INVOICE

THE GELLERT CO.,INC.

444 WAIAKAMILO ROAD • HONOLULU, HAWAII 96817-4941 • PHONE (808) 847-2695 • FAX (808) 847-1433
www.gellertco.com

REMIT TO:
444 WAIAKAMILO RD.
HONOLULU, HAWAII
96817-4941

NO. 424183

DATE (MO. | DAY | YR.): 11/30/16

SOLD TO
6216
AMERESCO
3555 HARDING AVE
SUITE 2A
HONOLULU, HI 96816

DELIVER TO
GEMINI NORTH ESP
GREG SHEINDLIN @
808-364-1301
SHIPPED 11/15 FR FACTORY

REQ. OR JOB NO.	SHIP VIA	FREIGHT	
COD/GEMINI NORTH ESP	HIFA		PREPAID ☐ COLLECT ☐

CUSTOMER P.O. NO.	ORDER DATE	OUR P.O. NO.	SLSM
117555	10-17-16	509354.10 SKF	SKF

DESCRIPTION	QUAN. ORDERED	QUAN. SHIPPED	UNIT PRICE	AMOUNT
TACO MODEL TB5TX30 NON-ASME BRAZED PLATE HEAT EXCHANGER SIDE A 10 GPM 55-45 F SIDE B 10 GPM 15-25 F 316 STAINLESS STEEL PLATES TAG: HX-2	*	1 In crate		
TACO MODEL TB50LX40 NON-ASME BRAZED PLATE HEAT EXCHANGER SIDE A 32 GPM 80-50 F SIDE B 46 GPM 15-35 F 316 STAINLESS STEEL PLATES TAG: HX-3	*	1 In crate		
FREIGHT				

THANK YOU. We Value Your Business.

MERCHANDISE RECEIVED BY _____ DATE _____

▲ SAME AS QUAN. ORD. UNLESS OTHERWISE INDICATED.

% TAX

TOTAL DUE ▶

TERMS: NET DUE 30 DAYS AFTER DATE OF INVOICE. INTEREST WILL BE CHARGED ON OVERDUE ACCOUNTS AT 1% PER MONTH OR AN ANNUAL RATE OF 12%.
RETURNS: MERCHANDISE MAY NOT BE RETURNED WITHOUT PRIOR AUTHORIZATION. WE RESERVE THE RIGHT TO APPLY A RESTOCKING CHARGE.

71362
CUSTOMER

Heat Exchanger HX-2

Taco Inc.
1160 Cranston St., Cranston RI 02920
401-942-8000

SinglePhase-Design
Part Number : 0157009.0
List Price : $404.00 (USD)
Heat Exchanger : TB5Tx30

Fluid Side 1 : Ethylene Glycol - Water (40%)
Fluid Side 2 : Ethylene Glycol - Water (40%)
Flow Type : Counter current

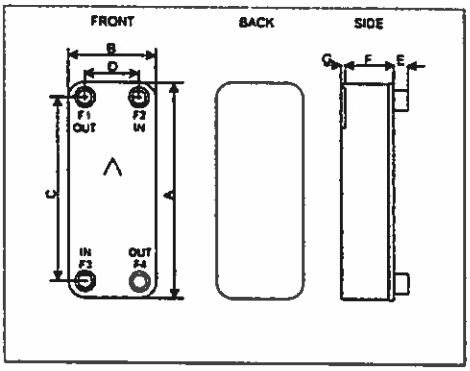
DUTY REQUIREMENTS	Unit	Side 1		Side 2
Heat load	Btu/h		43760	
Inlet temperature	°F	55.00		15.00
Outlet temperature	°F	45.00		25.00
Flow rate	US gpm	10.00		10.12
Max. pressure drop	psi	4.50		4.50
Thermal length		0.333		0.333

PLATE HEAT EXCHANGER	Unit	Side 1		Side 2
Total heat transfer area	sqrft		3.62	
Heat flux	Btu/h,sqrft		12100	
Mean temperature difference	°F		30.00	
O.H.T.C. (available/required)	Btu/sqrft,h,°F		483/403	
Pressure drop -total*	psi	3.45		3.42
- in ports	psi	0.732		0.753
Port diameter	in	0.630		0.630
Number of channels		14		15
Number of plates			30	
Oversurfacing	%		20	
Fouling factor	sqrft,h,°F/Btu		0.000	
Reynolds number		317.5		154.8
Port velocity	ft/s	10.3		10.4

PHYSICAL PROPERTIES	Unit	Side 1		Side 2
Reference temperature	°F	50.00		20.00
Dynamic viscosity	cP	4.14		8.06
Dynamic viscosity - wall	cP	5.46		5.62
Density	lb/cuft	66.47		66.80
Heat capacity	Btu/lb,°F	0.8208		0.8074
Thermal conductivity	Btu/ft,h,°F	0.2342		0.2237
Min. fluid temperature at wall	°F	32.18		
Max. fluid temperature at wall	°F			39.97

Film coefficient	Btu/sqrft,h,°F	1130	967
Minimum wall temperature	°F	36.77	35.45
Channel velocity	ft/s	1.01	0.956
Shear stress	psi	0.0142	0.0139

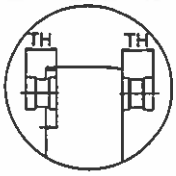
DIMENSIONS	Unit	Value	Tolerance +/-
A	in	7.59	0.0787
B	in	2.97	0.0787
C	in	6.06	0.0394
D	in	1.57	0.0394
E			
F			
G	in	0.244	0.0827

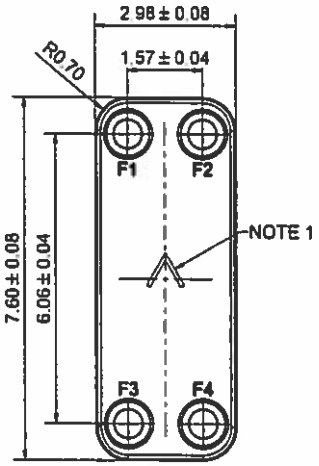


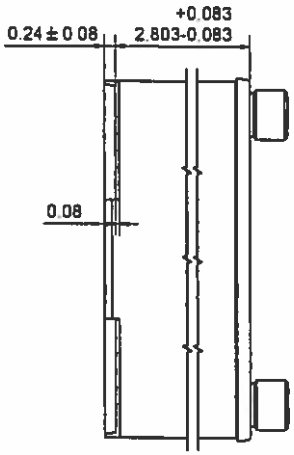
TECHNICAL DATA

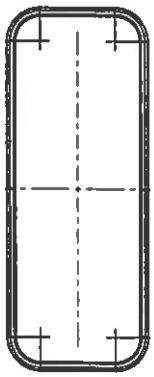
Approvals	UL	PED	
Pressure	PED 650 psig		UL 650 psig
Temperature	Minimum -320 °F		Maximum 437 °F
Material	Plate SS316	Brazing COPPER 99.9%	Connections SS304

*Excluding pressure drop in connections.









NOTE 1 ALTERNATE MARKING: STICKER OR STAMP

Pos	Article No	Title / Denomination, code, material, dimension etc	Drawing No./ref
F4	36693	NPT 3/4" - 14 & SOLDER 16, TH =	CD001564
F3	36693	NPT 3/4" - 14 & SOLDER 16, TH =	CD001564
F2	36693	NPT 3/4" - 14 & SOLDER 16, TH =	CD001564
F1	36693	NPT 3/4" - 14 & SOLDER 16, TH =	CD001564

Pos	Article No	Title / Denomination, code, material, dimension etc	Drawing No./ref

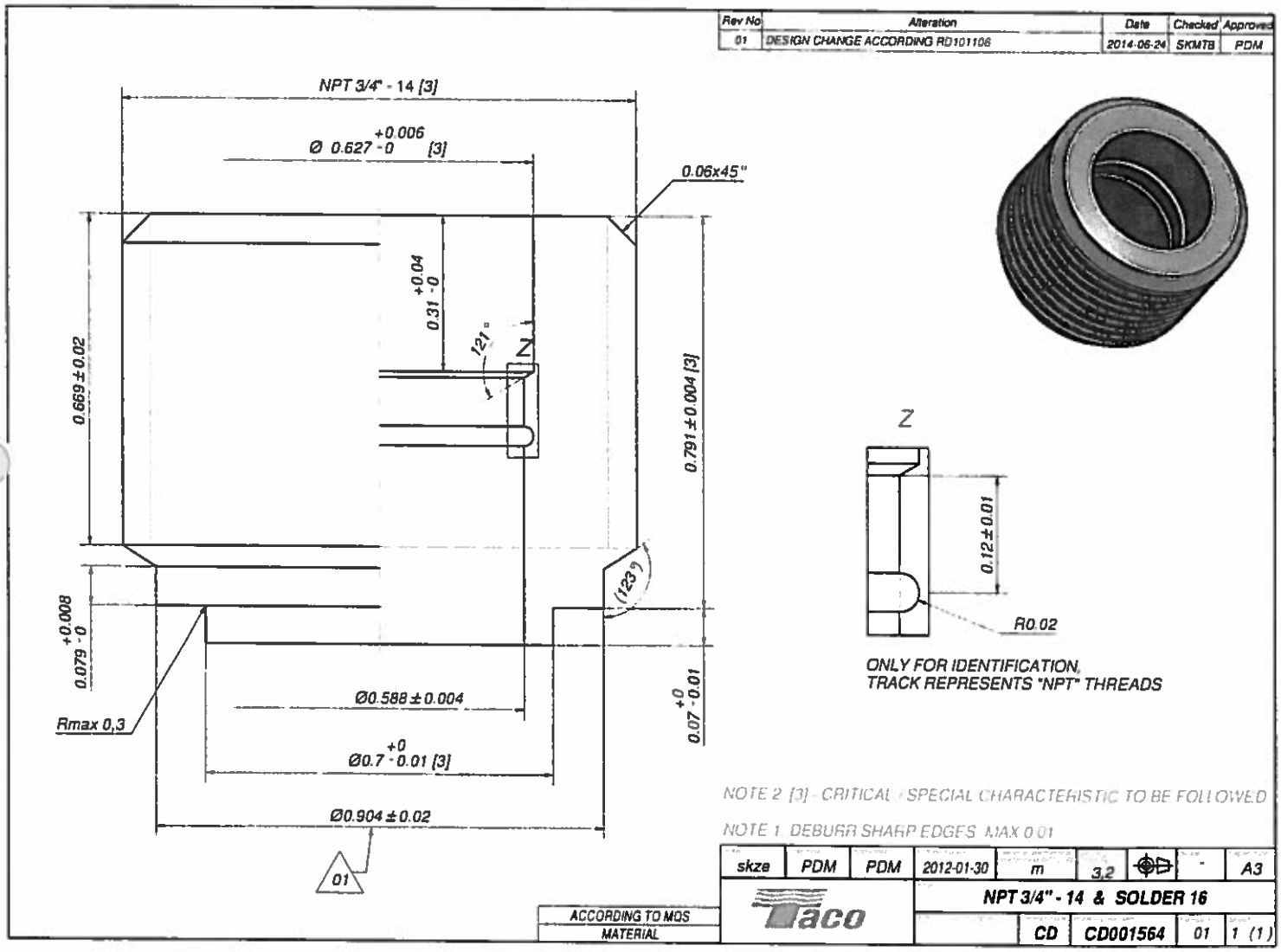
Title: TB5THx30/1P-SC-M 4x3/4"&16

Taco

Created Date	Created By
2014-12-04	AU

Article/Configuration number	Drawing number
0157009.0	AU00025346

Rev No	Alteration	Date	Checked	Approved
01	DESIGN CHANGE ACCORDING RD101106	2014-06-24	SKMTB	PDM



NOTE 2 [3] - CRITICAL / SPECIAL CHARACTERISTIC TO BE FOLLOWED

NOTE 1 DEBURR SHARP EDGES MAX 0.01

skze	PDM	PDM	2012-01-30	m	3,2		-	A3

ACCORDING TO MOS
MATERIAL

Taco

NPT 3/4" - 14 & SOLDER 16

	CD	CD001564	01	1 (1)

TB5T Brazed Plate Heat Exchanger

The TB5T enables efficient heat exchange in applications with small flows and extreme demands for compactness. Easy to install and use, the product is small yet versatile, which makes it a good choice for small oil or water coolers.

Taco Comfort Solutions™
A Taco Group Company

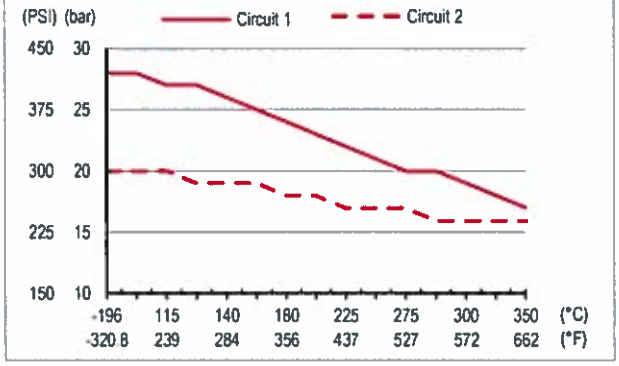
Supersedes: New

Effective Date: 01/27/16
Printed in USA

TB5T Performance Curves

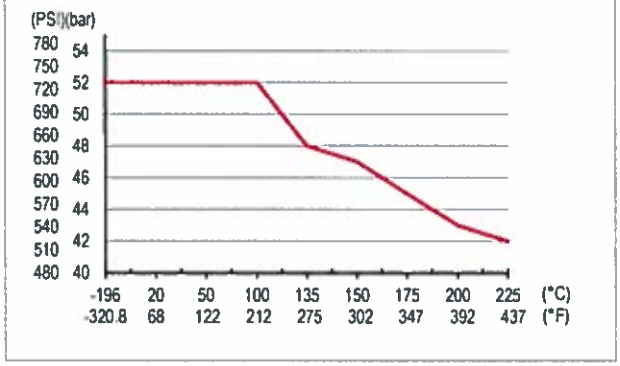
PED

SPS



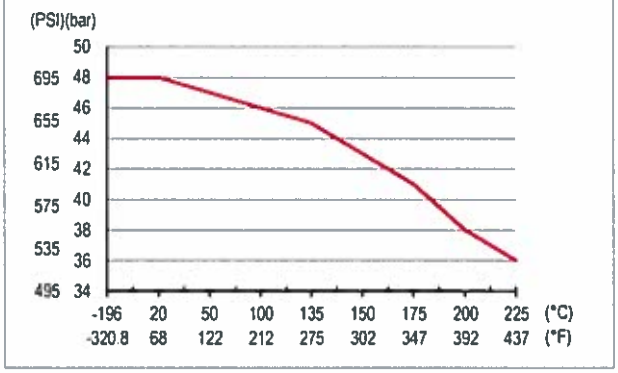
PED

Pressure H



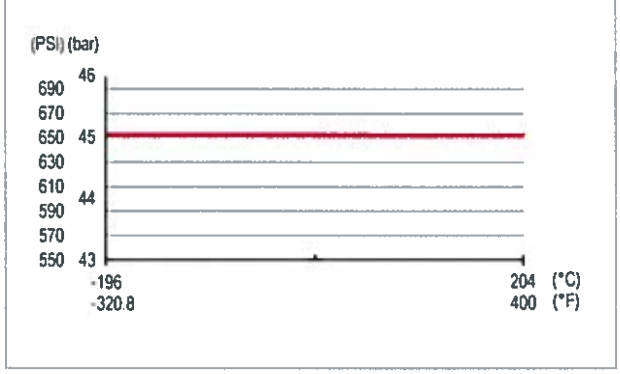
PED

Pressure M



UL

Pressure M



Heat Exchanger HX-3

Taco Inc.
1160 Cranston St., Cranston RI 02920
401-942-8000

SinglePhase-Performance
Part Number : 0194947.0
List Price : $3900.00 (USD)
Heat Exchanger : TB50Lx40

Fluid Side 1 : Ethylene Glycol - Water (40%)
Fluid Side 2 : Ethylene Glycol - Water (40%)
Flow Type : Counter current

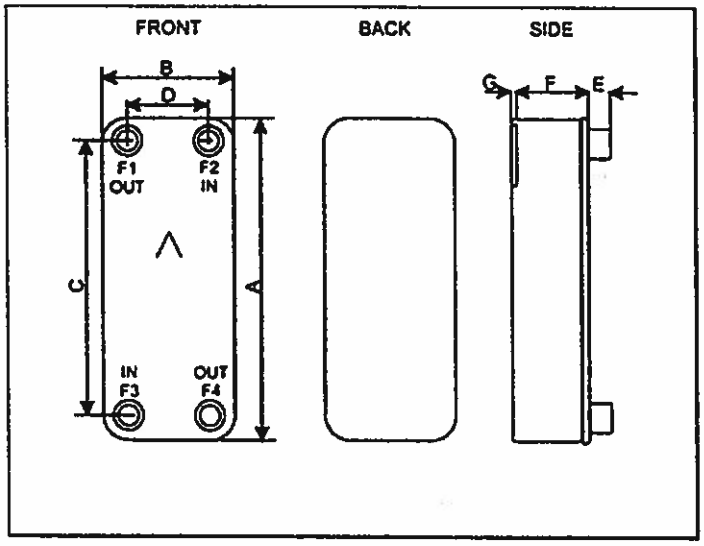
DUTY REQUIREMENTS	Unit	Side 1		Side 2
Heat load	Btu/h		428100	
Inlet temperature	°F	80.00		15.00
Outlet temperature	°F	49.56		35.99
Flow rate	US gpm	32.09		46.97
Max. pressure drop	psi	5.00		12.0
Thermal length		0.779		0.537

PLATE HEAT EXCHANGER	Unit	Side 1		Side 2
Total heat transfer area	sqrft		50.7	
Heat flux	Btu/h,sqrft		8440	
Mean temperature difference	°F		39.10	
O.H.T.C. (available/required)	Btu/sqrft,h,°F		216/216	
Pressure drop -total*	psi	1.69		3.40
- in ports	psi	0.0371		0.0809
Port diameter	in	2.36		2.36
Number of channels		19		20
Number of plates			40	
Oversurfacing	%		0	
Fouling factor	sqrft,h,°F/Btu		0.000	
Reynolds number		302.1		189.0
Port velocity	ft/s	2.34		3.44

PHYSICAL PROPERTIES	Unit	Side 1		Side 2
Reference temperature	°F	64.78		25.50
Dynamic viscosity	cP	3.14		7.05
Dynamic viscosity - wall	cP	4.63		4.73
Density	lb/cuft	66.28		66.75
Heat capacity	Btu/lb,°F	0.8274		0.8098
Thermal conductivity	Btu/ft,h,°F	0.2388		0.2258
Min. fluid temperature at wall	°F	32.09		
Max. fluid temperature at wall	°F			55.62

Film coefficient	Btu/sqrft,h,°F	427	484
Minimum wall temperature	°F	44.45	43.43
Channel velocity	ft/s	0.732	1.02
Shear stress	psi	3.74e-3	7.54e-3

DIMENSIONS	Unit	Value	Tolerance +/-
A	in	20.7	0.0787
B	in	9.57	0.0394
C	in	17.4	0.0394
D	in	6.26	0.0394
E			
F			
G	in	0.0787	0.0394

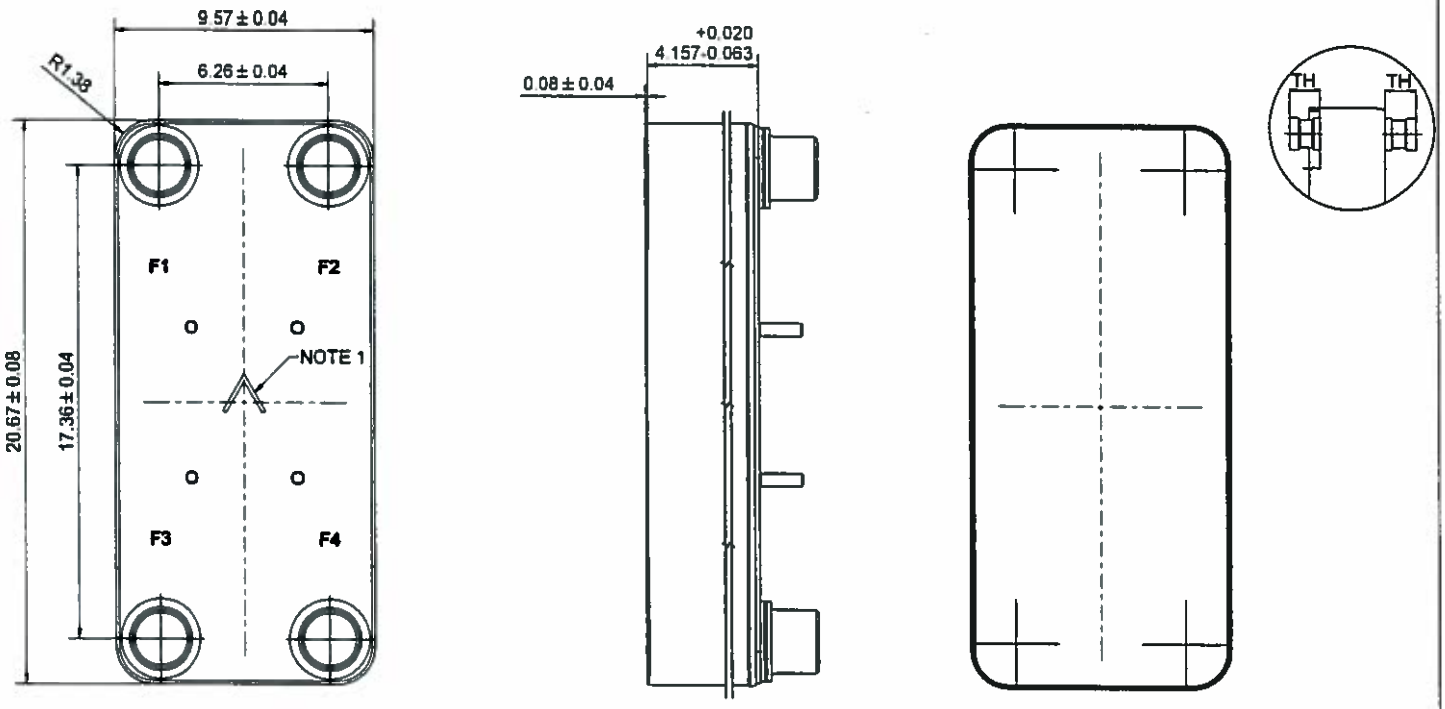


TECHNICAL DATA

Approvals	UL	CRN	ASME Available	PED
Pressure	PED 450 psig		UL 650 psig	
Temperature	Minimum -320 °F		Maximum 437 °F	
Material	Plate SS316	Brazing COPPER 99.9%	Connections SS304	

*Excluding pressure drop in connections.

Disclaimer: This software and the generated calculations provided herein are estimates only and should be treated as such. Taco, Inc. always strives to give complete and accurate information, but cannot provide any guarantees. This software and its output are provided as is and any express or implied warranties, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose are disclaimed. In no event shall Taco, Inc. be liable for any direct, indirect, incidental, special, exemplary, or consequential damages (including, but not limited to, procurement of substitute goods or services; loss of use, data, or profits; or business interruption) however caused and on any theory of liability, whether in contract, strict liability, or tort (including negligence or otherwise) arising in any way out of the use of this software, even if advised of the possibility of such damage.



NOTE 1 ALTERNATE MARKING: STICKER OR STAMP

Pos	Article No	Title / Denomination, code, material, dimension etc	Drawing No ref
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F3	45473	NPT 2-11 1/2, TH = 54,2	CD000139
F2	45473	NPT 2-11 1/2, TH = 54,2	CD000139
F1	45473	NPT 2-11 1/2, TH = 54,2	CD000139
F	21377	B45/50 BOLT LOC F 4x C140x100	CG450017

Pos	Article No	Title / Denomination, code, material, dimension etc	Drawing No ref

Title: TB50Lx40/1P-SC-S 4x2"NPT

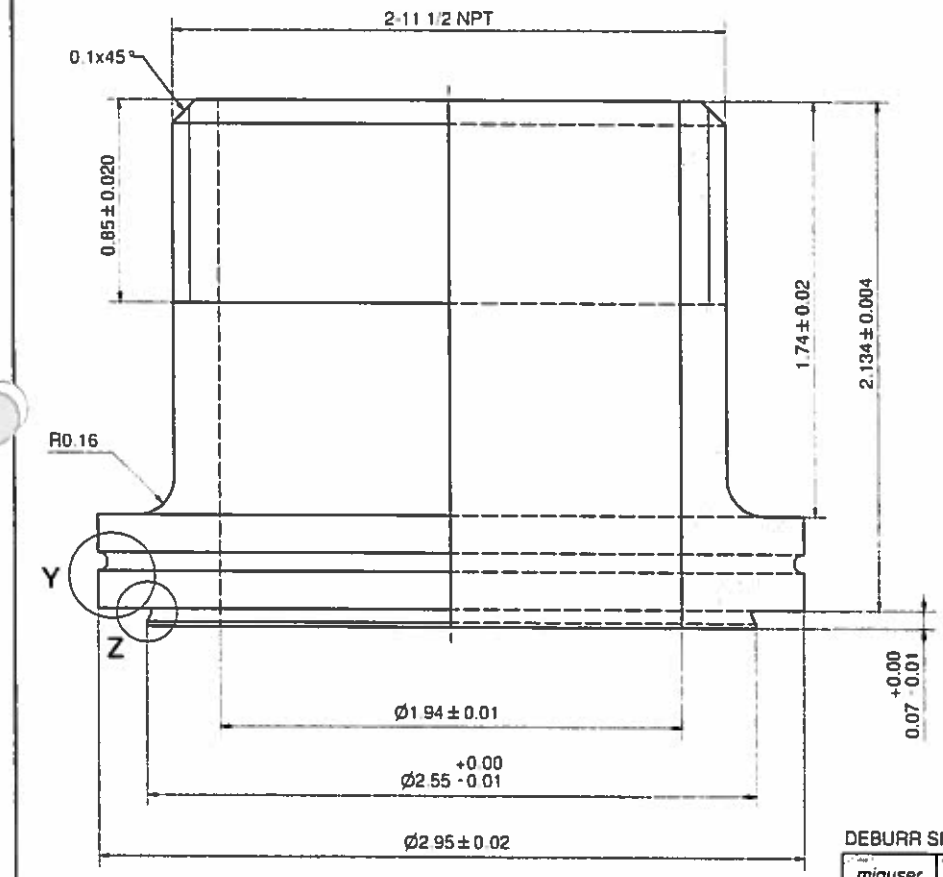
Drawing Date: 2014-12-04

Created by: AU

Article/Configuration number: 0194947.0

Drawing number: AU00025523

Rev No	Alteration	Date	Checked	Approved
7	ADDED DEBURR AND MATERIAL INFO	2009 07 29	RJ	PDM



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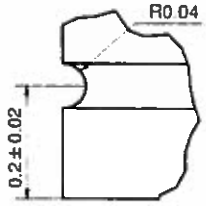

FOR IDENTIFICATION ONLY

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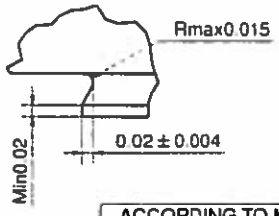


DEBURR SHARP EDGES; 0.01MAX

ACCORDING TO MQS

MATERIAL

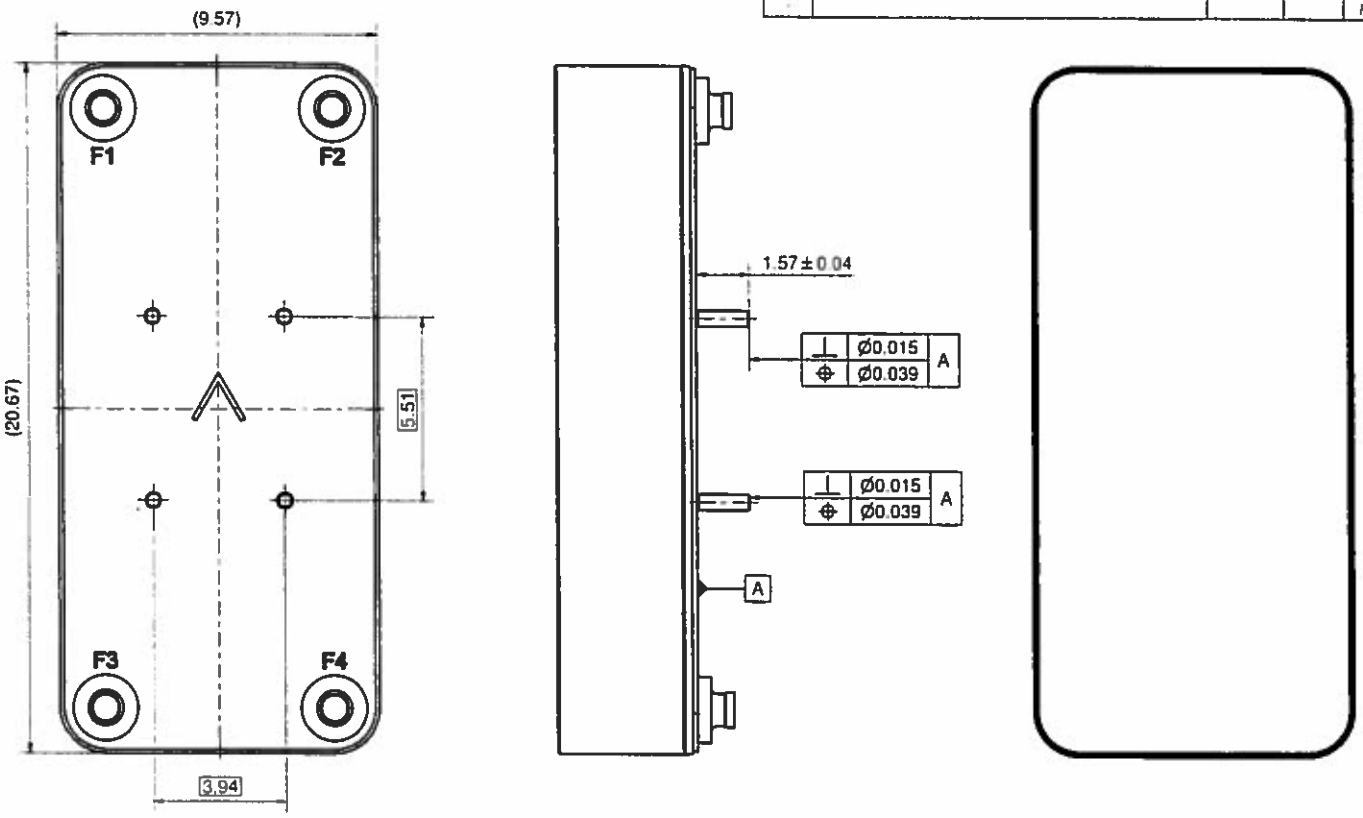
miguser	TP	VP	1993-03-16	m	3.2		-

Taco

NPT 2-11 1/2

CD000139 | 07 | 1 (1)

Rev No	Alteration	Date	Checked	Approved
				PDM



1	4	STUD BOLT M12x40 ART.NO 30180						M12 x 40	
IT	QTY	DESCRIPTION						Drawing No.	
ANO	PDM	PDM	2005-02-24	m	3.2			1:1	A3
Taco	B120T/50 BOLT LOC F 4x C140x100								
	21377	CG	CG450017					1 (1)	

TB50 Brazed Plate Heat Exchanger

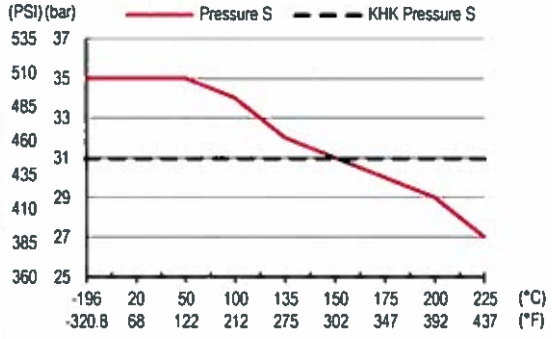
The modular TB50 is used in many demanding applications, such as district heating, steam, oil coolers and different industrial applications. With three different plate combinations and 2½" connections, it provides an efficient solution for performances of up to 56 m^3/h (246 gpm) water flow.

Taco Comfort Solutions™
A Taco Group Company

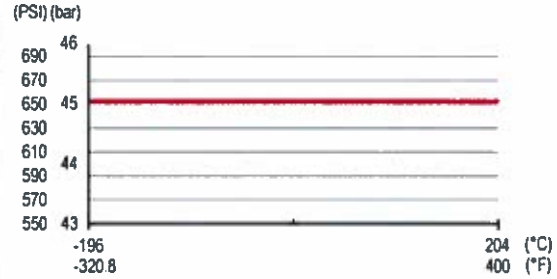
Effective Date: 02/10/16
Printed in USA

TB50 Performance Curves

PED / KHK



UL



ASME