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DAVIS TUBE TESTS ON DRILL-CORE MATERIAL FROM BLÖTBERGET AND HÅKSBERG. A PRE-FEASIBILITY STUDY.

Summary

Selected samples of drill core material from two iron ore deposits, Blötberget and Håksberg, have been subject to laboratory testing at Minpro AB.

Material

The test materials originate from earlier exploration drilling. Material from 85 individual drill core samples had been grouped into 16 "metallurgical samples". Material from these were selected and combined into three test samples. See *Table I*!

Table I. Assays of test samples.

Test sample	Assays [%]									
	Fe	FeO	P	SiO_2	Al_2O_3	CaO	MgO	Na_2O	K_2O	V
Blötberget Composite[1)]	34,5	14,7	0,91	32,3	5,8	3,9	2,8	0,85	1,9	0,08
Blötberget Hematite[2)]	36,0	6,9	0,12	37,9	5,4	0,75	0,60	1,1	2,9	<0,02
Håksberg Composite[3)]	30,5	12,8	0,06	39,3	7,1	3,0	3,0	1,3	1,5	<0,01

1) Met. Samples Nos 2, 3, 4, 7, 8. Weight: 12,1 kg
2) Met. Sample No 9. Weight: 2,4 kg
3) Met. Samples Nos 11, 13, 14, 15, 16. Weight: 13,1 kg

Program

The program comprised six tests with grinding and separation in a Davis Tube magnetic separator. The purpose has been to preliminary evaluate the potential for production of pellet feed concentrate from the ores.

In addition, two tests were performed with dry magnetic separation of crushed material, minus 5 mm as delivered. The purpose was to find out if some sinter fines concentrates could be extracted from the ores.

Results and comments

Davis Tube tests

Table II shows the summarized results of the Davis Tube tests.

Table II. Summarized results of DT-tests

Test sample / Grinding data	Product	Weight [%]	Fe [%] Ass.	Fe [%] Distr.	P [%] Ass.	P [%] Distr.
Blötberget Comp.	Feed	100,0	34,5	100,0	0,91	100,0
10 min. grinding	Magnetite conc.	39,1	70,6	79,9	0,042	1,8
43 % minus 45 µm	Hematite conc.	7,5	63,0	13,8	0,12	1,0
	Tot. Conc.	46,6	69,4	93,7	0,055	2,8
20 min. grinding	Magnetite conc.	38,0	71,1	78,4	0,025	1,0
75 % minus 45 µm	Hematite conc.	7,3	64,6	13,6	0,046	0,4
	Tot. Conc.	45,3	70,1	92,0	0,028	1,4
Blötberget Hem.	Feed	100,0	36,0	100,0	0,12	100,0
10 min. grinding	Magnetite conc.	11,2	71,5	22,2	0,005	0,5
34 % minus 45 µm	Hematite conc.	37,3	68,7	71,2	0,004	1,2
	Tot. Conc.	48,5	69,3	93,4	0,004	1,7
20 min. grinding	Magnetite conc.	11,1	71,4	22,0	0,006	0,6
65 % minus 45 µm	Hematite conc.	37,1	68,7	70,8	0,003	0,9
	Tot. Conc.	48,2	69,3	92,8	0,004	1,5
Håksberg Comp.	Feed	100,0	30,5	100,0	0,059	100,0
10 min. grinding	Magnetite conc.	30,8	68,7	69,3	0,008	4,2
47 % minus 45 µm	Hematite conc.	10,6	63,0	21,9	0,011	2,0
	Tot. Conc.	41,3	67,2	91,2	0,009	6,1
20 min. grinding	Magnetite conc.	29,7	70,7	68,9	0,004	2,0
76 % minus 45 µm	Hematite conc.	9,9	66,2	21,4	0,006	1,0
	Tot. Conc.	39,6	69,6	90,3	0,004	3,0

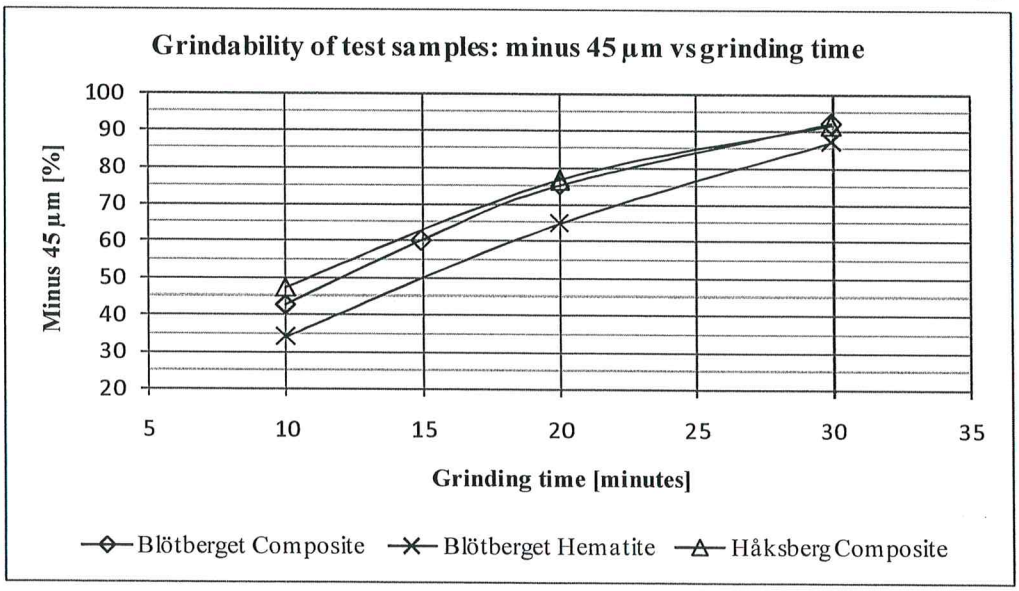
Obviously there are no difficulties to obtain saleable pellet feed concentrates from the ores represented by the test samples. The Håksberg Composite is finer grained than the Blötberget test samples and requires finer grinding in order to yield a high grade concentrate. Phosphorus reduction down to less than 0,03 % of the Blötberget Composite also requires fine grinding, down to 75 % minus 45 µm.

All separation products have been analyzed for ten elements including the oxides that make up the bulk of the ores. *Table III* shows these analyses for the total concentrates.

Table III. Assays of total DT concentrates (magnetite and hematite).

Concentrate.	Grinding time	Assays [%]									
		Fe	FeO	P	SiO_2	Al_2O_3	CaO	MgO	Na_2O	K_2O	V
Blötberget Comp.	10 min.	69,4	26,8	0,055	1,04	1,2	0,33	0,22	0,03	0,06	0,13
Blötberget Comp.	20 min.	70,1	29,2	0,028	0,53	1,1	0,23	0,13	0,01	0,04	0,12
Blötberget Hem.	10 min.	69,3	8,8	0,004	0,21	0,4	0,19	0,06	0,02	0,03	0,01
Blötberget Hem.	20 min.	69,3	9,9	0,004	0,20	0,4	0,19	0,04	0,01	0,02	0,01
Håksberg Comp.	10 min.	67,2	23,9	0,009	3,91	1,4	0,38	0,29	0,12	0,09	<0,03
Håksberg Comp.	20 min.	69,6	25,6	0,004	1,25	1,2	0,30	0,25	0,05	0,05	<0,03

Hematite is usually harder to grind than magnetite. This is illustrated by the diagram below.



Dry magnetic separation tests

It proved necessary to run the Mörtsell separator at a high speed in order to reach acceptable concentrate iron grades. The separation results are summarized in *Table IV.*

Table IV. Extraction of Sinter Fines by dry LIM separation

Product	Weight [%]	Fe [%]		P [%]	
		Ass.	Distr.	Ass.	Distr.
Feed: Blötberget Comp.	100,0	34,7	100,0	0,90	100,0
Sinter Fines at 4,4 m/s	26,9	64,8	50,1	0,25	7,5
Non magn. at 4,4 m/s	73,1	23,7	49,9	1,13	92,5
Feed: Håksberg Comp.	100,0	30,3	100,0	0,069	100,0
Sinter Fines at 4,4 m/s	13,0	61,6	26,5	0,030	5,7
Non magn. at 4,4 m/s	87,0	25,6	73,5	0,075	94,3

The limiting factors are obviously the phosphorus content of the Blötberget Composite concentrate and the iron grade of the Håksberg concentrate.

The compositions of the two Sinter Fines concentrates are illustrated in *Table V.*

Table V. Assays of Sinter Fines separated at 4,4 m/s.

S F Concentrate extracted from	Assays [%]									
	Fe	FeO	P	SiO_2	Al_2O_3	CaO	MgO	Na_2O	K_2O	V
Blötberget Composite	64,8	28,8	0,25	4,7	1,9	1,5	1,3	0,06	0,2	0,15
Håksberg Composite	61,6	26,9	0,03	10,8	2,1	0,69	0,99	0,18	0,27	0,01

By mixing of the two concentrates it is possible to produce a concentrate assaying more than 62 % Fe and less than 0,07 % P. The proportions, unfortunately, will be biased: 82 % Håksberg and 18 % Blötberget.

At the request of Mr. Alf Jedborn, PROing AB, selected samples of drill core material from two iron ore deposits, Blötberget and Håksberg, have been subject to laboratory testing at Minpro AB.

The program comprised fine grinding and separation in a Davis Tube magnetic separator. The purpose has been to preliminary evaluate the potential for production of pellet feed concentrate from the ores.

In addition, two tests with dry magnetic separation of crushed material have been performed. The purpose was to find out if some sinter fines concentrates could be extracted from the ores.

Material

The test materials originate from earlier exploration drilling. Sections of the drill cores had been examined geologically (GeoVista) and analyzed chemically (ALS Minerals). Surplus material, crushed to minus 5 mm, from the analytic work was delivered to Minpro in May 2011. The material consisted of 85 individual samples. Analytic data for all samples were provided.

The individual samples had been grouped into 16 "metallurgical samples" by the geologist. Metallurgical samples No 1-9 were from the Blötberget deposit and No10-16 from Håksberg. The essential analytical data for these samples are to be found in appendices B1 (Blötberget) and H1 (Håksberg).

Selection of material for the tests was done together with the client. The main consideration was the iron content; close to what is expected in the future mine operations.

Two composite samples, representing Blötberget and Håksberg respectively, were selected. See appendices B1 and H1! Tests on the Blötberget composite revealed that it contained too little hematite to be representative. Therefore an extra sample, high in hematite, was prepared and tested.

Table 1 shows the composition of the three samples. The assays are from Minpro test work and differ somewhat from the ALS figures of appendices B1 and H1.

Table 1. Assays of test samples.

Test sample	Assays [%]									
	Fe	FeO	P	SiO_2	Al_2O_3	CaO	MgO	Na_2O	K_2O	V
Blötberget Composite[1)]	34,5	14,7	0,91	32,3	5,8	3,9	2,8	0,85	1,9	0,08
Blötberget Hematite[2)]	36,0	6,9	0,12	37,9	5,4	0,75	0,60	1,1	2,9	<0,02
Håksberg Composite[3)]	30,5	12,8	0,06	39,3	7,1	3,0	3,0	1,3	1,5	<0,01

1) Met. Samples Nos 2, 3, 4, 7, 8. Weight: 12,1 kg
2) Met. Sample No 9. Weight: 2,4 kg
3) Met. Samples Nos 11, 13, 14, 15, 16. Weight: 13,1 kg

Program

Davis Tube (DT), separation

Each of the three test samples was ground to two different finenesses. The six ground products were subjected to complete magnetic separation in the Davis Tube.

The DT test is used to determine the content of ferri- and ferromagnetic minerals. Also, it gives information about mineral liberation.

The result of a DT test shows the *potential* for extraction of these minerals. In a continuous process the metallurgical results are often somewhat inferior to those of the DT test. Also, it must be hold in mind that the recovery of hematite in a continuous process has to be done by different methods, often in several steps.

Sinter fines (SF)

The potential for recovery of Sinter Fines from some of the crude ores was examined in two tests.

With each of the two composite test samples a dry magnetic separation test was performed on a Mörtsell separator. The materials were treated as delivered, that is at a fineness of minus 5 mm.

All recovered iron concentrates have been analyzed for 10 elements.

Gangue density was determined on the Blötberget composite sample.

Procedure

Davis Tube tests

The Davis Tube magnetic concentrator consists of a glass tube of 30 mm diameter, inclined at 45 ° adjacent to the air gap between a pair of conical pole pieces. The magnetic field of approximately 0,6 T (6 000 gauss) is produced by a pair of electromagnetic coils. The tube is reciprocated along its axis and simultaneously rotated about 90° around its axis.

Although the field strength is relatively high the DT must be regarded as a low intensity separator, due to the low field gradient.

The sample to be tested is poured into the water filled tube. The tube is oscillated at 100 strokes per minute while a wash water flow of 1 l/min. carries the non-magnetic out of the tube. Separation time is 10 minutes. Depending on its magnetic content, 10 to 20 g of material is treated in a test.

A complete test for recovery of both magnetite and hematite comprises the following steps.

- *Grinding* to desired fineness.
- *Separation of magnetite*. The results of two separate tests are compared and if they agree regarding weight distribution the non-magnetics from the tests is combined into one sample.

- *Reduction of hematite.* The non-magnetic is mixed with charcoal, covered with a layer of charcoal and treated at 500 °C in a covered crucible for 4 hours. Thus the hematite is reduced to "synthetic" magnetite.
- *Separation of "synthetic" magnetite.* The reduced sample is separated in the DT.
- *Oxidation.* The magnetic concentrate is treated at 800 °C for four hours in an open crucible. Thus the "synthetic" magnetite is oxidized back to hematite. Fe^{2+} bound to gangue minerals (silicates) is *not* affected.

The tests can be evaluated by means of chemical analyses of the separated products.[1]

Grinding prior to separation was done in a batch rod mill. 500g samples were ground at 60 per cent solids. See appendices B2 and H2! Grinding times from 10 to 30 minutes were tested.

The following tests have been carried out on the test samples

Blötberget Composite:

- Grinding tests at 10, 20, and 30 minutes grinding time.
- *Test No B2.* 10 minutes grinding and complete DT separation.
- *Test No B3.* 20 minutes grinding and complete DT separation.

Blötberget Hematite:

- Grinding tests at 10, 20, and 30 minutes grinding time.
- *Test No Bh1.* 10 minutes grinding and complete DT separation.
- *Test No Bh3.* 20 minutes grinding and complete DT separation.

Håksberg Composite:

- Grinding tests at 10, 20, and 30 minutes grinding time.
- *Test No H1.* 10 minutes grinding and complete DT separation.
- *Test No H2.* 20 minutes grinding and complete DT separation.

Sinter Fines tests

The upgrading of the crude composite test samples was done on a laboratory Sala-Mörtsell separator. Drum diameter is 280 mm. The set of magnets has 13 poles with 25 mm partition.

Each of the two composite samples from Blötberget and Håksberg was treated in a multi-stage test.

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[1] If the hematite concentrate contains non-liberated particles with magnetite and is analyzed for FeO (i.e. for Fe^{2+}) the result can be misleading (too low). These particles appear as pure hematite in the oxidized product from the second separation.

A sample of the crude material (i.e. as delivered at minus 5 mm) weighing about 4 kg was separated at a low drum speed of 1,5 m/s. The primary magnetic was then separated at increased drum speed, 2,2 m/s. Three more separations at successively higher drum speeds, up to 4,4 m/s was done. See appendices B3 and H3!

The non-magnetic products from steps 1 to 5 and the final magnetic concentrate from step 5 were analyzed for iron and phosphorus. Based on the results recovery-grade graphs could be drawn. These illustrate the potential for SF production from the ores.

Results

All relevant test data and results are to be found in the following appendices.

Blötberget, appendices B1 to B4.

App. B1 *Test materials.* Composition of metallurgical samples 1–9 and test samples: XRF analyses (ALS Minerals).

App. B2:1 *Tests No B2 & B3. DT-tests on Blötberget Composite.* Grinding and separation data. Material and metallurgical balances for Fe, FeO and P.

App. B2:2 *Tests No Bh1 & Bh2. DT-test on Blötberget Hematite.* Ditto.

App. B2:3 *Tests No B2 &B3. DT-tests on Blötberget Composite.* Assays for all elements analyzed.

App. B2:4 *Tests No Bh1 & Bh2. DT-tests on Blötberget hematite.* Ditto.

App. B3:1 *Test No B10. Dry LIM separation of Blötberget Composite.* Test data. Material and metallurgical balances for Fe and P.

App B3:2 *Test No B10. Dry LIM separation of Blötberget Composite.* Graphs illustrating separation results.

App. B3:3 *Test No B10. Dry LIM separation of Blötberget Composite.* Final concentrate. Assays for all elements analyzed.

App. B4 *Grinding tests.* Graph comparing grind ability of Composite and Hematite test samples.

App. B5 *Gangue density of Blötberget Composite.*

Håksberg, appendices H1 to H3.

App. H1 *Test materials.* Composition of metallurgical samples 10–16 and test sample: XRF analyses (ALS Minerals).

App. H2:1 *Tests No H1 & H2. DT-tests on Håksberg Composite.* Grinding and separation data. Material and metallurgical balances for Fe, FeO and P.

App. H2:2 *Tests No H1 & H2. DT-tests on Håksberg Composite.* Assays for all elements analyzed.

App. H3:1 *Test No H10. Dry LIM-separation of Håksberg Composite.* Test data. Material and metallurgical balances for Fe and P.

App. H3:2 *Test No H10. Dry LIM-separation of Håksberg Composite.* Graphs illustrating separation results.

App H3:3 *Test No H10. Dry LIM-separation of Håksberg Composite.* Final concentrate. Assays for all elements analyzed.

Comments

Davis Tube tests

Table 2 shows the summarized results of the DT tests. Complete results can be found in appendices B2 and H2.

Table 2. Summarized results of DT-tests

Test sample	Product	Weight	Fe [%]		P [%]	
Grinding data		[%]	Ass.	Distr.	Ass.	Distr.
Blötberget Comp.	Feed	100,0	34,5	100,0	0,91	100,0
10 min. grinding	Magnetite conc.	39,1	70,6	79,9	0,042	1,8
43 % minus 45 µm	Hematite conc.	7,5	63,0	13,8	0,12	1,0
	Tot. Conc.	46,6	69,4	93,7	0,055	2,8
20 min. grinding	Magnetite conc.	38,0	71,1	78,4	0,025	1,0
75 % minus 45 µm	Hematite conc.	7,3	64,6	13,6	0,046	0,4
	Tot. Conc.	45,3	70,1	92,0	0,028	1,4
Blötberget Hem.	Feed	100,0	36,0	100,0	0,12	100,0
10 min. grinding	Magnetite conc.	11,2	71,5	22,2	0,005	0,5
34 % minus 45 µm	Hematite conc.	37,3	68,7	71,2	0,004	1,2
	Tot. Conc.	48,5	69,3	93,4	0,004	1,7
20 min. grinding	Magnetite conc.	11,1	71,4	22,0	0,006	0,6
65 % minus 45 µm	Hematite conc.	37,1	68,7	70,8	0,003	0,9
	Tot. Conc.	48,2	69,3	92,8	0,004	1,5
Håksberg Comp.	Feed	100,0	30,5	100,0	0,059	100,0
10 min. grinding	Magnetite conc.	30,8	68,7	69,3	0,008	4,2
47 % minus 45 µm	Hematite conc.	10,6	63,0	21,9	0,011	2,0
	Tot. Conc.	41,3	67,2	91,2	0,009	6,1
20 min. grinding	Magnetite conc.	29,7	70,7	68,9	0,004	2,0
76 % minus 45 µm	Hematite conc.	9,9	66,2	21,4	0,006	1,0
	Tot. Conc.	39,6	69,6	90,3	0,004	3,0

Obviously there are no difficulties to obtain saleable pellet feed concentrates from the ores represented by the test samples. Total concentrates (magnetite and hematite) from five of the six tests assay more than 69 % Fe. Iron recovery is high with tailings assaying no more than 5 % Fe in all tests.

The Håksberg Composite is finer grained than the Blötberget test samples and requires finer grinding in order to yield a high grade concentrate. Phosphorus reduction down to less than 0,03 % of the Blötberget Composite also requires fine grinding, down to 75 % minus 45 µm.

All separation products have been analyzed for ten elements including the oxides that make up the bulk of the ores. See appendices B2:3, B2:4 and H2:2! *Table 3* shows these analyses for the total concentrates.

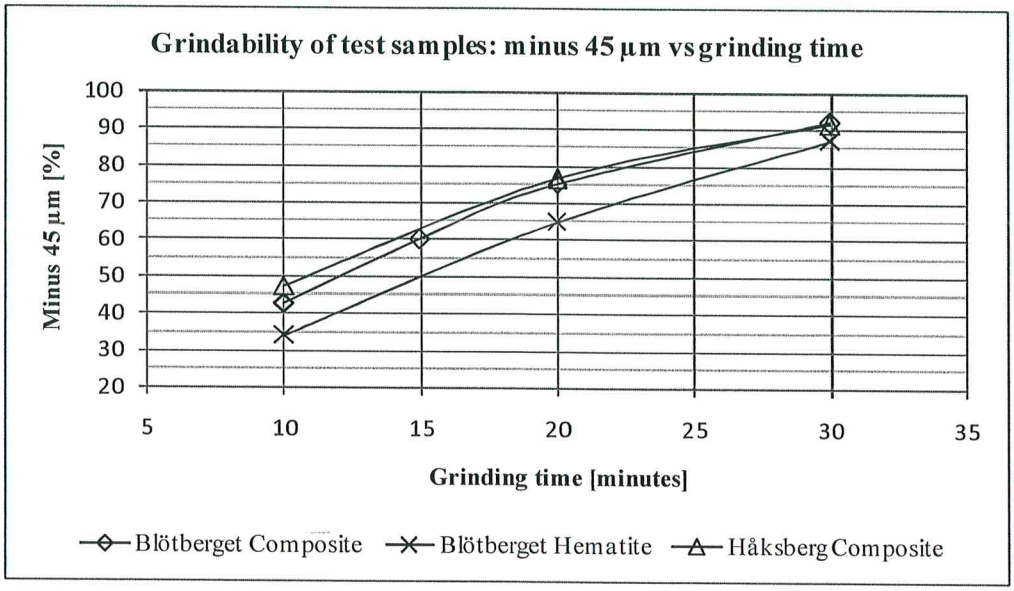
Table 3. Assays of total DT concentrates (magnetite and hematite).

Concentrate.	Grinding time	Assays [%]									
		Fe	FeO	P	SiO_2	Al_2O_3	CaO	MgO	Na_2O	K_2O	V
Blötberget Comp.	10 min.	69,4	26,8	0,055	1,04	1,2	0,33	0,22	0,03	0,06	0,13
Blötberget Comp.	20 min.	70,1	29,2	0,028	0,53	1,1	0,23	0,13	0,01	0,04	0,12
Blötberget Hem.	10 min.	69,3	8,8	0,004	0,21	0,4	0,19	0,06	0,02	0,03	0,01
Blötberget Hem.	20 min.	69,3	9,9	0,004	0,20	0,4	0,19	0,04	0,01	0,02	0,01
Håksberg Comp.	10 min.	67,2	23,9	0,009	3,91	1,4	0,38	0,29	0,12	0,09	<0,03
Håksberg Comp.	20 min.	69,6	25,6	0,004	1,25	1,2	0,30	0,25	0,05	0,05	<0,03

Possibly, the contents of Al_2O_3 and V are in some cases on the limit for a commercial product.

Hematite is usually harder to grind than magnetite. This is illustrated by the phosphorus assays of the two hematite concentrates from Blötberget Composite. The difference in phosphorus content after 10 and 20 minutes grinding is greater for the hematite concentrates than for the magnetite (*Table* 1), meaning that hematite is harder to liberate than magnetite.

Also, the hematite test sample is harder to grind than the composites. See diagram below!



Dry LIM tests

It proved necessary to run the Mörtsell separator at a high speed in order to reach acceptable concentrate iron grades. See appendices B3:2 and H3:2! The separation results are summarized in *Table 4.*

Table 4. Extraction of Sinter Fines by dry LIM separation

Product	Weight	Fe [%]		P [%]	
	[%]	Ass.	Distr.	Ass.	Distr.
Feed: Blötberget Comp.	100,0	34,7	100,0	0,90	100,0
Sinter Fines at 4,4 m/s	26,9	64,8	50,1	0,25	7,5
Non magn. at 4,4 m/s	73,1	23,7	49,9	1,13	92,5
Feed: Håksberg Comp.	100,0	30,3	100,0	0,069	100,0
Sinter Fines at 4,4 m/s	13,0	61,6	26,5	0,030	5,7
Non magn. at 4,4 m/s	87,0	25,6	73,5	0,075	94,3

The limiting factors are obviously the phosphorus content of the Blötberget Composite concentrate and the iron grade of the Håksberg concentrate.

The compositions of the two Sinter Fines concentrates are illustrated in *Table 5.*

Table 5. Assays of Sinter Fines separated at 4,4 m/s.

S F Concentrate extracted from	Assays [%]									
	Fe	FeO	P	SiO_2	Al_2O_3	CaO	MgO	Na_2O	K_2O	V
Blötberget Composite	64,8	28,8	0,25	4,7	1,9	1,5	1,3	0,06	0,2	0,15
Håksberg Composite	61,6	26,9	0,03	10,8	2,1	0,69	0,99	0,18	0,27	0,01

By mixing of the two concentrates it is possible to produce a concentrate assaying more than 62 % Fe and less than 0,07 % P. The proportions, unfortunately, will be biased: 82 % Håksberg and 18 % Blötberget.

Stråssa, August 29, 2011

Mats Sjögren

Per Nordenfelt

DT-TEST ON DRILL-CORE MATERIAL FROM BLÖTBERGET

Appendix B1

Delivered drill core material

Metallurgical sample No	No of core sections	Weight [g]	Assays [%] (calculated from XRF-assays on the individual drill core sections)									
			Fe	SiO_2	Al_2O_3	CaO	MgO	Na_2O	K_2O	TiO_2	P	S
1	6	4681	7,98	63,4	13,17	1,10	2,46	5,03	1,33	0,87	0,06	0,009
2	4	735	22,8	39,0	12,98	5,04	1,25	1,88	5,08	1,01	0,37	0,001
3	3	873	60,6	5,65	0,75	3,90	0,39	0,01	0,03	0,07	1,23	0,002
4	4	1550	35,8	33,4	5,80	3,19	2,97	1,01	1,25	0,30	0,49	0,016
5	5	755	17,4	57,0	8,96	1,66	2,48	2,83	0,93	0,49	0,09	0,084
6	6	5303	17,3	54,5	10,7	1,40	1,26	1,97	3,82	0,85	0,27	0,010
7	5	4985	20,9	51,9	8,62	1,85	1,17	1,19	2,59	1,07	0,61	0,015
8	13	3988	44,7	18,1	1,82	6,56	5,70	0,32	0,47	0,70	1,45	0,009

Selection of test material by successive exlusion of samples with low iron grade.

Metallurgical sample No	Weight [g]	Assays [%] (calculated from table above)									
		Fe	SiO_2	Al_2O_3	CaO	MgO	Na_2O	K_2O	TiO_2	P	S
Alll samples, **1-8**	22870	24,0	45,72	8,50	2,68	2,38	2,02	2,08	0,81	0,55	0,013
2, 3, 4, 5, 6, 7, 8	18189	28,2	41,15	7,30	3,09	2,36	1,25	2,28	0,79	0,68	0,014
2, 3, 4, 5, 7, 8	12886	32,7	35,64	5,91	3,78	2,82	0,96	1,64	0,76	0,85	0,016
Composite sample, selected for metallurgical tests											
2, 3, 4, 7, 8	**12131**	**33,6**	**34,3**	**5,72**	**3,91**	**2,84**	**0,84**	**1,69**	**0,78**	**0,90**	**0,012**
2, 3, 4, 8	7146	42,5	22,05	3,70	5,35	4,00	0,59	1,06	0,57	1,10	0,009
3, 4, 8	6411	44,7	20,11	2,64	5,38	4,32	0,45	0,60	0,52	1,19	0,010
3, 8	4861	47,6	15,88	1,63	6,08	4,75	0,27	0,39	0,59	1,41	0,008
3	873	60,6	5,65	0,75	3,90	0,39	0,013	0,028	0,074	1,2	0,002

Hematite sample, selected for metallurgicat tests												
Metallurgical sample No	No of core sections	Weight [g]	Assays [%] (calculated from XRF-assays on the individual drill core sections)									
			Fe	SiO_2	Al_2O_3	CaO	MgO	Na_2O	K_2O	TiO_2	P	S
9	6	**2377**	**36,4**	**36,4**	**5,59**	**0,60**	**0,63**	**1,11**	**2,71**	**0,48**	**0,13**	**0,007**

DT-TEST ON DRILL-CORE MATERIAL FROM BLÖTBERGET

Appendix B2:1

Composite sample (met. samples Nos 2, 3, 4, 7, 8)

Grinding and separation on the Davis Tube

Grinding — Composite ore, crushed to minus 3 mm.

Mill — Batch mill: diam. 200 mm, length 300 mm. Speed: 60 rpm.
Grinding media: 10 pcs of 25 mm rods, 9,75 kg.

Test — 500 g of crushed ore was ground at 60 % solids by wt.
Variable grinding time.

Screen analyses, cumulative weight per cent through.

Aperture [µm]	[mesh]	Grinding time [minutes] **10**	15	**20**	30
300	50	100,0			
212	70	99,9	100,0		
150	100	98,8	99,8	100,0	100,0
106	140	90,0	98,2	99,5	99,9
75	200	29,5	89,6	96,7	99,2
53	270	48,5	67,8	82,7	95,4
45	**325**	**42,6**	**59,8**	**75,0**	**91,8**
38	400	34,6	48,9	62,0	82,2
d_{80} [µm]		88	64	49	~36

Separation tests on the Davis Tube

Low intensity magnetic separation in two steps on ore ground to 43 and 75 % minus 45 µm
1) Separation of magnetite.
2) Reduction of hematite content of non-magn from step 1 followed by separation of "synthetic" magnetite.

Material balance and metallurgical balances for Fe, FeO and P.

Test No B2. Grinding time 10 min. Products		Weight [%]	$Fe_{(tot)}$ [%] ass.	$Fe_{(tot)}$ [%] distr.	FeO [%] ass.	FeO [%] distr.	P [%] ass.	P [%] distr.
Feed, fineness 43 % -45 µm	anal	100,0	34,5	100,0	14,7	100,0	0,91	100,0
Magnetite product	anal	39,1	70,6	79,9	31,9	84,8	0,042	1,8
Primary non-magnetic	calc	60,9	11,4	20,1	3,7	15,2	1,47	98,2
Hematite product	anal	7,5	63,0	13,8	0,2	0,1	0,12	1,0
Total concentrates	calc	46,6	69,4	93,7	26,8	84,9	0,055	2,8
Tailings	calc	53,4	4,1	6,3	4,2	15,1	1,66	97,2

Test No B3. Grinding time 20 min. Products		Weight [%]	$Fe_{(tot)}$ [%] ass.	$Fe_{(tot)}$ [%] distr.	FeO [%] ass.	FeO [%] distr.	P [%] ass.	P [%] distr.
Feed, fineness 75 % -45 µm	anal	100,0	34,5	100,0	14,7	100,0	0,91	100,0
Magnetite product	anal	38,0	71,1	78,4	34,8	90,0	0,025	1,0
Primary non-magnetic	calc	62,0	12,0	21,6	2,4	10,0	1,45	99,0
Hematite product	anal	7,3	64,6	13,6	0,2	0,1	0,046	0,4
Total concentrates	calc	45,3	70,1	92,0	29,2	90,1	0,028	1,4
Tailings	calc	54,7	5,0	8,0	2,7	9,9	1,64	98,6

DT-TEST ON DRILL-CORE MATERIAL FROM BLÖTBERGET

Appendix B2:2

Hematite sample (met. sample No 9)

Grinding and separation on the Davis Tube

Grinding — Hematite ore. crushed to minus 3 mm.

Mill — Batch mill: diam. 200 mm, length 300 mm. Speed: 60 rpm.
Grinding media: 10 pcs of 25 mm rods, 9,75 kg.

Test — 500 g of crushed ore was ground at 60 % solids by wt.
Variable grinding time.

Screen analyses, cumulative weight per cent through.

Aperture [µm]	[mesh]	Grinding time [minutes] **10**	**20**	30
300	50	100,0		
212	70	99,8		
150	100	96,7	100,0	100,0
106	140	79,0	99,3	99,9
75	200	55,1	93,2	98,9
53	270	38,9	73,9	92,7
45	**325**	**33,9**	**64,7**	**86,9**
38	400	27,5	53,3	75,1
d_{80} [µm]		82	58	41

Separation tests on the Davis Tube

Low intensity magnetic separation in two steps on ore ground to 34 and 65 % minus 45 µm
1) Separation of magnetite.
2) Reduction of hematite content of non-magn from step 1 followed by separation of "synthetic" magnetite.

Material balance and metallurgical balances for Fe, FeO and P.

Test No Bh1. Grinding time 10 min. Products		Weight [%]	$Fe_{(tot)}$ [%] ass.	$Fe_{(tot)}$ [%] distr.	FeO [%] ass.	FeO [%] distr.	P [%] ass.	P [%] distr.
Feed, fineness 34 % -45 µm	anal	100,0	36,0	100,0	6,9	100,0	0,12	100,0
Magnetite product	anal	11,2	71,5	22,2	36,2	58,8	0,005	0,5
Primary non-magnetic	calc	88,8	31,5	77,8	3,2	41,2	0,13	99,5
Hematite product	anal	37,3	68,7	71,2	0,6	3,0	0,004	1,2
Total concentrates	calc	48,5	69,3	93,4	8,8	61,7	0,004	1,7
Tailings	calc	51,5	4,6	6,6	5,1	38,3	0,23	98,3

Test No Bh3. Grinding time 20 min. Products		Weight [%]	$Fe_{(tot)}$ [%] ass.	$Fe_{(tot)}$ [%] distr.	FeO [%] ass.	FeO [%] distr.	P [%] ass.	P [%] distr.
Feed, fineness 65 % -45 µm	anal	100,0	36,0	100,0	6,9	100,0	0,12	100,0
Magnetite product	anal	11,1	71,4	22,0	42,1	67,7	0,006	0,6
Primary non-magnetic	calc	88,9	31,6	78,0	2,5	32,3	0,13	99,4
Hematite product	anal	37,1	68,7	70,8	0,3	1,5	0,003	0,9
Total concentrates	calc	48,2	69,3	92,8	9,9	69,2	0,004	1,5
Tailings	calc	51,8	5,0	7,2	4,1	30,8	0,23	98,5

Composite sample (met. samples Nos 2, 3, 4, 7, 8)

Separation tests on the Davis Tube. Assays for all elements analysed.

Test No B2. Grinding time 10 min.		Weight	Assays [%]									
Products		[%]	Fe	FeO	P	SiO_2	Al_2O_3	CaO	MgO	Na_2O	K_2O	V
Feed, fineness 43 % -45 µm	anal	100,0	34,5	14,7	0,91	32,3	5,8	3,9	2,8	0,85	1,9	0,08
Magnetite product	anal	39,1	70,6	31,9	0,042	0,80	1,2	0,27	0,19	0,013	0,046	0,13
Primary non-magnetic	calc	60,9	11,4	3,7	1,47	52,5	8,7	6,2	4,5	1,39	3,1	0,05
Hematite product	anal	7,5	63,0	0,2	0,12	2,28	1,3	0,65	0,38	0,10	0,16	0,15
Total concentrates	calc	46,6	69,4	26,8	0,055	1,04	1,2	0,33	0,22	0,027	0,064	0,13
Tailings	calc	53,4	4,1	4,2	1,66	59,6	9,8	7,0	5,1	1,57	3,5	0,03

Test No B3. Grinding time 20 min.		Weight	Assays [%]									
Products		[%]	Fe	FeO	P	SiO_2	Al_2O_3	CaO	MgO	Na_2O	K_2O	V
Feed, fineness 75 % -45 µm	anal	100,0	34,5	14,7	0,91	32,3	5,8	3,9	2,8	0,85	1,9	0,08
Magnetite product	anal	38,0	71,1	34,8	0,025	0,44	1,1	0,21	0,12	0,007	0,029	0,12
Primary non-magnetic	calc	62,0	12,0	2,4	1,45	51,8	8,7	6,2	4,4	1,37	3,0	0,06
Hematite product	anal	7,3	64,6	0,2	0,046	1,01	1,2	0,36	0,16	0,03	0,078	0,15
Total concentrates	calc	45,3	70,1	29,2	0,028	0,53	1,1	0,23	0,13	0,010	0,037	0,12
Tailings	calc	54,7	5,0	2,7	1,64	58,6	9,7	6,9	5,0	1,55	3,4	0,04

Hematite sample (met. sample No 9)

Separation tests on the Davis Tube. Assays for all elements analysed.

Test No Bh1. Grinding time 10 min.		Weight	Assays [%]									
Products		[%]	Fe	FeO	P	SiO_2	Al_2O_3	CaO	MgO	Na_2O	K_2O	V
Feed, fineness 34 % -45 µm	anal	100,0	36,0	6,9	0,12	37,9	5,4	0,75	0,60	1,1	2,9	<0,02
Magnetite product	anal	11,2	71,5	36,2	0,005	0,40	0,33	0,24	0,055	0,013	0,024	<0,01
Primary non-magnetic	calc	88,8	31,5	3,2	0,13	42,6	6,0	0,81	0,67	1,2	3,3	-
Hematite product	anal	37,3	68,7	0,6	0,004	0,15	0,44	0,17	0,055	0,016	0,031	0,01
Total concentrates	calc	48,5	69,3	8,8	0,004	0,21	0,4	0,19	0,06	0,015	0,029	0,01
Tailings	calc	51,5	4,6	5,1	0,23	73,4	10,1	1,3	1,11	2,1	5,6	-

Test No Bh3. Grinding time 20 min.		Weight	Assays [%]									
Products		[%]	Fe	FeO	P	SiO_2	Al_2O_3	CaO	MgO	Na_2O	K_2O	V
Feed, fineness 65 % -45 µm	anal	100,0	36,0	6,9	0,12	37,9	5,4	0,75	0,60	1,1	2,9	<0,02
Magnetite product	anal	11,1	71,4	42,1	0,006	0,35	0,23	0,21	0,048	0,017	0,020	<0,01
Primary non-magnetic	calc	88,9	31,6	2,5	0,13	42,6	6,0	0,82	0,67	1,2	3,3	-
Hematite product	anal	37,1	68,7	0,3	0,003	0,15	0,44	0,18	0,043	0,013	0,023	0,01
Total concentrates	calc	48,2	69,3	9,9	0,004	0,20	0,4	0,19	0,04	0,014	0,022	0,01
Tailings	calc	51,8	5,0	4,1	0,23	73,0	10,1	1,3	1,12	2,1	5,6	-

DT-TEST ON DRILL-CORE MATERIAL FROM BLÖTBERGET

Appendix B3:1

Composite sample (met. samples nr 2, 3, 4, 7, 8)

Dry LIM separation of crushed drill core material
Attempt to produce sinter fines.

Fineness of material: 100 % minus 4 mm, 96 % minus 3,36 mm

Separator: Sala Mörtsell laboratory test type. Drum diam. 280, drum length 250 mm.

Test No B10, separation in five steps with re-separation of concentrates.

Step	Shaft speed [min-1]	Periph. speed [m/s]	Products		Weight [kg]	Weight [%]	Fe [%] ass.	Fe [%] distr.	P [%] ass.	P [%] distr.
1	100	1,5	Feed	anal			34,5		0,91	
			Feed	calc	3,88	100,0	34,7	100,0	0,90	100,0
			Magn 1	calc	2,39	61,6	48,1	85,5	0,51	35,0
			Non mag 1	anal	1,49	38,4	13,1	14,5	1,52	65,0
2	150	2,2	Magn 2	calc	2,05	52,8	52,8	80,3	0,47	27,7
			Non mag 2	anal	0,34	8,9	20,4	5,2	0,73	7,2
			Non mag 1-2	calc	1,83	47,2	14,5	19,7	1,37	72,3
3	200	2,9	Magn 3	calc	1,72	44,4	57,3	73,4	0,44	22,0
			Non mag 3	anal	0,32	8,3	28,9	7,0	0,62	5,8
			Non mag 1-3	calc	2,15	55,6	16,6	26,6	1,26	78,0
4	250	3,7	Magn 4	calc	1,43	36,9	61,2	65,0	0,38	15,6
			Non mag 4	anal	0,29	7,5	38,3	8,3	0,76	6,4
			Non mag 1-4	calc	2,45	63,1	19,2	35,0	1,20	84,4
5	300	4,4	**Magn 5***	anal	1,04	**26,9**	64,8	**50,1**	0,25	**7,5**
			Non mag 5	anal	0,39	10,0	51,5	14,9	0,72	8,1
			Non mag 1-5	calc	2,84	73,1	23,7	49,9	1,13	92,5

*Magn 5, sinter fines, analyses [%]

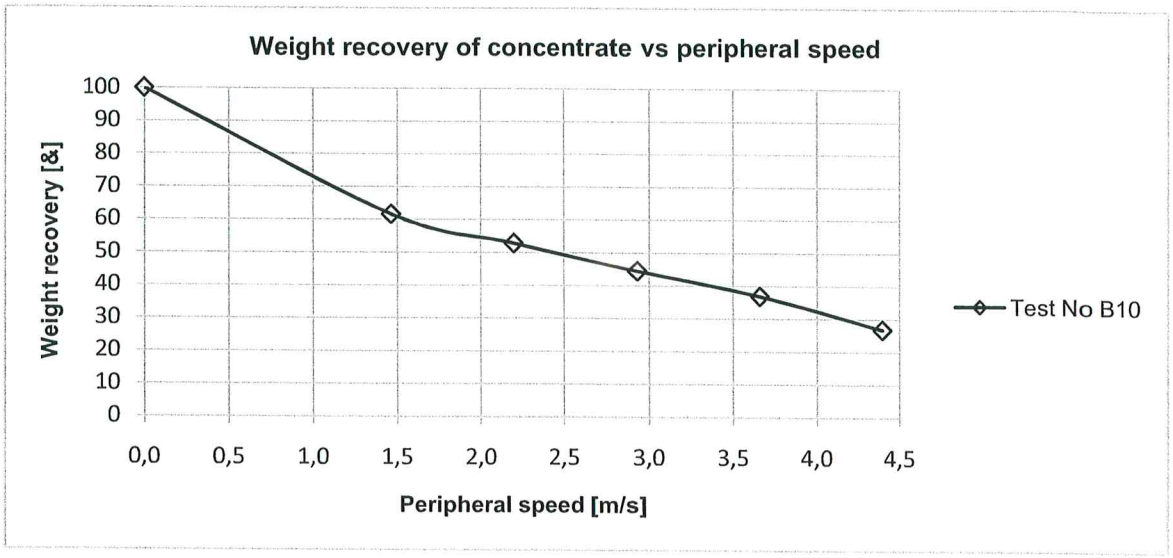
FeO	28,8
SiO_2	4,7
Al_2O_3	1,9
CaO	1,5
MgO	1,3
Na_2O	0,062
K_2O	0,20
V	0,15

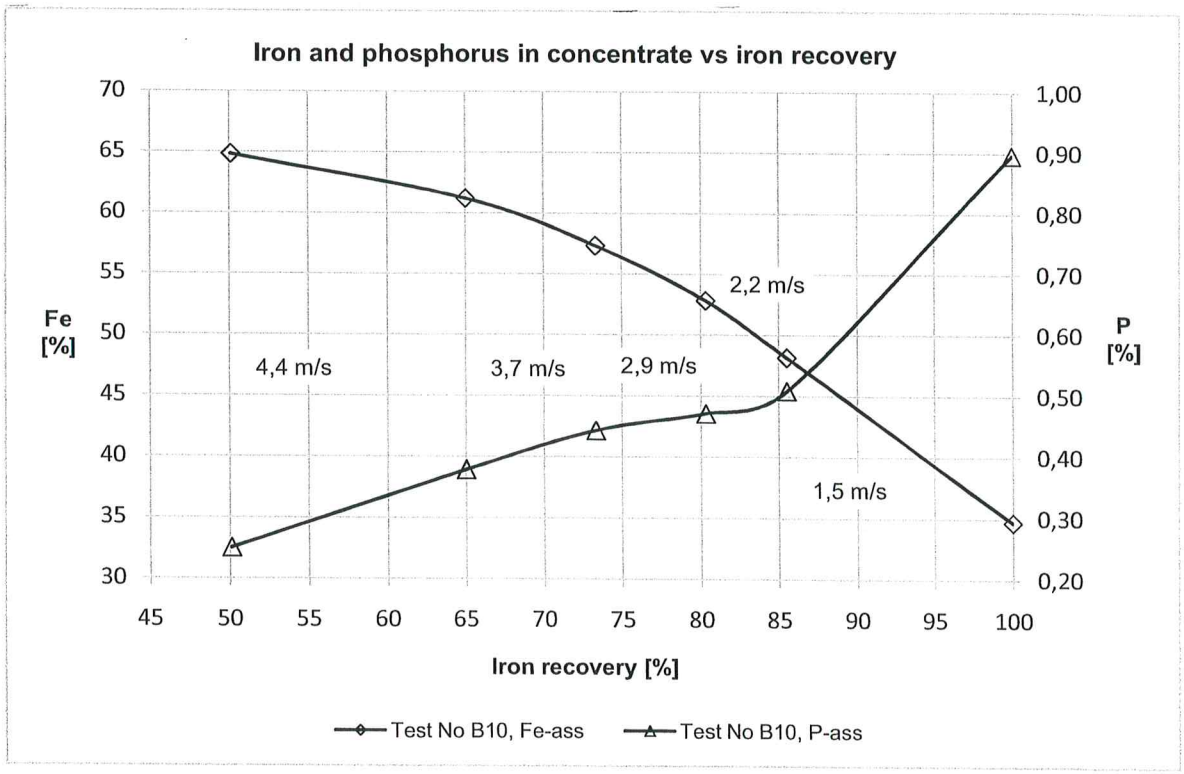
DT-TEST ON DRILL-CORE MATERIAL FROM BLÖTBERGET

Appendix B3:2

Composite sample (met. samples nr 2, 3, 4, 7, 8)

Test No B10 Dry LIM separation of crushed drill core material





DT-TEST ON DRILL-CORE MATERIAL FROM BLÖTBERGET

Appendix B3:3

Composite sample (met. samples nr 2, 3, 4, 7, 8)

Dry LIM separation of crushed drill core material. Assays for all elements analysed.

Test No B10, final concentrate after five steps

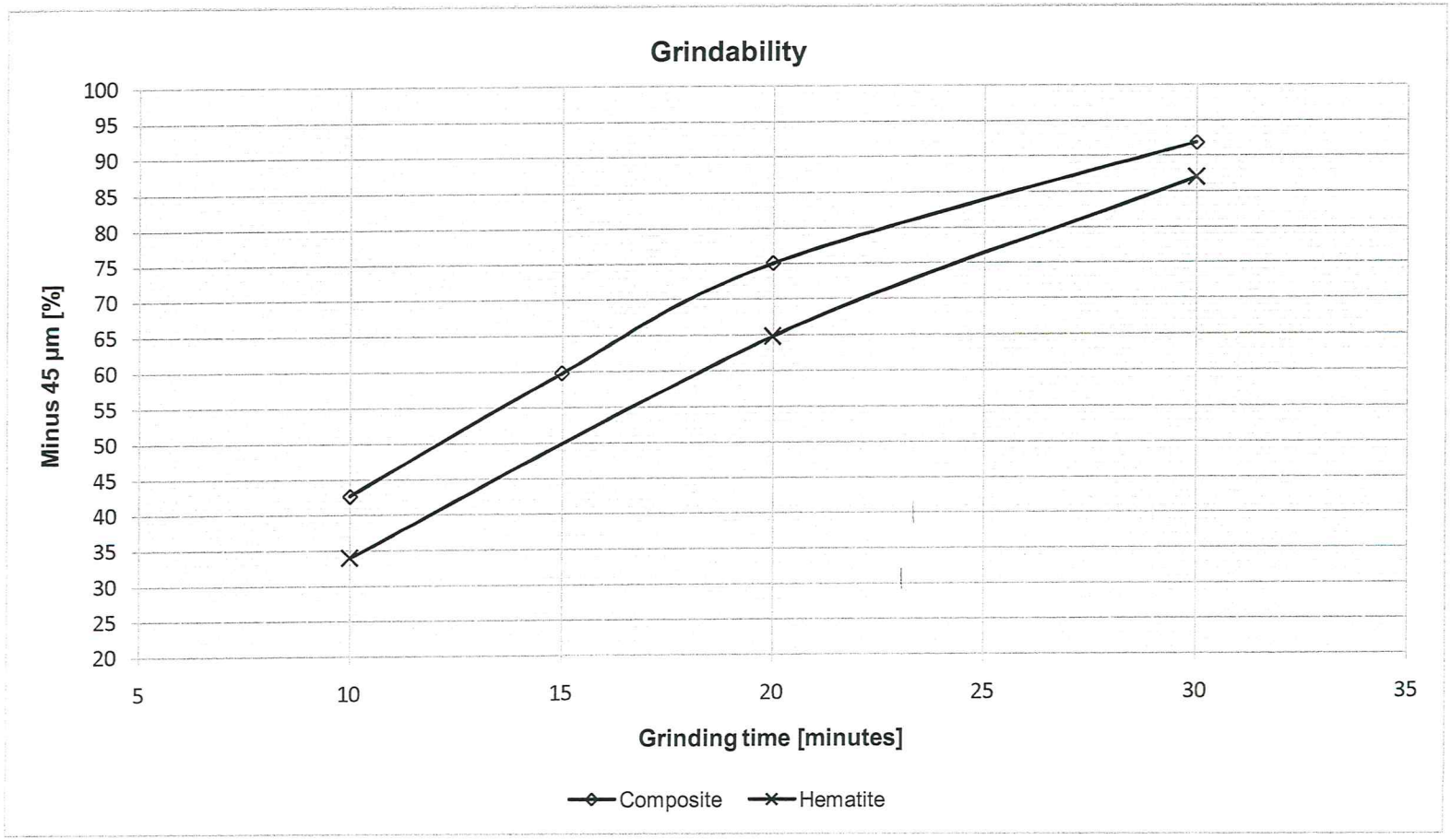
Shaft speed [min-1]	Periph. speed [m/s]	Products		Weight [%]	Assays [%]									
					Fe	FeO	P	SiO_2	Al_2O_3	CaO	MgO	Na_2O	K_2O	V
300	4,4	Feed	anal	100,0	34,5	14,7	0,91	32,3	5,8	3,9	2,8	0,85	1,9	0,08
		Magn 5, sinter fines	anal	26,9	64,8	**28,8**	0,25	**4,7**	**1,9**	**1,5**	**1,3**	**0,062**	**0,20**	**0,15**
		Non mag 1-5	calc	73,1	23,4	9,5	1,15	42,4	7,2	4,8	3,4	1,1	2,5	0,05

DT-TEST ON DRILL-CORE MATERIAL FROM BLÖTBERGET

Appendix B4

Composite sample and hematite sample (met. samples Nos 2, 3, 4, 7, 8 and met sample No 9)

Comparison of grindability



Composite sample (met. samples Nos 2, 3, 4, 7, 8)

Determination of gangue density.

The density of the composite sample has been determined in a Beckman gas pycnometer.

Oxide iron, i.e. iron bound in magnetite and hematite, is soluble in HCl, iron in gange minerals, as a rule, is not.
The composite sample has been analysed for its total iron content, Fe_{tot} and for iron soluble in HCl, Fe_{HCl}.

Known values are: material mass, Fe-contents of the iron oxides, densities of the iron oxides.

The distribution of iron in magnetite and hematite respectively is not known exact. However, a good aproximation would be the relation between iron distributions in the magnetite and hematite concentrates of the DT tests.

The result is illustrated in the matrix below.

85,2 % of oxide iron bound to magnetite (i.e, mean value of tests No 2 and 3)

Composite sample		Material	Magnetite	Hematite	Gangue
Assay: Fe_{HCl}	[%]	33,7	72,36	69,94	0,00
Assay: Fe_{tot}	[%]	34,5	72,36	69,94	1,50
Mass	[kg]	1,00	0,397	0,071	0,532
Volume	[l]	0,276	0,077	0,014	0,186
Density	[kg/l]	3,62	5,15	5,25	**2,87**

Remark:
If all HCl-soluble iron is assumed to be bound in magnetite the calculation would result in a gangue density of 2,88 kg/l.
If all HCl-soluble iron is assumed to be bound in hematite the calculation would result in a gangue density of 2,81 kg/l.

DT-TEST ON DRILL-CORE MATERIAL FROM HÅKSBERG

Appendix H1

Delivered drill core material

Metallurgical sample No	No of core sections	Weight [g]	Assays [%] (calculated from XRF-assays on the individual drill core sections)										
			Fe	SiO_2	Al_2O_3	CaO	MgO	Na_2O	K_2O	TiO_2	P	S	V
10	6	4901	18,4	50,7	10,7	2,87	3,30	1,22	2,26	0,93	0,121	0,006	0,021
11	3	2471	29,7	41,0	7,51	2,27	3,08	1,40	1,23	0,58	0,093	0,002	0,012
12	8	5396	25,4	47,6	7,51	2,38	2,95	1,33	1,48	0,31	0,059	0,014	0,007
13	2	1074	34,1	38,3	5,15	1,38	4,05	0,87	1,43	0,25	0,069	0,001	0,007
14	8	6014	27,2	44,1	7,94	1,69	3,17	1,69	1,67	0,46	0,078	0,003	0,008
15	3	2024	31,6	36,9	4,74	7,72	3,98	0,40	0,62	0,25	0,038	0,017	0,007
16	3	1560	32,9	39,1	5,52	4,22	2,64	1,09	0,34	0,50	0,052	0,062	0,015

Selection of test material by successive exlusion of samples with low iron grade.

Metallurgical sample No	Weight [g]	Assays [%] (calculated from table above)										
		Fe	SiO_2	Al_2O_3	CaO	MgO	Na_2O	K_2O	TiO_2	P	S	V
Alll samples, **10-16**	23440	26,3	44,7	7,81	2,83	3,21	1,29	1,51	0,51	0,079	0,011	0,011
11, 12, 13, 14, 15, 16	18538	28,4	43,2	7,04	2,82	3,19	1,31	1,31	0,40	0,068	0,012	0,009
Composite sample, selected for metallurgical tests												
11, 13, 14, 15, 16	**13143**	**29,6**	**41,4**	**6,85**	**3,00**	**3,28**	**1,30**	**1,25**	**0,44**	**0,071**	**0,012**	**0,010**
11, 13, 15, 16	7129	31,6	39,0	5,93	4,11	3,38	0,97	0,89	0,42	0,065	0,019	0,010
13, 15, 16	4658	32,6	38,0	5,09	5,09	3,55	0,74	0,71	0,33	0,050	0,028	0,010
13, 16	2634	33,4	38,8	5,37	3,07	3,22	1,00	0,78	0,40	0,059	0,037	0,012
13	1074	34,1	38,3	5,15	1,38	4,05	0,87	1,43	0,25	0,069	0,001	0,007

DT-TEST ON DRILL-CORE MATERIAL FROM HÅKSBERG

Appendix H2:1

Composite sample (met. samples Nos 11, 13, 14, 15, 16)

Grinding and separation on the Davis Tube

Grinding — Composite ore, crushed to minus 3 mm.

Mill — Batch mill: diam. 200 mm, length 300 mm. Speed: 60 rpm.
Grinding media: 10 pcs of 25 mm rods, 9,75 kg.

Test — 500 g of crushed ore was ground at 60 % solids by wt.
Variable grinding time.

Screen analyses, cumulative weight per cent through.

Aperture [µm]	[mesh]	Grinding time [minutes] **10**	**20**	30
300	50	100,0		
212	70	99,9		
150	100	99,0	100,0	100,0
106	140	93,5	99,4	99,8
75	200	74,7	96,3	98,7
53	270	53,5	83,9	94,7
45	**325**	**47,2**	**76,4**	**91,4**
38	400	37,8	63,7	81,1
d_{80} [µm]		80	48	~36

Separation tests on the Davis Tube

Low intensity magnetic separation in two steps on ore ground to 43 and 75 % minus 45 µm
1) Separation of magnetite.
2) Reduction of hematite content of non-magn from step 1 followed by separation of "synthetic" magnetite.

Material balance and metallurgical balances for Fe, FeO and P.

Test No H1. Grinding time 10 min. Products		Vikt [%]	$Fe_{(tot)}$ [%] ass	$Fe_{(tot)}$ [%] distr	FeO [%] ass	FeO [%] distr	P [%] ass	P [%] distr
Feed, fineness 47 % -45 µm	anal	100,0	30,5	100,0	12,8	100,0	0,059	100,0
Magnetite product	anal	30,8	68,7	69,3	32,0	76,9	0,008	4,2
Primary non-magnetic	calc	69,2	13,5	30,7	4,3	23,1	0,082	95,8
Hematite product	anal	10,6	63,0	21,9	0,53	0,4	0,011	2,0
Total concentrates	calc	41,3	67,2	91,2	23,9	77,4	0,009	6,1
Tailings	calc	58,7	4,6	8,8	4,9	22,6	0,094	93,9

Test No H2. Grinding time 20 min. Produkter		Vikt [%]	$Fe_{(tot)}$ [%] ass	$Fe_{(tot)}$ [%] distr	FeO [%] ass	FeO [%] distr	P [%] ass	P [%] distr
Feed, fineness 76 % -45 µm	anal	100,0	30,5	100,0	12,8	100,0	0,059	100,0
Magnetite product	anal	29,7	70,7	68,9	34,0	78,9	0,004	2,0
Primary non-magnetic	calc	70,3	13,5	31,1	3,8	21,1	0,082	98,0
Hematite product	anal	9,9	66,2	21,4	0,43	0,3	0,006	1,0
Total concentrates	calc	39,6	69,6	90,3	25,6	79,3	0,004	3,0
Tailings	calc	60,4	4,9	9,7	4,4	20,7	0,095	97,0

Composite sample (met. samples Nos 11, 13, 14, 15, 16)

Separation tests on the Davis Tube. Metallurgical balances for all elements analysed.

Test No H1. Grinding time 10 min.		Weight	Assays [%]									
Products		[%]	Fe	FeO	P	SiO_2	Al_2O_3	CaO	MgO	Na_2O	K_2O	V
Feed, fineness 47 % -45 µm	anal	100,0	30,5	12,8	0,059	39,3	7,1	3,0	3,0	1,3	1,5	<0,01
Magnetite product	anal	30,8	68,7	32,0	0,008	3,5	1,4	0,33	0,28	0,085	0,070	<0,01
Primary non-magnetic	calc	69,2	13,5	4,3	0,082	55,2	9,6	4,2	4,2	1,8	2,1	-
Hematite product	anal	10,6	63,0	0,53	0,011	5,1	1,5	0,51	0,33	0,21	0,16	0,03
Total concentrates	calc	41,3	67,2	23,9	0,009	3,91	1,4	0,38	0,29	0,12	0,093	<0,03
Tailings	calc	58,7	4,6	4,9	0,094	64,3	11,1	4,8	4,9	2,1	2,5	-

Test No H2. Grinding time 20 min.		Weight	Assays [%]									
Produkter		[%]	Fe	FeO	P	SiO_2	Al_2O_3	CaO	MgO	Na_2O	K_2O	V
Feed, fineness 76 % -45 µm	anal	100,0	30,5	12,8	0,059	39,3	7,1	3,0	3,0	1,3	1,5	<0,01
Magnetite product	anal	29,7	70,7	34,0	0,004	1,2	1,3	0,32	0,26	0,038	0,041	<0,01
Primary non-magnetic	calc	70,3	13,5	3,8	0,082	55,4	9,6	4,1	4,2	1,83	2,1	-
Hematite product	anal	9,9	66,2	0,43	0,006	1,4	0,80	0,23	0,20	0,077	0,071	0,03
Total concentrates	calc	39,6	69,6	25,6	0,004	1,25	1,2	0,30	0,25	0,05	0,048	<0,03
Tailings	calc	60,4	4,9	4,4	0,095	64,2	11,0	4,8	4,8	2,12	2,5	-

DT-TEST ON DRILL-CORE MATERIAL FROM HÅKSBERG

Composite sample (met. samples Nos 11, 13, 14, 15, 16)

Dry LIM separation of crushed drill core material
Attempt to produce sinter fines.

Fineness of material: 100 % minus 5 mm.

Separator: Sala Mörtsell laboratory test type. Drum diam. 280, drum length 250 mm.

Test No H10, separation in five steps with re-separation of concentrates.

Step	Shaft speed [min-1]	Periph. speed [m/s]	Products		Weight [kg]	Weight [%]	Fe [%] ass.	Fe [%] distr.	P [%] ass.	P [%] distr.
1	100	1,5	Feed	anal			30,5		0,059	
			Feed	calc	3,53	100,0	30,3	100,0	0,069	100,0
			Magn 1	calc	1,92	54,3	42,9	77,1	0,059	46,4
			Non mag 1	anal	1,61	45,7	15,2	22,9	0,081	53,6
2	150	2,2	Magn 2	calc	1,61	45,5	46,8	70,3	0,055	36,5
			Non mag 2	anal	0,31	8,8	23,2	6,8	0,078	9,9
			Non mag 1-2	calc	1,92	54,5	16,5	29,7	0,081	63,5
3	200	2,9	Magn 3	calc	1,27	36,0	50,5	60,0	0,053	27,4
			Non mag 3	anal	0,33	9,5	32,7	10,3	0,066	9,1
			Non mag 1-3	calc	2,26	64,0	18,9	40,0	0,078	72,6
4	250	3,7	Magn 4	calc	0,83	23,4	55,7	43,1	0,043	14,7
			Non mag 4	anal	0,44	12,6	40,7	16,9	0,070	12,7
			Non mag 1-4	calc	2,70	76,6	22,5	56,9	0,077	85,3
5	300	4,4	**Magn 5***	anal	0,46	**13,0**	**61,6**	**26,5**	**0,030**	**5,7**
			Non mag 5	anal	0,37	10,4	48,3	16,6	0,060	9,0
			Non mag 1-5	calc	3,07	87,0	25,6	73,5	0,075	94,3

*Magn 5, sinter fines, analyses [%]

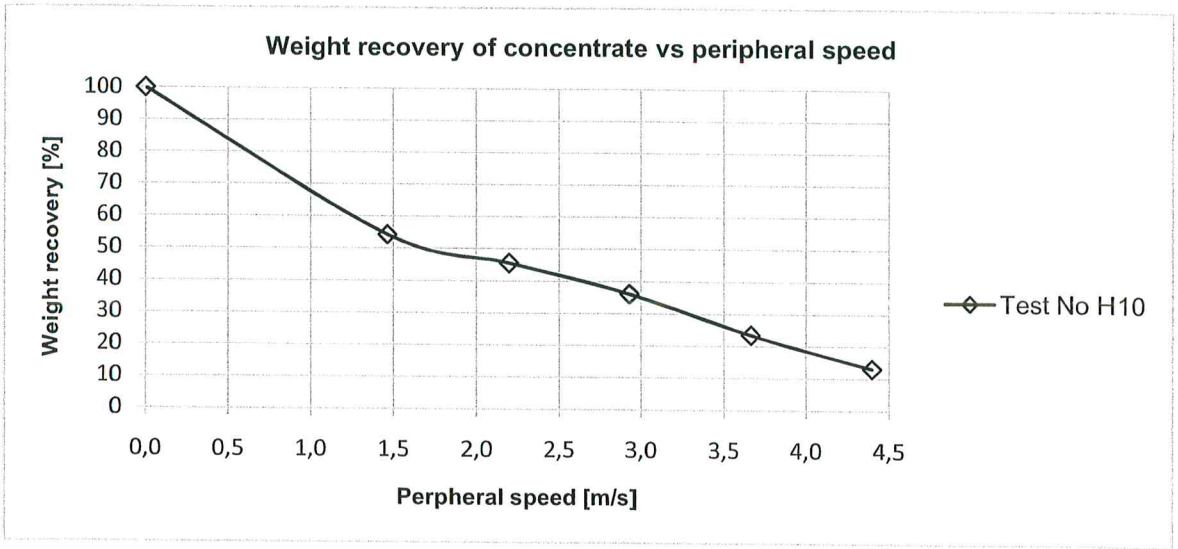
FeO	26,9
SiO_2	10,8
Al_2O_3	2,1
CaO	0,69
MgO	0,99
Na_2O	0,18
K_2O	0,27
V	0,01

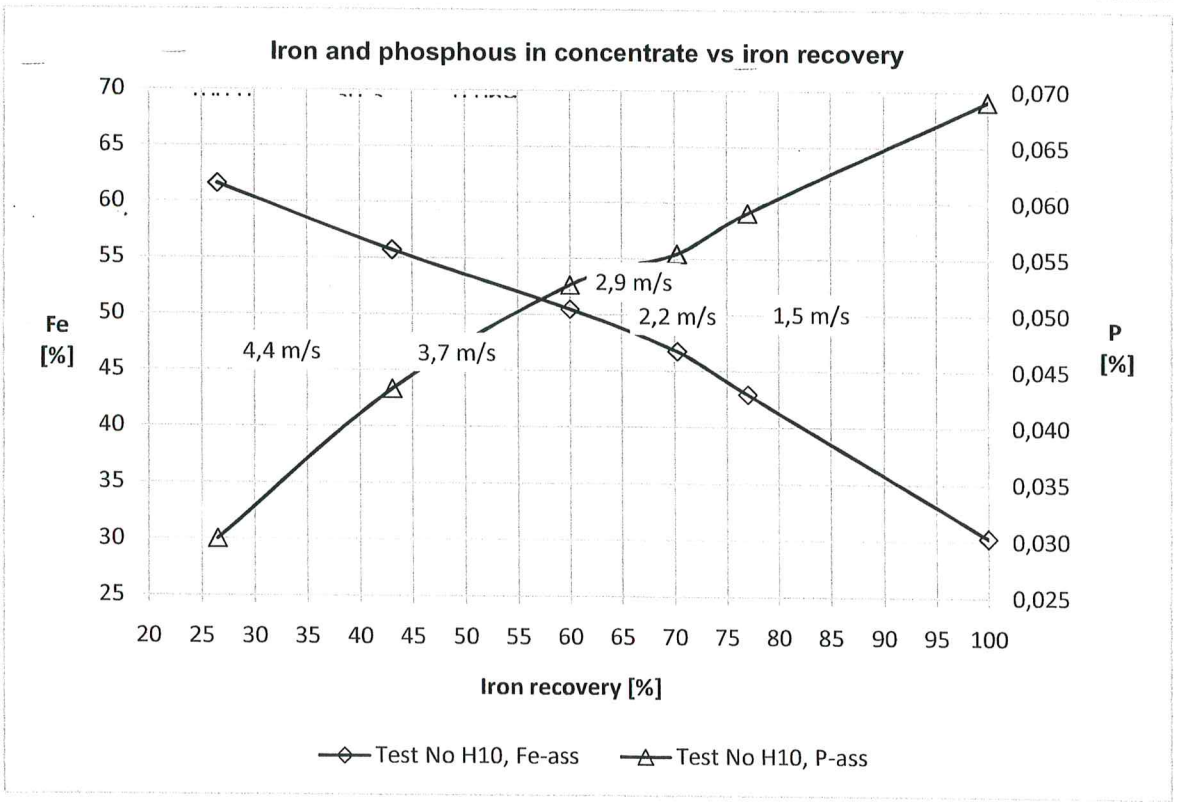
DT-TEST ON DRILL-CORE MATERIAL FROM HÅKSBERG

Appendix H3:2

Composite sample (met. samples Nos 11, 13, 14, 15, 16)

Test No H10 Dry LIM separation of crushed drill core material





DT-TEST ON DRILL-CORE MATERIAL FROM HÅKSBERG

Composite sample (met. samples Nos 11, 13, 14, 15, 16)

Dry LIM separation of crushed drill core material. Metallurgical balances for all elements analysed.

Test No H10, final concentrate after five steps

Shaft speed [min-1]	Periph. speed [m/s]	Products		Weight [%]	Assays [%]									
					Fe	FeO	P	SiO_2	Al_2O_3	CaO	MgO	Na_2O	K_2O	V
300	4,4	Feed	anal	100,0	30,5	12,8	0,059	39,3	7,1	3,0	3,0	1,3	1,5	<0,01
		Magn 5, sinter fines	anal	13,0	61,6	**26,9**	0,030	**10,8**	**2,1**	**0,69**	**0,99**	**0,18**	**0,27**	**0,01**
		Non mag 1-5	calc	87,0	25,8	10,7	0,063	43,6	7,8	3,3	3,3	1,5	1,7	>0,01