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# TECHNICAL DATA SHEET

## TP pipe labels

<b>MATERIAL DESCRIPTION:</b>	Tyco "TP" is a thermal transfer printable multi-layered construction label comprising a high performance acrylic pressure sensitive adhesive, an optically clear polyester with a colored printable coating and uses zero halogen materials. It is supplied as die cut wraparound labels or continuous rolls on a paper release liner.
<b>USE:</b>	Identification of aircraft pipes by computer-based printing onto wraparound self-laminating labels. Suitable for military and commercial aerospace applications. TP labels meet all the requirements of MIL-T-9066C with the exception of 5 minute dwell peel strength (note: MIL-T-9066C is obsolete and has not been replaced).
<b>PRINT METHOD/RIBBON:</b>	Thermal Transfer: T300 Series, Tyco 1330-3300-XX Ribbon Thermal Transfer: T408M-PRINTER, Tyco 1330-0617-XX Ribbon, Tyco 1330-3300-XX Ribbon
<b>SHELF LIFE:</b>	2 years when stored at 95°F (35°C).
<b>COLORS:</b>	Several pre-printed patterns conforming to MIL-STD-595B, MIL-STD-101B and MIL-STD-1247. Clear overlaminate "tail".
<b>APPROXIMATE TOTAL THICKNESS:</b>	Face stock: 0.036mm (0.0014 inches). Adhesive: 0.025mm to 0.028mm (0.001 to 0.0011 inches). Liner: 0.079mm (0.0031 inches).
<b>MINIMUM INSTALLATION TEMPERATURE:</b>	10°C (50°F).
<b>SERVICE TEMPERATURE:</b>	-40°C (-40°F) to +163°C (+325°F).
<b>HEAT AGEING:</b>	No cracking or wrinkling and markings unaffected after 100 hours at 163°C (325°F).
<b>LOW TEMPERATURE RESISTANCE:</b>	No adhesion loss after 3 X 2 hour cycles to -196°C (-321°F).

<b>TENSILE STRENGTH:</b>	6.6N/mm (38 lb/inch width) typical (ASTM D3759).
<b>ULTIMATE ELONGATION:</b>	130% typical (ASTM D3759).
<b>MARK PERMANENCE:</b>	Print legible after 20 rubs (SAE AS81531 4.6.2) without overlamine "tail" in place.
<b>CORROSION PROPERTIES:</b>	No surface corrosion or stress corrosion cracking of MIL-T-8504 stainless steel pipe after 144 hours at 163°C (325°F), 20cl water vapor Parr pressure vessel.
<b>WEATHERING RESISTANCE:</b>	No visible deterioration, markings legible and 0.77N/mm (70 oz/inch) peel strength retained after 96 hours (ASTM D3815 with water spray).
<b>ADHESION TO DRY ALUMINIUM:</b>	0.29N/mm (26oz/inch) peel strength typical after 5 minute dwell at 23°C (73°F) (ASTM D3330 Procedure A).
	0.42N/mm (40oz/inch) peel strength typical after 72 hour dwell at 23°C (73°F) (ASTM D3330 Procedure A).
<b>ADHESION TO PRINTED LAYER:</b>	0.25N/mm (23oz/inch) immediate peel strength (ASTM D3330 Procedure A).
	0.40N/mm (36oz/inch) peel strength typical after 72 hour dwell at 23°C (73°F) (ASTM D3330 Procedure A).
<b>ADHESIVE STABILITY:</b>	0.29N/mm (26oz/inch) peel strength typical 20 hours (ASTM D3815 without water spray).
<b>HIGH PRESSURE HOSE RESISTANCE:</b>	No visual change or movement of label after 5 minute water jet application to label seam (water jet at 35°C (95°F) and 80 bar pressure, 19mm silver steel rod substrate).
<b>ADHESIVE FLUID RESISTANCE:</b>	All tests conducted on aluminium panel substrates, peel strength measured according to ASTM D3330 Procedure A. Peel strengths in N/mm (oz/inch).

<b>FLUID</b>	<b>PEEL STRENGTH -TYPICAL</b>
Distilled water (24 hours at 23°C (73°F))	0.45 (41)
MIL-T-83133 aircraft fuel (JP-8) (72 hours at 23°C (73°F))	0.41 (38)
MIL-L-7808 lubricating oil (24 hours at 93°C (200°F))	0.51 (47)
MIL-H-5606 hydraulic oil (OM15) (72 hours at 23°C (73°F))	0.49 (45)
MIL-H-83282C hydraulic fluid (OX19) (72 hours at 23°C (73°F))	0.55 (50)
MIL-L-23699C engine & gearbox oil (OX27) (72 hours at 23°C (73°F))	0.59 (53)
MIL-L-6081C corrosion inhibitor (O133) (72 hours at 23°C (73°F))	0.55 (50)
Skydrol™ 500 B4 hydraulic fluid (72 hours at 23°C (73°F))	0.45 (41)
Skydrol™ LD4 hydraulic fluid (72 hours at 23°C (73°F))	0.53 (48)
S737/AL11 IPA deicing fluid (72 hours at 23°C (73°F))	0.38 (35)
60:40 isooctane:toluene aircraft fuel (72 hours at 23°C (73°F))	0.16 (14)
70:30 isooctane:toluene aircraft fuel (72 hours at 23°C (73°F))	0.29 (26)
Tri-n-butyl phosphate (72 hours at 23°C (73°F))	0.29 (26)

**LABEL FLUID RESISTANCE:** All tests conducted on aluminium rod substrates.

FLUID	ASSESSMENT
Distilled water (24 hours at 23°C (73°F))	Print & color unaffected; 0mm edge attack typical
MIL-T-83133 aircraft fuel (JP-8) (24 hours at 23°C (73°F))	Print & color unaffected; 0mm edge attack typical
MIL-L-7808 lubricating oil (24 hours at 23°C (73°F))	Print & color unaffected; 0mm edge attack typical
MIL-H-5606 hydraulic oil (OM15) (24 hours at 23°C (73°F))	Print & color unaffected; 0mm edge attack typical
MIL-H-83282C hydraulic fluid (OX19) (24 hours at 23°C (73°F))	Print & color unaffected; 0mm edge attack typical
MIL-L-23699C engine & gearbox oil (OX27) (24 hours at 23°C (73°F))	Print & color unaffected; 0mm edge attack typical
MIL-L-6081C corrosion inhibitor (O133) (72 hours at 23°C (73°F))	Print & color unaffected; 4.6mm edge attack typical

FLUID	ASSESSMENT
Skydrol™ 500 B4 hydraulic fluid (72 hours at 23°C (73°F))	Print & color unaffected; 3.5mm edge attack typical
Skydrol™ LD4 hydraulic fluid (72 hours at 23°C (73°F))	Print & color unaffected; 3.5mm edge attack typical
S737/AL11 IPA deicing fluid (72 hours at 23°C (73°F))	Print & color unaffected; 5.4mm edge attack typical
60:40 isooctane:toluene aircraft fuel (72 hours at 23°C (73°F))	Print & color unaffected
70:30 isooctane:toluene aircraft fuel (72 hours at 23°C (73°F))	Print & color unaffected

**AGGRESSIVE FLUID RESISTANCE:** Labels tested according to BPS-T-151 Revision D on 19mm (0.75 inches) diameter titanium (EN3120 (J84.451) TI-P64003, Hytre™ (MM0047) and neoprene (DTD5514/D) cylindrical substrates.

FLUID	ASSESSMENT
Skydrol™ 500 B4 hydraulic fluid (168 hours at 23°C (73°F))	Print & color unaffected; label firmly attached
JP-4 aircraft fuel (168 hours at 23°C (73°F))	Print & color unaffected; label firmly attached
MIL-L-7808 lubricating oil (168 hours at 23°C (73°F))	Print & color unaffected; label firmly attached

See Tyco specification RW 2068 for full TP performance & dimensional details.

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