



INDIANA DEPARTMENT OF TRANSPORTATION

Driving Indiana's Economic Growth

Design Memorandum No. 23-21

December 8, 2023

TO: All Design, Operations, and District Personnel, and Consultants

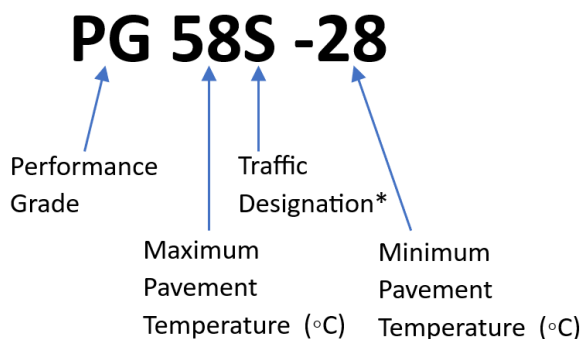
FROM: /s/Kumar Dave
Kumar Dave
Manager, Pavement Design Office
Highway Engineering Division

SUBJECT: HMA Pavement PG Binder

REVISES: *Indiana Design Manual* Sections 601-2.0, 601-3.0, 601-5.01(04), and Fig. 601-5C
Indiana Design Manual Section 602-3.02, 602-3.02(01) thru -3.02(03)
Indiana Design Manual Section 607-1.0, 607-1.01

EFFECTIVE: Lettings on or after September 1, 2024

The Standards Committee approved revisions to *Standard Specifications* Sections 401, 402, 406, 408, 410, 414, and 902 at the October 2023 meeting. Revisions address the need for an updated binder grade system to better account for truck traffic and a change in base binder grade to one more appropriate for Indiana's climate. More specifically, INDOT's base unmodified binder grade has been revised from Superpave PG 64-22 to Multiple Stress Creep Recovery (MSCR) PG 58-28 with a traffic designation value (shown below), resulting in all new 401 and 410 HMA pavement pay items.



*Traffic designation "S" (Standard grade) represents a neat (unmodified) binder. If heavy or slow-moving traffic is expected the MSCR traffic designation value is changed to the corresponding "H" (Heavy), or "E" (Extreme) grades.

Effective as noted, projects that include a 401, 402, or 410 HMA pavement pay item should include recurring special provision (RSP) 400-R-780, MSCR Binder Specifications. All contracts should include RSP 100-C-281, PG Binder Grades, until it is sunset on August 31, 2025. This provision serves as an additional measure to ensure the appropriate MSCR PG binder is included in the contract.

The RSPs will be included on the May 2024 RSP Menu. Until the menu is published, the provisions can be viewed from the INDOT [Recurring Special Provisions and Plan Details](#) webpage, under the applicable Division link.

Approved Pavement Designs

For contracts letting on or after September 1, 2024, previously approved pavement designs should not be resubmitted. For a pavement design that specifies QC/QA HMA or SMA, a copy of this memo should be appended to the Final Pavement Design file submitted with the Final Tracings package.

A few QC/QA SMA (410) pay items have been eliminated. For a project with a pavement design utilizing an eliminated pay item, contact the Office of Pavement Engineering for a revised recommendation.

Pay Items and Unit Costs

Pay Items. QC/QA HMA (401) and SMA (410) pay item numbers and descriptions are affected. A complete list for converting old pay items to new pay items is included as an attachment to this memo. The cost estimate should be updated to reflect the new pay items.

A simplified table of the PG binder conversion is shown below.

Old Superpave PG Binder Grade	Will become MSCR PG Binder Grade
PG 64-22	PG 58S-28
PG 70-22	PG 58H-28
PG 76-22	PG 58E-28

Unit Costs. Until a bid history is established for new pay items, designers should increase the unit cost based on the old pay item as follows. The cost estimate should be updated to reflect the change in unit cost.

- + \$2.00/ton for Base mix.
- + \$2.50/ton for Intermediate mix.
- + \$3.00/ton for Surface mix.

Plan Revisions

Pavement design information shown on the Typical Cross Sections and elsewhere on the plans should be revised to reflect the new pay item descriptions. This applies to contracts with approved pavement designs and contracts that use a standard pavement section.

IDM Revisions

Revisions have been incorporated into the referenced sections of IDM Chapters [601](#), [602](#), and [607](#). A summary of revisions and additional information for pavement designers is included below.

Questions regarding this design memo should be directed to the Office of Pavement Engineering, Nick Cosenza, Senior Pavement Design Engineer at ncosenza@indot.in.gov.

IDM Section	Revision
601-2.0, History	Added sentence for 2023 implementation of MSCR binder designation system.
601-3.0, Abbreviations	Added MSCR
601-5.01(04), INDOT Final Pavement Design	Deleted HMA Binder Selection from pavement design report appendices list.
Fig. 601-5C, Pavement Design for Bridge and Small Structure Projects	Revised figure to reflect new binder designations for standard pavement sections.
602-3.02, Asphalt Pavement	Added MSCR information.
602-3.02(01), -3.02(02), and -3.02(03)	Revised binder designations.
607-1.0, HMA Pavement Pay Items	Revised example for MSCR PG binder designation.
607-1.01, Performance Grade (PG) Binder	Deleted LTPPBinder information. Added • description for components of PG binder designation. • guidance for pavement designers for selecting an MSCR binder. • guidance for SMA and Open-Graded mixes.

Additional Information for Pavement Designers

The pavement designer will select an MSCR PG binder for QC/QA HMA surface and intermediate mixes using design ESALs and the table below. Figure 601-4E should be used to determine the design ESALs for a project. The top two lifts of HMA should be the same PG grade. HMA base mixes will always specify PG 58S-28 regardless of the design ESALs. Stone Matrix Asphalt (SMA) and Open-Graded (OG) asphalt are specialty mixes and will always use PG 58E-28 regardless of the design ESALs.

Performance-Graded Asphalt Binder Using Multiple Stress Creep Recovery (MSCR)			
MSCR PG Binder	Similar Superpave PG Binder for MEPDG	MSCR Traffic Designation	Design ESALs, millions
PG 58S-28	PG 58-28	Standard S grade	< 3 million ESAL's
PG 58H-28	PG 64-28	Heavy H grade	$3 \leq \text{ESAL's} < 10 \text{ million}$
PG 58E-28	PG 70-28	Extreme E grade	> 10 million ESAL's

New Pavement ME design input files for HMA with MSCR binders will be available to download from the [Office of Pavement Engineering](#) webpage.

If the old pay item is...		Use this pay item. New pay items have a 6-digit index number	
OLD PAY ITEM NUMBER	OLD DESCRIPTION (Superpave PG)	NEW PAY ITEM NUMBER	NEW DESCRIPTION (MSCR PG)
401-07321	QC/QA-HMA, 2, 64, SURFACE, 9.5 mm	401-000001	QC/QA-HMA, 2, 58S, SURFACE, 9.5 mm
401-07322	QC/QA-HMA, 3, 64, SURFACE, 9.5 mm	401-000002	QC/QA-HMA, 3, 58S, SURFACE, 9.5 mm
401-07323	QC/QA-HMA, 4, 64, SURFACE, 9.5 mm	401-000003	QC/QA-HMA, 4, 58S, SURFACE, 9.5 mm
401-07327	QC/QA-HMA, 2, 70, SURFACE, 9.5 mm	401-000004	QC/QA-HMA, 2, 58H, SURFACE, 9.5 mm
401-07328	QC/QA-HMA, 3, 70, SURFACE, 9.5 mm	401-000005	QC/QA-HMA, 3, 58H, SURFACE, 9.5 mm
401-07329	QC/QA-HMA, 4, 70, SURFACE, 9.5 mm	401-000006	QC/QA-HMA, 4, 58H, SURFACE, 9.5 mm
401-07333	QC/QA-HMA, 2, 76, SURFACE, 9.5 mm	401-000007	QC/QA-HMA, 2, 58E, SURFACE, 9.5 mm
401-07334	QC/QA-HMA, 3, 76, SURFACE, 9.5 mm	401-000008	QC/QA-HMA, 3, 58E, SURFACE, 9.5 mm
401-07335	QC/QA-HMA, 4, 76, SURFACE, 9.5 mm	401-000009	QC/QA-HMA, 4, 58E, SURFACE, 9.5 mm
401-07339	QC/QA-HMA, 2, 64, SURFACE, 12.5 mm	401-000010	QC/QA-HMA, 2, 58S, SURFACE, 12.5 mm
401-07340	QC/QA-HMA, 3, 64, SURFACE, 12.5 mm	401-000011	QC/QA-HMA, 3, 58S, SURFACE, 12.5 mm
401-07342	QC/QA-HMA, 4, 64, SURFACE, 12.5 mm	401-000012	QC/QA-HMA, 4, 58S, SURFACE, 12.5 mm
401-07345	QC/QA-HMA, 2, 70, SURFACE, 12.5 mm	401-000013	QC/QA-HMA, 2, 58H, SURFACE, 12.5 mm
401-07347	QC/QA-HMA, 3, 70, SURFACE, 12.5 mm	401-000014	QC/QA-HMA, 3, 58H, SURFACE, 12.5 mm
401-07348	QC/QA-HMA, 4, 70, SURFACE, 12.5 mm	401-000015	QC/QA-HMA, 4, 58H, SURFACE, 12.5 mm
401-07351	QC/QA-HMA, 2, 76, SURFACE, 12.5 mm	401-000016	QC/QA-HMA, 2, 58E, SURFACE, 12.5 mm
401-07352	QC/QA-HMA, 3, 76, SURFACE, 12.5 mm	401-000017	QC/QA-HMA, 3, 58E, SURFACE, 12.5 mm
401-07353	QC/QA-HMA, 4, 76, SURFACE, 12.5 mm	401-000018	QC/QA-HMA, 4, 58E, SURFACE, 12.5 mm
401-07356	QC/QA-HMA, 2, 64, INTERMEDIATE, 9.5 mm	401-000019	QC/QA-HMA, 2, 58S, INTERMEDIATE, 9.5 mm
401-07357	QC/QA-HMA, 3, 64, INTERMEDIATE, 9.5 mm	401-000020	QC/QA-HMA, 3, 58S, INTERMEDIATE, 9.5 mm
401-07358	QC/QA-HMA, 4, 64, INTERMEDIATE, 9.5 mm	401-000021	QC/QA-HMA, 4, 58S, INTERMEDIATE, 9.5 mm
401-07361	QC/QA-HMA, 2, 70, INTERMEDIATE, 9.5 mm	401-000022	QC/QA-HMA, 2, 58H, INTERMEDIATE, 9.5 mm
401-07362	QC/QA-HMA, 3, 70, INTERMEDIATE, 9.5 mm	401-000023	QC/QA-HMA, 3, 58H, INTERMEDIATE, 9.5 mm
401-07363	QC/QA-HMA, 4, 70, INTERMEDIATE, 9.5 mm	401-000024	QC/QA-HMA, 4, 58H, INTERMEDIATE, 9.5 mm
401-07366	QC/QA-HMA, 2, 76, INTERMEDIATE, 9.5 mm	401-000025	QC/QA-HMA, 2, 58E, INTERMEDIATE, 9.5 mm
401-07367	QC/QA-HMA, 3, 76, INTERMEDIATE, 9.5 mm	401-000026	QC/QA-HMA, 3, 58E, INTERMEDIATE, 9.5 mm
401-07368	QC/QA-HMA, 4, 76, INTERMEDIATE, 9.5 mm	401-000027	QC/QA-HMA, 4, 58E, INTERMEDIATE, 9.5 mm
401-07371	QC/QA-HMA, 2, 64, INTERMEDIATE, 12.5 mm	401-000028	QC/QA-HMA, 2, 58S, INTERMEDIATE, 12.5 mm
401-07372	QC/QA-HMA, 3, 64, INTERMEDIATE, 12.5 mm	401-000029	QC/QA-HMA, 3, 58S, INTERMEDIATE, 12.5 mm
401-07373	QC/QA-HMA, 4, 64, INTERMEDIATE, 12.5 mm	401-000030	QC/QA-HMA, 4, 58S, INTERMEDIATE, 12.5 mm
401-07378	QC/QA-HMA, 2, 70, INTERMEDIATE, 12.5 mm	401-000031	QC/QA-HMA, 2, 58H, INTERMEDIATE, 12.5 mm
401-07379	QC/QA-HMA, 3, 70, INTERMEDIATE, 12.5 mm	401-000032	QC/QA-HMA, 3, 58H, INTERMEDIATE, 12.5 mm
401-07380	QC/QA-HMA, 4, 70, INTERMEDIATE, 12.5 mm	401-000033	QC/QA-HMA, 4, 58H, INTERMEDIATE, 12.5 mm
401-07384	QC/QA-HMA, 2, 76, INTERMEDIATE, 12.5 mm	401-000034	QC/QA-HMA, 2, 58E, INTERMEDIATE, 12.5 mm
401-07385	QC/QA-HMA, 3, 76, INTERMEDIATE, 12.5 mm	401-000035	QC/QA-HMA, 3, 58E, INTERMEDIATE, 12.5 mm
401-07387	QC/QA-HMA, 4, 76, INTERMEDIATE, 12.5 mm	401-000036	QC/QA-HMA, 4, 58E, INTERMEDIATE, 12.5 mm
401-07390	QC/QA-HMA, 2, 64, INTERMEDIATE, 19.0 mm	401-000037	QC/QA-HMA, 2, 58S, INTERMEDIATE, 19.0 mm
401-07392	QC/QA-HMA, 3, 64, INTERMEDIATE, 19.0 mm	401-000038	QC/QA-HMA, 3, 58S, INTERMEDIATE, 19.0 mm
401-07393	QC/QA-HMA, 4, 64, INTERMEDIATE, 19.0 mm	401-000039	QC/QA-HMA, 4, 58S, INTERMEDIATE, 19.0 mm
401-07397	QC/QA-HMA, 2, 70, INTERMEDIATE, 19.0 mm	401-000040	QC/QA-HMA, 2, 58H, INTERMEDIATE, 19.0 mm
401-07398	QC/QA-HMA, 3, 70, INTERMEDIATE, 19.0 mm	401-000041	QC/QA-HMA, 3, 58H, INTERMEDIATE, 19.0 mm
401-07399	QC/QA-HMA, 4, 70, INTERMEDIATE, 19.0 mm	401-000042	QC/QA-HMA, 4, 58H, INTERMEDIATE, 19.0 mm
401-07402	QC/QA-HMA, 2, 76, INTERMEDIATE, 19.0 mm	401-000043	QC/QA-HMA, 2, 58E, INTERMEDIATE, 19.0 mm
401-07403	QC/QA-HMA, 3, 76, INTERMEDIATE, 19.0 mm	401-000044	QC/QA-HMA, 3, 58E, INTERMEDIATE, 19.0 mm
401-07404	QC/QA-HMA, 4, 76, INTERMEDIATE, 19.0 mm	401-000045	QC/QA-HMA, 4, 58E, INTERMEDIATE, 19.0 mm
401-07407	QC/QA-HMA, 2, 64, BASE, 25.0 mm	401-000046	QC/QA-HMA, 2, 58S, BASE, 25.0 mm
401-07408	QC/QA-HMA, 3, 64, BASE, 25.0 mm	401-000047	QC/QA-HMA, 3, 58S, BASE, 25.0 mm
401-07409	QC/QA-HMA, 4, 64, BASE, 25.0 mm	401-000048	QC/QA-HMA, 4, 58S, BASE, 25.0 mm
401-07412	QC/QA-HMA, 2, 70, BASE, 25.0 mm	401-000049	QC/QA-HMA, 2, 58H, BASE, 25.0 mm
401-07413	QC/QA-HMA, 3, 70, BASE, 25.0 mm	401-000050	QC/QA-HMA, 3, 58H, BASE, 25.0 mm

If the old pay item is...		Use this pay item. New pay items have a 6-digit index number	
OLD PAY ITEM NUMBER	OLD DESCRIPTION (Superpave PG)	NEW PAY ITEM NUMBER	NEW DESCRIPTION (MSCR PG)
401-07414	QC/QA-HMA, 4, 70, BASE, 25.0 mm	401-000051	QC/QA-HMA, 4, 58H, BASE, 25.0 mm
401-07423	QC/QA-HMA, 2, 64, BASE, 19.0 mm	401-000052	QC/QA-HMA, 2, 58S, BASE, 19.0 mm
401-07424	QC/QA-HMA, 3, 64, BASE, 19.0 mm	401-000053	QC/QA-HMA, 3, 58S, BASE, 19.0 mm
401-07427	QC/QA-HMA, 2, 70, BASE, 19.0 mm	401-000054	QC/QA-HMA, 2, 58H, BASE, 19.0 mm
401-07428	QC/QA-HMA, 3, 70, BASE, 19.0 mm	401-000055	QC/QA-HMA, 3, 58H, BASE, 19.0 mm
401-08364	QC/QA-HMA, 4, 64, BASE, 19.0 mm	401-000056	QC/QA-HMA, 4, 58S, BASE, 19.0 mm
401-08366	QC/QA-HMA, 4, 70, BASE, 19.0 mm	401-000057	QC/QA-HMA, 4, 58H, BASE, 19.0 mm
401-09717	QC/QA-HMA, 3, 64, SURFACE, 4.75 mm	401-000058	QC/QA-HMA, 3, 58S, SURFACE, 4.75 mm
401-09941	QC/QA-HMA, 3, 70, SURFACE, 4.75 mm	401-000059	QC/QA-HMA, 3, 58H, SURFACE, 4.75 mm
401-09949	QC/QA-HMA, 2, 70, SURFACE, 4.75 mm	401-000060	QC/QA-HMA, 2, 58H, SURFACE, 4.75 mm
401-09970	QC/QA-HMA, 2, 64, SURFACE, 4.75 mm	401-000061	QC/QA-HMA, 2, 58S, SURFACE, 4.75 mm
401-11787	QC/QA-HMA, 3, 76, INTERMEDIATE, OG, 19.0 mm	401-000062	QC/QA-HMA, 3, 58E, INTERMEDIATE, OG, 19.0 mm
401-11897	QC/QA-HMA, 2, 64, INTERMEDIATE, 25.0 mm	401-000063	QC/QA-HMA, 2, 58S, INTERMEDIATE, 25.0 mm
401-11915	QC/QA-HMA, 4, 76, SURFACE, 4.75 mm	401-000064	QC/QA-HMA, 4, 58E, SURFACE, 4.75 mm
401-11966	QC/QA-HMA, 3, 76, SURFACE, 4.75 mm	401-000065	QC/QA-HMA, 3, 58E, SURFACE, 4.75 mm
401-11971	QC/QA-HMA, 4, 70, SURFACE, 4.75 mm	401-000066	QC/QA-HMA, 4, 58H, SURFACE, 4.75 mm
401-12137	QC/QA-HMA, 4, 76, INTERMEDIATE, OG, 19.0 mm	401-000067	QC/QA-HMA, 4, 58E, INTERMEDIATE, OG, 19.0 mm
401-12138	QC/QA-HMA, 4, 76, INTERMEDIATE, OG, 25.0 mm	401-000068	QC/QA-HMA, 4, 58E, INTERMEDIATE, OG, 25.0 mm
401-12139	QC/QA-HMA, 4, 76, BASE, OG, 19.0 mm	401-000069	QC/QA-HMA, 4, 58E, BASE, OG, 19.0 mm
401-12141	QC/QA-HMA, 4, 76, BASE, OG, 25.0 mm	401-000070	QC/QA-HMA, 4, 58E, BASE, OG, 25.0 mm
401-12267	QC/QA-HMA, 4, 64, BASE, OG, 19.0 MM	401-000071	QC/QA-HMA, 4, 58S, BASE, OG, 19.0 mm
401-12495	QC/QA-HMA, 4, 76, INTERMEDIATE, OG, 9.5 mm	401-000072	QC/QA-HMA, 4, 58E, INTERMEDIATE, OG, 9.5 mm
410-09530	QC/QA-HMA, 4, 76, SURFACE, 9.5 mm - SMA	410-000073	QC/QA-HMA, 4, 58E, SURFACE, 9.5 mm - SMA
410-09877	QC/QA-HMA, 4, 70, SURFACE, 9.5 mm - SMA	DELETED - Contact Office of Pavement Engineering	
410-10128	QC/QA-HMA, 3, 76, SURFACE, 9.5 mm - SMA	DELETED - Contact Office of Pavement Engineering	
410-11777	QC/QA-HMA, 4, 76, SURFACE, 12.5 mm - SMA	410-000074	QC/QA-HMA, 4, 58E, SURFACE, 12.5 mm - SMA
410-11935	QC/QA-HMA, 3, 70, SURFACE, 9.5 mm - SMA	DELETED - Contact Office of Pavement Engineering	
410-12320	QC/QA-HMA, 3, 76, SURFACE, 12.5 mm - SMA	DELETED - Contact Office of Pavement Engineering	
410-12333	QC/QA-HMA, 3, 70, SURFACE, 12.5 mm - SMA	DELETED - Contact Office of Pavement Engineering	
410-12485	QC/QA-HMA, 4, 76, INTERMEDIATE, 12.5 mm - SMA	410-000075	QC/QA-HMA, 4, 58E, INTERMEDIATE, 12.5 mm - SMA
410-12672	QC/QA-HMA, 2, 70, SURFACE, 9.5 mm - SMA	DELETED - Contact Office of Pavement Engineering	