

**\*SET\_SEGMENT****\*SET****\*SET\_SEGMENT\_{OPTION1}\_{OPTION2}**

For *OPTION1* the available options are:

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GENERAL

For *OPTION2* the available option is

COLLECT

Purpose: Define set of segments with optional identical or unique attributes. For three-dimensional geometries, a segment can be triangular or quadrilateral. For two-dimensional geometries, a segment is a line defined by two nodes and the GENERAL option does not apply.

Card 1	1	2	3	4	5	6	7	8
Variable	SID	DA1	DA2	DA3	DA4	SOLVER		
Type	I	F	F	F	F	A		
Default	none	0.	0.	0.	0.	MECH		
Remarks		1	1	1	1	4		

**Segment Cards.** For each segment in the set include on card of this format. Set N3=N4 for triangular segments. Include as many cards as necessary. This input ends at the next keyword (“\*”) card.

Card 2	1	2	3	4	5	6	7	8
Variable	N1	N2	N3	N4	A1	A2	A3	A4
Type	I	I	I	I	F	F	F	F
Remarks				2	3	3	3	3

**\*SET****\*SET\_SEGMENT**

**Generalized Part ID Range Cards.** This Card 2 format applies to the GENERAL keyword option. Include as many cards as needed. This input ends at the next keyword (“\*”) card.

Card 2	1	2	3	4	5	6	7	8
Variable	OPTION	E1	E2	E3	E4	E5	E6	E7
Type	A	I	I	I	I or F	I or F	I or F	I or F

**VARIABLE****DESCRIPTION**

SID	Set ID. All segment sets should have a unique set ID.
DA1	First segment attribute default value, see remark 1 below.
DA2	Second segment attribute default value
DA3	Third segment attribute default value
DA4	Fourth segment attribute default value
SOLVER	Name of solver using this set (MECH, CESE, etc.)
N1	Nodal point $n_1$
N2	Nodal point $n_2$
N3	Nodal point $n_3$
N4	Nodal point $n_4$ , see Remark 2 below.
A1	First segment attribute, see Remark 3 below.
A2	Second segment attribute
A3	Third segment attribute
A4	Fourth segment attribute
NFLS	Normal failure stress
SFLS	Shear failure stress. Failure criterion:
OPTION	Option for GENERAL. See table below.
E1, ..., E7	Specified entity. Each card must have an option specified. See table below.

**The General Option:**

The “OPTION” column in the table below enumerates the allowed values for the “OPTION” variable in Card 2 for the GENERAL option. Likewise, the variables E1, ..., E7 refer to the GENERAL option Card 2.

Each of the following operations accept up to 7 arguments, but they may take fewer. Values of “En” left unspecified are ignored.

<b>OPTION</b>	<b>DESCRIPTION</b>
ALL	All exterior segments will be included in the set.
BOX	Generate segments inside boxes having IDs E1, E2, and E3 with attributes having values E4, E5, E6, and E7. For shell elements one segment per shell is generated. For solid elements only those segments wrapping the solid part and pointing outward from the part will be generated.
BOX_SHELL	Generate segments inside boxes having IDs E1, E2, and E3 with attributes having values E4, E5, E6, and E7. The segments are only generated for shell elements. One segment per shell is generated.
BOX_SLDIO	Generate segments inside boxes having IDs E1, E2, and E3 with attributes having values E4, E5, E6, and E7. Both exterior segments and inter-element segments are generated.
BOX_SOLID	Generate segments inside boxes having IDs E1, E2, and E3 with attributes having values E4, E5, E6, and E7. The segments are only generated for exterior solid elements
PART	Generate segments of parts E1, E2, and E3 with attributes E4, E5, E6, and E7. For shell elements one segment per shell is generated. For solid elements only those segments wrapping the solid part and pointing outward from the part will be generated. PART could refer to beam parts when defining 2D segments for traction application.
PART_IO	Generate segments from parts E1, E2, E3 with attributes E4, E5, E6, and E7. Same as the PART option above except that inter-element segments inside parts will be generated as well. This option is sometimes useful for single surface contact of solid elements to prevent negative volumes.
SEG	Create segment with node IDs E1, E2, E3, and E4.
VOL	Generate segments inside contact volume IDs E1, E2, and E3 with attributes having values E4, E5, E6, and E7. See BOX option for other details.

<b>OPTION</b>	<b>DESCRIPTION</b>
VOL_SHELL	Generate segments for shells inside contact volume IDs E1, E2, and E3 with attributes having values E4, E5, E6, and E7
VOL_SLDIO	Generate segments for solid elements inside contact volume IDs E1, E2, and E3 with attributes E4, E5, E6, and E7. See BOX_SLDIO for other details.
VOL_SOLID	Generate segments for solid elements inside contact volume IDs E1, E2, and E3 with attributes E4, E5, E6, and E7. See BOX_SOLID for other details.
SET_SHELL	Generate segments for shell elements in SET_SHELL_LIST with IDs E1, E2, and E3 with attributes E4, E5, E6, and E7.
SET_SOLID	Generate segments for solid elements in SET_SOLID_LIST with IDs E1, E2, and E3 with attributes E4, E5, E6, and E7.
SET_SLDIO	Generate segments for solid elements in SET_SOLID_LIST with IDs E1, E2, and E3 with attributes E4, E5, E6, and E7. Both exterior & interior segments are generated.
SET_TSHELL	Generate segments for thick shell elements in SET_TSHELL_LIST with IDs of E1, E2, and E3 with attributes E4, E5, E6, and E7. Only exterior segments are generated.
SET_TSHIO	Generate segments for thick shell elements in SET_TSHELL_LIST with IDs of E1, E2, and E3 with attributes E5, E5, E6, and E7. Both exterior & interior segments are generated.
DBOX	Segments inside boxes with IDs E1, ..., E7 will be excluded.
DBOX_SHELL	Shell related segments inside boxes of IDs E1, ..., E7 will be excluded.
DBOX_SOLID	Solid related segments inside boxes of IDs E1, ..., E7 will be excluded.
DPART	Segments of parts with IDs E1, ..., E7 will be excluded.
DSEG	Segment with node IDs E1, E2, E3, and E4 will be deleted.
DVOL	Segments inside contact volumes having IDs E1, ..., E7 will be excluded.
DVOL_SHELL	Shell related segments inside contact volumes having IDs E1, ..., E7 will be excluded.
DVOL_SOLID	Solid related segments inside contact volumes having IDs E1, ..., E7 will be excluded.

<b>OPTION</b>	<b>DESCRIPTION</b>
SALECPT	<p>Segments inside a box in Structured ALE mesh. E1 here is the S-ALE mesh ID (MSHID). E2, E3, E4, E5, E6, E7 correspond to XMIN, XMAX, YMIN, YMAX, ZMIN, ZMAX. They are the minimum and the maximum nodal indices along each direction in S-ALE mesh. This option is only to be used for Structured ALE mesh and should not be used in a mixed manner with other “_GENERAL” options.</p>
SALEFAC	<p>Please refer to *ALE_STRUCTURED_MESH_CONTROL_POINTS and *ALE_STRUCTURED_MESH_CONTROL for more details.</p> <p>Segments on the face of Structured ALE mesh. E1 here is the S-ALE mesh ID (MSHID). E2, E3, E4, E5, E6, E7 correspond to -X, +X, -Y, +Y, -Z, +Z faces. Assigning 1 to these 6 values would include all the surface segments at these faces in the segment set. This option is only to be used for Structured ALE mesh and should not be used in a mixed manner with other “_GENERAL” options.</p> <p>Please refer to *ALE_STRUCTURED_MESH_CONTROL_POINTS and *ALE_STRUCTURED_MESH_CONTROL for more details.</p>

**Remarks:**

1. Segment attributes can be assigned for some input types. For example, for the contact options.

The attributes for the SLAVE surface are:

DA1 (NFLS) = Normal failure stress, \*CONTACT\_TIEBREAK\_SURFACE contact only,

DA2 (SFLS) = Shear failure stress, \*CONTACT\_TIEBREAK\_SURFACE contact only,

DA3 (FSF) = Coulomb friction scale factor,

DA4 (VSF) = Viscous friction scale factor,

and the attributes for the MASTER surface are:

DA3 (FSF) = Coulomb friction scale factor,

DA4 (VSF) = Viscous friction scale factor.

For airbags, see \*AIRBAG, a time delay, DA1=T1, can be defined before pressure begins to act on a segment along with a time delay, DA2=T2, before full pressure is applied to the segment, (default T2=T1), and for the constraint option,

2. To define a triangular segment make N4 equal to N3.

## **\*SET**

## **\*SET\_SEGMENT**

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3. The default segment attributes can be overridden on these cards, otherwise, A1=DA1, A2=DA2, etc.
  4. This field is used by a non-mechanics solver to create a set defined on that solver's mesh. By default, the set refers to the mechanics mesh.

