Henkel Adhesive Solutions

For Assembly of Personal Protective Equipment, Respiratory Systems & other Medical Devices
Introduction

The following content explains:

- Materials used and potential Henkel assembly solutions for various Personal Protective Equipment, Respiratory systems and other medical devices for patient treatment

Note:

- The following information provides potential solutions based on our knowledge, but we do not claim to list all solutions.
- Henkel recommends you discuss applications with a Henkel adhesive solution specialist prior to use, to ensure the solution meets all your requirements.
- Henkel recommends that you test all new adhesive applications under simulated or actual end use conditions to ensure the adhesive meets or exceeds all required product specifications.

LOCTITE, TECHNOMELT, AQUENCE, LIOFOL and SONDERHOFF are registered trademarks of Henkel and its affiliates in the US and elsewhere.
# Table of Contents

- Face Masks & Protection Masks  
  Page 04
- Protection Shields  
  Page 06
- Surgical drapes and isolation gowns  
  Page 07
- Oxygen supply – for Respiratory / Ventilators  
  Page 08
- Respiratory – Breathing tubes  
  Page 09
- Respiratory / Ventilators  
  Page 10
- Respiratory / Ventilators – Subcomponent Resuscitator  
  Page 11
- Respiratory / Ventilators – Tracheal Tubes  
  Page 12
- Respiratory / Ventilators – Mechanical Elements  
  Page 13
- Respiratory / Ventilators – Electronic Devices (e.g. Monitor, Controller)  
  Page 14
- Patient Care - Printed Electronics  
  Page 16
- Patient Care – Skin contact adhesives  
  Page 17
- Patient Care – Packaging  
  Page 18
- Automated Product Application, Contract manufacturing (Filters, Housings)  
  Page 19
- 3D Printed Parts (Headbands, Fixtures, Jigs)  
  Page 20
- General Patient Care – for all Medical Devices  
  Page 21
Simple masks, Surgical Masks (no filter)

**Protect others** from speaking/breathing/coughing spillage

- **Materials:** Different fabrics and nonwoven
- **Connection method:** sewed, pleated, seamed or bonded

**Henkel solutions:** Hotmelts

**Note:** ISO 10993 (Biological Evaluation of Medical Devices) required / to be considered

**Lamination of Layers:**
- Hotmelt, e.g. TECHNOMELT DM 3500, TECHNOMELT DM 1800

**Elastic Strap Fixation:**
- Hotmelt, e.g. TECHNOMELT DM 173 B, TECHNOMELT DM 4100
Protection Masks

Filter Masks with filter – FFP2 – Filter Face Piece class 2

Protect the user against virus – for medical personnel
- **Materials:** Fabrics + Plastics + Filter
- **Connection method:** sewed, bonded

**Henkel potential solution:**
Hotmelts, Cyanoacrylates, Light Cure Acrylics

**Note:** Adhesives tested to ISO 10993 biocompatibility required

**Bonding filter into PP fabrics:**
- Cyanoacrylates, e.g. LOCTITE 4011 + Primer LOCTITE SF 7701
- Light Cure Acrylic: Plasma-treat the PP + LOCTITE AA 3963 cured with LOCTITE CL30

**Bonding parts inside filter:**
- Hotmelts, e.g. TECHNOMELT AS 4207, TECHNOMELT PUR 5200

**Lamination of Layers / Strap fixation:**
- See previous slide
Protection Shields

Transparent shield to protect eyes and face

Protect the user against virus – for medical, dentist or counter personnel

- **Materials:** Plastic shield on foam / plastic / fabrics
- **Connection method:** Bonding

Henkel potential solution:
Cyanoacrylates, Light Cure Acrylics, Light Cure Cyanoacrylates, Hotmelts, Spray adhesives, industrial or medical grades.

**Note:** Adhesives tested to ISO 10993 biocompatibility may be required

Bonding PETG visor to PP foam:
- Spray adhesive VR 5000
- Cyanoacrylates, e.g. LOCTITE 4541 + Primer LOCTITE SF 7701
- Light Cure-CA, e.g. LOCTITE 4311 + Primer LOCTITE SF 7701

Bonding visor into PP head cover:
- Primer Light Cure-CA, LCA
- Hotmelt, LOCTITE PA 6951
Surgical drapes and isolation gowns

 Protect the user against virus – for medical personnel

- **Materials:** nonwoven, PE, viscose, etc.
- **Connection method:** Sewing, Bonding

**Henkel potential solution:** Hotmelts

Please contact us [nonwovens@henkel.com](mailto:nonwovens@henkel.com) to get best adhesive recommendation to fulfill your needs

**Note:** Adhesives tested to meet ISO 10993 biocompatibility required

---

**Lamination nonwoven to nonwoven or PE to Viscose:**
E.g. TECHNOMELT DM 3520, TECHNOMELT DM 1800, AQUENCE 7243

**Adhesive stripes in skin contact:**
E.g. TECHNOMELT PS 8673, TECHNOMELT PS 1540
Oxygen supply – for Respiratory / Ventilators

Oxygen regulators, humidifier, flow control

Provide oxygen-rich air for respiratory or ventilation systems

- **Materials:** Metal threads, tube, housings
- **Connection method:** Sealing, Bonding

**Henkel potential solution:**
2 component Epoxies, Light Cure Acrylcs, Cyanoacrylates,

**Note:** Adhesives tested to ISO 10993 biocompatibility required

Sealing threaded joints:
- LOCTITE EA M-31CL
- LOCTITE HY 4090
- LOCTITE 4601

Bonding and Sealing of plastic parts:
- LOCTITE AA 3926
- LOCTITE 4081

Bonding plastic parts in pressure control units:
- Light Cure-CA, e.g. LOCTITE 4311 + Primer LOCTITE SF 7701
- Light Cure Acrylic, e.g. LOCTITE AA 3961

**Note:** All our adhesives are compatible with pure oxygen at RT atmospheric pressure conditions. For conditions >1.5 bar, or >50°C please contact us.
Respiratory – Breathing tubes

Breathing tubes, simple breathing masks

Provide oxygen rich breath to the patient

- **Materials:** Tube/connector
- **Connection method:** Solvent Welding or Bonding

**Henkel potential solution:**
Light Cure Acrylcs, Cyanoacrylates

**Note:** Adhesives tested to ISO 10993 biocompatibility required

**TPE or PP tubes into PC or PVC connector:**
- Cyanoacrylates, e.g. LOCTITE 4011 + Primer LOCTITE SF 7701 (applied on TPE or PP)
- Light Cure-CA, e.g. LOCTITE 4310 + Primer LOCTITE SF 7701 (applied on TPE or PP)

**Note:** Tight fitting PVC-tubes can be bonded, but also solvent welded. PVC-Tubes with a gap are hard to be solvent-welded. Contact us for an adhesive solution.
Respiratory / Ventilators

Mechanical ventilation of the patient

Provide oxygen rich air to patients, no longer able to breath by themselves

- Non-invasive ventilation
  - Breathing masks
- Invasive ventilation by tracheal tubes
  - Resuscitator
  - Tracheal tubes
  - Ventilators
  - Controller, Monitor
Resuscitator

Mechanical ventilation of the patient (in combination with a mask or tracheal tube)

- **Materials:** Tube/connector; Connector balloon; Mask
- **Connection method:** Solvent Welding or Bonding

**Henkel potential solution:** Light Cure Acrylics, Light Cure Silicones, Cyanoacrylates.

**Note:** Adhesives tested to ISO 10993 biocompatibility required

---

**Tube to valve, tube to bag, tube to reservoir bag:**
- Cyanoacrylate, e.g. LOCTITE 4011
- Light Cure -CA, e.g. LOCTITE 4310
- Light Cure Acrylic, e.g. LOCTITE AA 3951

**Mask dome to cushion:**
- Light Cure Acrylic, e.g. LOCTITE AA 3953
- Light Cure Silicone, e.g. LOCTITE SI 5055

**Note:** Tight fitting PVC-tubes can be bonded, but also solvent welded.
Tracheal Tubes

Provide breath to the patient (directly into the lung)
- **Materials**: Multi-lumen tube, balloon
- **Connections**: Balloon/connector, lumen closure, lumen/connector
- **Connection method**: Heat shrink, Solvent Welding, Bonding

**Henkel potential solution**: Light Cure Acrylcs, Cyanoacrylates

**Note**: Adhesives tested to ISO 10993 biocompatibility required

**Balloon onto lumen**:
- Note: This is a high-risk application. Severe testing needed. Contact us for proper product selection

**Lumen closure**:
- LOCTITE AA 3341

*Note: Tracheal tubes are high risk devices*
Mechanical “Oscillating” Element

Movement for breathing (oscillating)

- **Materials:** Metals, bolts
- **Solutions:** Bonding, Bolting, Welding

**Henkel potential solution:**
Medical two-component epoxies, machinery adhesives.

**Note:** Adhesives tested to ISO 10993 biocompatibility may not be required

**Threadlocking:**
- LOCTITE 243
- LOCTITE EA M-31CL

**Bonding pin into bore:**
- LOCTITE 638
- LOCTITE EA M-121HP

**Fixation of bearings:**
- LOCTITE 648
- LOCTITE EA M-21HP

*Note: If you use machinery adhesives you should clean off excess. Using Med 2-component epoxies, you gain same function + excess cure + ISO 10993 testing*
Respiratory / Ventilators – Electronic Devices

Monitor, Controller

**Mechanical Ventilation to patient (into the lung)**
- **Materials:** Electronic components and substrates
- **Solutions:** see next page

**Henkel potential solution:**
Electronic Device Assembly products across the board (see next page)

**Note:** Products tested to ISO 10993 biocompatibility may not be required, but electronic device typically needs market approval
Electronic Devices – Henkel Solutions Across the Board
ECG Electrodes, Smart Wearable Health Patch

**Body sensing applications:**
- Standard ECG electrodes, smart wearable health patches for remote patient monitoring and measurement of Covid-19 typical symptoms: body temperature, ECG heart rate and respiration
- **Materials:** TPU substrates, fabric
- **Solutions:** Printed electronics application

**Henkel potential solution:**
Conductive Inks (silver, silver chloride), diverse adhesives, dry electrode

**Contact us:** printed.electronics@henkel.com
Various technologies available to fulfill medical skin contact applications such as: traditional & advanced wound care, ECG, medical tapes, bandages, surgical drapes, transdermal patches

- Materials / facestocks: PET, polyamide, PE, PVC, PU films, Non-woven fabrics
- Key factors to consider: Length of wear, Breathability, Skin contact/regulations, Sterilization

Henkel potential solution: please contact us psa@henkel.com to get best adhesive recommendation to fulfill your needs

Different technologies:
- Hotmelt adhesives
- UV Acrylics
- Solution Acrylic
- Water Base Adhesives

Grades:
- TECHNOMELT PSM 1540 / 8673
- LOCTITE Duro-tak UV 26105 / 4040
- LOCTITE Duro-tak AH 115 / 235A / 222A / 737/788
- AQUENCE PS 6084-33

All Skin contact adhesives are certified with Biocompatibility ISO 10993 (own testing facilities)
Pharmaceutical Primary Packaging: Blisters / Bottles / Pouches

Various technologies available for Pharma packaging primary applications such as:

- **Blisters**: Heatseal back sheet to blister, Print primer / OPV, Laminate back sheet, Laminate blister
- **Bottles**: Seal Cap liner to package, Laminate layers of cap liner Tack the shrink seal to bottle
- **Pouches**: Breathable laminates for medical & dental instruments, Laminates for IV Bags, Laminates for drug inhalers, Laminates for heat/ice pouch, Heatseal for Breathable Pouches, Coldseal for medical swabs & compresses
- **Materials**: Films: PVC, PVdc, Coated PVC, PET - Paper: treated paper, Foil

**Henkel potential solution**: Please contact us at flexiblepackaging@henkel.com to get best adhesive recommendation to fulfill your needs

**Different technologies** :
- SB and SF PUR
- SB Polyacrylate
- SB vinyl and vinyl acrylic
- WB PUR dispersion
- WB Wet Bond: SBR or EVA
- Extrudable EVA

**Recommended grades**:
- LATISEAL A7734A
- LOCTITE LIOFOL CS 9206
- LOCTITE LIOFOL CS 22-164
- LOCTITE LIOFOL HS 1201
- LOCTITE LIOFOL HS A7922AN
- LOCTITE LIOFOL LA 3640/6800
- LOCTITE LIOFOL PR 8193-21
- TECHNOMELT 36-503
Automated Product Application, Contract manufacturing

Filters, Housings, other re-openable devices

Various parts which requires automated application of one or two component products, especially foamed beads, e.g.

- Exchangeable Filter for masks
- Ozone sanitization system for sterilization
- Containers for disposal of medical sharps

Henkel potential solution:

- Polyurethane Foam, Silicone Foam
- Application Equipment
- Application Service, via adhoc contract manufacturing (prototyping or serial production) in Henkel services sites

Contact: TCS-SSE-Sub@henkel.com

Sealing exchangeable filter elements for masks:
- 2 component PU Foam series FERMAPOR K31
- 2 component Silicone Foam series FERMASIL

Foamed Gaskets on housings (flat surface or groove)
- 2 component PU Foam series FERMAPOR K31

Permanent Bonding / Sealing
- 2 component TEROSON MS-Polymers
- 2 component LOCTITE Silicones
3D Printed Parts

Headband, Fixtures, Jigs

**Various parts** for PPE, Jigs and Fixtures for enhanced application of adhesives, production and prototype parts for fast, low volume manufacturing

- **Materials:** Thermoplastics
- **Build method:** 3DP ... a design file is needed

**Henkel potential solution:**
Engage Application Centers (US /Europe) at loctite3dp@Henkel.com with design, for cost and timing.

**Face shield headband:**
- 3D printed
- PA12
- Various designs individualized
- Fast response with no tooling

**Fixturing for:**
- Medical device assembly
- Adhesive application speed and accuracy
- Fast response, all in one design
- Individualized design possible

*Note: Only for supportive tools or parts without biocompatibility requirements, unless written approval given by the customer*
Henkel solution offers: Wide range of Adhesives tested to ISO 10993 biocompatibility.

- IV Catheters, Blood Collection Sets, Syringes, Lancets, Drug Delivery Devices, Anesthesia, Epidural & Insulin Syringes
- Blood Oxygenators, blood filters, heat exchangers, blood bowls, manifolds, blood pressure transducers, tubing to fittings, connectors, adaptors, ports & Y-connectors, IV sets, blood collection sets, drug infusion sets, feeding tubes
- Balloon to multi-lumen tubing, strain relief or transition of balloon to tube, thermistor potting, urological catheter balloon bonding, angioplasty catheters, drug eluting stents, marker band bonding
Contact us for additional information

na.Henkel-adhesives.com/medicaladhesives