

### Application of Oxygen

Industry	Brief Process Description	Gains to user	Typical Gas Consumption
(A)	(B)	(C)	(D)
<b>Minsteel</b>			
<b>Electric Arc Furnance</b>	Use of Oxygen to assist scrap oxygen infiltration technique or by incorporating Oxy-fuel burner Refining of liquid metal to specification by oxygen lancing particularly for decarborisation	Faster melt down refining period leading to reduced tap to tap time increasing productivity consumption	10 to 30 m3 per tonne of steel
<b>Secondary steel making processess</b>	Oxygen application with Argon and or Nitrogen in VOD, AOD, MRP systems to control carbon retaining alloying elements like chromium for stainless and alloy steel manufacture	Control of carbon retaining along elements. Use of low cost high carbon ferro alloys, making stainless steel to ELC grades.	Dependent on process adopted, grade of ferro -alloys used, composition of liquid metal and final specification of steel made.
<b>(VOD, AOD, MRP)</b>			
<b>Iron Foundry</b>	Enrichment of cupola air blast with oxygen of through-tuyere of subtuyere of oxygen	Faster, more flexible melting reduced cold metal reject, hotter metal on demand, lower coke ratio.	15 to 25 m3 / tonne
<b>Copper Smelting</b>	Oxygen enrichment of air for flash smelting and blister copper production in converter	Higher production rate, improved sulpher recovery inflash smelter. Increased cold charges and production in converter	Dependent on grade, process system.

<b>Lead / Zinc Production</b>	Oxygen enrichment of air in sintering plant and smelting furnace	Effective sulphur removal in sintering and recovery for conversion to sulphuric acid. Increased smelting rate, better slag separation, smoother furnace operation with reduced tuyere blockage	Dependent on product and range of raw material
<b>Glass</b>	(1) Underflame Oxygen enrichment temperature, heat transfer to charge glass melting tank to improve temperature, heat transfer to charge	(i) Increased glass production reduced specific fuel consumption, extended furnace campaign life	(i) Dependent on design, Firing , Additional output target.
	(II) Oxygen enrichment of burner air in flame finishing glass items, lamp manufacture	(II) Good surface finish and sealing	
<b>Optical Fibre</b>	Melting in oxy-hydrogen flame in drawing of glass fibre	Essential for optimum flame temperature and soot free clean flame for the process	
<b>Kilns in manufacture of</b>	Underflame oxygen enrichment or auxiliary	Increased output, lower specific fuel	
<b>Kiln firing heavy clay products</b>	Enrichment of furnace atmosphere with oxygen at oxidation or carbon burn-out stage in the kiln firing high quality bricks and other carbonaceous heavy clay products	Effective carbon burnout to avoid orange or black heating increased production and reduced fuel consumption	

<p><b>Waste water Treatment</b></p>	<p>(a) Injection of oxygen through special venturi and nozzle arrangement to meet oxygen deficiency or peak demand in biological treatment of sewage and industrial effluents.</p>	<p>Lower power requirement and capital cost, low land requirement, capacity augmentation of existing plants, improvement in treatment efficiency and efficient quality</p>	<p>Depends on strange type and quantity waste water and treatment process. Typical 1-2 kg/kg BOD remove</p>
	<p>(b) Direct or indirect oxygenation of waste water in sewers or pressure pipelines</p>	<p>Effective odour removal, inssewer treatment and relieving treatment plant to accept increased load, reducing corrosion of sewers, pumps, etc. and thereby lower maintenance</p>	<p>Depends on type are quantity of waste water generalli 5-30 mg/L</p>