

FORVALTNING, DRIFT OG VEDLIKEHOLD

PROSJEKT:.....

Entreprise:	Entreprenør/leverandør navn, adresse, tlf, e-post, kontaktperson)
.....	
Underleverandør:	
Leveranse:	Underleverandør (navn, adresse, tlf, e-post, kontaktperson)
Leverandør: Synshjelpemidler AS	Sporveisgata 10 0352 Oslo, bc@synshjelpemidler.no , 23215555
Garanti/reklamasjon:	Synshjelpemidles bestillings nr./lev dato:..... (for gyldig garanti/reklamasjon på produkt)
Installatør:	

Beskrivelse av leveranse sted adresse ol:
Prosjekt:
Beskrivelse av installasjon:
Produkt levert:
Type nr.:
Dimensjoner (l x b x d/t):
Produkt overflate type og eventuell behandling:
Krav etter TEK 17/NS referert til i FDV er fulgt:
Eventuelle avvik: (begrunn/dokumenter tiltak):
Installasjons metode:
Annen relevant informasjon:
.....

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Materialspesifikasjon på produkter:

Lede/oppmerksomhet:

- BP1011205 (med pinne, uten pinne/med tapelim VHB GPH, VHB5925F)
- BP1011530 - 140 mm (messing med pinne, uten pinne/med tapelim VHB GPH, VHB5925F)
- BP1011531 - 280 mm (messing med pinne, uten pinne/med tapelim VHB GPH, VHB5925F)

Fare knotter:

- BP1011424, BP1011423 - Ø35 (med/uten pinne, med tape lim VHB GPH, VHB5925F)
- BP1011426, BP1011425 - Ø15-30 (med/uten pinne, med tape lim VHB GPH, VHB5925F)
- BP1011432, BP1011430 - Ø35 (edelmetall med/uten pinne, med tape lim VHB GPH, VHB5925F)
- BP1011436, BP1011434 - Ø15-30 (edelmetall med/uten pinne, med tape lim VHB GPH, VHB5925F)

Vedlegg i FDV:

- Skli dokumentasjon for alle mønstre
- Stål opprinnelses sertifikat

(Be om opprinnelses sertifikat på andre metaller ved behov)

Se vedlagt teknisk spesifikasjon vedlegg 1:

- Produktblad taktile stål gulvelement med og uten ilegg.

Andre datablad for andre metaller ved behov:

- Produktblad taktile gulvelementer med og uten ilegg i aluminium
- Produktblad taktile gulvelementer med/uten ilegg i messing, bronse og kobber

Produktene kan leveres i:

Stål:

- Syrefast stål (316L)
- Rustfritt stål (303/304)

Aluminium:

- Aluminium (maritim type/ EN AW-6082)

Edelmetall:

- Messing (se produkt ark)
- Kobber (se produktark)
- Bronse (se produktark).

Elementene kan leveres med forskjellig overflater fra jevn overflate til forskjellig grad av diamantmønster og linjer.

Overflate typer:

- Jevn overflate matt, børstet eller blank. Linje element R9 DIN51130. Knott: R10 etter DIN51130
- Linjer eller sirkler på 0,75 mm dybde Linje element R9 DIN51130. Knott: R10 etter DIN51130
- 4 diamantmønstre på 0,75 mm dybde fra fint til grovt mønster (vil tilfredsstille norske sklisikkerhetskrav. Linje element R10-13 DIN51130. Knott: R11 -13 etter DIN51130

Se skli test dokumentasjon lenger ned. Min. krav i trappeløp og våtsoner er R10 i alle



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retninger.

Alle elementene kan også leveres med sandblåst overflate (matt). I stål kan de leveres brent, med forgyllning (PVD behandlet svart eller gull).

Der det er behov kan de også leveres med skreddersydde mål (spør oss). Overflate behandling ligger i et tynt lag på overflaten. Over tid vil denne fargen slites avhengig av belastning og overflate mønster.

Syrefast stål 316 L

Stålets rustfrie egenskap er et resultat av at det er legeret med krom. Når dette gjøres, oppstår det en usynlig, beskyttende hinne, som øker stålets motstandskraft mot korrosjon.

I syrefast stål er det i tillegg tilsatt molybden som er med på å øke stålets motstandskraft.

Syrefast stål inneholder også mindre karbon enn alminnelig rustfritt stål. Dette gjør at stålet kan utsettes for større kjemiske påkjenninger.

Syrefast stål er ikke-magnetisk. Syrefast eller syrebestandig stål inneholder foruten jern og krom, en del nikkel og/eller mangan samt mindre mengder av andre metaller som molybden og titan. Syrefast stål brukes i miljøer med stor kjemisk belastning som kystmiljø, industrimiljø eller annen kontakt med syrer.

For mer detaljer rundt stål, messing, kobber, bronse og aluminium se eget produktblad.

Lysrefleksjonsverdi LRV:

Lysrefleksjonsverdi avhengig av valgt metall, overflate struktur og behandling. Stål har en lysrefleksjon på ca 30 (matt) – 35 (blank) LRV. Det betyr at som rent stål ledelinje kan de brukes på gulv med en LRV lavere enn 25 LRV eller høyere enn 58 LRV. Som fare og oppmerksomhetselement er produktene kun egnet på gulv med lavere enn 20 i LRV. Rene metall produkter egner seg ikke på normalfarget betong.

Alternativt kan en gjøre betongen mørkere under elementene slik at det gir nok i LRV eller man kan behandle elementene så de får en annen farge.

Produktet skal levere en luminanskontrast mot underlaget på over 0,8 foran trapper. Ellers er kravet 0,4 ifølge TEK 10/17 og NS11001:2018 Del 1.

- Lysrefleksjonsverdi for stål på mellom 30 (matt) - 35 (blank) LRV.
- Lysrefleksjonsverdi for børstet aluminium på mellom 30 - 40 LRV
- Lysrefleksjonsverdi for ubehandlet messing på mellom 25 - 30 LRV (etter ca 1 år: 15 - 25 LRV om ubehandlet)
- Lysrefleksjonsverdi for ubehandlet bronse på mellom 20 - 25 LRV (etter ca 1 år: 10 - 20 LRV om ubehandlet)
- Lysrefleksjonsverdi for ubehandlet kobber på mellom 20 - 25 LRV (etter ca 1 år: 10 - 20 LRV om ubehandlet)
- Lysrefleksjonsverdi for brent stål på mellom 7-20 LRV avhengig av brenning. (avhengig av legering og overflate behandling). Lysner noe over tid avhengig av slitasje og overflate mønster.

Montering:

Elementene kan monteres innendørs og utendørs (2-4 mm tykke innendørs og 4-5 mm tykke utendørs) med og uten pigg. Innendørs med f.eks.: TEC 7 eller Sikabond T2 (som er Breeam sertifisert). I tillegg kan de monteres med tape lim. Her tilbys: 3M VHB 5925F. VHB GPH. VHB serien er sertifisert etter NFPA Hazard Classification-Health: 0, Flammability: 1,



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Reactivity: 0, Special Hazards: None.

Elementene er mellom 2 og 5 mm høye og tilfredsstiller intensjonen i ISO 23599. For flere mål se detaljer for hvert enkelt produkt i produktlisten.

Vi anbefaler ikke montering ute uten pigg (kun med egnet lim slik som TEC 7 eller Sikabond T2 eller Super Fix). Innendørs der underlaget er egnet anbefaler vi innfesting uten pigg med VHB5925F og VHB GPHs tape lim.

Tepper:

Lede elementene kan monteres på enkelte kort bustede tepper (tester må gjennomføres). Da skal 3M VHB 5925F benyttes for alle elementer. I et slikt miljø kan hefte egenskapene og levetiden være noe begrenset. Elementene kan kun monteres på helt rent underlag. D.v.s. nye tepper eller dyprensede tørre tepper. Vi anbefaler kun bruk av de bredeste elementene på tepper for maks vedheft. Om elementene skal legges i inngangsområder på tepper må løsningen gi rom for at teppe periodisk tørker opp og ikke alltid er våte. Fareknotter anbefales ikke festet på tepper.

Bruk og installasjon utendørs:

For å få en sterk innfesting utendørs er det viktig at elementer presses hardt ned mot limet med f.eks. en rulle. Det skal ikke forekomme luftbobler mellom elementer og underlaget. Ved bruk av stål elementene utendørs anbefales det bruk av pigg. Elementene anbefales ikke direkte montert på asfalt. Dette siden asfalt blir mykt i solen og på den måten kan elementene løsne. Ute under tak kan en på betong også bruke VHB 5925F tape lim om f.eks. området primes først, er jevnt/sugende. Ved feste på områder som det skal benyttes skjæreblad på må elementene freses ned tilsvarende høyden på elementene. Utendørs anbefales bruk av de groveste diamantmønstrene eller produkt med ilegg av Desmopan/TPU.

Annet:

Produktene er naturlige brannhemmende og inneholder ingen farlige forbindelser som gjør dem uegnet til bruk innendørs. Siden syrefast stål (316L) har meget høy ytelse kan de legges i utemiljø uten å ta skade. Dog skal man ikke salte eller syre utsette dem direkte.

Tynne elementer som lar seg bøye skal ikke plasseres på mye overflater.

Minimumskrav i forhold til installasjons tetthet og produkttegenskaper:

For å få en trygg og forsvarlig installasjonsløsning må en følge TEK 10/17 og retningslinjene gitt i NS11001:2018 vedlegg P750:2014 og ISO23599. Her spesifiseres bl.a. minimumskrav og utforming av elementene for bruk i Norge og internasjonalt. Alle elementer/maler Adaptor Hjelpemidler AS leverer i Norge følger anbefalinger gitt i Norge og eventuelt internasjonalt der dette ikke er nevnt i norske forskrifter eller std.. Der det ikke er spesifisert i norske dokumenter følger vi internasjonale minimumskrav.

Generelle krav:

Innendørs taktil høyde på 3 mm +/- 1 mm, utendørs 5 mm +/-1 mm (norsk), reisvinkel på element ikke over 45 grader (International - ISO 23599).

Ved trapper skal elementene være sklisisikre i både våt og tørr tilstand (norsk). Tilsvaret minimum R10 etter DIN51130 std ol..

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Luminanskontrast: (Bakgrunnsfarge LRV – element farge LRV)/ Bakgrunnsfarge LRV

Farefelt:

Dybde: 60 cm (norsk), diagonale felt anbefales, avstand mellom sentrum av knotter maks 70 mm senter avstand på Ø25 mm elementer (målt på toppen) /tilsvarer Ø35mm i bunn avhengig av elementhøyde). Dette gir ca 126 knotter pr 0,6 m² for 30 – 35 mm.

Maks 68 mm senteravstand på Ø20 mm elementer (målt på toppen)/tilsvarer Ø25mm målt i bunn. (ca 143 knotter pr 0,6 m²) knotter (målt på toppen/tilsvarer 25mm i bunn avhengig av elementhøyde) (International - ISO23599). Disse minimums kravene er gitt for at felte skal være stabilt og trygt å gå på. Sklisikkerhetstester er også gjennomført etter disse min kravene for mønster. Krav til luminanskontrast inne:0,8. Ute: 0,4.

Oppmerksomhetsfelt:

Dybde 60 cm (norsk), avstand mellom elementene maks 83 mm på 25 mm bredde på toppen/6 rekker (målt på toppen/tilsvarer 35 mm bredde i bunn avhengig av elementhøyde). 80 mm avstand mellom elementene på 20 mm/7 rekker (målt på toppen/tilsvarer 25 mm bredde avhengig av elementhøyde) (International - ISO23599). Disse minimums kravene er gitt for at felte skal være stabilt og trygt å gå på. Sklisikkerhetstester er også gjennomført etter disse min kravene for mønster. Krav til luminanskontrast inne:0,8 (trapp). 0,4 (heis mm). Ute: 0,4.

Ledelinje:

Mindre områder: Minimums krav på elementers bredde er 20 mm på linjen (norsk - krav til luminans kontrast og bredde på denne). Med ilegg i metall elementer gir det en minimumsbredde på 30 – 35 mm i bunn avhengig av høyde siden ilegg må være minst 20 mm bred. Store områder inne og utendørs skal ledelinje være 15 - 30 cm i bredde (norsk anbefaling). Bredden på feltet skal stå i stil til rommets/områdets størrelse.

Alle produkter blir montert etter disse minimumskravene eller bedre. Alle produkter følger norske og internasjonale krav. Krav til luminanskontrast inne og ute: 0,4.

Driftsinstruks: Det må aldri plasseres løse gjenstander nærmere en 50 cm fra de taktile elementene. Dette for at ikke svaksynte og blinde skal støte borti det mens de går ved eller på elementene. Elementene tåler stor gang trafikk inkludert rullestoler med gummihjul. En skal unngå å dra tunge gjenstander og skarpe gjenstander uten gummihjul over elementene slik som jekketraller med harde hjul mf. Trafikk med slikt på eget ansvar.

Vedlikeholds instruksjon:

Hvis elementene er riktig installert, trenger elementene ikke noen spesielle vedlikehold eller renholdsrutiner.

Om elementene monteres på kort bustede tepper må underlaget i all hovedsak være tørt. Underlaget kan i korte perioder bli våt.

Kobber, bronse og messing må regelmessig poleres ellers oksiderer de og blir mørkere i fargen slik all kobber, bronse og messing blir. Bruk dertil egnede pussemidler. Vi kan anbefale sitronsyre og Zalo i varmt vann. Brente eller PVD behandlede elementer kan vaskes med Zalo og varmt vann. Vær oppmerksom på at på utsatte steder vil fargen etter hvert slites ned og elementene lysner naturlig avhengig av belastning/slitasje og overflate mønster.



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Kan børstes/feies rent for støv og skitt. I tillegg kan elementene vasket med fuktig klut, kost eller mopp. Ph nøytralt vaskemiddel kan brukes. Ikke bruk rengjøringsmidler direkte på elementene som inneholder akryliske lim fjernings forbindelser.

Det vil over tid være behov for utbytting av enkelte elementer utfra belastningsgrad. Ved bytte må underlaget rengjøres før nytt lim/element legges. En kan bruke 3M Scotch-Weld Cleaner Spray 50098 for å fjerne gamle lim rester. Eventuelt aceton om underlaget tåler dette, men aldri direkte på eksisterende elementer.

Vedlegg:

- Antall vedlegg: 1 Produktblad taktile stål alu gulvelement med og uten ilegg

Alternativ:

- Produktblad taktile messing kobber bronse gulvelement med og uten ilegg

Retur/miljø: Om og eventuelt når produktene skal kastes skal de leveres inn til en offentlig gjenvinningsstasjon og kastes som metall avfall (avhengig av type metal). Metallene er fremstilt i Europa på en miljømessig god måte og de kommer ikke fra problemområder. Edel metaller kan også resirkuleres.



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Sklisikkerhets test Mars 2019 for metall elementer:



TECHNICKÝ A ZKUŠEBNÍ ÚSTAV STAVEBNÍ PRAHA, s.p.
Technical and Test Institute for Construction Prague

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Central laboratory

Testing department Plzeň, Zahradní 15, 326 00 Plzeň

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L 1018.3

TEST REPORT

issued by Testing Laboratory No. 1018.3
accredited pursuant to ČSN EN ISO/IEC 17025:2005 by Czech Accreditation Institute

No. 030 – 058164

for determination of anti-slip properties of floor coverings

Test sample: **Stainless steel floor coverings with embossed surface**

Order No.: **Z030 19 0105**

Number of pages of the Test Report incl. title page: 11 Pages of Annexes: -

Prepared by:


Ing. Hana Kotorová

specialist

Approved by:


Vít Ruml

head of the testing department

Print No.: 1

Number of prints: 3

Plzeň, 2019-03-14



Declaration: 1) The test results in this Report relate only to the tested article and they do not substitute any other documents
2) The Test Report must be copied as a whole only otherwise a written consent of the testing laboratory is needed.

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Det er ikke tillatt å endre innholds tekst uten skriftlig godkjenning fra leverandør



Synshjelpemidler AS
Norges Blindforbund

1 Initial Data

• Assignment

- Execution of tests of slipperiness of stainless steel tactile floorings according the requirement of the client:
 - **determination of slipperiness – walking methods – ramp test** (shoe method) according DIN 51130, P CEN/TS 16165 (annex B)

2 Samples

- Samples specification: **Stainless steel floor coverings:**
 - Floor covering: tactile warning studs AISI/KH
 - Floor covering: tactile warning studs AISI/KD
 - Floor covering: tactile warning studs AISI/K1
 - Floor covering: tactile warning studs AISI/KD3
 - Floor covering: tactile guiding strips AISI/PD1
 - Floor covering: tactile guiding strips AISI/PD3
 - Floor covering: tactile guiding strips AISI/P1
 - Floor covering: tactile guiding strips AISI/PH
 - Producer: OLEJÁR, spol. s r.o., Nižná Polianka 65, 086 36 Nižná Polianka, Slovakia
 - Samples supplied on 6th March 2019

3 Sampling Method

The test samples were supplied by the customer on 6th March 2019.
The samples were recorded this way:
under no. sample **VZ 030190189/1-8.**

4 Testing Procedures

DIN 51130: 2014

Testing of floor coverings determination of anti-slip properties Workrooms and fields of activities with slip danger– walking method – ramp test

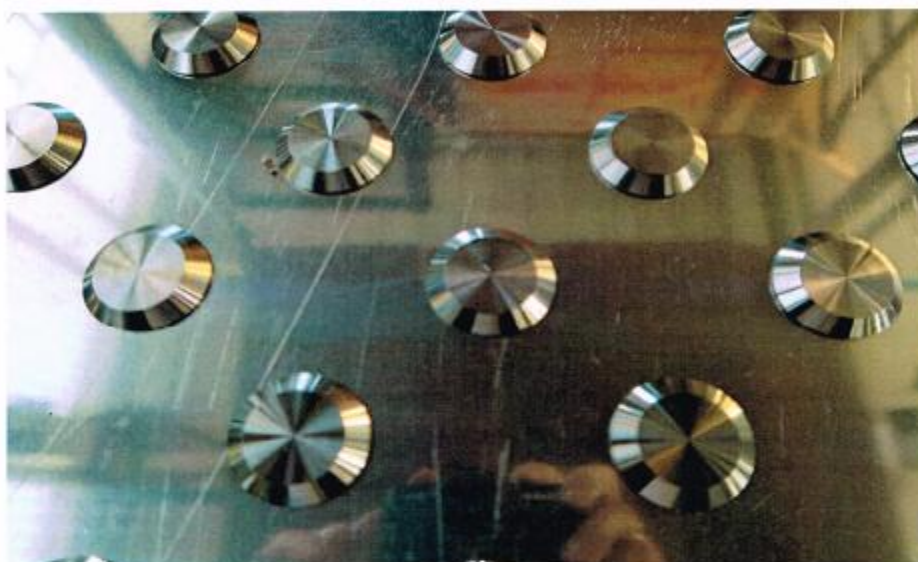
P CEN/TS 16165: 2013

Determination of slip resistance of pedestrian surfaces – Methods of evaluation



5 Measurements and Tests

- Determination of slipperiness – walking methods – ramp test (shoe method)
DIN 51130, P CEN/TS 16165 (annex B)



Testing samples	Critical angle of slip classification according to DIN 51130, P CEN/TS 16165 (annex B)	
AISI/KH	13,8°	R10



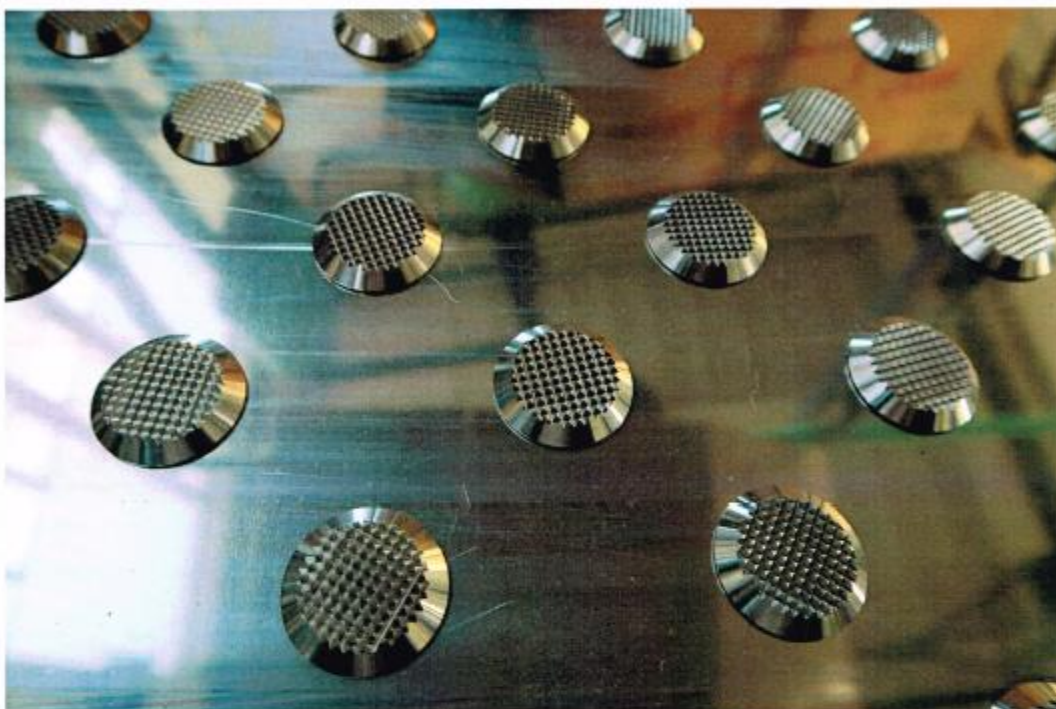
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TZÚS Prague, Central laboratory
Testing department Plzeň

030 – 058164

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Testing samples	Critical angle of slip classification according to DIN 51130, P CEN/TS 16165 (annex B)	
AISI/KD	> 35°	R13



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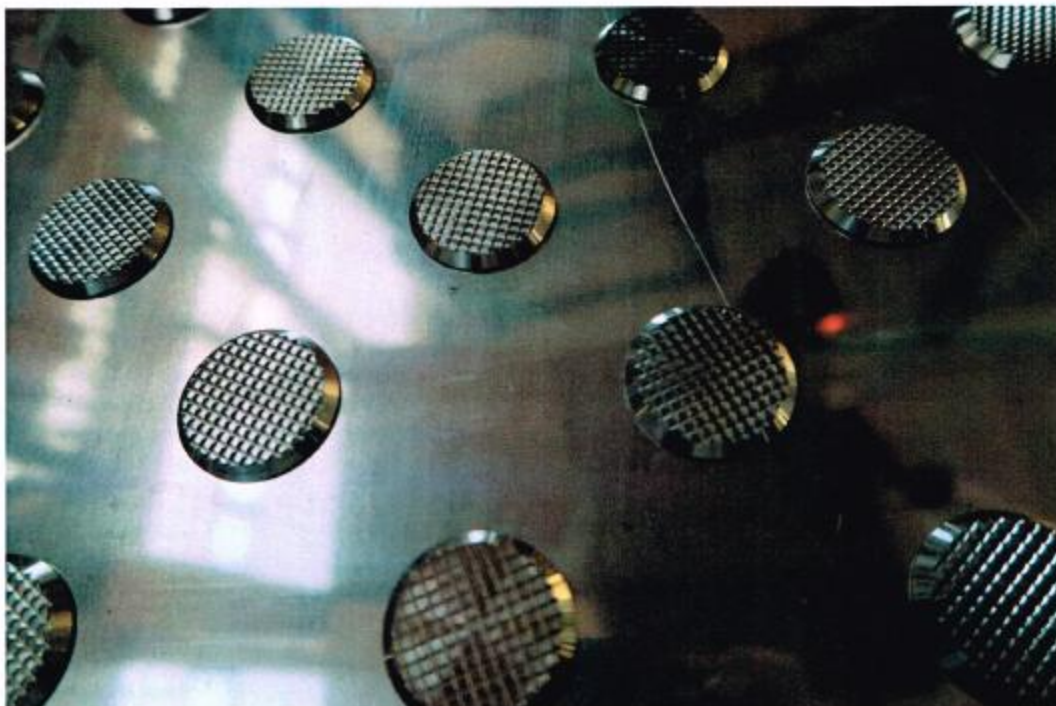
FORVALTNING, DRIFT OG VEDLIKEHOLD



Testing samples	Critical angle of slip classification according to DIN 51130, P CEN/TS 16165 (annex B)	
AISI/K1	19°	R10



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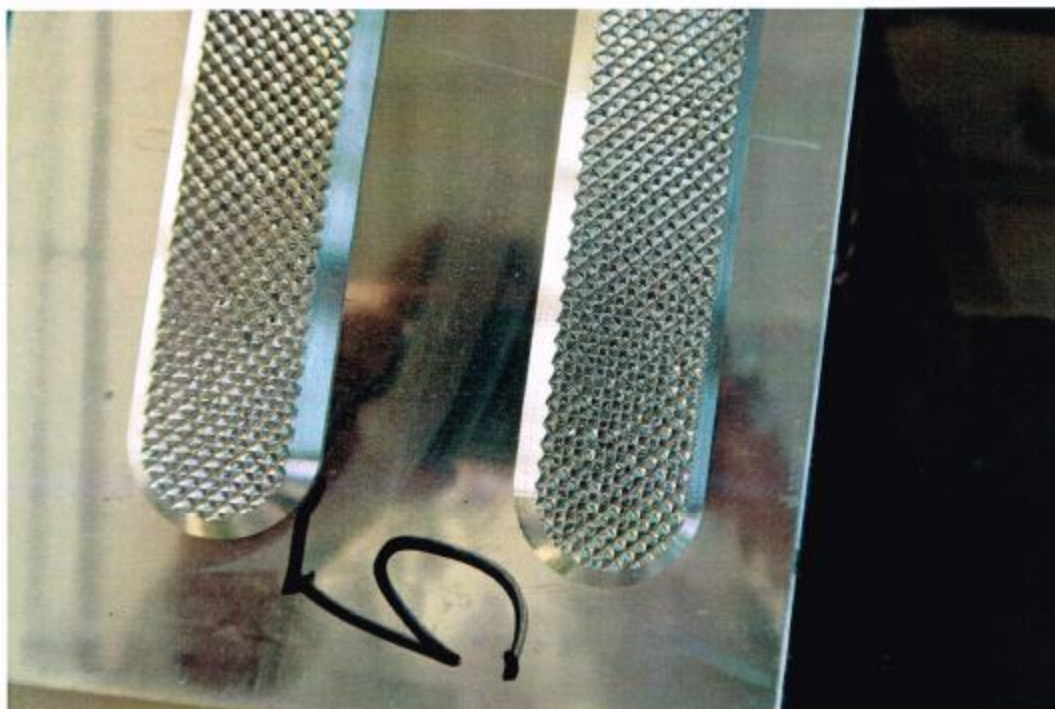


Testing samples	Critical angle of slip classification according to DIN 51130, P CEN/TS 16165 (annex B)	
AISI/KD3	26,4°	R11



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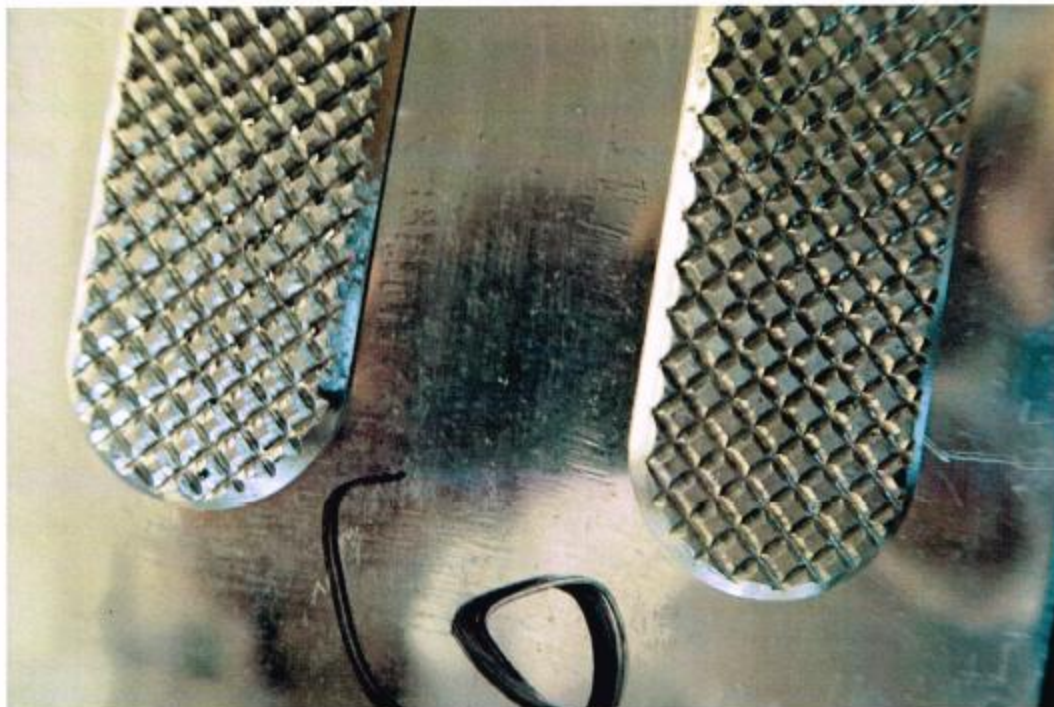


Testing samples	Critical angle of slip classification according to DIN 51130, P CEN/TS 16165 (annex B)	
AISI/PD1	> 35°	R13



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Testing samples	Critical angle of slip classification according to DIN 51130, P CEN/TS 16165 (annex B)	
AISI/PD3	19°	R10



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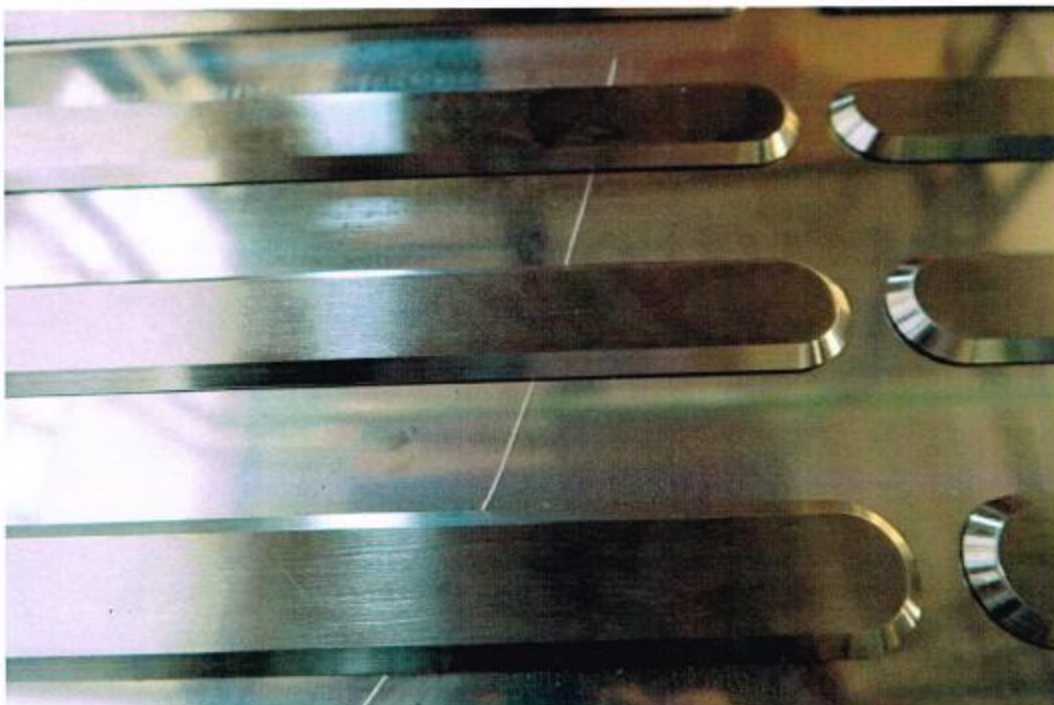


Testing samples	Critical angle of slip classification according to DIN 51130, P CEN/TS 16165 (annex B)	
AISI/P1	9°	R9



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Testing samples	Critical angle of slip classification according to DIN 51130, P CEN/TS 16165 (annex B)	
AISI/PH	10°	R9



6 Conclusion

Based on the results of the test pursuant to **DIN 51130, P CEN/TS 16165 (annex B)**, the tested samples of **stainless steel floor coverings**,

R 13	Floor covering: tactile warning studs	AISI/KD
	Floor covering: tactile guiding strips	AISI/PD1
R11	Floor covering: tactile warning studs	AISI/KD3
R10	Floor covering: tactile warning studs	AISI/KH
	Floor covering: tactile warning studs	AISI/K1
	Floor covering: tactile guiding strips	AISI/PD3
R9	Floor covering: tactile guiding strips	AISI/P1
	Floor covering: tactile guiding strips	AISI/PH

It should be pointed out that to ensure proper slip resistance function of flooring in the sense of stated conclusion, it is needed to maintain surface in clean conditions and without significant wear. Other properties were not subject to testing.

END OF REPORT



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VHB tape:

3M **VHB™ GPH Series**

Product Data Sheet

February 2017

Supersedes: August 2016

Product Description 3M™ VHB™ GPH Series, a general purpose, high temperature, grey conformable double coated acrylic foam tape with a high initial tack and a soft foam. Available in three different thicknesses with a 3M branded red siliconised polyethylene film liner.

Key Features

- Double coated acrylic foam tape
- 100 % closed cell acrylic foam
- High temperature performance (short term 230 °C)
- Good balance of high temperature and peel & shear performance
- High initial tack
- Soft foam enables stress relaxation & an easy application
- Good sealing properties
- For indoor and outdoor applications

Applications & Benefits

- Its temperature performance enables bonding of materials in applications with high operating temperatures such as prior to processing in a powder coating line
- Capability to bond to a variety of substrates makes it a good fit for multi material bonding - those substrates have a high or medium surface energy including many metals (e.g. stainless steel) and plastics (e.g. Polyamide, PMMA, ABS)
- For applications in metal working, signage, appliances and specialty vehicle

Physical Properties

	GPH-060GF	GPH-110GF	GPH-160GF
Adhesive Type	Acrylic foam adhesive		
Thickness acc. to ASTM D-3652	0.60 mm	1.10 mm	1.60 mm
Foam Density	710 kg/m ³		
Release Liner	3M branded red siliconised polyethylene film		
Tape Colour	Grey		



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Performance Characteristics

Type	GPH-060GF	GPH-110GF	GPH-160GF
90 ° Peel adhesion to Stainless Steel acc. to ASTM D3330, 90° peel angle @ RT, after 72h @ RT dwell	25 N/cm	37 N/cm	34 N/cm
90 ° Peel adhesion to PA6 acc. to ASTM D3330, 90° peel angle @ RT, after 72h @ RT dwell	33 N/cm	48 N/cm	55 N/cm
90 ° Peel adhesion to ABS acc. to ASTM D3330, 90° peel angle @ RT, after 72h @ RT dwell	21 N/cm	33 N/cm	32 N/cm
90 ° Peel adhesion to PMMA acc. to ASTM D3330, 90° peel angle @ RT, after 72h @ RT dwell	21 N/cm	34 N/cm	37 N/cm
Dynamic Shear acc. to ASTM D1002 on stainless steel, after 72h @ RT dwell	547 N/6.54 cm ²	476 N/6.54 cm ²	375 N/6.54 cm ²
Static Shear Strength acc. to ASTM D3654, after 72h @ RT dwell (Weight held for 10.000 minutes to stainless steel, 3.32cm ² (0.5in ²))	23 °C - 1000 g 150 °C - 500 g		
Normal Tensile (T-Block) acc. to ASTM D897 to Aluminium @ RT, after 72h @ RT dwell, 6.45 cm ² , test speed 50 mm/min	410 N/6.54 cm ²	439 N/6.54 cm ²	470 N/6.54 cm ²
Temperature Performance	Short term (minutes, hours): 230 °C Long term (days, weeks): 150 °C		

Application Temperature

Ideal application temperature range is 21 °C to 38 °C. Pressure sensitive adhesives use viscous flow to achieve substrate contact area.
To obtain good performance with all 3M™ VHB™ Tapes, it is important to ensure that the surfaces are clean, dry and free of condensed moisture.

Shelf Life

24 months from date of production when stored at 16 °C – 25 °C and 40-65 % relative humidity.
Performance of tapes is not projected to change even after shelf life expires; however, 3M does suggest that 3M™ VHB™ Tapes are used prior to the shelf life date whenever possible.

FORVALTNING, DRIFT OG VEDLIKEHOLD

Important Notice

All statements, technical information and recommendations contained in this document are based upon tests or experience that 3M believes are reliable. However, many factors beyond 3M's control can affect the use and performance of a 3M product in a particular application, including the conditions under which the product is used and the time and environmental conditions in which the product is expected to perform. Since these factors are uniquely within the user's knowledge and control, it is essential that the user evaluate the 3M product to determine whether it is fit for a particular purpose and suitable for the user's method or application. All questions of liability relating to this product are governed by the terms of the sale subject, where applicable, to the prevailing law.

Values presented have been determined by standard test methods and are average values not to be used for specification purposes. Our recommendations on the use of our products are based on tests believed to be reliable but we would ask that you conduct your own tests to determine their suitability for your applications. This is because 3M cannot accept any responsibility or liability direct or consequential for loss or damage caused as a result of our recommendations.

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3M VHB™ Tapes

Technical Data

October 2018

Product Description:

3M™ VHB™ Tapes provide the convenience and simplicity of a tape fastener and are ideal for use in many interior and exterior bonding applications. In many situations, they can replace rivets, spot welds, liquid adhesives and other permanent fasteners.

These 3M™ VHB™ Tapes are made with acrylic foam which is viscoelastic in nature. This gives the foam energy absorbing and stress relaxing properties which provides these tapes with their unique characteristics. The acrylic chemistry provides outstanding durability performance.

These tapes utilize a variety of specific foam, adhesive, color and release liner types to provide each product/family with specific features. These features can include adhesion to specific or a broad range of materials, conformability, high tensile strength, high shear and peel adhesion, resistance to plasticizer migration, and UL746C recognition. All 3M™ VHB™ Tapes have excellent durability and excellent solvent and moisture resistance.

The tapes included in this data page represent products most commonly used by customers. Please refer to "3M™ VHB™ Tape Specialty Tapes" technical data sheet for additional 3M™ VHB™ Tapes that may be required in special circumstances.

3M™ VHB™ Tape Products

4941 Family

This family utilizes multi-purpose acrylic adhesive on both sides of a conformable adhesive foam core. The adhesive provides excellent adhesion to a broad range of high and medium surface energy substrates including metals, glass, and a wide variety of plastics, as well as plasticized vinyl. The conformable adhesive foam core provides good contact, even with mismatched substrates. The combination of foam strength, conformability, and adhesion makes this family one of the most capable all-around 3M™ VHB™ tapes.

Tape Number	Color	Thickness in (mm)
4919F	Black	0.025 (0.6)
4926	Gray	0.015 (0.4)
4936(F)	Gray	0.025 (0.6)
4941(F)	Gray	0.045 (1.1)
4947F	Black	0.045 (1.1)
4950(F)	Gray	0.062 (1.6)
4979F	Black	0.062 (1.6)
4991	Gray	0.090 (2.3)
4991B	Black	0.090 (2.3)

5952 Family

This family utilizes modified acrylic adhesive on both sides of a very conformable adhesive foam core, providing adhesion the broadest range of substrates, including most powder coated paints.

Tape Number	Color	Thickness in (mm)
5906	Black	0.006 (0.15)
5907	Black	0.008 (0.20)
5908	Black	0.010 (0.25)
5909	Black	0.012 (0.30)
5915(P)	Black	0.016 (0.4)
5915WF	White	0.016 (0.4)
5925(P)	Black	0.025 (0.6)
5925WF	White	0.025 (0.6)
5930(P)	Black	0.032 (0.8)
5930WF	White	0.032 (0.8)
5952(P)	Black	0.045 (1.1)
5952WF	White	0.045 (1.1)
5958FR	Black	0.040 (1.0)
5962(P)	Black	0.062 (1.6)
5962WF	White	0.062 (1.6)

RP Family

This family utilizes multi-purpose acrylic adhesive on both sides of a conformable adhesive foam core. The adhesive provides good adhesion to a broad range of high and medium surface energy substrates including metals, glass, and a wide variety of plastics. The conformable adhesive foam core provides good contact, even with mismatched substrates.

Tape Number	Color	Thickness in (mm)
RP16(F)	Gray	0.016 (0.4)
RP25(F)	Gray	0.025 (0.6)
RP32(F)	Gray	0.032 (0.8)
RP45(F)	Gray	0.045 (1.1)
RP62(F)	Gray	0.062 (1.6)

(P) or (F) after the product number designates that both a paper and film liner product version are available. (e.g. 4941 (paper liner) and 4941F (film liner), 5915 (film liner) and 5915P (paper liner). See page 2 for specific details.

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3M™ VHB™ Tapes

Typical Physical Properties

Note: The following technical information and data should be considered representative or typical only and should not be used for specification purposes.

3M™ VHB™ Tapes				Adhesive and Foam			Release Liner		
Family	Number	Color	Tape Thickness Inches (mm) Tolerance	Adhesive Type	Foam Type	Density lb/ft³ (kg/m³)	Type	Thickness Inches (mm)	Color
4941	4919F	Black	0.025 (0.6) ± 15%	Multi-Purp	Conform	45 (720)	PE Film	0.005 (0.13)	Red (printed)
	4926	Gray	0.015 (0.4) ± 15%	Multi-Purp	Conform	45 (720)	Dk Paper	0.003 (0.08)	White (printed)
	4936	Gray	0.025 (0.6) ± 15%	Multi-Purp	Conform	45 (720)	Dk Paper	0.003 (0.08)	White (printed)
	4936F	Gray	0.025 (0.6) ± 15%	Multi-Purp	Conform	45 (720)	PE Film	0.005 (0.13)	Red (printed)
	4941	Gray	0.045 (1.1) ± 10%	Multi-Purp	Conform	45 (720)	Dk Paper	0.003 (0.08)	White (printed)
	4941F	Gray	0.045 (1.1) ± 10%	Multi-Purp	Conform	45 (720)	PE Film	0.005 (0.13)	Red
	4947F	Black	0.045 (1.1) ± 10%	Multi-Purp	Conform	45 (720)	PE Film	0.005 (0.13)	Red (printed)
	4956	Gray	0.062 (1.6) ± 10%	Multi-Purp	Conform	45 (720)	Dk Paper	0.003 (0.08)	White (printed)
	4956F	Gray	0.062 (1.6) ± 10%	Multi-Purp	Conform	45 (720)	PE Film	0.005 (0.13)	Red (printed)
	4979F	Black	0.062 (1.6) ± 10%	Multi-Purp	Conform	45 (720)	PE Film	0.005 (0.13)	Red (printed)
	4991	Gray	0.090 (2.3) ± 10%	Multi-Purp	Conform	45 (720)	PE Film	0.005 (0.13)	Red (printed)
5952	4991B	Black	0.090 (2.3) ± 10%	Multi-Purp	Conform	45 (720)	PE Film	0.005 (0.13)	Red (printed)
	5906	Black	0.006 (0.15) ± 15%	Modified	Very Conf	45 (720)	PET	0.003 (0.08)	Clear
	5907	Black	0.006 (0.20) ± 15%	Modified	Very Conf	45 (720)	PET	0.003 (0.08)	Clear
	5908	Black	0.010 (0.25) ± 15%	Modified	Very Conf	45 (720)	PET	0.003 (0.08)	Clear
	5909	Black	0.012 (0.30) ± 15%	Modified	Very Conf	45 (720)	PET	0.003 (0.08)	Clear
	5915	Black	0.016 (0.4) ± 15%	Modified	Very Conf	43 (690)	PE Film	0.005 (0.13)	Red (printed)
	5915P	Black	0.016 (0.4) ± 15%	Modified	Very Conf	43 (690)	PCK Paper	0.004 (0.10)	White (printed)
	5915WF	White	0.016 (0.4) ± 15%	Modified	Very Conf	43 (690)	PE Film	0.005 (0.13)	Red (printed)
	5925	Black	0.025 (0.6) ± 15%	Modified	Very Conf	37 (590)	PE Film	0.005 (0.13)	Red (printed)
	5925P	Black	0.025 (0.6) ± 15%	Modified	Very Conf	37 (590)	PCK Paper	0.004 (0.10)	White (printed)
	5925WF	White	0.025 (0.6) ± 15%	Modified	Very Conf	37 (590)	PE Film	0.005 (0.13)	Red (printed)
	5930	Black	0.032 (0.8) ± 15%	Modified	Very Conf	37 (590)	PE Film	0.005 (0.13)	Red (printed)
	5930P	Black	0.032 (0.8) ± 15%	Modified	Very Conf	37 (590)	PCK Paper	0.004 (0.10)	White (printed)
	5930WF	White	0.032 (0.8) ± 15%	Modified	Very Conf	37 (590)	PE Film	0.005 (0.13)	Red (printed)
	5952	Black	0.045 (1.1) ± 10%	Modified	Very Conf	37 (590)	PE Film	0.005 (0.13)	Red (printed)
	5952P	Black	0.045 (1.1) ± 10%	Modified	Very Conf	37 (590)	PCK Paper	0.004 (0.10)	White (printed)
	5952WF	White	0.045 (1.1) ± 10%	Modified	Very Conf	37 (590)	PE Film	0.005 (0.13)	Red (printed)
RP	5958FR	Black	0.040 (1.0) ± 10%	Modified	Very Conf	50 (800)	PE Film	0.005 (0.13)	Red (printed)
	5962	Black	0.062 (1.6) ± 10%	Modified	Very Conf	37 (590)	PE Film	0.005 (0.13)	Red (printed)
	5962P	Black	0.062 (1.6) ± 10%	Modified	Very Conf	37 (590)	PCK Paper	0.004 (0.10)	White (printed)
	5962WF	White	0.062 (1.6) ± 10%	Modified	Very Conf	37 (590)	PE Film	0.005 (0.13)	Red (printed)
	RP16	Gray	0.016 (0.4) ± 15%	Multi-Purp	Conform	45 (720)	Dk Paper	0.003 (0.08)	White (printed)
	RP16F	Gray	0.016 (0.4) ± 15%	Multi-Purp	Conform	45 (720)	PE Film	0.005 (0.13)	Red (printed)
	RP25	Gray	0.025 (0.6) ± 15%	Multi-Purp	Conform	45 (720)	Dk Paper	0.003 (0.08)	White (printed)
	RP25F	Gray	0.025 (0.6) ± 15%	Multi-Purp	Conform	45 (720)	PE Film	0.005 (0.13)	Red (printed)
RP	RP32	Gray	0.032 (0.8) ± 15%	Multi-Purp	Conform	45 (720)	Dk Paper	0.003 (0.08)	White (printed)
	RP32F	Gray	0.032 (0.8) ± 15%	Multi-Purp	Conform	45 (720)	PE Film	0.005 (0.13)	Red (printed)
	RP45	Gray	0.045 (1.1) ± 10%	Multi-Purp	Conform	45 (720)	Dk Paper	0.003 (0.08)	White (printed)
	RP45F	Gray	0.045 (1.1) ± 10%	Multi-Purp	Conform	45 (720)	PE Film	0.005 (0.13)	Red (printed)
	RP62	Gray	0.062 (1.6) ± 10%	Multi-Purp	Conform	45 (720)	Dk Paper	0.003 (0.08)	White (printed)
	RP62F	Gray	0.062 (1.6) ± 10%	Multi-Purp	Conform	45 (720)	PE Film	0.005 (0.13)	Red (printed)



FORVALTNING, DRIFT OG VEDLIKEHOLD

3M™ VHB™ Tapes

Available Sizes

Tape Thickness Inches (mm)	Standard Length yards (meters)	Minimum Width Inches (mm)	Maximum Width Inches (mm)	Maximum Roll Length		
				Width 1/4" up to 3/8" (6.4mm up to 9.6mm) yards (meters)	Width >3/8" up to 1/2" (9.6mm up to 12.7mm) yards (meters)	Width 1/2" and wider (12.7mm and wider) yards (meters)
< 0.015 (0.4)	72 (65.8)	0.5 (13)	46 (1168)	N/A N/A	N/A N/A	See Note Below
0.015/0.016 (0.4)	72 (65.8)	0.25 (6)	48* (1219)	144 (131.7)	175 (160.0)	360 (329.2)
0.025 (0.6)	72 (65.8)	0.25 (6)	48* (1219)	72 (65.8)	108 (98.8)	175 (160.0)
0.032 (0.8)	72 (65.8)	0.25 (6)	48 (1219)	72 (65.8)	108 (98.8)	175 (160.0)
0.040 (1.0)	36 (32.9)	0.25 (6)	48 (1219)	72 (65.8)	108 (98.8)	144 (131.7)
0.045 (1.1)	36 (32.9)	0.25 (6)	48 (1219)	72 (65.8)	108 (98.8)	144 (131.7)
0.062 (1.6)	36 (32.9)	0.25 (6)	46 (1168)	72 (65.8)	72 (65.8)	108 (98.8)
0.090 (2.3)	36 (32.9)	0.25 (6)	46 (1168)	36 (32.9)	36 (32.9)	72 (65.8)

*Exception – 5915 (P) max. width 46 inches (1168 mm); 5925 (P) max. width 47 inches (1194 mm).

Note: 5952 family tapes thinner than 0.015 in (0.4 mm) have max. length 360 yd (329.2 m) for widths 1 in (25 mm) to 8 in (203 mm) and 180 yd (164.6 m) for all other widths.

Slitting Tolerance

Standard slitting tolerance $\pm 1/32$ inch (± 0.031 inch, ± 0.79 mm).

Precision slitting with slitting tolerance of $\pm 1/64$ inch (± 0.016 in., ± 0.41 mm) is available on select products with minimum order of full web increments.

Core Size

All products are provided on a 3 inch ID Core (76.2 mm)

Converted Parts

In addition to standard and custom roll sizes available from 3M through the distribution network, 3M™ VHB™ Tapes are also available in limitless shapes and sizes through the 3M Converter network. For additional information, contact 3M Converter Markets at 1-800-223-7427 or on the web at www.3M.com/converter.

Shelf Life

All 3M™ VHB™ Tapes have a shelf life of 24 months from date of manufacture when stored at 40°F to 100°F (4°C to 38°C) and 0-95% relative humidity. The optimum storage conditions are 72°F (22°C) and 50% relative humidity.

Performance of tapes is not projected to change even after shelf life expires; however, 3M does suggest that 3M™ VHB™ Tapes are used prior to the shelf life date whenever possible.

The manufacturing date is available on all 3M™ VHB™ Tape cores as the lot number. The lot number, typically a 4 digit code, is a Julian date (Y D D D). The first digit refers to the year of manufacture, the last 3 digits refer to the days after January 1. Example: A lot number of 9266 would translate to a date of manufacture of Sept. 22 (266th day of year) in 2009. On most products this is found as the 4 digits after the "9" following the product number. For tapes printed continuously around the core (e.g. 3M™ VHB™ Tape 5952 family) the lot number typically will be the string of 4 digits preceding the product number.

Special Cases:

Plasticized Vinyl – Plasticizers compounded in soft vinyl can migrate into adhesives and significantly change their performance characteristics. 3M™ VHB™ Tapes 4941 family has very good plasticizer resistance and adhesion to many vinyl formulations. Because of the wide variation in vinyl formulations, however, evaluation by the user must be conducted with the specific vinyl used to ensure that performance will be satisfactory over time. Problems related to plasticizer migration can often be predicted by accelerated aging of assembled parts at 150°F (66°C) for one week).



FORVALTNING, DRIFT OG VEDLIKEHOLD

3M™ VHB™ Tapes

Typical Performance Characteristics

Note: The following technical information and data should be considered representative or typical only and should not be used for specification purposes.

3M™ VHB™ Tapes				Dynamic Adhesion Performance		
Family	Product Number	Color	Thickness Inches	90° Peel Adhesion lb/in N/cm	Normal Tensile lb/in² kPa	Dynamic Overlap Shear lb/in² kPa
4941	4919F	Black	0.025	17 (30)	90 (620)	80 (550)
	4926	Gray	0.015	14 (25)	95 (660)	90 (620)
	4936(F)	Gray	0.025	17 (30)	90 (620)	80 (550)
	4941(F)	Gray	0.045	22 (39)	85 (590)	70 (480)
	4947F	Black	0.045	22 (39)	85 (590)	70 (480)
	4956(F)	Gray	0.062	22 (39)	80 (550)	70 (480)
	4979F	Black	0.062	22 (39)	80 (550)	70 (480)
	4991	Gray	0.090	22 (39)	70 (480)	65 (450)
	4991B	Black	0.090	22 (39)	70 (480)	65 (450)
5952	5906	Black	0.006	9 (16)	100 (690)	100 (690)
	5907	Black	0.008	10 (18)	100 (690)	100 (690)
	5908	Black	0.010	12 (21)	100 (690)	100 (690)
	5909	Black	0.012	12 (21)	100 (690)	100 (690)
	5915(P)	Black	0.016	14 (25)	90 (620)	90 (620)
	5915WF	White	0.016	14 (25)	90 (620)	90 (620)
	5925(P)	Black	0.025	17 (30)	90 (620)	90 (620)
	5925WF	White	0.025	17 (30)	90 (620)	90 (620)
	5930(P)	White	0.032	19 (33)	90 (620)	85 (590)
	5930WF	Black	0.032	19 (33)	90 (620)	85 (590)
	5952(P)	Black	0.045	22 (39)	90 (620)	80 (550)
	5952WF	White	0.045	22 (39)	90 (620)	80 (550)
	5958FR	Black	0.040	20 (35)	100 (690)	100 (690)
	5962(P)	Black	0.062	22 (39)	90 (620)	80 (550)
	5962WF	White	0.062	22 (39)	90 (620)	80 (550)
RP	RP16(F)	Gray	0.016	12 (21)	95 (660)	90 (620)
	RP25(F)	Gray	0.025	17 (30)	90 (620)	80 (550)
	RP32(F)	Gray	0.032	18 (32)	85 (590)	75 (520)
	RP45(F)	Gray	0.045	20 (35)	85 (590)	70 (480)
	RP62(F)	Gray	0.062	20 (35)	80 (550)	70 (480)

 90° Peel Adhesion - Based on ASTM D3330 - To stainless steel, room temperature, jaw speed 12 in/min (304.8 mm/min). Average force to remove is measured. 72 hour dwell.

 Normal Tensile (T-Block Tensile) - ASTM D-897 - To aluminum, room temperature, 1 in² (6.45 cm²), jaw speed 2 in/min (50.8 mm/min) Peak force to separate is measured. 72 hour dwell.

 Dynamic Overlap Shear - ASTM D-1002 - To stainless steel, room temperature, 1 in² (6.45 cm²), jaw speed 0.5 in/min (12.7 mm/min) Peak force to separate is measured. 72 hour dwell.



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3M™ VHB™ Tapes

Typical Performance Characteristics

Note: The following technical information and data should be considered representative or typical only and should not be used for specification purposes.

3M™ VHB™ Tapes				Static Shear				Temperature Tolerance	
Family	Product Number	Color	Thickness Inches	72°F (22°C)	150°F (66°C)	200°F (93°C)	250°F (121°C)	Short Term (Minutes, Hours) °F (°C)	Long Term (Days, Weeks) °F (°C)
4941	4919F	Black	0.025	1000	500	500		300 (149)	200 (93)
	4926	Gray	0.015	1000	500	500		300 (149)	200 (93)
	4936(F)	Gray	0.025	1000	500	500		300 (149)	200 (93)
	4941(F)	Gray	0.045	1000	500	500		300 (149)	200 (93)
	4947F	Black	0.045	1000	500	500		300 (149)	200 (93)
	4956(F)	Gray	0.062	1000	500	500		300 (149)	200 (93)
	4979F	Black	0.062	1000	500	500		300 (149)	200 (93)
	4991	Gray	0.090	1000	500	500		250 (121)	200 (93)
	4991B	Black	0.090	1000	500	500		250 (121)	200 (93)
5952	5906	Black	0.006	1000	500	500	250	300 (149)	250 (121)
	5907	Black	0.008	1000	500	500	250	300 (149)	250 (121)
	5908	Black	0.010	1000	500	500	250	300 (149)	250 (121)
	5909	Black	0.012	1000	500	500	250	300 (149)	250 (121)
	5915(P)	Black	0.016	1000	500	500	250	300 (149)	250 (121)
	5915WF	White	0.016	1000	500	500	250	300 (149)	250 (121)
	5925(P)	Black	0.025	1000	500	500	250	300 (149)	250 (121)
	5925WF	Black	0.032	1000	500	500	250	300 (149)	250 (121)
	5930(P)	Black	0.032	1000	500	500	250	300 (149)	250 (121)
	5930WF	White	0.032	1000	500	500	250	300 (149)	250 (121)
	5952(P)	Black	0.045	1000	500	500	250	300 (149)	250 (121)
	5952WF	White	0.045	1000	500	500	250	300 (149)	250 (121)
	5958FR	Black	0.040	1000	350	250		300 (149)	200 (93)
	5962(P)	Black	0.062	1000	500	500	250	300 (149)	250 (121)
	5962WF	White	0.062	1000	500	500	250	300 (149)	250 (121)
RP	RP16(F)	Gray	0.016	1000	500	500		250 (121)	200 (93)
	RP25(F)	Gray	0.025	1000	500	500		250 (121)	200 (93)
	RP32(F)	Gray	0.032	1000	500	500		250 (121)	200 (93)
	RP45(F)	Gray	0.045	1000	500	500		250 (121)	200 (93)
	RP62(F)	Gray	0.062	1000	500	500		250 (121)	200 (93)



Static Shear - ASTM D3654 - To stainless steel, tested at various temperatures and gram loadings. 0.5 in² (3.23 cm²). Will hold listed weight for 10,000 minutes (approximately 7 days). Conversion: 1500 g/0.5 in² equals 6.6 lb/in²; 500 g/0.5 in² = 2.2 lb/in².

Short Term Temperature Tolerance - No change in room temperature dynamic shear properties following 4 hours conditioning at indicated temperature with 100 g/static load. (Represents minutes, hours in a process type temperature exposure).

Long Term Temperature Tolerance - Maximum temperature where tape supports at least 250 g load per 0.5 in² in static shear for 10,000 minutes. (Represents continuous exposure for days or weeks).



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3M™ VHB™ Tapes

Additional Typical Performance Characteristics

Note: The following technical information and data should be considered representative or typical only and should not be used for specification purposes.

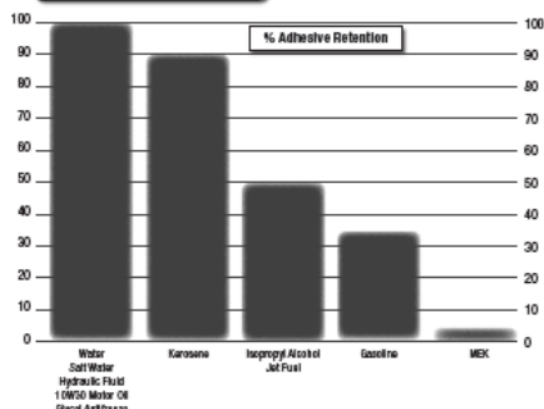
	3M™ VHB™ Tape 4941 5952		Units	Test Standard
Dielectric Constant	2.29 1.99	2.14 1.95	at 1 kHz at 1 MHz	ASTM D150 ASTM D150
Dissipation Factor	0.0245 0.0374	0.0065 0.0506	at 1 kHz at 1 MHz	ASTM D150 ASTM D150
Dielectric Breakdown Strength	14 (360)	18 (455)	V/μm (V/mil)	ASTM D140
Thermal Conductivity (k value)	0.08 (0.5)	0.05 (0.4)	W/mK (BTU•in/hr•ft²•°F)	
Volume Resistivity	2.1 x 10 ¹⁴	2.5 x 10 ¹⁴	Ω•cm	ASTM D257
Surface Resistivity	2.7 x 10 ¹⁴	>10 ¹⁵	Ω/sq	ASTM D257
Water Vapor Transmission Rate	25.6	37.1	g/m²•day	ASTM F1249 at 38°C/100% RH
Thermal Properties of Modeling				
Thermal Coefficient of Expansion	180 (100)		10 ⁻⁴ m/m°C (10 ⁻⁴ in/in°F)	
Shear Modulus (at 25°C, 1 Hz)	3 x 10 ⁹		Pa	

3M™ VHB™ Tapes UL746C Listings - File MH 17478 Category 000W2 Component - Polymeric Adhesive Systems, Electrical Equipment

3M™ VHB™ Tapes/ Product Families	Substrates	Temperature Rating Minimum Maximum	
4919F, 4925, 4936, 4936F, 4941, 4941F, 4947F, 4956, 4956F, 4979F	Ceramic Aluminum, Galvanized Steel, Stainless Steel, Enamelled Steel, Nickel Coated ABS, Glass (with or without Silane Coating) PVC, Glass/Epoxy, PBT, Polycarbonate, Acrylic/Polyurethane Paint, Polyester Paint	-35°C	110°C
4991	ABS Polycarbonate, Aluminum, Acrylic/ Polyurethane Paint, Polyester Paint	-35°C	90°C
5915, 5915P, 5915WF, 5925, 5925P, 5925WF, 5930, 5930P, 5930WF, 5952, 5952P, 5952WF, 5962, 5962P, 5962WF	Polycarbonate, Primer 94 Coated Polycarbonate, Aluminum, Acrylic/ Polyurethane Paint, Galvanized Steel, Polyester Paint, Epoxy Paint, Silane Coated Glass, Uncoated Glass, Stainless Steel, Enamelled Steel, Glass Epoxy, Polybutylene Terephthalate, Nylon, Polyphenylene Ether (PPE), Acrylic	-35°C	90°C
5952, 5952P, 5952WF	Rigid PVC, ABS	-35°C	75°C
RP16	Celulose Acetate Butyrate	-35°C	90°C
RP16, RP25, RP32, RP45, RP62	Aluminum, Silane Coated Glass PVC, ABS	-35°C	90°C
RP62	Galvanized Steel, Enamelled Steel, Nylon, Polycarbonate, Glass Epoxy, Phenolic, PPE/PS Blend, PBT, Epoxy Paint, Polyester Paint, Adhesion Promoter 111 Coated Epoxy Paint, Promoter 111 Coated Polyester Paint, Acrylic Urethane Paint, Epoxy/ Polyester Paint	-35°C	90°C
	Stainless Steel, Glass, Acrylic PVC, ABS	-35°C	75°C

A current list can be found at www.ul.com (select certifications, search file MH 17478)

Solvent and Fuel Resistance



Test Method

- Tape between stainless steel and aluminum foil
- 72 hours dwell at room temperature
- Solvent immersion for 72 hours
- Test within 45 minutes after removing from solvent
- 90° peel angle
- 12 in/min rate of peel
- Peel adhesion compared to control

Note: Continuous submersion in chemical solutions is not recommended. The above information is presented to show that occasional chemical contact should not be detrimental to tape performance in most applications in ordinary use.

Burn Characteristics 3M™ VHB™ Tape 5958FR

- Meets FAR 25.853 (a) 12 second vertical burn, Appendix F, Part I (a)(i)
- Meets NBS Smoking Density (ASTM F814/E662)
- Meets Toxicity (Dräger Tube ABD0031, ATM 3.0005)



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3M™ VHB™ Tapes

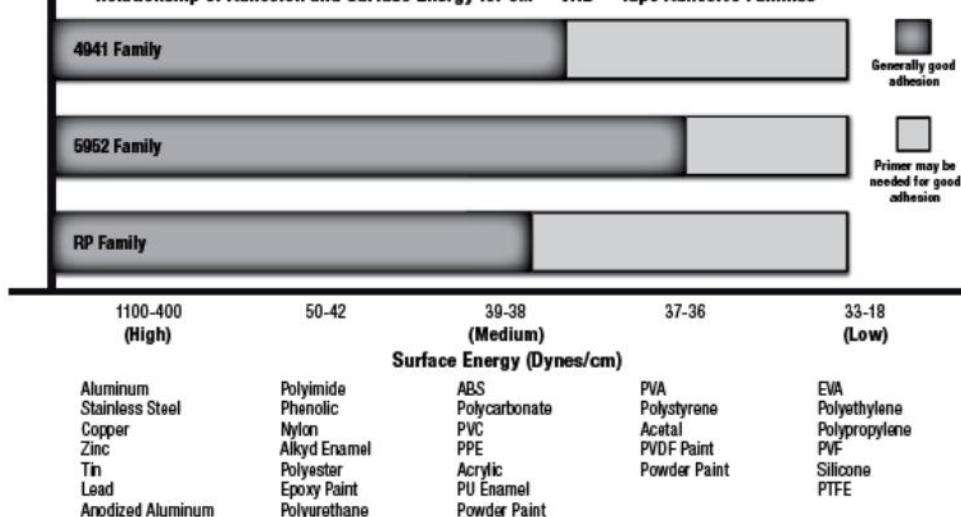
Design and Tape Selection Considerations

- **Choose the right tape for the substrate:** Adhesives must flow onto the substrate surfaces in order to achieve intimate contact area and allow the molecular force of attraction to develop. The degree of flow of the adhesive on the substrate is largely determined by the surface energy of the substrate.



This illustration demonstrates the effect of surface energy on adhesive interfacial contact. High surface energy materials draw the adhesive closer for high bond strength.

Relationship of Adhesion and Surface Energy for 3M™ VHB™ Tape Adhesive Families



NOTES: There are a wide variety of formulations, surfaces finishes and surface treatments available on substrate materials which can affect adhesion. This chart is intended to provide only a rough estimate of the adhesion levels which can be expected on some common materials relative to a reference surface such as aluminum. Foam type can affect and/or limit maximum adhesive strength.

- **Use the right tape thickness:** The necessary thickness of tape depends on the rigidity of substrates and their flatness irregularity. While the 3M™ VHB™ Tapes will conform to a certain amount of irregularity, they will not flow to fill gaps between the materials. For bonding rigid materials with normal flatness, consider use of tapes with thickness of 45 mils (1.1 mm) or greater. As the substrate flexibility increases thinner tapes can be considered.
- **Use the right amount of tape:** Because 3M™ VHB™ Tapes are viscoelastic by nature their strength and stiffness is a function of the rate at which they are stressed. They behave stronger with relatively faster rate of stress load (dynamic stresses) and will tend to show creep behavior with stress load acting over a long period of time (static stresses). As a general rule, for static loads, approximately four square inches of tape should be used for each pound (57 cm² of tape per kg) of weight to be supported in order to prevent excessive creep. For dynamic loads, the dynamic performance characteristics provided on page 4 should be useful, factoring in the appropriate safety factors.
- **Allow for thermal expansion/contraction:** 3M™ VHB™ Tapes can perform well in applications where two bonded surfaces may expand and contract differentially. Assuming good adhesion to the substrates, the tapes can typically tolerate differential movement in the shear plane up to 3 times their thickness.
- **Bond Flexibility:** While an advantage for many applications where allowing differential movement is a benefit, the tape bonds are typically more flexible than alternative bonding methods. Suitable design modifications or periodic use of rigid fasteners or adhesives may be needed if additional stiffness is required.
- **Severe Cold Temperature:** Applications which require performance at severe cold temperatures must be thoroughly evaluated by the user if the intended use will subject the tape product to high impact stresses. A technical bulletin "3M™ VHB™ Tape Cold Temperature Performance" (70-0707-3991-0) is available for additional information.

3M™ VHB™ Tapes

Application Techniques

- **Clean:** Most substrates are best prepared by cleaning with a 50:50 mixture of isopropyl alcohol (IPA*) and water prior to applying 3M™ VHB™ Tapes.

Exceptions to the general procedure that may require additional surface preparation include:

- **Heavy Oils:** A degreaser or solvent-based cleaner may be required to remove heavy oil or grease from a surface and should be followed by cleaning with IPA/water.
- **Abrasion:** Abrading a surface, followed by cleaning with IPA/water, can remove heavy dirt or oxidation and can increase surface area to improve adhesion.
- **Adhesion Promoters:** Priming a surface can significantly improve initial and ultimate adhesion to many materials such as plastics and paints.
- **Porous surfaces:** Most porous and fibred materials such as wood, particleboard, concrete, etc. need to be sealed to provide a unified surface.
- **Unique Materials:** Special surface preparation may be needed for glass and glass-like materials, copper and copper containing metals, and plastics or rubber that contain components that migrate (e.g. plasticizers).

Refer to 3M Technical Bulletin "Surface Preparation for 3M™ VHB™ Tape Applications" for additional details and suggestions. (70-0704-8701-5)

***Note:** These cleaner solutions contain greater than 250 g/l of volatile organic compounds (VOC). Please consult your local Air Quality Regulations to be sure the cleaner is compliant. When using solvents, be sure to follow the manufacturer's precautions and directions for use when handling such materials.

- **Pressure:** Bond strength is dependent upon the amount of adhesive-to-surface contact developed. Firm application pressure develops better adhesive contact and helps improve bond strength. Typically, good surface contact can be attained by applying enough pressure to insure that the tape experiences approximately 15 psi (100 kPa) pressure. Either roller or platen pressure can be used. Note that rigid surfaces may require 2 or 3 times that much pressure to make the tape experience 15 psi.

- **Temperature:** Ideal application temperature range is 70°F to 100°F (21°C to 38°C). Pressure sensitive adhesives use viscous flow to achieve substrate contact area. Minimum suggested application temperatures:

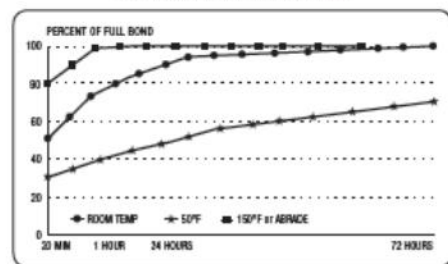
- 50°F (10°C): 3M™ VHB™ Tapes 5952 and RP families.
- 60°F (15°C): 3M™ VHB™ Tape 4941 family.

Note: Initial tape application to surfaces at temperatures below these suggested minimums is not recommended because the adhesive becomes too firm to adhere readily. However, once properly applied, low temperature holding is generally satisfactory.

To obtain good performance with all 3M™ VHB™ Tapes, it is important to ensure that the surfaces are dry and free of condensed moisture.

- **Time:** After application, the bond strength will increase as the adhesive flows onto the surface (also referred to as "wet out"). At room temperature approximately 50% of ultimate bond strength will be achieved after 20 minutes, 90% after 24 hours and 100% after 72 hours. This flow is faster at higher temperatures and slower at lower temperatures. Ultimate bond strength can be achieved more quickly (and in some cases bond strength can be increased) by exposure of the bond to elevated temperatures (e.g. 150°F [66°C] for 1 hour). This can provide better adhesive wetout onto the substrates. Abrasion of the surfaces or the use of primers/ adhesion promoters can also have the effect of increasing bond strength and achieving ultimate bond strength more quickly.

Bond Typical Build vs. Time



3M VHB™ GPH Series

Product Data Sheet

February 2017
Supersedes: August 2016

Product Description 3M™ VHB™ GPH Series, a general purpose, high temperature, grey conformable double coated acrylic foam tape with a high initial tack and a soft foam. Available in three different thicknesses with a 3M branded red siliconised polyethylene film liner.

Key Features

- Double coated acrylic foam tape
- 100 % closed cell acrylic foam
- High temperature performance (short term 230 °C)
- Good balance of high temperature and peel & shear performance
- High initial tack
- Soft foam enables stress relaxation & an easy application
- Good sealing properties
- For indoor and outdoor applications

Applications & Benefits

- Its temperature performance enables bonding of materials in applications with high operating temperatures such as prior to processing in a powder coating line
- Capability to bond to a variety of substrates makes it a good fit for multi material bonding - those substrates have a high or medium surface energy including many metals (e.g. stainless steel) and plastics (e.g. Polyamide, PMMA, ABS)
- For applications in metal working, signage, appliances and specialty vehicle

Physical Properties

	GPH-060GF	GPH-110GF	GPH-160GF
Adhesive Type	Acrylic foam adhesive		
Thickness acc. to ASTM D-3652	0.60 mm	1.10 mm	1.60 mm
Foam Density	710 kg/m³		
Release Liner	3M branded red siliconised polyethylene film		
Tape Colour	Grey		

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VHB™ GPH Series
February 2017

Performance Characteristics

Type	GPH-060GF	GPH-110GF	GPH-160GF
90 ° Peel adhesion to Stainless Steel acc. to ASTM D3330, 90° peel angle @ RT, after 72h @ RT dwell	25 N/cm	37 N/cm	34 N/cm
90 ° Peel adhesion to PA6 acc. to ASTM D3330, 90° peel angle @ RT, after 72h @ RT dwell	33 N/cm	48 N/cm	55 N/cm
90 ° Peel adhesion to ABS acc. to ASTM D3330, 90° peel angle @ RT, after 72h @ RT dwell	21 N/cm	33 N/cm	32 N/cm
90 ° Peel adhesion to PMMA acc. to ASTM D3330, 90° peel angle @ RT, after 72h @ RT dwell	21 N/cm	34 N/cm	37 N/cm
Dynamic Shear acc. to ASTM D1002 on stainless steel, after 72h @ RT dwell	547 N/6.54 cm²	476 N/6.54 cm²	375 N/6.54 cm²
Static Shear Strength acc. to ASTM D3654, after 72h @ RT dwell (Weight held for 10.000 minutes to stainless steel, 3.32cm² (0.51in²))	23 °C - 1000 g 150 °C - 500 g		
Normal Tensile (T-Block) acc. to ASTM D897 to Aluminium @ RT, after 72h @ RT dwell, 6.45 cm², test speed 50 mm/min	410 N/6.54 cm²	439 N/6.54 cm²	470 N/6.54 cm²
Temperature Performance	Short term (minutes, hours): 230 °C Long term (days, weeks): 150 °C		

Application Temperature

Ideal application temperature range is 21 °C to 38 °C. Pressure sensitive adhesives use viscous flow to achieve substrate contact area.
To obtain good performance with all 3M™ VHB™ Tapes, it is important to ensure that the surfaces are clean, dry and free of condensed moisture.

Shelf Life

24 months from date of production when stored at 16 °C – 25 °C and 40-65 % relative humidity.
Performance of tapes is not projected to change even after shelf life expires; however, 3M does suggest that 3M™ VHB™ Tapes are used prior to the shelf life date whenever possible.



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VHB™ GPH Series
February 2017

Important Notice

All statements, technical information and recommendations contained in this document are based upon tests or experience that 3M believes are reliable. However, many factors beyond 3M's control can affect the use and performance of a 3M product in a particular application, including the conditions under which the product is used and the time and environmental conditions in which the product is expected to perform. Since these factors are uniquely within the user's knowledge and control, it is essential that the user evaluate the 3M product to determine whether it is fit for a particular purpose and suitable for the user's method or application. All questions of liability relating to this product are governed by the terms of the sale subject, where applicable, to the prevailing law.

Values presented have been determined by standard test methods and are average values not to be used for specification purposes. Our recommendations on the use of our products are based on tests believed to be reliable but we would ask that you conduct your own tests to determine their suitability for your applications. This is because 3M cannot accept any responsibility or liability direct or consequential for loss or damage caused as a result of our recommendations.

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Stål opprinnelses sertifikat:

		APPROVAL CERTIFICATE BS EN 10204-3.1 CERTIFICAT DE RECEPTION NF EN 10204-3.1 ABNAHMEPRÜFZEUGNIS DIN EN 10204-3.1		N-Nr-N° 21K0012974-01 V01																																																																	
Correspondence address: Aperam Genk Svalbardveien 5, Postboks 7523 3600 Genk, Belgium Tel: +32 (0)89 30 21 11		Certified according to PED 2014/68/EU Annex 1 4.3 by Certification Body 0056 of TÜV SÜD Industrie Service GmbH with cert. No. 31420072MUC. Resonance of counter signature agreed by TÜV SÜD (9/5/2007) Approved according to AD 2000-Mechanical Work 100 by TÜV SÜD Industrie Service GmbH. Confirmation letter from TÜV SÜD Industrie Service GmbH of 07/05/2010 about the uniformity of coils according to AD 2000 W2 4.2.1.																																																																			
Manufacturer's works order number N° de la commande usine production Werksauftragsnummer 8065629/07-61675/013/07		Surveyor's mark Cachet de l'expert 		Purchaser's order number N° de commande client Kundenbestellnummer																																																																	
Product - Produit - Erzeugnis COIL, COLD ROLLED, SHOT-BLASTED, UNTRIMMED COIL, LAMINE A FROID, GRENAILLÉ, RIVES BRUTES COIL, KALTGEWALZT, GESTRAHLT, UNBESCHNITTEN		Steel designation Désignation de l'acier Stahlschreibweise EN 10268-7-2016 1.4404 / 1.4401 EN 10358-2-2014 1.4404 / 1.4401 ASTM A 240-2010 TYPE 316L / 316 ASME SA 240-2010 TYPE 316L / 316 EN 10358-4-2019 1.4404 / 1.4401		Product delivery condition État de livraison du produit - Lieferzustand Solution Annealing Hypertemper Lösungsgeht 1050 °C																																																																	
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EN ISO 3651/2 - A: OK																																																																																									
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The delivery is in accordance with the order La livraison est conforme aux exigences de la commande Die Lieferung entspricht den Bestellbedingungen																																																																																									
Packing list Avis d'expédition Lieferscheinnummer 2021033393-20076																																																																																									
Direction of the test pieces (2) Orientation des éprouvettes Profenrichtung 1. Transverse - Transvers - Quer 2. Longitudinal - Long - Längs																																																																																									
Marking, inspection and measurement: without objection Contrôle de marquage, d'aspect et de dimensions: sans objection Prüfung der Kennzeichnung, des Oberflächenzustands und der Abmessungen: ohne Beanstandung																																																																																									
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This to declare that the material as described in here as been cut to:
 Platto CES.316L F1 35,000X4,000 Length: 4050,000
 and remarked with steelgrade, heat n°, workinspector's stamp CC



FORVALTNING, DRIFT OG VEDLIKEHOLD

 Correspondance address Adresse de correspondance - Adressen für telefonisch	Annex to certificate 21K0012974-01 V01 Annexe du CCPU Anlage zum Zeugnis		Certificate CCPU - Zeugnis 21K0012974-CE V01	
	Certificate of Production Control Number Numéro du certificat de contrôle de la production Zeugnisnummer von Produktionskontrolle 0036-CPD-03-2011		 0036	
	Year Année Jahr			
	11			
Manufacturer's works order number N° de la commande usine productrice Werksauftragsnummer 89656629/07-616750/13/07	Purchaser and/or consignee Client et/ou destinataire Besteller und/oder Empfänger		Purchaser's order number N° de commande client Kundenbestellnummer	
			Customer article number N° d'article client Artikelnummer des Kunden	
Identification of the product Identification du produit - Identifizierung des Erzeugnisses				
Coil n° N° de bobine - Band Nr. 04808542	Thickness Epaisseur - Dicke 4.09 mm	Width Largeur - Breite 1500.00 mm	Length Longueur - Länge	
Stainless steel / Acier inoxydable / Rostfreier Stahl				
EN10388-4				
Intended user : building construction or civil engineering Usage prévus : construction immobilière ou génie civil Vorbestimmte Verwendungen : Hochbau und Ingenieurbauwerke				
Declaration of performance : Déclaration des performances : Leistungserklärung : DOP available on website Aperam : http://www.aperam.com/documentation				
Steel Acier Werkstoff 1.4404/1.4401				
Cold rolled Laminé à froid Kaltgewalzt				
Coil / bobine / Band				
Elongation / Allongement / Bruchdehnung Tensile strength / Résistance à la traction / Zugfestigkeit Yield strength / Limite d'élasticité / Dehngrenze Impact strength / Résistance au choc / Kerbschlagzähigkeit Weldability / Aptitude au soudage / Schweißbarkeit Durability / Durabilité / Dauerhaftigkeit Characteristics expressed as indicated in the above mentioned DOP Tolerances on dimension and shape / Tolérances sur les dimensions et sur forme / Grenzabweichung im Formtoleranz : EN ISO 9445				
Regulated substance : no performance determined Substance réglementée : aucune performance déterminée Regulierter Stoff keine Leistung festgelegt				

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 Platte CES.318L F1 35,000X4,000 Length: 4050,000
 and remarked with steelgrade, heat n°, workinspector's stamp CC