



Dept/ Name, phone, e-mail

Date

Page

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2006-11-25

1(3)

Distr: D661, D513, D516, D511, Appro, Clyde

Copy: D5, D66

VISIT FROM APPRO AND CLYDE 06-11-21

Personal:	Gordon Russel	Clyde
	Björn Alme'n	Appro
	Lena Nordlund	Häggglunds
	Torsten Svensson	"
	Nils Nilsson	"

1. Summary

The Screw M16x190-12.9 has laps in the threads in the first delivery.
The certificates from Clyde show big differences in hardness from HRC=38 to 43.

Activities: The both batches shall be returned to Appro – Clyde for investigations regarding:

- hardness
- laps
- damages
- cracks

Regarding the Screw M16x270-12.9 serial deliveries have already been started so it is important that Clyde quickly investigates if there is some laps in the threads.

Sealing the thread with Loctite is in test.

2. Screw M16x190-12.9 and screw M16x270-12.9

2.1 Result of test pieces

The result see appendix 1.

Corrections:

The corrections see appendix 2.

The tempering temperature has been decreased 10⁰C to reach a higher tensile strength. The internal hardness limits is now HRC= 41 to 43.

The radius has been adjusted.

2.2 Result of the first series

The certificates from Clyde show big differences in hardness from HRC=38 to 43, see appendix 3.

The results at Hägglunds do not show such differences see appendix 4.

The crew M16x190-12.9 shows laps in the threads see appendix 3. No laps have been seen in the M16x270-12.9.

Mr Russel says that is depending on a machine fault say. It shall be controlled by the operator. That shall normally have been controlled by the operator in a stereo microscope.

It is also cracks in the top of the screw head. It comes from a small centre tap at cutting the bars.

The radius in the threads and at the head is ok.

Some different damages in the bar and in the head have been found.

Some of the screws have a brown colour. The reason is the cooling oil and the tempering. Mr Russel will send an investigation report.

Activities: The both batches shall be returned to Appro – Clyde for investigations regarding:

- hardness
- laps
- damages
- cracks

Regarding the Screw M16x270-12.9 serial deliveries have already been started so it is important that Clyde quickly investigates if there is some laps in the threads.

2.3 Sealing the thread

The oil protection has been changed to give possibilities for the Loctite to fasten on the thread. Mr Russel shall send information for the oil.

Some screws have been prepared with Loctite by Appro.

4 screws have been assembled in a motor and the motor was in the washing process during the visit but it was not possible to investigate the result.



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Date

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D51/Nils Nilsson +46 660 87119, nils.nilsson@se.hagglunds.com

2006-11-25

3(3)

3. Quality

Statistics for this year see appendix 5.

Type of faults see appendix 6.

Tread bar 478 2486-003

40 bars have been rejected depending on rust.

New packing has been introduced to cover that problem

D513/Torsten Svensson

06-08-18

06041ts.doc

Distr; D5, D51, D661LN, D6542TY+PL, D664

Approval for test pieces, purchasing order 3008718

Approval is given for series delivery of ISO 4014 M16x270 12.9 part no 2121 2040-852 (for CA210) and M16x190 12.9 part no 2121 2040-652 (for CA100-CA140) material 42CrMo4 from Appro / Clyde Fasteners.

Remarks:

- The tensile strength in M16x270 has been measured at Volvo Powertrain Corporation to 189 ± 0.8 kN. The requirement is min 192 kN according to SS-EN ISO 898-1. Has to be corrected.
- Radius in thread end bottoms in M16x190 is measured to 0.17 mm (requirement is min 0.25 mm). Has to be corrected.
- The head - shank radius in M16x270 is very uneven. Has to be corrected.

Inspection department will check first series delivery.

Furthermore, see enclosed test and control reports.

Lena Nordlund will send this message to Appro.



Från/From
Adress/Address:

Björn Almén
Motorgatan 2
442 40 Kungälv

Telefon/Phone:
Fax:
e-mail:
Internet::

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SE556265419301
+46-(0)303-24 34 40
+46-(0)303-24 50 15
bjorn.almen@appro.se
www.appro.se

Datum/Date:

2006-09-07

Hej!

Här kommer svaren från Clyde ang. M16x270.

1/ Tensile strength of 192 KN will be maintained, we will make sure by means of extra care and checking of components, we will adjust our heat treatment parameters to ensure that the specification is met.

2/ Radius in thread bottoms will be corrected, by ensuring radius on our roll threading dies is maintained throughout production process.

3/ The head shank radius will be corrected by means of ensuring the hot forge tooling will be checked more thoroughly for this dimension because these parts are hot forged, this dimension wears more quickly, we will check this on a more regular basis to ensure any worn dies are replaced. Inspection Dept, will monitor this dimension more carefully.

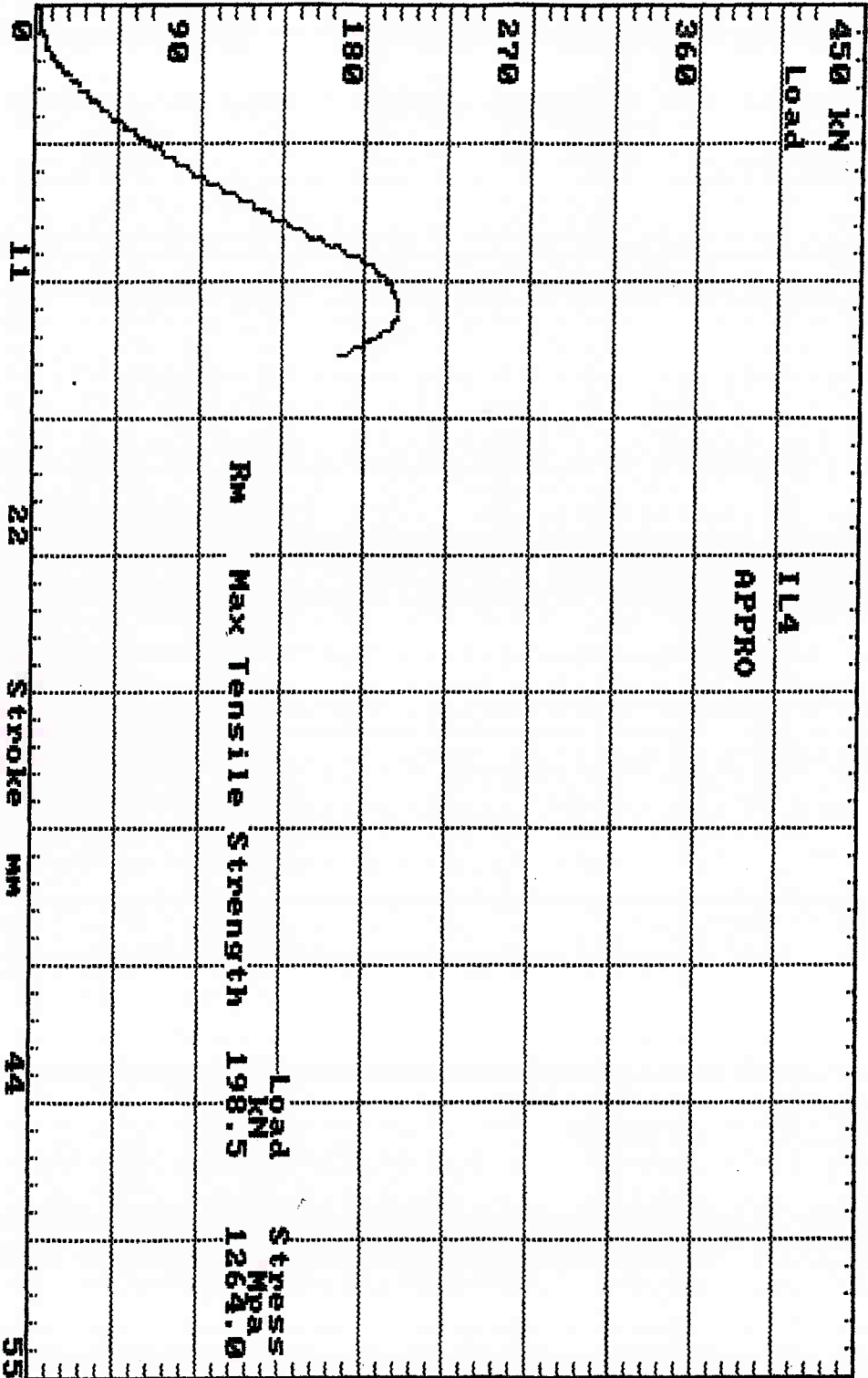
4/ Could we also ask the question of Hagglunds, regarding straightness of parts, what is the maximum straightness allowed on "A" and "B" on both components.

Bifogar även testen som jag gjorde på plats hos Clyde den 23/8-06 – proverna är skickade med posten idag från oss.

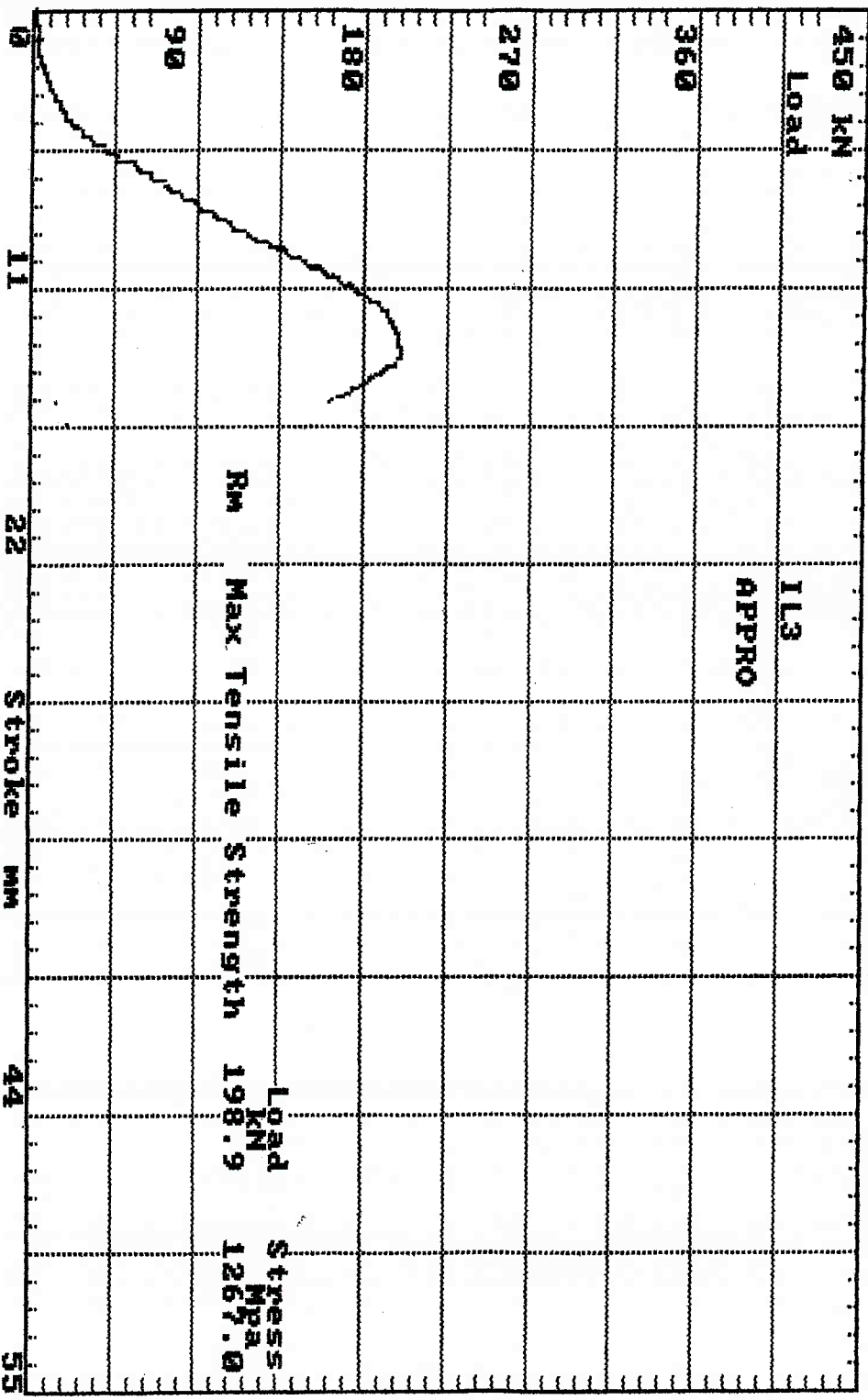
Med vänliga hälsningar
APPRO AB

Björn Almén

0° WEDGE ANGLE



60° WEDGE ANGLE.



D516/Fredrik Bäck, +46 (0)660 872 06
fredrik.back@se.hagglunds.com

Examination report
2006-11-22



H:\Rapporter\06051.doc

Distr: D513/TS, D51/NN

Häggglunds Drives AB
SE-890 42 Mellansel, Sweden
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Fax: +46 (0)660 871 60
E-mail: info@se.hagglunds.com
www.hagglunds.com

A company in the Arcorus group

Examination of M16x190-12.9 and M16x270-12.9 from Appro/Clyde

Bakground

The first batch of about 500 pcs of each screw type has been delivered to Häggglunds, see certificates in appendix 1. Some remarks from the previous test delivery shall be checked up (see TR 06026).

Examination

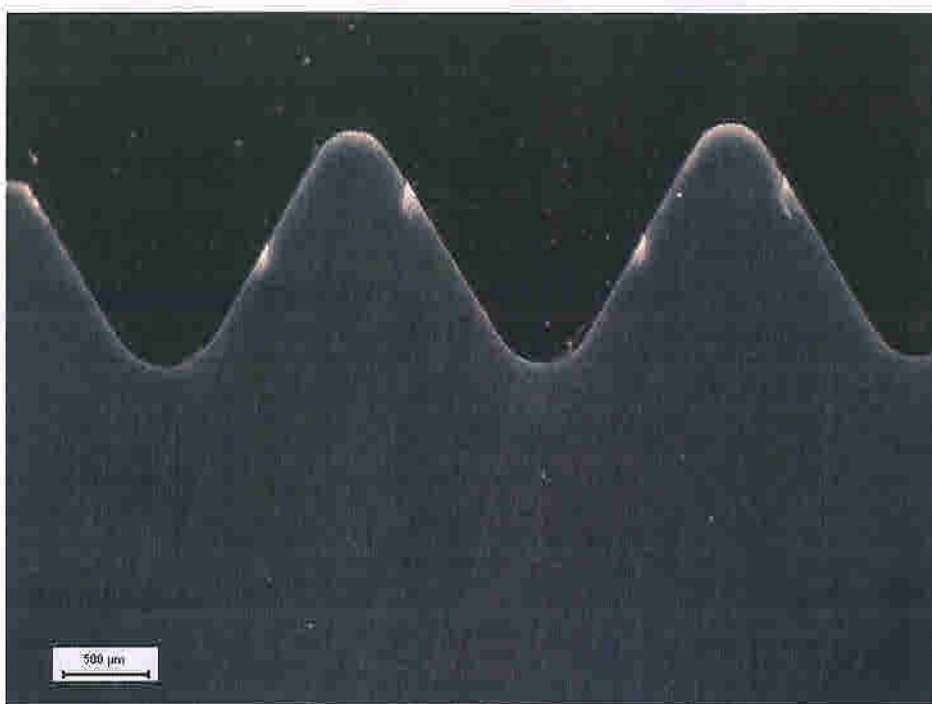
One screw from each length has been received for examinations. Axial sections have been cut in the thread and in the head-shank. The sections have been prepared for metallographical examinations in metal microscope. The geometry and the hardness have also been measured at these sections.

Results

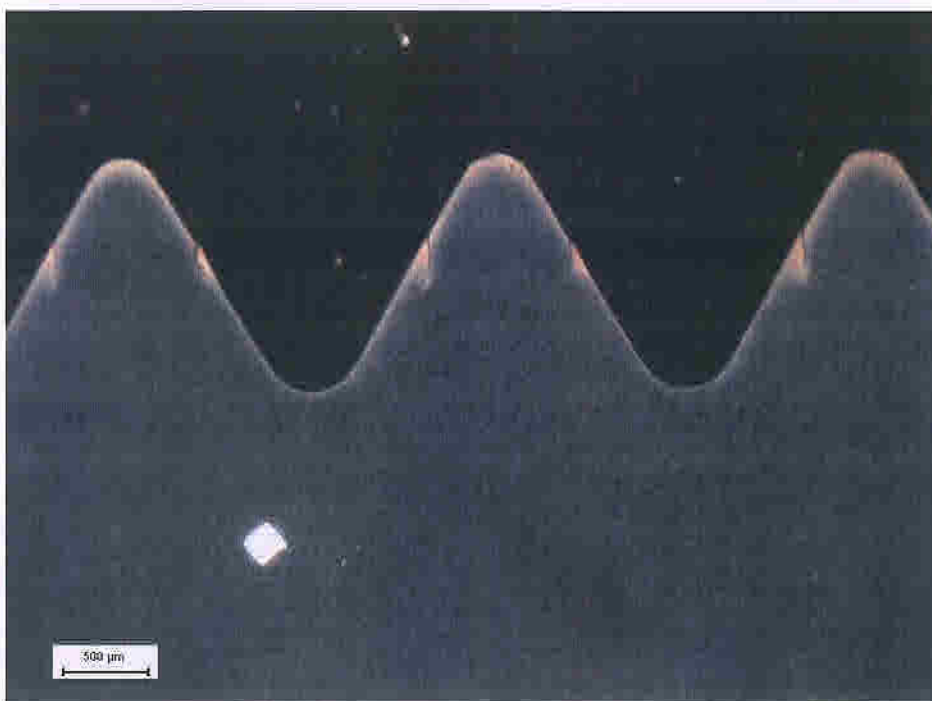
The examinations show the following results:

- Thread defects in shape of laps are generally present in the -190 screw, see figure 1-4. No defects of importance have been found in the -270 screw.
- All radius measured (thread, thread end and head-shank) are within the requirements, see figure 5-10. A notice at the -190 screw is that the head-shank radius is somewhat un-even.
- The micro structure consists as required of tempered martensite (tough hardened) in both screws. see figure 11 and 12.
- The hardness has been measured to **414** HV10 for the -190 screw and to **406** HV10 for the -270 screw (mean values of 5 measurements). These levels are well within the required 385-435 HV.

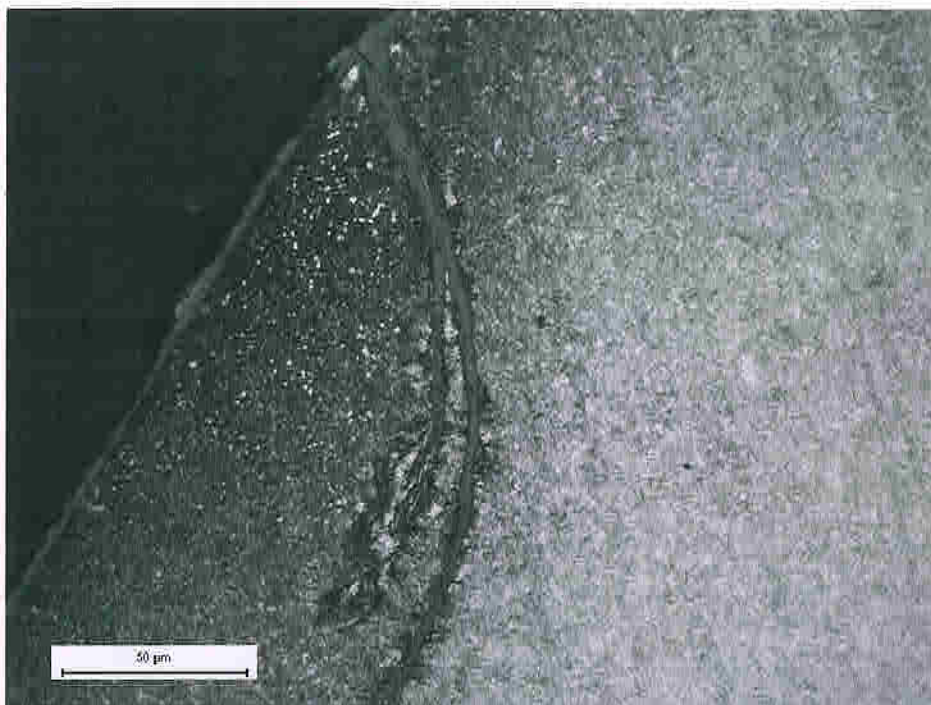
Fredrik Bäck
Metallurgist



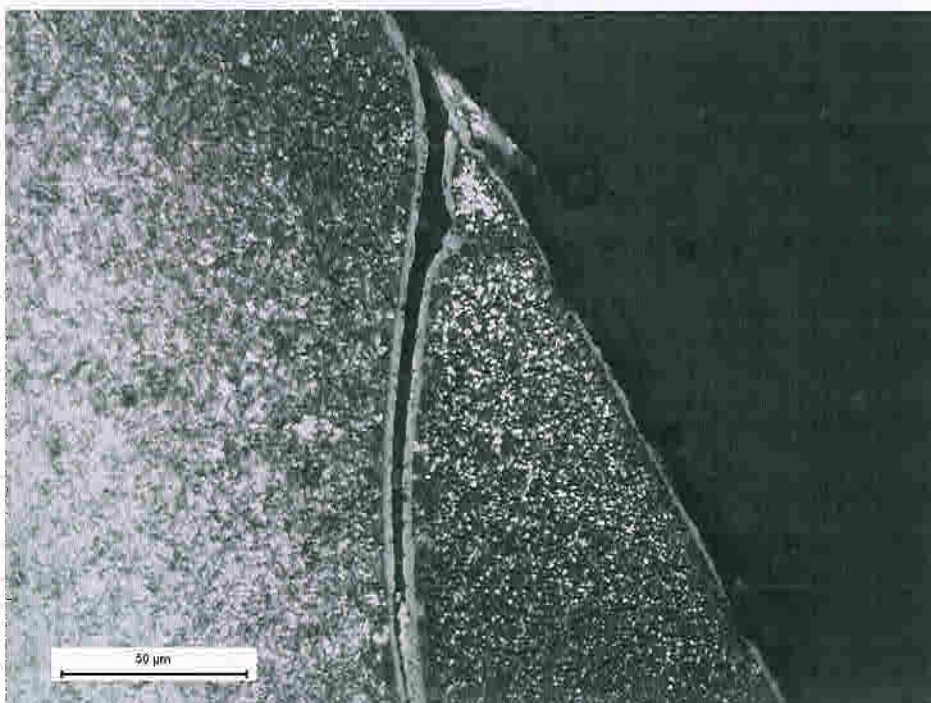
Figur 1. Section showing thread laps found in the -190 screw.



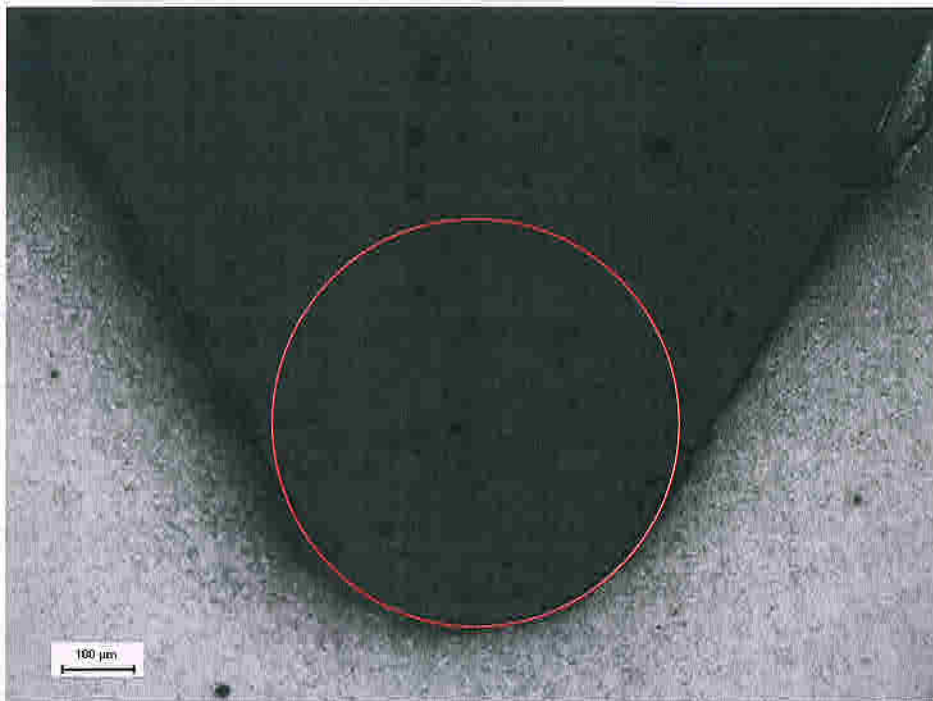
Figur 2. Same as figure 1.



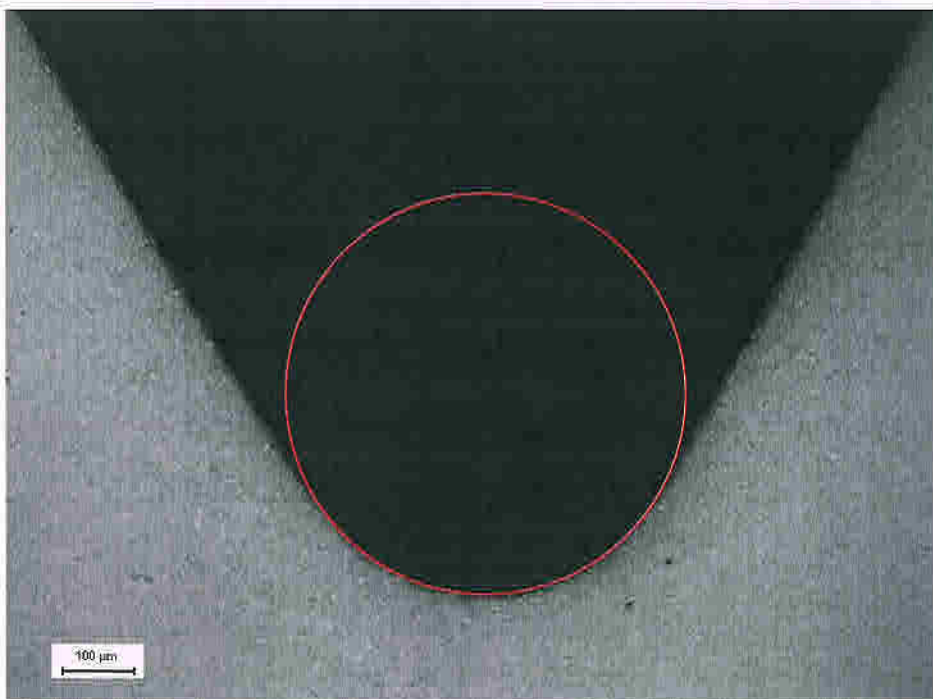
Figur 3. Detail of thread lap in the -190 screw.



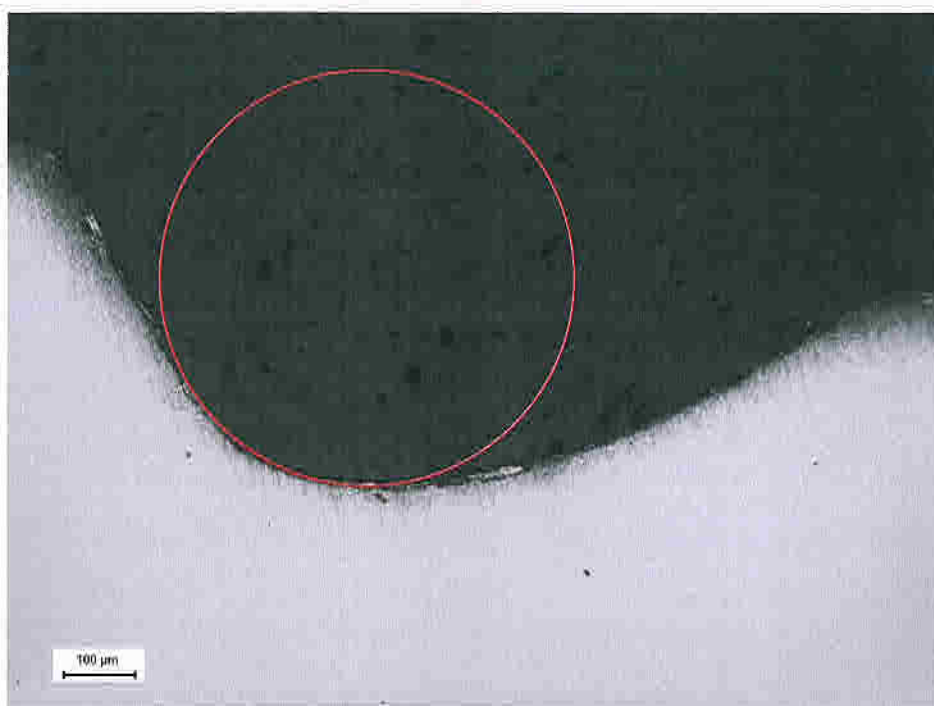
Figur 4. Same as figure 3.



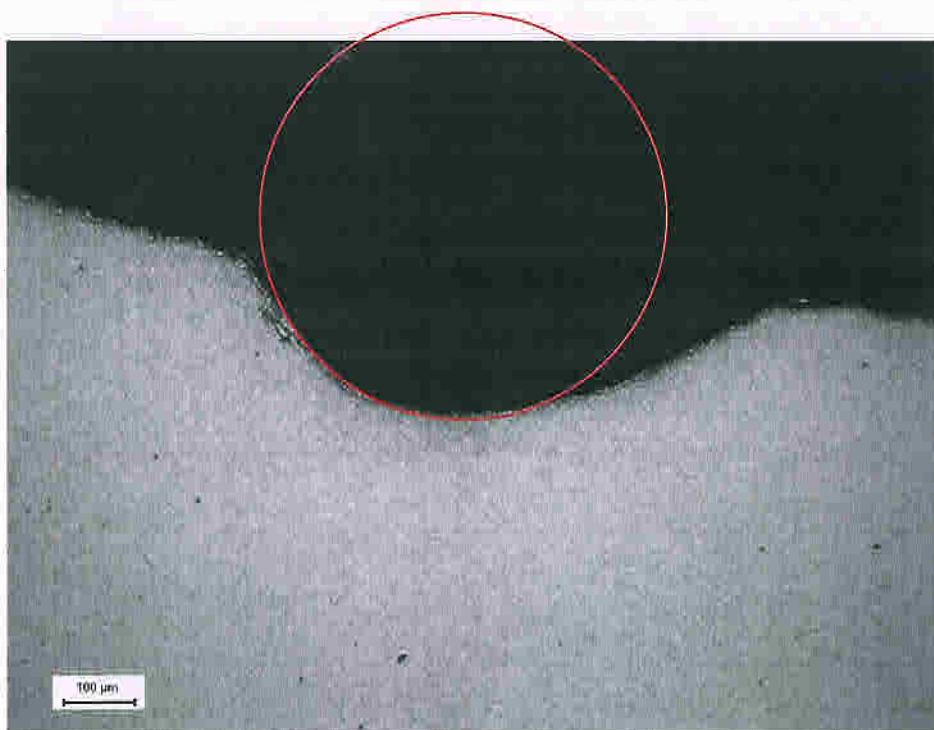
Figur 5. Thread bottom in the -190 screw. $R=0.28$ mm (min=0.25).



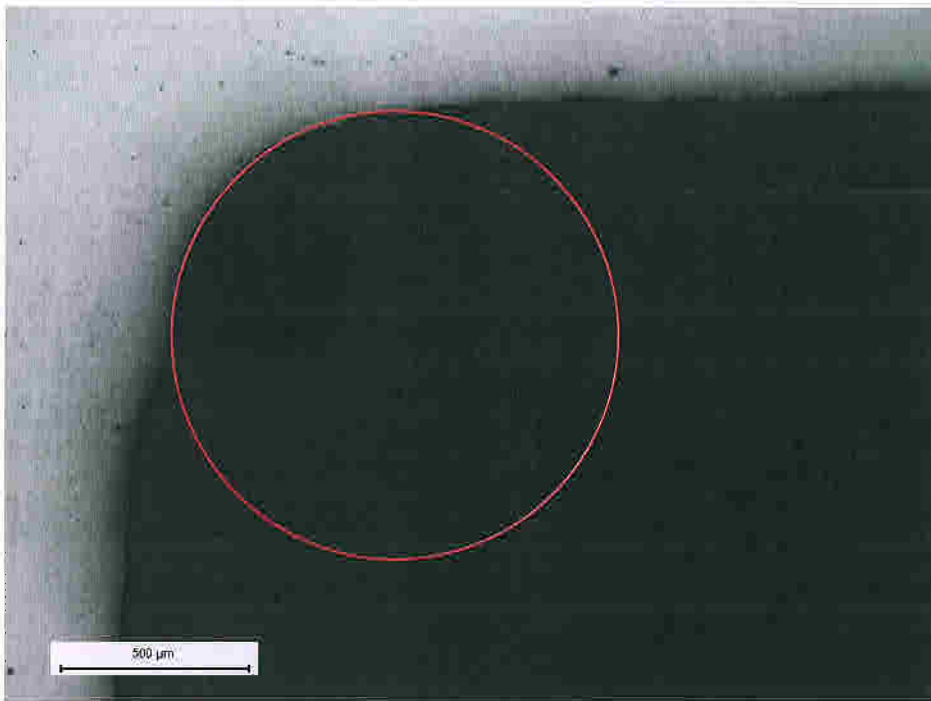
Figur 6. Thread bottom in the -270 screw. $R=0.27$ mm (min=0.25)



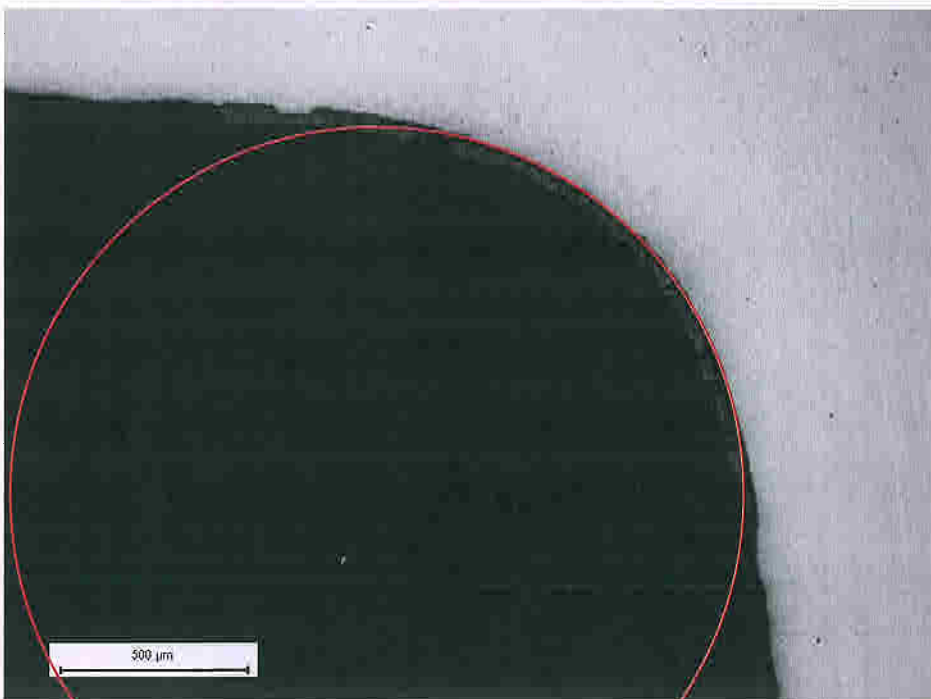
Figur 7. Thread end bottom in the -190 screw. $R=0.28$ mm (min=0.25).



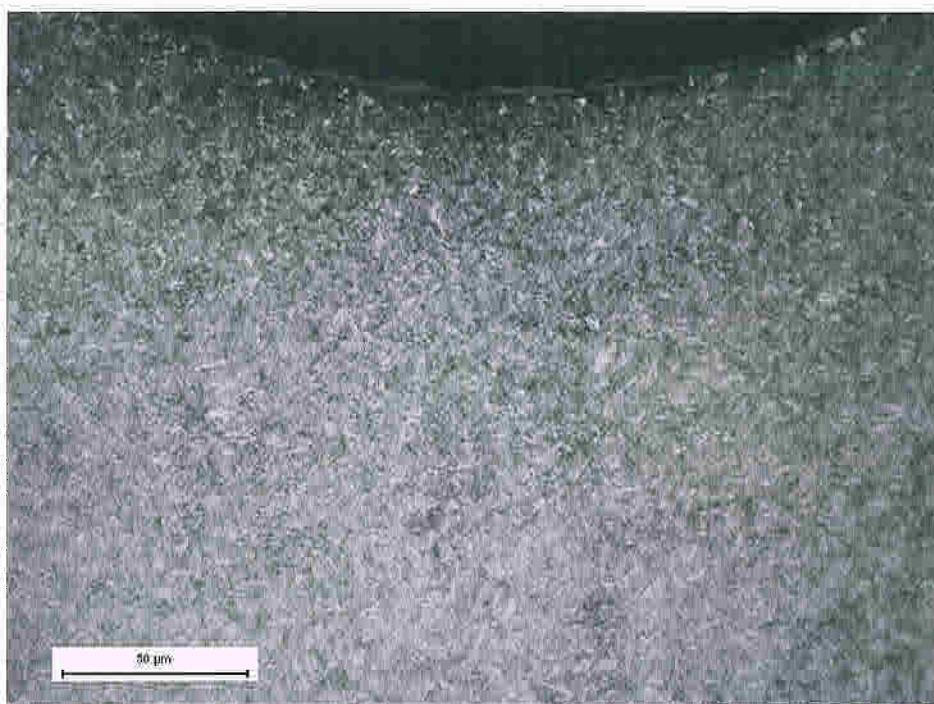
Figur 8. Thread end bottom in the -270 screw. $R=0.28$ mm (min 0.25)



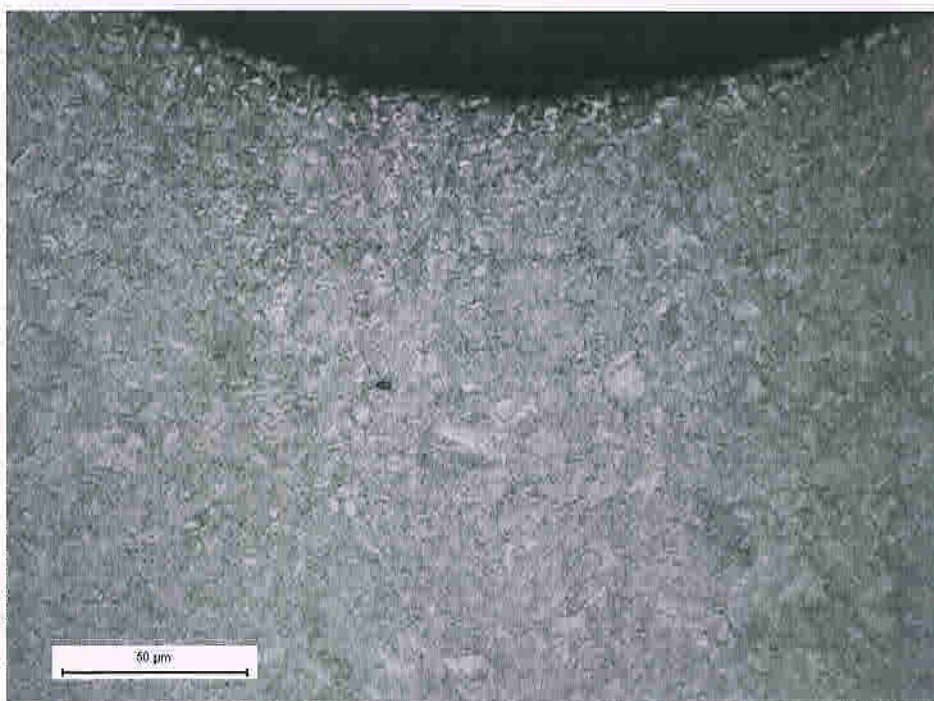
Figur 9. Head-shank radius in the -190 screw. $R=0.60$ mm (min 0.60).



Figur 10. head-shank radius in the -270 screw. $R=0.98$ mm (min 0.60).



Figur 11. Micro structure in the -190 screw.



Figur 12. Micro sctructure in the -270 screw.

6051

//////APPRO

Följesedel

Följesedelnr / Kundnr
16597 K147

Följesedelsdatum
2006-10-02

Fakturaadress
Häggglunds Drives AB

890 42 Mellansel

Leveransadress
Häggglunds Drives AB

890 42 Mellansel

Er referens Lena Nordlund
Ert ordernr 3015344 /Torsten Svens
Leveranssätt Schenker 96156161

Vår referens Björn Almén
Leveranstid 2006-11-03
Levillkor Fritt vårt lager

Artnr	Benämning	Best ant	Lev ant	ID	Hyllplats
2121 2040-652	ISO 4014 12.9 M16x190 fos Enligt TB 42CrMo4/708/9M40	500	460		A41-2
2121 2040-852	ISO 4014 12.9 M16x270 fos Enligt TB 42CrMo4/708/9M40	500	504		
50000+	Ram	2	2		NL
50000-	Pall	1	1		NL
Fraktsedel no: 4567496254 061108					
Helpall:	Heiram:	Halvpall:	Halvram:	Kartong:	Total vikt: 165,6

Vid retur eller vid anmärkning mot leveransen skall vår följesedel medskickas. Kontakta din säljare för vidare info. Allmänna bestämmelser enligt NLS 95.

Adress
442 40 Kungälv

Telefon
0303-24 34 40
Fax
0303-24 50 15
Företagets säte
14 V. Götalands län

PlusGiro
Bankgiro
Organisationsnr
556265-4193

Internet
www.appro.se
e-post
info@appro.se
Momsreg.nr
556265-4193
Innehar F-skattebevis

8. Nov. 2006 11:37

CLYDE FASTENERS
CLYDE FASTENERS

No. 9915 P. 11

CLYDE

CLYDE FASTENERS LIMITED

Hawbank Road, Collieston, East Kilbride G74 5ET, Scotland.
Tel: + 44 (0)1355 225451 Fax: + 44 (0)1355 263191
Email: info@clydefasteners.com
Website: www.clydefasteners.com

Certificate of Conformity

Number: 110686/1
Customer: APPRO
Order Number: 11469
Part description: M16 X 270 MM SPEC HEX HD BOLT
Spec/Dwg.no. & Issue: 21212040852
Grade: 12.9
Part Number: 21212040852
Cast Number: 050375
Date: 01/11/06
Unique ID: N/A
Quantity: 370
W.O.N.: HE1928/43
Batch Number: 431106E

Condition of material despatched
ZINC PHOSPHATED AND DE-EMBRITTLED.

Deviations/Concessions/Permits
NONE

Certified that the supplies/services detailed hereon have been inspected and tested in accordance with the conditions and requirements of the contract or purchase order and unless otherwise noted conform in all respects to the specification(s) and/or drawing(s) relevant thereto

Signed: *J. McCall* date: 1.11.06
For Clyde Fasteners Limited, QA Department



Registered in Scotland No. 42788

CLYDE FASTENERS LIMITED

8. Nov. 2006 11:36

CLYDE FASTENERS
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No. 9915 P. 10



CLYDE FASTENERS LIMITED

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Tel: +44 (0)1355 225451 Fax: +44 (0)1355 263191
Email: info@clydefasteners.com
Website: www.clydefasteners.com

Mechanical & Chemical Test Report

Number: 110685/1
Customer: APPRO
Order Number: 11469
Part description: M16 X 270 MM SPEC HEX HD BOLT
Spec/Dwg.no. & Issue: 21212040852
Grade: 12.9
Part Number: 21212040852
Cast Number: 050375
Mat'l Spec./Diameter: 708M40/.573
Date: 01/11/06
Unique ID: *NA*
Quantity: 370
W.O.N.: HE1928/43
Batch Number: 431106E

Chemical Analysis

C	0.3950%	Mn	0.7930%	P	0.0080%	S	0.0200%	Si	0.1700%	Cr	0.9910%
Mo	0.1730%	Ni	0.0580%	B	0.0000%	Pb	0.0000%	Cu	0.0000%	V	0.0000%
Al	0.0000%										

Mechanical Test results

Test piece id :
Section of test piece(mm)
Gauge length(mm)
0.2% proof stress (N/mm²)
Ultimate load (N)
Ultimate tensile strength (N/mm²)
Elongation on 5.65/So(%)
Elongation on 4 X diameter (%)
Reduction in area(%)
Izod impact -
at 0 degrees C (Joules)

Hardness (Hrc) : 38/39
: 431106E
: FULL SIZE
: ---
: ---
: 193580
: 1233
: ---
: ---
: ---
: ---

Remarks

WEDGE TESTED ACCORDING TO ISO 898-1 GRADE 12.9.
TEST No. WEDGE ANGLE
431106E 0 DEGREE
431106E1 6 DEGREE

Signed *John Kemp* date: 11/11/06
For Clyde Fasteners Limited, QA Department



Registered in Scotland No. 42705

8. Nov. 2006 11:36

CLYDE FASTENERS
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No. 9915 P. 9



CLYDE FASTENERS LIMITED

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Tel: + 44 (0)1355 225451 Fax: + 44 (0)1355 263191
Email: info@clydefasteners.com
Website: www.clydefasteners.com

Certificate of Conformity

Number: 110684/1
Customer: APPRO
Order Number: 11469
Part description: M16 X 270 MM SPEC HEX HD BOLT
Spec/Dwg.no. & Issue: 21212040852
Grade: 12.9
Part Number: 21212040852
Cast Number: 050375
Date: 01/11/06
Unique ID: N/A
Quantity: 335
W.O.N.: HE1928/43
Batch Number: 422906E

Condition of material despatched
ZINC PHOSPHATED AND DE-EMBRITTLED.

Deviations/Concessions/Permits
NONE

Certified that the supplies/services detailed hereon have been inspected and tested in accordance with the conditions and requirements of the contract or purchase order and unless otherwise noted conform in all respects to the specification(s) and/or drawing(s) relevant thereto

Signed: *J. McCull* date: 1/11/06
For Clyde Fasteners Limited, QA Department



Registered in Scotland No. 42785

CLYDE FASTENERS LIMITED

8. Nov. 2006 11:36

CLYDE FASTENERS
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No. 9915 P. 8



CLYDE FASTENERS LIMITED

Finxbank Road, Collieston, East Kilbride G74 5ET, Scotland.
Tel: + 44 (0)1355 225451 Fax: + 44 (0)1355 263191
Email: info@clydefasteners.com
Website: www.clydefasteners.com

Mechanical & Chemical Test Report

Number: 110683/1 Date: 01/11/06
Customer: APPRO
Order Number: 11469 Unique ID: N/A
Part description: M16 X 270 MM SPEC HEX HD BOLT
Spec/Dwg.no. & Issue: 21212040852
Grade: 12.9
Part Number: 21212040852 Quantity: 335
Cast Number: 050375 W.O.N.: HE1928/43
Batch Number: 422906E
Mat'l Spec./Diameter: 708M40/.753

Chemical Analysis

C	0.3950%	Mn	0.7930%	P	0.0080%	S	0.0200%	Si	0.1700%	Cr	0.9910%
Mo	0.1730%	Ni	0.0580%	B	0.0000%	Pb	0.0000%	Cu	0.0000%	V	0.0000%
Al	0.0000%										

Mechanical Test results

Test piece id :	Hardness (Hrc)	: 39/40
Section of test piece(mm)		: 422906E 422906E1
Gauge length(mm)		: FULL SIZE FULL SIZE
0.2% proof stress (N/mm ²)		: ---
Ultimate load (N)		: ---
Ultimate tensile strength (N/mm ²)		: 197330 196370
Elongation on 5.65/So(%)		: 1257 1251
Elongation on 4 X diameter (%)		: ---
Reduction in area(%)		: ---
Izod impact -		: ---
at 0 degrees C (Joules)		: ---

Remarks

WEDGE TESTED ACCORDING TO ISO 898-1 GRADE 12.9.
TEST No WEDGE ANGLE
422906E 0 DEGREE
422906E1 6 DEGREE

Signed *Jain* date: 11/11/06
For Clyde Fasteners Limited, QA Department



Registered in Scotland No. 42785

BRITISH FASTENERS MADE IN GREAT BRITAIN

8. Nov. 2006 11:36

CLYDE FASTENERS
CLYDE FASTENERS

No. 9915 P. 7

CLYDE

CLYDE FASTENERS LIMITED

Hawbank Road, College Milton, East Kilbride G74 5ET, Scotland.
Tel: + 44 (0)1355 225451 Fax: + 44 (0)1355 263191
Email: info@clydefasteners.com
Website: www.clydefasteners.com

Certificate of Conformity

Number: 110682/2
Customer: APPRO
Order Number: 11469
Part description: M16 X 270 MM SPEC HEX HD BOLT
Spec/Dwg.no.& Issue: 21212040852
Grade: 12.9
Part Number: 21212040852
Cast Number: 050375
Date: 01/11/06
Unique ID: N/A
Quantity: 259
W.O.N.: HE1928/43
Batch Number: 422606E

Condition of material despatched
ZINC PHOSPHATED AND DE-EMBRITTLER

Deviations/Concessions/Permits
NONE

Certified that the supplies/services detailed hereon have been inspected and tested in accordance with the conditions and requirements of the contract or purchase order and unless otherwise noted conform in all respects to the specification(s) and/or drawing(s) relevant thereto

Signed *J.M. Cath* date: 1.11.06
For Clyde Fasteners Limited, QA Department

Registered in Scotland No. 42783



ISO 9001:2000
Certificate
191121

8. Nov. 2006 11:36

CLYDE FASTENERS
 CLYDE FASTENERS

No. 9915 P. 6



CLYDE FASTENERS LIMITED

Hawbank Road, College Milton, East Kilbride G74 5ET, Scotland.
 Tel: +44 (0)1355 225451 Fax: +44 (0)1355 263191
 Email: info@clydefasteners.com
 Website: www.clydefasteners.com

Mechanical & Chemical Test Report

Number: 110681/2 Date: 01/11/06
 Customer: APPRO
 Order Number: 11469 Unique ID: N/A
 Part description: M16 X 270 MM SPCB HEX HD BOLT
 Spec/Dwg.no. & Issue: 21212040852
 Grade: 12.9
 Part Number: 21212040852 Quantity: 259
 Cast Number: 050375 W.O.N.: HB1928/43
 Batch Number: 422606E
 Mat'l Spec./Diameter: 708M40/.573

Chemical Analysis

C	0.3950%	Mn	0.7930%	P	0.0080%	S	0.0200%	Si	0.1700%	Cr	0.9910%
Mo	0.1730%	Ni	0.0580%	B	0.0000%	Pb	0.0000%	Cu	0.0000%	V	0.0000%
Al	0.0000%										

Mechanical Test results

Test piece id :	Hardness (Hrc) :	41/42		
Section of test piece(mm)	:	422306E	422606E	422606E1
Gauge length(mm)	:	10.06	FULL SIZE	FULL SIZE
0.2% proof stress (N/mm ²)	:	50.0	---	---
Ultimate load (N)	:	1231	---	---
Ultimate tensile strength (N/mm ²)	:	---	197820	198100
Elongation on 5.65/So(%)	:	1300	1260	1262
Elongation on 4 X diameter (%)	:	13.0	---	---
Reduction in area(%)	:	---	---	---
Charpy impact-	:	58.3	---	---
at 20 degrees C (Joules)	:	38,40,37	---	---

Remarks

CHARPY: U-NOTCH: BS EN 10045.
 WEDGE TESTED ACCORDING TO ISO 898-1 GRADE 12.9.
 TEST No. WEDGE ANGLE
 422606E 0 DEGREE
 422606E1 6 DEGREE

Signed: *[Signature]* date: 11/11/06
 For Clyde Fasteners Limited, QA Department



ISO 9001:2000
 Certificate
 FM121

Registered in Scotland No. 42783

8. Nov. 2006 11:36

CLYDE FASTENERS
CLYDE FASTENERS

No. 9915 P. 5

CLYDE

CLYDE FASTENERS LIMITED

Hawbank Road, College Millon, East Kilbride G74 5ET, Scotland.
Tel: + 44 (0)1355 225451 Fax: + 44 (0)1355 263191
Email: info@clydefasteners.com
Website: www.clydefasteners.com

Certificate of Conformity

Number: 110680/1 Date: 01/11/06
Customer: APPRO
Order Number: 11469
Part description: M16 X 270 MM SPEC HEX HD BOLT Unique ID: N/A
Spec/Dwg.no. & Issue: 21212040852
Grade: 12.9
Part Number: 21212040852 Quantity: 224
Cast Number: 050375 Batch Number: 422306E W.O.N.: HE1928/43

Condition of material despatched
ZINC PHOSPHATED ANDD DE-EMBRITLED

Deviations/Concessions/Permits
NONE

Certified that the supplies/services detailed hereon have been inspected and tested in accordance with the conditions and requirements of the contract or purchase order and unless otherwise noted conform in all respects to the specification(s) and/or drawing(s) relevant thereto

Signed: *J. McCull* date: 1/11/06
For Clyde Fasteners Limited, QA Department



Registered in Scotland No. 42783

ISO 9001:2000
Certified
PAS111

8. Nov. 2006 11:36

CLYDE FASTENERS
 CLYDE FASTENERS

No. 9915 P. 4



CLYDE FASTENERS LIMITED

Hawbank Road, College Milton, East Kilbride G74 5ET, Scotland.
 Tel: + 44 (0)1355 225451 Fax: + 44 (0)1355 263191
 Email: info@clydefasteners.com
 Website: www.clydefasteners.com

Mechanical & Chemical Test Report

Number: 110679/1
 Customer: APPRO
 Order Number: 11469
 Part description: M16 X 270 MM SPEC HEX HD BOLT
 Spec/Dwg.no.& Issue: 21212040852
 Grade: 12.9
 Part Number: 21212040852
 Cast Number: 050375
 Mat'l Spec./Diameter: 708M40/.573

Date: 01/11/06
 Unique ID: N/A
 Quantity: 224
 W.O.N.: HE1928/43
 Batch Number: 422306E

Chemical Analysis

C	0.3950%	Mn	0.7930%	P	0.0080%	S	0.0200%	Si	0.1700%	Cr	0.9910%
Mo	0.1730%	Ni	0.0580%	B	0.0000%	Pb	0.0000%	Cu	0.0000%	V	0.0000%
Al	0.0000%										

Mechanical Test results

Test piece id :	Hardness (Hrc) :	41/42	
Section of test piece(mm)	:	422306E	422306E2
Gauge length(mm)	:	10.06	FULL SIZE FULL SIZE
0.2% proof stress (N/mm ²)	:	50.0	---
Ultimate load (N)	:	1231	---
Ultimate tensile strength (N/mm ²)	:	---	---
Elongation on 5.65/So(%)	:	1300	200570 201230
Elongation on 4 X diameter (%)	:	13.0	1277 1282
Reduction in area(%)	:	---	---
Charpy impact-	:	58.3	---
at 20 degrees C (Joules)	:	38,40.37	---

Remarks

CHARPY; V-NOTCH; BS EN 10045.

WEDGE TESTED ACCORDING TO ISO 898-1 GRADE 12.9

TEST No. WEDGE ANGLE
 422306E1 0 DEGREE
 422306E2 6 DEGREE

Signed *[Signature]* date : ./. / .
 For Clyde Fasteners Limited, QA Department



Registered in Scotland No. 42783

BRITISH FASTENERS MANUFACTURING

8. Nov. 2006 11:35 CLYDE FASTENERS
CLYDE FASTENERS

No. 9915 P. 3



CLYDE FASTENERS LIMITED

Hawbank Road, Collieston, East Kilbride G74 5ET, Scotland.
Tel: +44 (0)1355 225461 Fax: +44 (0)1355 263191
Email: info@clydefasteners.com
Website: www.clydefasteners.com

Certificate of Conformity

Number: 110693/1 Date: 03/11/06
Customer: APPRO
Order Number: 11692 Unique ID: N/A
Part description: M16 X 190 MM SPEC HEX HD BOLT
Spec/Dwg.no. & Issue: 21212040652
Grade: 12.9 Quantity: 466
Part Number: 21212040652 W.O.N.: HE1993/43
Cast Number: 050375 Batch Number: 441406G

Condition of material despatched
ZINC PHOSPHATED AND DE-EMBRITTLED.

Deviations/Concessions/Permits
NONE

Certified that the supplies/services detailed hereon have been inspected and tested in accordance with the conditions and requirements of the contract or purchase order and unless otherwise noted conform in all respects to the specification(s) and/or drawing(s) relevant thereto

Signed: *JM Scott* date 3/11/06
For Clyde Fasteners Limited, QA Department



Registered in Scotland No. 42783

BRITISH FASTENERS MADE IN GREAT BRITAIN

8. Nov. 2006 11:35

CLYDE FASTENERS
 CLYDE FASTENERS

No. 9915 P. 2



CLYDE FASTENERS LIMITED

Hawbank Road, Collieston, East Kilbride G74 5ET, Scotland.
 Tel: +44 (0)1355 225451 Fax: +44 (0)1355 263191
 Email: info@clydefasteners.com
 Website: www.clydefasteners.com

Mechanical & Chemical Test Report

Number: 110692/1 Date: 03/11/06
 Customer: APPRO Unique ID: N/A
 Order Number: 11692
 Part description: M16 X 190 MM SPEC HEX HD BOLT
 Spec/Dwg.no. & Issue: 21212040652
 Grade: 12.9
 Part Number: 21212040652 Quantity: 466
 Cast Number: 050375 W.O.N.: RE1993/43
 Mat'l Spec./Diameter: 708M40/.573" Batch Number: 441406G

Chemical Analysis


C	0.3950%	Mn	0.7930%	P	0.0080%	S	0.0200%	Si	0.1700%	Cr	0.9910%
Mo	0.1730%	Ni	0.0580%	B	0.0000%	Pb	0.0000%	Cu	0.0000%	V	0.0000%
Al	0.0000%										

Mechanical Test results

Test piece id :	Hardness (Hrc) :	43		
Section of test piece(mm)	:	441406G	441406G1	441406G2
Gauge length(mm)	:	10.07	FULL SIZE	FULL SIZE
0.2% proof stress (N/mm ²)	:	50.0	---	---
Ultimate load (N)	:	1284	---	---
Ultimate tensile strength (N/mm ²)	:	1365	205980	203160
Elongation on 5.65/So(%)	:	10.0	1312	1294
Elongation on 4 X diameter (%)	:	---	---	---
Reduction in area(%)	:	51.7	---	---
Charpy impact- at 20 degrees C (Joules)	:	53.52,55	---	---

Remarks

CHARPY; V-NOTCH; BS EN 10045
 TEST NUMBER WEDGE ANGLE
 441406G1 0 DEGREE
 441406G2 6 DEGREE
 WEDGE TESTED ACCORDING TO ISO 898-1 GRADE 12.9.

Signed  date 2/11/06
 For Clyde Fasteners Limited, QA Department



ISO 9001:2000
 Certificate
 FM121

Registered in Scotland No. 42783

BRITISH FASTENERS MADE IN GREAT BRITAIN



Recr list

Appendix 4

/endor: account13224
 Name Appro AB
 Purchase order 3015344
 Date 2006-11-13
 Page 1 of 1

Line No	Item number	Description	Purchase quantity	Unit	Delivery date	Revision	Control code	Inspect	Watch	Quantity	Update
10	2121 2040-652	Skruv M16x190 -12.9 Tilliv av Clyde i material 42Cr Mo4	500,00	PCS	2006-11-03		000	No	Yes	500,00	460
20	2121 2040-852	Skruv M16x270 -12.9 Tilliv av Clyde i material 42Cr Mo4	500,00	PCS	2006-11-03		000	No	Yes	500,00	504



Kast 0,5 e 0,72 = ok

1507



Hårdhetsprovning - Vickers
Protokoll

DETALJ: Skruv
INDEX: 441406G
ART.NR: 2121 2040-652

Signatur: RMN
Kommentar: M16x190 order 3015344-10 Appro AB

Datum: 2006-11-14

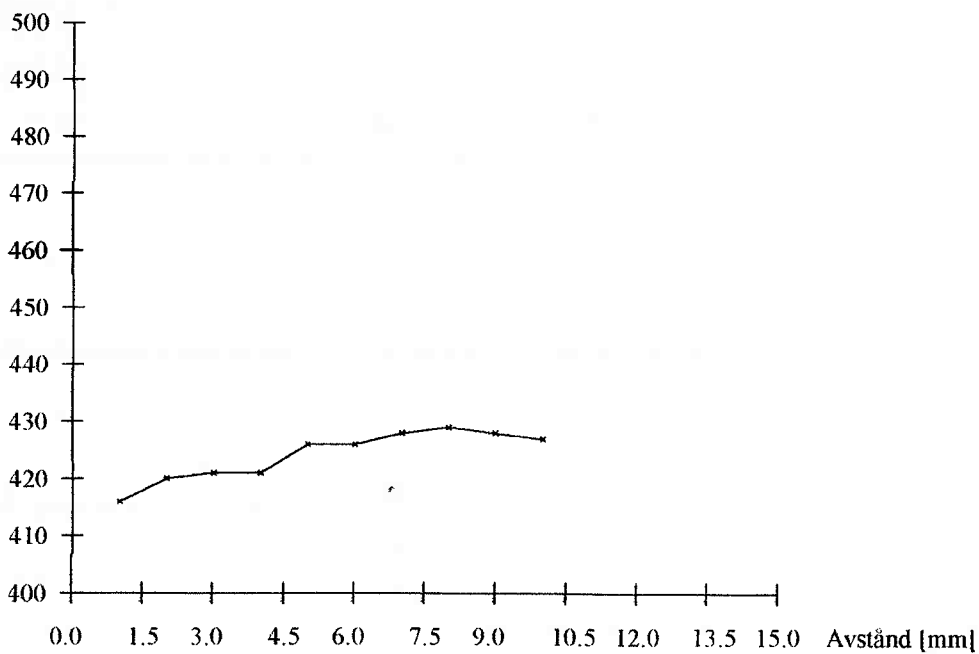
(1) Hårdhetstabell (HV 30)

Avst.	Hårdhet	Avst.	Hårdhet	Avst.	Hårdhet	Avst.	Hårdhet
01.00	416						
02.00	420						
03.00	421						
04.00	421						
05.00	426						
06.00	426						
07.00	428						
08.00	429						
09.00	428						
10.00	427						

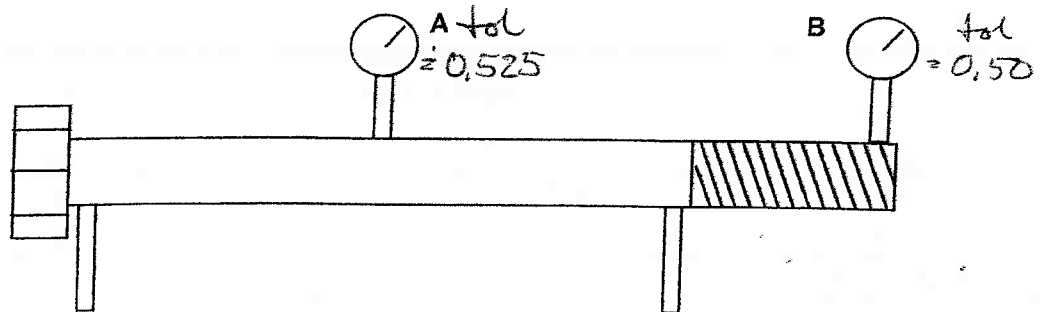
Medel = 424
Max = 429
Min = 416
Std = 4

Ythårdhet = 416 (42.3HRC)

Hårdhet HV 30



Kontroll av kast på skruv



Skruv Nr	Kast A	Kast B	Skruv Nr	Kast A	Kast B	Skruv Nr	Kast A	Kast B
1	0,05	0,05	34	0,29	0,30	67		
2	0,40	0,68	35	0,09	0,47	68		
3	0,33	0,13	36	0,12	0,33	69		
4	0,15	0,13	37	0,40	0,38	70		
5	0,54	0,64	38	0,17	0,21	71		
6	0,16	0,33	39	0,20	0,16	72		
7	0,55	0,65	40	0,16	0,32	73		
8	0,15	0,30	41	0,26	0,32	74		
9	0,13	0,26	42	0,24	0,36	75		
10	0,10	0,50	43	0,24	0,25	76		
11	0,44	0,50	44	0,18	0,60	77		
12	0,27	0,30	45	0,33	0,58	78		
13	0,10	0,30	46	0,30	0,53	79		
14	0,10	0,37	47	0,23	0,25	80		
15	0,30	0,45	48	0,15	0,38	81		
16	0,33	0,35	49	0,22	0,24	82		
17	0,13	0,10	50	0,06	0,15	83		
18	0,55	0,83	51			84		
19	0,20	0,37	52			85		
20	0,05	0,10	53			86		
21	0,35	0,28	54			87		
22	0,23	0,29	55			88		
23	0,40	0,52	56			89		
24	0,20	0,16	57			90		
25	0,60	0,77	58			91		
26	0,64	0,64	59			92		
27	0,26	0,21	60			93		
28	0,27	0,50	61			94		
29	0,07	0,46	62			95		
30	0,15	0,33	63			96		
31	0,15	0,22	64			97		
32	0,24	0,30	65			98		
33	0,30	0,70	66			99		



Hårdhetsprovning - Vickers
Protokoll

DETALJ: Skruv
INDEX: 422306E
ART.NR: 2121 2040-852

Signatur: RMN
Kommentar: M16x270 order 30015344-20 Appro AB

Datum: 2006-11-14

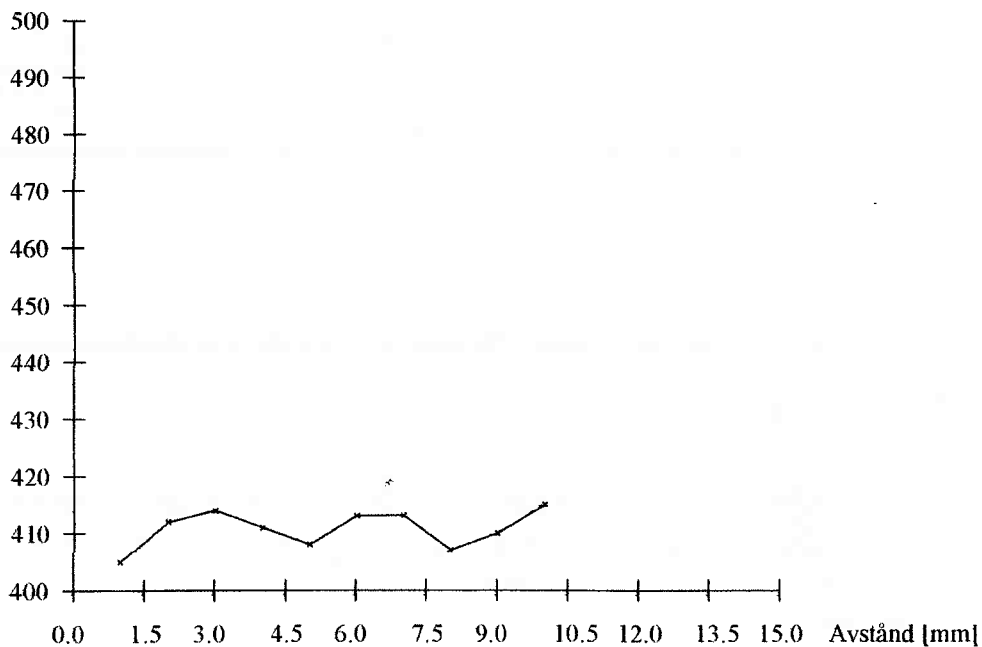
(1) Hårdhetstabell (HV 30)

Avst.	Hårdhet	Avst.	Hårdhet	Avst.	Hårdhet	Avst.	Hårdhet
01.00	405						
02.00	412						
03.00	414						
04.00	411						
05.00	408						
06.00	413						
07.00	413						
08.00	407						
09.00	410						
10.00	415						

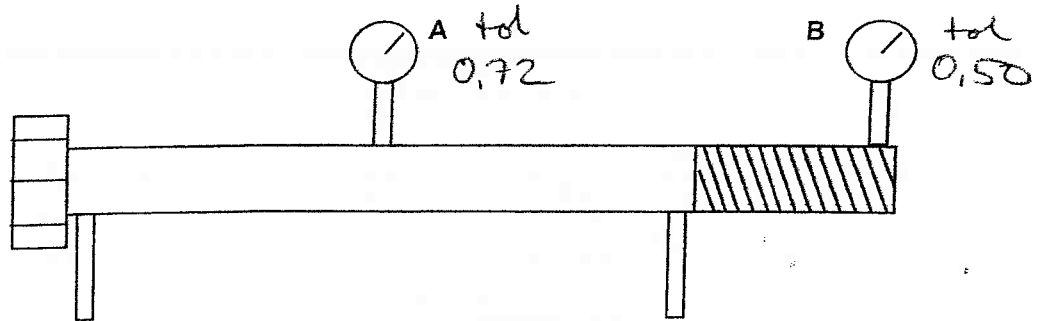
Medel = 411
Max = 415
Min = 405
Std = 3

Ythårdhet = 405 (41.3HRC)

Hårdhet HV 30



Kontroll av kast på skruv



Skruv Nr	Kast A	Kast B	Skruv Nr	Kast A	Kast B	Skruv Nr	Kast A	Kast B
1	0,13	0,07	34	0,28	0,27	67		
2	0,10	0,33	35	0,20	0,41	68		
3	0,18	0,12	36	0,22	0,23	69		
4	0,25	0,33	37	0,06	0,10	70		
5	0,20	0,11	38	0,10	0,23	71		
6	0,13	0,13	39	0,29	0,22	72		
7	0,25	0,32	40	0,08	0,18	73		
8	0,10	0,26	41	0,30	0,23	74		
9	0,13	0,46	42	0,13	0,27	75		
10	0,25	0,23	43	0,25	0,22	76		
11	0,38	0,41	44	0,10	0,27	77		
12	0,15	0,27	45	0,18	0,25	78		
13	0,15	0,17	46	0,03	0,12	79		
14	0,18	0,23	47	0,14	0,10	80		
15	0,15	0,25	48	0,20	0,17	81		
16	0,07	0,08	49	0,12	0,07	82		
17	0,26	0,55	50	0,09	0,10	83		
18	0,30	0,24	51	0,12	0,48	84		
19	0,10	0,16	52	0,14	0,05	85		
20	0,08	0,05	53	0,17	0,25	86		
21	0,33	0,17	54	0,18	0,20	87		
22	0,24	0,10	55	0,30	0,35	88		
23	0,24	0,19	56	0,09	0,20	89		
24	0,08	0,17	57	0,24	0,21	90		
25	0,08	0,20	58	0,28	0,30	91		
26	0,10	0,25	59	0,18	0,24	92		
27	0,26	0,23	60	0,20	0,08	93		
28	0,13	0,13	61	0,10	0,12	94		
29	0,21	0,21	62	0,22	0,22	95		
30	0,12	0,17	63	0,22	0,13	96		
31	0,03	0,10	64	0,15	0,07	97		
32	0,18	0,24	65			98		
33	0,16	0,22	66			99		



Hårdhetsprovning - Vickers
Protokoll

DETALJ: **Skruv nr 1**
INDEX: 431106E
ART.NR: 2121 2040-852

Signatur: RMN
Kommentar: M16x270 order 3015344 Appro AB

Datum: 2006-11-20

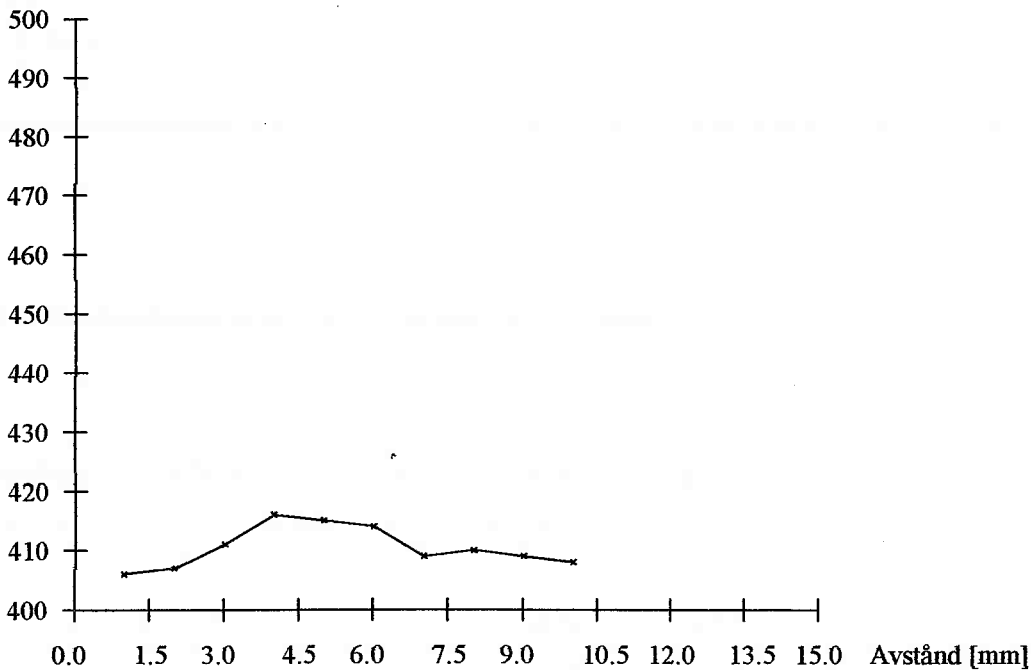
(1) Hårdhetstabell (HV 30)

Avst.	Hårdhet	Avst.	Hårdhet	Avst.	Hårdhet	Avst.	Hårdhet
01.00	406						
02.00	407						
03.00	411						
04.00	416						
05.00	415						
06.00	414						
07.00	409						
08.00	410						
09.00	409						
10.00	408						

Medel = 410
Max = 416
Min = 406
Std = 3

Ythårdhet = 406 (41.4HRC)

Hårdhet HV 30





Hårdhetsprovning - Vickers
Protokoll

DETALJ: **Skruv nr.2**
INDEX: 431106E
ART.NR: 2121 2040-852

Signatur: RMN
Kommentar: M16x270 order 3015344 Appro AB

Datum: 2006-11-20

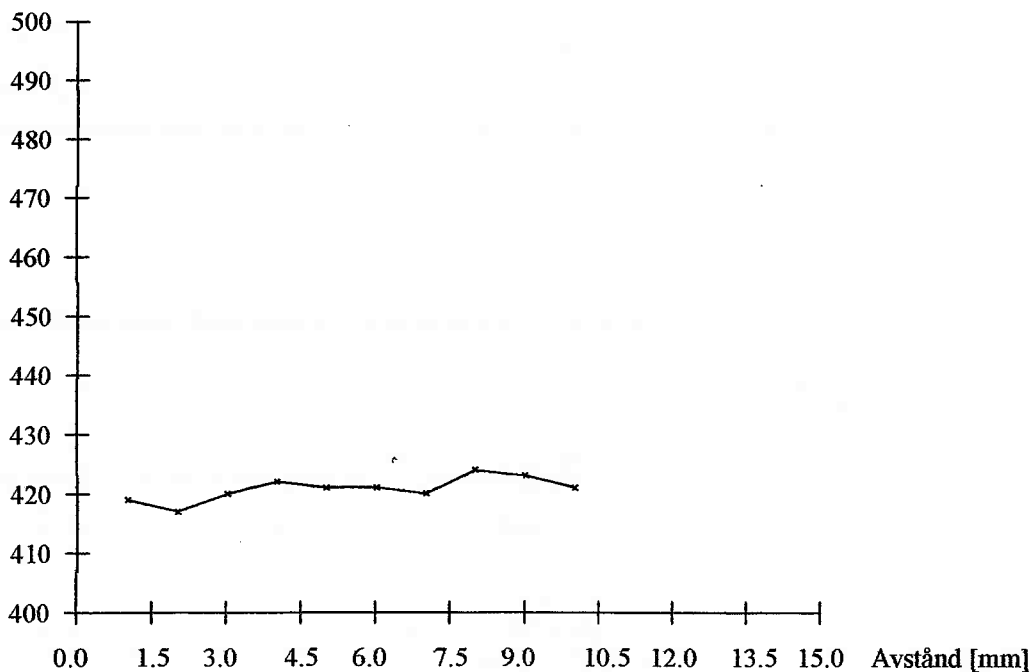
(1) Hårdhetstabell (HV 30)

Avst.	Hårdhet	Avst.	Hårdhet	Avst.	Hårdhet	Avst.	Hårdhet
01.00	419						
02.00	417						
03.00	420						
04.00	422						
05.00	421						
06.00	421						
07.00	420						
08.00	424						
09.00	423						
10.00	421						

Medel = 421
Max = 424
Min = 417
Std = 2

Ythårdhet = 419 (42.6HRC)

Hårdhet HV 30



Field Range
 Account number 13224
 Item number IQ, IT*, IV*
 Physical date 2006-01-01..2006-11-19
 Reference Purchase order

igullunds Drives AB

eject Statistics

Item number	Name	Item designation	Quantity	Not accepted quantity	Scrap percentage
21 2037-698	Hexagon headed screw	ISO 4014-M20x260-10.9	4 000,00	0,00	0,00
21 2037-699	Hexagon headed screw	ISO 4014-M20x300-10.9	6 020,00	0,00	0,00
21 2037-705	Hexagon headed screw	ISO 4014-M20x380-10.9	3 245,00	0,00	0,00
21 2037-709	Hexagon headed screw	ISO 4014-M20x420-10.9	183,00	0,00	0,00
21 2541-647	Hexagon socket head cap screw	ISO 4762-M16x140-12.9	200,00	0,00	0,00
21 2541-704	Hexagon socket head cap screw	ISO 4762-M20x360-12.9	20,00	0,00	0,00
21 2561-449	Screw	SMS 1960-UC6S3/4UNCx178-12.9	50,00	0,00	0,00
21 2561-827	Screw	SMS 1960-UC6S1/2UNCx203-12.9	596,00	0,00	0,00
21 2561-915	Screw	SMS 1960-UC6S3/4UNCx216-12.9	86,00	0,00	0,00
21 2561-945	Screw	SMS 1960-UC6S5/8UNCx440-12.9 TI	2 708,00	0,00	0,00
26 2039-128	Hexagon nut	ISO 4032-M24-10	8 425,00	0,00	0,00
26 2540-024	Acorn nut	SS 2180-B-M24-8	7 500,00	0,00	0,00
8 2366-801	Threaded bar	M24 (MB2400)	2 792,00	0,00	0,00
8 2287-001	Screw	M30X300 10.9	67,00	0,00	0,00
8 2287-002	Screw	M30X600 10.9	282,00	0,00	0,00
8 2287-003	Screw	M30X450 10.9	62,00	0,00	0,00
8 2486-002	Threaded bar	M 24, MB 3200	89,00	0,00	0,00
8 2486-003	Threaded bar	M 24, MB 4000	587,00	0,00	0,00
8 3647-004	Socket head cap screw	MC6S M20X310-12.9	22,00	40,00	6,81
and total			36 934,00	40,00	0,00

Vår ref
Lena Nordlund

Returdatum

Ordernummer
3007048Leverantör
13224Referens
Björn Almén

Leveransadress

Appro AB
Motorgatan 2
442 40 KUNGÄLVLeveransvillkor
EX WorksLeverantörsreferens
13449Leveransdatum
2006-03-03Leverantörens följesedel
13449Ankomst datum
2006-03-06Kontrollant
Andreas SellgrenKontrolldatum
2006-03-07

Artikelnummer	Ändringsläge	Artikelnamn	Enhet	Mottagen kvantitet	Godkänd kvantitet	Ej godkänd kvantitet	Ersättningskvantitet
378 2486-003	B	Gängad stång M 24, MB 4000	PCS	40,00	0,00	40,00	40,00
				Leverans diff.	0,00		

Anmärkning

Kasserade.

Stängerna är dåligt rostskyddade samt dåligt packeterade

Stängerna är rostiga, returneras till Appro AB för åtgärd.

Ersättningsleverans på denna beställning med ny faktura önskas.
Replacement delivery on this order with a new invoice is wanted.

Förväntar oss kreditering av Ej godkänd kvantitet inom 15 dagar. Om så ej är fallet skapas avdrag vid nästa utbetalning.
Expect credit for Not accepted quantity within 15 days. If not we will make a reduction from next payment.