

22d SPINE Meeting

MATREX - MATERIAL RECORDING EXPERIENCE: CNES MATERIALS DATABASE FOR SPACE APPLICATIONS

Hélène Combes

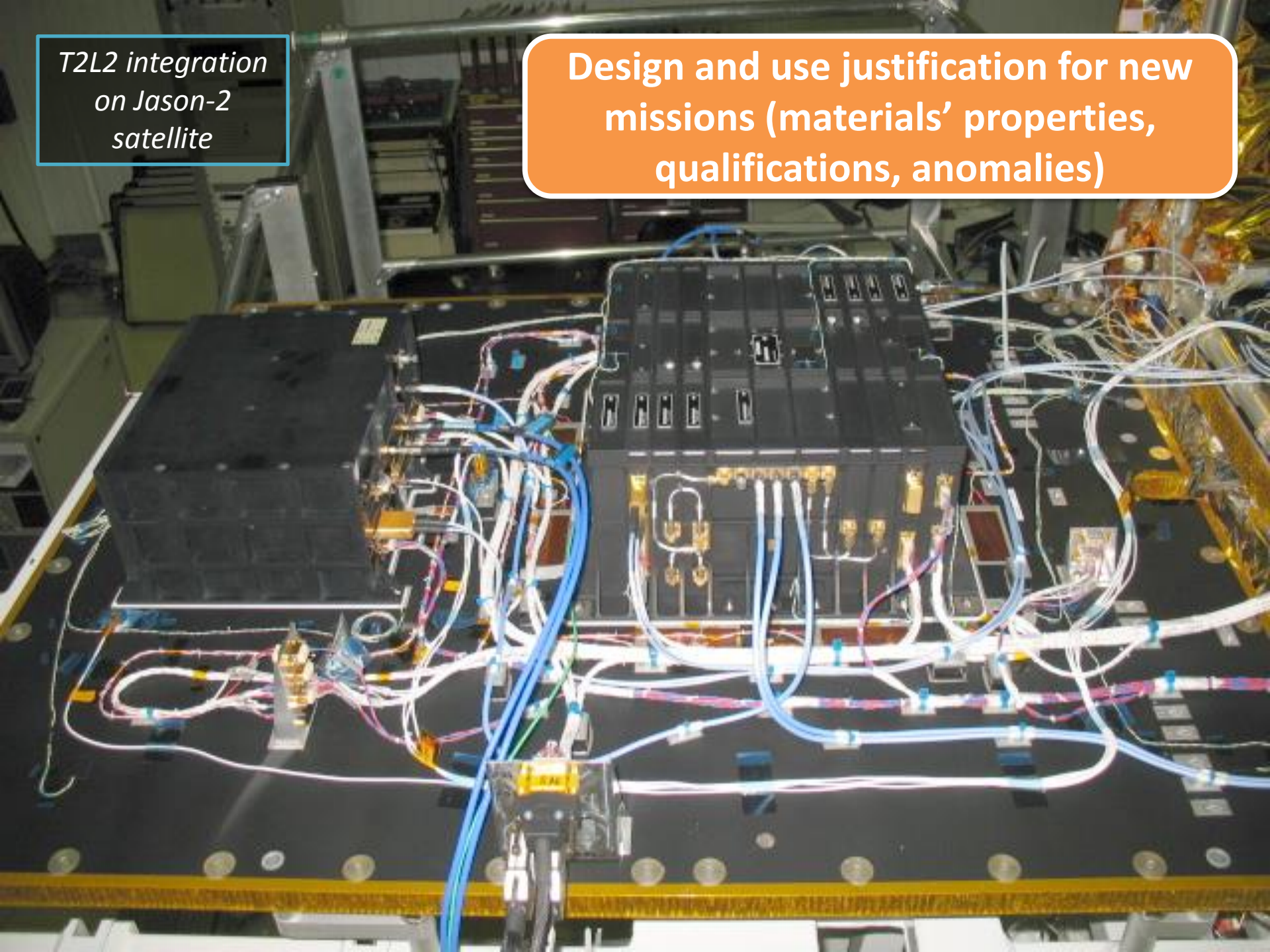
23/03/16

Sous-direction Assurance Qualité
Service Technologies Matériaux et Procédés
CNES Toulouse



*T2L2 integration
on Jason-2
satellite*

**Design and use justification for new
missions (materials' properties,
qualifications, anomalies)**



*Titanium tank
having survived
an atmospheric
re-entry*

**Materials re-entry
(materials' properties)**



**Environmental pollution induced by
the end of life of the spacecraft
elements in case of re-entry
(toxicity data)**



Risks regarding the procurement
(REACH, export control items...)



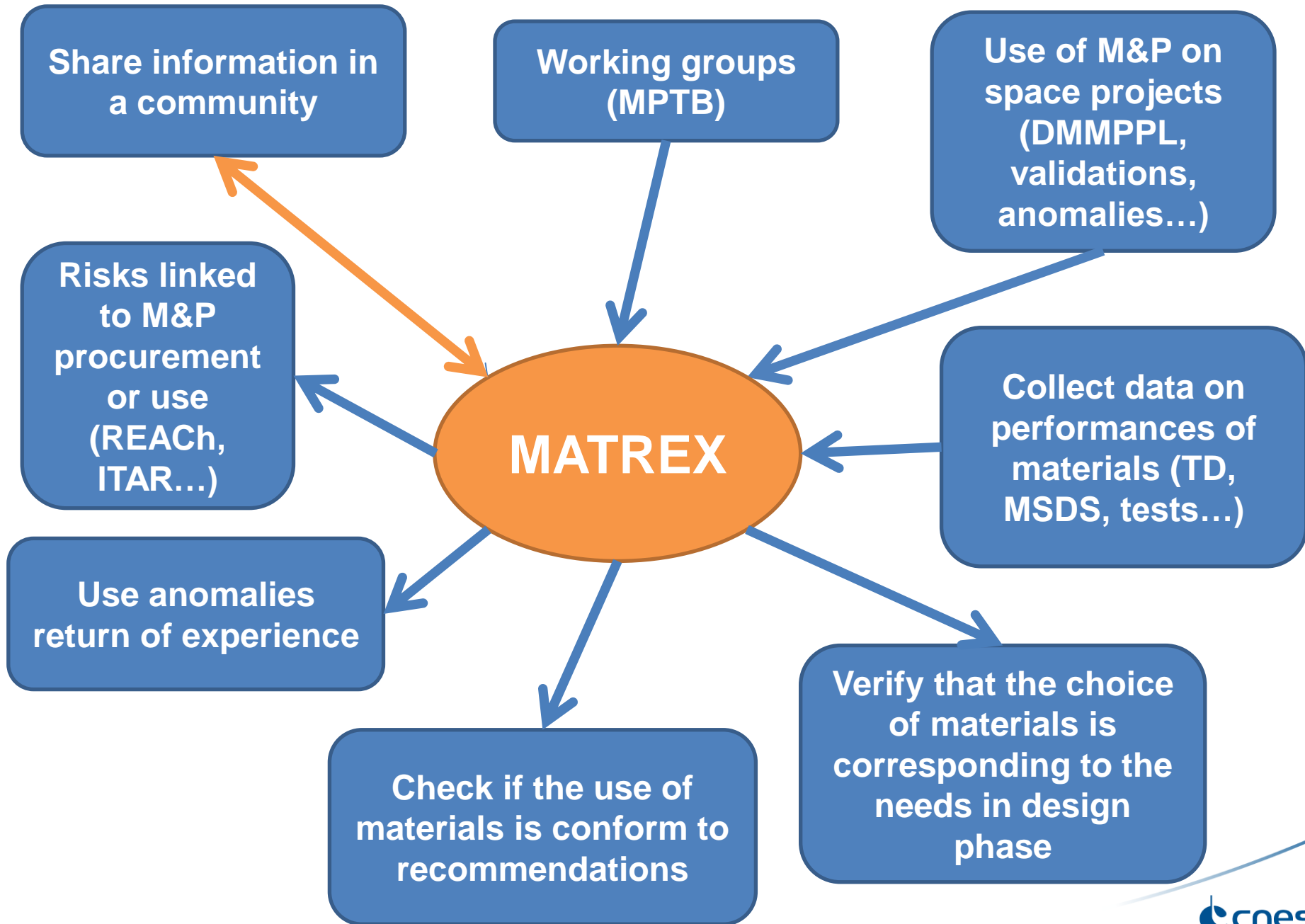
WHY A DB?

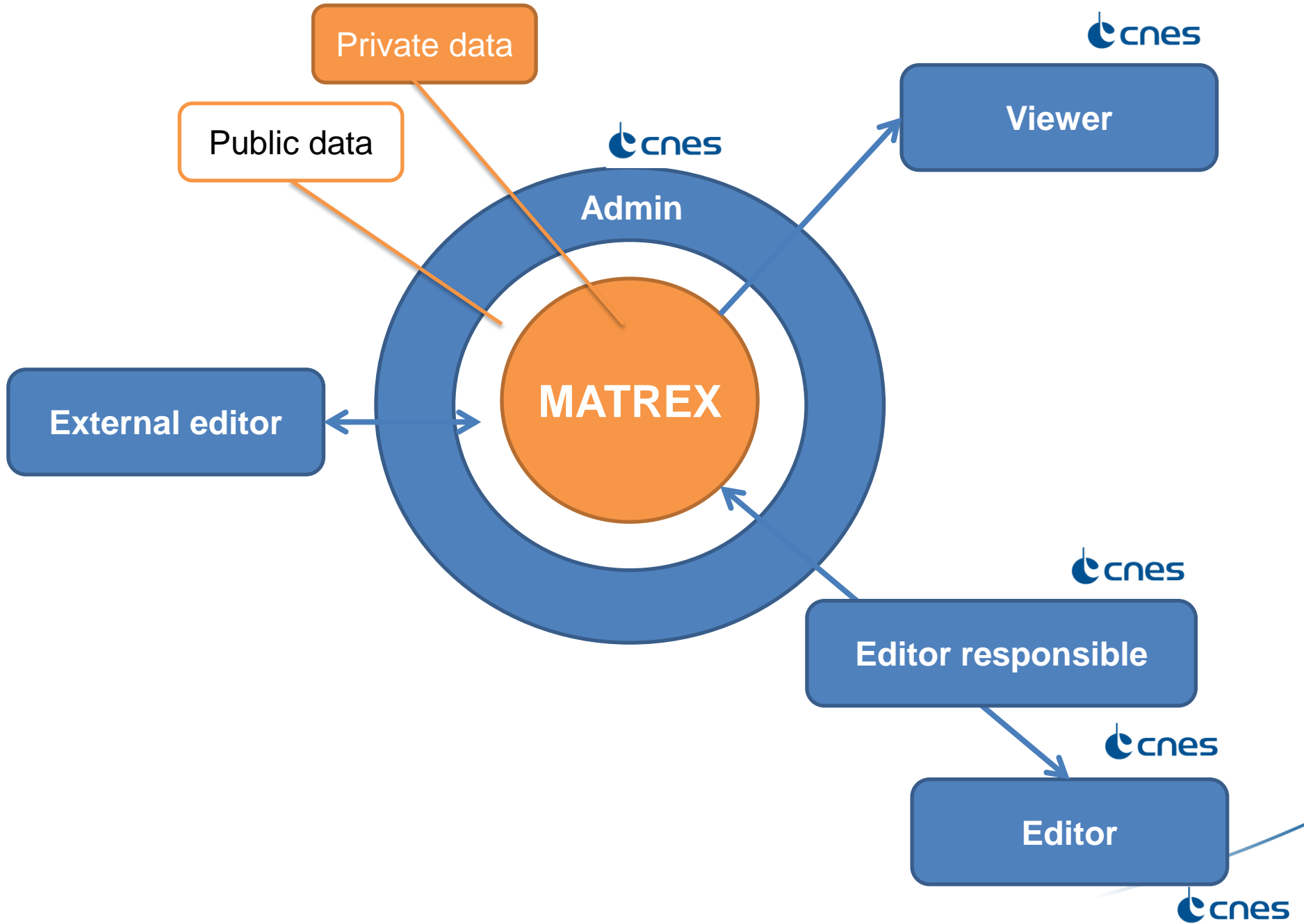
CAPITALISATION

EFFICIENCY

























COST / TIME SAVING

COLLABORATION





EXISTING DB

DB	Materials' name	Materials' properties	Toxicity data	Risks	Collaborative tool
MAPTIS 					
ESMAT 					
MAT DB SYS 					
MATREX 					

bienvenue

▶ 0 materials being modified

Le CNES prend toutes les mesures raisonnables pour s'assurer que les informations présentes sur ce site soient exactes et à jour. Toutefois, le CNES, ne donne aucune garantie, expresse ou implicite d'exhaustivité de ces informations ou que celles-ci soient exemptes d'erreurs. Il ne garantit aucune conformité avec les besoins des utilisateurs. Le CNES décline par ailleurs toute responsabilité en cas de dommages résultant de l'utilisation de ces données. L'utilisateur effectue sous sa responsabilité toutes les mesures et vérifications qu'il juge utile. Il informe l'administrateur de la base de toute anomalie qu'il aurait pu constater à ce titre. Le CNES se réserve le droit, à tout moment, de restreindre, suspendre, fermer l'accès de la base, ou d'en modifier sa structure. Il peut également s'il l'estime utile retirer toute information. Le présent site a nullement pour objectif de proposer des prestations ou expertises gratuites ou payantes. Aucun échange d'information ne pourra être analysé comme tel et engager de ce fait une quelconque responsabilité de son auteur ou du CNES.

Material search

Home

Materials

Process

Substances

Projects

Suppliers

Links

Material search

Create a material

Search by properties

Search Criteria

Usual name: Material identifier: Keyword: ECSS material class: All the words At least one word

Advanced search

Family

Material group: Chemical family:

Project

Project name:

Substances

CAS Number: EC Number:

List of high concern substances:

- CES list
- EChA Annex XIV
- EChA Annex XVII
- EChA Candidate List
- EChA Proposed for inclusion in Annex XIV

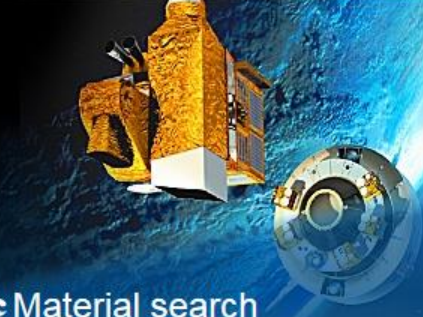
Ctrl + left click to select or deselect more than one list

Risks

 Only the materials with risks

Reset

Search



Material search

Search Criteria

Usual name:

Material identifier:

Keyword:

ECSS material class:

All the words
 At least one word

▶ [Advanced search](#)

[Reset](#)

[Search](#)

Identifier ↑	Usual name ↑	ECSS Material class	Chemical family	Version ↑	Risk	Status	Action
105	Scotch-Weld EC-2216 Gray	10: Adhesives, coatings, varnishes	Epoxy	37	!	🔒	
214	Scotch-Weld EC-3500	10: Adhesives, coatings, varnishes	Epoxy	3		✓	🔄
621	Scotch-Weld EC-3901	12: Paints and inks	Epoxy	7		✓	🔄
675	Scotch-Weld DP 490	10: Adhesives, coatings, varnishes	Epoxy	18	!	🔒	
1878	Scotch-Weld EC-9323-2 Black	10: Adhesives, coatings, varnishes	Epoxy	7		✓	🔄

[CSV](#)

[PDF](#)

Material Scotch-Weld EC-2216 Gray version 37

General Information

Properties

Substances

Projects

Suppliers

Documents

Risks

▼ User details

User Type:

CNES

Last modification date :

09/11/2015

Creation date :

13/06/2012

 Public

▼ Risks on material

There is at least, one Technical risk

Designation

Usual name:

Scotch-Weld EC-2216 Gray

Others designations:

EC2216

Chemical nature

ECSS Material class:

10: Adhesives, coatings, varnishes

Materials family:

Thermoset polymers

Chemical family:

Epoxy

Other chemical information:

▼ Miscellaneous information

Presentation:

3M™ Scotch-Weld™ epoxy adhesive EC-2216 B/A is a flexible, two-part, room temperature curing epoxy with high peel and shear strength. Scotch-Weld epoxy adhesive EC-2216 B/A has been labeled, packaged, tested, and certified for aircraft and aerospace applications (Note: Scotch-Weld epoxy adhesive 2216 B/A is not certified for aircraft and aerospace application).

Application:

- Mechanical bonding
- Screw locking
- EEE parts bonding

Means of implementation:

- Mix Ratio (by weight): 5 parts base / 7 parts accelerator
Working Time (Approx): 100-120 min (at 25°C)

Comments:

Cf. ECSS-Q-70-71

Properties joined to Material *Scotch-Weld EC-2216 Gray* version 37

Proprieté	Value (unit)	Visibility	Comments	Last modification date	User type	Action
Coefficient of thermal expansion	182 (µm/m/K)	Public	40°C to 100°C (ECSS-Q-70-71)	09/10/2015 03:02:13	CNES	
Coefficient of thermal expansion	45 (µm/m/K)	Public	-100°C to 0°C (ECSS-Q-70-71)	09/10/2015 03:02:13	CNES	
Glass transition temperature	11.8 (°C)	Public	TMA (ECSS-Q-70-71)	09/10/2015 03:02:13	CNES	
Maximum use temperature (vacuum)	80 (°C)	Public	Source: ECSS-Q-70-71	09/10/2015 03:02:13	CNES	
Minimum use temperature (vacuum)	-50 (°C)	Public	Source: ECSS-Q-70-71	09/10/2015 03:02:13	CNES	
Specific heat capacity	1340 (J/kg/K)	Public	At 0°C (ECSS-Q-70-71)	09/10/2015 03:02:13	CNES	

Substances joined to Material *Scotch-Weld EC-2216 Gray version 38*

Part A : SCOTCH-WELD 2216 B/A (PARTIE A)

Revision date	Manufacturer	Source of the MSDS	Action
03/12/2014	3M France		

Identifier	Usual name	CAS number	EC number	List of high concern substances	Action
1500	toluene	108-88-3	203-625-9	EChA Annex XVII ; CES list	
1643	Kaolin	1332-58-7	310-194-1		
1247	titanium dioxide	13463-67-7	236-675-5	CES list	
1613	3,3'-Oxybis(ethyleneoxy)bis(propylamine)	4246-51-9	224-207-2		
1718	Acides gras, insatures en C18, dimeres, polymeres avec 3,3-(oxybis(2,1-ethanediyloxy))bis(1-propanamine)	68911-25-1			

Part B : SCOTCH-WELD 2216 B/A (PARTIE B)

Revision date	Manufacturer	Source of the MSDS	Action
03/12/2014	3M France		

Identifier	Usual name	CAS number	EC number	List of high concern substances	Action
1643	Kaolin	1332-58-7	310-194-1		
1675	Bisphenol A-epichlorohydrin polymer	25088-38-6			

Propriétés joined to Material *Kapton HN* version 14

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[Risks](#)
[Electrical](#)
[Mechanical](#)
[Physical](#)
[Space](#)
[Thermal](#)

Propriété	Value (unit)	Visibility	Comments	Last modification date	User type	Action
Dielectric strength	276 (kV/mm)	Public	ECSS Q-70-71A. Test: ASTM D194-64 on 25µm film at 25°C.	30/01/2014 06:04:17	AUTRES	
Dissipation or loss factor (tan delta)	0.003 (-)	Public	ECSS Q-70-71A. Test: ASTM D150-64T on 25µm film at 25°C.	30/01/2014 06:04:17	AUTRES	
Electrical resistivity	1e16 (ohms.m)	Public	ECSS Q-70-71A. Test: ASTM D257-61 on 25µm film at 25°C.	30/01/2014 06:04:17	AUTRES	
Relative dielectric constant (Epsilon_r), relative permittivity	3.5 (-)	Public	ECSS Q-70-71A. Test: ASTM D150-64T (1kHz) on 25µm film at 25°C.	30/01/2014 06:04:17	AUTRES	

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WHO CAN ASK FOR AN ACCESS?

External users =

Materials experts* from companies or entities having a
contractual link with CNES

+

Originating from EU (access conditioned to specific
autorisation if not)

*on justification

MATREX ACCESSIBLE TO CNES PARTNERS

4 levels:

- **external editor**

- external editor + **Règlements & substances**

Access to the module « REACH & substances » and to toxicity data to demonstrate conformity to French Space Act

- external editor + **SPIS** : access to data shared between users of Spacecraft Plasma Interaction Software (SPIS)

- external editor + Règlements & substances + SPIS

MATREX ACCESSIBLE TO CNES PARTNERS

Account request online:

<https://matrex.cnes.fr>

MATREX ACCESSIBLE TO CNES PARTNERS

Communicate on the opening of the DB

Add information: collaborative tool!

MATREX = evolutive tool => please transmit suggestions

OUTLOOK

=> European materials database (ESMDB)





La vérité de demain se nourrit de l'erreur d'hier.
(Antoine de Saint-Exupéry)