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Reference HAK/SG P406

ACTION COPY SENT TO ENGINE SUPT

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8th, February 1962

Mngr. ... Eng. Supt.	
Sec. ... C. Eng. A.D.	
Asst. Sec. ... Pers. Supt.	
Ch. Acct. 12 FEB 1962	Supply Sales
Stores	
Ansd	Init

FR 3/27.

MISSION AUSTRALIENNE
S.N.E.C.M.A.
70, bld Kellermann

PARIS 13e
France

COMMONWEALTH AIRCRAFT CORPORATION PTY.LTD.
BOX 779 H P.O.
Elizabeth st.

MELBOURNE
Australia

Attention : the MANAGER.

Subject : Salt baths for heat treatment.

Dear Sir,

Enclosed herewith please find three copies of Report "Electrically heated salt baths for heat treatment of ATAR 9C parts - Kellermann plant".

It is expected that there will be an adequate supply of heat treatment salts available from stocks at C.A.C. or suppliers in Australia to meet our requirement. An additional salt to those already in use at C.A.C., could be required to cover the heat treatment of stage 1 steel compressor blades.

Please advise if any ordering action is required for supply of any heat treatment salts from France.

CIRCULATION / COPIES / 6	
E.F. MNGR	FCT. ADM. SUPT.
DSGN. ENGR	MC. SHOP. SUPT.
DEV. ENGR ✓	PRODUCN. SUPT.
SERV. ENGR	ASSMLY. SUPT.
QUAL. ENGR	FOUNDRY SUPT.
PROD. ENGR	METLCAL. SUPT.
MATL. ENGR	PROCESS SUPT. ✓
CH. TL. DSGR	TOOL. PROD. SUPT.
CH. INSP. E. F.	TOOL. ROOM. SUPT.
A/F MANAGER	SUPT. INSPECTION

Yours faithfully,

G.H. Foster

G.H. FOSTER

NOTED
CNPS

HAK/SG 8th, February 1962.

ELECTRICALLY HEATED SALT BATHS FOR HEAT TREATMENT OF

ATAR 9C PARTS - S.N.E.C.M.A. KELLERMANN PLANT.

The following details of salt baths currently in use at S.N.E.C.M.A. Kellermann Plant for the heat treatment of ATAR 9C parts are here recorded for information and future reference.

(I) Salt bath for hardening heat treatment of carburised gears etc...

a) Salt used : Houghtons 540 + 0.3 % sodium cyanide to prevent decarburisation of the surface of the parts.

b) Temperature range : 750 - 900ºC

c) Control of bath :

- Add 3 egg size pellets of sodium cyanide every hour when the bath is in use. The pellets are added by placing in a small wire mesh basket, having the charging hole on the side of the basket, and plunged to the bottom of the bath.
- Check titration at the beginning of every shift and adjust when necessary. Take 1 gm sample of salt from bath.
  Dissolve in 100 C.C. of water.
  Titrate with N/10 HCl.
- If the titration of N/10 HCl is greater than 2 C.C., the bath is either discarded, or portion removed and new salt added.

d) General comments :

- S.N.E.C.M.A. have authorised the use within the plant of an addition of 0.3% sodium cyanide to salt 540 to prevent decarburisation.
- By experience, S.N.E.C.M.A. have found that the routine hourly addition of 3 pellets of sodium cyanide while the bath is in operation, gives a very satisfactory control.
- A hazzard can exist when quenching from this salt into a nitrate tempering salt, eg. Houghtons Draw temper 275 salt, from an explosive reaction between the cyanide and nitrate. S.N.E.C.M.A. have advised that this will not be evident (and even then only to a very minor degree) until the cyanide content is raised to 10%.

(2) Salt bath for hardening heat treatment of stage 1 stainless steel compressor blades.

a) Salt used : ACIA 3 B salt as supplied by
"Applications chimiques pour l'industrie et l'automobile"
Bureau Commercial
18, rue Papillon (Paris 9e)

...

b) Temperature range : 815 - 1100º C

c) Control of bath :

- Titration check twice per 8 hour shift if the bath is in continual use.
  Take 1 gm sample.
  Dissolve in water.
  Titrate with N/10 HCl.
- If titration is greater than 2 C.C. of N/10 HCl, the bath is to be adjusted using ACIA salt NO2.
- SNECMA carry out, on this bath, a routine weekly deslugging treatment by baling out the salt, cleaning out the sludge, and restarting the bath with the old salt if the titration beforehand is satisfactory.

d) General comments :

-The frequency of titration checks on this bath have been reduced at SNECMA as a result of experience that has indicated that while the bath is in use and a stated quantity of NO.2 salt is added at prescribed intervals then the bath titration will be maintained at all times within the 2 C.C. maximum limit.
- ACIA salt NO 3 can also be used for bath correction and is in fact recommended by the suppliers, however SNECMA have found the use of the NO2 salt gives satisfactory control and maintains a more fluid and satisfactory bath at the lower end of the temperature range where it is being used.
  If on the other hand the salt bath was being used at 1000ºC or higher, they would use the NO3 salt.
- ACIA salt NO 2 is thought to be essentially boric acid.

(3) Salt bath for heat treatment of high speed steel.

a) Salt used : A mixture of 1/3 Houghtons salt 970 & 2/3 carboneutral salt.

b) Starting up new bath :

- Fill salt pot 1/3 full of salt 970 and melt.
- Progressively add carboneutral salt in three or four lots allowing each lot to become dissolved and the bath fluid before the next lot is added.

b) Control of bath :

- "Drag out" losses are made good by addition of a mixture of 50% salt 970 + 50 % carboneutral salt.
- SNECMA carry out on this bath a routine weekly deslugging treatment by baling out the salt, cleaning out the sludge, and restarting the bath with the old salt. The 50-50 salt mixture mentioned above is used to "top up" the bath.

c) General comments :

The main reason for using a mixture of 2 salts is to provide a more electrically conductive bath resulting in a greater heating efficiency.

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(4) Salt bath for elevated temperature quenching and general tempering.

a) Salt used : Houghtons draw temper 275.

b) Temperature range : 170 - 650ºC

c) Control of bath :

- A desludging operation is carried out every two weeks by removing a false insert from inside the bath. This is emptied and replaced.
- The bath is topped up as required, with new salt to compensate for "drag out" losses.

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