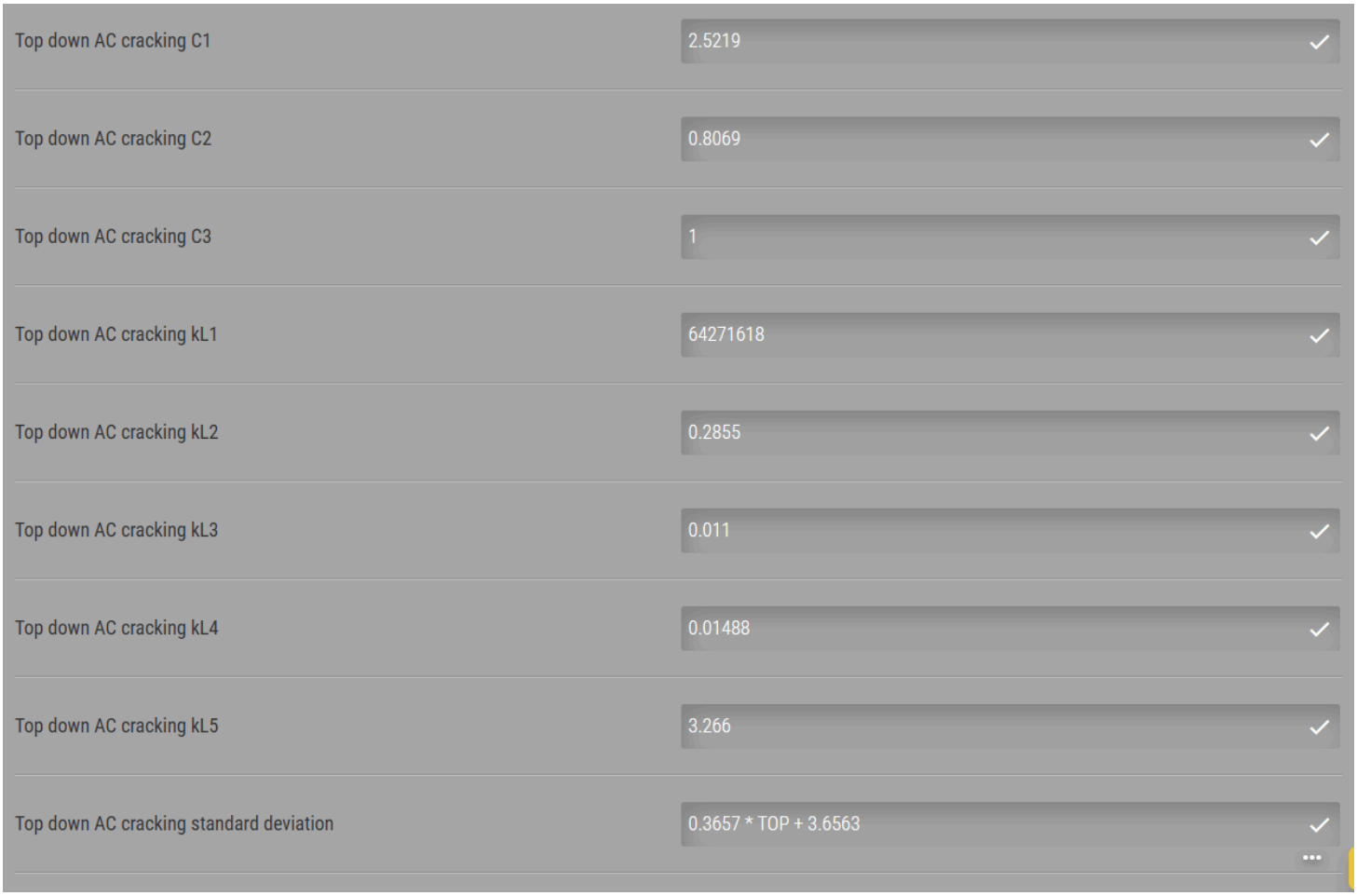
$$C_2 = \begin{cases} 2.1585 & \text{if } h_{\text{AC}} < 5 \\ 0.867 + 0.2583\ h_{\text{AC}} & \text{if } 5 \leq h_{\text{AC}} \leq 12 \\ 3.9666 & \text{if } 12 < h_{\text{AC}} \end{cases}$$

Bottom up AC cracking C2: < 5 in.	2.1585 ✓
Bottom up AC cracking C2: 5 in. <= hac <= 12 in.	(0.867 + 0.2583 * hac) * 1 + 0 ✓
Bottom up AC cracking C2: > 12 in.	3.9666 ✓

2.2. AC Top-Down Cracking

Several factors were introduced for top-down cracking and have the following defaults:

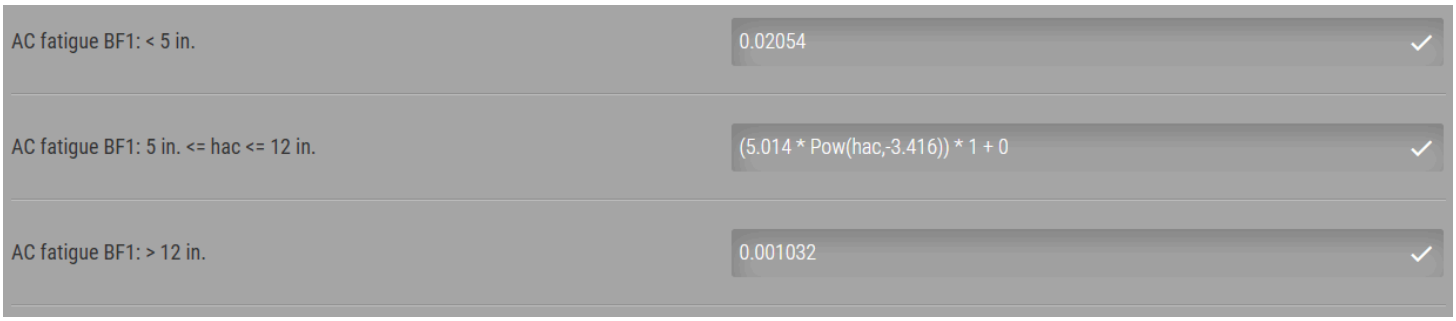
$$
\begin{aligned}
C_1 &= 2.5219 \\
C_2 &= 0.8069 \\
C_3 &= 1 \\
K_{\mathrm{L1}} &= 64\,271\,618 \\
K_{\mathrm{L2}} &= 0.2855 \\
K_{\mathrm{L3}} &= 0.011 \\
K_{\mathrm{L4}} &= 0.01488 \\
K_{\mathrm{L5}} &= 3.266 \\
\sigma_{\mathrm{RE}} &= 0.3657\ \mathrm{TDC}_{\mathrm{mean}} + 3.6563
\end{aligned}
$$



2.3. AC Fatigue Cracking

The $B_{\mathrm{f,1}}$ factor was updated and has the following defaults:

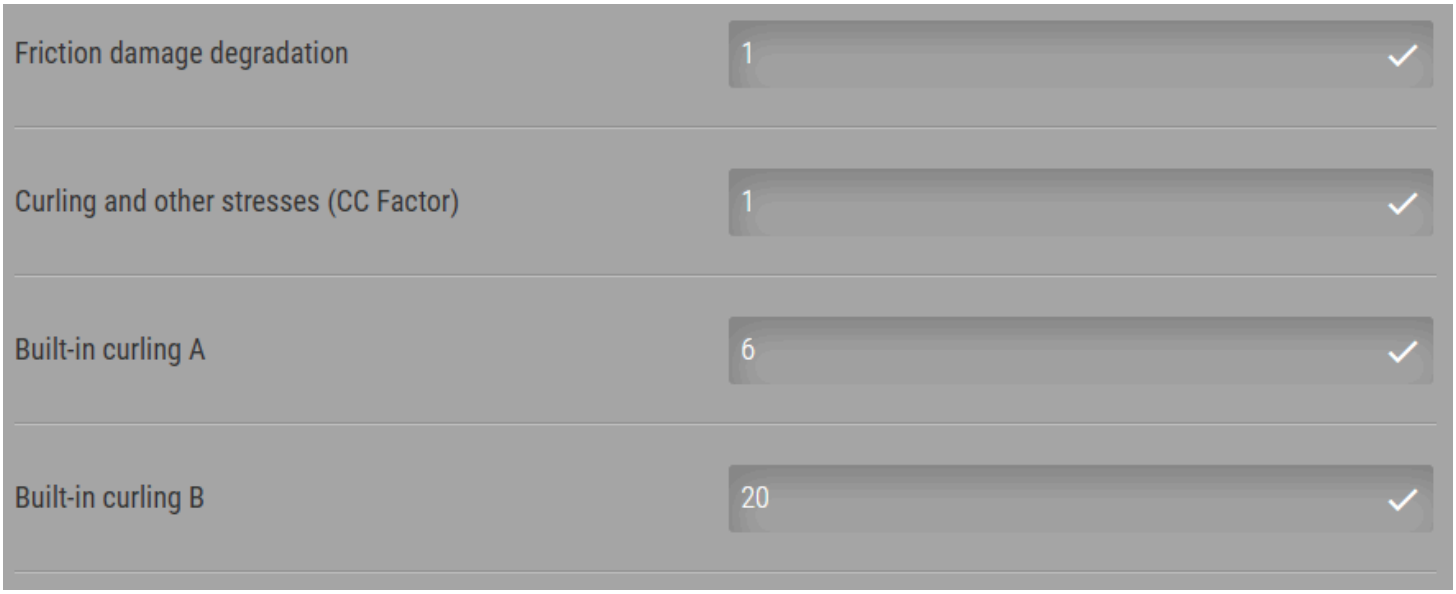
$$
B_{\mathrm{f,1}} = \begin{cases} 0.02054 & \text{if } h_{\mathrm{AC}} < 5 \\ 5.014\ {h_{\mathrm{AC}}}^{-3.416} & \text{if } 5 \leq h_{\mathrm{AC}} \leq 12 \\ 0.001032 & \text{if } 12 < h_{\mathrm{AC}} \end{cases}
$$



2.4. JPCP Friction

During the integration of NCHRP 1-51, several factors were introduced for JPCP friction and have the following defaults:

$$\begin{aligned} \text{friction degradation} &= 1 \\ C_c &= 1 \\ A &= 6 \\ B &= 20 \end{aligned}$$

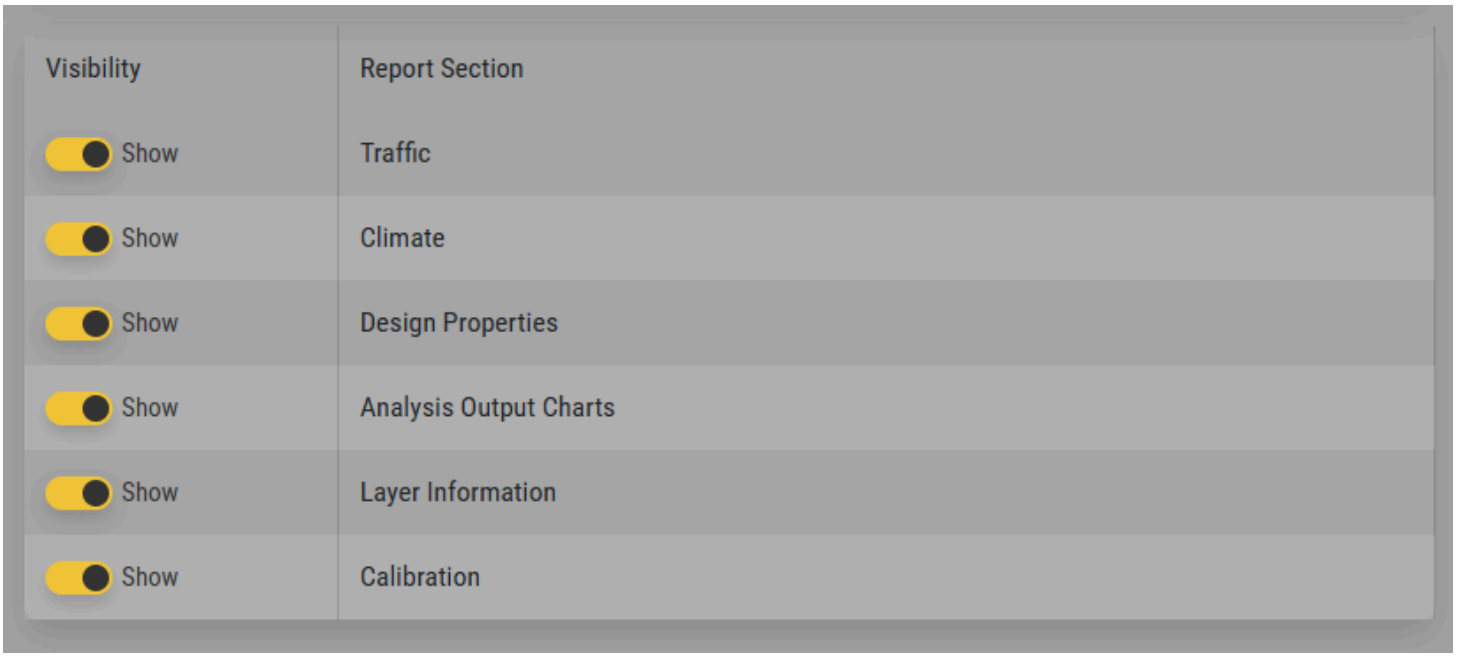


3. Library Type: Report Customization

- XML schema: `ReportConfigurationSetting`

Six properties have been added to allow users to determine the visibilities of larger sections in the PMED analysis output report. These properties apply to all designs, and the corresponding report sections default to visible.

Here is a screenshot of the relevant UI section:



4. Library Type: AC Material

- XML schema: `AsphaltObject`

Four categories of properties have been added to the AC Material library schema: |E*| prediction, top-down cracking (TDC), indirect tensile (IDT) strength, and multiple stress creep recovery (MSCR) binder grading.

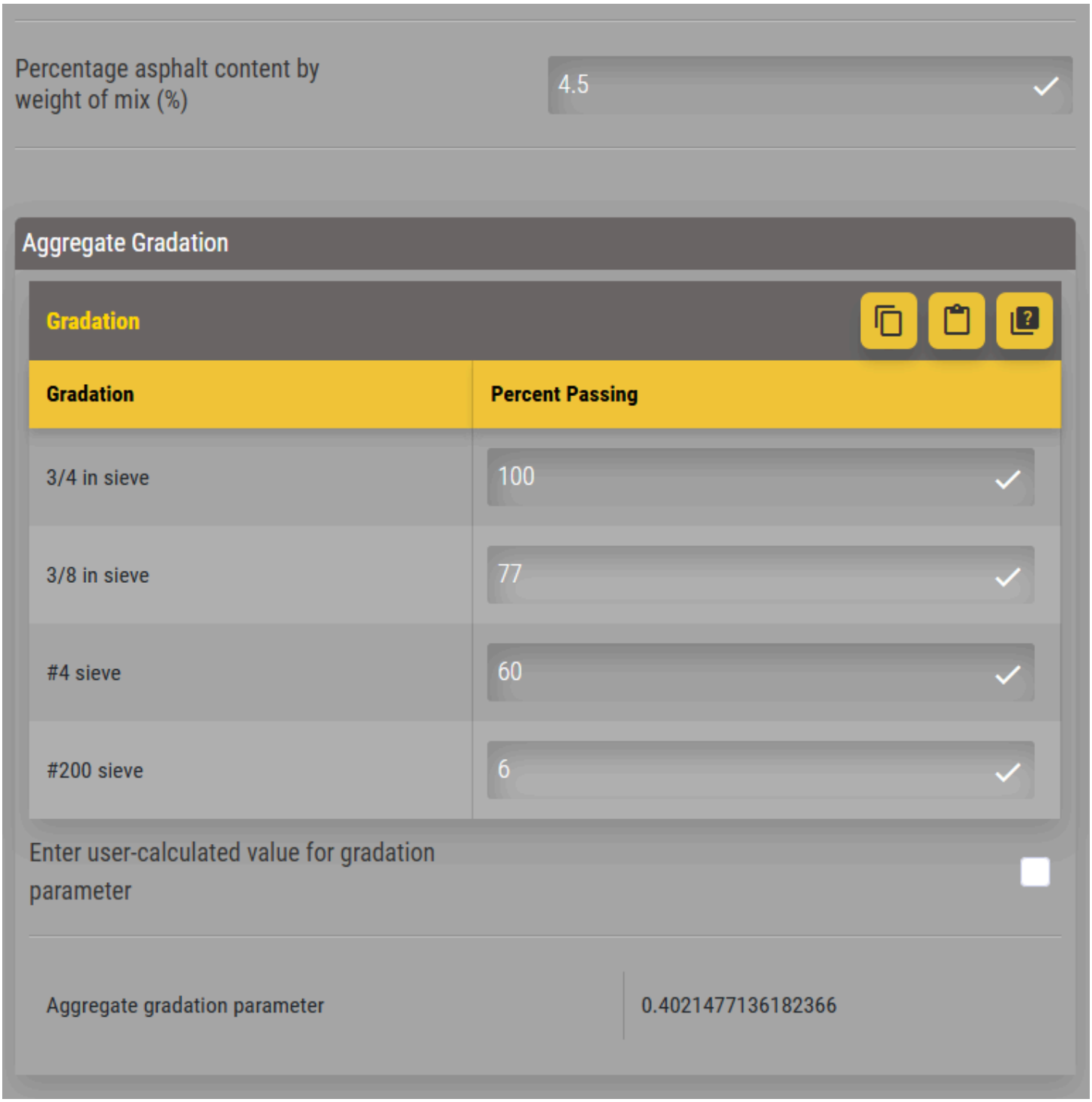
4.1. |E*| Prediction

- |E*| prediction model selection
  - A choice of two options: NCHRP 1-37A or NCHRP 1-40D (a.k.a. "G*").
  - Defaults to 1-37A.

4.2. TDC Properties

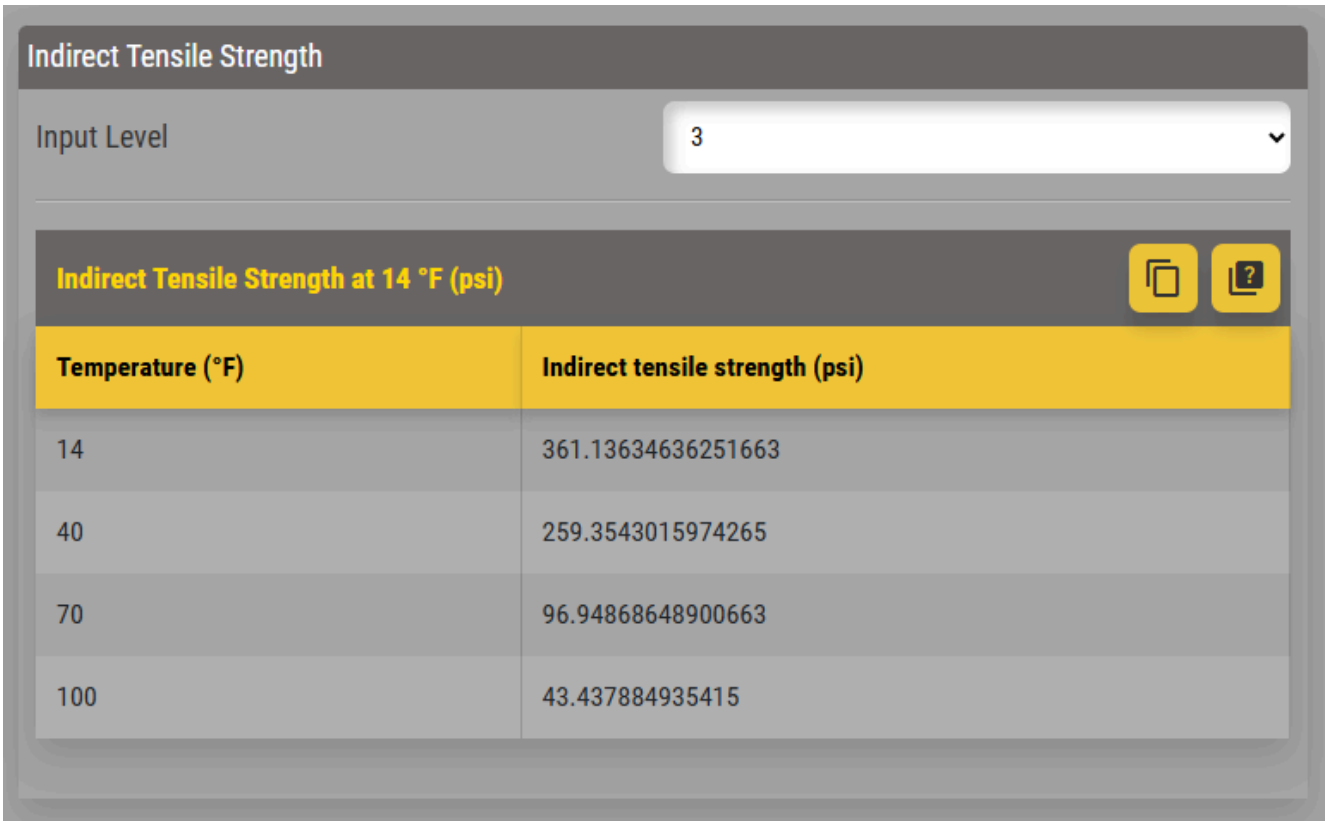
- Asphalt content by weight of mix
  - Defaults to 4.5%.
- Aggregate gradation parameter

- This value can be provided directly by the the user, or it can be calculated by the software based on the asphalt aggregate gradation values provided by the user.
- Defaults to being calculated by the software.

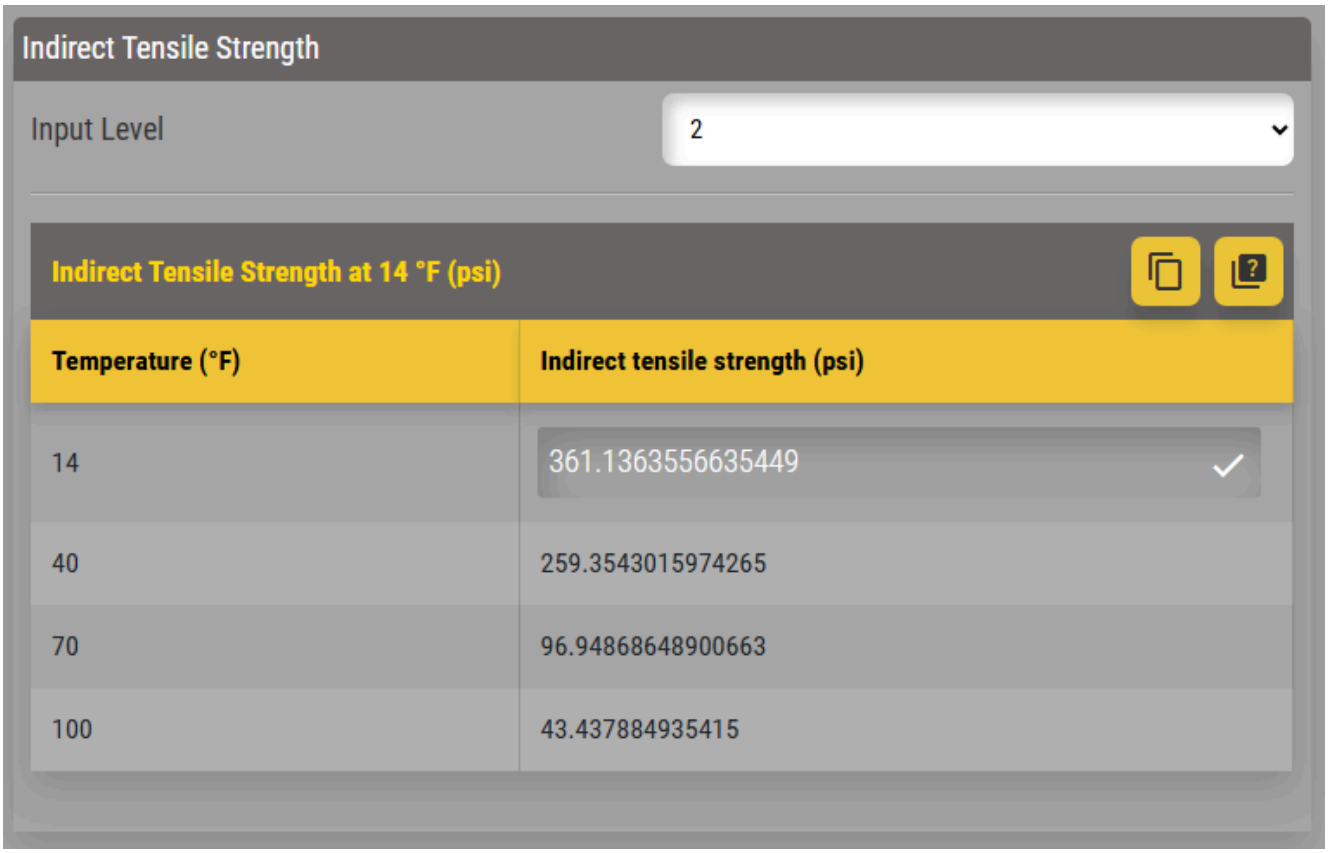


4.3. IDT Strength Properties

- IDT strength input level
  - Defaults to level 3, with all IDT strength values internally calculated.

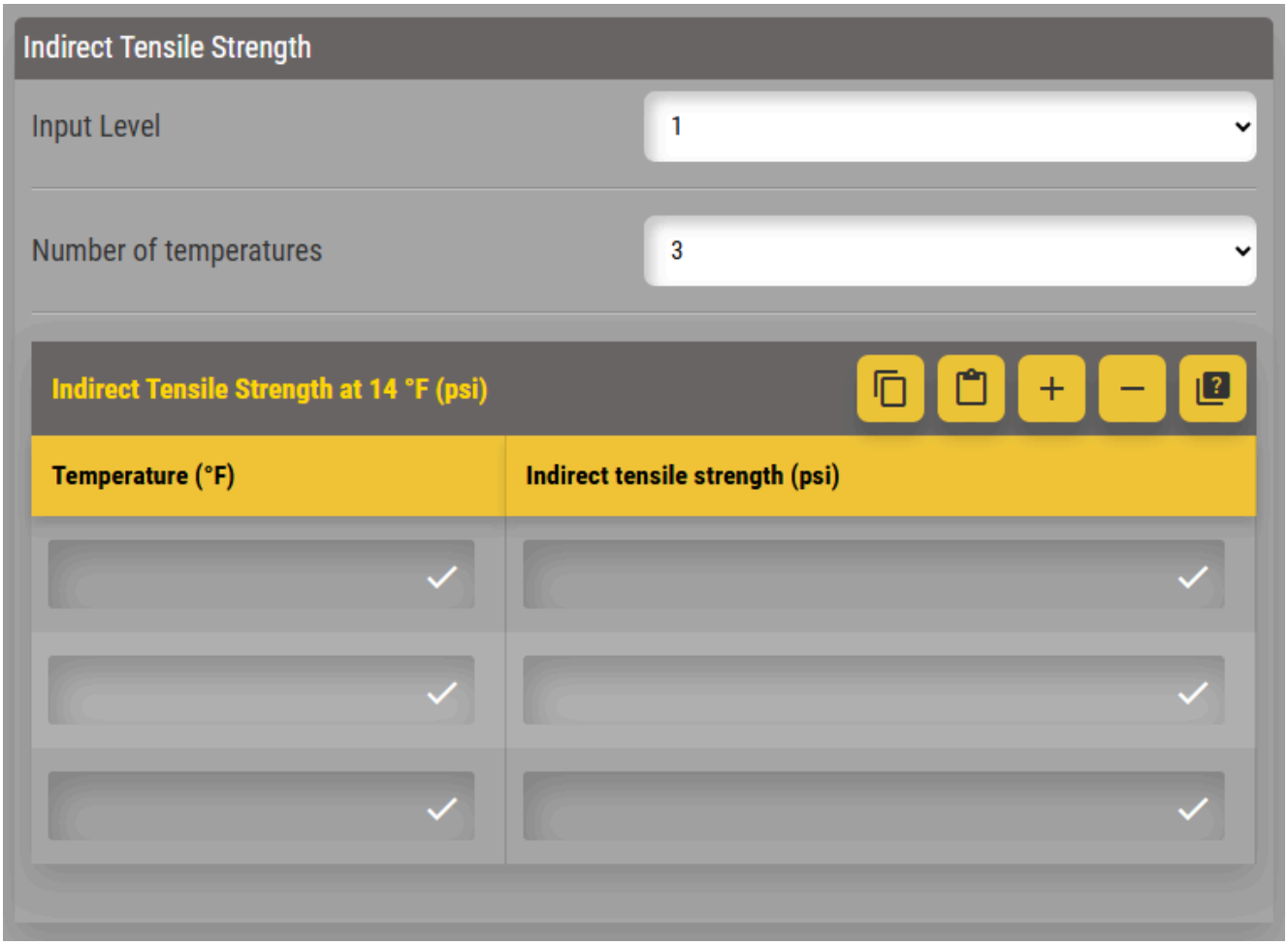


- IDT strength maximum
  - Available only at input level 2.



- IDT strength matrix

- Available only at input level 1.



4.4. MSCR Binder Grading Properties

These properties are available only when (a) the dynamic modulus input level is at level 2 and (b) MSCR is the selected binder grading method.

- Temperature
- Complex shear modulus (G*)
- Phase angle
- Percent recovery at 3200 Pa

Asphalt Binder (Level 2 - MSCR)

Binder Category: MSCR

MSCR Binder

Temperature (°F)	Binder G* (Pa)	Phase angle (deg)	Recovery @ 3.2 Kpa (%)
0 ✓	0 ✓	0 ✓	0 ✓