

## Fabric Designation

### **SEFAR<sup>®</sup> Architecture TENARA<sup>®</sup> Fabric 4T40HF**

Material of Construction:	Fluoropolymer-coated fabric woven from ePTFE fiber
Fabric Weight:	1080 grams per square meter 31.9 oz/square yard
Thickness:	0.55 mm/0.022 inch
Width:	1.575 meter/62.0 inch
Tensile Strength* (ASTM D4851)	Warp: 4000 Newtons/5cm 456 pounds/inch Fill: 4000 Newtons/5cm 456 pounds/inch
Trapezoidal Tear: (ASTM D4851)	Warp: 798 Newtons/179 pounds Fill: 752 Newtons/169 pounds
<b>Light Transmission:</b> (ASTM E903, Avg 450-650 nm)	<b>38%</b>
Flammability:	EN 13501 B-s1, DO ASTM E84 – Class A NFPA 701 – Small Scale - Pass

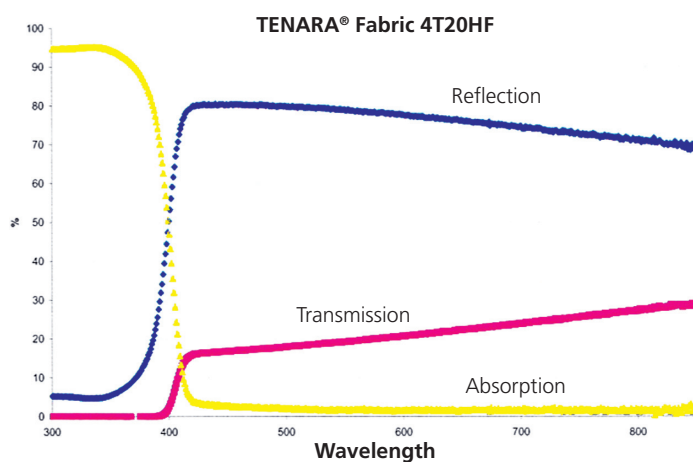
## Fabric Designation

### **SEFAR<sup>®</sup> Architecture TENARA<sup>®</sup> Fabric 4T20HF**

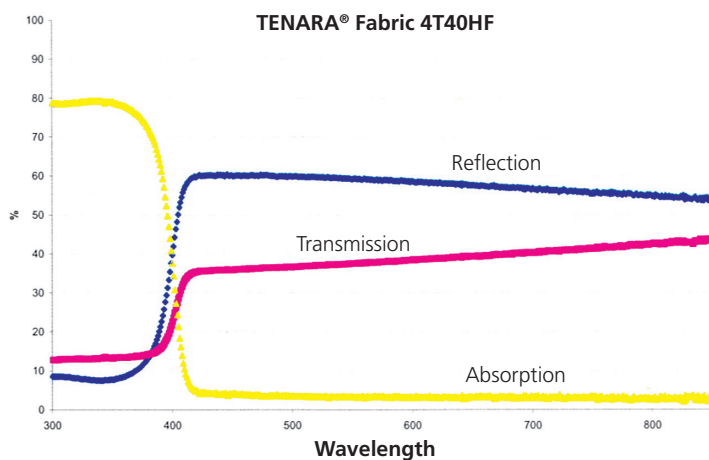
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Trapezoidal Tear: (ASTM D4851)	Warp: 798 Newtons/179 pounds Fill: 752 Newtons/169 pounds
<b>Light Transmission:</b> (ASTM E903, Avg 450-650 nm)	<b>19%</b>
Flammability:	EN 13501 B-s1, DO ASTM E84 – Class A NFPA 701 – Small Scale - Pass NFPA 701 – Large Scale - Pass

## Light Transmission Reflection & Absorption Characteristics

P/N: 4T20HF	Transmission	Reflection	Absorption
Avg. 450-650 nm (visible)	19%	79%	2%
350 nm (UV) (ASTM E903)	<1%	5%	94%



P/N: 4T40HF	Transmission	Reflection	Absorption
Avg. 450-650 nm (visible)	38%	59%	3%
350 nm (UV) (ASTM E903)	13%	8%	79%



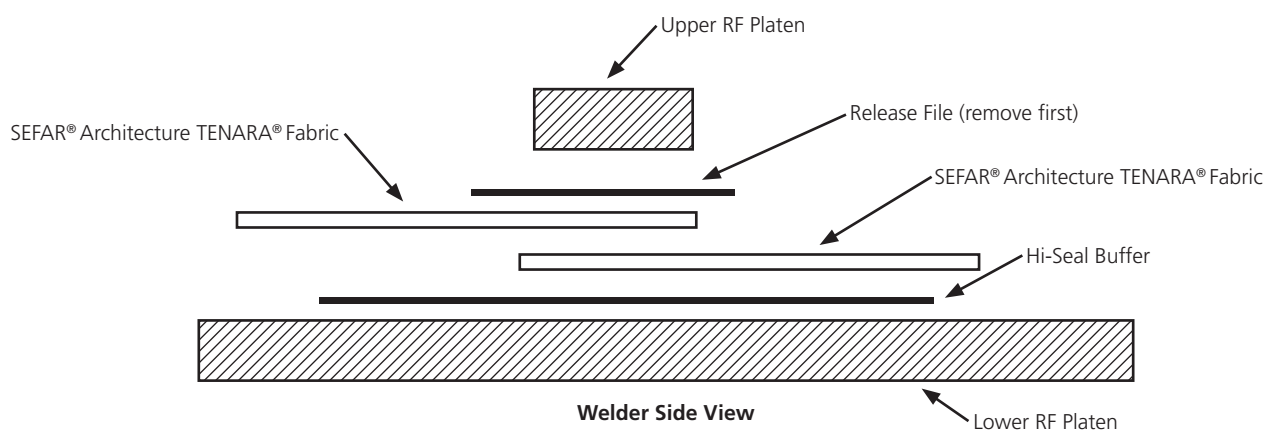
## Flammability Guidelines

SEFAR® Architecture TENARA® Fabric is inherently non-flammable, and does not support a flame. It has been tested in accordance with a number of industry protocols as shown below. If you would like to know if SEFAR® Architecture TENARA® Fabric has been tested in accordance with a particular test not listed below, or require a copy of the test report, please contact us with details.

Test Standard	Results
NFPA 701 Method 1: Flame Propagation of Textiles and Films (4T20HF, 4T40HF tested)	Part 1, small scale - PASS
NFPA 701 Large Scale Test Method #2 4T20HF	PASS
FTM 191A, Method 5902 ASTM D6413: Flame Resistance of Cloth; Vertical Flame Test (Type 2 tested)	After-Flame Time: < 1.5 seconds After-Glow Time: 0 seconds Char Length: 1 inch
ASTM E84 UL 723 ANSI/NFPA 255 UBC 801: Surface Burning Characteristics of Building Materials (4T40 tested)	Flame Spread - 5 or less Smoke Index - 70 or less Meets 'Class A' Flame Spread Rating*. <i>Note: Typical Flame Spread Classification, aka Flame Spread Rating or "Index" definitions are as follows:</i> <i>Class 1 (or A) 0-25 Flame Spread</i> <i>Class 2 (or B) 26-75 Flame Spread</i> <i>Class 3 (or C) 76-200 Flame Spread</i> <i>* Consult local building requirements</i>
DIN EN 13501-1 Includes Single Burning Item (CBI) test according to DIN EN 13823 and ignitability test according to DIN EN ISO 11925-2 (Type 1 and Type 2 tested)	Class: B-s1, d0 Fire behavior: B Smoke production: s1 (Smoke Growth Rate Index SMOGR $\leq 30\text{m}^2/\text{s}^2$ ; Total Smoke Production TSP600 $\leq 50\text{ m}^3$ ) Flaming droplets/particles: d0 (no)
UL 94	All components: UL94 V-O

## Procedure for RF (HF) Welding SEFAR® Architecture TENARA® Fabric

1. SEFAR® Architecture TENARA® Fabric comes with a protective film layer on both sides. This must be removed from the fabric before welding.
2. It is important to insure that the fabric and the RF welding components are clean. Dirt on these surfaces can transfer to the fabric seams during the welding process.
3. See the side-view diagram below for placement of components in the RF welder.
4. Satisfactory welds can be made using Hi-Seal or an equivalent buffer (0.010 inch/0.25 mm thick polyester film-covered paper) on the lower platen, and putting a release film between the upper bar and the fabric. Silicone-coated fiberglass cloth SRC-5 from Saint Gobain Performance Plastics is a typical release film, 0.003 inch/0.08 mm thick PTFE-coated fiberglass fabric also works well.
5. Typical process times are 3 seconds pre-seal, 6 seconds weld, and 3 seconds cool down.
6. It is good practice to have the upper bar temperature controlled for repeatable welds. 158°F/70°C is a typical control temperature.
7. Approximately 1 kilowatt of RF power per 5 square inches/32 square centimeters of weld area is a good estimate of the power required.
8. To insure that a satisfactory weld has been made, test the completed weld for the strength required.



## CLEANING RECOMMENDATIONS

SEFAR® Architecture TENARA® Fabric is 100% fluoropolymer and is naturally self-cleaning. However, additional cleaning procedures can be employed to remove stubborn dirt or stains that could harm people or the environment.

### Overall Cleaning

In general, most contaminants such as dust and dirt can be cleaned with water. If water proves insufficient to clean the fabric, an ammonia or detergent solution can be used, along with a soft brush and a gentle cleaning action. It should not be necessary to aggressively „scrub“ the fabric to remove dirt/ stains. If desired, chlorine bleach solutions can also be used in any concentration without affecting the fabric. „Pressure washers“ should not be used, as their extremely high pressure could damage the fabric.

### Spot Cleaning

First wipe the discoloration off with a clean damp rag by rubbing gently. If this fails to remove the discoloration, apply a liberal amount of cleaning solution (as recommended below) to a clean rag and rub the fabric gently. Use a final water rinse, and allow the fabric to air dry. If desired, dry fabric with a clean rag. This should remove most dirt spots.

*Note: Ammonia and detergents are recommended cleaning agents to try BEFORE isopropyl alcohol, as alcohol will tend to dissolve the contaminant and could cause it to be absorbed into the top fabric layer.*

### Cleaning Agents to Avoid

Solvents are NOT recommended and should not be used, as they may adversely affect the stain by helping to „set it“ into the fabric. Examples include: Ketones, acetone and methylene chloride, paint removers, oven cleaners, or dry cleaning solutions. Abrasive cleaning agents or implements should NOT be used as they could damage the fabric surface.

### Common „Stains“ and Recommended Cleaning Agents

- Amino Acids/Natural fats: Ammonia based products, detergents.
- Common dirt, grease, ink, etc.: Detergents, Isopropyl alcohol.
- Bleach solutions do not affect SEFAR® Architecture TENARA® Fabrics and can be safely used without affecting the performance of the fabric.

*Note: Cleaning agents should be used with care, and if possible tested on a hidden section for adverse affects. Of course appropriate personal protective equipment should be used as recommended by the cleaning manufacturer.*



## Environmental Impact

### Material

SEFAR® Architecture TENARA® Fabric is 100% fluoropolymer with a backbone of high tenacity PTFE yarn. It has the following properties:

- free of chlorine
- no contribution to ozone depletion unlike chlorofluorocarbons (CFC's)
- no contribution to the formation of chloro/bromodioxins or furans ("dioxins")
- free of plastisizers
- free of stabilizers
- free of catalysts

SEFAR® Architecture TENARA® Fabric is therefore harmless to the skin and completely odor-free.

### Lifetime

Due to their extremely strong carbon/fluorine bonds, fluoropolymers have unique properties: excellent chemical resistance, high resistance against extreme temperatures and UV radiation.

These properties make products produced from fluoropolymers extremely durable with long service lives, which has a direct positive influence on our environment.

When a product performs for an extended period of time, the ecological balance of that product is positive to the environment. For example, if a product provides a function for twice the time of an alternative product, the negative impact on the environment is significantly reduced.

### Recycling and Disposal

The ability to recycle and reuse a material is beneficial to our environment and is normally preferred as compared to disposal by landfilling or incineration. Since SEFAR® Architecture TENARA® Fabric is 100% fluoropolymer and does not degrade during its useful life, it can be reprocessed and used in other applications.

We will accept returned uncontaminated SEFAR® Architecture TENARA® Fabric resulting from fabrication scrap or from that used in architectural applications.

PTFE is not classified as hazardous waste in Europe or in the USA.

In a landfill, SEFAR® Architecture TENARA® Fabric is completely inert and will not degrade biologically. Consequently, it cannot contribute to hazardous leachates or gases.

In an incineration plant the materials contained within SEFAR® Architecture TENARA® Fabric are primarily converted to CO<sub>2</sub> and hydro fluoridic acid (HF). The scrubbers in a state of the art municipal incineration plant that is capable of handling halogenated materials can capture the HF. The resulting HF emissions are far below levels that could harm people or the environment.

## STANDARD WARRANTY

Sefar AG warrants its SEFAR® Architecture TENARA® Fabric at time of delivery to be free from material defects which would affect functional performance, and will not be damaged by exposure to sunlight, normal weather conditions or water which would affect functional performance for a period of fifteen (15) years from date of delivery.

Sefar's obligation under this warranty is limited to the purchase price of the original material shipment. Furthermore, it is Sefar's option to provide: an allowance for credit, repair, or replacement of the material which may prove to be defective within the warranty period stated. In the event Sefar is unable to repair or replace the material or to provide an allowance for credit that could be used by the user, Sefar will provide a refund of the original purchase price of the damaged material. The total value of the warranty is limited to the original material invoice amount for the application.

### Warranty Exclusions:

This warranty shall be null and void and does not apply to any product or part thereof that, in Sefar's sole judgment has been subject to misuse, neglect, alteration or accident, abused by machinery, equipment or any persons, been exposed to excessive pressures, acts of God, falling objects, explosions, fire, riots, civil commotion, external forces, faulty or inadequate installation, abrasion, structural shrinkage or distortion of supporting structure, acts of war, radiation, foreign substances in the atmosphere, floods; further, where its use in architectural structures is not in accordance with accepted or recommended design, engineering and manufacturing standards, fabricated with unacceptable practices, or repaired or altered by anyone other than a fabricator schooled in the practices of fabricating SEFAR® Architecture TENARA® Fabric, so as, in Sefar's sole judgment, to affect the quality, efficiency or effectiveness of the product. Furthermore, this warranty shall be null and void and does not apply to any product or part thereof that in Sefar's sole judgment has been fabricated or installed improperly or maintained in a manner not recommended by Sefar, including the use of non-recommended solvent-based cleaning agents, including but not limited to those containing MEK toluene, THF, MIBK butyl acetate, ethyl acetate, acetone. Light transmission color fastness (fading), and micro-organism growth due to poor air circulation are not warranted, unless specifically outlined in a separate provisional warranty.

### Claims:

Any claim made under this warranty shall be made in writing by registered mail to the address listed below no later than thirty (30) days following the discovery of the alleged defect. Failure to notify Sefar within the thirty (30) day period following the discovery of any defect shall render this warranty null and void. Sefar shall be entitled to inspect the product in order to take timely and appropriate action. In the event Sefar representatives (or those acting as agents for Sefar for the purpose of providing a material assessment and evaluation) are denied access to inspection of material for alleged defect, this warranty shall be null and void.



## Limitation of Warranty and Liability:

THIS WARRANTY IS THE WARRANTY WITH RESPECT TO THE PRODUCTS, AND SUPERCEDES ALL OTHER REPRESENTATIONS OR WARRANTIES, UNLESS SUBSEQUENT WARRANTIES ARE EXPRESSLY WRITTEN AND AGREED TO BY SEFAR. SEFAR EXPRESSLY DISCLAIMS ANY IMPLIED WARRANTIES OR MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. SEFAR SHALL NOT BE LIABLE FOR ANY LOSS OF PROFITS OR REVENUE, LOSS OF USE OF EQUIPMENT OR FACILITIES, COST OF CAPITAL, OR FOR ANY OTHER SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES OF ANY NATURE RESULTING FROM OR IN ANY MANNER RELATING TO THE PRODUCTS COVERED HEREBY, THEIR DESIGN, USE, ANY INABILITY TO USE THE SAME OR ANY DELAY IN THE DELIVERY OF THE SAME. THE SOLE AND EXCLUSIVE REMEDY AND THE LIMIT OF LIABILITY WITH RESPECT TO ANY DEFECTIVE PRODUCTS SHALL BE THE REPAIR, CORRECTION AND/OR REPLACEMENT THEREOF, PURSUANT TO THE FOREGOING PROVISIONS.

## Effectiveness of Warranty and Warranty Registration:

This warranty shall become effective only upon receipt of full payment for fabric. The warranty start date is determined by the receipt date of the product shipment from Sefar.

This warranty shall run to the ultimate owner of the product from Sefar, and in the event of a claim, may be assigned to a Fabricator or other contractor, selected by the owner that is schooled in the practices of fabricating structures with SEFAR® Architecture TENARA® Fabric. Owners may transfer this warranty to subsequent owners by providing written notice to Sefar within 30 days after the date of transfer of ownership. The notification should include the location of the product installation, the name and mailing address of the new owners and the date of transfer. The notice should be sent to the address listed below.

Any questions, inquiries or claims under this Warranty shall be directed to:

### Sefar AG

Architecture Solutions  
Hinterbissastrasse 12  
9410 Heiden, Switzerland  
Phone 0041 (0)71 898 51 04  
Fax 0041 (0)71 898 58 71

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