

Marking Standards

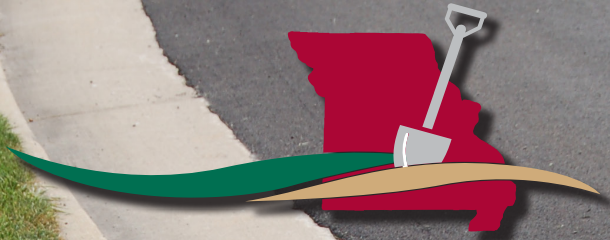
Quick Reference



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Uniform **Color Code** and Marking Guidelines









The information contained in this appendix is intended to supplement information for existing practices found within CGA Best Practices.^{57/}

BEST PRACTICES CHAPTER 4—LOCATING AND MARKING

Practice Statement 4-3: Color Code: A uniform color code and set of marking symbols is adopted nationwide.

Uniform Color Code ^{58/}

The following APWA uniform color code (ANSI Z535.1) shall be adopted as the uniform color code for marking excavation sites and underground facilities in conflict with an excavation. This recommendation is not intended to preempt any existing state requirement that specifies other colors.

| | | | |
|--|---|---|---|
|  | PROPOSED EXCAVATION |  | COMMUNICATION, ALARM OR SIGNAL LINES, CABLES OR CONDUIT |
|  | TEMPORARY SURVEY MARKINGS |  | POTABLE WATER |
|  | ELECTRIC POWER LINES, CABLES, CONDUIT AND LIGHTING CABLES |  | RECLAIMED WATER, IRRIGATION AND SLURRY LINES |
|  | GAS, OIL, STEAM, PETROLEUM OR GASEOUS MATERIALS |  | SEWERS AND DRAIN LINES |

References:

- APWA Uniform Color Code
- Existing operating practices from various states' one call centers
- Existing one call laws from various states
- ANSI Standard Z535.1 Safety Color Code

^{57/} Information contained in this appendix approved by the CGA Board on September 24, 2004.

^{58/} TR-2001-05: Amendment approved by the CGA Board on September 24, 2004.

BEST PRACTICES CHAPTER 5—EXCAVATION

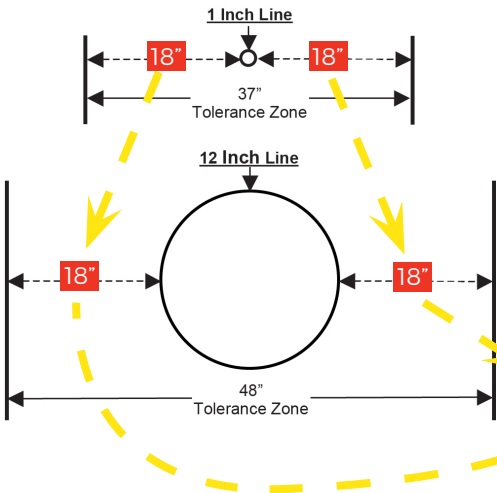
Practice Statement 5-19: Excavation Tolerance Zone:


The excavator observes a tolerance zone that is comprised of the width of the facility plus 18 in. on either side of the outside edge of the underground facility on a horizontal plane. This practice is not intended to preempt any existing state/provincial requirements that currently specify a tolerance zone of more than 18 in.



Tolerance Zone ^{59/}

The following examples are of tolerance zones for a 1 in. and 12 in. line:



Be Aware! 

Missouri statute 319.015 #1 defines the “Approximate Location” as a strip of land not wider than the width of the underground facility, plus two feet (24”) on either side.

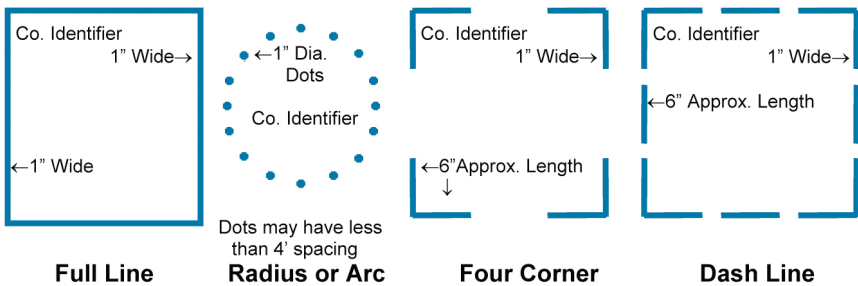
BEST PRACTICES CHAPTER 5—EXCAVATION

Practice Statement 5-2: White Lining: When the excavation site cannot be clearly and adequately identified on the locate ticket, the excavator designates the route and/or area to be excavated using white premarking prior to the arrival of the locator.

Guidelines for Excavation Delineation ^{60/}

The following marking illustrations are examples of how excavators may choose to mark their area of proposed excavation. The use of white marking products (e.g., paint, flags, stakes, whiskers, or a combination of these) may be used to identify the excavation site.

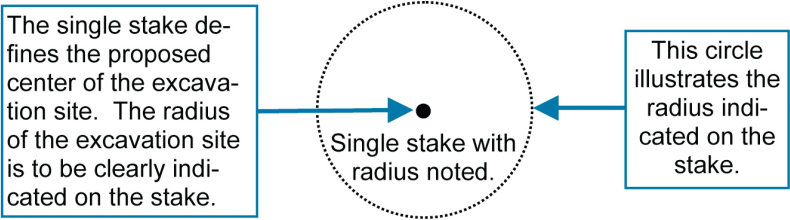
Single Point Excavations Markings



Delineate in white paint the proposed area of excavation using a continuous line, dots marking the radius or arcs, dashes marking the four corners of the project, or dashes outlining the excavation project. Limit the size of each dash to approximately 6 in. to 12 in. long and 1 in. wide with interval spacing approximately 4 ft to 50 ft apart.

Reduce the separation of excavation marks to a length that can reasonably be seen by the operator's locators when the terrain at an excavation site warrants. Dots of approximately 1 in. diameter typically are used to define arcs or radii and may be placed at closer intervals in lieu of dashes.

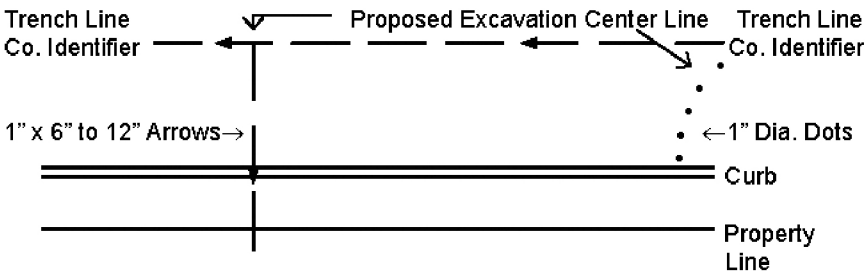
Single Stake Marking Center Point of Excavation Site



When an excavation site is contained within a 50 ft maximum radius or less, it can be delineated with a single stake that is positioned at the proposed center of the excavation. If the excavator chooses this type of delineation, they must convey that they have delineated the excavation site with a single stake at the center of the excavation and include the radius of the site in the notification to the one call center.

This single stake is white in color and displays the excavator's company identifier (name, abbreviations, or initials) and the radius of the excavation site in black letters on the stake or with a notice attached to the stake.

Trenching, Boring, or Other Continuous-Type Excavations



Continuous Excavation Marking

Mark in white paint the proposed centerline of planned excavation using 6 in. to 12 in. x 1 in. arrows approximately 4 ft to 50 ft apart to show direction of excavation. Reduce the separation of excavation marks to a length that can

reasonably be seen by the operator's locators when the terrain at an excavation site warrants. Mark lateral excavations with occasional arrows showing excavation direction from centerline with marks at curb or property line if crossed. Dots may be used for curves and closer interval marking.

Stake, Flag, or Whisker Excavation Markers



Delineate the proposed area of excavation using stakes, flags, or whiskers instead of spray paint to mark radius or arcs; the four corners of the project; or when outlining the excavation project. Limit the interval spacing to approximately 4 ft to 50 ft. Reduce the separation of excavation marks to a length that can reasonably be seen by the operator's locators when the terrain at an excavation site warrants.

Stakes, flags, or whiskers provided to illustrate arcs or radii may be placed at closer intervals to define the arc or radius. Stakes, flags, or whiskers are white in color and display the excavator's company identifier (name, abbreviations, or initials).



BEST PRACTICES CHAPTER 4

LOCATING AND MARKING

Practice Statement 4-3: Color Code: A uniform color code and set of marking symbols is adopted nationwide.

Guidelines for Operator’s Facility Field Delineation ^{61/}

Operator markings of facilities include the following:

- The appropriate color for their facility type
- Their company identifier (name, initials, or abbreviation) when other companies are using the same color
- The total number of facilities and the width of each facility
- A description of the facility (HP, FO, STL, etc).

Use paint, flags, stakes, whiskers, or a combination to identify the operator’s facility(s) at or near an excavation site.

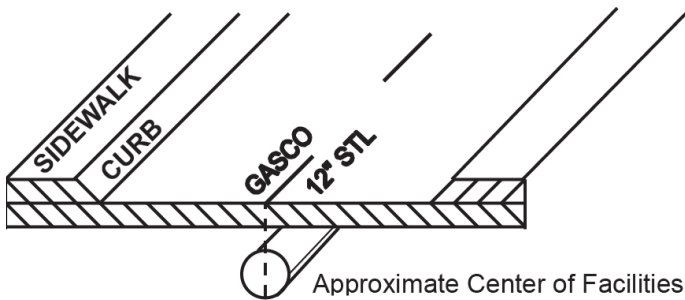
1. Marks in the appropriate color are approximately 12 in. to 18 in. long and 1 in. wide, spaced approximately 4 ft to 50 ft apart. When marking facilities, the operator considers the type of facility being located, the terrain of the land, the type of excavation being done, and the method required to adequately mark the facilities for the excavator.



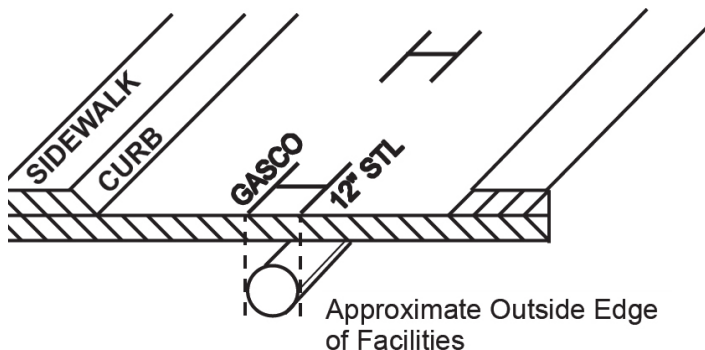
2. The following marking examples illustrate how an operator may choose to mark their subsurface installations:

A. Single Facility Marking: Used to mark a single facility. This can be done in one of two ways.

1) placing the marks over the approximate center of the facility:



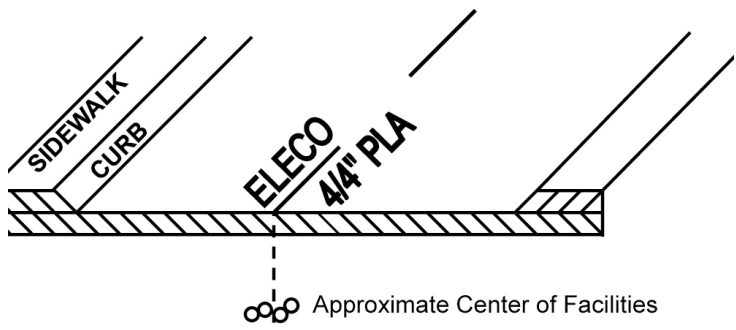
2) placing the marks over the approximate outside edges of the facility with a line connecting the two horizontal lines (in the form of an H) to indicate there is only one facility:



These examples indicate an operator's 12 in. facility. When a facility can be located or toned separately from other facilities of the same type, it is marked as a single facility.^{62/}

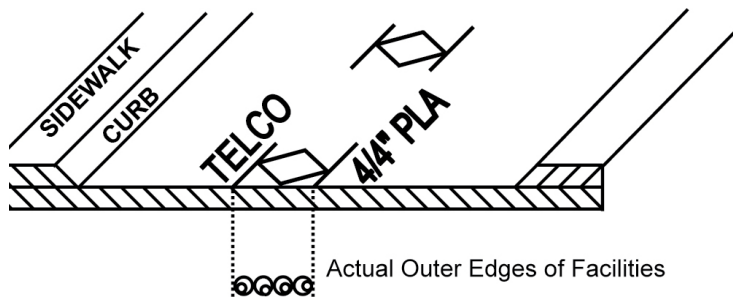
B. Multiple Facility Marking: Used to mark multiple facilities of the same type (e.g., electric), where the separation does not allow for a separate tone for each facility, but the number and width of the facilities is known. Marks are placed over the approximate center of the facilities and indicate the number and width of the facilities.

Example: four plastic facilities that are 4 in. in diameter (4/4" PLA)



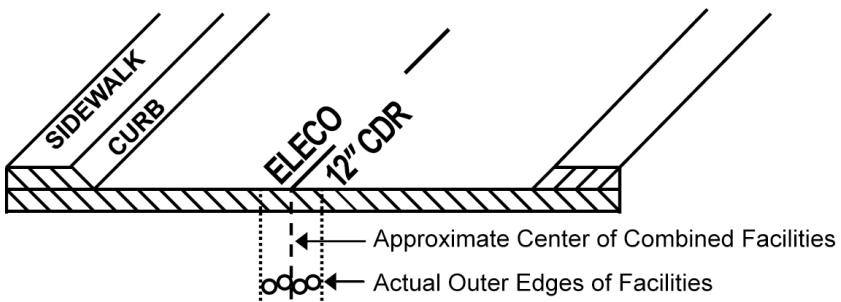
C. Conduit Marking: Used for any locatable facility being carried inside conduits or ducts. The marks indicating the outer extremities denote the actual located edges of the facilities being represented.

Example: four plastic conduits that are 4 in. in diameter (4/4" PLA), and the marks are 16 in. apart, indicating the actual left and right edges of the facilities



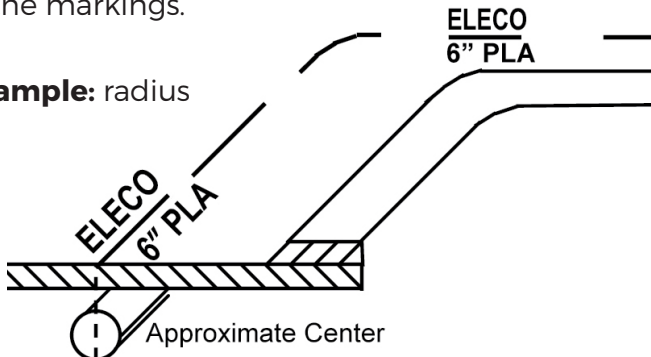
D. Corridor Marking: Used to mark multiple facilities of the same type (e.g., electric), bundled or intertwined in the same trench, where the total number of facilities is not readily known (operator has no record on file for the number of facilities). Marks are placed over the approximate center of the facilities and indicate the width of the corridor. The width of the corridor is the distance between the actual located outside edges of the combined facilities.

Example: a 12 in. corridor (12" CDR)

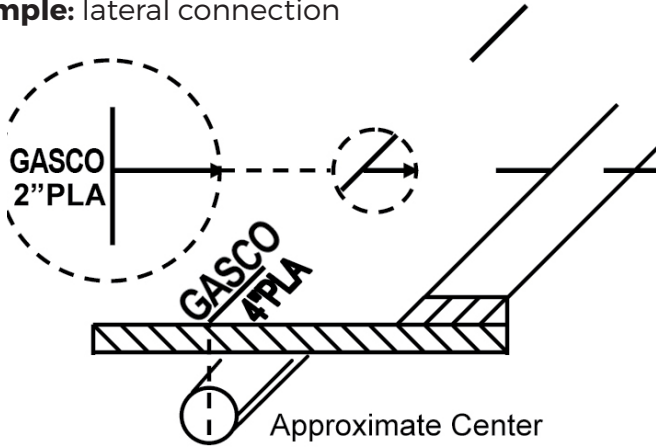


3. Changes in direction and lateral connections are clearly indicated at the point where the change in direction or connection occurs, with an arrow indicating the path of the facility. A radius is indicated with marks describing the arc. When providing offset markings (paint or stakes), show the direction of the facility and distance to the facility from the markings.

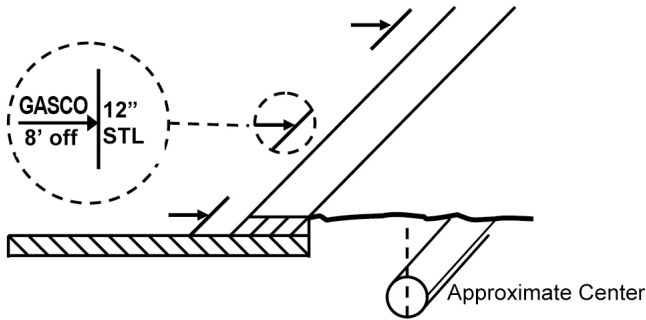
Example: radius



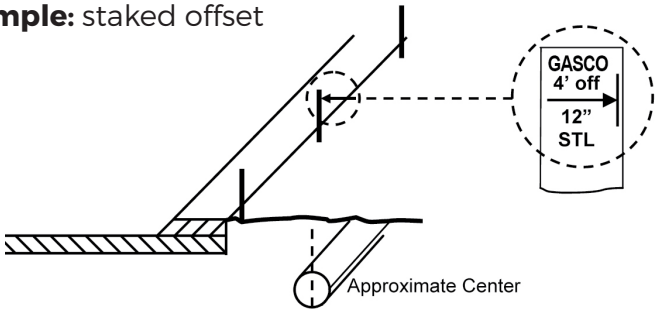
Example: lateral connection



Example: painted offset



Example: staked offset



- 4.** An operator's identifier (name, abbreviation, or initials) is placed at the beginning and at the end of the proposed work. In addition, subsequent operators using the same color mark their company identifier at all points where their facility crosses another operator's facility using the same color. Reduce the separation of excavation marks to a length that can reasonably be seen by the operator's locators when the terrain at an excavation site warrants.

Examples:

CITYCO

ELECO

TELCO

- 5.** Information regarding the size and composition of the facility is marked at an appropriate frequency.

Examples:

the number of ducts in a multi-duct structure, width of a pipeline, and whether it is steel, plastic, cable, etc.

TELCO

9/4" CAB

GASCO

4" PLA

WATERCO

12" STL

- 6.** Facilities installed in a casing are identified as such.

Examples:

6 in. plastic in 12 in. steel and fiber optic in 4 in. steel.

GASCO

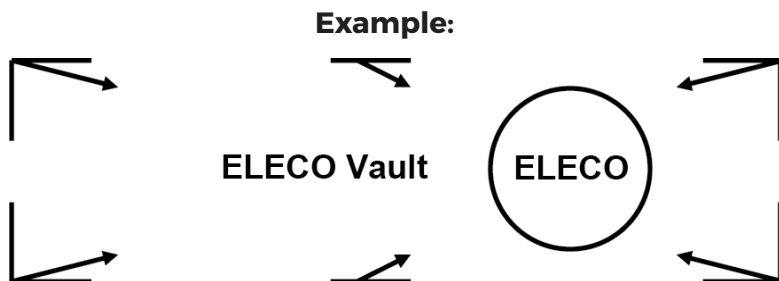
6" PLA/12" STL

TELCO

FO (4" STL)



- 7.** Structures such as vaults, inlets, and lift stations that are physically larger than obvious surface indications are marked so as to define the parameters of the structure.



- 8.** Termination points or dead ends are indicated as such.



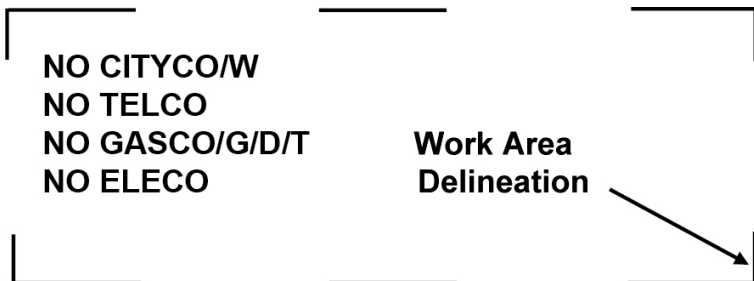
- 9.** When there is “No Conflict” with the excavation, complete one or more of the following:
- Operators of a single type of facility (e.g., TELCO) mark the area “NO” followed by the appropriate company identifier in the matching APWA color code for that facility.
 - Example: NO TELCO
 - Operators of multiple facilities mark the area “NO” followed by the appropriate company identifier in the matching APWA color code for that facility with a slash and the abbreviation for the type of facility for which there is “No Conflict.”
 - Example: NO GASCO/G/D illustrates that GASCO has no gas distribution facilities at this excavation site. The following abbreviations are used when appropriate: /G/D (gas distribution); /G/T (gas transmission); /E/D (electric distribution); /E/T (electric transmission).

- Place a clear plastic (translucent) flag that states “No Conflict” in lettering matching the APWA color code of the facility that is not in conflict. Include on the flag the operator’s identifier, phone number, a place to write the locate ticket number, and date. Operators of multiple facilities indicate on the flag which facilities are in “No Conflict” with the excavation (see the previous example).
- If it can be determined through maps or records that the proposed excavation is obviously not in conflict with their facility, the locator or operator of the facility may notify the excavator of “No Conflict” by phone, fax, or e-mail, or through the one call center, where electronic positive response is used. Operators of multiple facilities indicate a “No Conflict” for each facility (see the previous examples).
- Place “No Conflict” markings or flags in a location that can be observed by the excavator and/or notify the excavator by phone, fax, or e-mail that there is “No Conflict” with your facilities. When the excavation is delineated by the use of white markings, place “No Conflict” markings or flags in or as near as practicable to the delineated area.

Caution: Allow adequate space for all facility mark-outs.

“No Conflict” indicates that the operator verifying the “No Conflict” has no facilities within the scope of the delineation; or when there is no delineation, there are no facilities within the work area as described on the locate ticket.

Example:



Common Abbreviations

Facility Identifier

CH Chemical
E Electric
FO Fiber Optic
G Gas
LPG Liquefied Petroleum Gas
PP Petroleum Products
RR Railroad Signal
S Sewer
SD Storm Drain

SS Storm Sewer
SL Street Lighting
STM Steam
SP Slurry System
TEL Telephone
TS Traffic Signal
TV Television
W Water
W Reclaimed Water "Purple"



Infrastructure Material

ABS Acrylonitrile - Butadiene - Styrene
ACP Asbestos Cement Pipe
CI Cast Iron
CMC Cement Mortar Coated
CML Cement Mortar Lined
CPP Corrugated Plastic Pipe
CMP Corrugated Metal Pipe
CU Copper
CWD Creosote Wood Duct
HDPE High Density Polyethylene
MTD Multiple Tile Duct
PLA Plastic (conduit or pipe)
RCB Reinforced Concrete Box
RCP Reinforced Concrete Pipe
RF Reinforced Fiberglass
SCCP Steel Cylinder Concrete Pipe
STL Steel
VCP Vertrified Clay Pipe

Underground Construction Descriptions

C Conduit
CDR Corridor
D Distribution Facility
DB Direct Buried
DE Dead End
JT Joint Trench
HP High Pressure
HH Hand Hole
MH Manhole
PB Pull Box
R Radius
STR Structure (vaults, junction boxes, inlets, lift stations)
T Transmission Facility



Guide for Abbreviation Use

Follow these guidelines when placing abbreviations in the field:

- Place the Company Identifier at the top or at the left of the abbreviations.
- Place the abbreviations in the following order:
Company Identifier / Facility Identifier / Underground Construction Descriptions / Infrastructure Material

Example: TELCO/TEL/FO/PLA indicates that TELCO has a telecommuni-cation fiber optic line in a single plastic conduit. The use of the abbreviation /TEL is not necessary, because the orange marking would indicate that the facility was a communication line; but its use is optional.

- To omit one or more of the abbreviation types, use the order described above but omit the slash and abbreviation that does not apply.

Example: to omit /TEL), the result would be TELCO/FO/PLA.



Color Code Identifiers



PROPOSED EXCAVATION



TEMPORARY SURVEY MARKINGS



**ELECTRIC POWER LINES, CABLES,
CONDUIT AND LIGHTING CABLES**



**GAS, OIL, STEAM, PETROLEUM
OR GASEOUS MATERIALS**



**COMMUNICATION, ALARM OR
SIGNAL LINES, CABLES OR CONDUIT**



POTABLE WATER



**RECLAIMED WATER, IRRIGATION
AND SLURRY LINES**



SEWERS AND DRAIN LINES

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