STANDARDS

Philmac 3G® range of compression fittings hold certificates for the following standards:

NSF-61 (USA & Canada), Fitting materials approved for use in drinking water applications.

BS 6920, (United Kingdom and Middle East) Fitting materials approved for use in drinking water applications.

ACS, (France) Fitting materials approved for use in drinking water applications.

AS/NZS 4020, (Australia) Testing of products for use in contact with drinking water.

Philmac 3G® fittings meet the following thread standards

ANSI/ASME B1.20.1, Pipe threads, General purpose (inch).

ASTM F1498, Standard specification for tapered pipe threads 60° for thermoplastic pipe and fittings.

AS/ISO 7.1, Pipe threads where pressure joints are made on the threads. Part 1 Dimensions, tolerances and designations.

3G® fittings meet the requirements of the following codes:

AWWA C800, Underground Service line valves and fittings. Philmac 3G® fittings comply with the relevant dimensional and performance requirements of AWWA C800.

ISO 14236, Plastic pipe and fittings - Mechanical joint compression fittings use with polyethylene pipes in water supply systems

ASTM D2565, UV Resistance, Grade 8. 3G® fittings are rated 8 on a 1 to 8 scale.

Philmac tests the 3G® fitting range using the following test methods:

ASTM D2444, Standard Test Method for Determination of the Impact Resistance of Thermoplastic Pipe and Fittings by Means of a Tup (Falling Weight).

ASTM D1598, Standard Test Method for Time-to-Failure of Plastic Pipe Under Constant Internal Pressure.

ASTM F 1674, Standard Test Method for Joint Restraint Products for Use with PVC Pipe.

ASTM F 2164, Standard Practice for Field Leak Testing of Polyethylene (PE) Pressure Piping Systems Using Hydrostatic Pressure.

3G® fittings are designed for connection to PE pipes and tubes manufactured to the following specifications:

ASTM D2737, Standard Specification for Polyethylene (PE) Plastic Tubing to Copper Tube Size (CTS) dimensions.

ASTM F876, Standard Specification for Crosslinked Polyethylene (PEX) Tubing to Copper Tube Size (CTS) dimensions.

ASTM D2239, Standard Specification for Polyethylene (PE) Plastic Pipe (SIDR-PR) Based on Controlled Inside Diameter (IPS-ID or ID-Series).

ASTM D3035, Standard Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based on Controlled Outside Diameter (IPS-OD or SDR).

ASTM D2447, Standard Specification for Polyethylene (PE) Plastic Pipe, Schedules 40 and 80, Based on Outside Diameter.

ASTM F1282, Standard Specification for Polyethylene/Aluminum/Polyethylene (PE-AL-PE) Composite Pressure Pipe.

ASTM F1281, Standard Specification for Crosslinked Polyethylene/Aluminum/Crosslinked Polyethylene (PEX-AL-PEX) Pressure Pipe.

ASTM B88, Standard Specification for Seamless Copper Tube, Type K, L & M

3G® Engineered for Strength

Philmac 3G® High-Performance Fittings are stronger than the pipe

Under an endload test the length of 2" SIDR pipe failed before the 3G® ID-Series fitting

SYSTEM DESIGN CONSIDERATIONS

There are generally two types of PE pipe fittings; mechanical and thermofusion. Philmac 3G™ Compression fittings a range of mechanical fittings that offers three distinct advantages over thermofusion fittings;

- **More economical**
- **Quick and easy installation**
- **Quick and easy revision to installation**

This section highlights engineering considerations when designing a PE pipe system with Philmac 3G™ Compression fittings.

Projected life of Compression fittings

Whilst Philmac 3G™ Compression fittings conforms to institutionalized specifications written to have a minimum life of 50 years, its compression fittings are intentionally developed to exceed the expectations of these specifications.

Head Losses

To calculate head loss, fittings can be replaced with an equivalent length of pipe. The following formula is used to estimate this equivalent length of PE pipe based on the conveyance of water;

L (feet) = ID (inch) x F
where L = head loss based on equivalent pipe length (feet)
ID = pipe inner diameter (inch)
F = fitting constant

Fitting	Fitting Constant (F)
90° elbow	2.5
90° tee - straight through	1
90° tee - side branch	5

Resistance to Impact

The thermoplastic materials used in the Philmac 3G™ Compression fittings have excellent impact properties.

Abrasion Resistance

Philmac 3G™ Compression fittings are suitable for the transportation of abrasive slurries and will withstand normal conditions found in urban, mining, industrial, rural water and waste water systems.

Weathering

The materials used contain pigments to provide excellent protection to degradation due to ultra-violet radiation. Continuous use of the Philmac 3G™ Compression fittings in systems above ground is therefore permissible without additional protection.

Electrolytic Corrosion - 'Dielectric' fitting

Philmac 3G™ Compression fittings are non magnetizing and does not cause electrolytic deterioration.

Thermal Insulation

Polypropylene has natural thermal insulation of 2000 times over copper and 200 times over steel.

Light Transmission

The all black Philmac 3G™ Compression fittings do not transmit light, thus protecting the water quality in potable water pipelines from growth of micro organizms.

Effect on Water

Philmac 3G™ Compression fittings do not impart to water any odor, taste, color, or any constituents in concentrations that could be injurious to health.

Fluids other than Water

Many factors can affect the chemical resistance of plastics. Some of these include temperature, pressure, exposure time, continuous or cyclic expose and the type of mechanical stress applied. The fact that certain combinations of chemicals and mechanical load can induce stress cracking in many otherwise chemically resistant materials, both metallic and non-metallic, is of particular significance.

Mixtures of chemicals can result in a performance quite different than that of each individual chemical. Equally vapors and corrosive liquids can often be combinations of chemicals.

Due to the number of parameters that influence the performance of metals and plastics in the presence of chemicals and the performance can differ from a laboratory test. Philmac strongly recommends that the final decision be based on the results of a trial installation evaluated under actual service conditions.

Evaluation method

To evaluate the performance of Philmac 3G® fittings in the presence of chemicals, evaluate each materials used in the fitting by using chemical performance tables published by the chemical industry.

Normally only the wetted area of the fitting, ie the body and seal need evaluation. For immersed applications, the nut, split ring and spacer also need evaluation.

Philmac Assistance

To evaluate the performance of a material in the Philmac product in the presence of chemicals please contact Philmac and supply the following five parameters.

Size. What size is the valve or pipe work?

Temperature. What temperature are the chemicals? Is the temperature constant or cycling?

Application. Where and how is the fitting being used? Is the chemical on the inside or is the fitting immersed in the chemical, ie on the outside of the body rather than the inside?

Media. What chemical is being used? Is it a liquid or gas, is it one chemical or are there combinations? Are there surrounding chemicals or gases in the air?

Pressure. What pressure is being applied to the pipe and fitting? Does it vary?

Remember the **STAMP** acronym.

CHEMICAL RESISTANCE

Chemical	Satisfactory	Consult Philmac
Air	▲	
Ammonium Hydroxide	▲	
Alcohol	▲	
Acetone		▲
Auto Transmission Fluid	▲	
Antifreeze	▲	
Benzene		▲
Butane	▲	
Calcium Salts	▲	
Caustic Soda (40% aqueous)	▲	
Cresol		▲
Citric Acid (10% aqueous)	▲	
Copper Salts	▲	
Ethylene Alcohol	▲	
Ethyl Glycol	▲	
Diesel	▲	
Formic Acid		▲
Gasoline		▲
Hydrochloric Acid		▲
Kerosene		▲
Mineral Oils	▲	
Methane	▲	
Methylene Chloride		▲
Nitric Acid		▲
Petroleum Oils	▲	
Sewerage	▲	
Sodium Cyanide	▲	
Sulphuric Acid		▲
Toluene		▲
Turpentine		▲
Transformer Oil	▲	
Zinc Salt Solution	▲	
Note: Fluid Temperature = 68°F		