

### A.2.3 Association for common datums

### A.2.3.1 General

The association method for common datums requires that a collection of ideal single surfaces be fitted simultaneously (in one step) to several non-ideal surfaces.

The process of association for common datums includes location and orientation constraints between the different associated features. These constraints are the new intrinsic characteristics defined by the collection of the features. These constraints are either defined explicitly by TEDs or implicitly (implicit orientation constraint: 0°, 90°, 180°, 270° and implicit location constraint: 0 mm). The internal constraints for association described for single datums are also applicable for common datums, but complementary constraints (e.g. coplanarity, coaxiality, etc.) between the associated features shall be added.

### A.2.3.2 Default association criteria

The default association criterion is defined by constraints and an objective function.

The following constraints for establishing a common datum apply to each associated feature included in the collection defined by the common datum indication:

- be outside the material of its corresponding filtered feature;
- respect the orientation and location constraints defining the relationship between the nominal features in the collection (indicated by an explicit or implicit TED), while taking into account any modifiers (e.g. [DV]).

The objective function is to simultaneously minimize the maximum distance normal to the associated feature between each associated feature and its filtered feature, as illustrated by the following formula, while respecting the default constraints (see Figure A.7).

$$\text{minimize} \left[ \max_{i=1, \dots, N} d(A_i, F_i) \right]$$

where

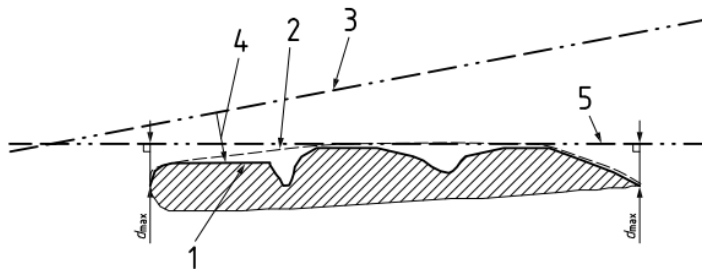
$d(A_i, F_j)$  is the distance between the features  $A_i$  and  $F_j$ ;

$i$  is the index of a single feature member of the collection surface for the common datum;

$N$  is the number of single features constituting the collection surface for the common datum;

$A_i$  is the associated feature of the filtered feature;

$F_i$  is the filtered feature of the real integral feature.



### Key

- 1 real integral feature
- 2 filtered feature
- 3 ideal feature
- 4 local distance defined from the ideal feature to the filtered feature
- 5 associated feature with the objective function "minmax" and the association constraint tangent outside the material ( $d_{\max}$  is minimized)

**Figure A.7 — Illustration of association process with minmax objective function and outside material constraint**