

THERMIC FETTLER FOR INNARDS FROM METAL

Gheorghe Popescu¹, Henrieta Luiza Popescu², Alin Stăncioiu³

ABSTRACT

This work presents the result of researches made by author to find some solutions in thermic fettler of pieces processed from metal. In this sense we propose new combustible mixtures and a new technology to oxidize of casts from the edges of the pieces which are mechanic processed and poured under pressure.

KEYWORDS: Thermic fettler, Technological operation of fettler, Combustible mixtures, Metals excavation, Plastic deformation, Energy of reaction, Vertical blast room, Horizontal blast room.

1. Introduction.

The processing metals through excavation, plastic deformation, cast below pressure, etc, in most many cases caused a production casts which on the fact as they have an ugly appearance and produces the accident to handle, are difficult assembled and decreases the quality produced asamble.

Literature of speciality recommend many methods of elimination these mechanic casts, constituting technological operation of *fettler*.

By this work, we will introduce the result of the our examinations regarding to thermic fettler innards from metal with the help of the fuel blends which detonate or deflagrate in special rooms with constant volume.

2. Theoretical elements

The casts are areas with little mass which on besides the fact they have an ugly appearance, they are very sharp and they produce wounds to handle, they prevent the assemblage and decreases the quality of the joined products.

The only possibility of producing the reactions of reduction – oxidation, at which a lot of fuel molecules take part, it is the chaining reaction, starting at the initial fuel mixture and continuing up to the finish of the reaction by obtaining the final reaction products.

The mechanism burning [1], explained through chain reaction, presupposes the formation in an extremely short time of atoms with big energy of reaction (O, H), free radicals (OH* ; CHO* ; CH₃* ; Etc.) or other composed structurally (CH₂ O),

They are very active, they react with molecules of gas, from which they result manufactures finishes of burning, simultaneously with the generation other radicals or atoms with high reaction energy.

Owing to this energy of reaction, the temperature of the final produced finish is very raised (3000 -5000 ° C) and it must be capable of raising the temperature of the casts to a value of beginning reactions of oxidize the metals from these with the contribution bulk of oxygen in excess.

3. Techniques of experimentation

With a view to realization of a high temperature which propagates burn reaction

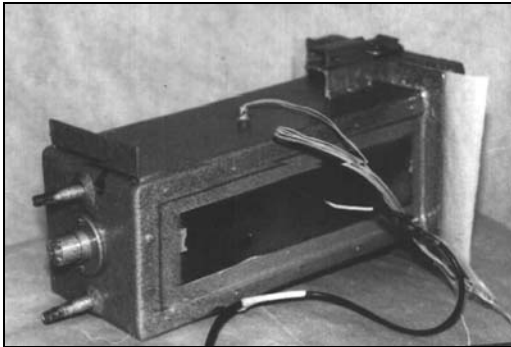
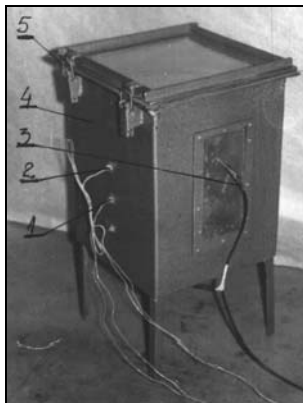


Fig. 1.



of casts, we studied the behavior of a lot of carburetted-oxygen mixtures which [3 paper] caused them experimentally flames temperature produced of reaction, as well as the burning period of them to values bigger than 2500 °C.

Also we were curious to know the behavior dusts of nitrocellulose with base unartificial, tipe P 55, of Romanian production [4].

For the testing gaseous alcoges, we projected a room of horizontal blast of 4,32 dm³, predestinated with homogenizer of gas and with a transparent wall for the visualization of the flames from interior (figure 1).

To ensure a constant pressure inside the room on an established period of time, we used for obturation the many diafragmes from diverse plastic materials and different thickness. The thickness of the wall were thus selected that it might resist to a pressure of a

reaction products of 20 bigger than initial pressure.

The firing of the inflammable inland blends of the wall was made with pyrotechnical igniter utilized frecvently in the manufacture blasting caps industrial.

Since the dust of nitrocellulose has in composition the necessary oxygen for the burning, we projected and built a vertical blast room with a volume of 40, 5 dm³ and which to resist to a pressure of 20 bigger than one initial (figure 2).

The determination of the temperature of the flame burning products and the duration of maintaining of these at values bigger of 2500 °C, it was accomplished with the help of the electronical apparatus presented in the work 2.

4. The mode of experimentation

We studied many combustible gaseous-

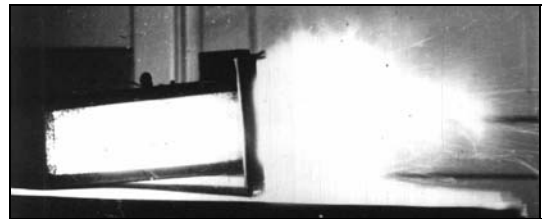


Fig. 3.

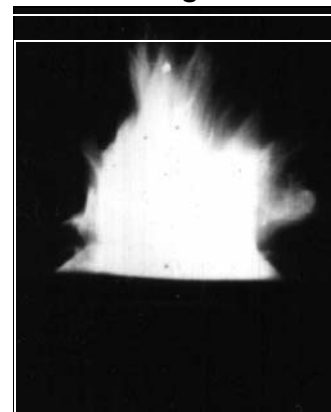


Fig. 4.

oxygen mixtures, but among these except the blends from the table 1 presented the interest.

The dosage of the gas was made volumetrically with the of help volumetrical proportioner described in the work 3. The dusts of nitrocellulose were pressed in a device with a cylindrical cavity at base of the room of blast. For experimentations we used

the same type of closing diaphragm with thickness of 0, 2 mm.

By photographing in the obscure camera (figures 3 end 4), after developing we certained that a part from the combustible mixtures continues the development of the reactions of reduction-oxidation after the destruction of closing diaphragm, outside the room of blast.

Starting from these remarks, we have increased the thickness of closing diaphragm in more rows till there weren't found finalities of the reaction of reduction-oxidation outside the room.

Measuring the duration t_1 of the development of the reactions of reduction-oxidation to temperatures the bigger measured the duration t_2 of produces of burning till

Table 1.

combustible mixtures	Combustible Vol, [%]	Tmax [°C]	t ₁ [ms]	t ₂ [s]
H ₂ + O ₂	29,58	3080	3,5	1,6
H ₂ + O ₂	50	2810	8,9	2,3
H ₂ + O ₂	73	2527	9,3	3,1
CH ₄ + O ₂	9,5	3030	9,6	4,9
CH ₄ + O ₂	18	2720	10,1	5,2
C ₂ H ₂ +O ₂	7,8	>3800	6,4	2,4
C ₂ H ₂ +O ₂	50	2727	7,7	2,8
90%C ₄ H ₁₀ + 10%C ₃ H ₈	3,2	2502	8,6	3,6
Powder P55	10g	3010	4,2	6,9

temperature of 700° C.

The innards of finless were fixed on a bar screen situated to 20 cm of based for the room of blast from figure 1 and to 10 cm of bases for room from figure 2.

5. The result of experiments

In figures 5, 6, 7 and 8 it'prezented the samples of finless innards end unfinless.

6. Conclusions

As a result of the effectuation of the above experiments we can formulate the next conclusions:



Figure 5.

As a result of the reactions of reduction-oxidation the water steams are emit, CO₂, specific oxides for every mixture and heat that for short period of time arrives at across

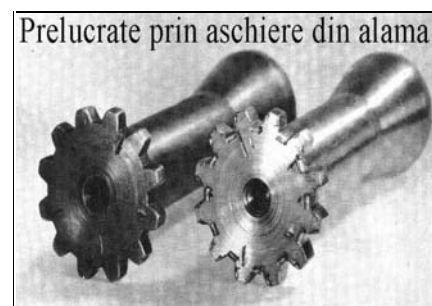


Fig. 6.

3500° C;

-The casts being surfaces with little mass, they are heating by the burning products until it can propagate alone with the help of surplus of oxygen, the reaction of oxidizes of these metals;

-The process of burning of the casts is favored by the fact that the oxidation of the metal keeps alone;

-The reaction of burning is made in two phases: In first phase the fuel helps as agent of reduction-oxidation with intense emission of heat and increase of pressure, and in the second phase this is replaced by the crown of the cast, the burning being in progress by itself;

-The smaller the thermic conductivity

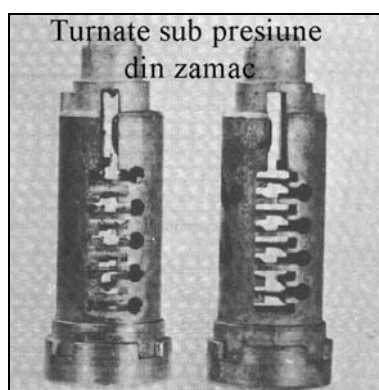


Figure 7.



Figure 8.

material of the cast is, the thermic finless is more efficacious and it has an output increase in what looks the report: volume of shipment/ volume room;

By this method the interior casts are eliminated because high temperature penetrate in all the cavities; For the effectuation of technological process of thermic finless we can utilize any of the

fuels blends the fuels presented in the table 1;

The quality of finless is conditioned by thickness and the material of the diaphragm of obturation.

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AUTORS

- 1 - Prof.Dr. Eng. Gheorghe Popescu, Mechanics Department of Engineering Faculty, "C. Brâncuși" University of Târgu Jiu, Geneva 3, 1400 Târgu Jiu, România, tel. 00402-53-213509, fax 00402-53-214462, e-mail: gepo@utgjiu.ro
- 2 - Eng. Henrieta Luiza Popescu, Industrial Secondary School of Constructions Materials, Victoria 132-134, 1400 Târgu Jiu, România, tel/fax 00402-53-228006, e-mail: luiza@utgjiu.ro
- 3 - Lecturer. Dr. Eng. Alin Stăncioiu, Mechanics Department of Engineering Faculty, "C. Brâncuși" University of Târgu Jiu, Geneva 3, 1400 Târgu Jiu, România, tel. 00402-53-213509, fax 00402-53-214462, e-mail: alin@utgjiu.ro