

## Operator POST\_FM

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### 1 Goal

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To carry out postprocessings of the tables of results resulting from the operators `CALC_G` and of parameters materials for the calculation of factors of margins.

Product a structure of data `table` with the following columns:

- `INST` : moments of calculations,
- `TEMP` : temperatures of the basic point of crack,
- `KIC` : value of critical tenacity,
- `KELAS` : factor of intensity of the constraints in linear elasticity,
- `KPLAS` : factor of intensity of the constraints in elastoplasticity,
- `KCP` : factor of intensity of the constraints corrected plastically,
- `FM_ASN` : lawful factor of margin,
- `FM_PLAS` : realistic factor of margin, present if the defect considered is a defect under coating (GDR), (IE.  $\max(KELAS) > \max(KPLAS)$  )

Macro-order POST\_FM functions in `AXIS` or in `3D`.

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## 2 Syntax

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```
postFm[table] = POST_FM(  
  ♦ TABLE_G = , [table]  
  ♦ RESULT = result, [evol_noli]  
  ♦ GROUP_NO = grno , [grno]  
)
```

## 3 Opérandes

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### 3.1 Operand TABLE\_G

```
♦ TABLE_G = , [table]
```

This operand makes it possible to choose the table on which one carries out the operations. This table must contain the 3 following columns:

- INST
- G\_ELAS
- G\_PLAS

G\_ELAS comes from the order CALC\_G on a linear elastic design. G\_PLAS comes from the order CALC\_G on an elastoplastic calculation incremental . The moments of calculations between 2 calculations, linear and non-linear, must correspond to the column INST .

Remarque :

- Dyears the case 3D, the user must filter the table resulting from CALC\_G for does not preserveR that only one node of interest, on which the operator will determine the factors of margin.

### 3.2 Operand RESULT

```
♦ RESULT = result, [evol_noli]
```

This operand makes it possible to choose the result of elastoplastic mechanical calculation, resulting from the order STAT\_NON\_LINE . This result makes it possible to the operator to reach the grid, the model, the field material, who contains curve KIC, like with the variable of order TEMP .

### 3.3 Operand GROUP\_NO

```
♦ GROUP_NO = grno , [grno]
```

This operand makes it possible to define the basic point of crack from where were extracted S tables. This group should contain one node which DOI T to correspond to the node from where were extracted S values of G.

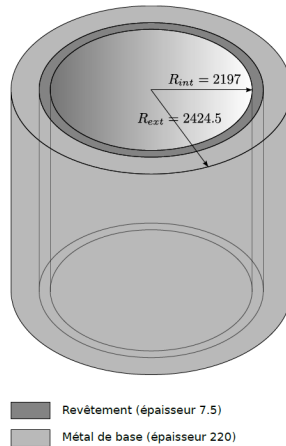
RemarqueS :

- Lbe related meshes with the node must be affectedbe by a single material, i.e it Nbasic oeuD should not be on a discontinuity material.
- LE definite material must be rene I gné of the keyword factor RUPT\_FM for the definition of KIC.

## 4 Perimeter of use

The perimeter of application of the macro-order is specified in it paragraph.

On the one hand, components concerned are tanks out of steel slightly allied 16MND5 (base metal), covered surfaces intern of a stainless austenitic steel coating of it 309L and 308L, like magazine on Figure 4-1.

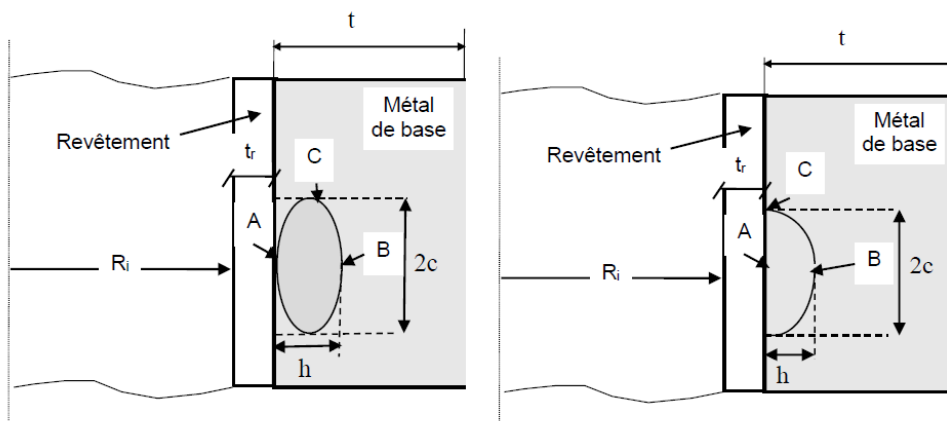


**Figure 4-1 : Example of a geometry 3D of the zone of heart of a tank 1300 MWe covered surfaces intern (units of it: mm).**

In addition, the macro-order allows analysis of harmfulness of the following defects:

- Defects under coating (DSRs) elliptic or semi-elliptic (cf. Figure 4-2 the illustration resulting from the RSE-M),
- Defects in the coating (DDR) elliptique or semi-elliptic (cf. Figure 4-3 for a schematization of a GDR and a DSR in 2D).

These two defects present each one a point located side coating out of Stainless steel and a point located in the Ferritic Steel base metal. Lmacro-order has be interested in the brittle risk of fracture for the point of the defect located side base metal, that is to say the point of the face of crack named B on Lbe figures 4-2 and 4-3.



**Figure 4-2 : geometry of the defect under elliptic or semi-elliptic coating. The calculation of the factor of margin fact at the point B, in the base metal**

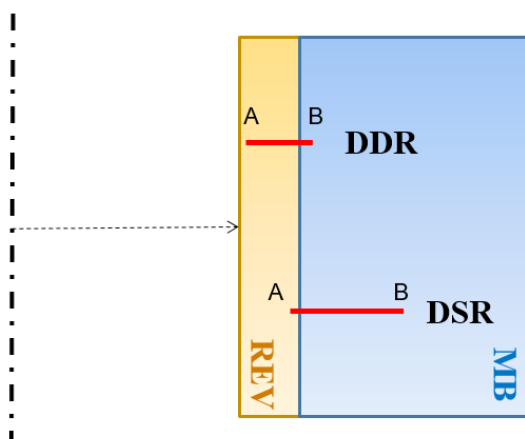


Figure 4-3 : Schematization of a GDR (higher red segment) and of a DSR (lower red segment) in 2D. The calculation of the factor of margin fact at the point B, in the base metal