THE NETHERLANDS
(N E D E R L A N D)

E4

COMMUNICATION

Concerning [1]:

- ~~approval granted~~
- approval extended
- ~~approval refused~~
- ~~approval withdrawn~~
- ~~production definitively discontinued~~

of a type of ~~CNG~~/LNG component pursuant to Regulation number 110.

Approval number: E4*110R05/00*0378*06

1. ~~CNG~~/LNG component considered:

   - ~~Container(s) or cylinder(s)~~ [1]
   - ~~Tank(s) or vessel(s)~~ [1]
   - ~~CNG accumulator(s)~~ [1]
   - ~~Pressure indicator~~ [1]
   - ~~Pressure relief valve~~ [1]
   - ~~Automatic valve(s)~~ [1]
   - ~~Excess flow valve~~ [1]
   - ~~Gas-tight housing~~ [1]
   - ~~Pressure regulator(s)~~ [1]
   - ~~Non-return valve(s) or check valve(s)~~ [1]
   - ~~Pressure relief device (PRD)(temperature triggered)~~ [1]
   - ~~Manual valve~~ [1]
   - ~~Flexible fuel lines~~ [1]
   - ~~Filling unit or receptacle~~ [1]
   - ~~Gas injector(s)~~ [1]
   - ~~CNG Compressor~~ [1]
   - ~~Gas flow adjuster~~ [1]
   - ~~Gas/air mixer~~ [1]
   - ~~Electronic control unit~~ [1]
   - ~~Pressure and temperature sensor(s)~~ [1]
   - ~~CNG filter(s)~~ [1]
   - ~~PRD (pressure triggered)~~ [1]
   - ~~Fuel rail~~ [1]
   - ~~Heat exchanger(s)/vaporizer(s)~~ [1]
   - ~~Natural gas detector(s)~~ [1]

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Type-approval Department

- ~~LNG filling receptacle(s)~~ (1)
- ~~LNG pressure control regulator(s)~~ (1)
- ~~LNG pressure and/or temperature sensor(s)~~ (1)
- ~~LNG manual valve(s)~~ (1)
- ~~LNG automatic valve(s)~~ (1)
- LNG non-return valve(s) (1)
- ~~LNG pressure relief valve(s)~~ (1)
- ~~LNG excess flow valve(s)~~ (1)
- ~~LNG fuel pump(s)~~ (1)
-

2.	Trade name or mark	:	Macro check valve 14250 series Brand name: RegO Products
3.	Manufacturer's name and address	:	Engineered Controls International LLC 100 RegO Drive 27244 Elon, North Carolina United States of America
4.	If applicable, name and address of manufacturer's representative	:	N.A.
5.	Submitted for approval on	:	February 2015
6.	Technical service responsible for conducting approval tests	:	Kiwa Nederland B.V. P.O. Box 137 7300 AC Apeldoorn The Netherlands
7.	Date of report issued by that service	:	23-01-2023
8.	Number of report issued by that service	:	141001402_P000272294
9.	Approval	:	~~granted~~/~~refused~~/extended/~~withdrawn~~ (1)
10.	Reason(s) of extension (if applicable)	:	The currently homologated Macro check valve 14250 series is updated to the latest Revision of the ECE Regulation 110
11.	Place	:	Zoetermeer
12.	Date	:	28 February 2023
13.	Signature	:	

14. The documents filed with the application or extension of approval can be obtained upon request.

(1) Strike out what does not apply.

ADDENDUM

1. Additional information concerning the type approval of a type of ~~CNG~~/LNG components pursuant to Regulation number 110.

1.1.	Natural Gas Storage System	
1.1.1.	Container(s) or cylinder(s) (for CNG system)	
1.1.1.1.	Dimensions	:
1.1.1.2.	Material	:
1.1.2.	Tank(s) or vessel(s) (for LNG system)	
1.1.2.1.	Capacity	:
1.1.2.2.	Material	:
1.1.3.	CNG accumulator	
1.1.3.1.	Dimensions	:
1.1.3.2.	Material	:
1.1.3.3.	Capacity	:
1.2.	Pressure indicator	
1.2.1.	Working pressure(s) (2)	:
1.2.2.	Material	:
1.3.	Pressure relief valve (discharge valve)	
1.3.1.	Working pressure(s) (2)	:
1.3.2.	Material	:
1.4.	Automatic valve(s)	
1.4.1.	Working pressure(s) (2)	:
1.4.2.	Material	:
1.5.	Excess flow valve	
1.5.1.	Working pressure(s) (2)	:
1.5.2.	Material	:
1.6.	Gas-tight housing	
1.6.1.	Working pressure(s) (2)	:
1.6.2.	Material	:
1.7.	Pressure regulator(s)	
1.7.1.	Working pressure(s) (2)	:
1.7.2.	Material	:
1.8.	Non-return valve(s) or check valve(s)	
1.8.1.	Working pressure(s) (2)	:
1.8.2.	Material	:
1.9.	Pressure relief device (temperature triggered)	
1.9.1.	Working pressure(s) (2)	:
1.9.2.	Material	:
1.10.	Manual valve	
1.10.1.	Working pressure(s) (2)	:
1.10.2.	Material	:

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1.11.	Flexible fuel lines	
1.11.1.	Working pressure(s) (2)	:
1.11.2.	Material	:
1.12.	Filling unit or receptacle	
1.12.1.	Working pressure(s) (2)	:
1.12.2.	Material	:
1.13.	Gas injector(s)	
1.13.1.	Working pressure(s) (2)	:
1.13.2.	Material	:
1.14.	Gas flow adjuster	
1.14.1.	Working pressure(s) (2)	:
1.14.2.	Material	:
1.15.	Gas/air mixer	
1.15.1.	Working pressure(s) (2)	:
1.15.2.	Material	:
1.16.	Electronic control unit	
1.16.1.	Basic software principles	:
1.17.	Pressure and temperature sensor(s)	
1.17.1.	Working pressure(s) (2)	:
1.17.2.	Material	:
1.18.	CNG filter(s)	
1.18.1.	Working pressure(s) (2)	:
1.18.2.	Material	:
1.19.	PRD (pressure triggered)	
1.19.1.	Working pressure(s) (2)	:
1.19.2.	Material	:
1.20.	Fuel rail(s)	
1.20.1.	Working pressure(s) (2)	:
1.20.2.	Material	:
1.21.	Heat Exchanger(s)/Vaporizer(s)	
1.21.1.	Working pressure(s) (2)	:
1.21.2.	Material	:
1.22.	Natural gas detector(s)	
1.22.1.	Working pressure(s) (2)	:
1.22.2.	Material	:
1.23.	LNG filling receptacle(s)	
1.23.1.	Working pressure(s) (2)	:
1.23.2.	Material	:
1.24.	LNG pressure control regulator(s)	
1.24.1.	Working pressure(s) (2)	:
1.24.2.	Material	:

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1.25.	LNG pressure and/or temperature sensor(s)		
1.25.1.	Working pressure(s) [2]	:	
1.25.2.	Material	:	
1.26.	LNG manual valve(s)		
1.26.1.	Working pressure(s) [2]	:	
1.26.2.	Material	:	
1.27.	LNG automatic valve(s)		
1.27.1.	Working pressure(s) [2]	:	
1.27.2.	Material	:	
1.28.	LNG non-return valve(s)		
1.28.1.	Working pressure(s) [2]	:	3.8 MPa (38 bar)
1.28.2.	Material	:	See report 141001402_P000272294
1.29.	LNG pressure relief valve(s)		
1.29.1.	Working pressure(s) [2]	:	
1.29.2.	Material	:	
1.30.	LNG excess flow valve(s)		
1.30.1.	Working pressure(s) [2]	:	
1.30.2.	Material	:	
1.31.	LNG fuel pump(s)		
1.31.1.	Working pressure(s) [2]	:	
1.31.2.	Material	:	
1.32	CNG Compressor		
1.32.1.	Working pressure(s) [2]	:	
1.32.2.	Material	:	

[2] Specify the tolerance

Report 141001402_P000272294
23 January 2023

Test report

Macro Check valve 14250 series

Applicant

Engineered Controls International, LLC
100 RegO Drive 27244
Elon, North Carolina
United States of America

Trust
Quality
Progress

www.kiwaenergy.com

Contents

The test results in this report are exclusively related to the samples offered and tested.
Tests marked in this report with the IRN number are part of the accreditation scope (RvA L248) unless stated differently.
Measurement uncertainty of testing in the context of ISO/IEC 17025.
Test reports can, in some cases, contain besides the numeric measured values also the qualification “pass” or “fail”. In this assessment, compliance with the specification limit from the applicable product standard is used. The measurement complies with the requirement if the probability of its being within the limit is at least 50%.
This does not take into account the measurement uncertainty associated with the test method.
It is explicitly stated that in the case of a "pass" or "fail", the measured result is corrected for the measurement uncertainty and/or the relevant test conditions for the measured result.
Unless otherwise noted the measurement uncertainty and conditions are as specified in the test specifications.
This report is only valid when signed by the test person and reviewer.

- RDW designation number for E4 and e4: RDWT-CAC-04
- KBA designation number for E1 and e1: KBA-P00033-12

Conclusions for compliance with e.g. product standard requirements are not part of the lab scope (RvA L248).
In case when information is supplied by the customer it is possible that it can affect the validity of results.
In case of dispute regarding this test report please contact Kiwa Nederland B.V.
Version: 004

TEST REPORT
Macro Check valve 14250 series

In accordance with ECE R110

Report number	:	**141001402**
Job reference	:	**P000272294**
Date of issue	:	23-01-2023
Total number of pages	:	13 (including appendices)
Testing laboratory	:	**KIWA Nederland B.V.**
Testing location/address	:	Wilmersdorf 50 7327 AC Apeldoorn The Netherlands
Applicant's name	:	**Engineered Controls International, LLC**
Address	:	100 RegO Drive 27244 Elon, North Carolina United States of America
Manufacturers location	:	**Engineered Controls International, LLC**
Address	:	100 RegO Drive 27244 Elon, North Carolina United States of America
Scope	:	Testing of Macro Check valve series regarding the requirements as derived from the below mentioned Test specifications.
Test specifications	:	
Standards	:	Regulation 110 Addendum 109: Regulation No. 110 Revision 6 - Amendment 4 05 series of amendments– Date of entry into force: 22 June 2022
Non-standard test method	:	N.A.
Component description	:	Macro Check valve 14250 series
Manufacturer	:	Engineered Controls International, LLC
Trade Mark	:	RegO Products Macro Technologies LLC
Model/Type reference	:	Macro Check valve 14250-5 Macro Check valve 14250-6 (a full overview can be found in chapter 2: Description of the product)

Sample number(s)	:	N.A.
Intake date sample(s)	:	N.A.
Date(s) of testing	:	N.a.

Remarks : N.A.

Summary : Complies with the requirements as far as identified in the attached test- and result sheets.

Tested by : Regina Adelmann
(name + signature)

Reviewed by : Eric Harmsen
(name + signature)

1 Summary of testing

On request of Engineered Controls International, LLC the items as mentioned under Test item description are tested according to the Test specifications (see page 3 of this report).

Based on the product(s) information the test plan is not subject to any special interpretations or modifications.

The following modifications are made to the Macro Check valve 14250 series

- The currently homologated Macro Check valve 14250 series is updated to the latest Revision of the ECE Regulation 110

As a result, no tests are carried out

Notes

- The described test results are only valid for the tested materials and objects.
- RDW designation number for E4 and e4: RDWT-CAC-04
- KBA designation number for E1 and e1: KBA-P00033-12

2 Description of the product

The information below is based on the test results on the models under testing and the information of the manufacturer.

Macro Check valve 14250 series

Approval number(s)	:	E4*110R05/00*0378*06
Marking number		E4-110R-050378 “L”
Manufacturer	:	Engineered Controls International, LLC
Brand name(s)	:	RegO Products
		Macro Technologies LLC
Type(s)	:	Macro check valve 14250-5
		Macro check valve 14250-6
Working pressure	:	3.8 MPa (38 bar)
Classification	:	Class 5
Temperature range	:	-162 °C up to 85 °C
Material(s)	:	see drawings

3 Report history

Report number	**:**	**141001402**
Project number	**:**	**141001402**
Approval number	:	E4-110R-010378 L
Report date	:	03-02-2015
Author	:	not known
Description	:	Initial report Macro check valve 14250-5

Report number	**:**	**141001402**
Project number	**:**	**150301049**
Approval number	:	E4-110R-010378 L
Report date	:	12-05-2015
Author	:	not know
Description	:	Extension 01 The following modifications are included: - Material change: pin and packing made from carbon filled peek

Report number	**:**	**141001402**
Project number	**:**	**160101737**
Approval number	:	E4-110R-010378 L
Report date	:	23-02-2016
Author	:	not know
Description	:	Extension 02 The following modifications are included: - The Macro Check Valve 14250 series are extended with the new type 14250-6 where the internal actuation drive is modified

Report number	**:**	**141001402**
Project number	**:**	**160901176**
Approval number	:	E4-110R-010378 L
Report date	:	22-09-2016
Author	:	not know
Description	:	Extension 03 The following modifications are included: - The stem of the Macro check valve 14250-6 is combined into a one-piece Stainless Steel part - No other material has been changed. The design is the same

Report number	**:**	**141001402**
Project number	**:**	**170200424**
Approval number	:	E4-110R-020378 L
Report date	:	14-02-2017
Author	:	not know
Description	:	Extension 04

The following modifications are included:

- The extended check valve has the same washer and spring cup as the homologated LNG Manual valve (E4-110R-010444).
  There is no change to material or sealing.
  Additional testing is not necessary.
- The stamp location of the data plate has been changed.
- Referring to the Revision 3 – Amendment 4 of the Regulation ECE R110 the E4 number for the Macro check valve has been changed to E4-110R-020378.

Report number	**:**	**141001402**
Project number	**:**	**P000050684**
Approval number	:	E4*110R02/00*0378*05
Marking number		E4-110R-020378 L
Report date	:	16-11-2021
Author	:	Regina Adelmann
Description	:	Extension 05

The following modifications are included:

- Addition of refence dimension Macro Check valve 14250-6
  Testing is not applicable.
- The certificate number for the Regulation 110 has been rewritten to the updated 1958 Agreement revision 3

Report number	**:**	**141001402**
Project number	**:**	**P000272294**
Approval number	:	E4*110R05/00*0378*06
Marking number		E4-110R-050378 “L”
Report date	:	23-01-2023
Author	:	Regina Adelmann
Description	:	Extension 06

The following modifications are included:

- The currently homologated Macro Check valve 14250 series is updated to the latest Revision of the ECE Regulation 110.

4 Measurement uncertainty

Measurement uncertainty of testing in the context of ISO/IEC 17025

Applied equipment

The applied equipment in the department Automotive are in the calibration database ICS2000, in this database the equipment of the department is stated with the applicable measurement uncertainty. This database is controlled by the calibration department.

Applied measurement uncertainty

In the laboratory the OM 3.10.7 applies.

Unless otherwise specified in the test specifications the measurement uncertainty and conditions applied are:

Voltage	± 2 % Reading
High voltage test device (SPS) 500 – 3750 Vac	± 5 % Reading
Resistance	± 2 % Reading
Protective wire and insulation test device	± 5 % Reading
Sliding gauge	± 0.1 mm
Measuring tape	± 1 mm
Cooling and heating < -10 °C	± 5 °C
Cooling and heating –10 °C / +100 °C	± 3 °C
Cooling and heating > 100 °C	± 5 % Reading
Climate chamber	± 2 °C / ± 3 %RV
Ambient temperature	± 1 °C (10-30)
Time =< 1 hour	± 0.2 s
Time > 1 hour	± 0.1 % Reading
Torque	± 5 % Reading
Bending moment	± 5 % Reading
Standard weight	± 5 % Reading
Weighing < 30 g	± 0.1 % Reading
Weighing > 30 g	± 2 % Reading
Pressure (gas + air) general	± 5 % Reading
Barometer reading	± 5 mbar
Pressure (water)	± 5 % Reading
Burst water pressure	± 1 % Reading
Gas tightness 0-100 cm^3/h	± 5 cm^3/h
Gas tightness > 100 cm3/h	± 5 % Reading
Actual Flow rate (general)	± 5 % Reading

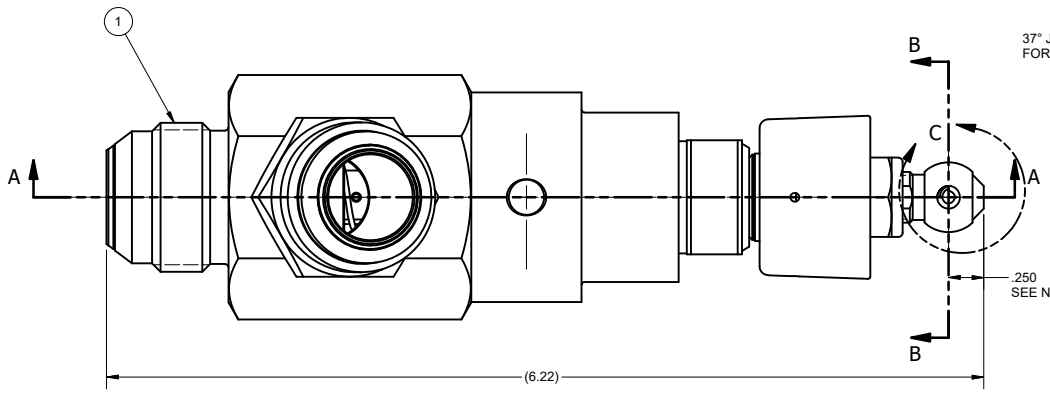
5 Appendices

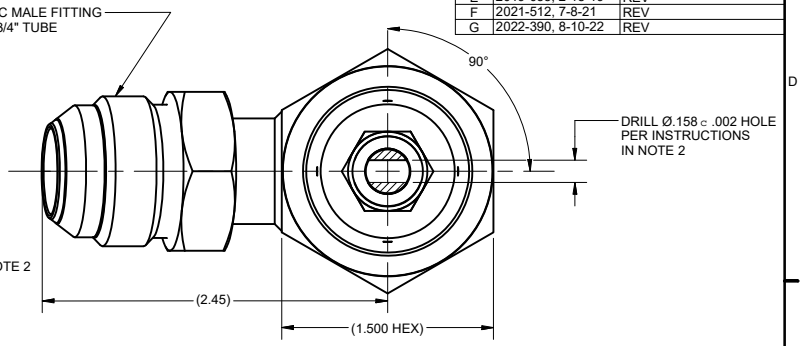
Appendix 1 – Drawings

(1 page)

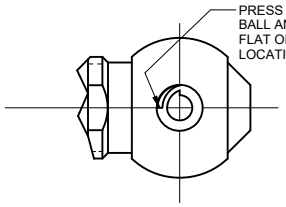
APPROVED/CONTROLLED

REVISION HISTORY		
REV	DATE	DESCRIPTION
A-C		REV
D	2018-191, 4-2-18	REV
E	2019-055, 2-18-19	REV
F	2021-512, 7-8-21	REV
G	2022-390, 8-10-22	REV





SECTION B-B



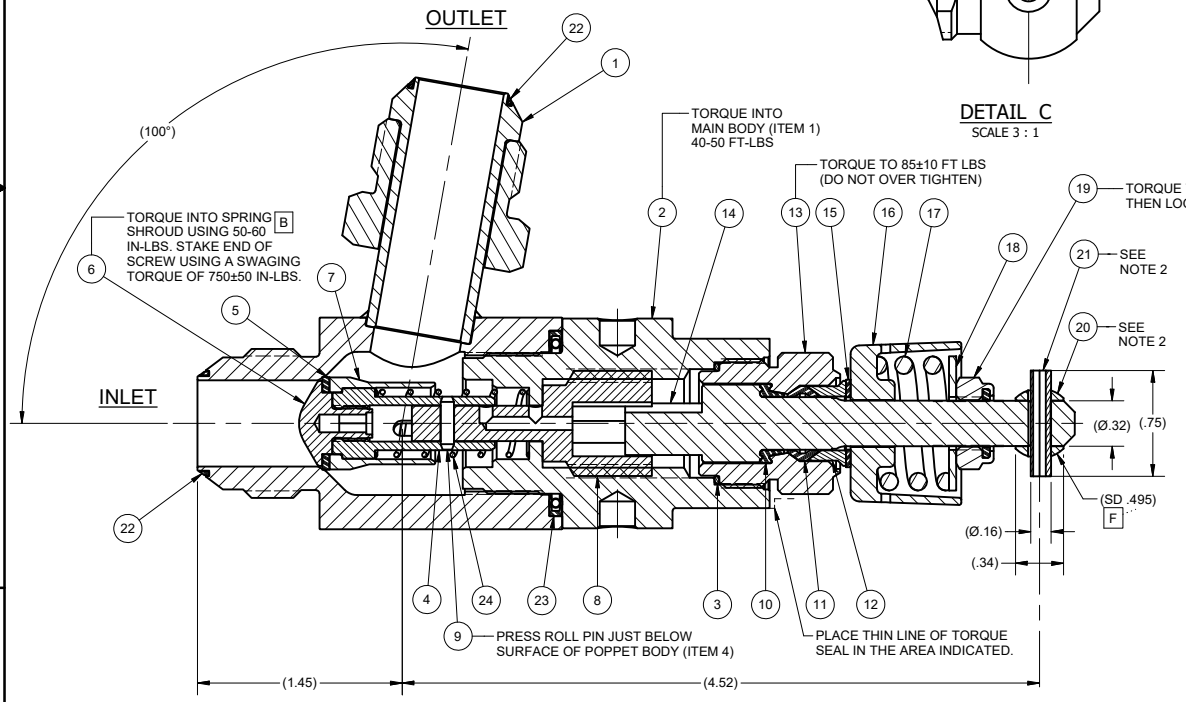
DETAIL C
SCALE 3 : 1

NOTES:

1. CLEAN & PACKAGE PER B-11550-400 OXYGEN SERVICE.
2. ASSEMBLE ALL COMPONENTS EXCEPT BALL JOINT (ITEM 20) AND COIL PIN (ITEM 21), TURN SPRING HOLDER CLOCKWISE TO PLACE VALVE IN FULLY CLOSED/CHECK POSITION. DRILL Ø.158±.002 HOLE IN STEM AT THE ORIENTATION SHOWN IN SECTION B-B. INSTALL BALL JOINT AND PIN WITH EQUAL SPACING ON EACH SIDE.
3. PERMANENTLY MARK ON SURFACES INDICATED:
   - C A. LNG FILL CHECK VALVE
   - B. REGO PART NUMBER
   - C C. ECE R110 NO. & PART MARK
   - C D. ASSEMBLY DATE CODE-XXX (SERIAL NUMBER) E
   - D C E. 1.59 MPa (230 PSIG)
   - F. HOUSING MATERIAL TRACEABILITY CODE "MMC"

B E4 110R-050378-L G
ØA= Ø.315

E 4. TEST PER 14250-100.



SECTION A-A

ITEM	QTY	DESCRIPTION	PART NUMBER
24	1	SPRING, CYLINDRICAL	14246
23	1	SEAL, BODY	14261
22	2	SEAL, PORT	14259
21	1	PIN, COIL	14544
20	1	JOINT, BALL	14613
19	1	NUT, LOCK	7513-13SS
18	1	WASHER	9464EX-2 B
17	1	SPRING, CYLINDRICAL	9464-6
16	1	SPRING, HOLDER	9464EX-3 B
15	1	WASHER, SLIP	9464-17
14	1	STEM, UPPER	14610
13	1	BONNET, UPPER	14609
12	1	GLAND, PACKING	9464-15
11	1	PACKING, STEM	9464-14
10	1	SEAL, LOWER	9464-13
9	1	ROLL PIN	14262
8	1	STEM, INNER	14608
7	1	SHROUD, POPPET SPRING	14281
6	1	SCREW, POPPET	14244
5	1	SEAL, POPPET	14243
4	1	BODY, POPPET	14242
3	1	GASKET	9452ES-5
2	1	BONNET, LOWER	14607
1	1	BODY, WELDMENT	14250-61

Project no. P000272294

kiwa

ECE
11395-ECE

DRAWN	T.TICKLE	ISSUED DATE	2/25/2016
CHECKED	N.EANES	CHECKED DATE	2/7/2023
INSPECTED	T.TICKLE	INSPECTED DATE	2/7/2023
APPROVED	C.HERMAN	APPROVED DATE	2/7/2023
REFERENCE NUMBER		IDENTIFIER	
PROJECT NUM	LC1503	VARIANT DIM	
SCALE	1:1	REV LEVEL	G

UNLESS OTHERWISE SPECIFIED:
2 PL DEC ⌖.02
3 PL DEC ⌖.005
4 PL DEC ⌖.0005
ANGLES ⌖ 1°
CONCENTRICITY .010 FIM
FINISH 125 MAX, REMOVE BURRS, BREAK SHARP EDGES R.015 MAX
INTERPRET DIMENSIONS & TOLERANCES PER ASME Y14.5M-1994
A -CHANGES GAUGES- 1

ENGINEERED CONTROLS INTERNATIONAL, LLC.

REGO ELON, N.C. 27244 — REGO ASIA PUDONG, SHANGHAI, CHINA 201202

TITLE
VALVE, CHECK
W/ MANUAL BY-PASS

DRAWING NUMBER 14250-6

DWG SIZE C

6 End of report