

Ind AS Industry Meet -General Insurance Council



29th August 2025



Agenda

Reinsurance Held

- Contract Boundary
- PAA Eligibility
- UoA consistency with Direct side
- NDIC

Materiality and Materiality Thresholds

- Relevant Extracts
- Regulatory provisions
- Key Areas of Materiality







Agenda

Reinsurance Held

- Contract Boundary
- PAA Eligibility
- UoA consistency with Direct side
- NDIC

Materiality and Materiality Thresholds

- Relevant Extracts
- Regulatory provisions
- Key Areas of Materiality







Contract Boundary

What does the standard say?

Para 34

Cash flows are within the boundary of an insurance contract if they **arise from substantive rights and obligations** that exist during the reporting period in which the entity can compel the policyholder to pay the premiums or in which the entity has a substantive obligation to provide the policyholder with insurance contract services (see paragraphs B61–B71). A substantive obligation to provide insurance contract services ends when:

- a) the entity has the **practical ability to reassess the risks** of the particular policyholder and, as a result, can set a price or level **of benefits that fully reflects those risks**; or
- b) both of the following criteria are satisfied:
 - i. the entity has the practical ability to reassess the risks of the portfolio of insurance contracts that contains the contract and, as a result, can set a price or level of benefits that fully reflects the risk of that portfolio; and
 - ii. the pricing of the premiums up to the date when the risks are reassessed does not take into account the risks that relate to periods after the reassessment date.



Contract Boundary

Appendix A of TRG Staff Paper 4 – May 2018

Para A.2

TRG members discussed the analysis in Agenda Paper 3 and observed that:

- a) the application of the requirements in paragraph 34 of IFRS 17 to reinsurance contracts held means that cash flows within the boundary of a reinsurance contract held **arise from the substantive rights** and obligations of the entity—i.e. the holder of the contract, therefore:
 - a) the substantive right is to receive services from the reinsurer; and
 - b) the **substantive obligation is to pay amounts** to the reinsurer.
- a substantive right to receive services from the reinsurer ends when the reinsurer has the **practical** ability to reassess the risks transferred to the reinsurer and can set a price or level of benefits for the contract to fully reflect the reassessed risk or the reinsurer has a substantive right to terminate the coverage.
- accordingly, the boundary of a reinsurance contract held could include cash flows from underlying contracts covered by the reinsurance contract that are expected to be issued in the future.





Contract Boundary – Initial Recognition

What does the standard say?

As per Para 62-62A

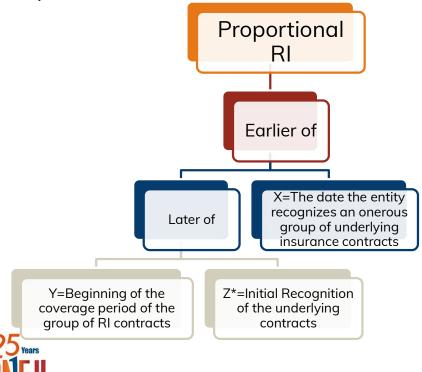


Illustration:

Particulars	Sc 1	Sc 2
a. Coverage Period Start of Underlying contracts	10 Apr 25	10 Apr 25
b. Premium Due for underlying contracts	10 Apr 25	10 Apr 25
c=X. Onerous Recognition of underlying contracts	30 Sep 25	1 Apr 25
Initial Recognition of underlying contracts (Z=min(a,b,c))	10 Apr 25	1 Apr 25
Y. Prop Treaty Coverage Period Start	1 Apr 25	10 Apr 25
Initial Recognition of RI Prop contracts = Min(Max(Y,Z),X)	10 Apr 25	1 Apr 25

Para 25: Z*= Recognition of Insurance contracts

An entity shall recognise a group of insurance contracts it issues from the earliest of the following:

- a) the beginning of the coverage period of the group of contracts;
- b) the date when the first payment from a policyholder in the group becomes due; and
- c) for a group of onerous contracts, when the group becomes onerous.



Contract Boundary – Initial Recognition

What does the standard say?

As per Para 62-62A

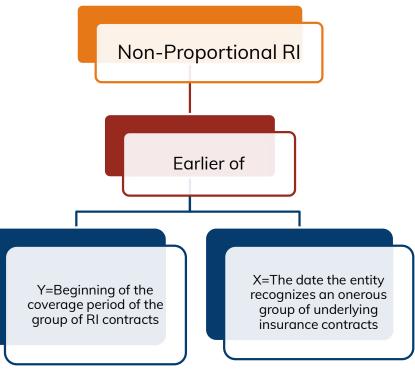


Illustration:

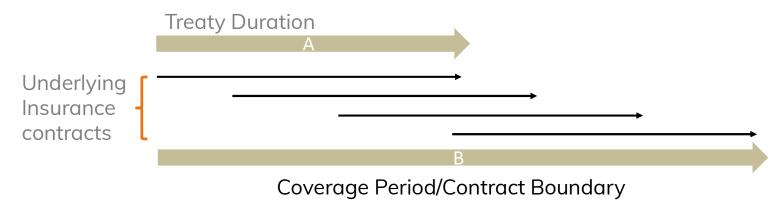
Particulars	Sc 1	Sc 2
X. Onerous Recognition of underlying contracts	30 Sep 25	1 Apr 25
Y. Non-Prop Treaty Coverage Period Start	10 Apr 25	5 Apr 25
Initial Recognition of RI Non-Prop contracts = Min(X,Y)	10 Apr 25	1 Apr 25



Contract Boundary – Determination

Treaty Basis

Risk Attaching – Based on Contract boundary (B) of the underlying contracts



Losses Occurring – Based on the Treaty duration(A) itself



For Losses Occurring, the contract boundary is the treaty duration but for Risk Attaching, it extends beyond the treaty duration. (This is in line with Para 34 of the Standard given in Slide 4)



Contract Boundary – Determination

Cancellation clause

In case of **unilateral** cancellation clauses (say, 90 days cancellation clause) **with both the reinsurer and the insurer**, the contract boundary will not include the contracts post the cancellation period. Any underlying contracts issued post the cancellation period will be a part of the new contract boundary.

Treaty Duration – 1 Year

90 days

Cut-off date to include contracts in the contract boundary



Risk Attaching Basis: If an underlying contract has been written on 90th day, when the cancellation has happened. The contract boundary will continue for underlying contract term in this case 1 year 90 days. Loss Occurring Basis: Contract Boundary of 90 days only



Agenda

Reinsurance Held

- Contract Boundary
- PAA Eligibility
- UoA consistency with Direct side
- NDIC

Materiality and Materiality Thresholds

- Relevant Extracts
- Regulatory provisions
- Key Areas of Materiality







What does the standard say?

Para 69

An entity may use the premium allocation approach set out in paragraphs 55–56 and 59 (adapted to reflect the features of reinsurance contracts held that differ from insurance contracts issued, for example the generation of expenses or reduction in expenses rather than revenue) to simplify the measurement of a group of reinsurance contracts held, if at the inception of the group:

- a) the entity reasonably expects the **resulting measurement would not differ materially** from the result of applying the requirements in paragraphs 63–68; or
- b) the coverage period of each contract in the group of reinsurance contracts held (including insurance coverage from all premiums within the contract boundary determined at that date applying paragraph 34) is one year or less.

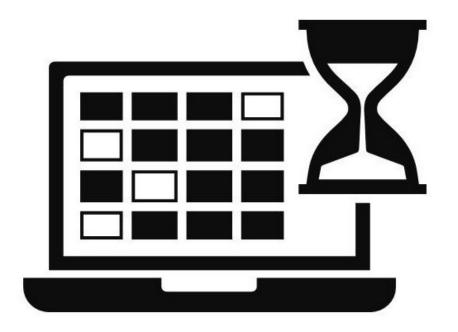
Para 70

An entity cannot meet the condition in paragraph 69(a) if, at the inception of the group, **an entity expects significant** variability in the fulfilment cash flows that would affect the measurement of the asset for remaining coverage during the period before a claim is incurred. Variability in the fulfilment cash flows increases with, for example:

- a) the extent of future cash flows relating to any derivatives embedded in the contracts; and
- b) the length of the coverage period of the group of reinsurance contracts held



Data Availability – a Potential Showstopper!!







PAA Eligibility – Unit of Account

Possible UoAs for cashflow projections

Option 1
 RI Portfolio

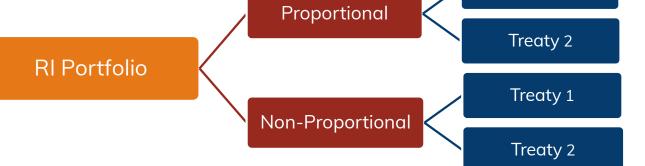
Option 2

RI Portfolio

Non-Proportional

Option 3





Proportional

Treaty 1



Proportional: All Underlying contracts are Profitable

Assumptions ->

Fire Prop Treaty - Risk At	taching:
Treaty duration	1 year
Ceded %	30%
CWP	6,000
Treaty LR	80%
Non Performance Risk (NPR)	3%
Provisional Commission	18%
CWP adj. Prov. Comm.	4,920
MAD	5%
Discount Rate	8%

	Y1	Y2	Y3	Y4	Y5	Y6
Treaty Claim Settlement Pattern	13%	28%	25%	18%	13%	5%

Test Results ->



	Time	BEL	RA	CSM	GMM	PAA	% of ARC-GMM	1 % of adj.CWP
. [0	-928	-160	-1,372	-2,460	-2,460	0.00%	0.00%
	1	-2,960	-148	-1,218	-4,326	-4,305	-0.49%	-0.43%
	2	-2,192	-110	-868	-3,169	-3,075	-2.97%	-1.91%
	3	-1,362	-68	-519	-1,949	-1,845	-5.32%	-2.11%
	4	-465	-23	-171	-659	-615	-6.72%	-0.90%



Adjustments to CSM for Reinsurance Held

Para 65A

If the net cost of purchasing reinsurance coverage relates **to events that occurred before the purchase of the group** of reinsurance contracts held, notwithstanding the requirements of paragraph B5, the entity shall recognise such a cost immediately in profit or loss as an expense.

Para 66A

An entity shall adjust the contractual service margin of a group of reinsurance contracts held, and as a result recognise income, when the entity recognises a loss on initial recognition of an onerous group of underlying insurance contracts or on addition of onerous underlying insurance contracts to a group (see paragraphs B119C-B119E).

Para B119C

Paragraph 66A applies if, and only if, the reinsurance contract held is entered into before or at the same time as the onerous underlying insurance contracts are recognised.

Para B119D

To apply paragraph 66A, an entity shall determine the adjustment to the contractual service margin of a group of reinsurance contracts held and the resulting income by multiplying:

- a) the loss recognised on the underlying insurance contracts; and
- b) the percentage of claims on the underlying insurance contracts the entity expects to recover from the group of reinsurance contracts held.



Proportional: Some underlying contracts are Onerous

Assumptions ->

Fire Prop Treaty - Risk Attaching					
Treaty duration	1 year				
Ceded %	30%				
CWP	6,000				
Treaty LR	80%				
Non Performance Risk (NPR)	3%				
Provisional Commission	18%				
CWP adj. Prov. Comm.	4,920				
MAD	5%				
Discount Rate	8%				

Additional Details	
Loss Component	2,467
Loss Recovery Component	740

	Y1	Y2	Y3	Y4	Y5	Y6
Treaty Claim Settlement Pattern	13%	28%	25%	18%	13%	5%

Test Results ->



	Time	BEL	RA	CSM	GMM	PAA	% of ARC-GMM	% of adj.CWP
•	0	-928	-160	-2,112	-3,200	-3,200	0.00%	0.00%
	1	-2,960	-148	-1,876	-4,984	-4,953	-0.63%	-0.63%
	2	-2,192	-110	-1,337	-3,638	-3,538	-2.75%	-2.03%
	3	-1,362	-68	-799	-2,229	-2,123	-4.76%	-2.16%
	4	-465	-23	-263	-751	-708	-5.84%	-0.89%

Applying Conditions of Ind AS Para 66A, the CSM of the RI Contract held has been adjusted for Loss Recovery Component = -1,372 - 740 = -2,112. (Refer Slide 15 to compare CSM at t=0)



Proportional: Net Gain Treaty

Assumptions ->

Fire Prop Treaty - Risk Att	aching:	
Treaty duration	1 year	
Ceded %	30%	
CWP	6,000	
Treaty LR	150%	
Non Performance Risk (NPR)	3%	
Provisional Commission	18%	
CWP adj. Prov. Comm.	4,920	
MAD	5%	
Discount Rate	8%	
		-

Additional Details					
Loss Component	4,019				
Loss Recovery Component	1,206				
CSM of the Treaty	1,574				
CSM after LoReCo adj.	368				

	Y1	Y2	Y3	Y4	Y5	Y6
Treaty Claim Settlement Pattern	13%	28%	25%	18%	13%	5%

Test Results ->



	Time	BEL	RA	CSM	GMM	PAA	% of ARC-GMM	% of adj.CWP
•	0	-3,734	-301	368	-3,666	-3,666	0.00%	0.00%
	1	-5,550	-277	327	-5,500	-5,360	-2.55%	-2.85%
	2	-4,109	-205	233	-4,081	-3,829	-6.19%	-5.14%
	3	-2,553	-128	139	-2,541	-2,297	-9.61%	-4.96%
	4	-873	-44	46	-870	-766	-12.02%	-2.13%

Applying Conditions of Ind AS Para 66A, the CSM of the RI Contract held has been adjusted for Loss Recovery Component = 1,574 - 1,206 = 368.



Non-Proportional

Assumptions ->

MYML - Risk Attaching:						
Treaty duration	3 years					
Loss Ratio	63%					
CWP	2,000 Millions					
Profit Commission	30%					
Non Performance Risk (NPR)	3%					
RA	5%					
Discount Rate	8%					

	Y1	Y2	Y3
Treaty Claim Settlement Pattern	50%	25%	25%

Amounts in INR Millions

Test Results ->

Time	BEL	RA	CSM	GMM	PAA	% of ARC-GMM	% of CWP
0	164	-74	-241	-151	-151	0.00%	0.00%
1	-143	-64	-206	-413	-468	13.49%	-2.78%
2	-247	-39	-129	-415	-515	24.25%	-5.03%
3	-331	-17	-51	-398	-366	-8.19%	1.63%





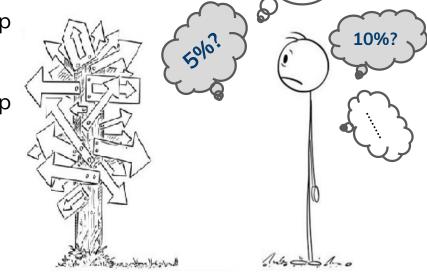
What to

keep?

PAA Eligibility – Materiality Threshold

The following metrics could be used to check significant variability between Asset for Remaining Coverage(ARC) under GMM and PAA -

- $\frac{ARC_{GMM_t} ARC_{PAA_t}}{CWP} < \pm$ **Percentage Threshold** for the Group
- $\frac{ARC_{GMM_t} ARC_{PAA_t}}{AR_{GMM_t}} < \pm$ **Percentage Threshold** for the Group
- $ARC_{GMM_t} ARC_{PAA_t} < \pm Absolute Value$ for the Group

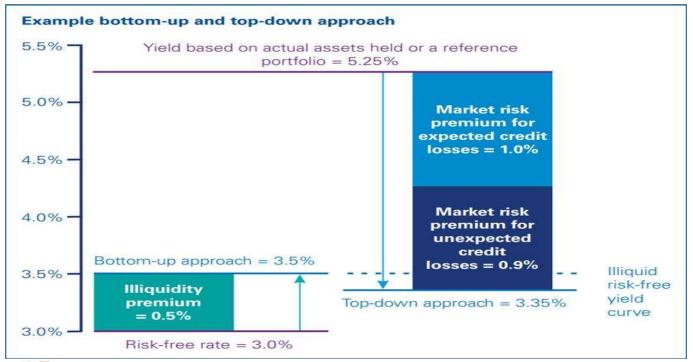






PAA Eligibility – Discounting

Bottom-Up and Top-Down approach



Points to note:-

- 1. The derivation should be consistent to that done for the Direct side
- 2. The discount rate should consider the characteristics of the RI cashflows thus reflecting the differences in the liquidity characteristics of the RI cashflows vis-avis the cashflows of the underlying contracts





PAA Eligibility – Discounting

Locked-In rates

• The Ind AS 117 application guidance states that, when determining the discount rates for initial recognition, "an entity may use weighted-average discount rates over the period that contracts in the group are issued, which applying paragraph 22 cannot exceed one year" [paragraph B73]. When a reinsurance contract covers multiple cession years and all cession years are considered as part of the same contract for Ind AS 117 purposes, the locked-in discount rates for the reinsurance contracts held could be different than the locked-in discount rates for the underlying contracts.

Illustration:

- Underlying insurance contracts issued annually in 2023 and 2024, grouped separately as per Ind AS 117 Para 22 (grouping of contracts cannot exceed one year).
- Reinsurance contract entered on 1 Apr 2023, covering both 2023 and 2024 underlying contracts.
- Locked-in discount rates applied at initial recognition date for all contracts.



Contract Type	Financial Year	Initial Recognition Date	Locked-in Discount Rate*
Direct Contracts	2023	1 Apr 2023	7.0%
Direct Contracts	2024	1 Apr 2024	6.5%
Reinsurance Contract Held	2023-2024	1 Apr 2023	6.75%

^{*}Assuming Uniformly distributed business, locked-in discount rate is considered for direct contracts. Hence, locked-in discount rate for corresponding reinsurance contract is average of both the rates. Discount rate to be selected basis Macauley Duration of liability of underlying contracts.



Agenda

Reinsurance Held

- Contract Boundary
- PAA Eligibility
- UoA consistency with Direct side
- NDIC

Materiality and Materiality Thresholds

- Relevant Extracts
- Regulatory provisions
- Key Areas of Materiality







UoA consistency – RI & Gross

Challenges in synchronizing the UoAs

- For Multiline treaties:
 Follow para 8 of TRG Paper(Feb'18) for unbundling
 Operational complexities in breaking the treaty and measuring separately for the underlying LOBs
- Un-avoidable challenges:
 - Recognition could be different to that of Gross UoA.
 Hence, different Discount curve and earning
 pattern. So, the net results would still not be
 accurate.
 - The measurement model (PAA/GMM) could be different for RI & Gross
- Cohorts can be different for Multiyear treaties.

Challenges in inconsistent

 Business is viewed at a net level (KPI/MIS) hence lack of consistency between Gross and RI results will not give a complete picture





Agenda

Reinsurance Held

- Contract Boundary
- PAA Eligibility
- UoA consistency with Direct side
- NDIC

Materiality and Materiality Thresholds

- Relevant Extracts
- Regulatory provisions
- Key Areas of Materiality







Relevant Extracts from Ind AS 117 standard

Para B31

Paragraph 11(b) requires an entity to separate a distinct investment component from the host insurance contract. An investment component is distinct if, and only if, both the following conditions are met:

- a) the investment component and the insurance component are not highly interrelated.
- b) a contract with equivalent terms is sold, or could be sold, separately in the same market or the same jurisdiction, either by entities that issue insurance contracts or by other parties. The entity shall take into account all information reasonably available in making this determination. The entity is not required to undertake an exhaustive search to identify whether an investment component is sold separately.

Para B32

An investment component and an insurance component are highly interrelated if, and only if:

- a) the entity is unable to measure one component without considering the other. Thus, if the value of one component varies according to the value of the other, an entity shall apply Ind AS 117 to account for the combined investment and insurance component; or
- b) the policyholder is unable to benefit from one component unless the other is also present. Thus, if the lapse or maturity of one component in a contract causes the lapse or maturity of the other, the entity shall apply Ind AS 117 to account for the combined investment component and insurance component.



Relevant Extracts from Ind AS 117 standard

Para 83

An entity shall present in profit or loss insurance revenue arising from the groups of insurance contracts issued. Insurance revenue shall depict the provision of coverage and other services arising from the group of insurance contracts at an amount that reflects the consideration to which the entity expects to be entitled in exchange for those services.

Para 85

Insurance revenue and insurance service expenses presented in profit or loss shall exclude any investment components. An entity shall not present premium information in profit or loss if that information is inconsistent with paragraph 83.





NDIC

- The Non-Distinct Investment Component (NDIC) refers to embedded investment-like components in insurance contracts that cannot be separated from the insurance contract
- These components represent cash flows that would occur **regardless of the insured event**, and therefore **carry no significant insurance risk**, making them not part of pure insurance coverage.

Why NDIC should be excluded from Ind AS 117 P&L?

Appropriate Classification of Revenue and Expense:

• NDIC must be excluded from insurance revenue and service expenses in the Profit & Loss (P&L), since it doesn't involve risk transfer.

Compliance with Ind AS Requirement:

• Ind AS 117 mandates separating the insurance component from non-insurance or investment components to apply correct measurement and appropriate representation

Improved Transparency and Comparability:

• Separating NDIC ensures clearer financial disclosures. Stakeholders can better assess the insurer's returns from pure insurance activity versus embedded non-insurance components, aiding comparability across entities.





Treatment of NDIC – Reinsurance Held

Cash flows that would occur regardless of the insured event will trigger NDIC. It can be part of both Direct Contract (Crop/Other Govt. Policy where minimum LR of the insurer is part of the contract) and RI contract (Proportional Contracts with sliding scale commission).

Below example reflects the treatment of NDIC in PnL and Balance Sheet of Direct Insurer for its RI contract

Assumptions: Proportional treaty with Profit Sharing Model

Treaty Details:						
Gross Premium	5,000					
RI Ceding	20%					
Treaty LR	60%					
Discount Rate	6%					

For calculation of Profit Commission:						
Profit Share	50%					
Reinsurer Profit Loading	5%					
Commission	15%					
Management Expenses	2%					
Maximum Profit Commission	14%					

Year	1	2	3	4
Premium Earning Pattern	25%	25%	25%	25%
Coverage Unit-Pattern	37%	47%	83%	100%
AY- Claims pattern	50%	25%	25%	

	ScenarioWise - Payout									
LR	Fixed Comm	Profit Comm	Payout							
0%	15%	14%	29%							
10%	15%	14%	39%							
20%	15%	14%	49%							
30%	15%	14%	59%							
40%	15%	14%	69%							
50%	15%	14%	79%							
60%	15%	9%	84%							
70%	15%	4%	89%							
80%	15%	0%	95%							
90%	15%	0%	105%							
100%	15%	0%	115%							
110%	15%	0%	125%							
120%	15%	0%	135%							



NDIC= Minimum Payout - Provisional/Min. Commission = 14%



Treatment of NDIC (Sample Balance Sheet and PnL)

Since the example pertains to RI contract there is no change in Gross PnL and BS Comparison of RI PnL and Balance Sheet between IGAAP and Ind AS (PAA):

BS RI Comparison of IGAAP and Ind AS (PAA)									
Particulars	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6		
RI UPR		750	500	250	-	-	-		
ARC - IGAAP (a)		750	500	250	-	-	-		
Less: Prov. Comm. (b)		-113	-75	-38					
ARC - PAA (c = a-b)		638	425	213	-	-	-		
NDIC (d)		105	70	35					
ARC - PAA excl. NDIC (c-d)		533	355	178	-	-	-		
Claims Recoverable-RI OS		75	113	113	113	38	-		
AIC – IGAAP		75	113	113	113	38	-		
Claims Recoverable		71	107	107	107	36	-		
Commsision Recoverable(Profit)		19	41	66	-0	-0	-		
AIC - PAA		90	148	173	107	36	-		



THE THE Expense Companison	The the expense companion of text to and make (1777)							
Particulars	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Total	
RI Earned Premium - IGAAP	250	250	250	250			1,000	
Less: Prov. Comm.	-38	-38	-38	-38			-150	
Less: NDIC	-35	-35	-35	-35			-140	
RI Earned Expense - PAA	178	178	178	178	-	-	710	
PnL RI Recovery Comparison of IGAAP and Ind AS (PAA)								
Particulars	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Total	
Commissions (a)	150	-	-	90	-	-	240	
Recovery- Change in OS (b)	75	38	-	-	-75	-38	-	
Recovery- Paid (c)	75	113	150	150	75	38	600	
Claims Recovery d=(b+c)	150	150	150	150	-	-	600	
Amounts recoverable from reinsurers (a+d) - IGAAP	300	150	150	240	-	-	840	
Claims Paid	75	113	150	150	75	38	600	
Change in AIC PVFCF	69	31	-6	-6	-75	-38	-25	
Profit Commission	19	20	21	23	-	-	83	
Less: NDIC	-35	-35	-35	-35			-140	
Amounts recoverable from reinsurers - PAA	128	129	130	131	-	-	518	
Finance income/ expense – Recoveries	2	5	6	6	4	1	25	
Finance income/ expense - Profit Commission	1	2	3	2	0	0	7	
RI Profit/Loss – IGAAP	50	-100	-100	-10	-	-	-160	
RI Profit/Loss - PAA	-47	- 42	-38	-38	4	1	-160	
							20	

PnL RI Expense Comparison of IGAAP and Ind AS (PAA)



NDIC Impact on Capital Requirements

Capital Requirements as per IRBCF: Calibrated to achieve a 99.5% confidence level over al 1-yr horizon **Premium risk** is the risk of **adverse deviations** in frequency/severity assumptions applied in:

- i. Estimating the URR for unexpired risks (i.e risk corresponding to the UPR)
- ii. In determining premiums for the upcoming year's business

Capital covers worst-case adverse risk events; NDIC reflects favorable scenarios and depends on the specific terms of the contract—especially in GI, as shown earlier.

- ➤ Globally know RBC frameworks such as European Solvency II, the US NAIC Risk-Based Capital (RBC) model, and several others do not link their volume measures used in risk charge calculations to NDIC.
- Correspondingly, the volume measure in IRBCF is defined using NEP—without any adjustments for NDIC—as a proxy only to capture the risk sensitivity of claims losses.



NDIC Impact on Capital Requirements | Illustration #1

Let us consider the below hypothetical illustration to understand better for a 'Reinsurer':

In the prese	nce of NDIC	In the absence of NDIC		
Best Estimate Scenario 99.5 th percentile Adverse Event		Best Estimate Scenario	99.5 th percentile Adverse Event	
100	100	100	100	
10	10	10	10	
5% & 140	7.5% & 140	5% & 140	7.5% & 140	
<mark>70</mark>	<mark>105</mark>	<mark>70</mark>	<mark>105</mark>	
50	50	0	0	
20	55	70	105	
105 – 7	70 = 35	105 – 70 = 35		
	100 10 5% & 140 70 50 20	100 100 10 10 5% & 140 7.5% & 140 70 105 50 50	Best Estimate Scenario 99.5 th percentile Adverse Event Best Estimate Scenario 100 100 100 10 10 10 5% & 140 7.5% & 140 5% & 140 70 105 70 50 50 0 20 55 70	

The capital requirements remain the same regardless of the presence or absence of the NDIC component.

	Risk Charge Factor Calibration		
	If NDIC component is not deducted in the volume	If NDIC component is deducted in the volume	
	measure	measure	
Premium Earnings	100	100	
Volume Measure (V)	100	50 (= 100 – 50)	
Capital Requirement (C)	35	35	
Capital Charge Factor (C / V)	35% (= 35 / 100)	70% (= 35 / 50)	

Since the capital requirement will remain the same, the risk charge factor will need to increase if the volume measure is redefined to exclude the NDIC component.

However, the illustration above assumes NDIC < URR & no profit-sharing when the loss ratio is 70% or higher.



NDIC Impact on Capital Requirements | Illustration #2

Now, let us consider another scenario with below terms in perspective of a 'Reinsurer':

(i) NDIC of 80 (<= the URR)

	In the presence of NDIC		In the absence of NDIC	
ltem	Best Estimate Scenario	99.5 th percentile Adverse Event	Best Estimate Scenario	99.5 th percentile Adverse Event
UPR	100	100	100	100
UPR Exposure in terms of annualized lives (a)	10	10	10	10
Frequency & Severity (b & c)	5% & 140	7.5% & 140	5% & 140	7.5% & 140
URR as per RBC B/s (d = min(a * b * c, e)	<mark>80</mark>	<mark>105</mark>	<mark>70</mark>	<mark>105</mark>
NDIC Component as per terms (e)	80	80	0	0
Remaining Component (f = d - e)	0	25	70	105
Capital Requirement	105 – 80 = 25		105 – 70 = 35	

Capital requirements are reduced in the presence of NDIC, although such arrangements are relatively uncommon in practice.



Profit-commission (PC) Impact on Capital Requirements

Now, let us consider another scenario where profit sharing exists with the below conditions — with a perspective of 'Reinsurer':

- (i) profit-commission of 5% will paid in case of 70% loss ratio
- (ii) profit-commission of 0% will paid in case of 105% loss ratio

ltem	In the presence of Profit Commission		In the absence of Profit Commision	
	Best Estimate Scenario	99.5 th percentile Adverse Event	Best Estimate Scenario	99.5 th percentile Adverse Event
UPR	Rs. 100	100	Rs. 100	100
UPR Exposure in terms of annualized lives (a)	10	10	10	10
Frequency & Severity (b & c)	5% & 140	7.5% & 140	5% & 140	7.5% & 140
Profit Commission (pc = UPR * 5%)	<mark>5</mark>	<mark>0</mark>	<mark>O</mark>	<mark>0</mark>
URR as per RBC B/s (d = a * b * c + pc)	<mark>75</mark>	<mark>105</mark>	<mark>70</mark>	<mark>105</mark>
Capital Requirement	105 – 75 = 30		105 – 70 = 35	

Capital requirement reduces in the presence of profit-sharing, due to its loss-absorbing capacity during extreme events.



Due to the loss-absorbing capacity of the profit-sharing arrangement, provisions have been incorporated to reduce capital charges under both the US NAIC and Solvency II frameworks, albeit through distinct approaches.



Profit-commission Impact on Capital Requirements

Global Practices

US NAIC RBC model (Odomirok, K. C., McFarlane, L. M., Kennedy, G. L., & Brenden, J. J. (2020). Financial reporting through the lens of a property/casualty actuary (Chapter 19). EY.):

US NAIC discounts the volume measure of policies associated with such loss-sensitivity:

- (i) By 30% where such loss-sensitivity is assumed through primary/direct contracts and
- (ii) BY 15% where such loss-sensitivity is assumed through indirect contract such reinsurance programs

The 30% and 15% discounts were calibrated based on an industry-level study of all such loss-sensitive contracts across participating insurers and reinsurers. While US NAIC has provided such provisions mentioned above, the contracts should follow the below strict criteria to satisfy and be part treated as loss-sensitive (These criteria are listed in the NAIC Annual Statement Instructions for Part 7 of Schedule P):

- An increase in losses can lead to an increase in net payment for that policy. In other words, if the loss-sensitive item is not a monetary transaction, the contract is not loss-sensitive.
- The loss-sensitive payment must be at least 75% of the loss on primary business and at least 50% of the loss on reinsurance treaties, before the application of any limits. In other words, if losses on a retrospectively rated workers compensation policy increase by \$10,000, the retrospective premium must increase by at least \$7,500, before the application of loss limits or maximum premium caps.
 - Maximum and minimum premiums, loss limits, and upper and lower bounds on the reinsurance commission may constrain an otherwise loss-sensitive contract. For a contract to be classified as loss-sensitive, the "swing" of the plan must be at least 20% for primary business and 10% for reinsurance treaties. In other words, the net amount payable when the loss experience is the worst possible must be at least 20% greater than the net amount payable when the loss experience is the best possible. For example, a retrospectively rated workers compensation policy with a minimum premium of \$9,000 and a maximum premium of \$10,000 would not qualify as loss-sensitive.

Oicici Combard

Profit-Commission Impact on Capital Requirements

Global Practices (continued..)

- The maximum net payment must be at least 15% greater than the expected net payment for primary business and at least 7.5% greater than the expected net payment for reinsurance treaties. For example, a retrospectively rated workers compensation policy with a minimum premium of \$5,000, an expected premium of \$10,000, and a maximum premium of \$11,000 would qualify as loss sensitive under Criterion 3 but not under Criterion 4.
- The loss-sensitive payments must be either premiums or commissions. In other words, a policy with loss-sensitive policyholder dividends does not qualify as loss-sensitive.
- The losses and the corresponding loss-sensitive payments must flow through the income statement and the balance sheet. In other words, suppose the workers compensation policy has a large dollar deductible of \$100,000. For losses below \$100,000, the insurance company still settles the claim and pays the benefits, but the insured reimburses the insurer for these payments. One might characterize this policy as loss-sensitive, since the greater the losses paid by the insurer, the greater the payments made by the insured. However, these amounts do not flow through the income statement as incurred losses and as premiums, so the contract does not qualify as loss-sensitive.

European Solvency II includes provisions for constructing capital event scenarios and assessing the resulting impact on technical provisions through detailed, ground-up calculations. (European Commission. (2019). Commission Delegated Regulation (EU) 2019/981 of 8 March 2019 amending Delegated Regulation (EU) 2015/35 supplementing Directive 2009/138/EC of the European Parliament and of the Council on the taking-up and pursuit of the business of Insurance and Reinsurance (Solvency II). Official Journal of the European Union, L 164, 1-58. https://eurlex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32019R0981).





Stoploss Impact on Capital Requirements

Now, let us consider another scenario where profit sharing exists with the below conditions — with a perspective of 'Reinsurer':

- (i) Stop loss @102.5%
- (ii) profit-commission of 0% will paid in case of 105% loss ratio

ltem	In the presence of Stop Loss		In the absence of Stop Loss	
	Best Estimate Scenario	99.5 th percentile Adverse Event	Best Estimate Scenario	99.5 th percentile Adverse Event
UPR	Rs. 100	100	Rs. 100	100
UPR Exposure in terms of annualized lives (a)	10	10	10	10
Frequency & Severity (b & c)	5% & 140	7.5% & 140	5% & 140	7.5% & 140
Stop Loss (SL = UPR * 102.5%)	<mark>102.5</mark>	<mark>102.5</mark>	<mark>O</mark>	<mark>0</mark>
URR as per RBC B/s (d = min(a * b * c, SL))	<mark>70</mark>	<mark>102.5</mark>	<mark>70</mark>	<mark>105</mark>
Capital Requirement	105 – 75 = 32.5		105 – 70 = 35	

Capital requirement reduces in the presence of stoploss, due to its loss-absorbing capacity during extreme events.



Solvency II is observed to make provisions for stop-loss arrangements.

However, no explicit adjustments are provided under the U.S. NAIC framework—possibly because the calibration is based on data that already includes stop-loss policies.



Treatment of NDIC – Crop: Cup & Cap

Below example reflects the treatment of NDIC in PnL and Balance Sheet of Direct Insurer for its Crop Portfolio

"Cup & Cap" Model (80:110) – As per PMFBY Guidelines

Particulars	Specifications
Risk Sharing	Insurance Company – up to loss ratio of 110% State Government – loss ratio > 110%
Surplus Sharing	Loss ratio between 0% - 80% - Insurance company retains 20% State Government – remaining (80% - Actual LR)

Assumptions:

Particulars	1	2	3	4
Gross Premium	1000	900	810	
Loss Ratio	60%	90%	120%	
Discount Rate	6%			
Premium Earning Pattern	100%			
Coverage Unit-Pattern	37%	53%	100%	
AY- Claims pattern	50%	50%		



Treatment of NDIC (Sample Balance Sheet and PnL)

Comparison of Gross PnL and Balance Sheet between IGAAP and Ind AS (PAA):

BS Comparison of IGAAP and Ind AS (PAA)							
Particulars	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Gross UPR		-	-	-	-	-	-
LRC - IGAAP (a)		-	-	-	-	-	-
LRC – Ind A (b = a)		-	-	-	-	-	-
NDIC (c)		1368	648	-	-	-	
LRC - PAA excl. NDIC (b-c)		-1368	-648	-	-	-	-
Claims - IBNR & OS		400	405	446	-	-	-
LIC - IGAAP		400	405	446	-	-	-
Claims - IBNR & OS		389	393	433	-	-	-
LIC – PAA		389	393	433	-	-	-

PnL Insurance Service Revenue Comparison of IGAAP and Ind AS (PAA)							
Particulars	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Total
Gross Earned Premium - IGAAP	1000	900	810				2710
Less: NDIC	-800	-720	-648				-2168
Insurance Service Revenue - PAA	200	180	162				542
PnL Gross Insurance Service Exp	ense of	IGAAI	P and I	nd AS	(PAA)		
Particulars	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Total
Claims - Change in OS (a)	400	5	41	-446	-	-	ı
Claims - Paid (b)	400	805	851	446	-	-	2501
Insurance Service Expense (a+b) – IGAAP	800	810	891	-	-	-	2501
Claims Paid	400	805	851	446	-	-	2501
Change in LIC PVFCF	377	-18	15	-446	-	-	71
Less: NDIC	-800	-720	-648	-	-	-	-2168
Insurance Service Expense - Ind AS	-23	67	218	-	-	-	262
Insurance Finance Expense	11	23	24	13	-	-	71
Gross Profit/Loss – IGAAP	200	90	-81	-	-	-	209
Insurance Service Result - PAA	211	90	-80	-13	-	-	209





Agenda

Reinsurance Held

- Contract Boundary
- PAA Eligibility
- UoA consistency with Direct side
- NDIC

Materiality and Materiality Thresholds

- Relevant Extracts
- Regulatory provisions
- Key Areas of Materiality







Materiality – In the context of Reporting Segments

Relevant extracts from the Ind AS Standards

Para 96 of Ind AS 117

Paragraphs 29–31 of Ind AS 1 set out requirements relating to materiality and aggregation of information. Examples of aggregation bases that might be appropriate for information disclosed about insurance contracts are:

- a) type of contract (for example, major product lines);
- b) geographical area (for example, country or region); or
- c) reportable segment, as defined in Ind AS 108, Operating Segments.

Para 30 of Ind AS 1

Financial statements result from processing large numbers of transactions or other events that are aggregated into classes according to their nature or function. The final stage in the process of aggregation and classification is the presentation of condensed and classified data, which form line items in the financial statements. If a line item is not individually material, it is aggregated with other items either in those statements or in the notes. An item that is not sufficiently material to warrant separate presentation in those statements may warrant separate presentation in the notes.



Materiality – In the context of Reporting Segments

Relevant extracts from the Ind AS Standards

Para 13 of Ind AS 108

An entity shall report separately information about an operating segment that meets any of the following quantitative thresholds:

- a) Its reported revenue, including both sales to external customers and intersegment sales or transfers, is 10 per cent or more of the combined revenue, internal and external, of all operating segments.
- b) The absolute amount of its reported profit or loss is 10 per cent or more of the greater, in absolute amount, of
 - the combined reported profit of all operating segments that did not report a loss and
 - ii. the combined reported loss of all operating segments that reported a loss.
- c) Its assets are 10 per cent or more of the combined assets of all operating segments.

Para 14 of Ind AS 108

An entity may combine information about operating segments that do not meet the quantitative thresholds with information about other operating segments that do not meet the quantitative thresholds to produce a reportable segment only if the operating segments have similar economic characteristics and share a majority of the aggregation criteria listed in paragraph 12.





Materiality – In the context of PAA Eligibility

Relevant extracts from the Ind AS 117 Standard

Para 53

An entity may simplify the measurement of a group of insurance contracts using the premium allocation approach set out in paragraphs 55–59 if, and only if, at the inception of the group:

- a) the entity reasonably expects that such simplification would produce a measurement of the liability for remaining coverage for the group that would not **differ materially** from the one that would be produced applying the requirements in paragraphs 32–52; or
- b) the coverage period of each contract in the group (including insurance contract services arising from all premiums within the contract boundary determined at that date applying paragraph 34) is one year or less.

Para 69

An entity may use the premium allocation approach set out in paragraphs 55–56 and 59 (adapted to reflect the features of reinsurance contracts held that differ from insurance contracts issued, for example the generation of expenses or reduction in expenses rather than revenue) to simplify the measurement of a group of reinsurance contracts held, if at the inception of the group:

- a) the entity reasonably expects the resulting measurement would not **differ materially** from the result of applying the requirements in paragraphs 63–68; or
- b) the coverage period of each contract in the group of reinsurance contracts held (including insurance coverage from all premiums within the contract boundary determined at that date applying paragraph 34) is one year or less.



Agenda

Reinsurance Held

- Contract Boundary
- PAA Eligibility
- UoA consistency with Direct side
- NDIC

Materiality and Materiality Thresholds

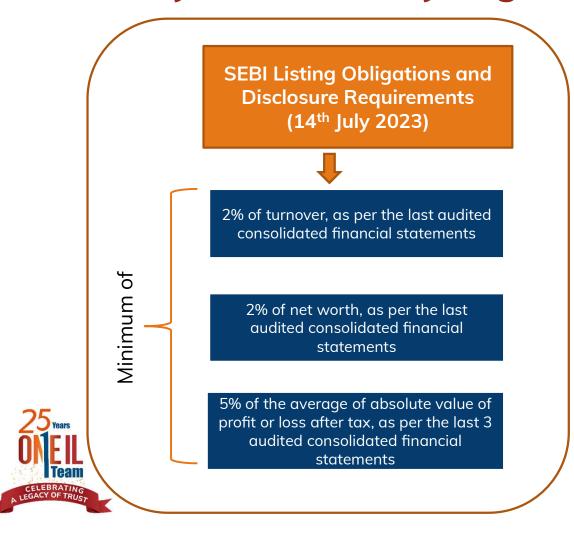
- Relevant Extracts
- Regulatory provisions
- Key Areas of Materiality







Materiality Thresholds by Regulatory Bodies



IRDAI Master Circular (17th May 2024)



If GWP from a new product exceed 10% of total GWP, report separately in financials





Agenda

Reinsurance Held

- Contract Boundary
- PAA Eligibility
- UoA consistency with Direct side
- NDIC

Materiality and Materiality Thresholds

- Relevant Extracts
- Regulatory provisions
- Key Areas of Materiality







- Materiality refers to significance of information related to insurance contracts that, if omitted, misstated or obscured, could reasonably influence decisions of users of financial statements.
- Materiality is judged using
 - Quantitative threshold typically, threshold is a percentage of profit, net worth, turnover, or revenue, and is based on professional judgement and auditor's alignment **guided by extant regulatory provisions defining materiality.**
 - Qualitative threshold This is based on nature and characteristics of the information rather than its size. Even small amounts can be material if they mislead users or obscure important information.

	Area	Judgement Required	Possible Criteria		Materiality Threshold
	Level of Aggregation	 What constitutes a "similar risk" and "managed together" for its specific business. This impacts loss recognition. Materiality of a business segment as a separate LOA in respect of % of the overall business 	 Any business segment more to x% of GWP and not get clubbed with any other portf basis "similar risk and mand together" criteria, should be kep a separate portfolio 		Qualitative / Quantitative
		, <u> </u>	Metric	Threshold	
	Revenue		Cumulative revenue difference by mid-year	>10%	
	Recognition (PAA)	 Judgement required to consider whether recognizing insurance revenue evenly over time 	Revenue variance in any month	>15%	Quantitative
L		would misrepresent the insurance service provided	Profit variance	>5%	



Area	Judgement Required	Possible Criteria	Materiality Threshold
Measurement Approach	 Whether using the PAA would result in materially different liability measurement compared to the GMM Possible Thresholds: ±5% of GWP, ±5% of LRC under GMM, or any other threshold as per company's judgement 	 Globally, large companies have taken 5% of GWP as the materiality threshold to compare the maximum difference between LRC under PAA and GMM across the coverage period of the group of contracts. 	Quantitative
Risk Adjustment (RA)	 Select a method that reflects your internal risk preferences and is consistent with your pricing / capital framework Minimum confidence level or percentile point, if using confidence level approach Level of capital required and cost of capital, if using cost of capital approach 	• Globally, it has been observed that majority of the companies have kept confidence level around the 65 th – 85 th percentile.	Qualitative / Quantitative





Area	Judgement Required	Possible Criteria	Materiality Threshold
Discount Rates	 Choice of methodology: top-down or bottom-up Selection of risk-free rate Minimum illiquidity premium loading , fixed vs variable basis duration Determining discount rates for foreign currencies 	Globally, it has been observed that majority of the non-life insurance companies have followed a bottom-up approach for calculating discount rate	Qualitative
CSM Release Pattern	 Determining if the weighting of coverage units should be simple (e.g., equal weight per year) or more complex weights based on expected value of coverage or risk release, particularly for long- duration contracts. 	 Any material (x%) deviations between both release patterns, period on period basis, can be checked 	Quantitative





Area	Judgement Required	Possible Criteria	Materiality Threshold
Transition Methodology	 The choice depends on the availability of historical information without "undue cost or effort," a phrase that requires considerable judgement For a particular cohort where the percentage of unexpired business is not material, a judgement to adopt FVA needs to be considered, balancing the trade-off between data accuracy (given limitations in data availability) and operational efficiency 	Threshold to be calibrated as a percentage of overall company portfolio	Quantitative
Significant Financing Component	Entities must assess all facts and circumstances to determine if a significant financing component exists and if it significant enough to affect the transition price and hence the revenue recognition	• Investment Component in pricing < 5%	Quantitative





Thank You





Para 25

An entity shall recognise a group of insurance contracts it issues from the earliest of the following:

- a) the beginning of the coverage period of the group of contracts;
- b) the date when the first payment from a policyholder in the group becomes due; and
- c) for a group of onerous contracts, when the group becomes onerous.

Para 62

Instead of applying paragraph 25, an entity shall recognise a group of reinsurance contracts held from the earlier of the following:

- a) the beginning of the coverage period of the group of reinsurance contracts held; and
- b) the date the entity recognises an onerous group of underlying insurance contracts applying paragraph 25(c), if the entity entered into the related reinsurance contract held in the group of reinsurance contracts held at or before that date.

Para 62A

Notwithstanding paragraph 62(a), an entity shall delay the recognition of a group of reinsurance contracts held that provide proportionate coverage until the date that any underlying insurance contract is initially recognised, if that date is later than the beginning of the coverage period of the group of reinsurance contracts held.





Para 55

Using the premium allocation approach, an entity shall measure the liability for remaining coverage as follows:

- a) on initial recognition, the carrying amount of the liability is:
 - i. the premiums, if any, received at initial recognition;
 - ii. minus any insurance acquisition cash flows at that date, unless the entity chooses to recognise the payments as an expense applying paragraph 59(a); and
 - iii. plus or minus any amount arising from the derecognition at that date of:
 - 1. any asset for insurance acquisition cash flows applying paragraph 28C; and
 - 2. any other asset or liability previously recognised for cash flows related to the group of contracts as specified in paragraph B66A.
- b) at the end of each subsequent reporting period, the carrying amount of the liability is the carrying amount at the start of the reporting period:
 - i. plus the premiums received in the period;
 - ii. minus insurance acquisition cash flows; unless the entity chooses to recognise the payments as an expense applying paragraph 59(a);
 - iii. plus any amounts relating to the amortisation of insurance acquisition cash flows recognised as an expense in the reporting period; unless the entity chooses to recognise insurance acquisition cash flows as an expense applying paragraph 59(a);
 - iv. plus any adjustment to a financing component, applying paragraph 56;
 - v. minus the amount recognised as insurance revenue for services provided in that period (see paragraph B126); and
 - vi. minus any investment component paid or transferred to the liability for incurred claims.



Para 56

If insurance contracts in the group have a significant financing component, an entity shall adjust the carrying amount of the liability for remaining coverage to reflect the time value of money and the effect of financial risk using the discount rates specified in paragraph 36, as determined on initial recognition. The entity is not required to adjust the carrying amount of the liability for remaining coverage to reflect the time value of money and the effect of financial risk if, at initial recognition, the entity expects that the time between providing each part of the services and the related premium due date is no more than a year.

Para 59

In applying the premium allocation approach, an entity:

- a) may choose to recognise any insurance acquisition cash flows as expenses when it incurs those costs, provided that the coverage period of each contract in the group at initial recognition is no more than one year.
- b) shall measure the liability for incurred claims for the group of insurance contracts at the fulfilment cash flows relating to incurred claims, applying paragraphs 33–37 and B36–B92. However, the entity is not required to adjust future cash flows for the time value of money and the effect of financial risk if those cash flows are expected to be paid or received in one year or less from the date the claims are incurred.





Para 63

In applying the measurement requirements of paragraphs 32–36 to reinsurance contracts held, to the extent that the underlying contracts are also measured applying those paragraphs, the entity shall use consistent assumptions to measure the estimates of the present value of the future cash flows for the group of reinsurance contracts held and the estimates of the present value of the future cash flows for the group(s) of underlying insurance contracts. In addition, the entity shall include in the estimates of the present value of the future cash flows for the group of reinsurance contracts held the effect of any risk of non-performance by the issuer of the reinsurance contract, including the effects of collateral and losses from disputes.

Para 64

Instead of applying paragraph 37, an entity shall determine the risk adjustment for non-financial risk so that it represents the amount of risk being transferred by the holder of the group of reinsurance contracts to the issuer of those contracts.





Para 65

The requirements of paragraph 38 that relate to determining the contractual service margin on initial recognition are modified to reflect the fact that for a group of reinsurance contracts held there is no unearned profit but instead a net cost or net gain on purchasing the reinsurance. Hence, unless paragraph 65A applies, on initial recognition the entity shall recognise any net cost or net gain on purchasing the group of reinsurance contracts held as a contractual service margin measured at an amount equal to the sum of:

- a) the fulfilment cash flows;
- b) the amount derecognised at that date of any asset or liability previously recognised for cash flows related to the group of reinsurance contracts held;
- c) any cash flows arising at that date;
- d) and any income recognised in profit or loss applying paragraph 66A.





Para 66

Instead of applying paragraph 44, an entity shall measure the contractual service margin at the end of the reporting period for a group of reinsurance contracts held as the carrying amount determined at the start of the reporting period, adjusted for:

- (a) the effect of any new contracts added to the group (see paragraph 28);
- (b) interest accreted on the carrying amount of the contractual service margin, measured at the discount rates specified in paragraph B72(b);
- (ba) income recognised in profit or loss in the reporting period applying paragraph 66A;
- (bb) reversals of a loss-recovery component recognised applying paragraph 66B (see paragraph B119F) to the extent those reversals are not changes in the fulfilment cash flows of the group of reinsurance contracts held;
- (c) changes in the fulfilment cash flows, measured at the discount rates specified in paragraph B72(c), to the extent that the change relates to future service, unless:
 - (i) the change results from a change in fulfilment cash flows allocated to a group of underlying insurance contracts that does not adjust the contractual service margin for the group of underlying insurance contracts; or
 - (ii) the change results from applying paragraphs 57–58 (on onerous contracts), if the entity measures a group of underlying insurance contracts applying the premium allocation approach.
- (d) the effect of any currency exchange differences arising on the contractual service margin; and
- (e) the amount recognised in profit or loss because of services received in the period, determined by the allocation of the contractual service margin remaining at the end of the reporting period (before any allocation) over the current and remaining coverage period of the group of reinsurance contracts held, applying paragraph B119.





Para 66B

An entity shall establish (or adjust) a loss-recovery component of the asset for remaining coverage for a group of reinsurance contracts held depicting the recovery of losses recognised applying paragraphs 66(c)(i)–(ii) and 66A. The loss-recovery component determines the amounts that are presented in profit or loss as reversals of recoveries of losses from reinsurance contracts held and are consequently excluded from the allocation of premiums paid to the reinsurer (see paragraph B119F).

Para B119E

Applying paragraphs 14–22, an entity might include in an onerous group of insurance contracts both onerous insurance contracts covered by a group of reinsurance contracts held and onerous insurance contracts not covered by the group of reinsurance contracts held. To apply paragraphs 66(c)(i)–(ii) and paragraph 66A in such cases, the entity shall apply a systematic and rational method of allocation to determine the portion of losses recognised on the group of insurance contracts that relates to insurance contracts covered by the group of reinsurance contracts held.





Para 67

Changes in the fulfilment cash flows that result from changes in the risk of non-performance by the issuer of a reinsurance contract held do not relate to future service and shall not adjust the contractual service margin.

Para 68

Reinsurance contracts held cannot be onerous. Accordingly, the requirements of paragraphs 47–52 do not apply.

Para B73

To determine the discount rates at the date of initial recognition of a group of contracts described in paragraphs B72(b)–B72(e), an entity may use weighted-average discount rates over the period that contracts in the group are issued, which applying paragraph 22 cannot exceed one year.

Para 22

An entity shall not include contracts issued more than one year apart in the same group. To achieve this the entity shall, if necessary, further divide the groups described in paragraphs 16–21.





Para 29 of Ind AS 1

An entity shall present separately each material class of similar items. An entity shall present separately items of a dissimilar nature or function unless they are immaterial except when required by law.

Para 31 of Ind AS 1

An entity need not provide a specific disclosure required by an Ind AS if the information is not material except when required by law.

Para 12 of Ind AS 108

Operating segments often exhibit similar long-term financial performance if they have similar economic characteristics. For example, similar long-term average gross margins for two operating segments would be expected if their economic characteristics were similar. Two or more operating segments may be aggregated into a single operating segment if aggregation is consistent with the core principle of this Ind AS, the segments have similar economic characteristics, and the segments are similar in each of the following respects:

- a) the nature of the products and services;
- b) the nature of the production processes;
- c) the type or class of customer for their products and services;
- d) the methods used to distribute their products or provide their services; and
- e) if applicable, the nature of the regulatory environment, for example, banking, insurance or public utilities.