



INDUSTRY & FACILITIES

TYPE TEST CERTIFICATE n° HSK40130159-GTA20***THIS IS TO CERTIFY THAT*****General:**

Manufacturer: Lamor Corporation, Finland
Pump type: GTA 20
Specification: Lamor Corporation specification identified as HSK40130159-GTA20

Type description:

Hydraulic Submersible Archimedes Screw Pump for Water / Bitumen / POR 100 and POR 380 pumping.

Nominal capacity: 20 m³/h
Type: GTA 20
Serial n:o: 0200306
Item ID: 226135

Type test range:

As per Lamor corporation type test program identified as HSK 40130159-GTA20

- POR 100;
 - o viscosity app. 1103 cSt , density 0,975, ambient temperature +12°C during testing
- POR 380;
 - o viscosity app. 6431 cSt, density 0,986, ambient temperature +14,4°C during testing
- Bitumen;
 - o viscosity app. 374 781 cSt, density 0,998, ambient temperature +14°C during testing



INDUSTRY & FACILITIES

TYPE TEST CERTIFICATE n° HSK40130159-GTA20

Conclusion:

After examination of the following documents:

- Type approval test report Lamor_GTA_Test_Results_2013 (ID78445); dated 14.10.2013.

By performing following tests:

- Performed by introducing different hydraulic power to pump and measuring the liquid flow and discharge pressure in these different powers.

As third party organisation

- Witnessing the test and confirming the results.

Bureau Veritas inspector certifies the test results presented in the table below and the performance of the test as per document presented in the specification.

Certified by:

Name: Toni HAKKARAINEN

Signature:

Date of issue: 04.06.2014

Inspection centre: Bureau Veritas Finland





INDUSTRY & FACILITIES

TYPE TEST CERTIFICATE n° HSK40130159-GTA20



TEST SUMMARY

PRODUCTS:

Pump:	GTA 20
Item ID:	226135
Serial Number:	0200306

TEST BASIC INFO

Test Type	CAPACITY TEST
Date:	24.9-14.10.2013

	Water	POR100	POR380	BITUMEN
Viscosity (approx.) [cSt]	1	1103 cSt	6431 cSt	374.781 cSt
Capacity [m³/h]	20,5 m³/h	21,7 m³/h	20,9 m³/h	19,0 m³/h
Discharge pressure [bar]	14,0 bar	13,0 bar	14,8 bar	13,0 bar
Calculated hydraulic power [kW]	15,7 kW	20,1 kW	23,3 kW	24,7 kW
Water injection used	-	-	-	22 l/min @ 60°C
Comments				

Notes. Given values are maximum values tested per each liquid, not necessarily occurring simultaneously.

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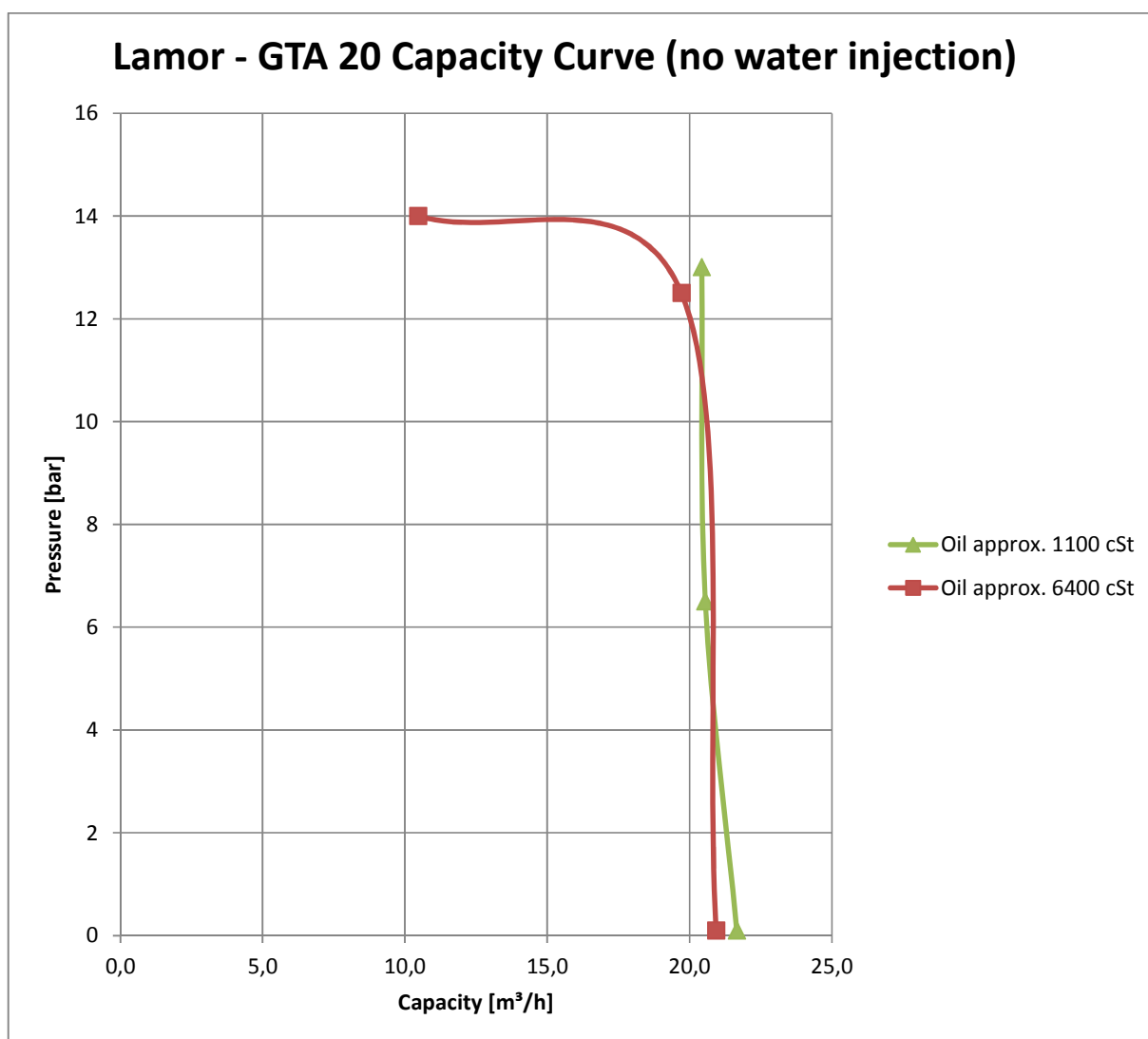
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INDUSTRY & FACILITIES

TYPE TEST CERTIFICATE n° HSK40130159-GTA20
Capacity curve of the type tested pump:




INDUSTRY & FACILITIES

TYPE TEST CERTIFICATE n° HSK40130159-GTA30***THIS IS TO CERTIFY THAT*****General:**

Manufacturer: Lamor Corporation, Finland
Pump type: GTA 30
Specification: Lamor Corporation specification identified as HSK40130159-GTA30

Type description:

Hydraulic Submersible Archimedes Screw Pump for Water / Bitumen / POR 100 and POR 380 pumping.

Nominal capacity: 30 m³/h
Type: GTA 30
Serial n:o: 0300414
Item ID: 226138

Type test range:

As per Lamor corporation type test program identified as HSK 40130159-GTA30

- POR 100;
 - o viscosity app. 1103 cSt , density 0,975, ambient temperature +12°C during testing
- POR 380;
 - o viscosity app. 5164 cSt, density 0,986, ambient temperature +14,4°C during testing
- Bitumen;
 - o viscosity app. 174 663 cSt, density 0,998, ambient temperature +14°C during testing



INDUSTRY & FACILITIES

TYPE TEST CERTIFICATE n° HSK40130159-GTA30

Conclusion:

After examination of the following documents:

- Type approval test report Lamor_GTA_Test_Results_2013 (ID78446); dated 14.10.2013.

By performing following tests:

- Performed by introducing different hydraulic power to pump and measuring the liquid flow and discharge pressure in these different powers.

As third party organisation

- Witnessing the test and confirming the results.

Bureau Veritas inspector certifies the test results presented in the table below and the performance of the test as per document presented in the specification.

Certified by:

Name: Toni HAKKARAINEN

Signature:

Date of issue: 04.06.2014

Inspection centre: Bureau Veritas Finland





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TYPE TEST CERTIFICATE n° HSK40130159-GTA30



TEST SUMMARY

PRODUCTS:

Pump:	GTA 30
Item ID:	226138
Serial Number:	0300414

TEST BASIC INFO

Test Type	CAPACITY TEST
Date:	24.9-14.10.2013

	Water	POR100	POR380	BITUMEN
Viscosity (approx.) [cSt]	1	1103 cSt	5164 cSt	174.633 cSt
Capacity [m³/h]	31,0 m³/h	29,8 m³/h	29,3 m³/h	28,3 m³/h
Discharge pressure [bar]	14,0 bar	13,0 bar	14,5 bar	
Calculated hydraulic power [kW]	20,7 kW	23,4 kW	26,9 kW	
Water Injection used				20 l/min @ 60°C
Comments				

Notes. Given values are maximum values tested per each liquid, not necessarily occurring simultaneously.

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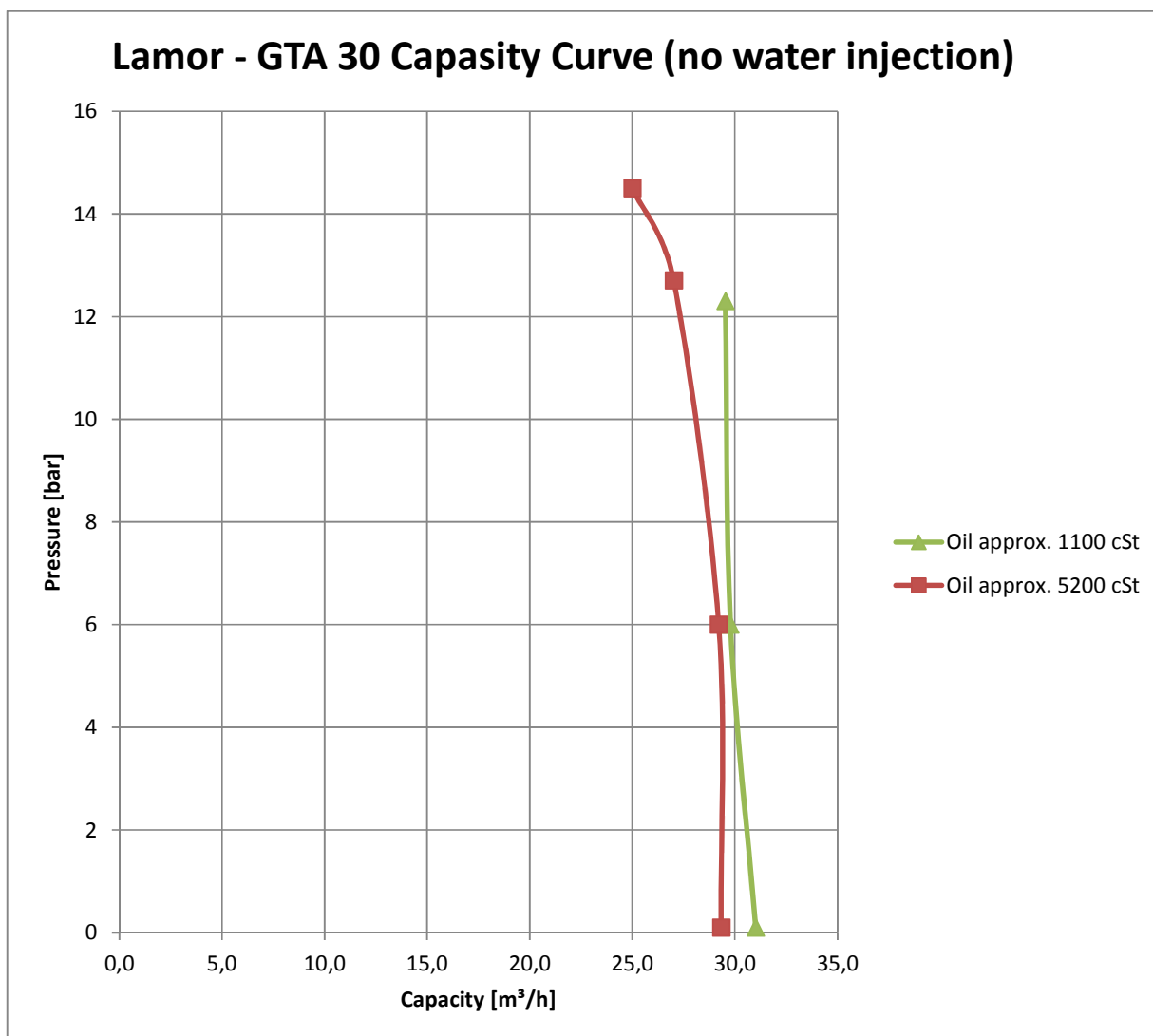
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INDUSTRY & FACILITIES

TYPE TEST CERTIFICATE n° HSK40130159-GTA30
Capacity curve of the type tested pump:




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TYPE TEST CERTIFICATE n° HSK40130159-GTA50***THIS IS TO CERTIFY THAT*****General:**

Manufacturer: Lamor Corporation, Finland
Pump type: GTA 50
Specification: Lamor Corporation specification identified as HSK40130159-GTA50

Type description:

Hydraulic Submersible Archimedes Screw Pump for Water / Bitumen / POR 100 and POR 380 pumping.

Nominal capacity: 50 m³/h
Type: GTA 50
Serial n:o: 0500435
Item ID: 226140

Type test range:

As per Lamor corporation type test program identified as HSK 40130159-GTA50

- POR 100;
 - o viscosity app. 1103 cSt , density 0,975, ambient temperature +12°C during testing
- POR 380;
 - o viscosity app. 4639 cSt, density 0,986, ambient temperature +16°C during testing
- Bitumen;
 - o viscosity app. 436 834 cSt, density 0,998, ambient temperature +14°C during testing



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TYPE TEST CERTIFICATE n° HSK40130159-GTA50

Conclusion:

After examination of the following documents:

- Type approval test report Lamor_GTA_Test_Results_2013 (ID78447); dated 14.10.2013.

By performing following tests:

- Performed by introducing different hydraulic power to pump and measuring the liquid flow and discharge pressure in these different powers.

As third party organisation

- Witnessing the test and confirming the results.

Bureau Veritas inspector certifies the test results presented in the table below and the performance of the test as per document presented in the specification.

Certified by:

Name: Toni HAKKARAINEN

Signature:

Date of issue: 04.06.2014

Inspection centre: Bureau Veritas Finland





INDUSTRY & FACILITIES

TYPE TEST CERTIFICATE n° HSK40130159-GTA50



TEST SUMMARY

PRODUCTS:

Pump:	GTA 50
Item ID:	226140
Serial Number:	0500435

TEST BASIC INFO

Test Type	CAPACITY TEST
Date:	24.9-14.10.2013

	Water	POR100	POR380	BITUMEN
Viscosity (approx.) [cSt]	1	1103 cSt	4639 cSt	436.834 cSt
Capacity [m³/h]	51,0 m³/h	59,9 m³/h	61,1 m³/h	49,1 m³/h
Discharge pressure [bar]	14,0 bar	13,5 bar	15,3 bar	
Calculated hydraulic power [kW]	35,8 kW	28,5 kW	52,5 kW	
Water injection used	-	-	-	33 l/min @ 70°C
Comments				

Notes: Given values are maximum values tested per each liquid, not necessarily occurring simultaneously.

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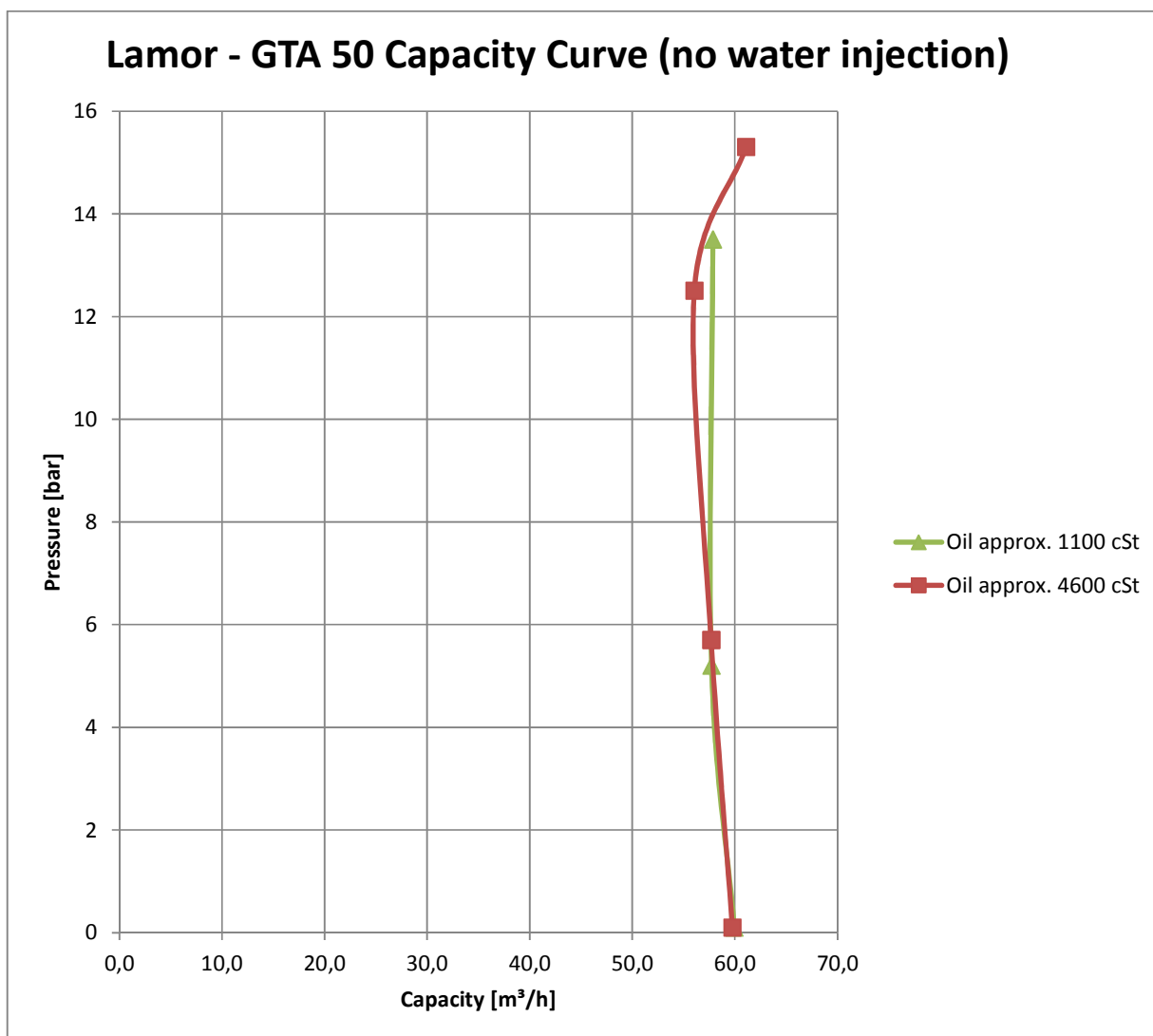
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TYPE TEST CERTIFICATE n° HSK40130159-GTA50
Capacity curve of the type tested pump:




INDUSTRY & FACILITIES

TYPE TEST CERTIFICATE n° HSK40130159-GTA70***THIS IS TO CERTIFY THAT*****General:**

Manufacturer: Lamor Corporation, Finland
Pump type: GTA 70
Specification: Lamor Corporation specification identified as HSK40130159-GTA70

Type description:

Hydraulic Submersible Archimedes Screw Pump for Water / Bitumen / POR 100 and POR 380 pumping.

Nominal capacity: 70 m³/h
Type: GTA 70
Serial n:o: 0700323
Item ID: 226143

Type test range:

As per Lamor corporation type test program identified as HSK 40130159-GTA70

- POR 100;
 - o viscosity app. 1009 cSt , density 0,975, ambient temperature +12°C during testing
- POR 380;
 - o viscosity app. 3399 cSt, density 0,986, ambient temperature +16°C during testing
- Bitumen;
 - o viscosity app. 235 335 cSt, density 0,998, ambient temperature +14°C during testing



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TYPE TEST CERTIFICATE n° HSK40130159-GTA70

Conclusion:

After examination of the following documents:

- Type approval test report Lamor_GTA_Test_Results_2013 (ID78448); dated 17.10.2013.

By performing following tests:

- Performed by introducing different hydraulic power to pump and measuring the liquid flow and discharge pressure in these different powers.

As third party organisation

- Witnessing the test and confirming the results.

Bureau Veritas inspector certifies the test results presented in the table below and the performance of the test as per document presented in the specification.

Certified by:

Name: Toni HAKKARAINEN

Signature:

Date of issue: 04.06.2014

Inspection centre: Bureau Veritas Finland





INDUSTRY & FACILITIES

TYPE TEST CERTIFICATE n° HSK40130159-GTA70

**TEST SUMMARY****PRODUCTS:**

Pump:	GTA 70
Item ID:	226143
Serial Number:	0700323

TEST BASIC INFO

Test Type	CAPACITY TEST
Date:	24.9-17.10.2013

	Water	POR100	POR380	BITUMEN
Viscosity (approx.) [cSt]	1	1009 cSt	3399 cSt	235.335 cSt
Capacity [m³/h]	72,0 m³/h	84,8 m³/h	81,4 m³/h	71,5 m³/h
Discharge pressure [bar]	10,0 bar	10,3 bar	9,3 bar	
Calculated hydraulic power [kW]	32,3 kW	30,0 kW	38,7 kW	
Water injection used	-	-	-	67 l/min @ 67°C
Comments				

Notes. Given values are maximum values tested per each liquid, not necessarily occurring simultaneously.

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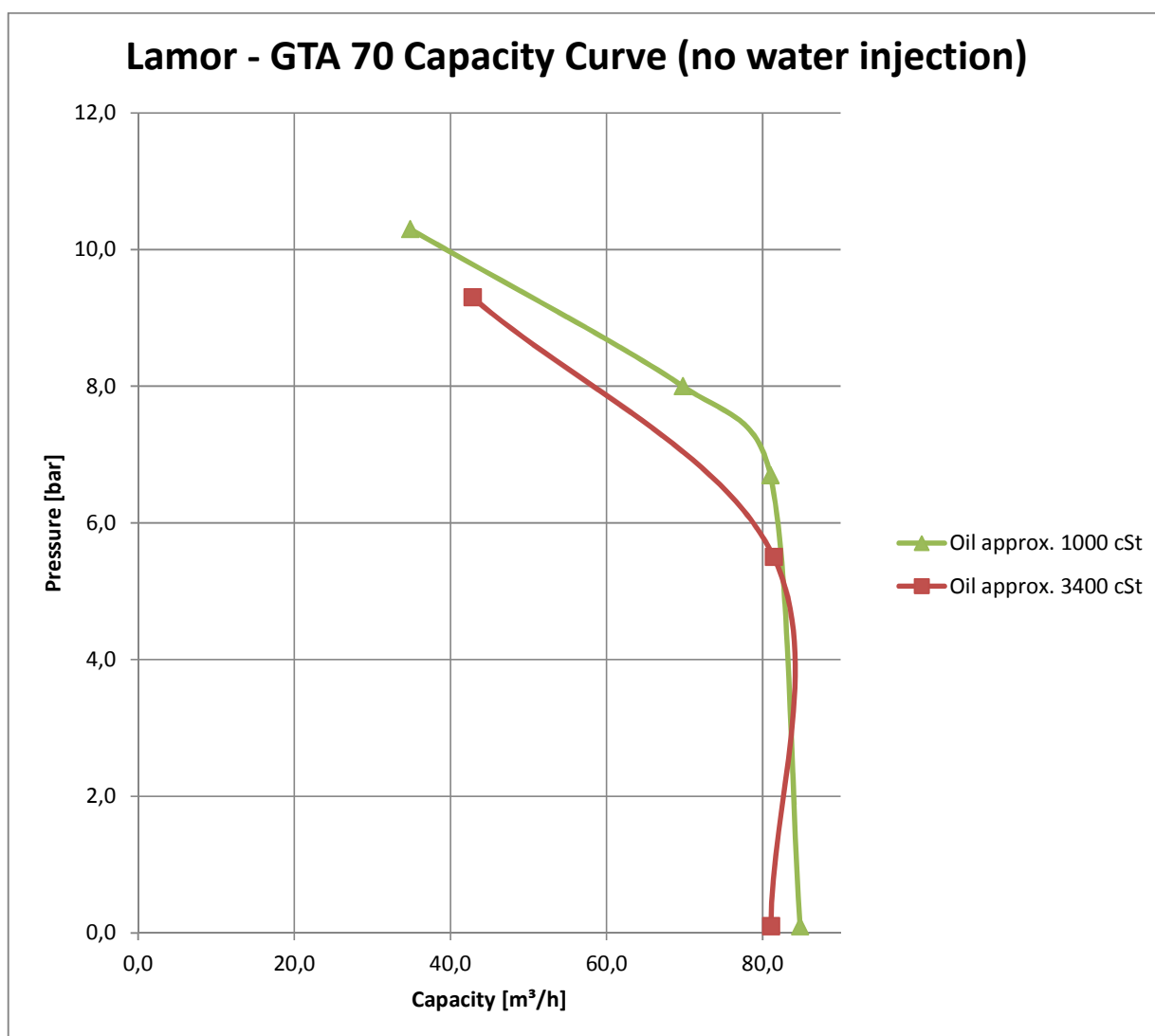
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TYPE TEST CERTIFICATE n° HSK40130159-GTA70
Capacity curve of the type tested pump:




INDUSTRY & FACILITIES

TYPE TEST CERTIFICATE n°HSK40130159-GTA115***THIS IS TO CERTIFY THAT*****General:**

Manufacturer: Lamor Corporation, Finland
Pump type: GTA 115
Specification: Lamor Corporation specification identified as HSK40130159-GTA115

Type description:

Hydraulic Submersible Archimedes Screw Pump for Water / Bitumen / POR 100 and POR 380 pumping.

Nominal capacity: 115 m³/h
Type: GTA 115
Serial n:o: 1150345
Item ID: 226114

Type test range:

As per Lamor corporation type test program identified as HSK 40130159-GTA115

- POR 100;
 - o viscosity app. 1207 cSt , density 0,975, ambient temperature +12°C during testing
- POR 380;
 - o viscosity app. 4639 cSt, density 0,986, ambient temperature +14°C during testing
- Bitumen;
 - o viscosity app. 517 496 cSt, density 0,998, ambient temperature +14°C during testing



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TYPE TEST CERTIFICATE n°HSK40130159-GTA115

Conclusion:

After examination of the following documents:

- Type approval test report Lamor_GTA_Test_Results_2013 (ID78449); dated 17.10.2013.

By performing following tests:

- Performed by introducing different hydraulic power to pump and measuring the liquid flow and discharge pressure in these different powers.

As third party organisation

- Witnessing the test and confirming the results.

Bureau Veritas inspector certifies the test results presented in the table below and the performance of the test as per document presented in the specification.

Certified by:

Name: Toni HAKKARAINEN

Signature:

Date of issue: 04.06.2014

Inspection centre: Bureau Veritas Finland





INDUSTRY & FACILITIES

TYPE TEST CERTIFICATE n°HSK40130159-GTA115



TEST SUMMARY

PRODUCTS:

Pump:	GTA 115
Item ID:	226144
Serial Number:	1150345

TEST BASIC INFO

Test Type	CAPACITY TEST
Date:	24.9-17.10.2013

	Water	POR100	POR380	BITUMEN
Viscosity (approx.) [cSt]	1	1207 cSt	4639 cSt	517.496 cSt
Capacity [m³/h]	90,0 m³/h	119,1 m³/h	114,1 m³/h	121,4 m³/h
Discharge pressure [bar]	14,0 bar	13,0 bar	12,0 bar	
Calculated hydraulic power [kW]	52,0 kW	51,0 kW	53,3 kW	
Water injection used	-	-	-	35 l/min @ 70°C
Comments				

Notes: Given values are maximum values tested per each liquid, not necessarily occurring simultaneously.

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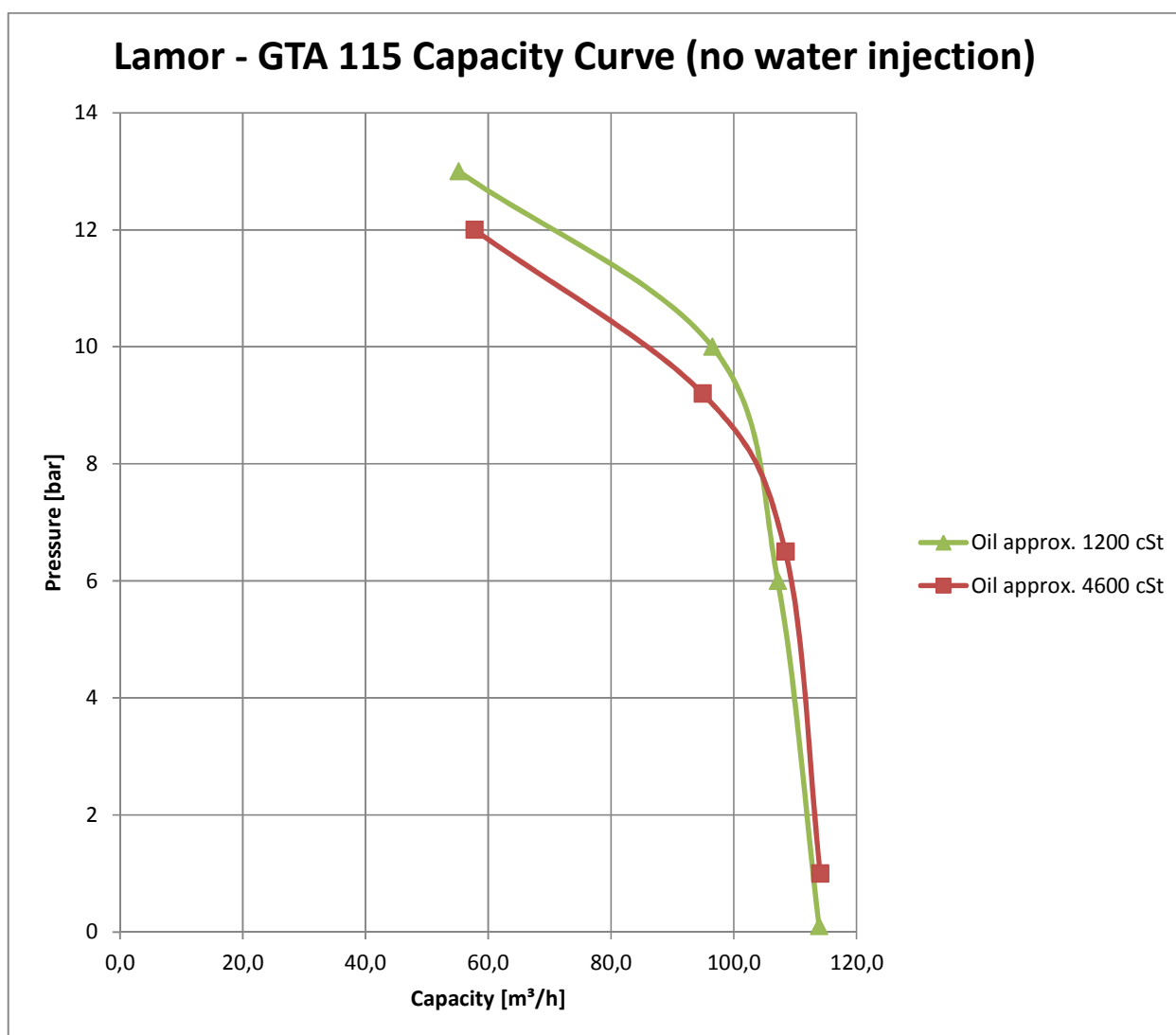




INDUSTRY & FACILITIES

TYPE TEST CERTIFICATE n°HSK40130159-GTA115

Capacity curve of the type tested pump:





INDUSTRY & FACILITIES

TYPE TEST CERTIFICATE n°HSK40130159-GTA140***THIS IS TO CERTIFY THAT*****General:**

Manufacturer: Lamor Corporation, Finland
Pump type: GTA 140
Specification: Lamor Corporation specification identified as HSK40130159-GTA140

Type description:

Hydraulic Submersible Archimedes Screw Pump for Water / Bitumen / POR 100 and POR 380 pumping.

Nominal capacity: 140 m³/h
Type: GTA 140
Serial n:o: 1400312
Item ID: 226149

Type test range:

As per Lamor corporation type test program identified as HSK 40130159-GTA140

- POR 100;
 - o viscosity app. 925 cSt , density 0,975, ambient temperature +12°C during testing
- POR 380;
 - o viscosity app. 4175 cSt, density 0,986, ambient temperature +14°C during testing
- Bitumen;
 - o viscosity app. 274 155 cSt, density 0,998, ambient temperature +14°C during testing



INDUSTRY & FACILITIES

TYPE TEST CERTIFICATE n°HSK40130159-GTA140

Conclusion:

After examination of the following documents:

- Type approval test report Lamor_GTA_Test_Results_2013 (ID78450); dated 14.10.2013.

By performing following tests:

- Performed by introducing different hydraulic power to pump and measuring the liquid flow and discharge pressure in these different powers.

As third party organisation

- Witnessing the test and confirming the results.

Bureau Veritas inspector certifies the test results presented in the table below and the performance of the test as per document presented in the specification.

Certified by:

Name: Toni HAKKARAINEN

Signature:

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INDUSTRY & FACILITIES

TYPE TEST CERTIFICATE n°HSK40130159-GTA140



TEST SUMMARY

PRODUCTS:

Pump:	GTA 140
Item ID:	226149
Serial Number:	1400312

TEST BASIC INFO

Test Type	CAPACITY TEST
Date:	24.9-14.10.2013

	Water	POR100	POR380	BITUMEN
Viscosity (approx.) [cSt]	1	925 cSt	4175 cSt	274.155 cSt
Capacity [m³/h]	115,0 m³/h	142,8 m³/h	139,7 m³/h	140,7 m³/h
Discharge pressure [bar]	10,0 bar	9,3 bar	9,0 bar	
Calculated hydraulic power [kW]	40,8 kW	48,5 kW	49,8 kW	
Water injection used	-	-	-	60 l/min @ 65°C
Comments				

Notes. Given values are maximum values tested per each liquid, not necessarily occurring simultaneously.

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TYPE TEST CERTIFICATE n°HSK40130159-GTA140

Capacity curve of the type tested pump:

