

STATUS OF RAFM STEELS

- **Eurofer steel:** Code qualified for TBM and entered in RCC-MRx in a probatory status.
- **F82H:** Has reached code qualified status. EAF has been used for production of 20 t F82H-BA12
- **CLAM:** Large heats have been characterised, Industrial heat production achieved.
- **INRAFM:** Large heats characterised, Industrial heats defined and procurement in progress.
- **ARAA:** Laboratory scale melts characterised, program for full qualification defined.
- **RUSFER:** Work in progress
- **US RAFM:** High Temp. laboratory heats characterised.

NEED TO INTERACT WITH OTHER PLAYERS

WE

?

OTHERS

Designers Constructors
Alloy Producers Welders

AB Initio Modeling
Microstructure Mechanical

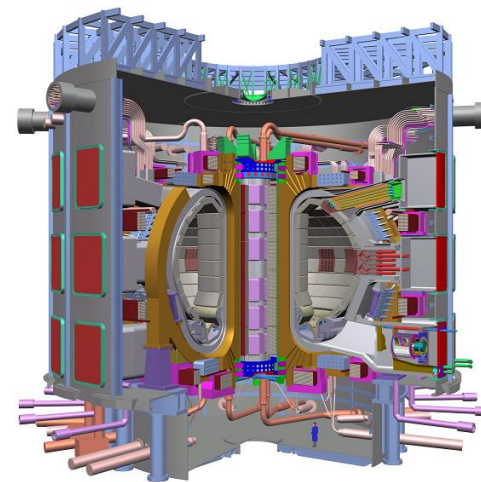
**Metallurgy
&
Materials**

Irradiation Thermal aging
Joining

Data analyses

CODE-BOOKS

ASME, RCC-MRx, ...



NDE Inspectors
Safety Authorities Utilities
Public Authorities

**WE TAKE PARAMETERS FROM DESIGN
& DETERMINE MATERIALS PROPERTIES**

RCC-MX

EDITION 2008

Cahier 1	Section I	Dispositions Générales	XDG
	Section III	Exigences Complémentaires et dispositions particulières	XEC
Section II - Tome 1 - Volume Z : annexes techniques			
	Annexe X1 :	guide pour l'analyse sismique des équipements	
	Annexe X2 :	calcul des assemblages boulonnés	XA
	Annexe X4 :	règles de conception des raccords mécaniques	XB
	Annexe X6 :	coques de révolution sous pression externe et cylindres sous compression axiale	XC
	Annexe X7 :	fonds bombés sous pression interne	XD
	Annexe X8 :	règles de conception des supports de type linéaire	XK
	Annexe X9 :	dispositions constructives associées aux visites de surveillance en exploitation	XL
	Annexe X16 :	prévention de la rupture brutale	X3, X5
Cahier 5	Section II - Tome 1 - Volume Z	Annexes techniques X1, X2, X4, X6, X7, X8, X9, X16	X1, X2
Cahier 6	Section II - Tome 2	Matériaux	XM
Cahier 7	Section II - Tome 3	Méthodes de contrôle	XMC
Cahier 8	Section II - Tome 4	Soudage	XS
Cahier 9	Section II - Tome 5	Fabrication	XF

RCC-MRx subsection Z : Appendix A3		Basic data	Creep data	Irradiation data	Fracture M. data
Carbon Steels (13 RPS in Tome 2)					
A3.10NAS : P235GH (SA 516 60)		•			
A3.11NAS : P265GH (SA 516 65)		•			•
A3.12NAS : P295GH (SA 516 70)		•			•
Alloy Steels (16 RPS in Tome 2)					
A3.11AS : 25CrMo4, 42CrMo4, 30CrNiMo8		•			
A3.13AS : 16MND5 (A508 cl3)		•			
A3.14AS : 10CrMo9-10 fully annealed		•	•		
A3.15AS : 13CrMo4-5 quenched and tempered		•	•		
A3.16AS : 2.25% Cr, 1% Mo normalised tempered or quenched tempered		•	•		
A3.17AS : X10CrMoVNb9-2 quenched tempered		•	•		
A3.18AS : X10CrMoVNb9-1 N&T or Q&T (Mod 9Cr-1MO)		•	•		•
Stainless Steels (25 RPS in Tome 2)					
A3.1S : X2CrNiMo17-12-2(N) solution annealed (316L(N))		•	•	•	•
A3.2S : X6CrNi18-10 et X5CrNi18-10 solution annealed (304)		•	•		
A3.3S : X2CrNiMo17-12-2, 17-12-3, X2CrNiMo18-14-3		•	•	•	
A3.4S : X2CrNi18-9, X2CrNi19-11		•	•		
A3.6S : X15CrNiW22-12 solution annealed followed by aging		•	•		
A3.7S : X2CrNiMo17-12-2 around 20% work hardening (316L CW)		•	•	•	
A3.8S : X4CrNiMo16-05-01 quenched and annealed		•	•		
A3.10S : X6NiCrTiMoVB25-15-2 heat treated structural hardening		•	•		
Special Alloys Ni-Cr-Fe (5 RPS in Tome 2)					
A3.19AS : Eurofer steel normalised tempered or quenched tempered		*	*	*	*
A3.1A : 5754-O		•	•	•	
A3.2A : 6061-T6		•	•	•	
Zirconium alloys (4 RPS in Tome 2)					
A3.2Z : Zircaloy 4		•	•	•	

CODE RECOMMENDATIONS & SUPPORT DOCUMENTS

- **Design Allowable Tables** are given in codebooks.

T °C	20	50	100	150	200	250	300	350	400	450	500	550	600	650	700
Sm	212	206	198	191	185	179	172	165	156	145	131	113	92	67	36

- **Support Documents** provide justifications for recommendations given in the codebook. These are given to expert groups and kept in reserve.
- **Databases and Raw Data** remain property of labs and relevant authorities.