Hydrogen furnace trial sees SORG and HRASTNIK1860 team-up

A PILOT TEST NOT WITHOUT PRECEDENT

Hydrogen is a solution for significantly reducing CO2 emissions from the combustion of a glass melting furnace whereby the use of green hydrogen will avoid them altogether. Recently SORG and Hrastnik1860 worked on a laboratory and pilot scale to test the use of hydrogen for glass production. SORG has already tested various burner types, and newly developed gas-oxygen and underport burners (SDB) are being prepared on an industrial scale. The SORG SDB underport burner has been operated with 100 percent H2 in the GWI Hy-Glass project, while another test with a natural gas/H2 and LPG/H2 mixture is currently in the process of starting. In this industrial style set with Hrastnik1860, the safety measurement, control system and calculation software were specifically designed for hydrogen and thereupon delivered. Installed on a furnace so that both hydrogen and pure operation with hydrogen or gas could be supplied in normal operating conditions, the existing gas and oxygen supply equipment were used in the process chosen by SORG. Here the H2 supply and control systems met all applicable standards and regulations while gaining official safety approval as well.

FIRST TEST

During December of last year the oxyfuel-powered glass pro-

World leader in glass melting and conditioning technology, Nikolaus SORG joined forces recently with renowned Slovenian high-quality glassware producer HRASTNIK1860 to test how furnace system technology and control could potentially facilitate a definitive energy switch to hydrogen.

duction plant of Hrastnik1860 was switched from gas to hydrogen. Individual burner pairs were gradually switched to hydrogen and the hydrogen content in the gas was gradually increased. Gas content was reduced to an energy equivalent and the oxygen was adapted to the lower oxygen demand. Only the Vol-percentage - H2 proportion was set on the control system, with all heating parameters calculated and controlled automatically. The burners were operated with 100 percent hydrogen for several days.

SECOND TEST

A second test switched the melting furnace burners directly from 100 percent natural gas to 100 percent hydrogen. Over the experimental period, the relevant factors were recorded and evaluated:

- Combustion process
- Emissions
- Glass melting process
- Quality of glass

CONCLUSIONS

The trial indicates that it is indeed possible to switch to hydrogen with the appropriate system technology and control. The results also tell us that it's relatively easy to switch and revert a furnace to hydrogen by adapting the heating system to the different physical properties of gas and hydrogen. Moreover, operational changes were within the expected range and controllable. ■

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