



SUPERSEDED BY EB 99-014 EFFECTIVE 2/23/99		New York State Department of Transportation ENGINEERING INSTRUCTION	EI 96-019
Title: METRIC STANDARD SHEETS			
Distribution: <input checked="" type="checkbox"/> Manufacturers (18) <input type="checkbox"/> Surveyors (33) <input checked="" type="checkbox"/> Main Office (30) <input checked="" type="checkbox"/> Consultants (34) <input checked="" type="checkbox"/> Local Govt. (31) <input checked="" type="checkbox"/> Contractors/AGC (39) <input checked="" type="checkbox"/> Regions/Agencies (32) <input type="checkbox"/> _____ ()		Approved:  P. J. CLARK, Deputy Chief Engineer, Design Division Date: <u>9/30/96</u>	

Administrative Information: The Metric Standard Sheets are now available for purchase and general use. The Metric Standard Sheets are being distributed under separate cover to all appropriate Department offices, and will be sold to the general public by the Plan Sales Unit, tel. (518) 457-2124.

General Information: Most of the Metric Standard Sheets are similar to the non-metric Standard Sheets except that the metric ones incorporate all the revisions previously included in Proposals as shelf notes, and convert all dimensions to metric (SI) measurements. The Metric Standard Sheets are numbered according to the corresponding sections of the Standard Specifications, and usually have numbers similar to the non-metric Standard Sheets preceded by the letter M, but without the revision number (R1, R2 etc.).

The non-metric Standard Sheets will continue to be used on non-metric contracts.

Specific Changes Other Than Metrication: Several Metric Standard Sheets bear little resemblance to the corresponding non-metric Standard Sheets, and several completely new drawings have also been developed.

Standard Sheet **M603-1**, adds new, less common, pipe end section sizes (375, 525, 675 and 838 mm diameter).

Standard Sheet **M603-3** applies to both corrugated steel and corrugated aluminum ("metal") end sections. The pipe size designations are in agreement with EI 96-16. Tables, figures and notes were rearranged to avoid repetition of the notes.

Standard Sheet **M604-1** decreased the length of the Transverse Drainage Interceptor by 19 mm in order to reduce the gap between grates. The reticuline grate is unchanged. The previous gap was 1" (excluding joint filler). The new gap is 7.6 mm, excluding joint filler, which allows room for rivet heads.

Standard Sheets **M604-5 thru M604-8** were consolidated and rearranged.

Standard Sheet **M604-5** includes the XX and YY codes, originally on Standard Sheet 604-6, and the explanatory notes.

Standard Sheet **M604-6** includes the TABLE OF "X" AND "Y" DIMENSIONS, a modified form of the FRAME & GRATE ORIENTATION detail, and the FRAME DIMENSION table, all originally on Standard Sheet 604-7.

Standard Sheet **M604-7** includes the bent bar details originally on Standard Sheet 604-6, and contains numerous changes in the bar designations. The LX and WY bars of the same length have the same last number, and LS bars of the same length have the same designation. The WS bar designations remain unchanged. The TABLE OF STRUCTURE SIZES was deleted since it can also be found on M604-5. The top slab top reinforcement description was moved from the reinforcement tables to the top slab size table since the top reinforcing varies only with slab size.

Standard Sheet **M604-8** (structures without top slabs) has new standard structure sizes so precasters can use ready-made standard forms. Both new and old sizes may be used on any job. The new standard sizes require a separate collar for welded and parallel bar frames. This standard sheet also includes the SELECTION TABLE FOR ALTERNATE ROUND DRAINAGE STRUCTURES and details for PRECAST ROUND MANHOLES. The Isometric view of parallel bar frame with curb, from Standard Sheet 604-8, was omitted.

Standard Sheet **M606-22** is a new standard sheet for Machine Formed Concrete Barrier.

Standard Sheet **M624-1** shows concrete gutter with curb, originally on Standard Sheet 609-2, since the standard sheet number should correspond to the pay item number for concrete gutter, item 624.01XX M.

The **M644** series standard drawings for overhead sign structures include numerous changes that will be described further in a future EI. The main revision of concern to designers is the inclusion of horizontal control dimensions which tell the contractor where to install the sign structure, precluding the need for line drawings. Generally,

diameters, depths, and widths of tubing, angles and Z-bars are specified to the nearest millimeter, and thicknesses are specified to the nearest tenth of a millimeter. Some dimensions are "hard" converted, and others are "semisoft" converted. A metric sign truss will fit on non-metric posts. The only completely new sheet in this series is **M644-8**, OVERHEAD SIGN STRUCTURES Dampener, Chord Splice, and Aluminum Web Welding details.

The **M645 series** consists largely of new drawings necessitated by changes to the specifications.

1) The following is an approximate correlation between the metric and non-metric 645 series drawings:

NON-METRIC 645 SERIES

645-7, 645-8R1, 645-9
645-10, 645-11, 645-12
645-13R1
645-14R2
645-20 THROUGH 645-25
645-30

METRIC 645 SERIES

M645-50, M645-51, M645-52, M645-55
M645-56
M645-70, M645-72, M645-76, M645-55
M645-80
M645-20 THROUGH M645-25
M645-73

2) The metric dimensions for sign panels have been "hard" converted using $25\text{ mm} = 1"$, but the framing details have been "soft" converted because sign posts and stiffeners are usually prepunched with holes exactly one inch apart, and that spacing can not be easily altered. However, each drawing includes a note that sign panel dimensions up to 2 % larger than the dimensions shown will be acceptable, thus including the same size signs previously accepted.

3) Another change included in the metric 645 series of drawings is the new sign height requirements. Vertical clearance to the ground beneath the sign panel has been set at 2.1 m. This change was required because the latest series of crash tests tested these signs at a 2.1 m ground clearance. Therefore, signs must be installed at the same height they were tested. In addition, mounting heights above the pavement have all been referenced to a table on drawing M645-55 because it will be easier to change one drawing than to change numerous drawings if or when this requirement is implemented in the Federal MUTCD.

4) Included on drawing M645-55 is a table of guiderail deflection distances, and the requirement that sign posts be placed beyond the given deflection distance. If this requirement cannot be met, the regional traffic and safety engineer should be consulted.

The following is an approximate correlation between the metric and non-metric 655 series drawings:

- The metric 655 series eliminates unused frame and grate sizes
- Standard Sheets 655-3, 655-4, 655-5 and 655-7R1 have been discontinued
- The cast iron manhole frame and cover shown on 655-3 are now shown on M655-9
- The reticulate grates shown on 655-3 and 655-7 are now shown on M655-10.
- The rectangular grates shown on 655-4 are now shown on M655-6
- The cast iron frames shown on 655-7 are now shown on M655-11. Drilled and tapped holes in cast frames are now an approved option to welded on nuts
- Welded frames shown on 655-3 thru 655-6R1 are now shown on M655-11.

A new series of Highway Lighting drawings, the M670 series, has been compiled from the lighting drawings used in the various regions:

M670-1 shows various precast and cast in place lamppost foundations, with sizes dependant on groundwater conditions and pole height. The anchor bolts all require couplings near the top, with threaded studs, to minimize damage to the foundation in the event of an impact by an errant vehicle.

M670-2 shows light standard details, including pole, bracket arm, transformer base, grounding, and mounting on top of a concrete barrier.

M670-3 shows details of davit arm poles, deep foundations, and mounting a bracket arm on a wood pole.

The **M680 series** of traffic signal standard sheets includes the following changes:

- New location for hand hole and control cabinet wiring access hole.
- Circumferential pole clamps as an alternate to eye bolts.
- Deleted ultra sonic vehicle detector.
- Requires larger concrete work pad at control cabinets.
- New M680-4 shows details for control cabinet installation.

Contact Person: Any questions on this Engineering Instruction may be addressed to Richard Stempel at telephone number (518) 457-5440. c:\ei96019.60a