



# Minsur

## Installation of InLine Pressure Jigs



<b>Model:</b>	2 x IPJ2400 (105 t/ph treated)
<b>Purpose:</b>	Tin Recovery
<b>Place:</b>	San Rafael Tin Mine - Peru.
<b>Gerente de Metalurgia:</b>	Ian Gordon Hall Dun
<b>Date:</b>	October 2003.
<b>Results:</b>	Increased Overall Plant Recovery by 1%.

The San Rafael tin mine of MINSUR SA is situated high in the Peruvian Andes at 4500m and has been in operation for the last 30 years in various levels of production and is currently treating 77000T/month of ore at around 5%Sn and today its production represents 14% of world's tin production.



**San Rafael Tin Mine**

The concentrator was modernised to improve concentrate quality, increase recoveries and lower operating costs. Based on the promising results of a pilot test on the crushed feed of 100% passing 14mm to the plant a decision was reached to install two IPJ2400s. The aim was to reduce the liberated or nearly liberated cassiterite from reporting to primary grinding and thus reduce the generation of fines which are difficult to recover in latter stages of the process and are in fact eliminated prior to the tin flotation circuit in the form of slimes in the desliming step. The new circuit was commissioned in October 2003

Crushed ore at 100% passing 14mm is fed from the Fine ore bin at 115 T/hour and a loop through the PLC adds water to make up a 50% pulp. This pulp is then fed by gravity to a rotating distributor that has four exits. Two of these exits feed the two installed IPJ2400's and the other two feed the two horizontal vibrating screens on the IPJ tails. The feed to either one of the IPJ2400's can be bypassed to its corresponding screen if the IPJ is being repaired or if there is a circuit failure. The tails from the IPJ normally report to Screen where the coarse fraction at >2mm reports to a Rod Mill for size reduction and liberation and the <2mm fraction goes to a conventional jigging circuit.



**View of IPJ2400 lid platform showing the feed pipes from the rotating distributor**

The concentrate from each IPJ is then treated on a small vibrating screen with an opening of 2mm where two concentrates are produced. The coarse fraction, >2mm, about 8T/hour with a grade of 30-35%Sn and the fine fraction with a flow of about 5T/hour with a grade of 12-15%Sn. The higher grade concentrate reports to rolls crusher followed by an upgrade circuit consisting of conventional jigging followed by grinding in a ball mill, spirals and a sulphide flotation to reduce the impurities according to smelter specifications. The lower grade concentrate reports to a secondary jigging circuit. Final shipping grade from the gravity circuit is 63%Sn

Both IPJ2400's are operating with a stroke of 25mm and a pulsation frequency of 70cpm. The inlet water to each hutch is 50m<sup>3</sup>/hour and the internal wedge wire screen has an opening of 20mm and a ragging bed of 25mm ceramic balls with a specific density of 4.1g/cm covers about 95% of the area allowing flexibility of the formed bed which in turn allows large, heavy particles to report to the concentrate hutch. The down stroke velocity is set at 10 (on a scale of 1 to 10)

The installation of both IPJ2400's with the ability to handle very coarse feed has resulted in the generation of less tin slimes in the Rod Mill and overall plant recovery has increased by +1% from 90.6 % to 91.6%.

	T/hour	%Sn	Distribution %Sn
Feed to the GEKKO Circuit 100% <14mm	115.0	5.00	<b>100.0</b>
Feed to GEKKO 01- IPJ2400	57.5	5.00	50.0
Feed to GEKKO 02- IPJ2400	57.5	5.00	50.0
<b>Concentrate Gekko 01 &amp; Gekko 02</b>	<b>7.0</b>	<b>23.5</b>	<b>28.6</b>
Tails GEKKO 01( Feed to Sizetec 4mm Screen)	54.0	3.8	35.7
Tails GEKKO 02( Feed to SIZETEC 4mm Screen)	54.0	3.8	35.7
Oversize to SIZETEC 01 & 02 ( Feed to Rod Mill)	54.0	3.6	33.8
Undersize of SIZETEC 01 & 02 ( Partial feed to Secondary Jigging)	54.0	4.0	37.6
Feed to SIZETEC 2mm Screen ( concentrate GEKKO 01 & 02)	7.0	23.5	28.6
<b>Oversize from SIZETEC 2mm Screen ( Conc. High Grade)</b>	<b>2.0</b>	<b>50.0</b>	<b>17.4</b>
<b>Undersize from SIZETEC 2mm Screen ( Conc. Low Grade)</b>	<b>5.0</b>	<b>12.9</b>	<b>11.2</b>
Feed to ROD Mill ( 9.5' x 13')	54.0	3.6	33.8
Feed to Secondary Jigging	108.0	3.8	71.4

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