EU ODS material Vendor Perspective, Past, Present and Future.

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Why a New Dour Metal ODS Supplier?

- Because the former Dour Metal Belgium had demonstrated the ability to produce large quantities of high performance ODS materials

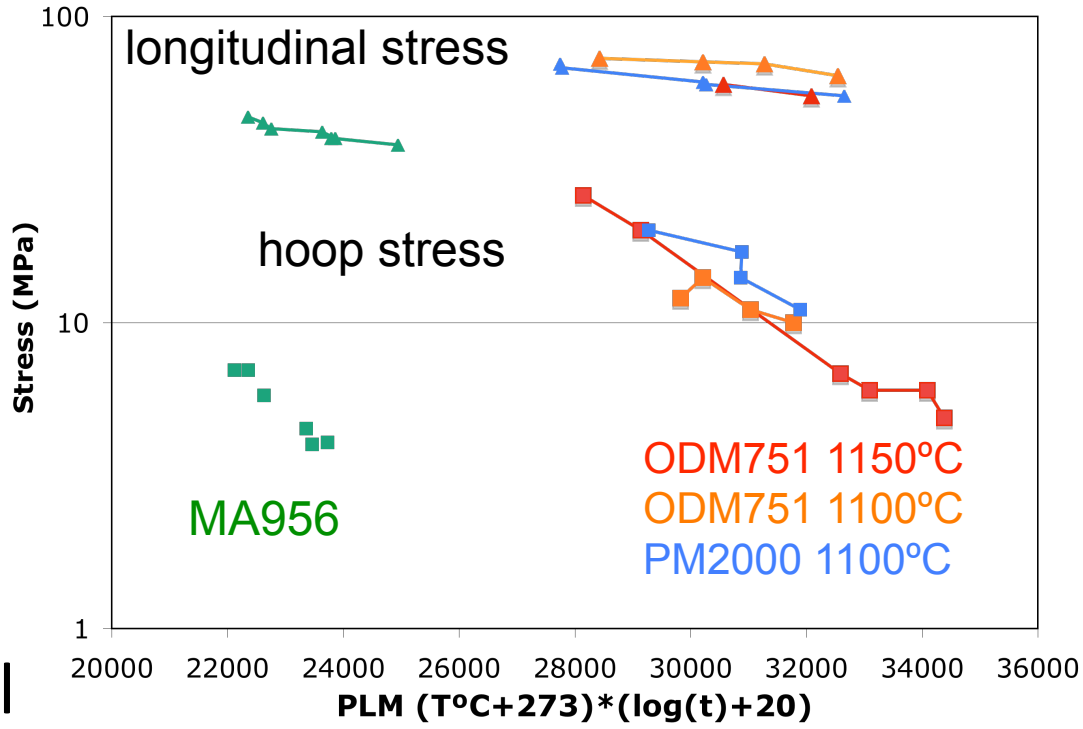
- Because competitors i.e. Special Metals and Plansee have stopped ODS production but part of the ODS market is still there

-Rising interest in ODS materials for energy applications (fossil, fissile, fusion) especially in the form of tubing

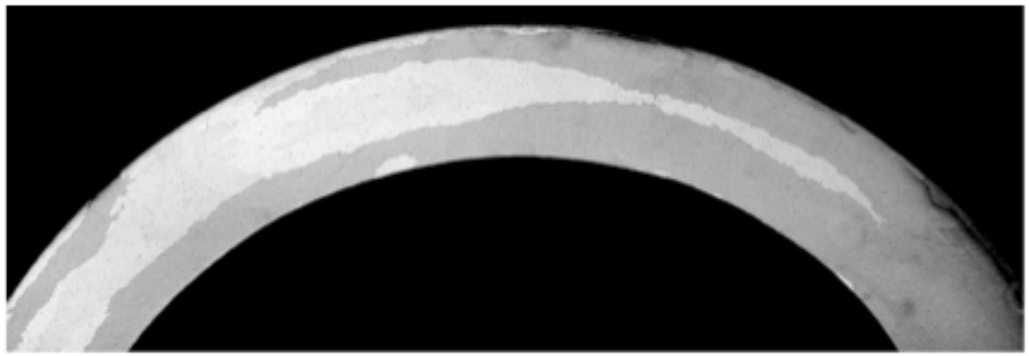
-Because Dour Metal is convinced that it may build a new decisive advantage over competitors in the ODS tubing field

Past achievements: high performance ODM751 alloy

- Excellent high temperature creep and corrosion resistance



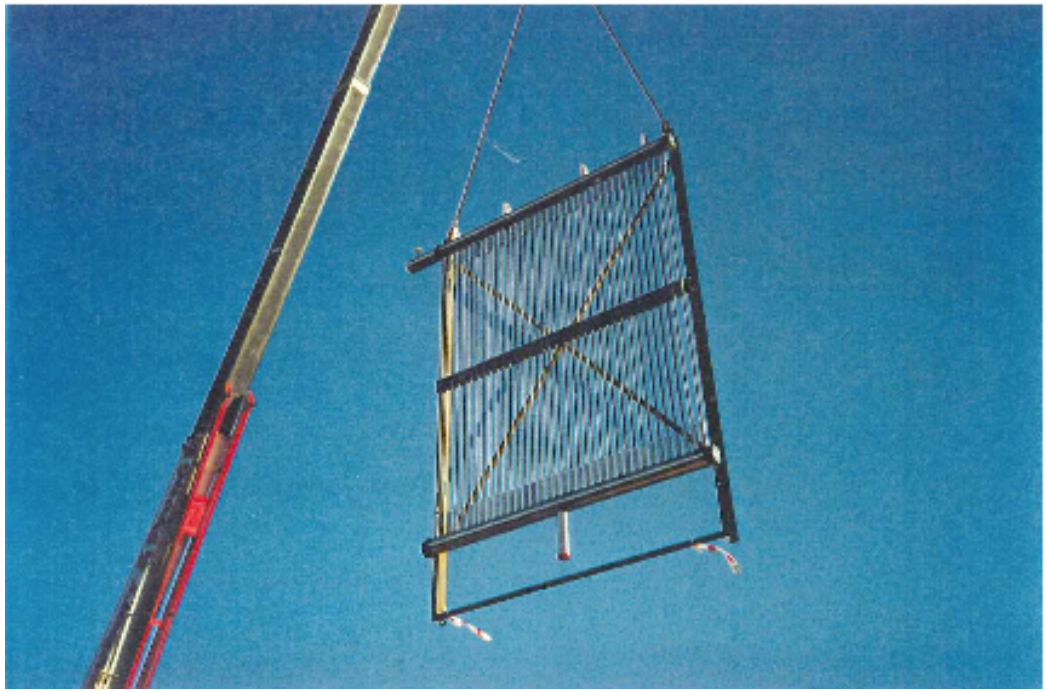
- Unique circumferential overlapping and serrated grain structure



British Gas Heat Exchanger prototype

- 40 ODM 751 tubes, 3.6m long, Ø27.5mm, were welded to top and bottom headers in a Harp arrangement

- Demonstrator operated at 1150C and 3.5 bar without any sign of material degradation



Tubing for cladding and end plugs of IDEFIX experiment in Phenix fast breeder reactor

- More than 500 tubes made in ferritic DT and DY ODS alloys

-Conditions of exposure:

*max mid-clad Temp: 636°C

* linear power: 386W/cm

* accumulated dose:99dpa

Table 1 : Chemical composition of ODS ferritic alloys (wt%)

Elements (wt.%)	Cr	Mo	Ti	O2 bound to Ti	Y2O3
DT (DT2906)	13	1,5	2,9	0,6	_
DY (DT2203Y05)	13	1,5	2,2	0,3	0,5

Range of high performance ODS alloys but lack of sufficiently profitable market

Dour Metal Belgium developed the skill and know-how:

- to produce a broad range of ODS alloys:

ODM061
ODM331
ODS Nickel based similar in composition to MA6000 of Inco
ODM0014, which was an inter-metallic ODS Fe3Al
ODS Al-Li.

- to post process these alloys and deliver various types of components: bars, tubes, sheets

Despite its technical and industrial achievements, Dour Metal Belgium failed in the mid 90' due to the lack of access to end users

Dour Metal Sro. Today

- Mechanical alloying facility allowing the producing of some 20kg of ferritic ODS per week

-Already 3 contracts to supply ODM materials:

- 1 for Fossil Energy and
- 2 new alloys in development (Eurofer type; 14Cr1W)

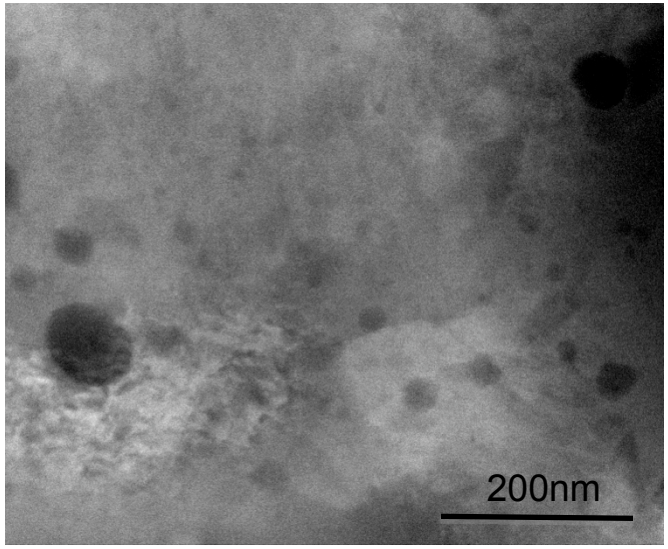
-Discussion for supplying ODM materials to several other potential customers: 4 in non-nuclear field and 2 for NE.

-FeCrAl ODM751

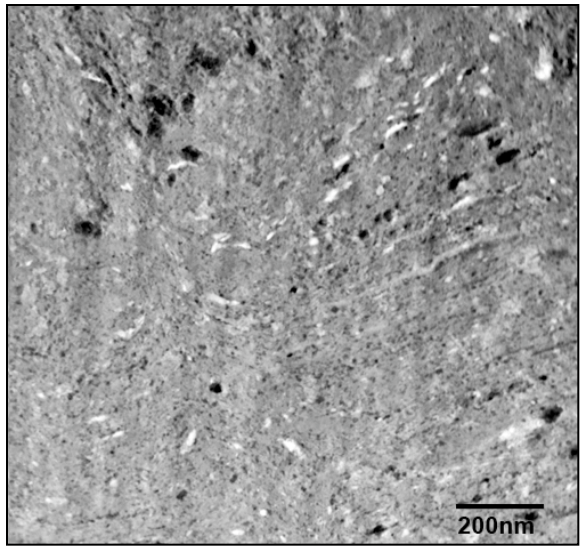
ODM 751

This alloy is still under development (composition / processing). Actual composition of Kaz3 (approaching ODM751) is: $Fe17Cr5Al1.5Mo1.2Si0.5Y_2O_3$

-7 kg extruded bar of Kaz3



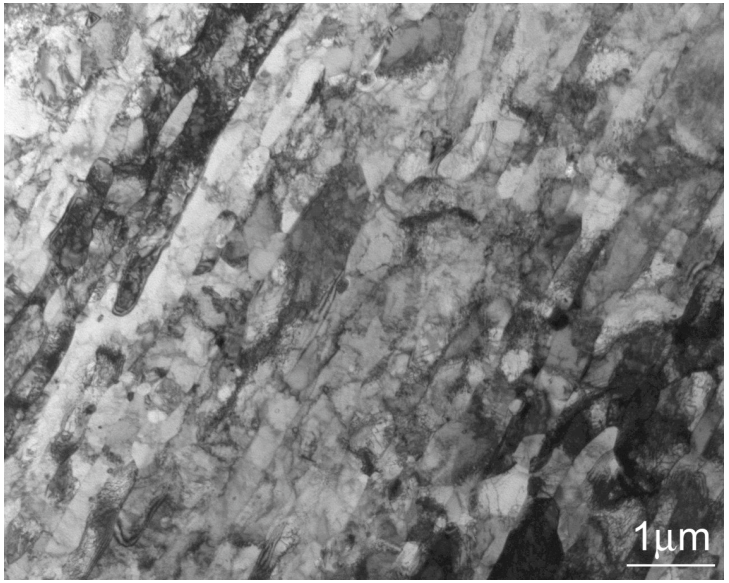
Kaz2 As extruded



Kaz3 Powder, As ball milled

FeCr ODM401

ODM 401 , 5 kg extruded bar of 30mm in diameter, with a composition of:



element	C	Cr	Ti	Mo	Y_2O_3	Al
measured composition ODM401	0.007	13.6	0.85	0.29	0.25	0.06

But what next? Is this story viable?

Why Dour Metal will succeed where SM and Plansee failed

Why enter the market when SM and Plansee withdraw?

- What was the accessible market size?
- Estimated Plansee market was 10-20tons/year.
- Best estimated Inco's market was 100 tons/year.
- For these companies, such markets are of little interest if there is no year on year growth.

Why Dour Metal will succeed where SM and Plansee failed

But for small company like DM, having already the knowledge and partly manufacturing equipment, this may be a real business.

- Todays DM's capacity is about 1000kg/year of ODS.
- Within 6 month this will be 2500kg/year, and if the market demand extends, this will be 10tons/year or even more according to the demand.
- DM is very confident in the possibility to capture customers from former ODS manufacturers and ensure the viability of the company

Dour Metal sro. in the near Future

New DM approach is similar to Plansee, to limit the risks:

-focus on MA powder fabrication and sub contract downstream production;

-Increase the powder production capacity from 20 to 50-60 kg/week in the next 6 months;

- New ball milling equipment design has been made;

- Improvement of MA process by controlling the environment to avoid contamination and increase quality and reproducibility of final products.

Dour Metal sro. Objectives

- Develop ball milling equipment to enable fabrication of 200 kg of MA powders per week (within 1 year);
- Refurbish/purchase various metal forming equipment for the production of complex very high performance ODS components:

-Hipping capacity, *- Hot extrusion press*
-Glass cleaning device, *- High temp. furnaces*
- Swaging machine, *- Straightening machine*
- Cold drawing machine, *- Pilgrim mill*
- Basic metallographic facility

- Stay Creative: new manufacturing process to fabricate tubes with a helical large “onion skin” grain structure to improve hoop strength

Conclusion

Despite the fact that new DM is small and just recently established, the company is convinced that the future is very promising:

- Need for ODS tubing with outstanding performance for energy application.
- DM knowledge and in the near future manufacturing capacity to produce such tubing

Outstanding scientific and material support from laboratories involved in developing new ODS materials.

Possibility of capturing legacy customers for ODS materials (because of withdrawal of previous suppliers).