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Test Report/Prufbericht
for intermixability / interchangeability test
of Compression Tube Fittings
uber Austausch von Teilen der Rohrverbindungssystem
der Druckrohrverschraubungen

Report number/Bericht Nr. **:** 1803117682-001 dated 18-10-2016
Client/Auftraggeber **:** Vipal Enterprises Pvt Ltd
Inspection/Gegenstand der Prufung : Intermixability / Interchangeability test of Compression Tube fittings
Inspection requirement/Prufanforderungen: To certify that HAVI Brand of Double Compression Fittings are 100% part to part interchangeable and intermixable with Swagelok Tube Fittings
Marking/Kennzeichnung : HAVI

1. Inspection commission/Prufaufgable
Verifying tightness-equivalency of tube joint systems manufactured by HAVI and Swagelok.
Reference standard for testing ASTM F 1387

2. Remark/Vorbemerkung
The parts of testing specimens bear same appearance but made from different manufacturers.

3. Details of Specimen/Pruflingbeschreibung

	HAVI	Swagelok	Tube
¼ inch ODT	Tube Cap/Blindkappe Front Ferrule/Vordere Klemmring Back Ferrule/Hinter Klemmring Nut/Mutter Union body/Verbindungskoper Material grades/Werkstoff: 316	Male Connector/ männlich Steckverbinder Front Ferrule/Vordere Klemmring Back Ferrule/Hinter Klemmring Nut/Mutter Material grades/Werkstoff: 316	1/4” OD x 1.2 mm Material grades/Werkstoff: TP316
3/8 inch ODT	Tube Cap/Blindkappe Front Ferrule/Vordere Klemmring Back Ferrule/Hinter Klemmring Nut/Mutter Union body/Verbindungskoper Material grades/Werkstoff: 316	Male Connector/ männlich Steckverbinder Front Ferrule/Vordere Klemmring Back Ferrule/Hinter Klemmring Nut/Mutter Material grades/Werkstoff: 316	3/8” OD x 0.88 mm Material grades/Werkstoff: TP316
½ inch ODT	Tube Cap/Blindkappe Front Ferrule/Vordere Klemmring Back Ferrule/Hinter Klemmring Nut/Mutter Union body/Verbindungskoper Material grades/Werkstoff: 316	Male Connector/ männlich Steckverbinder Front Ferrule/Vordere Klemmring Back Ferrule/Hinter Klemmring Nut/Mutter Material grades/Werkstoff: 316	1/2” OD x 0.88 mm Material grades/Werkstoff: TP316

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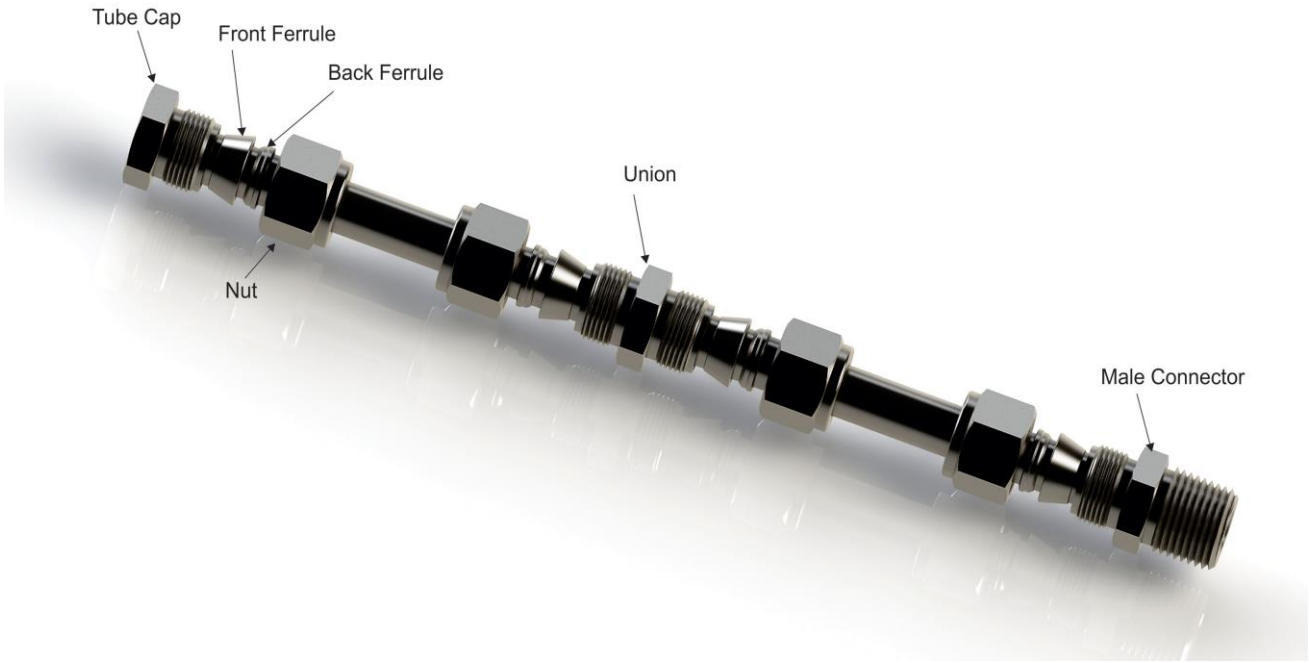
INTERMIXABILITY / COMBINATION CHART /Kombinationstabelle

Size	1/4”ODT x 1.2mmThk	3/8”ODT x 0.88mmThk	1/2”ODT x 1.20mmThk
Tube Cap	Havi	Havi	Havi
Front Ferrule	Swagelok	Swagelok	Swagelok
Back Ferrule	Swagelok	Swagelok	Swagelok
Nut	Swagelok	Swagelok	Swagelok
Nut	Swagelok	Swagelok	Swagelok
Back Ferrule	Havi	Havi	Havi
Front Ferrule	Havi	Havi	Havi
Union	Havi	Havi	Havi
Front Ferrule	Swagelok	Swagelok	Swagelok
Back Ferrule	Swagelok	Swagelok	Swagelok
Nut	Havi	Havi	Havi
Nut	Havi	Havi	Havi
Front Ferrule	Havi	Havi	Havi
Back Ferrule	Havi	Havi	Havi
Male Connecter	Swagelok	Swagelok	Swagelok



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4.0 Inspection/Prufungen

4.1 Tightness test/Dichtigkeitsprufung:
The original package of parts for assembly of specimen was opened and witnessed. It has been confirmed that the pressure class of the parts with same size is provided by two manufacturers is identical.
The parts were assembled to specimen, and assembly is made as shown above.
The specimen in mounted on test bench to check the tightness. The pressure tightness test checked and no leakage observed.

5. Inspection result/Prufergebnis

Size of specimen/Pruflingsgrobe	1/4" ODT	3/8" ODT	1/2" ODT
Tube Wall Thickness	0.048"	0.035"	0.049"
Tube Hardness (HRB)	77/79	76/80	76/80
Material grades/Werkstoff	ASTM A 269 TP316	ASTM A 269 TP316	ASTM A 269 TP316
Test fluid/Priffluide	water	water	water
Test pressure/Prufdruck (pisg)	12000	5000	5500
Holiding time/Haltezeit	5 minutes	5 minutes	5 minutes
Result of tightness Ergebnis der Dichtigkeitsprufung	no leakage or pressure drop observed	no leakage or pressure drop observed	no leakage or pressure drop observed

Remark/ Bemerkung :
The testing results showed that no impact on perfect tightness could be found by exchanging parts of two manufacturers
The hydraulic test combination showed no visual determining leakage or other damage by applying pressure with water.
Under the static pressure or speedy application of pressure with water, no defect impacting tightness function was found where single part of tube joint compression fittings system have been intently, not intently as well, exchanged.

It comes to conclusion that the device safety will not be impacted by arising un-tightness through exchanging above mentioned single part, whereby no statement about the longer period of time, frequent load cycle is not given, and the production fluctuation is not determined.

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