

# DIN EN 13492:2018-07 (E)

## Geosynthetic barriers - Characteristics required for use in the construction of liquid waste disposal sites, transfer stations or secondary containment

---

<b>Contents</b>		<b>Page</b>
European foreword .....		5
Introduction .....		6
<b>1</b>	<b>Scope .....</b>	<b>7</b>
<b>2</b>	<b>Normative references .....</b>	<b>7</b>
<b>3</b>	<b>Terms, definitions and abbreviations .....</b>	<b>10</b>
<b>3.1</b>	<b>Terms and definitions .....</b>	<b>10</b>
<b>3.2</b>	<b>Abbreviations .....</b>	<b>12</b>
<b>4</b>	<b>Characteristics and corresponding methods of test .....</b>	<b>13</b>
<b>4.1</b>	<b>General .....</b>	<b>13</b>
<b>4.2</b>	<b>Types of applications .....</b>	<b>13</b>
<b>4.2.1</b>	<b>General .....</b>	<b>13</b>
<b>4.2.2</b>	<b>Application 1: "Base and side barrier" .....</b>	<b>13</b>
<b>4.2.3</b>	<b>Application 2: "Cover barrier" .....</b>	<b>13</b>
<b>4.2.4</b>	<b>Application 3: "secondary containment of liquid waste" .....</b>	<b>14</b>
<b>4.3</b>	<b>Relevant characteristics .....</b>	<b>14</b>
<b>4.4</b>	<b>Characteristics relevant to specific conditions of use .....</b>	<b>21</b>
<b>4.4.1</b>	<b>General .....</b>	<b>21</b>
<b>4.4.2</b>	<b>Gas permeability .....</b>	<b>21</b>
<b>4.4.3</b>	<b>Burst strength and elongation .....</b>	<b>21</b>
<b>4.4.4</b>	<b>Tear strength .....</b>	<b>21</b>
<b>4.4.5</b>	<b>Friction characteristics (direct shear and inclined plane tests) .....</b>	<b>21</b>
<b>4.4.6</b>	<b>Low temperature behaviour .....</b>	<b>21</b>
<b>4.4.7</b>	<b>Weathering .....</b>	<b>22</b>
<b>4.4.8</b>	<b>Resistance to wetting and drying .....</b>	<b>22</b>
<b>4.4.9</b>	<b>Freeze-thaw cycle resistance .....</b>	<b>22</b>
<b>4.4.10</b>	<b>Resistance to root penetration .....</b>	<b>22</b>
<b>4.5</b>	<b>Release of dangerous substances .....</b>	<b>22</b>
<b>5</b>	<b>Assessment and verification of constancy of performance (AVCP) .....</b>	<b>22</b>
<b>5.1</b>	<b>General .....</b>	<b>22</b>
<b>5.2</b>	<b>Type testing .....</b>	<b>23</b>
<b>5.2.1</b>	<b>General .....</b>	<b>23</b>
<b>5.2.2</b>	<b>Test samples, testing and compliance criteria .....</b>	<b>24</b>
<b>5.2.3</b>	<b>Test reports .....</b>	<b>24</b>
<b>5.2.4</b>	<b>Shared other party results .....</b>	<b>24</b>
<b>5.2.5</b>	<b>Cascading determination of the product type results .....</b>	<b>25</b>
<b>5.3</b>	<b>Factory production control (FPC) .....</b>	<b>26</b>
<b>5.3.1</b>	<b>General .....</b>	<b>26</b>
<b>5.3.2</b>	<b>Requirements .....</b>	<b>26</b>
<b>5.3.3</b>	<b>Product specific requirements .....</b>	<b>32</b>
<b>5.3.4</b>	<b>Initial inspection of factory and of FPC .....</b>	<b>32</b>
<b>5.3.5</b>	<b>Continuous surveillance of FPC .....</b>	<b>33</b>
<b>5.3.6</b>	<b>Procedure for modifications .....</b>	<b>33</b>
<b>5.3.7</b>	<b>One-off products, pre-production products (e.g. prototypes) and products produced in very low quantity .....</b>	<b>33</b>

<b>Annex A (normative) Durability of geosynthetic barriers .....</b>	<b>35</b>
<b>A.1 General .....</b>	<b>35</b>
<b>A.1.1 Service Life .....</b>	<b>35</b>
<b>A.1.2 Type testing of durability .....</b>	<b>35</b>
<b>A.1.3 Mechanisms of degradation .....</b>	<b>36</b>
<b>A.1.4 Use of rework material .....</b>	<b>36</b>
<b>A.1.5 Recycled materials .....</b>	<b>36</b>
<b>A.2 Weathering .....</b>	<b>36</b>
<b>A.2.1 General .....</b>	<b>36</b>
<b>A.2.2 Direct tests and accelerated tests .....</b>	<b>37</b>
<b>A.2.3 Period of exposure .....</b>	<b>37</b>
<b>A.3 Products used with a service life up to 5 years .....</b>	<b>38</b>
<b>A.4 Other applications and service life of 25 and 50 years .....</b>	<b>38</b>
<b>A.4.1 General .....</b>	<b>38</b>
<b>A.4.2 Tests for PE type of GBR-P .....</b>	<b>39</b>
<b>A.4.3 Tests for FPO-type of GBR-P .....</b>	<b>40</b>
<b>A.4.4 Tests for EPDM type of GBR-P .....</b>	<b>41</b>
<b>A.4.5 Tests for GBR-P made of PVC-P .....</b>	<b>41</b>
<b>A.4.6 Tests for clay geosynthetic barriers (GBR-C) .....</b>	<b>42</b>
<b>A.5 Durability tests on GBR-P .....</b>	<b>44</b>
<b>A.5.1 Introduction .....</b>	<b>44</b>
<b>A.5.2 Microbiological resistance .....</b>	<b>44</b>
<b>A.5.3 Resistance to environmental stress cracking .....</b>	<b>45</b>
<b>A.5.4 Resistance to leaching .....</b>	<b>46</b>
<b>A.5.5 Resistance to oxidation/thermal ageing .....</b>	<b>48</b>
<b>A.6 Evaluation tests on GBR-P and GBR-C .....</b>	<b>50</b>
<b>A.6.1 General .....</b>	<b>50</b>
<b>A.6.2 Evaluation by comparison of tensile properties .....</b>	<b>50</b>
<b>A.6.3 Evaluation by comparison of oxidative induction time (OIT) values .....</b>	<b>51</b>
<b>A.6.4 Evaluation by change in mass .....</b>	<b>51</b>
<b>A.6.5 Evaluation by change in water permeability .....</b>	<b>51</b>
<b>A.7 Durability tests on GBR-B .....</b>	<b>51</b>
<b>A.7.1 Introduction .....</b>	<b>51</b>
<b>A.7.2 Microbiological resistance .....</b>	<b>52</b>
<b>A.7.3 Resistance to environmental stress cracking .....</b>	<b>52</b>
<b>A.7.4 Resistance to leaching .....</b>	<b>53</b>
<b>A.7.5 Resistance to oxidation/thermal ageing .....</b>	<b>54</b>
<b>A.7.6 Weathering resistance .....</b>	<b>54</b>
<b>A.8 Evaluation tests on GBR-B .....</b>	<b>55</b>
<b>A.8.1 General .....</b>	<b>55</b>
<b>A.8.2 Evaluation by comparison of tensile properties .....</b>	<b>55</b>
<b>A.8.3 Evaluation by change in mass .....</b>	<b>55</b>
<b>A.8.4 Evaluation of water permeability .....</b>	<b>55</b>
<b>A.8.5 Evaluation of flow resistance at elevated temperature .....</b>	<b>56</b>
<b>A.8.6 Evaluation of flexibility at low temperature .....</b>	<b>56</b>
<b>A.8.7 Evaluation of ring and ball softening point temperature .....</b>	<b>56</b>
<b>Annex ZA (informative) Relationship of this European Standard with Regulation (EU) No. 305/2011 .....</b>	<b>57</b>
<b>ZA.1 Scope and relevant characteristics .....</b>	<b>57</b>
<b>ZA.2 System of Assessment and Verification of Constancy of Performance (AVCP) .....</b>	<b>59</b>
<b>ZA.3 Assignment of AVCP tasks .....</b>	<b>59</b>
<b>Bibliography .....</b>	<b>61</b>