

STEEL MILL PRODUCTS DIVISIONRESEARCH & DEVELOPMENT DEPT.SEPTEMBER 1973Non-Asbestos Profax(a) Plant Experiments

An experimental run was scheduled on September 7, 1973 using EP-5273F for Armco-Middletown boards. Mark III 'E' and 'P' machines were employed for this experimental run.

During the experiment, the recipe was changed due to surface roughness by decreasing X2782 content from 1.0% to 0.75% and X3580 from 0.25% to 0.19%. After these changes (made on the 3rd batch), the run was smooth without any technical problems and the boards were acceptable from Quality Control standpoint. Since September 18, 1973, EP-5465 (the new recipe number for EP-5273F modified) became a production accepted recipe for these two accounts.

Within two weeks period we experienced, with EP-5465, intermittently excessive foam formation. The foam formation is attributed to X3580 which is not accurately added.

EP-5465 was also tested on the 1-Pc machine using tool #669 for Republic-Canton. The experiment was ran on September 24, 1973 and 30 tops were produced. The preliminary field trial was successful.

(b) Laboratory Experiments and Tests

EP-5465 (which is non-asbestos and non-paper recipe) is using a new binder, X3579 (PVAc) besides RM-177A(1.2%) and RM-447 (1.5%). The transverse strength ranges between 250-290 p.s.i. and the density between 0.75 g/cc (K4), 0.80 g/cc (1-Pc) and 0.82 and 0.88 g/cc (Mark III). Because the total binder content for EP-5465 is higher than Profax 31 (6.25 vs. 5.58), a burning out test was ran comparing Profax 31, EP-5465, EP-5452A and EP-5465 modified (RM-177A replacing X3579). The test results are:

---	EP-5465 modified	lost 24% of its initial strength
---	Profax 31	lost 59% of its initial strength
---	EP-5465	lost 79% of its initial strength
---	EP-5452A	lost 100% of its initial strength.

The burn-out test was ran for 1-1/2 hours at 550°F. The above results are relevant concerning the superiority of using RM-177A instead of other binders. Our further lab experiments showed that EP-5465 needs 30% less RM-177A than Profax 31 besides RM-447.

RM-447 was replaced in EP-5465 with X3211 (U.F. liquid resin). The replacement was made at the same percentage despite the less solid content of the U.F. liquid used.

The friability test showed no differences and the conclusion is that X3211 gives the same properties as RM-447. EP-5465 was said to be less permeable in green stage than Profax 31 during a plant experiment.

We have tried different air pressures for forming and dewatering processes under lab conditions. 2.5, 5, 7.5 and 10 p.s.i. were tried using EP-5465 and Profax 31. Both slurries were made under production procedures and the tests showed that EP-5465 is more permeable than Profax 31. The dewatering problem was attributed to the tool.

(c) Miscellaneous

The raw material cost for EP-5465 has initiated a careful investigation, exploring the possibilities of leveling it at Profax 31.

The raw material cost analysis showed that there are two main factors which are determinant:

- 21% less RM-131D did increase the raw material cost for EP-5465 with 17.4%, and
- the usage of X3679 instead of RM-177A did increase the raw material cost with 6.8%.

The overall cost difference is 21.7%. Under lab conditions, we found that EP-5465 calls for 30% less RM-177A than Profax 31 and also X3211 instead of RM-447.

In each of the above modifications are considered, the EP-5465 raw materials cost drops to 11.9%. (Profax 31 raw material cost was considered also in the hypothesis that X3211 is replacing RM-447).

Taking into consideration that the machine productivity is 5-8% favorable to EP-5465, the usage of green and dry scrap is positive, the oven cycle is 10-15% lower for EP-5465, the overall cost is at least equal to Profax 31 if not favorable to EP-5465.

Another important factor which should be taken into consideration is that EP-5465 is designed and the preliminary results confirmed to replace all other Profax type recipes.

In that respect, we will foresee only one or two Profax type recipes in production (considering the non-asbestos paper bearing recipe replacing Profax 10, EP-3408, EP-3901 S.O) which will assure more accuracy in preparing batches.

Non-Asbestos Proflex

(a) Proflex Boards and Tops

The lab work is under way and we can foresee, after 2-3 weeks, the possibility of developing a material with acceptable flexibility and less compressibility.

(b) Seal-On Rings

XS-1530B has been perfected under lab conditions since June 1973 but we haven't had the opportunity to experiment with it.

Replacement of Silica in Profax-Proflex Materials

The silica replacement work was revised with some encouraging results. However, the raw material cost for non-silica, non-paper recipe will be twice as much as present Profax 31 recipe raw material cost.

Premix Profax at Bethlehem-Johnstown

The average scrap rate for the month was 0.44% versus 0.49% last month. The transverse strength and density were 277 p.s.i. and 0.87 g/cc compared with 272 p.s.i. and 0.86 g/cc. The data consistency since the production was switched to Mt. Braddock should be pointed out. Bethlehem-Johnstown is using Premix Profax material containing the new binder. The material works well with no major technical problems occurring.

The leakers and boiling problems, which occurred during the month, are attributed to their castings and molds situation.

Miscellaneous

During September, we have received two samples of non-asbestos non-paper boards made by Ferro Engineering and PMP.

These samples contain the same raw materials we are using in EP-5465. This fact probably will force us to accelerate the EP-5465 production implementation.