

# ISO 21809-1:2018

## Technical Summary for Polyolefin External Coatings (3-layer PE and 3-layer PP)

This PDF is a technical summary for engineering review. It highlights the scope, classification logic, selected numeric requirements, and purchase-order controls of ISO 21809-1:2018. It is not a substitute for a licensed copy of the standard.

What the standard covers	Why it matters in projects
Plant-applied external 3-layer polyethylene and polypropylene coatings for welded and seamless steel pipes used in buried or submerged pipeline transportation systems in the petroleum and natural gas industries.	It turns a vague request such as “3LPP coated pipe” into a controlled order basis: coating class, thickness class, cutback, qualification, testing, and release documents.

### Key standard takeaways

- The standard treats 3-layer PE and 3-layer PP as system coatings for buried or submerged pipeline service, with cathodic protection compatibility assumed.
- The coating class is selected from the design temperature range and expected field duty. The coating thickness class is selected from transport, handling, laying, operating, environmental conditions, and pipe dimensions.
- The purchase order is expected to define the bare pipe standard, design and operating temperatures, coating class, thickness class, cutback details, and certificate of compliance.
- The purchaser can add requirements for traceability, APS/ITP approval, incoming pipe inspection, repair qualification, storage/handling procedures, end protection, extra thickness, and special testing.

### Coating classes and design temperature ranges

Coating class	Top layer material	Design temperature range	Typical positioning
A	LDPE	-20 C to +60 C	Lower-temperature PE route.
B	MDPE / HDPE	-40 C to +80 C	Higher PE route with stronger mechanical properties than Class A.
C	PP	-20 C to +110 C	3LPP route for higher-temperature service and/or higher mechanical duty.

Note: Class B or Class C may be selected for higher mechanical properties even when maximum operating temperature alone does not force that choice. The design temperature range includes transport, storage, handling, installation, and operation.

### Minimum total coating thickness - thickness class summary

Bare pipe mass Pm (kg/m)	Class A1 / A2 / A3	Class B1 / B2 / B3	Class C1 / C2 / C3
Pm ≤ 15	1.8 / 2.1 / 2.6 mm	1.3 / 1.8 / 2.3 mm	1.3 / 1.7 / 2.1 mm
15 < Pm ≤ 50	2.0 / 2.4 / 3.0 mm	1.5 / 2.1 / 2.7 mm	1.5 / 1.9 / 2.4 mm
50 < Pm ≤ 130	2.4 / 2.8 / 3.5 mm	1.8 / 2.5 / 3.1 mm	1.8 / 2.3 / 2.8 mm
130 < Pm ≤ 300	2.6 / 3.2 / 3.9 mm	2.2 / 2.8 / 3.5 mm	2.2 / 2.5 / 3.2 mm
Pm > 300	3.2 / 3.8 / 4.7 mm	2.5 / 3.3 / 4.2 mm	2.5 / 3.0 / 3.8 mm

Project note: the standard allows a 10% reduction of total coating thickness on weld seams for SAW welded pipes. Purchasers can also specify higher minimum total thickness than the baseline table values.

# Purchase-order checklist

What ISO 21809-1:2018 expects the purchaser to state

Core order items	Additional purchaser-controlled items
<ul style="list-style-type: none"> <li>• Standard reference and year of publication</li> <li>• Pipe quantity, OD, wall thickness, length, and steel grade</li> <li>• Bare pipe standard (for example, ISO 3183)</li> <li>• Design temperature range and operating temperature</li> <li>• Coating class and thickness class</li> <li>• Qualification scheme (PPT / PQT when required)</li> <li>• Cutback configuration and finish</li> <li>• Type of certificate of compliance</li> </ul>	<ul style="list-style-type: none"> <li>• Pipe tracking and traceability to coating materials</li> <li>• APS / ITP approval</li> <li>• Inspection and testing plan or daily production log</li> <li>• Inspection of incoming pipes</li> <li>• End protection and preservation during storage</li> <li>• Repair qualification and repair limits</li> <li>• Handling and storage procedures</li> <li>• Minimum epoxy or total thickness above the standard minimum</li> <li>• Different methods, frequencies, or acceptance criteria for testing</li> </ul>

## Key definitions that matter in practice

Term	Working meaning in the standard
Design temperature range	Minimum and maximum temperatures likely to be reached during transport, storage, handling, installation, and operation. It can be narrower than the range for the steel pipe or the whole pipeline system.
Operating temperature	Temperature that the pipeline component or system can endure during operation, within the design temperature range.
Cutback	Length of pipe left uncoated at each end for joining purposes.
Inspection certificate 3.1	Document in accordance with ISO 10474 or EN 10204 giving results of coated pipe testing and signed by an authorized representative of the applicator.
PPT / PQT	Pre-production trial and procedure qualification trial used to confirm that the approved application procedure can produce coating with the specified properties.

## Release logic and project implications

- Coating class answers the temperature and field-duty question. Thickness class answers the transport, laying, and environmental severity question.
- If welding or field-joint coating will heat the coated pipe, the purchaser may require additional testing, such as adhesion checks, to confirm compatibility between line-pipe coating and field-joint system.
- The standard is written for contractual clarity. It reduces ambiguity between pipe mill, coating applicator, third-party inspector, and end user by turning coating supply into a controlled set of declared purchase requirements.

## Selected material-property signals from the class system

Property / signal	Class A	Class B	Class C
Adhesive Vicat softening temperature	$\geq 60$ C	$\geq 85$ C	$\geq 110$ C
Top-layer Vicat softening temperature	$\geq 95$ C	$\geq 110$ C	$\geq 130$ C
Top-layer tensile yield strength at 23 C	$\geq 10$ MPa	$\geq 15$ MPa	$\geq 20$ MPa

## How to use this summary

Use this PDF to check whether a project requirement is written clearly enough for inquiry, technical bid review, and inspection planning. For contractual use, qualification, and acceptance, consult the licensed standard and the full project specification.

## Source basis

1) ISO official abstract / catalog page for ISO 21809-1:2018. 2) Public preview pages of ISO 21809-1:2018 used to confirm scope, definitions, purchase-order content, class logic, and thickness table data. This summary does not reproduce the full standard.