DELPHI PACKARD ELECTRIC SYSTEMS
WARREN, OHIO 44486

DWG STATUS					ZONE	REVISION HISTORY	AUTH	DR	CK	APVD
DATE	STG	REV	N/P	CHG						
02AUI2	R	02	--	--		ADDED SHEET 1 & 3 ALL PARTS - DWG UPDATED TO LATEST PRINT, REVISED NOTES & CHART	323392	LB	LB	JCR

NOTES:

1. REF FCI INTERLOCK P/N SEE CHART
2. DELPHI PACKARD ELECTRIC SYSTEMS IS NOT RESPONSIBLE FOR DESIGN CONTROL OF PURCHASED "OFF SHELF" COMPONENTS.
3. SUPPLIER SHOULD COMPLY WITH DELPHI SPECIFICATION (SHEET 3)

PART NO.	REV	N/P	STATUS	SUP FCI INTERLOCK P/N
13839320	01	AA	ACTIVE	F407400
13830594	01	AA	ACTIVE	F307400

DWG TYPE: PART DRAWING
STYLE: N/A
VOLUME (CM)3: N/A
DISTR CODE: D
AutoCAD

DELPHI

DELPHI PACKARD ELECTRIC SYSTEMS
WARREN, OH

		DATE
DR:	BONILLA, LILIANA	02AU12
APVD1:	BONILLA, LILIANA	02AU12
APVD2:	REYNOSA, JUAN C	03AU12
APVD3:		
APVD4:		
APVD5:		

SUBSTANCES OF CONCERN AND RECYCLED CONTENT PER DELPHI -A 10949001

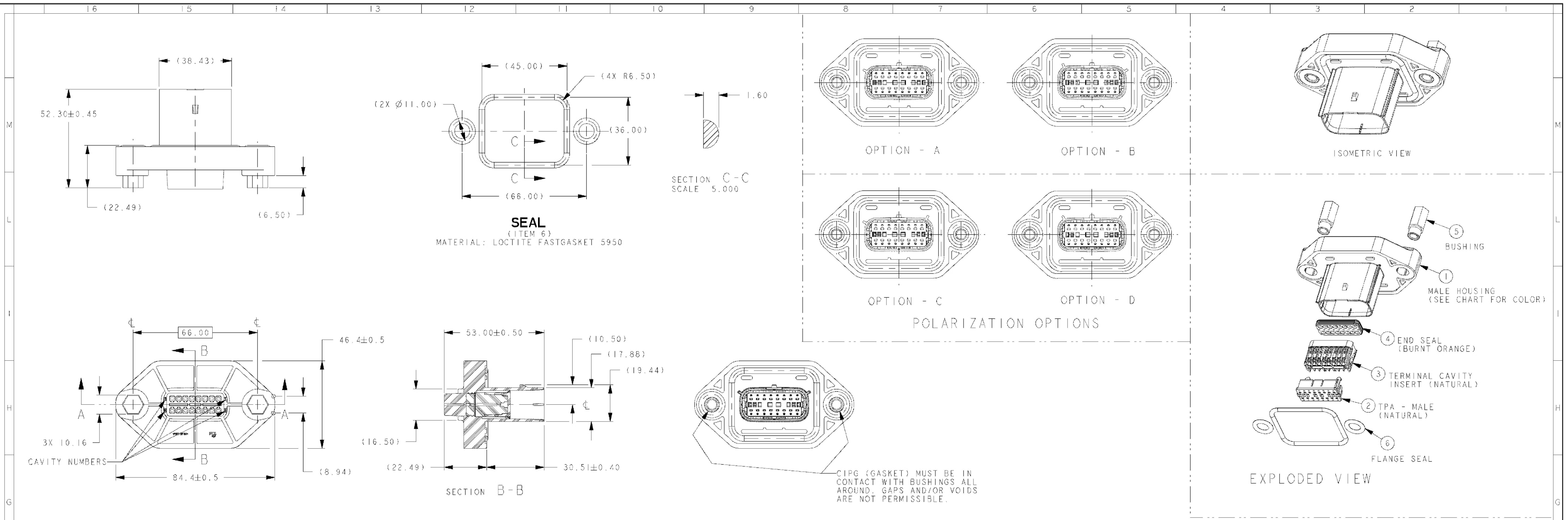
MATERIAL: SEE DWG

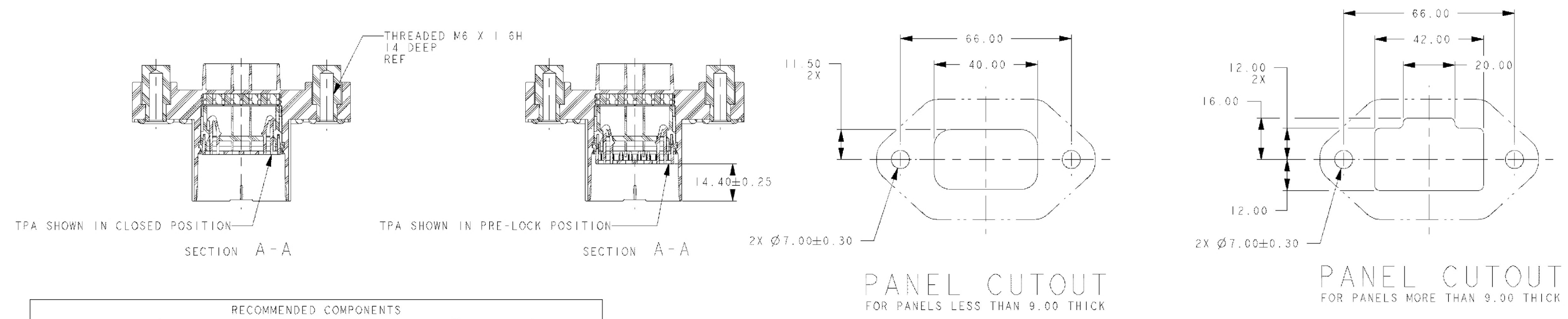
DRAWING NAME: TAXI ASM CONN M 1.5 SLD

DRAWING NUMBER: 13839322

SIZE:	SCALE:	FRAME NO:	SHEET NO:	STG:	REV:	N/P:
A0	NONE	1 OF 1	1 OF 3	R	02	--

DWG STATUS DATE	STG	REV	N/P	CHG	ZONE	REVISION HISTORY	AUTH	DR	CK	APVD
04AU10	R	01	--	--		ALL PARTS - RELEASED	315207	JJD	VMC	JG
02AU12	R	02	--	--		"SHT 2" WAS "SHT 1"; ALL PARTS - DWG UPDATED TO LATEST PRINT; REVISED NOTES & CHART	323392	LB	LB	JCR





NOTES

UNLESS OTHERWISE SPECIFIED:

GENERAL TOLERANCE:
X.X - ±0.50
X.XX - ±0.30
ANGLES - ±2°

ALL DIMENSIONS APPLY TO FULLY ASSEMBLED CONNECTOR

THREADED BUSHINGS MUST WITHSTAND A PUSH-OUT FORCE OF 10 N (2.24 lbf) MIN

THREADED BUSHINGS MUST RESIST A TORQUE OF 3.39-3.95 N-m (30-35 lb-in) IN BOTH DIRECTIONS

ATTACHMENT FASTENERS ARE NOT SHOWN AND ARE NOT INCLUDED

SIZE AND STYLE OF ATTACHMENT FASTENER CAM VARY ACCORDING TO THE APPLICATION AND ARE THE RESPONSIBILITY OF THE USER.

CONNECTOR MAY BE USED WITH THE FOLLOWING RANGE OF WIRE SIZES/TYPES:
-SIZE: 22 GAGE- 16 GAGE- 1.50mm MIN O.D. TO 2.41mm MAX O.D.
-TYPE: TXL (MIL123-A /MS-8288)

-SIZE: 0.5mm² TO 1.5mm² - 1.40mm MIN O.D. TO 2.40mm MAX O.D.
-TYPE: FLR2X (125° C PE-X) OR FLRYW (125°C PVC)
(STRUCTURE AND PROPERTIES ACC. ISO 6722)

-CONTACT FCI ENGINEERING REGARDING USE OF OTHER WIRE TYPES AND/OR SIZES

RECOMMENDED COMPONENTS

FCI PART NUMBER	ITEM DESCRIPTION	PLATING	GRIP SIZE
54001626	APEX 150 TERMINAL	TIN	16,18
54002001	APEX 150 TERMINAL	TIN	20,22
54001628	APEX 150 TERMINAL	GOLD	16,18
54002003	APEX 150 TERMINAL	GOLD	20,22
54241629	APEX 150 UNIVERSAL SEAL PLUG	-	-

ASSEMBLY NUMBER	ASSY NUMBER IN PROCESS (NO FLANGE SEAL)	KEY OPTION	COLOR	ALL PLUGS	HOUSING (ITEM 1)	TPA (ITEM 2)	TCI (ITEM 3)	SEAL (ITEM 4)	BUSHING (ITEM 5)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	TOTAL CIRCUITS	FCI MATING CONNECTOR REF
					COMPONENTS					MOLDED PLUGS POSITIONS																	
F607400	S191010	D	GREEN	REMOVED	F953600	54241684	54241685	54241689	C055200																	16	54241633
F507400	S091010	C	BROWN		F853600																					16	54241632
F407400	S981010	B	GREY		F753600																					16	54241631
F307400	S881010	A	BLACK		F653600																					16	54241630
TBD	TBD	D	GREEN	PRESENT	F553600					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	0	54241633
TBD	TBD	C	BROWN		F453600					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	0	54241632
TBD	TBD	B	GREY		F353600					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	0	54241631
TBD	TBD	A	BLACK		F253600					X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	0	54241630

EUR C04 112 F29 PDS

ECN-NO.	ZONE	CHANGE DESCRIPTION
11952	NOTES	ADDED METRIC WIRE SPECIFICATION
	CHART	CORRECTED MATING PART NUMBERS
	G13	DIM (22.49) WAS 22.49
11789	CHART	ADDED IN PROCESS ASSEMBLY NUMBERS AND CORRECTED ITEM NUMBERS
	L11	ADDED SEAL MATERIAL CALLOUT
11692	H9	ADDED DRAWING VIEW AND NOTE
11297	-	RELEASED FOR PRODUCTION

PRODUCT SPEC. - | PACKAGING SPEC. - | APPLICATION SPEC. -

TOLERANCES ±0.1 ±2° | MATERIAL: - | SURFACE FINISH - | 3RD ANGLE | CAD SYSTEM pro / eng.

COUNTERPART Nr. SEE K36002 | COLOUR: SEE CHART | DIMENSION IN MILLIMETERS | DWG SIZE A1

DO NOT MEASURE DRAWING | TOOL NO. - | ECO Loc. Code AN

	DATE	NAME
CREATED BY	2009/06/23	S PALANICHAMY
MODIFIED BY	2011/07/28	Matt MAJOR
CHECKED BY	2011/07/28	Sucha SIAN
APPROVED BY	2011/07/28	Frank HOLUB

TITLE: APEX 150 16W MALE FLANGED

PROJECT: APEX 150 BULKHEAD SEALED FLANGE

ESR NO. AM-070099 | CAT. NO. -

DRAWING NUMBER: PCC0641356 | REV. D

STATE: SERIAL RELEASED

PART NUMBER: None | REV. -

APPROVAL LEVEL - | SHEET 1 of 1 | SCALE 1.000

FILE NAME PCC0641356 | DOCUMENT UNDER PDS CONTROL NO MODIFICATION ALLOWED OUTSIDE

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WARREN, OHIO 44486

DELPHI

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WARREN, OH

THIS DRAWING IS NOT A PROPRIETARY DESIGN OF DELPHI AUTOMOTIVE SYSTEM.

		DATE
DR:	DIAZ, JUAN J	04AU10
APVD1:	MEZA, VERONICA	04AU10
APVD2:	GAVALDON, JESUS	05AU10
APVD3:		
APVD4:		
APVD5:		

SUBSTANCES OF CONCERN AND RECYCLED CONTENT PER DELPHI -A 10949001

DWG TYPE: PART DRAWING

STYLE: N/A | DISTR CODE: D

VOLUME (CM)3: N/A

AutoCAD

MATERIAL: SEE DWG

DRAWING NAME: TAXI ASM CONN M 1.5 SLD

DRAWING NUMBER: 13839322

SIZE:	SCALE:	FRAME NO:	SHEET NO:	STG:	REV:	N/P:
A0	NONE	1 OF 1	2 OF	R	02	--

DELPHI PACKARD ELECTRIC SYSTEMS
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DWG STATUS					ZONE	REVISION HISTORY	AUTH	DR	CK	APVD
DATE	STG	REV	N/P	CHG						
02AU12	R	02	--	--		ADDED SHEET 1 & 3. ALL PARTS - DWG UPDATED TO LATEST PRINT; REVISED NOTES & CHART	323392	LB	LB	JCR

DELPHI SUPPLIER MUST MEET DELPHI MANUFACTURABILITY SPECIFICATIONS FOR CONNECTION SYSTEM:

Delphi. Manufacturability Specifications for Connections Systems

Spec No.	Category	Specification Description	Acceptance Criteria		
1a	Terminal-Connector	Terminal insertion force to Connector	For terminals with<1.0mm² wire, the engagement force to fully seat and lock the terminal shall be 15N max. Neither the conductor nor the terminal may buckle during the test. The Forward stop must withstand a force greater than the force required to insert the terminal into its cavity.		
2a	Terminal-Connector		For terminals with 1.0mm² wire, the engagement force to fully seat and lock the terminal shall be 20N max. Neither the conductor nor the terminal may buckle during the test. The Forward stop must withstand a force greater than the force required to insert the terminal into its cavity.		
3a	Terminal-Connector		For terminals with ≤1.0mm² wire, the engagement force to fully seat and lock the terminal shall be 30N max. Neither the conductor nor the terminal may buckle during the test. The Forward stop must withstand a force greater than the force required to insert the terminal into its cavity.		
10a	Terminal-Connector	Terminal retention force on Connector	Terminal Size	Primary Lock only (N Min)	With Secondary lock (N Min)
	Terminal-Connector		050	20	30
11a	Terminal-Connector		064	30	60
12a	Terminal-Connector		≤1.5	45	70
13a	Terminal-Connector		≤2.8	60	100
14a	Terminal-Connector		≤4.8	60	100
15a	Terminal-Connector		≤6.3	80	120
16a	Terminal-Connector		<9.5>6.3	80	120
17a	Terminal-Connector		≥9.5	100	150
20a	Terminal-Connector	Terminal/Cavity Polarization (do not allow incorrect orientation of terminal on the connector)	For any Non symmetrical designs: Terminals inserted in any incorrect orientation shall not fit or lock into a connector cavity beyond the isulation wings (grips) or cable seal at a force 1.5 times the normal insertion force. 15N, or the column strength of the largest applicable wire size, whichever is greater.		
21a	Terminal-Connector	Terminal- Connector Cavity Fit	Female terminal should NOT bend or damage male blades/terminals. Example: Terminal should not move or rotate excessively inside the connector cavity so that damage could occur when Mating connection.		
22a	Terminal-Connector	Unseated Terminals	Design connectors with a feature to detect and/or correct partially seated terminals (like PLR). Unseated terminal condition is created when terminal and/or cable seal is not visible when viewed from a perpendicular side of plugging area and terminal is not fully seated/locked into connector.		
30a	Terminal-Connector	Terminal insertion on Connector with closed TPA or PLR	<1.0 mm Wire² size	The engagement force to fully seat and lock the terminal shall be 30N min. Alternately, the terminal shall not be capable of being seated and lacked due to interference between the TPA and the terminal.	
31a			1.0 mm Wire² size	The engagement force to fully seat and lock the terminal shall be 40N min. Alternately, the terminal shall not be capable of being seated and lacked due to interference between the TPA and the terminal.	
32a			>1.0 mm Wire² size	The engagement force to fully seat and lock the terminal shall be 60N min. Alternately, the terminal shall not be capable of being seated and lacked due to interference between the TPA and the terminal.	
1b	Connector	Connector with mixed terminal designs	Terminal and connector cavity design should avoid ability to insert an terminal (within the same Connector) Any incorrect terminal insertion shall not fit or lock into a connector cavity beyond the insulation wings (grips) or at a force 1.5 times the normal insertion force, 15N, or the column strength of the largest applicable wire size, whichever is greater.		
2b	Connector	Connector Family designs indexing	Connector family design should have an index to differentiate physically between each connector part number within Connector family or series.		
3b	Connector	Open access for wire/terminal assemby	Connector should have open access for Terminal/wire assembly. Example: Lever should not be obstructing terminal/wire plugging area.		
10b	Connector	Connector to Connector matting force (with all contacts installed)	70 N Max		
11b	Connector	Connector to Connector Un-matting force	110 N Min with locks (lever) enable except CPA		
12b	Connector	Connector (or Housing) to Connector Miss-mated Prevention test.	Shall not be miss-matted by hand (with all contacts) or by applying 196N		
20b	Connector	Cavities Terminal insertion direction	Provide all cavities in the same direction of terminals insertion. If not, terminal and connector cavity should avoid attempt to plug on any incorrect orientation.		
21b	Connector	Terminal Forward Stop	Must provide a terminal forward stop that supports a force of 50N minimum or the biggest wire size buckles.		
22b	Connector	Access for Electrical test	Provide access on connector for contacts electrical test. Access must locate correct final position and orientation of terminal into connector cavity. If there is particular requirement for Electrical Test of the connection, supplier must provide all related information to Delphi.		
30b	Connector	Housing Inserting Force	24N Max		
31b	Connector	Housing Retention Force	49N Min		

40a	Connector	Connector Cavity identification	Connector should have cavities identified (starting and end point of cavity rows)
1c	Cavity Plug	Connector Cavity Plug insertion	Cavity Plug should be assembled with a force of 20N Max (by hand or with a manual tool)
1d	Locks	PLR detect/correct Unseated Terminals	PLR should detects (requires 3 times more force -than normal condition- and/or corrects partially seated terminals
10d	Locks	PLR/TPA Insertion force (from pre-stage to lock)	60N Max with terminals installed
11d	Locks		15N Min without terminals installed
12d	Locks	PLR/TPA Insertion force (from insert to lock)	60N Max with all terminals installed
13d	Locks	PLR/TPA Extraction force (remove from pre-stage)	25N Min
14d	Locks	PLR/TPA extraction force (from lock to pre-stage)	60N Max (with terminals installed in all available cavities) 15N Min
15d	Locks		18N Min after initial removal
20d	Locks	Insertion force PLR/TPA with one or more incorrectly oriented terminals assembled	PLR/TPA should NOT be able to lock when there is one or more terminals assembled with incorrect orientation Or insertion force should be 1.5 times the normal force or 49N, which ever is greater
30d	Locks	CPA Insertion force (insert to lock position)	60N Min (w/connectors un-mated) 22N max w/connectors mated (loose pc. CPA)
31d	Locks	CPA Insertion force (pre-stage to lock position)	60N Min (w/connectors un-mated) 22N max w/connectors mated
32d	Locks	CPA extraction force (lock to pre-stage position)	10N Min, 30N Max
33d	Locks	CPA extraction force (from pre-stage position)	60N Min.
40d	Locks	Lever retention force on pre-stage (shipping position)	Forse to maintain on pre-stage (shipping) position, 50N Min
41d	Locks	Lever insertion force from pre-stage (shipping) to final stage (lock)	If the Maximun Assembly Force is: ≤22N — Then the Minimun Contact Area must be at least: Non minimum requirement — Typical Operator Hand Posture During Assembly: One-finger press
42d	Locks		≤45N — 10mm x 20mm — thumb/2 or more fingers press
43d	Locks		≤75N — 10mm x 35mm — Two thumbs or palm/heel of hand press
1e	General	Components (with positive retention force, like Connector Clips, Cover, etc.) Insertion Force	60N Max
2e	General	Components (with positive retention force, like Connector Clips, Cover, etc.) Retention Force	110N Min
3e	General	Connection drop Test	Test 10 connection system, 3 times each one with parts except cable and terminals. Drop from a 1m distance the connector to a hard surface, change orientation to expose all parts. The device under test must not show, any evidence of deterioration, cracks, deformities, etc. tant could affect their functionality. This test evaluates the ability of the connection to withstand impact due to dropping on a hard surface.
4e	General	Components (with positive retention force, like Connector Clips, Cover, etc.) Retention Force	Attached parts to connector (Connector seal, secondary locks, PLR, CPA, Matt seal, Cable seal, etc.) should have a contrasting color to the connector
5e	General	All connection systems parts should be free from defects.	Mechanical Performance Exterior Shall be free from detrimental cracking, rust, play, flaw. deformation, flash and/or other defects; this prior and during usage.
6e	General	Service an Repair	Connection systems components should be serviceable and repairable without functional damage
7e	General	Components requiring assembly to Connector, incorrect orientation prevention test	All components requiring assembly to connector (like Cover, TPA, Clip, CPA, Lever, Housing, etc.) shall not be incorrectly assembled (incorrect orientation by hand or by applying 196N. This is NOT applicable for symmetrical designs.
1f	Testing	Equipment capability of providing a constant Velocity	50mm/min
2f	Testing	Accuracy of measurement	≤0.05%
3f	Testing	Tolerance for all tests	±10%

Notes:

USCAR can we used as reference on how to perform each test.

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		DATE
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APVD1:	BONILLA, LILIANA	02AU12
APVD2:	REYNOSA, JUAN C	03AU12
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APVD4:		
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SUBSTANCES OF CONCERN AND RECYCLED CONTENT PER DELPHI -A 10949001

MATERIAL: SEE DWG

DRAWING NAME: TAXI ASM CONN M 1.5 SLD

DRAWING NUMBER: 13839322

DWG TYPE:		
PART DRAWING		
STYLE: N/A	DISTR CODE: D	
VOLUME (CM)3: N/A		
AutoCAD		

SIZE:	SCALE:	FRAME NO:	SHEET NO:	STG:	REV:	N/P:
A0	NONE	1 OF 1	3 OF	R	02	--