Pages 728, 730, 731, and 732, under Section 702 - Butuminus Materials ***replace*** Tables 702-1, 702-5, 702-6, and 702-9 and corresponding notes with the following:

TABLE 702-1
PERFORMANCE GRADED BINDERS FOR PAVING

MATERIAL DESIGNATION	702-5828	702-5834	702-6422	702-6428	702-7022	702-7622
PERFORMANCE GRADE	PG 58		PG 64		PG 70	PG 76
	-28	-34	-22	-28	-22	-22
Original Binder						
Flash Point Temp, T 48: Min ºC	230					
Viscosity, ASTM D 4402[1] Maximum, 3 Pa·s (3000 cP) Test Temp, ºC	135					
Dynamic Shear, TP5[2] G*/sin δ, Min., 1.00 kPa Test Temp @ 10 rad/s, ºC	58		64		70	76
Rolling Thin Film Oven (T 240) or Thin Film Oven (T 179) Residue						
Mass Loss, Maximum, %	1.00					
Dynamic Shear, TP5: G*/sin δ, Min., 2.20 kPa Test Temp @ 10 rad/s, ºC	58		64		70	76
Pressure Aging Vessel Residue (PP1)						
PAV Aging Temp, ºC	100		100		100	100
Dynamic Shear, TP5: G*sin δ, Max., 5000 kPa Test Temp @ 10 rad/s, ºC	19	16	25	22	28	31
Physical Hardening[3]	Report					
Creep Stiffness, TP1:[4] S, Maximum, 300 MPa *m*-value, Minimum, 0.300 Test Temp, @ 60 sec, ºC	-18	-24	-12	-18	-12	-12
Direct Tension, TP3:[4] Failure Strain, Min, 1.0% Test Temp @ 1.0 mm/min, °C	-18	-24	-12	-18	-12	-12

NOTES:

1. This requirement may be waived by the Director, Materials Bureau if the supplier warrants that the PGB can be adequately pumped and mixed at temperatures that meet all applicable safety standards.
2. For quality control of unmodified PGB production, measurement of the viscosity of the original PGB may be substituted for dynamic shear measurements of G*/sin δ at test temperatures where the PGB is a Newtonian fluid. Any suitable standard means of viscosity measurement may be used, including capillary or rational viscometry (AASHTO T 201 or T 202).
3. Physical Hardening - TP1 is performed on a set of PGB beams according to Section 13.1, except the conditioning time is extended to 24 hours ± 10 minutes at 10°C above the minimum performance temperature. The 24-hour stiffness and *m*-value are reported for information purposes.
4. If the creep stiffness is below 300 MPa, the direct tension test is not required. If the creep stiffness between 300 and 600 MPa the direct tension failure strain requirement can be used in lieu of the creep stiffness requirement. The *m*-value requirement must be satisfied in both cases.

TABLE 702-5
ASPHALT EMULSIONS

TYPE	RAPID SETTING						MEDIUM SETTING								SLOW SETTING			
MATERIAL DESIGNATION	702-3001		702-3101		702-3102		702-3201		702-3301		702-3401		702-3402		702-3501		702-3601	
GRADE	RS-1		RS-2		HFRS-2		MS-2		HFMS-2		HFMS-2h		HFMS-2s		SS-1		SS-1h	
Tests on Emulsion	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**
Viscosity, Saybolt Furol 25ºC, Sec.	20	100	-	-	-	-	100	-	100	-	100	-	50	-	20	100	20	100
Viscosity, Saybolt Furol 50ºC, Sec.	-	-	75	400	75(1)	400(1)	100(1)	400(1)	100	400	-	-	-	-	-	-	-	-
Storage Stability Test, 1 Day (Difference in % Residue)	-	1	-	1	-	1	-	1	-	1	-	1	-	1	-	1	-	1
Demulsibility, 35 ml, 0.02 *N* $CaC1_2$, %	60	-	60	-	60	-	-	-	-	-	-	-	-	-	-	-	-	-
Cement Mixing Test, %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.0	-	2.0
Sieve Test, %	-	0.10	-	0.10	-	0.10	-	0.10	-	0.10	-	0.10	-	0.10	-	0.10	-	0.10
Residue by Distillation, %	55	-	63	-	63	-	65	-	65	-	65	-	65	-	57	-	57	-
Oil Distillate, Volume Total Emulsion, %	-	2	-	3	-	3	-	10	-	10	-	3	-	10	-	-	-	-
Tests on Residue From Distillation Test	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**
Penetration, 25ºC, 100 g, 5 Sec.	100	200	100	200	100	200	100	250	100	250	40	90	200	-	100	200	40	90
Float Test,(2) 60ºC, Sec.	-	-	-	-	1200	-	-	-	1200	-	1200	-	1200	-	-	-	-	-
Tests on Asphalt Base for Emulsion	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**
Penetration, 25ºC, 100 g, 5 Sec.	100	200	100	200	100	200	100	200	100	200	60	100	100	200	100	200	60	100
Solubility or Trichloroethylene, %	99.0	-	99.0	-	99.0	-	99.0	-	99.0	-	99.0	-	99.0	-	99.0	-	99.0	-
Ductility, 25ºC, 5cm/min, cm	100	-	100	-	100	-	100	-	100	-	50	-	100	-	100	-	50	-
Flash Point, ºC	177	-	177	-	177	-	177	-	177	-	225	-	177	-	177	-	225	-
Typical Applications:(3)	Spray Patch, Penetration Macadam		Surface Treatment, Penetration Macadam				Base and Shoulder Stabilization, Cold Mixes, Shoulder Seal				Penetration Macadam, Hot and Cold Mixes		Stockpile Patching Mix		Base and Shoulder Stabilization			
Suggested Temperature Range	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**
Mixing, ºC	-	-	-	-	-	-	40	75	40	75	25	75	25	75	25	60	25	60
Spraying, ºC	25	60	55	75	55	75	55	75	55	75	25	75	-	-	25	60	25	60

NOTES:

1. This viscosity requirement at 50ºC applies to emulsion used for shoulder sealing.
2. Float Test AASHTO T 50, except that the residue from distillation shall be poured immediately into the float collar at 260ºC.
3. These typical applications are intended only as a guide for selecting the proper emulsion grade.

TABLE 702-6
CATIONIC ASPHALT EMULSIONS

TYPE	RAPID SETTING				MEDIUM SETTING				SLOW SETTING				QUICK SETTING		POLYMER MODIFIED			
															RAPID SETTING		QUICK SETTING	
MATERIAL DESIGNATION	**702-4001**		**702-4101**		**702-4201**		**702-4301**		**702-4401**		**702-4501**		**702-4601**		**702-4701**		**702-4801**	
GRADE	**CRS-1**		**CRS-2**		**CMS-2**		**CMS-2h**		**CSS-1**		**CSS-1h**		**CQS-1h**		**CRS-1p**		**CQS-1p**	
Tests on Emulsion	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**
Viscosity, Saybolt Furol 25ºC, Sec.	-	-	-	-	-	-	-	-	20	100	20	100	20	100	-	-	20	100
Viscosity, Saybolt Furol 50ºC, Sec.	20	100	100	400	50	450	50	450	-	-	-	-	-	-	20	100	-	-
Storage Stability Test, 1 Day (Difference in % Residue)	-	1	-	1	-	1	-	1	-	1	-	1	-	1	-	1	-	1
Classification Test	Passes		Passes		-		-		-		-		-		Passes		-	
Particle Charge Test	Positive		Positive		Positive		Positive		Positive(1)		Positive(1)		Positive(1)		Positive(1)		Positive(1)	
Sieve Test, %	-	0.10	-	0.10	-	0.10	-	0.10	-	0.10	-	0.10	-	0.10	-	0.10	-	0.10
Cement Mixing Test, %	-	-	-	-	-	-	-	-	-	2.0	-	2.0	-	-	-	-	-	-
Demulsibility, (ASTM D 244)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	40	-	-	-
Ring and Ball Softening Point(2) ºC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	57	-
Polymer Content, %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	3	-
Residue by Distillation, %	60	-	65	-	65	-	65	-	57	-	57	-	62	-	60(3)	-	62(3)	-
Oil Distillate, Volume Total Emulsion, %	-	3	-	3	-	12	-	12	-	-	-	-	-	-	-	3	-	-
Tests on Residue From Distillation Test	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**
Penetration, 25ºC, 100 g, 5 Sec.	100	200	100	200	100	250	40	110	100	250	40	90	40	90	100	200	40	90
Tests on Asphalt Base for Emulsion	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**
Penetration, 25ºC, 100 g, 5 Sec.	100	200	100	200	100	200	60	100	100	200	60	100	60	100	100	200	60	100
Solubility or Trichloroethylene, %	99.0	-	99.0	-	99.0	-	99.0	-	99.0	-	99.0	-	99.0	-	99.0	-	99.0	-
Ductility, 25ºC, 5cm/min, cm	100	-	100	-	100	-	50	-	100	-	50	-	50	-	100	-	50	-
Flash Point, ºC	177	-	177	-	177	-	225	-	177	-	225	-	225	-	177	-	225	-
Typical Applications:(4)	Spray Patch, Penetration Macadam		Surface Treatment, Penetration Macadam		Cold Mixes, Penetration Macadam				Base and Shoulder Stabilization				Quick-Set Slurry		Paver-Placed Surface Treatment		Micro-Surfacing Treatment	
Suggested Temperature Range	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**
Mixing, ºC	-	-	-	-	40	75	40	75	25	65	25	65	25	65	-	-	-	-
Spraying, ºC	25	60	55	75	55	75	55	75	25	65	25	65	-	-	-	-	-	-

NOTES:

1. If the Particle Charge Test result is inconclusive, material having a maximum pH value of 6.7 will be acceptable.
2. According to AASHTO T 53.
3. According to AASHTO T 59.
4. These typical applications are intended only as a guide for selecting the proper emulsion grade.

TABLE 702-9 ASPHALT EMULSION TACK COAT		
MATERIAL DESIGNATION	**702-90**	
Test Requirements	**Minimum**	**Maximum**
Sieve Test, %	-	0.10
Residue by Distillation, %	28	40
Oil Distillate, Volume of Total Emulsion, %	-	2
Test on Residue from Distillation: Penetration, 25ºC, 100 g, 5 s	40	90
The asphalt emulsion tack coat shall be produced by diluting one of the following bituminous materials with a suitable emulsifier solution and thoroughly mixing into a homogeneous liquid:	**GRADE**	**MATERIAL DESIGNATION**
Asphalt Emulsion	HFMS-2h	702-3401
Asphalt Emulsion	SS-1h	702-3601
Cationic Asphalt Emulsion	CSS-1h	702-4501
Suggested Spraying Temperature, ºC	25 min.	65 max.

Grid lines have been added to various Tables for clarity and improved readability, ***replace*** the following corresponding Tables of the same number and title.

TABLE 401-1 COMPOSITION OF HOT MIX ASPHALT MIXTURES						
Mixture Requirements	**Permeable Base**				**Shim**	
	Type 1		**Type 2**		**Type 5**	
Screen Sizes	**General Limits % Passing[1]**	**Job Mix Tolerance %**	**General Limits % Passing[1]**	**Job Mix Tolerance %**	**General Limits % Passing[1]**	**Job Mix Tolerance %**
50.0 mm	100	-	100	-	-	-
37.5 mm	95-100	-	75-100	±7	-	-
25.0 mm	80- 95	±6	55- 80	±8	-	-
12.5 mm	30- 60	±6	23- 42	±7	-	-
6.3 mm	10- 25	±6	5- 20	±6	100	-
3.2 mm	3- 15	±6	2- 15	±4	80-100	±6
850 µm	-	-	-	-	32- 72	±7
425 µm	-	-	-	-	18- 52	±7
180 µm	-	-	-	-	7- 26	±4
75 µm	0- 4	±2	-	-	2- 12	±2
Asphalt Content, %[2,3]	2.0-4.0	NA	2.5-4.5	NA	7.0-9.5	NA
Mixing and Placing Temperature Range ºC	110-150		110-150		120-165	

TABLE 401-3 QUALITY CONTROL SAMPLING AND TESTING			
Plant Test Property	**Sample Location**	**Test Method**	**Quality Control Frequency**
Aggregate Gradation	NYSDOT MM 5.0	AASHTO T27	Note 1
Aggregate Moisture[6]	NYSDOT MM 5.0	NYSDOT MM 5.0	1 every other sublot Minimum 2 per day
Air Voids [3]	NYSDOT MM 5.0	AASHTO T166 & T209 MM 5.16M	1 per sublot
Mix Moisture[2, 4]	NYSDOT MM 5.0	NYSDOT MM 5.0	1 minimum per day
Mix Temperature	Plant and Haul Vehicle	N/A	Routinely, minimum 4 per day
Asphalt Binder Content	NYSDOT MM 5.0	NYSDOT MM 5.0	Routinely, minimum 4 per day/mix
RAP Binder Content	NYSDOT MM 5.0	NYSDOT MM 5.0 NY400-13C	2 per week
RAP Gradation	NYSDOT MM 5.0	AASHTO T 27	2 per week
RAP Moisture	NYSDOT MM 5.0	NYSDOT MM 5.0	1 per day
Asphalt Binder Sampling [5]	NYSDOT MM 8.1	NYSDOT MM 8.1	1 per day
Friction Aggregate	NYSDOT MM 28	NYSDOT MM 28	As outlined in MM 28

TABLE 401-4 ALLOWABLE SPECIMEN TOLERANCE RANGE			
Mix Types	**All Mix Types except the 37.5 mm Maximum Sp.Gr**		**37.5 mm**
Number of Specimens	**Bulk Sp.Gr.**	**Maximum Sp.Gr.**	**Maximum Sp.Gr.**
2	.020	.011	.019
3	.023	------	------
4	.025	------	------

TABLE 401-6 HMA HOLDING BIN ACCEPTANCE CRITERIA	
Property	**Acceptance Criteria**
Mix Temperature	±10°C from pugmill discharge temperature.
Aggregate Gradation	Within Job Mix Formula tolerances (applies to pugmill discharge mean gradation).
Asphalt Binder Content	±0.4% (applies to pugmill discharge mean asphalt binder content).
Asphalt Binder Recovered from Mixtures	
Dynamic Shear (TP5)	G*/sin δ, min., 2.20 kPa

TABLE 402-1 GENERAL DESCRIPTION					
Specification Types		**50 Series**	**60 Series**	**70 Series**	**80 series**
Coarse Agg. Type = F1 & Coarse Agg. Type = F2	Use	Mainline paving for controlled access highways, i.e., interstate, parkways.	Mainline paving other than 50 or 70 Series.	Mainline paving on low volume roadways.	Miscellaneous repairs, bridge approaches, trenches, etc.
	Compaction Monitoring	Compaction monitoring using 4 cores every day.	Compaction monitoring using PTD based on average of 4 cores.	Compaction monitoring using a density gauge.	Compaction based on number of passes.
Coarse Agg. Type = F3	Use		Mainline paving other than 70 Series.	Mainline paving on low volume roadways.	Miscellaneous repairs, bridge approaches, trenches, etc.
	Compaction Monitoring		Compaction monitoring using PTD based on average of 4 cores.	Compaction monitoring using a density gauge.	Compaction based on number of passes.
Coarse Agg. Type = F9	Use	Mainline paving for controlled access highways, i.e., interstate, parkways.	Mainline paving other than 50 or 70 Series.	T&L, mainline paving on low volume roadways.	T&L, shoulders, miscellaneous repairs, bridge approaches, trenches, etc.
	Compaction Monitoring	Compaction monitoring using 4 cores every day.	Compaction monitoring using PTD based on average of 4 cores.	Compaction monitoring using a density gauge.	Compaction based on number of passes.

TABLE 501-3 CONCRETE MIXTURES							
Design Mix Guidelines (where sand fineness modulus = 2.80)[1]							
Concrete Class	**T.C.M.[5] Content (kg/m^3)**	**Sand % Total Agg. (solid volume)**	**Water/ cement-itious mat'ls (by mass)**	**Air Content % desired (Range)**	**Slump Range (mm)**	**Type of Coarse Aggregate Gradation**	**Primary Use**
A	360	36.2	0.46	6.5 (5.0 - 8.0)	65 - 90	CA 2	general purpose structural
C6	359	35.8	0.44	6.5 (5.0 - 8.0)	25 - 75	CA 2	Pavement: slipform paving, form paving
D	430	45.8	0.44	7.5 (6.0 - 9.0)	65 - 90	CA 1	thin structural applications
DP [2]	430	45.8	0.40	7.5 (6.0 - 9.0)	75-125	CA 1	thin structural applications, overlays
E	384	35.8	0.44	6.5 (5.0 - 8.0)	75 - 100	CA 2	structural slabs and structural approach slabs
F	425	34.6	0.38	6.5 (5.0 - 8.0)	50 - 75	CA 2	high early strength for pavement or structural applications
G [3]	431	45.0	0.45	6.0 (4.0 - 8.0)	150-180	CA 2	underwater
GG [3]	475	45.0	0.45	6.0 (4.0 - 8.0)	150-180	CA 1	underwater (special)
H	400	40.0	0.44	6.5 (5.0 - 8.0)	75 - 100	CA 2	pumping applications
HP [2]	405	40.0	0.40	6.5 (5.0 - 8.0)	75 - 125	CA 2	pumping, structural slabs, approach slabs, substructures exposed to chlorides
I [4]	380	41.0	0.44	6.0 (4.0 - 8.0)	15 - 40	CA 2	slip forming highway median barriers
J [4]	403	45.8	0.44	6.0 (4.0 - 8.0)	15 - 40	CA 1	slip forming structural median barriers, parapet walls and curbs

TABLE 501-4 BATCHING TOLERANCES	
Cement, Pozzolan, or Blended Cement	± 1% (by mass) of total cementitious materials, if no microsilica is weighed cumulatively on common scale. ± 0.5% (by mass) of total cementitious materials, if microsilica powder is weighed cumulatively on a common scale.
Microsilica Powder	± 0.5% (by mass) of total cementitious materials, if weighed cumulatively with cement, Type IP or SM blend, or pozzolan.
	± 1% (by mass) if weighed on a separate scale.
Microsilica Slurry	± 2% (by volume)
Aggregate	±2% (by mass)
Water (See Note 1)	± 1% (by mass or volume)
Admixtures 711-08	± 3% (by mass or volume) or ± 1 meter pulse (see Note 3), whichever is greater.
Admixture (other)	contact Director, Materials Bureau
Zero - Aggregate (See Note 2)	± 2%
Zero - Cementitious Mat'ls. (See Note 2)	± 1%
Zero - Water (See Note 1, 2)	± 1%

TABLE 501-5 CONCRETE UNIFORMITY		
Test		**Permissible Variation (Concrete samples taken at two locations in the batch)**
Mass per cubic meter calculated to an air-free basis		32.0 kg per m^3
Air Content, % by volume of concrete		1.0%
Slump:	Average slump 100 mm or less	25 mm
	Average slump greater than 100 mm	40 mm
Coarse aggregate content, portion by mass of each sample retained on a 4.75 mm sieve		6.0%
Unit mass of air-free mortars based on average for all comparative samples tested		1.6 %

TABLE 501-7 SUMMARY OF CONCRETE BATCHING, MIXING, HAULING AND DISCHARGING				
Central Mixed Concrete	**Transit Mixed Concrete**		**Truck Mixed Concrete**	
Begin Batching Load mixer **End of Batching and Begin Mixing** 90 Second minimum after all materials are in the mixer. **End of Mixing** **Open Haul Units**: 30 Minutes maximum **Rotating Drum**: Agitate 2-6 rpm, 90 Minutes maximum (See Note 2) **Completion of Discharge** (When concrete is transported in units approved for mixing, see Note 1)	**Begin Batching** Hatch load, or ribbon load materials through barrel hopper. Add approx. 90% of design water		**Begin Batching REGULAR MIX** Load aggregates. Drum may be rocked or revolved **Load Cement** (See Note 3) **Cement In Contact With Aggregates** 30 Minutes max.	**Begin Batching LAYERED MIX** Load fine agg. , then SSD coarse agg. through hatch Drum may be rocked. **Load Cement** (See Note 3) **Cement In Contact With Aggregates** 90 Minutes max.
	▲	**Cement In Contact With Aggregates** 5 Minutes max.		
		Begin Mixing at plant or in transit **Class HP or Class DP** 100 rev. minimum 200 rev. maximum Mix: 6-18 rpm	**Begin Mixing** At project, after adding water Mix: 6-18 rpm	
	90 Minutes max. (Note 2)	**All Other Classes** 100 rev. minimum 160 rev. maximum Mix: 6-18 rpm	100 rev. minimum 160 rev. maximum 15 Minutes maximum	
		End of Mixing Agitate 2-6 rpm	**End of Mixing** Agitate 2-6 rpm	
		Begin Discharge 50 Minutes maximum	**Begin Discharge** 30 Minutes maximum	
	▼	**Completion of Discharge**	**Completion of Discharge**	

TABLE 555-4 MINIMUM TIME FOR FORM REMOVAL/FORMING/LOADING LIMITATIONS - SUBSTRUCTURES (1)			
SUBSTRUCTURE PIECE	**STRIPPING (2)**	**FORMING NEXT PLACEMENT**	**LOADING**
All Footings	2 days	2 days	4 days before next placement
Abutment stems, backwalls	2 days if less than 3.0 m (avg.). Add 1 day for each additional 1.5 m to 5 days, maximum.	2 days	5 days before placing backwall on stem. 7 days before backfilling, 14 days before placing superstructure loads. (3)
Pier Columns, Pier Plinths	2 days if less than 3.0 m high (avg.). Add 1 day for each additional 1.5 m.	4 days - columns 2 days if forming pedestal	Columns - 7 days before placing cap beam. Plinth- 2 days before pedestal placement. 21 days before placing superstructure loads. (3)
Pier cap beams	8 days (bottom) 3 days (sides)	2 days	5 days before pedestal placement. 21 days before placing superstructure loads. (3)
All pedestals	2 days	__	7 days (class A) 3 days (class F) (4)
Wingwalls or Retaining walls	Same as abutment stems.	__	14 days before backfilling (3)
Arch centers Centering under beams	8 days	__	14 day (3)

TABLE 619-1 REQUIRED TREATMENT FOR PAVEMENT EDGE DROP-OFFS					
Depth of Drop-off (mm.)	**Anticipated Exposure Time (Calendar Days)**	**AADT. 7500**		**AADT. 7500 and all Freeways and Expressways**	
		Operating Speed 70 km/h	**Operating Speed > 70 km/h**	**Operating Speed 70 km/h**	**Operating Speed >70 km/h**
50 to 150	≤7	30	45	15	15
	8 to 60	30 / 1:1	60/ 1:1	15 / 1:1	30 / 1:1
	60+	30 / 1:1	60 / 1:1	15 / 1:3	60/ 1:3
150 to 600	≤7	15	15	15	15
	8 to 60	15	60 / 1:3	30 / 1:3	60 / 1:3
	60+	15	60 / 1:3	30 / 1:3	60 / 1:3
600+	≤7	15	15	15	15
	8 to 60	30 / 1:3	60 / 1:3	30 / 1:3	60 / 1:3
	60+	30 / 1:3	60 / 1:3	30 / 1:3	Positive Barrier

TABLE 619-3 GUIDERAIL & CONCRETE BARRIER DEFLECTION DISTANCES		
Guide Rail Type	**Post Spacing**	**Deflection Distances**
Cable	4880 mm	3350 mm
	3660 mm	2900 mm
	2440 mm	2440 mm
	1220 mm	2130 mm
Corrugated Beam (Weak Post)	3810 mm	2440 mm
	1900 mm	1830 mm
	1270 mm	1520 mm
Corrugated Beam (Heavy Post)	1900 mm	1220 mm
	950 mm	610 mm
Box Beam	1830 mm	1520 mm
	910 mm	1220 mm
Concrete Barrier	NOT APPLICABLE	0 mm

FIGURE 620-1 STONE FILLING GRADATION REQUIREMENTS			
Stone Filling Item	**See Notes**	**Stone Size1**	**Percent of Total by Weight**
Fine	2, 3, 4	Smaller than 200 mm	90 - 100
		Larger than 75 mm	50 - 100
		Smaller than 2.0 mm	0 - 10
Light	2, 3, 4	Lighter than 50 kg	90 - 100
		Larger than 150 mm	50 - 100
		Smaller than 12 mm	0 - 10
Medium	2, 4	Heavier than 50 kg	50 - 100
		Smaller than 150 mm	0 - 10
Heavy	2, 4, 5	Heavier than 300 kg	50 - 100
		Smaller than 150 mm	0 - 10

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GROUP NUMBER	INDICATION	WIRE COLOR CODE*		GROUP NUMBER	INDICATION	WIRE COLOR CODE*
1	Red	14/19C-1-R		4	Red	14/19C-1-B/R
	Yellow	14/19C-1-0			Yellow	14/19C-1-O/R
	Green	14/19C-1-G			Green	14/19C-1-BL/R
	Ground Wire	14/19C-1-W			Ground Wire	14/19C-1-W/R
2	Red	14/19C-1-R/B		5	Red	14/19C-2-R
	Yellow	14/19C-1-O/B			Yellow	14/19C-2-O
	Green	14/19C-1-G/B			Green	14/19C-2-G
	Ground Wire	14/19C-1-W/B			Ground Wire	14/19C-2-W
3	Red	14/19C-1-R/W		6	Red	14/19C-2-R/B
	Yellow	14/19C-1-BL/W			Yellow	14/19C-2-O/B
	Green	14/19C-1-G/W			Green	14/19C-2-G/B
	Ground Wire	14/19C-1-B/W			Ground Wire	14/19C-2-W/B

GROUP NUMBER	INDICATION	WIRE COLOR CODE*		GROUP NUMBER	INDICATION	WIRE COLOR CODE*
7	Red	14/19C-2-R/W		11	Red	14/19C-3-R/W
	Yellow	14/19C-2-BL/W			Yellow	14/19C-3-BL/W
	Green	14/19C-2-G/W			Green	14/19C-3-G/W
	Ground Wire	14/19C-2-B/W			Ground Wire	14/19C-3-B/W
8	Red	14/19C-2-B/R		12	Red	14/19C-3-B/R
	Yellow	14/19C-2-O/R			Yellow	14/19C-3-O/R
	Green	14/19C-2-BL/R			Green	14/19C-3-BL/R
	Ground Wire	14/19C-2-W/R			Ground Wire	14/19C-3-W/R
9	Red	14/19C-3-R		13	Red	14/10C-1-R
	Yellow	14/19C-3-O			Yellow	14/10C-1-O
	Green	14/19C-3-G			Green	14/10C-1-G
	Ground Wire	14/19C-3-W			Ground Wire	14/10C-1-W
10	Red	14/19C-3-R/B		14	Red	14/10C-1-R/B
	Yellow	14/19C-3-O/B			Yellow	14/10C-1-O/B
	Green	14/19C-3-G/B			Green	14/10C-1-G/B
	Ground Wire	14/19C-3-W/B			Ground Wire	14/10C-1-W/B

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PED NUMBER	WIRE COLOR CODE*	INDICATION		PED NUMBER	WIRE COLOR CODE*	INDICATION
1	14/5C-1-P/R	DONT WALK		3	14/5C-3-P/R	DONT WALK
	14/5C-1-P/G	WALK			14/5C-3-P/G	WALK
	14/5C-1-P/B	Switch Wire			14/5C-3-P/B	Switch Wire
	14/5C-1-P/O	Switch Wire			14/5C-3-P/O	Switch Wire
	14/5C-1-P/W	Ground Wire			14/5C-3-P/W	Ground Wire
2	14/5C-2-P/R	DONT WALK		4	14/5C-4-P/R	DONT WALK
	14/5C-2-P/G	WALK			14/5C-4-P/G	WALK
	14/5C-2-P/B	Switch Wire			14/5C-4-P/B	Switch Wire
	14/5C-2-P/O	Switch Wire			14/5C-4-P/O	Switch Wire
	14/5C-2-P/W	Ground Wire			14/5C-4-P/W	Ground Wire

TABLE 703-2 PHYSICAL REQUIREMENTS (TESTING)[1]				
Material Designation	**Crushed Stone 703-0201**	**Crushed Gravel 703-0202**	**Screened Gravel 703-0203**	**Crushed Slag 703-0204**
Magnesium Sulfate Test (703-07 P,G)[2] Max. percent loss by weight at 10 cycles	18	18	18	6
Freezing and Thawing Test (703-08 P,G)[3] Max. percent loss by weight at 25 cycles	20	20	20	_
Los Angeles Abrasion Test (703-11 P,G) Max. percent loss by weight (Grading A or B)	35[4] 45[5]	35	35	40
Flat Particles, Elongated Particles, or Flat and Elongated Particles (ASTM D 4791) Maximum percent by weight Flat and Elongated to the Degree of 5:1	10[6]	10[6]	-	-
Crushed Particles in any primary size(ASTMD 5821) Minimum percent by weight Larger than 12.5mm (1 fractured face) ---------- Smaller than 12.5mm (2 fractured faces)	- ---------- --	75[7] ---------- 85[7]	- ---------- -	- ---------- -
Minimum unit weight (703-10 P,G) kg/m3	-	-	-	70

TABLE 715-04-1 PHYSICAL AND CHEMICAL REQUIREMENTS		
PRODUCT	**ALLOY & TEMPERS**	**ASTM SPEC.**
Sheet and Plate	1100-0 2024-T4 3003-H14 3004-H38 5052-H32,-H38 5154-H38 6061-T6 7075-T6 ALCLAD 2024-T3,-T42 ALCLAD 6061-T6	B209M B209M B209M B209M B209M B209M B209M B209M B209M
Wire	1100-H38 3003-H14 5052-H38 6061-T941	B211M B211M B211M B211M
Bars and Rod	2024-T4 6061-T6	B211M B211M
Extruded Bars and Rods and Shapes	5154-0 6061-T6 6063-T5	B221M B221M B221M
Extruded Shapes	6063-T6 6005-T5 6351-T6	B211M B211M B211M
Drawn Seamless Tube	6061-T6 6063-T832	B210M B210M
Extruded Tube	6061-T6	B241M
Pipe	6061-T6 6063-T6	B241M B241M
Structurals, Rolled or Extruded	6061-T6	B308M
Welding Rods and Bare Electrodes	4043-O 5154-0	Not ASTM[2] Not ASTM[2]

TABLE 718-06-1 TESTING REQUIREMENTS FOR HP CONCRETE		
PROPERTY	**TEST METHOD**	**ACCEPTANCE CRITERIA**
Compressive Strength (at 56 days)	AASHTO T22	> 70MPa (all tests)
Freeze/Thaw Durability (x=relative dynamic modulus of elasticity after 300 cycles)	AASHTO T161 Procedure A	$x \geq 80\%$
Scaling Resistance (y= visual rating of surface after 50 cycles)	ASTM C672	$y \leq 3$
Elasticity (E = modulus of elasticity)	ASTM C469 (Note C)	$E \geq 30GPa$
Shrinkage (s= microstrain)	AASHTO T160-97 (at 56 days)	$s < 600$
Creep (c = microstrain/pressure unit)	ASTM C512(at 56 days, 40% fc')	$c \leq 60/$ MPa
Chloride Penetration (p= increase in percent of chloride ion by weight of concrete)	AASHTO T259 modified (Note A)	$p \leq 0.025\%$ at 25 mm
Air Content	AASHTO T 152	A = % selected by contractor, $A \geq 3\%$
Water/Cementitious-Materials ratio (W= mass ratio)	AASHTO TP23-93 (Note B)	Supplier selects W, $W < 0.40$

TABLE 730-22-1 STEEL FASTENERS						
Bolt (ASTM F568)	**Bolt Size**	**Allowable Nuts[1] (ASTM A563m)**	**Bolt, Nuts & Washer Coating Systems[2]**	**Plain Washer**	**Prevailing Torque Hex Nuts And Hex Flange Nuts[3]**	**Lock Washer**
CLASS 4.6	M5 to M36 M42 to M100	5 - H1 5 - HH	P or Z P or Z	< M12, use ANSI B18.22M, soft ≥M12, use ASTM F436M IFI 542 or ANSI B18.22M, hard only	CLASS 5,9 or 10	General Motors Standard Metric Helical Spring General Specification
CLASS 8.8	M16 to M36 M42 to M100	9 - H2 12 - H2 9 - HH 12 - HH	P Z P Z		CLASS 5,9 or 10	
CLASS 10.9	M5 to M36 M42 to M100	10 - H1 12 - HH	P P or Z		CLASS 9 or 10	