

## Operator POST\_MAC3COEUR

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### 1 Goal

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Macro-order dedicated to the postprocessing of `CALC_MAC3COEUR`. This operator allows:

- to visualize the cards of water blades in an engine on the level of the grids
- to visualize the cards of deformations in an engine on the level of the grids (amplitude, module, orientation) or in the form of a table similar to a statement DAMAC.
- to visualize the deformation of a particular assembly in the engine.

## 2 Syntax

```
table = POST_MAC3COEUR (
  ◆ TYPE_COEUR = / 'MONO',
                / 'MONO_COLD',
                / 'TEST',
                / '900',
                / '1300',
                / 'N4',
                / 'LINE900 ',
                / 'LINE1300 ',
                / 'LINEN4',
  # If TYPE_COEUR is of type ' LINE '
  ◆ / NB_ASSEMBLAGE = nbass [ I ]

  ◆ RESULT = resu [evol_noli]
  ◆ TABLE = table [table]
  ◆ INST = I [R]
  ◇ BLADE = _F (
    ◆ FORMAT = / 'GRACE'
              / 'TABLE'
    ◆ UNIT = ul [I]

    # if FORMAT=' GRACE'
    ◆ / NUME_GRILLE= ng [I]
      / TYPE_RESU = / 'MINI',
                  / 'MAXIMUM',
                ),
  ◇ FORCE_CONTACT=_F (
    ◆ FORMAT = / 'TABLE'
    ◆ UNIT = ul [I]
  ),
  ◇ DEFORMATION =_F (
    ◆ FORMAT = / 'GRACE'
              / 'TABLE'
    ◆ UNIT = ul [I]

    # if FORMAT=' GRACE'
    ◆ / NUME_GRILLE= ng [I]
      / TYPE_RESU = / 'MINI',
                  / 'MAXIMUM',
    ◇ / POSITION = pos [K]
    ◆ TYPE_VISU = / 'AMPLITUDE'
                  / 'MODULE'
                  / 'VECTOR'
                  / 'DEFORMS'
    ◇ DESIGN = concept [K]

    # or if FORMAT=' TABLE'
    ◆ NOM_SITE = 'TXT' [TXT]
    ◇ FORMAT_R = / 'DAMAC', [DEFECT]
                / 'STANDARD',

    # finsi
  ),
)
```

# Code\_Aster

Version  
default

Titre : *Opérateur POST\_MAC3COEUR*  
Responsable : *BADEL Pierre*

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POST\_MAC3COEUR turn over an object of the type `table_sdaster`.

## 3 Operands

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### 3.1 Operand **TYPE\_COEUR**

Name of the type of heart to be treated. See [u4.90.11] CALC\_MAC3COEUR.

### 3.2 Operand **NB\_ASSEMBLAGE**

In the case of one heart of type 'LIGNEXXX' (with XXX=' 900 ', '1300' or 'N4'), allows to specify the length of the line

### 3.3 Operand **RESULT**

Name of the structure of data result post-to treat.

### 3.4 Operand **TABLE**

Table (with format DAMAC) containing the information of the assemblies.

### 3.5 Operand **INST**

Moment of desired postprocessing. Only one possible moment at the same time.

### 3.6 Operand **BLADE**

Keyword factor which specifies that the macro-order is used here post-to treat the water blades of the structure of data **RESULT**.

The table of exit contains the following parameters: quantile with 70%,80%,90%,95%,99%

#### 3.6.1 Operand **UNIT**

Number of the logical unit for the writing of the result.

#### 3.6.2 Operand **FORMAT**

Two exits of possible postprocessing. That is to say an exit in the form of **TABLE** with the format text, that is to say a digital exit of visualization to the format **GRACE**.

#### 3.6.3 Operands specific to the format **GRACE**

##### 3.6.3.1 Operand **NUME\_GRILLE**

Number of the grid post-to be treated for all the assemblies of the engine (conventionally going number of bottom upwards in the axial direction of the assembly).

**Notice** : Operand which excluded the call to **TYPE\_RESU**.

##### 3.6.3.2 Operand **TYPE\_RESU**

Type of result post-to treat. If 'MINIS'one recovers allowance between each assembly, if 'MAXIMUM'one recovers the maximum clearance.

**Notice** : Operand which excluded the call to **NUME\_GRILLE**.

## 3.7 Operand FORCE\_CONTACT

Keyword factor which specifies that the macro-order is used here post-to treat them forces of contacts structure of data `RESULT`. The exit is exclusively printed in the logical unit, the table `table_sdaster` does not contain post treatment.

### 3.7.1 Operand UNIT

Number of the logical unit for the writing of the result.

### 3.7.2 Operand FORMAT

Only exit in the form of `TABLE` with the format text is possible with the word keyword factor `FORCE_CONTACT`.

## 3.8 Operand DEFORMATION

Keyword factor which specifies that postprocessing relates to the analysis of the deformation of the assemblies in the engine.

Note: the deformations of which it is question are not identical to displacements (components `DX`, `DY` and `DZ` field of displacement) but are calculated starting from the arrows according to the convention of statements DAMAC.

For recall, the arrow with altitude  $h$  is defined by the following formula:

$$\text{flèche}(h) = \text{depl}(h) - \text{corde}(h)$$

where  $\text{depl}(h)$  is the displacement obtained by `Code_Aster` with altitude  $h$

$$\text{and } \text{corde}(h) = \text{depl}(h_{\text{inf}}) + \frac{\text{depl}(h_{\text{sup}}) - \text{depl}(h_{\text{inf}})}{h_{\text{sup}} - h_{\text{inf}}}(h - h_{\text{inf}})$$

$h_{\text{sup}}$  et  $h_{\text{inf}}$  the higher altitude of the assembly and the lower altitude of the assembly represent respectively.

The arrows are broken up along the 2 side axes  $X$  and  $Y$  (convention DAMAC).

Attention, in `Code_Aster`, the side axes are  $Y$  and  $Z$ . In the continuation, one refers to conventions DAMAC.

The noted parameter  $Ro$  is also calculated according to the formula of statements DAMAC starting from the side arrows on the level of each grid:

$$Ro = \max_{(i, j) \in [1, \text{nb\_grilles}]^2} \sqrt{(\text{fleche}_X(i) - \text{fleche}_X(j))^2 + (\text{fleche}_Y(i) - \text{fleche}_Y(j))^2}$$

This parameter  $Ro$  is not equivalent to the module of the arrow:

$$\max_{i \in [1, \text{nb\_grilles}]} \sqrt{\text{fleche}_X(i)^2 + \text{fleche}_Y(i)^2}$$

The table of exit contains the following parameters: average of  $Ro$  on heart, average of  $Ro$  by type of assembly, max of  $Ro$  on heart, max of  $Ro$  by type, average "gravity" of the heart, max of "gravity" of heart, standard deviation of "gravity", gravity max by type, max of displacement by grid, as well as the localizations (assembly) for the differences max ( $Ro$ , revolves, displacement of grid).

### 3.8.1 Operand UNIT

Number of the logical unit for the writing of the result.

## 3.8.2 Operand **FORMAT**

Two exits of possible postprocessing. That is to say an exit in the form of `TABLE` with the format text, that is to say a digital exit of visualization to the format `GRACE`.

### 3.8.2.1 Format **GRACE**

For the format `GRACE`, the operands treated are: `NUME_GRILLE`, `TYPE_RESU`, `NUME_GRILLE`, `POSITION` and `DESIGN`.

### 3.8.2.2 Format **TABLE**

For the format `TABLE`, there is only the operand `NOM_SITE` to inform.

The table of exit is written in a form identical to that of a statement `DAMAC`:

- each line corresponds to a position of assembly
- the columns are the following ones:
  - 1: `NOM_AC` : name of the position (denomination `DAMAC`),
  - 2: `Cycle` : always 1 for the moment
  - 3: `Reference mark` : nonwell informed for the moment
  - 4: `Ro` : arrow max,
  - 5-14: deformation (marks with arrows) along the axis  $X$  for each grid,
  - 15-24: deformation (marks with arrows) along the axis  $Y$  for each grid
  - 25: `Medium` : nonwell informed for the moment
  - 26: `Min X` : minimum of displacements according to  $X$
  - 27: `Max X` : maximum of displacements according to  $X$
  - 28: `DC X` : peak displacement with peak according to  $X$
  - 29: `Min Y` : minimum of displacements according to  $Y$
  - 30: `Max Y` : maximum of displacements according to  $Y$
  - 31: `DC Y` : peak displacement with peak according to  $Y$
  - 32: `Form X` : Form ('lt or ') according to  $X$
  - 33: `Form Y` : Form ('lt or ') according to  $Y$
  - 34: `Form` : Combined form ('2C', '2S' or 'CS')

Remarks on the format of the table: the table is written to be read again by the `Damac30a.exe` software under Windows. For that, the character of end of line is `\ R \`. The character used as separating of value is the Tabulation `\` you. The heading of the table comprises the 5 following lines:

- 1st line: vacuum
- 2nd line: 80 indents
- 3rd line: vacuum
- 4th line: the type of heart (N4, 900.1300...)
- 5th line: the name of the site (cf operand `NOM_SITE`)

In order to be read again by the `Damac30a.exe` software under Windows, it is necessary to remove the first 3 lines of this table.

## 3.8.3 Operands specific to the format **GRACE**

### 3.8.3.1 Operand **NUME\_GRILLE**

Number of the grid post-to be treated for all the assemblies of the engine (conventionally going number of bottom upwards in the axial direction of the assembly).

**Notice** : Operand which excluded the call to `TYPE_RESU`.

### 3.8.3.2 Operand TYPE\_RESU

Type of result post-to treat. If 'MINIS'one recovers allowance between each assembly, if 'MAXIMUM'one recovers the maximum clearance.

**Notice** : Operand which excluded the call to NUME\_GRILLE.

### 3.8.3.3 Operand TYPE\_VISU

The postprocessing required at the level of engine door is on the amplitude ('AMPLITUDE') deformations of the assemblies, is on their module ('MODULE'), that is to say on their direction ('VECTOR').

It is also possible post-to treat the deformation ('DEFORM') of a particular assembly in the heart.

### 3.8.3.4 Operand POSITION

This operand is necessary if the choice of postprocessing is of TYPE\_VISU= 'DEFORM'. It makes it possible to define the position of the assembly in the engine which one wishes post-to treat.

### 3.8.3.5 Operand DESIGN

This operand is necessary if the choice of postprocessing is of TYPE\_VISU= 'DEFORM'. It makes it possible to specify the type of design of the assembly in the engine which one wishes post-to treat. It is necessary for the recovery of the geometrical properties of the assembly.

## 3.8.4 Operand specific to the format TABLE

### 3.8.4.1 Operand NOM\_SITE

Text which identifies the name of the site (by ex: 'CHO101'). This information is used only for the Damac30a.exe software.  
One can put what one wants.

### 3.8.4.2 Operand FORMAT\_R

Allows to choose the format of impression of realities in the table of exit.  
With the format DAMAC (the defect), one prints with 1 decimal.  
With the format STANDARD, one uses 5 decimals.